SHERMAN HYDRAULIC STUDY
SHERMAN, ILLINOIS

for

Village of Sherman
401 Saint John Dr.
Sherman, Illinois 62684-9780

#08-247

April 29, 2009

Prepared By:
Greene & Bradford, Inc.
3501 Constitution Drive
Springfield, Illinois 62711
(217) 793-8844
Daniel R. Gambill, E.I.T.

Approved By:
Kevin Kuhn, P.E.

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1 INTRODUCTION

Greene and Bradford, Inc. was authorized on December 28, 2008, by the Village of Sherman, to perform a hydraulic study and prepare recommendations for drainage improvements. Four areas were noted as susceptible to frequent flooding by the Village and the Village Engineers, IE Consultants, Inc. These areas are as follows: Flaggland Park, Georgetowne Oaks and Meredith Dr. near the Union Pacific Railroad, Quail Ridge, and All His Children Daycare Center. This report summarizes the hydraulic study completed for each area, the drainage problems found, and the recommendations for improvements to prevent frequent flooding.

2 GEORGETOWNE OAKS, MEREDITH DR., & UNION PACIFIC R.R.

2.1 Overview

Georgetowne Oaks is a subdivision located south of Villa East between Bus. 55 and the Union Pacific Railroad. Two drainage channels (one under Bus. 55 and the other under Georgetowne Rd.) meet at the subdivision and flow southeast toward Meredith Rd. and the U.P. Railroad (Exhibit 1). The culverts under Bus. 55 and Georgetowne Rd. are a 6' x 6' box culvert and an 84" reinforced concrete cylinder pipe (RCCP) respectively. Once the channels merge, the stream passes under a private bridge off Williamsburg Rd. and through a 36" corrugated metal pipe (CMP), a 12' x 8' box culvert under Meredith Dr., a 66" CMP, and a 6' x 3.8' concrete arch culvert under the railroad. The stream then flows south towards the Sangamon River. The drainage areas of the 6' x 6' box under Bus. 55, the 84" RCCP under Georgetowne Rd., and the 6' x 3.8' concrete arch culvert under the U.P. Railroad are 260 ac, 178 ac, and 518 ac respectively (Exhibit 2). A hydraulic survey of the described drainage channel (reach) was completed January 2009.

2.2 Hydraulic Study and Results

Regular flooding has been observed upstream of the Georgetowne Rd. culvert, directly upstream of the private bridge off Williamsburg Rd., and between the private bridge and Meredith Dr. Meredith Dr. has also been flooded near the railroad (Exhibits 3 and 4).

The reach from the private bridge to 1000 ft below the U.P. Railroad concrete arch culvert was modeled using the Army Corps of Engineers' HEC-RAS model. HEC-RAS is capable of modeling flow events through drainage channels, including culverts and bridges. The layout of the model can be found in Exhibit 4. A number of smaller culverts were surveyed and modeled (36" and 66" CMPs) in addition to the 12' x 8' box under Meredith Dr. and the 6'x 3.8' concrete arch culvert under the railroad. The model showed that the small culverts are drowned out during larger flow events and do not contribute significantly to the recorded flooding in Georgetowne Oaks.

The limiting factor in the drainage system is the 6'x 3.8' concrete arch culvert under the U.P. Railroad. This culvert is significantly smaller than the 12' x 8' box culvert under

Meredith Dr. just 500 ft upstream. Under the existing conditions water backs up behind the 6'x 3.8' concrete arch culvert while the railroad embankment acts as a dam. When the backed up water overtops Meredith Dr., it diverts east along the road, through the hole in the railroad embankment created by Meredith Dr., and into a drainage channel on the east side of the railroad.

A house with a walkout basement and a finished floor elevation of 548.28 ft is located just upstream of the 84" Georgetowne Rd. concrete culvert. This culvert was analyzed using Bentley CulvertMaster® v3.2. The 10 yr and 25 yr flow events (265 cfs & 360 cfs) correspond to inlet controlled headwater elevations of 548 ft and 549.3 ft respectively. Meaning, the walkout basement may flood during the 25 yr flow event.

2.3 Recommendations and Estimated Cost

2.3.1 Meredith Rd. & and Union Pacific R.R.

For the existing conditions, a home in Georgetowne Oaks located on Williamsburg Rd. directly upstream of the private bridge (River Sta. 39+39) begins to flood during flow events larger than the 50 yr event and Meredith Dr. floods during flow events larger than the 5 yr event (Exhibit 5). The flood sensitive home in Georgetowne Oaks has a patio with an elevation of 547.57 ft and a finished floor elevation of 549.64. Meredith Dr. floods when the water elevation at River Sta. 27+45 reaches 545 ft. Meaning, the overflow along Meredith Dr. and to the east side of the railroad during flow events larger than the 5 yr event acts as a release valve that keeps Georgetowne Oaks from flooding more often.

A larger culvert opening should be installed under the U.P. Railroad to prevent flooding of Meredith Rd. and Georgetowne Oaks. If the existing concrete arch culvert is left in place, an 8' x 8' box culvert installed next to and at the same grade as the existing arch culvert should prevent homes in Georgetowne Oaks from flood during the 100 yr flow event. Meredith Dr. may flood during the 50 yr flow event (Exhibit 6).

If the existing concrete arch culvert is removed or abandoned, a 12' x 8' box culvert installed at the same grade as the existing arch culvert should prevent homes in Georgetowne Oaks from flood during the 100 yr flow event. Meredith Dr. may flood during the 50 yr flow event (Exhibit 7).

2.3.2 Georgetown Rd.

A second pipe culvert should be installed to prevent flooding upstream of the 84" RCCP under Georgetown Rd. A 72" RCCP laid next to and at the same grade as the existing 84" culvert should prevent flooding up to the 50 yr storm event (470 cfs). See Exhibits 8 & 9 for the existing and proposed model outputs respectively. The additional culvert should not cause an increase in the downstream water surface elevation for a given flow and should not increase the likelihood of flooding for the home immediately downstream.

Nonetheless, the undersized railroad culvert should be addressed before an additional culvert is installed under Georgetowne Rd.

The estimated construction costs for the Georgetowne Rd. and U.P. Railroad culverts are presented in Exhibit 10.

2.3.3 Steeplechase

Steeplechase Subdivision is located south of Meredith Dr. and downstream of the concrete arch culvert under the railroad. The 4th Addition of the subdivision has not yet been constructed, but will be located on the west side of the drainage channel while the rest of the subdivision is on the east side. The road, Aintree Chase, and subsequent bridge connecting the two halves of the subdivision will span the drainage channel. At that location, the upstream drainage area is about 780 acres and the conservative 10 yr and 100 yr flow events are over 700 cfs and 1300 cfs respectively. Considering the significant flows and drainage area, a full hydraulic review of the proposed bridge design should be completed before the bridge is approved. An undersized or under designed bridge at that location will result in flooding upstream and/or failure of the bridge itself. A hydraulic bridge review is beyond the scope of this report.

3 RED BUD & NORTH HAVEN

3.1 Overview

Red Bud and North Haven subdivisions are located between Old Tipton School Rd. and Bus. 55 south of Saint Johns Dr. Two drainage channels (one under Old Tipton School Rd. and the other under Stardust Dr.) meet in Red Bud and flow through the 6' x 6' box culvert under Bus. 55 towards Georgetowne Oaks (Exhibit 11). The channel under Old Tipton School Rd. drains Red Bud Run and parts of the agriculture field west of Old Tipton School Rd. The channel under Stardust Dr. drains the outlet of Flaggland Lake, North Haven and Villa West subdivisions, and part of the agriculture field west of Old Tipton School Rd. The drainage area of the 6' x 6' box culvert under Bus. 55 is 260 ac (Exhibit 12). A hydraulic survey of the area was completed in March 2009.

3.2 Hydraulic Study and Results

Four houses are located in the area and have flood sensitive elevations of between 551.5 ft – 556 ft (Exhibit 13). Regular flooding has been observed between Stardust Dr. and the Bus. 55 box culvert but the homes have flooded very infrequently. The 6' x 6' box culvert under Bus. 55 was analyzed using Bentley CulvertMaster® v3.2. The analysis included downstream flood conditions caused by the undersized arched railroad culvert near Meredith Dr. described and analyzed in Section 2. The high water caused by the arched railroad culvert contributes to the flooding in Red Bud and North Haven during large storm events such as the July 12, 2008 flood. The high water on the downstream side of the culvert (in Georgetowne Oaks) makes the culvert inefficient and contributes to

the high water on the upstream side. The railroad culvert contributes to the flooding upstream of Bus. 55 only during flow events larger than the 50 yr event.

For flow events less than the 50 yr event, the 6' x 6' box culvert under Bus. 55 is the limiting factor that causes high water in Red Bud and North Haven. The headwater elevations for the 50 yr and 100 yr events are 551.2 ft and over 552 ft respectively (Exhibit 14). Meaning, one home may experience limited flooding during flow events larger than the 50 yr event and three homes will experience flooding during flow events larger than the 100 yr event, such as the July 12, 2008 flood.

3.3 Recommendations and Estimated Cost

Installing an additional culvert under the Union Pacific Railroad as described in Section 2.3.1, will minimize flooding during large flow events such as the July 12, 2008 storm. The additional culvert under the railroad will alleviate high water in Georgetowne Oaks and reduce the tailwater effects on the Bus. 55 box culvert. Lower downstream water elevations should allow the 6' x 6' box culvert to flow efficiently during large storm events and reduce flooding upstream of Bus. 55 by 1-1.5 ft depending on the size of the storm event. The Bus. 55 culvert headwater elevation for the 100 yr event should be reduced to 551.3 ft if a larger culvert is installed under the Union Pacific Railroad (Exhibit 15). Meaning, the homes in Red Bud and North Haven should flood only during flow events larger than the 100 yr event.

Installing a second 6' x 6' box culvert next to and on the same grade as the existing box culvert would reduce flooding upstream of Bus. 55 by 1-3 ft depending on the size of the storm event. However, the additional culvert may increase the likelihood of flooding between the railroad and Georgetowne Oaks. Installing an additional culvert under Bus. 55 is not recommended, especially if an additional culvert has not been installed under the Union Pacific Railroad near Meredith Dr as per Section 2.3.1.

4 QUAIL RIDGE

4.1 Overview

Quail Ridge Park is located between the railroad and First St. north of Meredith Dr. and south of Gooseneck Tr. and Grouse Ct. (Exhibit 16). The park has a number of natural springs and is the main drainage way for parts of Quail Ridge and The Prairie at Brookside Glen subdivisions (Exhibit 17). The water flows south through twin 30" CMPs under a dirt berm and an 8' x 5' box culvert under Meredith Dr. and towards the Sangamon River. The berm over the 30" CMPs creates a detention pond that covers half of Quail Ridge Park during large storm events.

Quail Ridge Park remains wet and swampy most of the year due to the natural springs and the unmaintained and undefined nature of the channel. Grading work prepared by IE Consultants was ongoing during the winter of 2008-2009 and designed to alleviate the

flooding issues by creating a uniform channel to increase conveyance. The ongoing grading project extends from the north end of the park to the twin 30" CMPs, which are located 350 ft upstream of Meredith Dr. The proposed channel should effectively drain the natural spring water and low flow events if it is properly maintained. Vegetation should be established as quickly as possible to prevent erosion. The channel and floodplain should be mowed regularly and cleared of debris to maintain adequate conveyance. The twin CMPs should be cleaned and cleared of debris.

4.2 Hydraulic Study and Results

The drainage way was modeled from the north end of the park to 500 ft below the 8' x 5' box culvert under Meredith Dr. using the Army Corps of Engineers' HEC-RAS model (Exhibit 18). Survey data collected in February 2009 was used to supplement the channel design proposed by IE Consultants. At the time of the survey, the twin 30" CMPs were partially buried and full of dirt and debris.

Under existing conditions the detention berm over the twin 30" CMPs (clear of dirt and debirs) is overtopped during the 100 yr storm event (Exhibit 19). The 8' x 5' box under Meredith Dr. is sized appropriately. The twin 30" CMPs are sized appropriately but are placed at an insufficient grade to prevent overtopping of the detention berm. The resulting high water is contained within the park and backyards of the adjacent homes and doesn't cause structural flooding. Homes, many with walkout basements, line the east and north sides of the park but the finished floor elevations of all the homes are at least 4 ft above the 100 yr water surface elevation.

4.3 Recommendations and Estimated Cost

The swampy nature of the park is being addressed by the ongoing grading and channelization project. The proposed channel should provide adequate drainage as along as it is properly vegetated and maintained. The twin 30" CMPs should be re-laid to the originally designed grade to prevent overtopping during the 100 yr event.

The detention pond created by the berm will need to be addressed if the proposed addition of Quail Ridge is completed by extending Pheasant Run south between the railroad and Quail Ridge Park (Exhibit 16). The proposed lots located at the southern end of the addition will be located next to the twin 30" CMPs and may be within the 100 yr event floodplain. The proposed finished floor elevations of the new homes should be at least 1 ft above the 100 yr water surface elevation. A specific recommendation can not be provided until the final plans of the proposed subdivision extension are accepted.

The estimated construction costs for the Quail Ridge recommendation is presented in Exhibit 20.

5 ALL HIS CHILDREN DAYCARE CENTER

5.1 Overview

All His Children Daycare Center is located at 615 St. Johns Dr. in Sherman. The Daycare Center sits between Bus. 55 and the railroad. The Daycare Center and nearby drainage network was surveyed in January 2009. The building has a walkout basement with a finished floor elevation of 562.28 ft. An open drainage channel is located behind the Daycare Center and flows south through triple 60" CMPs about 200 ft downstream (Exhibit 21). The drainage area of the triple CMPs is approximately 147 acres and extends north to Andrew Rd. between Middleburg Dr. and First St (Exhibit 22). A single 60 inch CMP empties into the drainage channel directly upstream of the Daycare Center.

5.2 Hydraulic Study and Results

Bentley CulvertMaster® v3.2 was used to analyze the triple 60" CMPs. The 50 yr flow event (410 cfs) corresponds to an inlet controlled headwater elevation of approximately 562 ft (Exhibit 23). Given the steep slope of the channel upstream and downstream of the triple culverts, the inlet of the triple culverts is the limiting factor. The finished floor of the basement (562.28 ft) floods at approximately the 50 yr flood event (562 ft).

5.3 Recommendations and Estimated Cost

The walkout basement of All His Children Daycare Center is located within the floodplain of the drainage channel. The back side of the Daycare Center itself forms the west bank of the channel and the railroad embankment forms the east side of the channel at flood stage. The location of the building and the low elevation of the walkout basement limit what can be done to prevent flooding.

Option 1 is to install a forth 60" CMP next to, and on the same grade as the existing triple 60" CMPs. This should lower the headwater elevations for all flow events and prevent flooding of the Daycare Center during the 100 yr storm event (Exhibit 24). However, the addition of a forth 60" CMP may increase the frequency of flooding at the 84" RCCP under Georgetown Rd. Georgetown Rd. and the nearby flood susceptible residence (See Section 3.2) are directly downstream of the outlet of the triple 60" CMPs.

Option 2 involves installing a 12' x 6' box culvert extending from north of the Daycare Center to the existing inlet of the triple 60" CMPs (Exhibit 25). The single 60" CMP located directly north of the Daycare Center would be extended and connected to the box culvert. The box culvert and all pipe junctions would be buried with fill and graded to match the surrounding area. This option would move the inlet of the culvert drainage system north of the Daycare Center and bury the existing open channel. Any rise in the water surface elevation due to the culvert system would be located at the inlet of the box culvert and remain upstream of the Daycare Center. However, consideration should be made for the headwater effects at the box culvert inlet and the potential of flooding upstream structures such as Good Shepherd Lutheran Church located at 6086 Bus. 55.

Also, there may be insufficient space between the railroad and the Daycare Center to place a 12' x 6' box culvert without disturbing the embankment or the Daycare's backyard playground.

These are only two of many options the Village could implement. There are no cost effective solutions to prevent flooding at the Daycare Center. A walkout basement is inappropriate for that location. The potential for flooding would have been obvious at the time of construction. The engineering effort required to remedy this, largely private, issue is a significant amount and outside the scope of this report.

The estimated construction costs for both options are presented in Exhibit 26.

6 FLAGGLAND PARK

6.1 Overview

Flaggland Park is located on the southeast corner of Old Tipton School Rd. and Andrew Rd. Five areas within the subdivision flood regularly; (1) the corner of Flaggland Dr. and Westhampton Dr., (2) Old Tipton School Rd. between Flaggland Dr. and Portland Dr., (3) the corner of Flaggland Dr. and Middelburg Dr., (4) the corner of Trenton Dr. and Rutgers Dr., and (5) the corner of Westhampton Dr. and Trenton Dr. (Exhibit 27).

Flaggland Park was surveyed in January 2009. At that time, the storm sewer drainage systems and drainage areas were mapped. The subdivision drains into Flaggland Lake through two storm sewer networks (Exhibits 28 & 29). The smaller network runs south along Old Tipton School Rd. and east along Flaggland Dr. for one block before emptying into the west side of Flaggland Lake via a drainage ditch. This network drains 34 acres of farmland and parts of Old Tipton School Rd., Flaggland Dr., and Westhampton Dr. The larger network drains the rest of the subdivision, including the park, and empties into the east side of Flaggland Lake via Upper Flaggland Lake (Exhibit 30).

6.2 Hydraulic Study and Results

The small network was analyzed using the Rational Method. The analyses for the existing and proposed network are shown in Exhibits 31 & 32 respectively. Many of the pipes in the network lie at little to no slope. The lack of a grade makes the network inefficient. During a relatively small storm event (5yr) there is no capacity to convey the large runoff flows from the farm field located west of Old Tipton School Rd. In the past, water has run over Old Tipton School Rd. and into the garages and basements of the homes located across the street from the farm field runoff inlet (Area 2). The drainage ditch into which the small network drains has a mild slope and is only 1.5 ft deep. As a result, tail water conditions limit the effectiveness of the sewer system during flood events.

The large network was also analyzed using the Rational Method. The analyses for the existing and proposed network are shown in Exhibits 33 & 34 respectively. The pipes are generally undersized to handle the 5yr storm event. The 5 yr event is generally considered the minimum storm event upon which to design. Undersized pipes likely cause the flooding that frequently occurs at the corner of Trenton Dr. and Rutgers Dr. (Area 4). The flooding at the corner of Westhampton Dr. and Trenton Dr. (Area 3) is due to the inadequate number of sewer inlets located at that intersection. Four or five inlets are needed to efficiently drain the 5yr storm event but there are only three. In addition, the network outlet is partially submerged by Upper Flaggland Lake, which slows the flow of water out of the network.

6.3 Recommendations and Estimated Cost

6.3.1 Small Storm Sewer Network

The small network is overloaded by the runoff from the farm field west of Old Tipton School Rd. and inefficient due to mild pipe slopes and tail water effects at the network outlet. Our solution for the small sewer network includes two phases. Phase 1 is to re-grade the drainage ditch that connects the network outlet to Flaggland Lake (Exhibit 35). Re-grading the ditch to a deeper, steeper channel should reduce tailwater effects at the network outlet and increase the flow rate. Phase 1 is designed to alleviate flooding at the corner of Flaggland Dr. and Westhampton Dr. (Area 1).

Phase 2 involves diverting the farm field runoff around the existing sewer network and into the re-graded drainage ditch (See Phase 1). Phase 2 is designed to alleviate flooding at Area 2. Two options are available. Option 1 involves re-grading the roadside ditch on the west side of Old Tipton School Rd. from Structure 1 to a new inlet, Structure 1b. The runoff would flow down the roadside ditch, enter a 30" pipe at Structure 1b, and flow under the road and, to the re-graded drainage ditch leading to Flaggland Lake (Exhibit 36).

Option 2 is to pipe the farm field run-off from the existing inlet at Structure 1 around to the Flaggland Lake drainage ditch. The pipe would run from the existing inlet, south along the west side of Old Tipton School Rd., and then east under the road and into the ditch (Exhibit 37). Option 1 and Option 2 are similar but the former would utilize the roadside ditch and reduce the required pipe length by half. Options 1 and 2 would also require the Village to obtain drainage easements.

Option 3 for Phase 2 involves constructing a detention pond to capture the farm field runoff and release the water slowly into the existing sewer system (Exhibit 38). The detention pond would be located on the west side of Old Tipton School Rd. and would require the Village to purchase the necessary land to accommodate the detention pond.

The estimated construction costs for the Flaggland Small Storm Sewer Network recommendations are presented in Exhibit 39.

6.3.2 Large Storm Sewer Network

The pipes of the large network are generally undersized to handle the 5yr storm event and inefficient due to mild pipe slopes and tail water effects at the network outlet. Our solution for the large sewer network includes three phases.

Phase 3 involves lowering the water surface elevation of Upper Flaggland Lake in order to reduce tailwater effects at the network outlet. Twin 18" concrete culverts connect Upper Flaggland Lake to Flaggland Lake (Exhibit 40). The lay of the culverts cause the water surface elevation of Upper Flaggland Lake to be at least 0.7 ft higher than the water surface elevation of Flaggland Lake. Lowering the water surface elevation of Upper Flaggland Lake will reduce tailwater effects at the network outlet and increase the flow rate. Dredging Upper Flaggland Lake may be necessary due to the lowered pool water surface elevation. Phase 3 also involves breaking the large Flaggland sewer network into two separate networks, the east and west networks (Exhibit 41). The east network includes the sewer system that runs along Rutgers Dr., the east side of Flaggland Park, and Middleburg Dr. The west network includes the sewer system that runs along Trenton Dr., Baylor Ct., and the west and south sides of Flaggland Park. The system will be separated between Structures 19 and 30. A new 30" pipe will be installed from Structure 19 to Upper Flaggland Lake to provide an outlet for the west network. The 24" pipe from Structure 37 to Upper Flaggland Lake will be replaced with a 30" pipe. Phase 3 is designed to alleviate flooding at the intersection of Flaggland Dr. and Middleburg Dr. (Area 3) and increase the efficiency of the drainage system.

Phase 4 involves replacing sections of the existing pipes of the east network under Flaggland Park with larger pipes. The existing sewer from Structures 26 to 30 should be replaced with 24" pipes (Exhibit 42). Phase 4 work on the east network should fix the flooding issues at the corner of Trenton Dr. and Rutgers Dr. (Area 4).

Phase 5 is required to alleviate flooding at the intersection of Westhampton Dr. and Trenton Dr. (Area 5). The work involves installing an additional inlet and structure (Structure 12b) on the west side of Westhampton Dr. next to Structure 12. An additional inlet will allow more water to enter the sewer system without pooling in the intersection. Unfortunately the pipes between Structures 14 and 19 are undersized. In order to take advantage of the additional sewer inlet the pipe between Structures 14 and 15 should be replaced with a 24" pipe and the pipes between Structures 15 and 18 and between 18 and 19 should be replaced with 30" pipes (Exhibit 43).

The estimated construction costs for the Flaggland Large Storm Sewer Network recommendations are presented in Exhibit 44.

7 CONCLUSIONS AND SUMMARY

A summary of the recommended improvements follows:

Drainage Problem	Phase #	Option #	Location	Proposed Probability of Flooding	Priority
Meredith Dr. @ Railroad	*	Option 1	Union Pacific Railroad South Meredith Dr.	2%	1
		Option 2			
Flaggland Park Small Network	Phase 1	-	West Side O Flaggland Lak	20%	2
	Phase 2 *	Option 1	Old Tipton Sch Rd. Between Portland Dr. A Flaggland Dr	20%	3
		Option 2			
		Option 3			
Flaggland Park Large Network	Phase 3	-	Corner Of Flaggland Dr. A Middleburg D	20%	4
	Phase 4	-	Flaggland Pa	20%	5
	Phase 5	-	Trenton Dr. A Westhamption	20%	6
Georgetowne Rd.	-	-	Georgetowne	2%	7
Quail Ridge	-	-	Quail Ridge Pa	1%	8
All His Children Daycare Center	*	Option 1	Drainage Ditc Between Dayc and UP Railro	1%	9
		Option 2			
Red Bud & North Haven	-	-	Red Bud An North Haven N Bus. 55	< 1%	-

Probability Of Flooding: The Probability That Flooding

(*): Denotes More Than One Option For Resolving A

Installing a 72" RCCP under Georgetowne Rd. and an 8' x 8' box culvert under the railroad to supplement existing drainage culverts should alleviate frequent flooding from Georgetowne Rd. to Meredith Dr. The additional box culvert under the railroad will also reduce the frequency of flooding upstream of Bus. 55 in Red Bud and North Haven Subdivision. The 8' x 8' box culvert should be installed before work on the 72" RCCP begins. Option 2 for the railroad, a 12' x 8' box culvert, is only required if the existing concrete arch culvert is removed, which should not be necessary.

The ongoing grading and channelization of Quail Ridge Park is addressing the frequent standing water and swampy nature of the green space. The proposed channel should provide adequate drainage as along as it is properly vegetated and maintained. The twin 30" CMPs should be re-laid to a steeper grade to prevent overtopping of the detention berm during the 100 yr event. The detention pond created by the berm should need to be studied if the proposed addition of Quail Ridge is completed by extending Pheasant Run south between the railroad and Quail Ridge Park to make sure the new homes will not be flooded during large flow events.

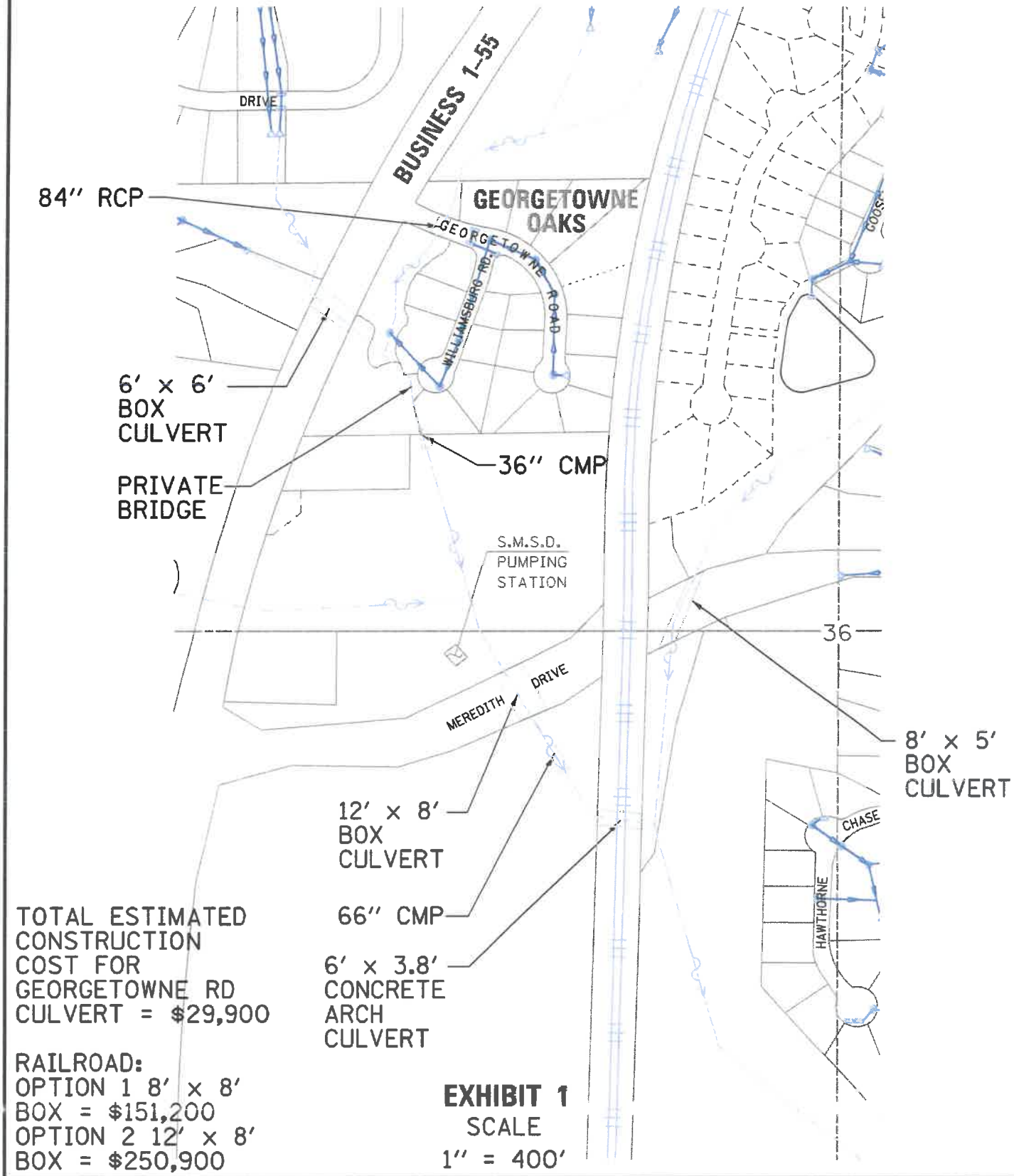
The walkout basement of All His Children Daycare Center is located within the floodplain of the drainage channel. The drainage ditch has been widened at this location so that the back side of the Daycare Center forms the west bank of the channel and the railroad embankment forms the east side of the channel at flood stage. There are no cost effective solutions due to the location of the building and the fact that the walkout basement is within the flood plain. Option 1 is to install a forth 60" CMP next to, and on the same grade as the existing triple 60" CMPs. However, the addition of a forth 60" CMP may increase the frequency of flooding at Georgetowne Rd. Option 2 would move the inlet of the culvert drainage system north of the Daycare Center and bury the existing open channel in a 12' x 6' box culvert. However, consideration should be made for the headwater effects at the box culvert inlet and the potential of flooding upstream structures such as Good Shepherd Lutheran Church located at 6086 Bus. 55.

The completion of recommended phases 1-5 should improve drainage in Flaggland Park Subdivision and alleviate frequent flooding at the five areas of concern; (1) the corner of Flaggland Dr. and Westhampton Dr., (2) Old Tipton School Rd. between Flaggland Dr. and Portland Dr., (3) the corner of Flaggland Dr. and Middelburg, (4) the corner of Trenton Dr. and Rutgers Dr., and (5) Dr the corner of Westhampton Dr. and Trenton Dr. The completion of Phase 2, Option 1 is preferable to Option 2 or Option 3. Options 1 and 2 divert the agricultural runoff around the existing sewer network but Option 1 is half the cost of Option 2. Option 3 is also comparatively costly and would require the Village to buy the necessary land and take responsibility for the maintenance and up-keep of the detention pond.

EXHIBITS

GEORGETOWNE OAKS, MEREDITH DR., & U.P. RAILROAD

EXHIBITS



TOTAL ESTIMATED CONSTRUCTION COST FOR GEORGETOWNE RD CULVERT = $29,900

RAILROAD:
OPTION 1 8' x 8' BOX = $151,200
OPTION 2 12' x 8' BOX = $250,900

EXHIBIT 1
SCALE
1" = 400'

GREENE & BRADFORD, INC.
OF SPRINGFIELD
CONSULTING ENGINEERS
3501 CONSTITUTION DRIVE
SPRINGFIELD, ILLINOIS 62711
PROFESSIONAL DESIGN FIRM NO. 184-001179
PROFESSIONAL & STRUCTURAL ENGINEERING CORPORATION
(217) 793-8844, 793-6227 (F), E-MAIL - cad@greeneandbradford.com

LOCATION MAP

VILLAGE OF SHERMAN
GEORGETOWNE OAKS AND
MEREDITH DR AT RAILROAD

COMPUTER FILE NO.
Exhibit 1.dgn

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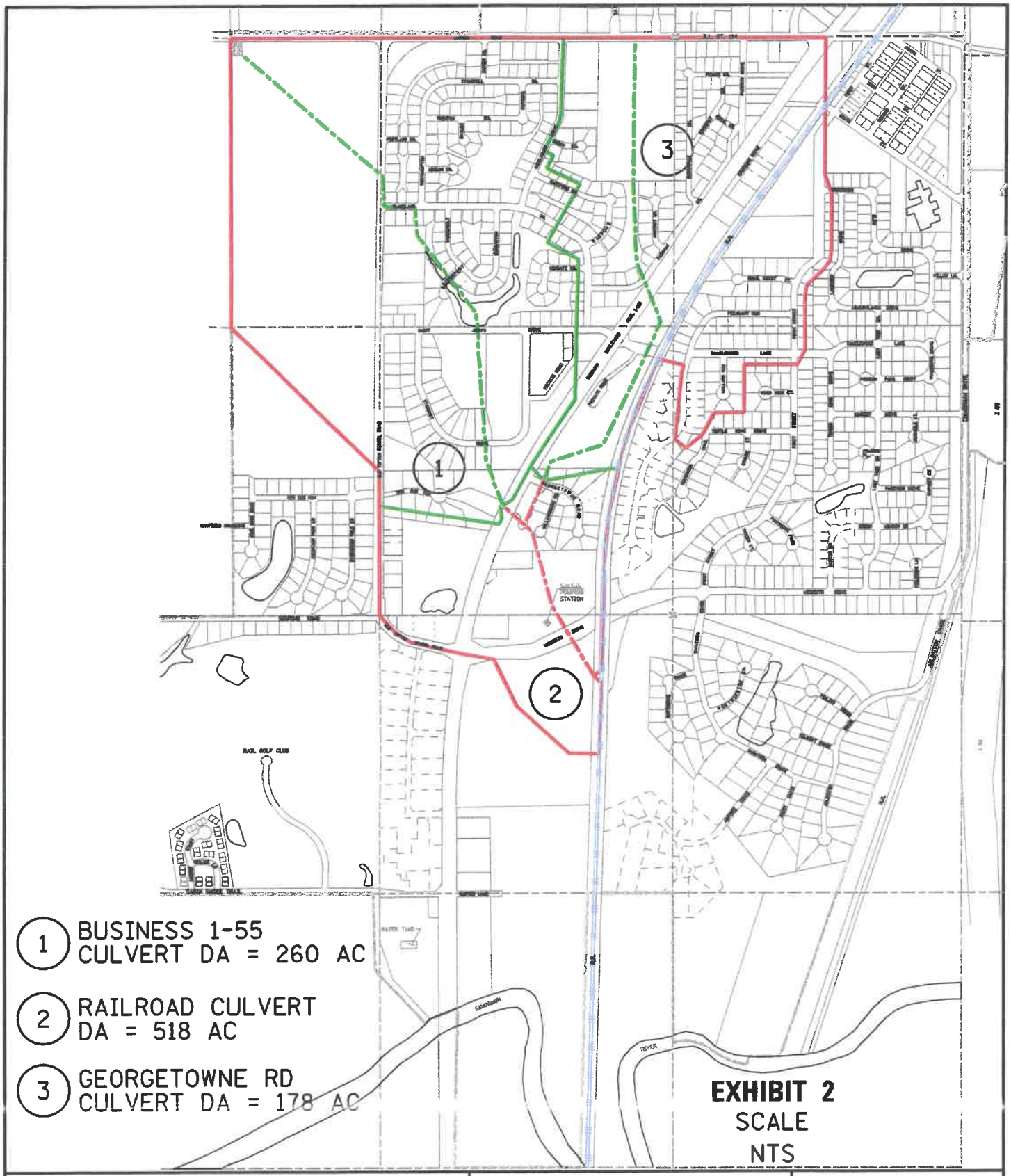

1 BUSINESS 1-55
CULVERT DA = 260 AC

2 RAILROAD CULVERT
DA = 518 AC

3 GEORGETOWNE RD
CULVERT DA = 178 AC

EXHIBIT 2
SCALE
NTS

GREENE & BRADFORD, INC.
OF SPRINGFIELD
CONSULTING ENGINEERS
3501 CONSTITUTION DRIVE
SPRINGFIELD, ILLINOIS 62711
PROFESSIONAL DESIGN FIRM NO. 184-001179
PROFESSIONAL & STRUCTURAL ENGINEERING CORPORATION
(217) 793-8844, 793-6227 (F), E-MAIL - cad@greeneandbradford.com

DRAINAGE AREAS

VILLAGE OF SHERMAN
GEORGETOWNE OAKS &
MEREDITH RD AT RAILROAD

COMPUTER FILE NO.
Exhibit 2.dgn

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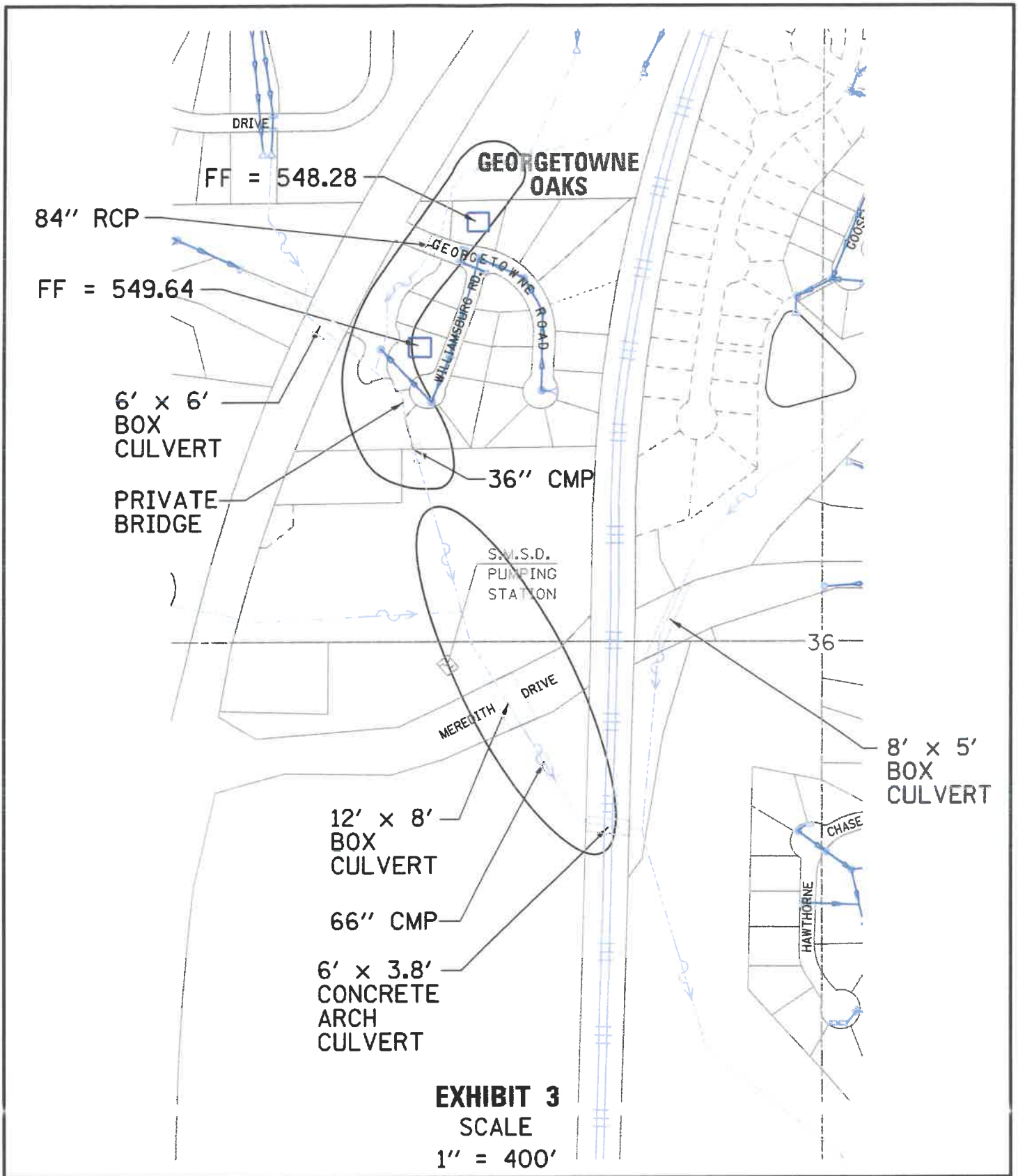

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PROFESSIONAL & STRUCTURAL ENGINEERING CORPORATION
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FLOOD MAP

VILLAGE OF SHERMAN
GEORGETOWNW OAKS AND
MEREDITH DR. AT RAILROAD

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02/26/09 - FAV

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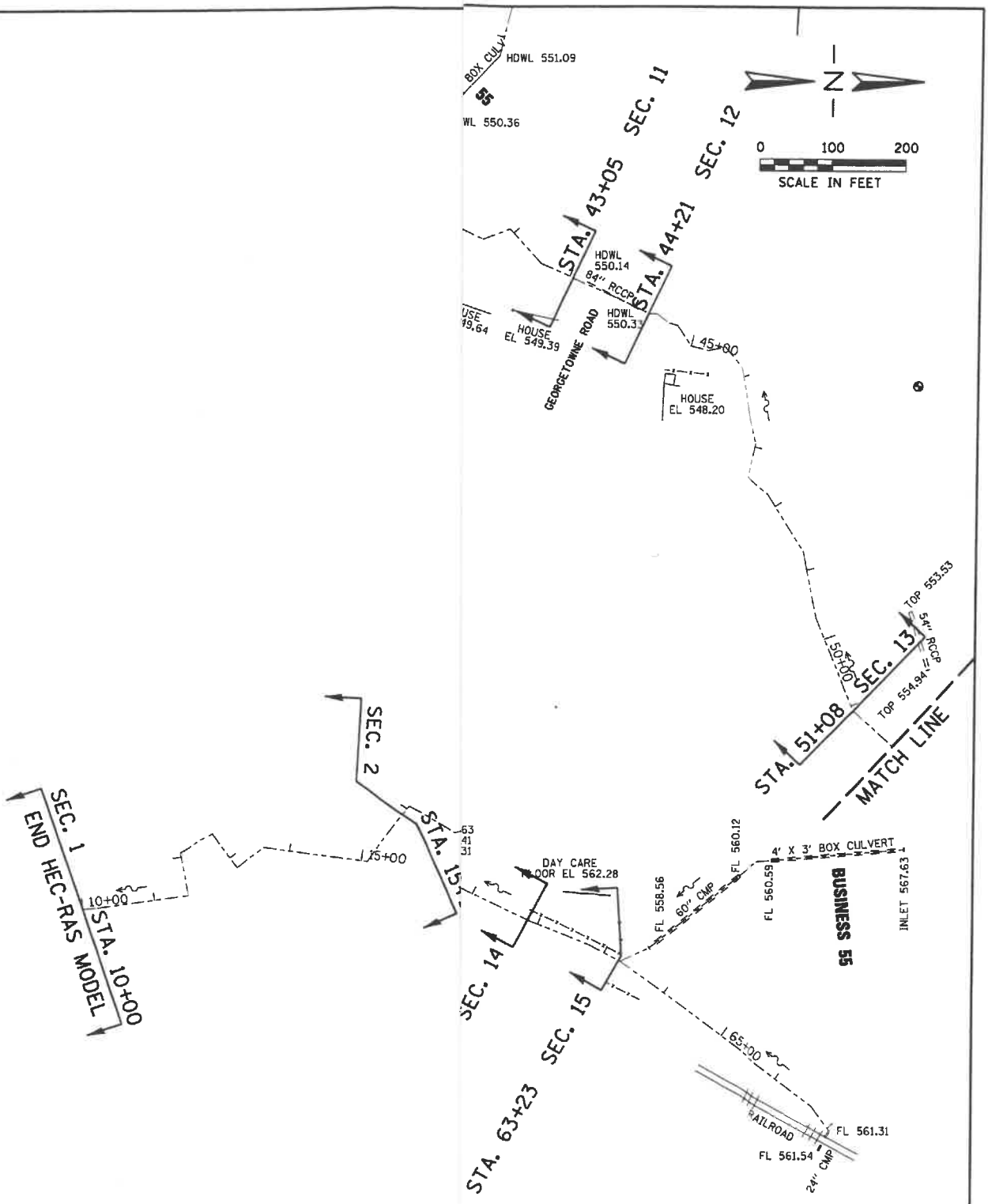


EXHIBIT 4

FILE NAME = J:\08247\DRAWINGS\08247-sht-planhyd01.dgn	USER NAME = dang	DE:	F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		DR					
	PLOT SCALE = 200.0000 ' / IN.	CH			CONTRACT NO.		
G&B PROJECT:	PLOT DATE = 4/15/2009	DA TO STA.	FED. ROAD DIST. NO.	ILLINOIS	FED. AID PROJECT		

PLOT DRIVER = TDS700_PS_LOCAL_HALFSIZE_IDOT.PLT

GREEVES & BRADFORD, INC.

Existing 6'x 3.81' Box Arch

HEC-RAS Plan: Exist_complx_nor River: Drainage Reach: Sherman

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Sherman	3939	5 yr	417.00	537.82	545.52		545.57	0.000260	2.28	308.51	114.31	0.16
Sherman	3939	10 yr	580.00	537.82	546.80		546.85	0.000210	2.30	498.81	201.68	0.14
Sherman	3939	25 yr	800.00	537.82	548.09		548.12	0.000153	2.17	830.13	297.65	0.13
Sherman	3939	50 yr	1022.00	537.82	549.06		549.09	0.000115	2.02	1128.68	315.53	0.11
Sherman	3939	100 yr	1280.00	537.82	550.13		550.15	0.000089	1.89	1474.57	326.20	0.10
Sherman	3785	5 yr	417.00	537.76	545.41	541.53	545.51	0.000383	2.65	200.69	90.55	0.19
Sherman	3785	10 yr	580.00	537.76	546.73	542.10	546.81	0.000258	2.48	346.19	119.52	0.16
Sherman	3785	25 yr	800.00	537.76	548.03	542.78	548.09	0.000198	2.42	514.96	140.76	0.15
Sherman	3785	50 yr	1022.00	537.76	549.00	543.42	549.06	0.000173	2.43	655.05	147.06	0.14
Sherman	3785	100 yr	1280.00	537.76	550.07	544.01	550.13	0.000148	2.41	815.27	150.10	0.13
Sherman	3784		Bridge									
Sherman	3644.*	5 yr	417.00	536.61	545.39		545.43	0.000172	1.83	316.19	126.38	0.13
Sherman	3644.*	10 yr	580.00	536.61	546.74		546.77	0.000118	1.72	499.14	145.97	0.11
Sherman	3644.*	25 yr	800.00	536.61	548.00		548.04	0.000099	1.74	696.14	164.47	0.10
Sherman	3644.*	50 yr	1022.00	536.61	548.98		549.01	0.000091	1.80	862.65	173.93	0.10
Sherman	3644.*	100 yr	1280.00	536.61	550.06		550.09	0.000082	1.82	1053.29	180.41	0.10
Sherman	3503.*	5 yr	417.00	535.47	545.39	539.72	545.41	0.000084	1.30	457.36	154.10	0.09
Sherman	3503.*	10 yr	580.00	535.47	546.73	540.39	546.75	0.000061	1.25	676.77	172.15	0.08
Sherman	3503.*	25 yr	800.00	535.47	548.00	541.10	548.02	0.000054	1.30	906.13	189.18	0.08
Sherman	3503.*	50 yr	1022.00	535.47	548.98	541.70	549.00	0.000052	1.37	1097.53	201.18	0.08
Sherman	3503.*	100 yr	1280.00	535.47	550.06	542.40	550.07	0.000049	1.41	1317.49	207.50	0.07
Sherman	3499		Culvert									
Sherman	3362	5 yr	417.00	534.32	545.37		545.38	0.000044	0.95	622.65	181.40	0.06
Sherman	3362	10 yr	580.00	534.32	546.71		546.72	0.000034	0.94	876.14	198.21	0.06
Sherman	3362	25 yr	800.00	534.32	547.95		547.96	0.000032	1.01	1131.31	213.80	0.06
Sherman	3362	50 yr	1022.00	534.32	548.94		548.95	0.000032	1.08	1349.55	226.28	0.06
Sherman	3362	100 yr	1280.00	534.32	550.05		550.06	0.000031	1.12	1606.22	234.82	0.06
Sherman	3198.66*	5 yr	417.00	533.81	545.37		545.38	0.000036	0.94	653.16	190.77	0.06
Sherman	3198.66*	10 yr	580.00	533.81	546.70		546.71	0.000029	0.94	924.94	215.49	0.05
Sherman	3198.66*	25 yr	800.00	533.81	547.94		547.95	0.000028	1.00	1204.52	233.64	0.05
Sherman	3198.66*	50 yr	1022.00	533.81	548.93		548.95	0.000028	1.05	1440.01	241.12	0.06
Sherman	3198.66*	100 yr	1280.00	533.81	550.04		550.06	0.000027	1.10	1712.29	249.48	0.05
Sherman	3035.33*	5 yr	417.00	533.31	545.36		545.37	0.000028	0.89	722.01	216.65	0.05
Sherman	3035.33*	10 yr	580.00	533.31	546.70		546.71	0.000023	0.88	1032.82	241.98	0.05
Sherman	3035.33*	25 yr	800.00	533.31	547.94		547.95	0.000022	0.93	1340.36	254.22	0.05
Sherman	3035.33*	50 yr	1022.00	533.31	548.93		548.94	0.000022	0.99	1597.44	263.60	0.05
Sherman	3036.33*	100 yr	1280.00	533.31	550.04		550.05	0.000021	1.02	1890.11	263.60	0.05
Sherman	2872	5 yr	417.00	532.80	545.36	536.74	545.37	0.000019	0.75	860.83	256.20	0.04
Sherman	2872	10 yr	580.00	532.80	546.70	537.43	546.70	0.000016	0.75	1178.40	264.50	0.04
Sherman	2872	25 yr	800.00	532.80	547.94	538.20	547.94	0.000015	0.80	1472.50	264.50	0.04
Sherman	2872	50 yr	1022.00	532.80	548.93	538.86	548.94	0.000015	0.85	1816.06	264.50	0.04
Sherman	2872	100 yr	1280.00	532.80	550.04	539.53	550.05	0.000015	0.89	2109.71	264.50	0.04
Sherman	2746		Lat Struct									
Sherman	2745	5 yr	405.86	532.57	545.35	535.51	545.36	0.000021	0.93	452.52	281.80	0.05
Sherman	2745	10 yr	416.17	532.57	546.69	535.55	546.70	0.000015	0.84	511.53	281.80	0.04
Sherman	2745	25 yr	426.32	532.57	547.93	535.59	547.94	0.000011	0.78	566.17	281.80	0.04
Sherman	2745	50 yr	433.83	532.57	548.93	535.61	548.94	0.000009	0.73	609.91	281.80	0.03
Sherman	2745	100 yr	444.00	532.57	550.04	535.64	550.05	0.000007	0.69	658.84	281.80	0.03
Sherman	2729		Culvert									
Sherman	2580	5 yr	405.86	532.22	544.92	535.29	544.93	0.000007	0.51	960.98	241.56	0.03
Sherman	2580	10 yr	416.17	532.22	546.24	535.31	546.24	0.000004	0.44	1135.75	249.08	0.02
Sherman	2580	25 yr	426.32	532.22	547.46	535.35	547.46	0.000003	0.40	1302.57	256.04	0.02
Sherman	2580	50 yr	433.83	532.22	548.43	535.37	548.43	0.000002	0.36	1439.77	259.73	0.02
Sherman	2580	100 yr	444.00	532.22	549.52	535.40	549.52	0.000001	0.22	2663.37	263.33	0.01
Sherman	2524		Culvert									
Sherman	2459.5*	5 yr	405.86	531.80	544.92	535.35	544.92	0.000008	0.54	1028.74	187.64	0.03
Sherman	2459.5*	10 yr	416.17	531.80	546.23	535.39	546.23	0.000005	0.45	1285.37	202.79	0.02
Sherman	2459.5*	25 yr	426.32	531.80	547.45	535.44	547.46	0.000003	0.38	1539.51	211.64	0.02
Sherman	2459.5*	50 yr	433.83	531.80	548.42	535.45	548.42	0.000002	0.34	1745.85	216.42	0.02
Sherman	2459.5*	100 yr	444.00	531.80	549.52	535.49	549.52	0.000002	0.31	1986.38	221.87	0.01

Exhibit 5A

HEC-RAS Plan: Exist_complx_nor River: Drainage Reach: Sherman (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sherman	2339	5 yr	405.86	531.39	544.91	535.36	544.92	0.000023	0.87	618.60	149.75	0.05
Sherman	2339	10 yr	416.17	531.39	546.22	535.39	546.23	0.000013	0.71	795.50	161.18	0.04
Sherman	2339	25 yr	426.32	531.39	547.45	535.46	547.45	0.000008	0.60	964.86	170.90	0.03
Sherman	2339	50 yr	433.83	531.39	548.41	535.49	548.42	0.000006	0.53	1098.70	176.83	0.03
Sherman	2339	100 yr	444.00	531.39	549.51	535.54	549.52	0.000004	0.47	1251.03	183.59	0.02
Sherman	2264		Culvert									
Sherman	2077	5 yr	536.86	529.74	535.98		536.13	0.000845	3.15	174.29	45.17	0.27
Sherman	2077	10 yr	605.17	529.74	536.83		536.96	0.000588	2.93	216.34	57.74	0.23
Sherman	2077	25 yr	692.32	529.74	537.59		537.71	0.000463	2.85	266.65	72.53	0.21
Sherman	2077	50 yr	779.83	529.74	538.20		538.32	0.000400	2.83	312.69	77.61	0.19
Sherman	2077	100 yr	884.00	529.74	538.82		538.93	0.000359	2.84	361.83	82.89	0.19
Sherman	1955.25*	5 yr	554.00	529.00	535.85		536.02	0.000862	3.37	180.26	65.70	0.27
Sherman	1955.25*	10 yr	784.00	529.00	536.61		536.83	0.000947	3.90	234.67	74.29	0.29
Sherman	1955.25*	25 yr	1096.00	529.00	537.24		537.54	0.001179	4.67	282.91	80.13	0.33
Sherman	1955.25*	50 yr	1413.00	529.00	537.71		538.11	0.001436	5.42	321.96	86.24	0.37
Sherman	1955.25*	100 yr	1784.00	529.00	538.16		538.66	0.001729	6.20	361.85	92.02	0.41
Sherman	1833.5*	5 yr	554.00	526.60	535.74	532.05	535.92	0.000804	3.45	187.47	66.30	0.26
Sherman	1833.5*	10 yr	784.00	526.60	536.46	532.90	536.71	0.000980	4.13	243.87	89.48	0.29
Sherman	1833.5*	25 yr	1096.00	526.60	537.03	533.81	537.39	0.001319	5.08	298.82	105.73	0.34
Sherman	1833.5*	50 yr	1413.00	526.60	537.43	534.66	537.91	0.001696	5.98	342.92	116.16	0.39
Sherman	1833.5*	100 yr	1784.00	526.60	537.77	535.59	538.42	0.002172	6.99	385.02	125.31	0.45
Sherman	1828		Culvert									
Sherman	1711.75*	5 yr	554.00	526.60	534.11		534.54	0.002605	5.29	111.42	39.09	0.44
Sherman	1711.75*	10 yr	784.00	526.60	535.10		535.61	0.002468	5.87	170.08	82.31	0.44
Sherman	1711.75*	25 yr	1096.00	526.60	535.78		536.42	0.002838	6.80	233.51	104.69	0.48
Sherman	1711.75*	50 yr	1413.00	526.60	536.26		537.03	0.003273	7.67	287.65	121.08	0.52
Sherman	1711.75*	100 yr	1784.00	526.60	536.70		537.62	0.003776	8.60	343.91	136.42	0.57
Sherman	1590	5 yr	554.00	525.71	533.77		534.22	0.002671	5.50	121.26	39.75	0.41
Sherman	1590	10 yr	784.00	525.71	534.65		535.26	0.003139	6.47	176.35	122.08	0.45
Sherman	1590	25 yr	1096.00	525.71	535.44		536.05	0.003099	6.95	294.69	179.57	0.46
Sherman	1590	50 yr	1413.00	525.71	536.04		536.59	0.002882	7.08	416.00	219.04	0.45
Sherman	1590	100 yr	1784.00	525.71	536.64		537.11	0.002571	7.02	553.35	242.73	0.43
Sherman	1442.5*	5 yr	554.00	525.37	533.39		533.83	0.002573	5.40	119.87	41.53	0.41
Sherman	1442.5*	10 yr	784.00	525.37	534.22		534.80	0.002975	6.31	185.81	135.41	0.45
Sherman	1442.5*	25 yr	1096.00	525.37	535.02		535.60	0.002906	6.76	318.33	189.57	0.45
Sherman	1442.5*	50 yr	1413.00	525.37	535.64		536.17	0.002760	6.97	442.34	220.37	0.45
Sherman	1442.5*	100 yr	1784.00	525.37	536.24		536.73	0.002572	7.08	583.89	244.71	0.44
Sherman	1295.*	5 yr	554.00	525.03	533.03		533.45	0.002471	5.28	117.92	42.59	0.40
Sherman	1295.*	10 yr	784.00	525.03	533.84		534.37	0.002729	6.07	204.22	149.09	0.43
Sherman	1295.*	25 yr	1096.00	525.03	534.65		535.17	0.002652	6.49	345.69	201.12	0.43
Sherman	1295.*	50 yr	1413.00	525.03	535.27		535.77	0.002550	6.74	478.69	225.47	0.43
Sherman	1295.*	100 yr	1784.00	525.03	535.88		536.36	0.002424	6.93	622.96	242.80	0.43
Sherman	1147.5*	5 yr	554.00	524.69	532.69		533.09	0.002330	5.13	122.16	113.36	0.39
Sherman	1147.5*	10 yr	784.00	524.69	533.51		533.97	0.002393	5.72	233.22	160.54	0.41
Sherman	1147.5*	25 yr	1096.00	524.69	534.32		534.79	0.002344	6.16	384.41	212.05	0.41
Sherman	1147.5*	50 yr	1413.00	524.69	534.94		535.40	0.002295	6.45	523.24	231.75	0.41
Sherman	1147.5*	100 yr	1784.00	524.69	535.56		536.01	0.002229	6.70	670.18	244.37	0.41
Sherman	1000	5 yr	554.00	524.35	532.41	529.30	532.76	0.002001	4.81	151.72	120.79	0.37
Sherman	1000	10 yr	784.00	524.35	533.24	530.27	533.62	0.002003	5.30	273.96	173.46	0.38
Sherman	1000	25 yr	1096.00	524.35	534.05	531.38	534.45	0.002002	5.76	434.80	223.67	0.39
Sherman	1000	50 yr	1413.00	524.35	534.67	533.16	535.07	0.002001	6.09	578.20	237.73	0.39
Sherman	1000	100 yr	1784.00	524.35	535.28	533.78	535.68	0.002002	6.42	726.27	248.09	0.40

Exhibit 5B

Proposed 8'x8' Box w/ Existing Box Arch

HEC-RAS Plan: Proposed_com River: Drainage Reach: Sherman

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Sherman	3939	5 yr	417.00	537.82	543.39		543.63	0.001576	4.33	129.20	55.24	0.36
Sherman	3939	10 yr	580.00	537.82	544.09		544.37	0.001651	4.88	173.85	74.06	0.38
Sherman	3939	25 yr	800.00	537.82	544.89		545.20	0.001584	5.26	242.56	96.72	0.38
Sherman	3939	50 yr	1022.00	537.82	545.52		546.53	0.000897	4.57	413.55	157.43	0.30
Sherman	3939	100 yr	1280.00	537.82	547.34		547.42	0.000748	4.50	597.56	243.06	0.27
Sherman	3785	5 yr	417.00	537.76	542.91	541.52	543.28	0.002701	4.93	89.86	33.58	0.46
Sherman	3785	10 yr	580.00	537.76	543.48	542.08	543.98	0.003026	5.76	110.12	37.28	0.50
Sherman	3785	25 yr	800.00	537.76	544.11	542.78	544.76	0.003365	6.68	133.97	38.93	0.54
Sherman	3785	50 yr	1022.00	537.76	545.84	543.42	546.27	0.001636	5.73	244.76	107.74	0.40
Sherman	3785	100 yr	1280.00	537.76	546.93	544.01	547.24	0.001087	5.18	370.27	122.82	0.33
Sherman	3784		Bridge									
Sherman	3644.*	5 yr	417.00	536.61	542.65		542.89	0.001647	3.91	112.18	42.01	0.36
Sherman	3644.*	10 yr	580.00	536.61	543.18		543.51	0.001942	4.64	136.24	48.45	0.40
Sherman	3644.*	25 yr	800.00	536.61	543.77		544.20	0.002228	5.43	165.89	52.10	0.44
Sherman	3644.*	50 yr	1022.00	536.61	545.74		545.94	0.000778	4.04	360.56	131.40	0.27
Sherman	3644.*	100 yr	1280.00	536.61	546.88		547.02	0.000521	3.67	519.97	148.03	0.23
Sherman	3503.*	5 yr	417.00	535.47	542.51	539.72	542.66	0.001072	3.19	137.18	52.63	0.29
Sherman	3503.*	10 yr	580.00	535.47	543.01	540.39	543.23	0.001301	3.82	167.03	63.76	0.32
Sherman	3503.*	25 yr	800.00	535.47	543.58	541.10	543.86	0.001527	4.50	209.35	94.21	0.36
Sherman	3503.*	50 yr	1022.00	535.47	545.71	541.70	545.81	0.000391	2.90	508.30	158.47	0.19
Sherman	3503.*	100 yr	1280.00	535.47	546.86	542.40	546.94	0.000272	2.68	699.18	173.89	0.17
Sherman	3499		Culvert									
Sherman	3362	5 yr	417.00	534.32	541.10		541.34	0.002052	3.93	106.03	32.22	0.38
Sherman	3362	10 yr	580.00	534.32	542.13		542.38	0.001772	4.04	149.32	58.76	0.37
Sherman	3362	25 yr	800.00	534.32	543.44		543.61	0.000952	3.55	295.97	157.10	0.28
Sherman	3362	50 yr	1022.00	534.32	545.73		545.78	0.000204	2.12	888.52	185.91	0.14
Sherman	3362	100 yr	1280.00	534.32	546.87		546.91	0.000151	2.01	908.38	200.24	0.12
Sherman	3198.66*	5 yr	417.00	533.81	540.87		541.05	0.001325	3.41	122.11	33.47	0.32
Sherman	3198.66*	10 yr	580.00	533.81	541.93		542.13	0.001159	3.58	170.96	89.09	0.30
Sherman	3198.66*	25 yr	800.00	533.81	543.33		543.48	0.000659	3.27	311.93	123.06	0.24
Sherman	3198.66*	50 yr	1022.00	533.81	545.70		545.75	0.000173	2.11	718.02	197.05	0.13
Sherman	3198.66*	100 yr	1280.00	533.81	546.85		546.89	0.000132	2.01	956.21	217.92	0.12
Sherman	3035.33*	5 yr	417.00	533.31	540.72		540.86	0.000913	3.05	136.81	33.69	0.27
Sherman	3035.33*	10 yr	580.00	533.31	541.81		541.97	0.000783	3.25	195.27	82.45	0.26
Sherman	3035.33*	25 yr	800.00	533.31	543.26		543.38	0.000469	2.98	355.11	130.87	0.21
Sherman	3035.33*	50 yr	1022.00	533.31	545.68		545.72	0.000138	2.00	792.25	225.47	0.12
Sherman	3035.33*	100 yr	1280.00	533.31	546.83		546.87	0.000104	1.88	1085.08	243.29	0.10
Sherman	2872	5 yr	417.00	532.80	540.60	536.74	540.73	0.000684	2.82	147.90	34.24	0.23
Sherman	2872	10 yr	580.00	532.80	541.71	537.43	541.85	0.000595	3.04	219.43	97.88	0.23
Sherman	2872	25 yr	800.00	532.80	543.22	538.20	543.31	0.000328	2.64	439.86	168.33	0.17
Sherman	2872	50 yr	1022.00	532.80	545.67	538.86	545.70	0.000091	1.69	934.65	260.30	0.10
Sherman	2872	100 yr	1280.00	532.80	546.83	539.53	546.85	0.000070	1.61	1208.67	264.50	0.09
Sherman	2746		Lat Struct									
Sherman	2745	5 yr	423.00	532.57	540.62	535.57	540.67	0.000166	1.78	244.39	99.83	0.13
Sherman	2745	10 yr	595.00	532.57	541.72	536.11	541.79	0.000185	2.09	292.91	200.33	0.14
Sherman	2745	25 yr	830.00	532.57	543.19	536.89	543.28	0.000190	2.40	357.43	279.81	0.14
Sherman	2745	50 yr	1028.87	532.57	545.60	537.13	545.68	0.000125	2.29	463.64	281.80	0.12
Sherman	2745	100 yr	1153.67	532.57	546.75	537.39	546.83	0.000112	2.31	514.28	281.80	0.12
Sherman	2729		Culvert									
Sherman	2580	5 yr	423.00	532.22	540.19	535.34	540.22	0.000102	1.31	379.92	214.52	0.10
Sherman	2580	10 yr	595.00	532.22	540.84	535.79	540.88	0.000125	1.56	455.49	218.24	0.11
Sherman	2580	25 yr	830.00	532.22	541.43	536.31	541.48	0.000164	1.90	525.33	221.62	0.13
Sherman	2580	50 yr	1028.87	532.22	542.85	536.70	542.89	0.000112	1.78	697.43	229.72	0.11
Sherman	2580	100 yr	1153.67	532.22	543.28	536.90	543.32	0.000114	1.86	750.23	232.14	0.11
Sherman	2524		Culvert									
Sherman	2459.5*	5 yr	423.00	531.80	537.34	535.42	537.56	0.001903	3.76	112.39	36.68	0.38
Sherman	2459.5*	10 yr	595.00	531.80	538.72	536.01	538.91	0.001206	3.54	169.67	48.96	0.31
Sherman	2459.5*	25 yr	830.00	531.80	540.58	536.67	540.70	0.000488	2.90	355.75	120.40	0.21
Sherman	2459.5*	50 yr	1028.87	531.80	542.79	537.15	542.84	0.000188	2.11	659.93	157.95	0.13
Sherman	2459.5*	100 yr	1153.67	531.80	543.18	537.42	543.23	0.000167	2.17	722.72	163.39	0.13

Exhibit 6A

HEC-RAS Plan: Proposed_com River: Drainage Reach: Sherman (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sherman	2339	5 yr	423.00	531.39	536.33	535.43	537.02	0.006860	6.69	63.23	21.12	0.68
Sherman	2339	10 yr	595.00	531.39	536.13	536.23	538.60	0.003365	5.50	108.57	31.77	0.50
Sherman	2339	25 yr	830.00	531.39	540.29	537.09	540.56	0.001351	4.33	215.37	63.81	0.33
Sherman	2339	50 yr	1028.87	531.39	542.64	537.70	542.78	0.000455	3.22	381.94	77.58	0.21
Sherman	2339	100 yr	1153.67	531.39	543.02	538.05	543.17	0.000467	3.37	411.68	79.79	0.21
Sherman	2284		Culvert									
Sherman	2077	5 yr	554.00	529.74	535.97		536.13	0.000908	3.26	173.78	45.11	0.27
Sherman	2077	10 yr	784.00	529.74	536.73		536.96	0.001057	3.88	210.82	55.49	0.30
Sherman	2077	25 yr	1096.00	529.74	537.38		537.71	0.001331	4.72	251.73	69.91	0.35
Sherman	2077	50 yr	1374.87	529.74	537.88		538.30	0.001516	5.33	288.21	74.96	0.38
Sherman	2077	100 yr	1593.67	529.74	538.45		538.89	0.001439	5.50	332.31	79.68	0.37
Sherman	1955.25*	5 yr	554.00	529.00	535.85		536.02	0.000862	3.37	180.26	65.70	0.27
Sherman	1955.25*	10 yr	784.00	529.00	536.61		536.83	0.000947	3.90	234.67	74.29	0.29
Sherman	1955.25*	25 yr	1096.00	529.00	537.24		537.54	0.001179	4.67	282.91	80.13	0.33
Sherman	1955.25*	50 yr	1413.00	529.00	537.71		538.11	0.001436	5.42	321.98	86.24	0.37
Sherman	1955.25*	100 yr	1784.00	529.00	538.16		538.66	0.001729	6.20	361.85	92.02	0.41
Sherman	1833.5*	5 yr	554.00	526.60	535.74	532.05	535.92	0.000804	3.45	187.47	66.30	0.26
Sherman	1833.5*	10 yr	784.00	526.60	536.46	532.90	536.71	0.000980	4.13	243.87	89.48	0.29
Sherman	1833.5*	25 yr	1096.00	526.60	537.03	533.81	537.39	0.001319	5.08	298.82	105.73	0.34
Sherman	1833.5*	50 yr	1413.00	526.60	537.43	534.66	537.91	0.001696	5.98	342.92	116.16	0.39
Sherman	1833.5*	100 yr	1784.00	526.60	537.77	535.59	538.42	0.002172	6.99	385.02	125.31	0.45
Sherman	1828		Culvert									
Sherman	1711.75*	5 yr	554.00	526.60	534.11		534.54	0.002605	5.29	111.42	39.09	0.44
Sherman	1711.75*	10 yr	784.00	526.60	535.10		535.61	0.002468	5.87	170.08	82.31	0.44
Sherman	1711.75*	25 yr	1096.00	526.60	535.78		536.42	0.002838	6.80	233.51	104.69	0.48
Sherman	1711.75*	50 yr	1413.00	526.60	536.26		537.03	0.003273	7.67	287.65	121.08	0.52
Sherman	1711.75*	100 yr	1784.00	526.60	536.70		537.62	0.003776	8.60	343.91	136.42	0.57
Sherman	1590	5 yr	554.00	525.71	533.77		534.22	0.002671	5.50	121.26	39.75	0.41
Sherman	1590	10 yr	784.00	525.71	534.65		535.26	0.003139	6.47	176.35	122.08	0.45
Sherman	1590	25 yr	1096.00	525.71	535.44		536.05	0.003099	6.95	294.69	179.57	0.46
Sherman	1590	50 yr	1413.00	525.71	536.04		536.59	0.002882	7.08	416.00	219.04	0.45
Sherman	1590	100 yr	1784.00	525.71	536.64		537.11	0.002571	7.02	553.35	242.73	0.43
Sherman	1442.5*	5 yr	554.00	525.37	533.39		533.83	0.002573	5.40	119.87	41.53	0.41
Sherman	1442.5*	10 yr	784.00	525.37	534.22		534.80	0.002975	6.31	185.81	135.41	0.45
Sherman	1442.5*	25 yr	1096.00	525.37	535.02		535.60	0.002908	6.76	316.33	189.57	0.45
Sherman	1442.5*	50 yr	1413.00	525.37	535.64		536.17	0.002760	6.97	442.34	220.37	0.45
Sherman	1442.5*	100 yr	1784.00	525.37	536.24		536.73	0.002572	7.08	583.89	244.71	0.44
Sherman	1295.*	5 yr	554.00	525.03	533.03		533.45	0.002471	5.28	117.92	42.59	0.40
Sherman	1295.*	10 yr	784.00	525.03	533.84		534.37	0.002729	6.07	204.22	149.09	0.43
Sherman	1295.*	25 yr	1096.00	525.03	534.65		535.17	0.002652	6.49	345.69	201.12	0.43
Sherman	1295.*	50 yr	1413.00	525.03	535.27		535.77	0.002550	6.74	478.69	225.47	0.43
Sherman	1295.*	100 yr	1784.00	525.03	535.88		536.36	0.002424	6.93	622.96	242.80	0.43
Sherman	1147.5*	5 yr	554.00	524.69	532.69		533.09	0.002330	5.13	122.15	113.36	0.39
Sherman	1147.5*	10 yr	784.00	524.69	533.51		533.97	0.002393	5.72	233.22	160.53	0.41
Sherman	1147.5*	25 yr	1096.00	524.69	534.32		534.79	0.002344	6.16	384.41	212.05	0.41
Sherman	1147.5*	50 yr	1413.00	524.69	534.94		535.40	0.002295	6.45	523.24	231.75	0.41
Sherman	1147.5*	100 yr	1784.00	524.69	535.56		536.01	0.002229	6.70	670.18	244.37	0.41
Sherman	1000	5 yr	554.00	524.35	532.41	529.31	532.76	0.002001	4.81	151.71	120.79	0.37
Sherman	1000	10 yr	784.00	524.35	533.24	530.28	533.62	0.002003	5.30	273.94	173.45	0.38
Sherman	1000	25 yr	1096.00	524.35	534.05	531.37	534.45	0.002002	5.76	434.81	223.67	0.39
Sherman	1000	50 yr	1413.00	524.35	534.67	533.16	535.07	0.002001	6.09	578.20	237.73	0.39
Sherman	1000	100 yr	1784.00	524.35	535.28	533.78	535.68	0.002002	6.42	726.27	248.09	0.40

Exhibit 6B

Proposed 12' x 8' Box

HEC-RAS Plan: Prop_complx_norm River: Drainage Reach: Sherman

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Sherman	3939	5 yr	417.00	537.82	543.39		543.63	0.001580	4.34	129.07	55.20	0.36
Sherman	3939	10 yr	580.00	537.82	544.08		544.37	0.001656	4.88	173.58	73.96	0.38
Sherman	3939	25 yr	800.00	537.82	544.89		545.20	0.001586	5.26	242.40	96.67	0.38
Sherman	3939	50 yr	1022.00	537.82	545.18		546.40	0.000977	4.71	392.69	144.55	0.31
Sherman	3939	100 yr	1280.00	537.82	547.39		547.45	0.000726	4.45	606.65	246.53	0.27
Sherman	3785	5 yr	417.00	537.76	542.91	541.52	543.28	0.002712	4.93	89.72	33.55	0.46
Sherman	3785	10 yr	580.00	537.76	543.48	542.08	543.97	0.003046	5.77	109.85	37.26	0.50
Sherman	3785	25 yr	800.00	537.76	544.11	542.78	544.75	0.003374	6.68	133.84	38.92	0.54
Sherman	3785	50 yr	1022.00	537.76	545.55	543.42	546.09	0.002080	6.27	214.29	104.21	0.44
Sherman	3785	100 yr	1280.00	537.76	546.98	544.01	547.28	0.001049	5.11	376.20	123.62	0.33
Sherman	3784		Bridge									
Sherman	3644.*	5 yr	417.00	536.61	542.65		542.88	0.001656	3.92	111.94	41.94	0.36
Sherman	3644.*	10 yr	580.00	536.61	543.17		543.50	0.001960	4.66	135.73	48.38	0.40
Sherman	3644.*	25 yr	800.00	536.61	543.77		544.20	0.002237	5.44	165.62	52.07	0.44
Sherman	3644.*	50 yr	1022.00	536.61	545.44		545.69	0.000989	4.42	322.46	127.10	0.31
Sherman	3644.*	100 yr	1280.00	536.61	546.94		547.08	0.000499	3.61	529.19	148.94	0.23
Sherman	3503.*	5 yr	417.00	535.47	542.50	539.72	542.66	0.001079	3.20	136.84	52.46	0.29
Sherman	3503.*	10 yr	580.00	535.47	543.00	540.39	543.22	0.001316	3.84	166.23	63.59	0.33
Sherman	3503.*	25 yr	800.00	535.47	543.58	541.10	543.87	0.001535	4.51	208.75	93.49	0.36
Sherman	3503.*	50 yr	1022.00	535.47	545.41	541.70	545.53	0.000496	3.17	461.04	154.42	0.22
Sherman	3503.*	100 yr	1280.00	535.47	546.92	542.40	547.00	0.000262	2.64	710.13	174.73	0.16
Sherman	3499		Culvert									
Sherman	3362	5 yr	417.00	534.32	541.10		541.34	0.002046	3.93	106.15	32.25	0.38
Sherman	3362	10 yr	580.00	534.32	542.11		542.36	0.001796	4.06	148.35	58.16	0.37
Sherman	3362	25 yr	800.00	534.32	543.42		543.60	0.000972	3.58	292.79	156.85	0.28
Sherman	3362	50 yr	1022.00	534.32	545.44		545.50	0.000252	2.29	635.13	182.26	0.15
Sherman	3362	100 yr	1280.00	534.32	546.92		546.96	0.000147	1.99	918.50	200.88	0.12
Sherman	3198.66*	5 yr	417.00	533.81	540.88		541.06	0.001320	3.41	122.27	33.49	0.31
Sherman	3198.66*	10 yr	580.00	533.81	541.91		542.11	0.001170	3.60	169.59	67.97	0.31
Sherman	3198.66*	25 yr	800.00	533.81	543.31		543.46	0.000672	3.29	309.22	122.45	0.24
Sherman	3198.66*	50 yr	1022.00	533.81	545.40		545.46	0.000212	2.28	660.28	191.47	0.14
Sherman	3198.66*	100 yr	1280.00	533.81	546.90		546.94	0.000128	1.99	967.37	218.78	0.11
Sherman	3035.33*	5 yr	417.00	533.31	540.72		540.87	0.000910	3.04	136.98	33.71	0.27
Sherman	3035.33*	10 yr	580.00	533.31	541.78		541.95	0.000797	3.27	193.44	81.22	0.26
Sherman	3035.33*	25 yr	800.00	533.31	543.24		543.36	0.000478	3.00	352.04	130.22	0.21
Sherman	3035.33*	50 yr	1022.00	533.31	545.38		545.43	0.000169	2.16	725.35	217.07	0.13
Sherman	3035.33*	100 yr	1280.00	533.31	546.88		546.92	0.000101	1.86	1077.64	243.80	0.10
Sherman	2872	5 yr	417.00	532.80	540.61	536.74	540.73	0.000682	2.82	148.09	34.28	0.23
Sherman	2872	10 yr	580.00	532.80	541.69	537.43	541.83	0.000606	3.06	217.06	96.41	0.23
Sherman	2872	25 yr	800.00	532.80	543.20	538.20	543.28	0.000335	2.66	435.73	167.87	0.18
Sherman	2872	50 yr	1022.00	532.80	545.37	538.86	545.40	0.000112	1.84	862.39	256.29	0.11
Sherman	2872	100 yr	1280.00	532.80	546.88	539.53	546.90	0.000068	1.59	1220.94	264.50	0.09
Sherman	2746		Lat Struct									
Sherman	2745	5 yr	423.00	532.57	540.63	535.57	540.67	0.000165	1.77	244.63	100.05	0.13
Sherman	2745	10 yr	595.00	532.57	541.70	536.11	541.77	0.000187	2.10	291.85	198.81	0.14
Sherman	2745	25 yr	830.00	532.57	543.10	536.69	543.25	0.000192	2.40	356.37	279.13	0.14
Sherman	2745	50 yr	1054.89	532.57	545.29	537.18	545.38	0.000145	2.42	449.95	281.80	0.13
Sherman	2745	100 yr	1151.29	532.57	546.81	537.39	546.89	0.000110	2.30	516.59	281.80	0.12
Sherman	2729		Culvert									
Sherman	2580	5 yr	423.00	532.22	540.20	535.34	540.22	0.000101	1.30	380.63	214.55	0.10
Sherman	2580	10 yr	595.00	532.22	540.82	535.79	540.85	0.000127	1.57	452.75	218.11	0.11
Sherman	2580	25 yr	830.00	532.22	541.41	536.31	541.46	0.000167	1.91	522.53	221.48	0.13
Sherman	2580	50 yr	1054.89	532.22	542.40	536.74	542.46	0.000150	1.98	642.46	227.17	0.13
Sherman	2580	100 yr	1151.29	532.22	543.34	536.90	543.38	0.000110	1.84	758.51	232.52	0.11
Sherman	2524		Culvert									
Sherman	2459.5*	5 yr	423.00	531.80	537.33		537.55	0.001925	3.78	111.90	36.61	0.38
Sherman	2459.5*	10 yr	595.00	531.80	538.60		538.81	0.001325	3.65	163.96	47.30	0.33
Sherman	2459.5*	25 yr	830.00	531.80	540.24		540.39	0.000643	3.19	315.53	114.99	0.24
Sherman	2459.5*	50 yr	1054.89	531.80	542.26		542.34	0.000242	2.42	580.41	146.99	0.16
Sherman	2459.5*	100 yr	1151.29	531.80	543.28		543.33	0.000156	2.11	740.17	164.87	0.13

Exhibit 7A

HEC-RAS Plan: Prop_complx_norm River: Drainage Reach: Sherman (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Sherman	2339	5 yr	423.00	531.39	536.28	535.43	537.00	0.007171	6.81	62.14	20.91	0.70
Sherman	2339	10 yr	595.00	531.39	537.94	536.23	538.46	0.003867	5.80	102.61	28.50	0.53
Sherman	2339	25 yr	830.00	531.39	539.85	537.09	540.20	0.001916	4.86	187.86	61.24	0.39
Sherman	2339	50 yr	1054.89	531.39	542.07	537.77	542.26	0.000660	3.68	338.71	74.25	0.25
Sherman	2339	100 yr	1151.29	531.39	543.13	538.02	543.28	0.000439	3.30	420.78	80.45	0.20
Sherman	2284		Culvert									
Sherman	2077	5 yr	554.00	529.74	535.97		536.13	0.000908	3.26	173.78	45.11	0.27
Sherman	2077	10 yr	784.00	529.74	536.73		536.96	0.001057	3.88	210.82	55.49	0.30
Sherman	2077	25 yr	1096.00	529.74	537.38		537.71	0.001331	4.72	251.73	69.91	0.35
Sherman	2077	50 yr	1400.89	529.74	537.88		538.31	0.001577	5.43	287.97	74.93	0.38
Sherman	2077	100 yr	1591.29	529.74	538.45		538.89	0.001433	5.49	332.46	79.70	0.37
Sherman	1955.25*	5 yr	554.00	529.00	535.85		536.02	0.000862	3.37	180.26	85.70	0.27
Sherman	1955.25*	10 yr	784.00	529.00	536.61		536.83	0.000947	3.90	234.87	74.29	0.29
Sherman	1955.25*	25 yr	1096.00	529.00	537.24		537.54	0.001179	4.67	282.91	80.13	0.33
Sherman	1955.25*	50 yr	1413.00	529.00	537.71		538.11	0.001436	5.42	321.98	86.24	0.37
Sherman	1955.25*	100 yr	1784.00	529.00	538.16		538.66	0.001729	6.20	361.85	92.02	0.41
Sherman	1833.5*	5 yr	554.00	526.60	535.74	532.05	535.92	0.000804	3.45	187.47	66.30	0.26
Sherman	1833.5*	10 yr	784.00	526.60	536.46	532.90	536.71	0.000960	4.13	243.87	89.48	0.29
Sherman	1833.5*	25 yr	1096.00	526.60	537.03	533.81	537.39	0.001319	5.08	298.82	105.73	0.34
Sherman	1833.5*	50 yr	1413.00	526.60	537.43	534.66	537.91	0.001696	5.98	342.92	116.16	0.39
Sherman	1833.5*	100 yr	1784.00	526.60	537.77	535.59	538.42	0.002172	6.99	385.02	125.31	0.45
Sherman	1628		Culvert									
Sherman	1711.75*	5 yr	554.00	526.60	534.11		534.54	0.002605	5.29	111.42	39.09	0.44
Sherman	1711.75*	10 yr	784.00	526.60	535.10		535.61	0.002468	5.87	170.08	82.31	0.44
Sherman	1711.75*	25 yr	1096.00	526.60	535.78		536.42	0.002838	6.80	233.51	104.69	0.48
Sherman	1711.75*	50 yr	1413.00	526.60	536.26		537.03	0.003273	7.67	287.65	121.08	0.52
Sherman	1711.75*	100 yr	1784.00	526.60	536.70		537.62	0.003776	8.60	343.91	136.42	0.57
Sherman	1590	5 yr	554.00	525.71	533.77		534.22	0.002671	5.50	121.26	39.75	0.41
Sherman	1590	10 yr	784.00	525.71	534.65		535.26	0.003139	6.47	176.35	122.08	0.45
Sherman	1590	25 yr	1096.00	525.71	535.44		536.05	0.003099	6.95	294.69	179.57	0.46
Sherman	1590	50 yr	1413.00	525.71	536.04		536.59	0.002882	7.08	416.00	219.04	0.45
Sherman	1590	100 yr	1784.00	525.71	536.64		537.11	0.002571	7.02	553.35	242.73	0.43
Sherman	1442.5*	5 yr	554.00	525.37	533.39		533.83	0.002573	5.40	119.87	41.53	0.41
Sherman	1442.5*	10 yr	784.00	525.37	534.22		534.80	0.002975	6.31	185.81	135.41	0.45
Sherman	1442.5*	25 yr	1096.00	525.37	535.02		535.60	0.002906	6.76	316.33	189.57	0.45
Sherman	1442.5*	50 yr	1413.00	525.37	535.64		536.17	0.002760	6.97	442.34	220.37	0.45
Sherman	1442.5*	100 yr	1784.00	525.37	536.24		536.73	0.002572	7.08	583.89	244.71	0.44
Sherman	1295.*	5 yr	554.00	525.03	533.03		533.45	0.002471	5.28	117.92	42.59	0.40
Sherman	1295.*	10 yr	784.00	525.03	533.84		534.37	0.002729	6.07	204.22	149.09	0.43
Sherman	1295.*	25 yr	1096.00	525.03	534.65		535.17	0.002652	6.49	345.69	201.12	0.43
Sherman	1295.*	50 yr	1413.00	525.03	535.27		535.77	0.002550	6.74	478.69	225.47	0.43
Sherman	1295.*	100 yr	1784.00	525.03	535.88		536.36	0.002424	6.93	622.96	242.80	0.43
Sherman	1147.5*	5 yr	554.00	524.69	532.69		533.09	0.002330	5.13	122.15	113.36	0.39
Sherman	1147.5*	10 yr	784.00	524.69	533.51		533.97	0.002393	5.72	233.22	160.53	0.41
Sherman	1147.5*	25 yr	1096.00	524.69	534.32		534.79	0.002344	6.16	384.41	212.05	0.41
Sherman	1147.5*	50 yr	1413.00	524.69	534.94		535.40	0.002295	6.45	523.24	231.75	0.41
Sherman	1147.5*	100 yr	1784.00	524.69	535.56		536.01	0.002229	6.70	670.18	244.37	0.41
Sherman	1000	5 yr	554.00	524.35	532.41	529.31	532.76	0.002001	4.81	151.71	120.79	0.37
Sherman	1000	10 yr	784.00	524.35	533.24	530.28	533.62	0.002003	5.30	273.94	173.45	0.38
Sherman	1000	25 yr	1096.00	524.35	534.05	531.37	534.45	0.002002	5.76	434.81	223.67	0.39
Sherman	1000	50 yr	1413.00	524.35	534.67	533.16	535.07	0.002001	6.09	578.20	237.73	0.39
Sherman	1000	100 yr	1784.00	524.35	535.28	533.78	535.68	0.002002	6.42	726.27	248.09	0.40

Exhibit 7B

Rating Table Report
Georgetowne Rd Culvert - Existing - 84" RCCP

Range Data:			
	Minimum	Maximum	Increment
Discharge	100.00	700.00	20.00 cfs

Discharge (cfs)	HW Elev. (ft)	TW Elev. (ft)	(1) Discharge	W) Discharge
100.00	545.27	544.04	100.02	0.00
120.00	545.65	544.26	120.03	0.00
140.00	546.02	544.46	139.98	0.00
160.00	546.36	544.63	159.97	0.00
180.00	546.69	544.79	180.03	0.00
200.00	547.01	544.93	200.03	0.00
220.00	547.33	545.06	219.95	0.00
240.00	547.63	545.18	239.94	0.00
260.00	547.93	545.30	259.97	0.00
280.00	548.22	545.40	279.94	0.00
300.00	548.52	545.50	300.03	0.00
320.00	548.81	545.60	320.03	0.00
340.00	549.10	545.69	339.97	0.00
360.00	549.39	545.78	360.03	0.00
380.00	549.68	545.86	380.03	0.00
400.00	549.98	545.94	399.97	0.00
420.00	550.27	546.02	419.97	0.00
440.00	550.58	546.09	439.97	0.00
460.00	550.91	546.17	459.97	0.00
480.00	551.28	546.24	480.00	0.00
500.00	551.67	546.31	499.97	0.00
520.00	552.07	546.37	519.96	0.00
540.00	552.49	546.44	540.02	0.00
560.00	552.92	546.50	560.01	0.00
580.00	553.25	546.56	574.67	5.38
600.00	553.43	546.62	582.26	17.80
620.00	553.54	546.68	587.38	32.63
640.00	553.64	546.74	591.63	48.26
660.00	553.73	546.79	595.40	64.72
680.00	553.81	546.86	598.59	81.41
700.00	553.87	546.97	601.44	98.56

→ Finished Floor Elev. 548.28ft

Exhibit 8A

Performance Curves Report
Georgetowne Rd Culvert - Existing - 84" RCCP

Range Data:			
	Minimum	Maximum	Increment
Discharge	100.00	700.00	20.00 cfs

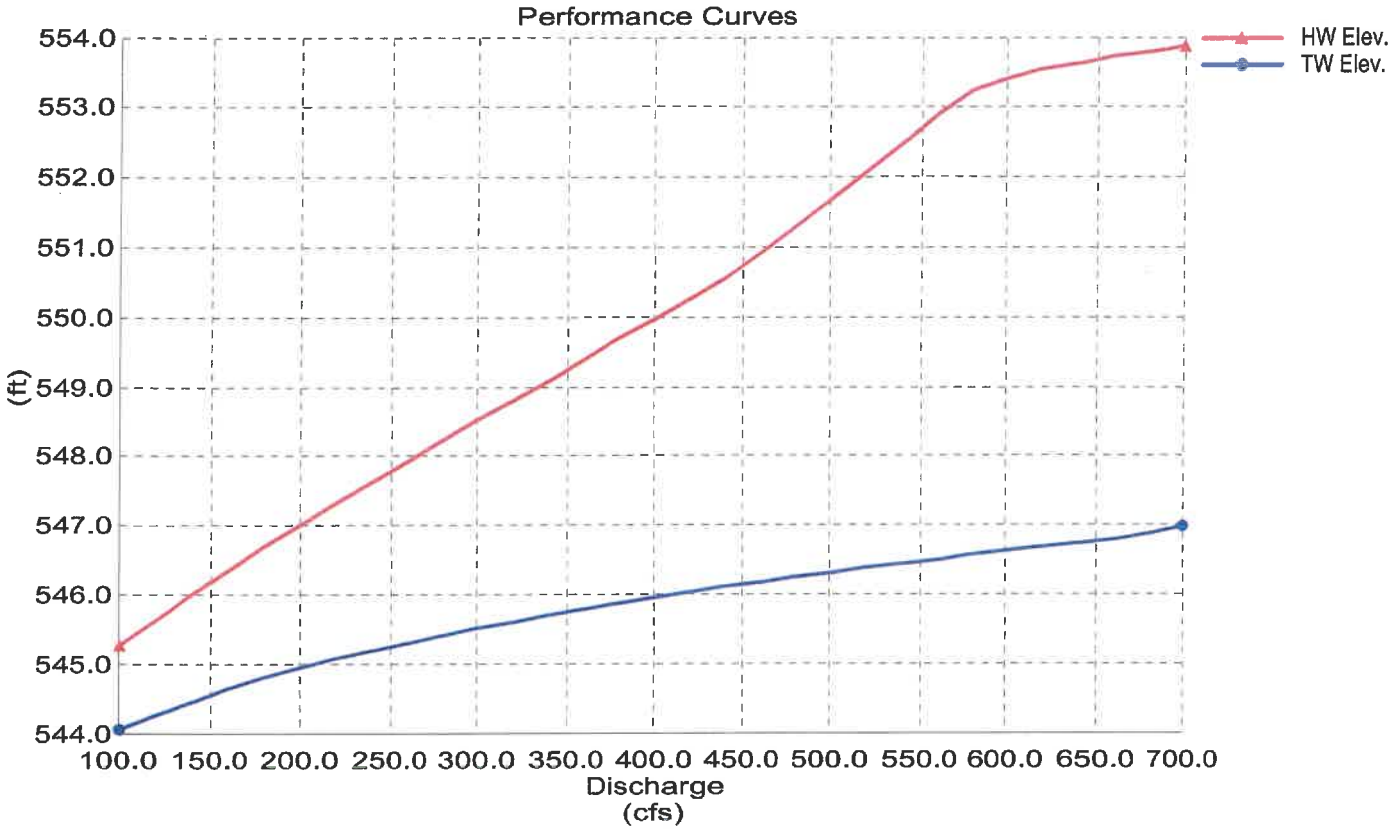


Exhibit 8B

Culvert Designer/Analyzer Report
Georgetowne Rd Culvert - Existing - 84" RCCP

Component:Culvert-1

Culvert Summary					
Computed Headwater Elev:	552.97	ft	Discharge	562.03	cfs
Inlet Control HW Elev.	552.97	ft	Tailwater Elevation	546.51	ft
Outlet Control HW Elev.	552.63	ft	Control Type	Inlet Control	
Headwater Depth/Height	1.63				

Grades					
Upstream Invert	541.57	ft	Downstream Invert	541.38	ft
Length	86.00	ft	Constructed Slope	0.002209	ft/ft

Hydraulic Profile					
Profile	CompositeM2PressureProfile		Depth, Downstream	6.12	ft
Slope Type	Mild		Normal Depth	N/A	ft
Flow Regime	Subcritical		Critical Depth	6.12	ft
Velocity Downstream	15.74	ft/s	Critical Slope	0.007014	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	7.00	ft
Section Size	84 inch		Rise	7.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	552.63	ft	Upstream Velocity Head	3.31	ft
Ke	0.20		Entrance Loss	0.66	ft

Inlet Control Properties					
Inlet Control HW Elev.	552.97	ft	Flow Control	N/A	
Inlet Type	Groove end w/headwall		Area Full	38.5	ft²
K	0.00180		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	2	
C	0.02920		Equation Form	1	
Y	0.74000				

Exhibit 8C

Culvert Designer/Analyzer Report
Georgetowne Rd Culvert - Existing - 84" RCCP

Component:Weir

Hydraulic Component(s): Roadway					
Discharge	0.00	cfs	Allowable HW Elevation	552.97	ft
Roadway Width	28.00	ft	Overtopping Coefficient	2.90	US
Low Point	552.97	ft	Headwater Elevation	N/A	ft
Discharge Coefficient (Cr)	2.90		Submergence Factor (Kt)	1.00	
Tailwater Elevation	546.51	ft			

Sta (ft)	Elev. (ft)
-70.00	556.00
-65.00	553.43
-36.00	552.97
11.00	553.77
53.00	556.00

Exhibit 8 D

Rating Table Report
Georgetowne Rd Culvert Proposed 84" & 72" RCCP

Range Data:

	Minimum	Maximum	Increment	
Discharge	100.00	700.00	20.00	cfs

Discharge (cfs)	HW Elev. (ft)	TW Elev. (ft)	(1) Discharge	(2) Discharge	W) Discharge
100.00	544.41	544.04	52.69	47.34	0.00
120.00	544.68	544.26	63.27	56.66	0.00
140.00	544.93	544.46	74.01	66.07	0.00
160.00	545.16	544.63	84.62	75.30	0.00
180.00	545.38	544.79	95.33	84.60	0.00
200.00	545.59	544.93	106.10	93.90	0.00
220.00	545.78	545.06	116.83	103.13	0.00
240.00	545.97	545.18	127.66	112.40	0.00
260.00	546.15	545.30	138.39	121.53	0.00
280.00	546.33	545.40	149.20	130.70	0.00
300.00	546.50	545.50	160.14	139.93	0.00
320.00	546.67	545.60	170.93	148.98	0.00
340.00	546.84	545.69	181.80	158.06	0.00
360.00	547.01	545.78	192.75	167.14	0.00
380.00	547.17	545.86	203.76	176.23	0.00
400.00	547.34	545.94	214.73	185.22	0.00
420.00	547.50	546.02	225.74	194.20	0.00
440.00	547.66	546.09	236.79	203.13	0.00
460.00	547.82	546.17	247.89	212.05	0.00
480.00	547.98	546.24	259.03	220.91	0.00
500.00	548.14	546.31	270.21	229.73	0.00
520.00	548.30	546.37	281.42	238.52	0.00
540.00	548.46	546.44	292.70	247.26	0.00
560.00	548.62	546.50	304.07	255.90	0.00
580.00	548.78	546.56	315.45	264.53	0.00
600.00	548.94	546.62	326.90	273.09	0.00
620.00	549.11	546.68	338.40	281.53	0.00
640.00	549.27	546.74	350.00	289.93	0.00
660.00	549.44	546.79	361.69	298.25	0.00
680.00	549.61	546.86	373.65	306.44	0.00
700.00	549.80	546.97	386.27	313.67	0.00

→ Finished Floor Elev. 548.28 ft

Exhibit 9A

Performance Curves Report
Georgetowne Rd Culvert Proposed 84" & 72" RCCP

Range Data:			
	Minimum	Maximum	Increment
Discharge	100.00	700.00	20.00 cfs

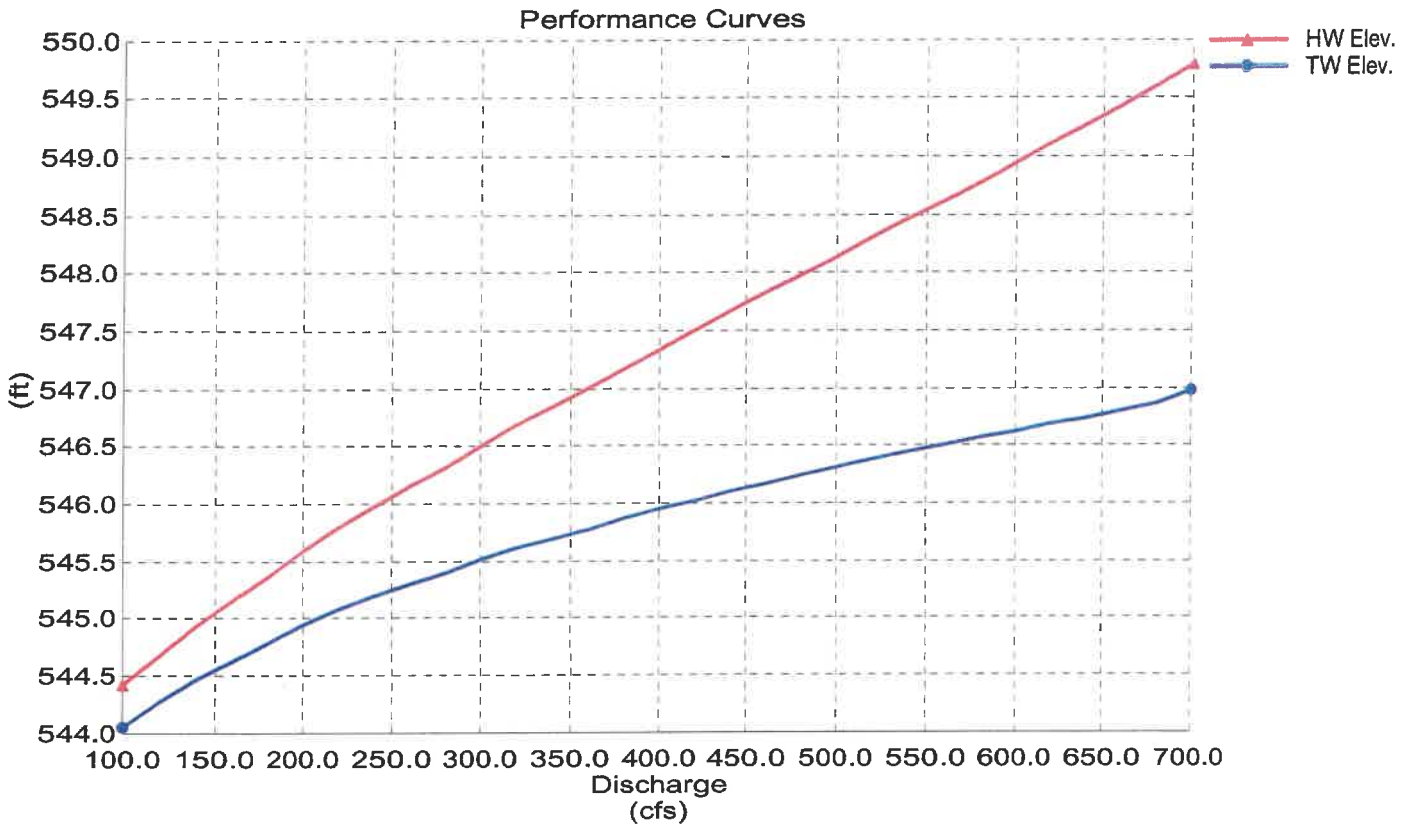


Exhibit 9B

Culvert Designer/Analyzer Report
Georgetowne Rd Culvert Proposed 84" & 72" RCCP

Component:Culvert-1

Culvert Summary			
Computed Headwater Elev:	547.84 ft	Discharge	249.56 cfs
Inlet Control HW Elev.	547.50 ft	Tailwater Elevation	546.18 ft
Outlet Control HW Elev.	547.84 ft	Control Type	Outlet Control
Headwater Depth/Height	0.90		

Grades			
Upstream Invert	541.57 ft	Downstream Invert	541.38 ft
Length	86.00 ft	Constructed Slope	0.002209 ft/ft

Hydraulic Profile			
Profile	M2	Depth, Downstream	4.80 ft
Slope Type	Mild	Normal Depth	4.87 ft
Flow Regime	Subcritical	Critical Depth	4.14 ft
Velocity Downstream	8.88 ft/s	Critical Slope	0.003531 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.013
Section Material	Concrete	Span	7.00 ft
Section Size	84 inch	Rise	7.00 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev.	547.84 ft	Upstream Velocity Head	1.22 ft
Ke	0.20	Entrance Loss	0.24 ft

Inlet Control Properties			
Inlet Control HW Elev.	547.50 ft	Flow Control	Unsubmerged
Inlet Type	Groove end w/headwall	Area Full	38.5 ft²
K	0.00180	HDS 5 Chart	1
M	2.00000	HDS 5 Scale	2
C	0.02920	Equation Form	1
Y	0.74000		

Exhibit 9C

Culvert Designer/Analyzer Report
Georgetowne Rd Culvert Proposed 84" & 72" RCCP

Component:Culvert-2

Culvert Summary					
Computed Headwater Elev:	547.84	ft	Discharge	213.37	cfs
Inlet Control HW Elev.	547.43	ft	Tailwater Elevation	546.18	ft
Outlet Control HW Elev.	547.84	ft	Control Type	Outlet Control	
Headwater Depth/Height	1.05				

Grades					
Upstream Invert	541.57	ft	Downstream Invert	541.38	ft
Length	86.00	ft	Constructed Slope	0.002209	ft/ft

Hydraulic Profile					
Profile	M2		Depth, Downstream	4.80	ft
Slope Type	Mild		Normal Depth	5.49	ft
Flow Regime	Subcritical		Critical Depth	4.00	ft
Velocity Downstream	8.80	ft/s	Critical Slope	0.004140	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	6.00	ft
Section Size	72 inch		Rise	6.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	547.84	ft	Upstream Velocity Head	1.17	ft
Ke	0.20		Entrance Loss	0.23	ft

Inlet Control Properties					
Inlet Control HW Elev.	547.43	ft	Flow Control	Unsubmerged	
Inlet Type	Groove end w/headwall		Area Full	28.3	ft²
K	0.00180		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	2	
C	0.02920		Equation Form	1	
Y	0.74000				

Exhibit 9D

Culvert Designer/Analyzer Report
Georgetowne Rd Culvert Proposed 84" & 72" RCCP

Component:Weir

Hydraulic Component(s): Roadway					
Discharge	0.00	cfs	Allowable HW Elevation	547.84	ft
Roadway Width	28.00	ft	Overtopping Coefficient	2.90	US
Low Point	552.97	ft	Headwater Elevation	N/A	ft
Discharge Coefficient (Cr)	2.90		Submergence Factor (Kt)	1.00	
Tailwater Elevation	546.18	ft			

Sta (ft)	Elev. (ft)
-70.00	556.00
-65.00	553.43
-36.00	552.97
11.00	553.77
53.00	556.00

Exhibit 9E

GREENE & BRADFORD, INC.
3501 CONSTITUTION DRIVE
SPRINGFIELD, IL. 62711-7007
(217) 793-8844
(217) 793-6227 FAX
www.greeneandbradford.com

PROJECT NO: 08-247
DESCRIPTION: Georgetowne Rd. & Railroad Cost Estimate
CALC. BY: KK DATE: 2/27/09
CHKED BY: DRG DATE:

Exhibit 10 - Georgetowne Rd. & U.P. Railroad

PRELIMINARY CONSTRUCTION COST ESTIMATE

GEORGETOWNE RD. CULVERT RECOMMENDATION

ITEM NO.	DESCRIPTION OF PAY ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
1	72" RCCP BORED	92	FOOT	$325.00	$29,900.00
	TOTAL				$29,900.00

RAILROAD CULVERT - OPTION 1

ITEM NO.	DESCRIPTION OF PAY ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
1	8' X 8' BOX CULVERT UNDER R.R.	130	FOOT	$1,040.00	$135,200.00
2	8' X 8' END SECTION	2	EACH	$8,000.00	$16,000.00
	TOTAL				$151,200.00

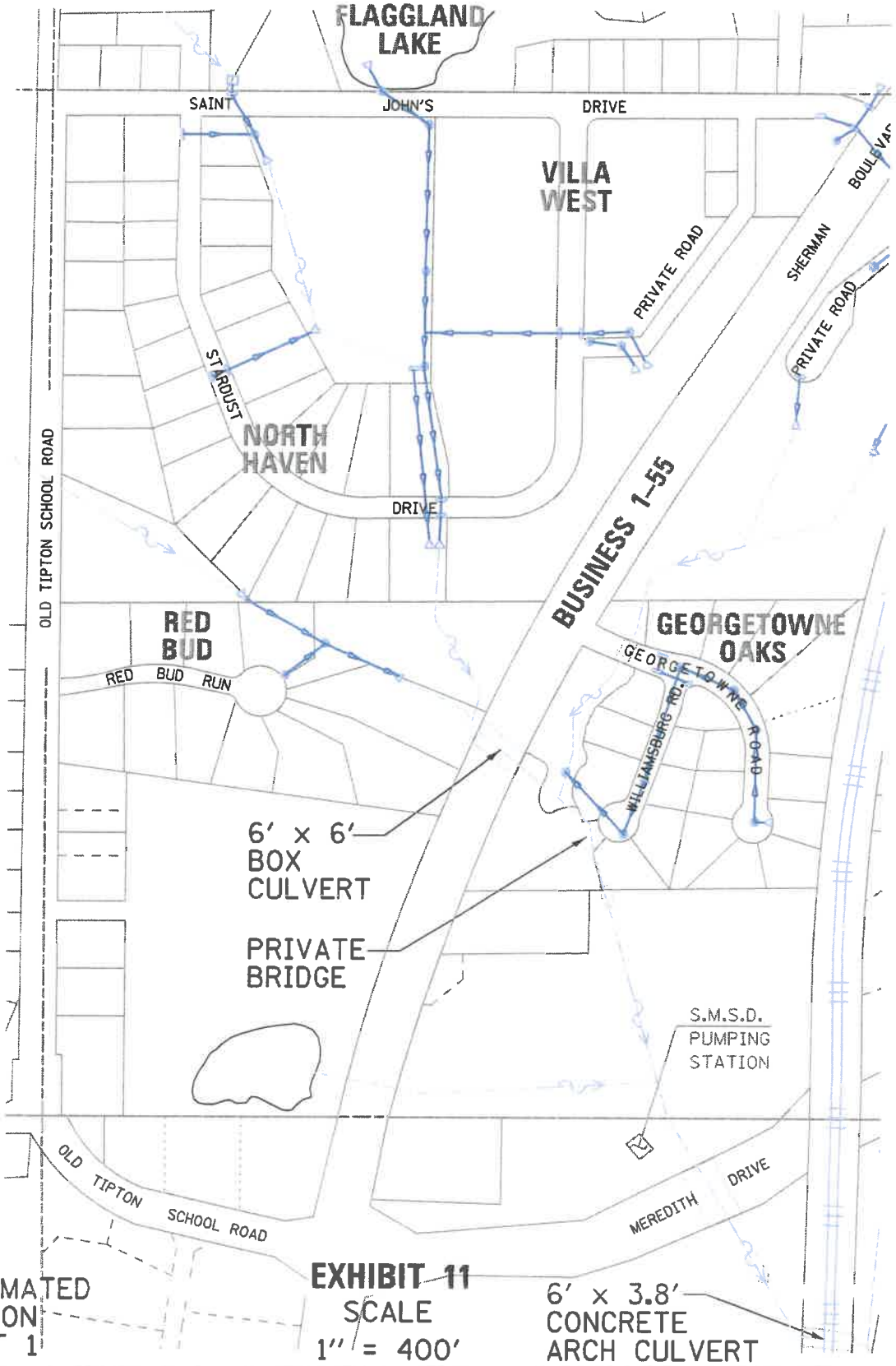
RAILROAD CULVERT- OPTION 2

ITEM NO.	DESCRIPTION OF PAY ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
1	12' X 8' BOX CULVERT UNDER R.R.	130	FOOT	$1,730.00	$224,900.00
2	12' X 8' END SECTION	2	EACH	$13,000.00	$26,000.00
	TOTAL				$250,900.00

ITEM NO.	DESCRIPTION OF PAY ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
	TOTAL				$0.00

RED BUD & NORTH HAVEN

EXHIBITS



TOTAL ESTIMATED CONSTRUCTION SEE EXHIBIT 1

EXHIBIT 11
SCALE
1" = 400'

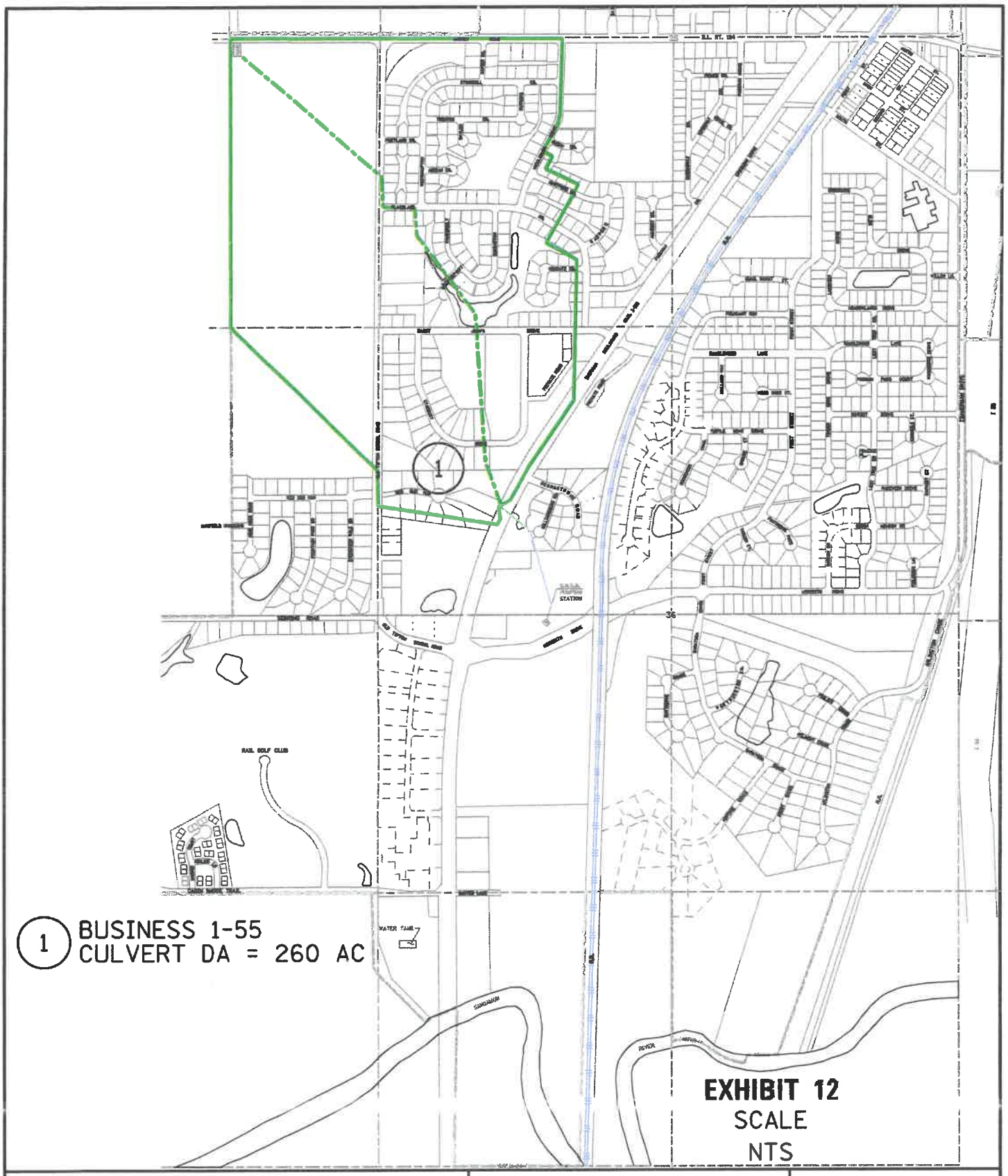
GREENE & BRADFORD, INC.
OF SPRINGFIELD
CONSULTING ENGINEERS
3501 CONSTITUTION DRIVE
SPRINGFIELD, ILLINOIS 62711
PROFESSIONAL DESIGN FIRM NO. 184-001179
PROFESSIONAL & STRUCTURAL ENGINEERING CORPORATION
(217) 793-8844, 793-6227 (F), E-MAIL - cad@greeneandbradford.com

LOCATION MAP

VILLAGE OF SHERMAN
NORTH HAVEN AND
RED BUD

COMPUTER FILE NO.
Exhibit 11.dgn

PROJECT: 08247
02/26/09 - FAV



(1) BUSINESS 1-55
CULVERT DA = 260 AC

EXHIBIT 12
SCALE
NTS

GREENE & BRADFORD, INC.
OF SPRINGFIELD
CONSULTING ENGINEERS
3501 CONSTITUTION DRIVE
SPRINGFIELD, ILLINOIS 62711
PROFESSIONAL DESIGN FIRM NO. 184-001179
PROFESSIONAL & STRUCTURAL ENGINEERING CORPORATION
(217) 793-8844, 793-6227 (F), E-MAIL - oad@greeneandbradford.com

DRAINAGE AREAS

VILLAGE OF SHERMAN
NORTH HAVEN &
RED BUD

COMPUTER FILE NO.
Exhibit 12.dgn

PROJECT: 08247
02/26/09 - FAV

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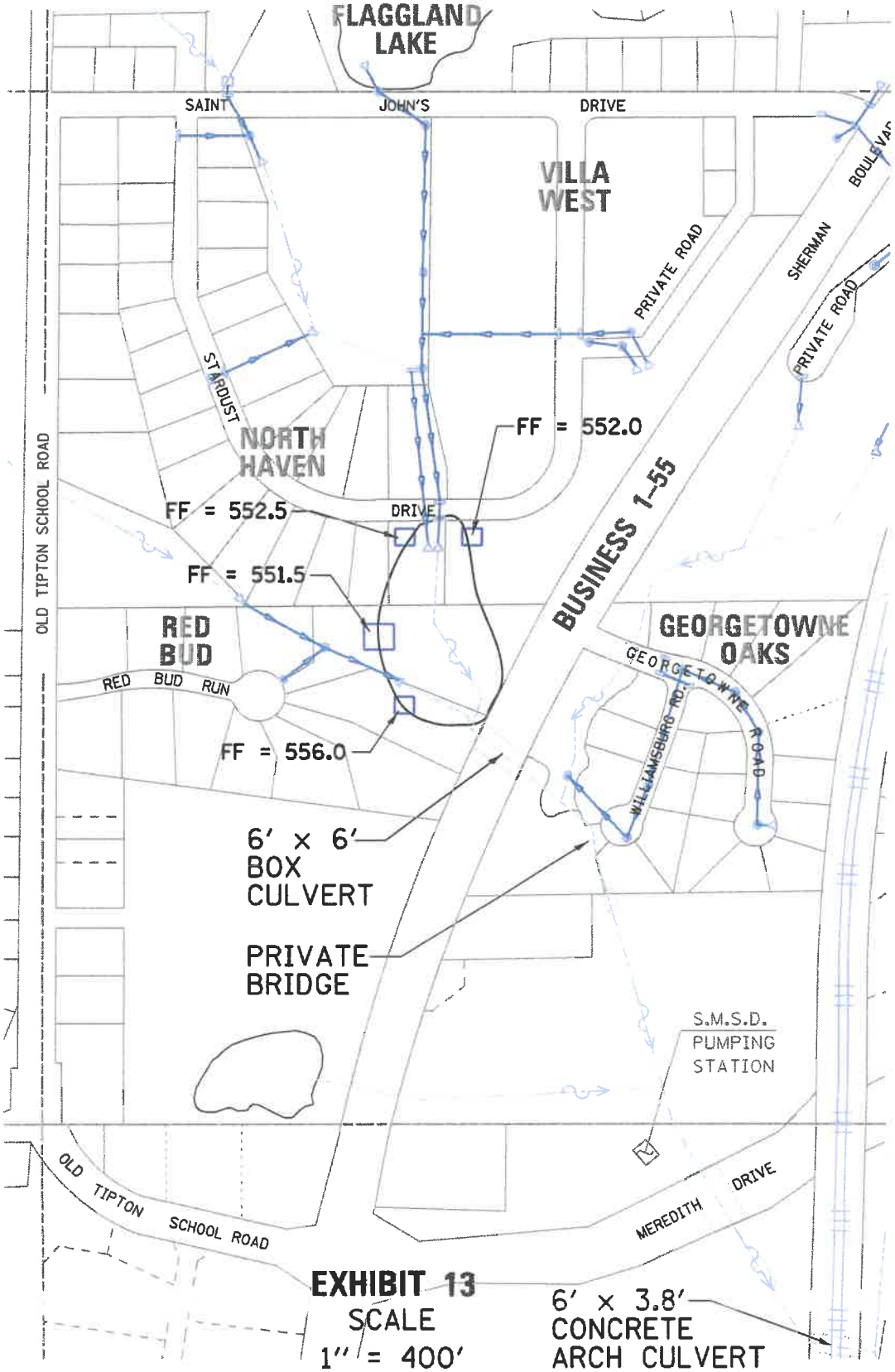


EXHIBIT 13

SCALE 1" = 400'

GREENE & BRADFORD, INC.
OF SPRINGFIELD
CONSULTING ENGINEERS
3501 CONSTITUTION DRIVE
SPRINGFIELD, ILLINOIS 62711
PROFESSIONAL DESIGN FIRM NO. 184-001179
PROFESSIONAL & STRUCTURAL ENGINEERING CORPORATION
(217) 793-8844, 793-6227 (F), E-MAIL - cad@greeneandbradford.com

FLOOD MAP

VILLAGE OF SHERMAN
NORTH HAVEN AND
RED BUD

COMPUTER FILE NO.
Exhibit 13.dgn

PROJECT: 08247
02/26/09 - FAV

Rating Table Report
BUS 55 w/ Existing RR culvert

Range Data:			
	Minimum	Maximum	Increment
Discharge	0.00	500.00	25.00 cfs

Discharge (cfs)	HW Elev. (ft)	TW Elev. (ft)
0.00	550.10	550.10
25.00	550.11	550.10
50.00	550.16	550.10
75.00	550.22	550.10
100.00	550.32	550.10
125.00	550.44	550.10
150.00	550.59	550.10
175.00	550.77	550.10
200.00	550.98	550.10
225.00	551.21	550.10
250.00	551.47	550.10
275.00	551.76	550.10
300.00	552.08	550.10
325.00	552.42	550.10
350.00	552.79	550.10
375.00	553.19	550.10
400.00	553.62	550.10
425.00	554.07	550.10
450.00	554.55	550.10
475.00	555.06	550.10
500.00	555.59	550.10

Exhibit 14 A

Performance Curves Report
BUS 55 w/ Existing RR culvert

Range Data:			
	Minimum	Maximum	Increment
Discharge	0.00	500.00	25.00 cfs

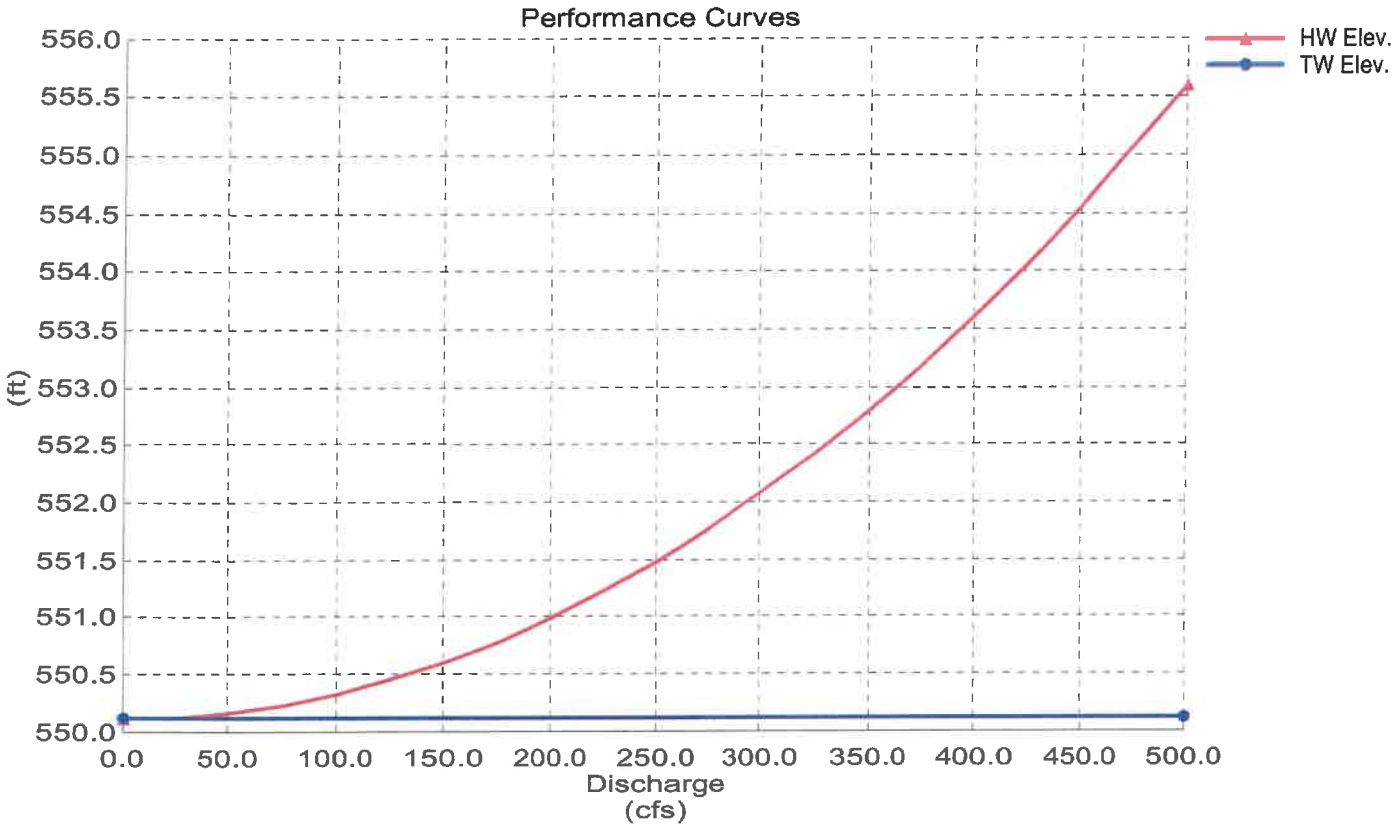


Exhibit 14B

Culvert Designer/Analyzer Report
BUS 55 w/ Existing RR culvert

Component:Culvert-1

Culvert Summary			
Computed Headwater Elev	551.47 ft	Discharge	249.97 cfs
Inlet Control HW Elev.	550.10 ft	Tailwater Elevation	550.10 ft
Outlet Control HW Elev.	551.47 ft	Control Type	Outlet Control
Headwater Depth/Height	1.27		

Grades			
Upstream Invert	543.88 ft	Downstream Invert	543.16 ft
Length	116.00 ft	Constructed Slope	0.006207 ft/ft

Hydraulic Profile			
Profile	PressureProfile	Depth, Downstream	6.94 ft
Slope Type	N/A	Normal Depth	3.39 ft
Flow Regime	N/A	Critical Depth	3.78 ft
Velocity Downstream	6.94 ft/s	Critical Slope	0.004688 ft/ft

Section			
Section Shape	Box	Mannings Coefficient	0.013
Section Material	Concrete	Span	6.00 ft
Section Size	6 x 6 ft	Rise	6.00 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev.	551.47 ft	Upstream Velocity Head	0.75 ft
Ke	0.50	Entrance Loss	0.37 ft

Inlet Control Properties			
Inlet Control HW Elev.	550.10 ft	Flow Control	Unsubmerged
Inlet Type 45° wingwall flare, d=0.0430		Area Full	36.0 ft²
K	0.51000	HDS 5 Chart	9
M	0.66700	HDS 5 Scale	1
C	0.03090	Equation Form	2
Y	0.80000		

Exhibit 14C

Culvert Designer/Analyzer Report
BUS 55 w/ Existing RR culvert

Component:Weir

Hydraulic Component(s): Roadway (Constant Elevation)					
Discharge	0.00	cfs	Allowable HW Elevation	551.47	ft
Roadway Width	100.00	ft	Overtopping Coefficient	2.90	US
Length	100.00	ft	Crest Elevation	556.50	ft
Headwater Elevation	N/A	ft	Discharge Coefficient (Cr)	2.90	
Submergence Factor (Kt)	1.00				

Sta (ft)	Elev. (ft)
0.00	556.50
100.00	556.50

Exhibit 14D

Rating Table Report
BUS 55 w/ Proposed RR culvert

Range Data:			
	Minimum	Maximum	Increment
Discharge	0.00	500.00	25.00 cfs

Discharge (cfs)	HW Elev. (ft)	TW Elev. (ft)
0.00	547.25	547.25
25.00	547.28	547.25
50.00	547.39	547.25
75.00	547.56	547.25
100.00	547.80	547.25
125.00	548.11	547.25
150.00	548.51	547.25
175.00	549.09	547.25
200.00	549.58	547.25
225.00	550.04	547.25
250.00	550.49	547.25
275.00	550.93	547.25
300.00	551.35	547.25
325.00	551.76	547.25
350.00	552.16	547.25
375.00	552.55	547.25
400.00	552.93	547.25
425.00	553.30	547.25
450.00	553.67	547.25
475.00	554.04	547.25
500.00	554.62	547.25

Exhibit 15A

Performance Curves Report
BUS 55 w/ Proposed RR culvert

Range Data:			
	Minimum	Maximum	Increment
Discharge	0.00	500.00	25.00 cfs

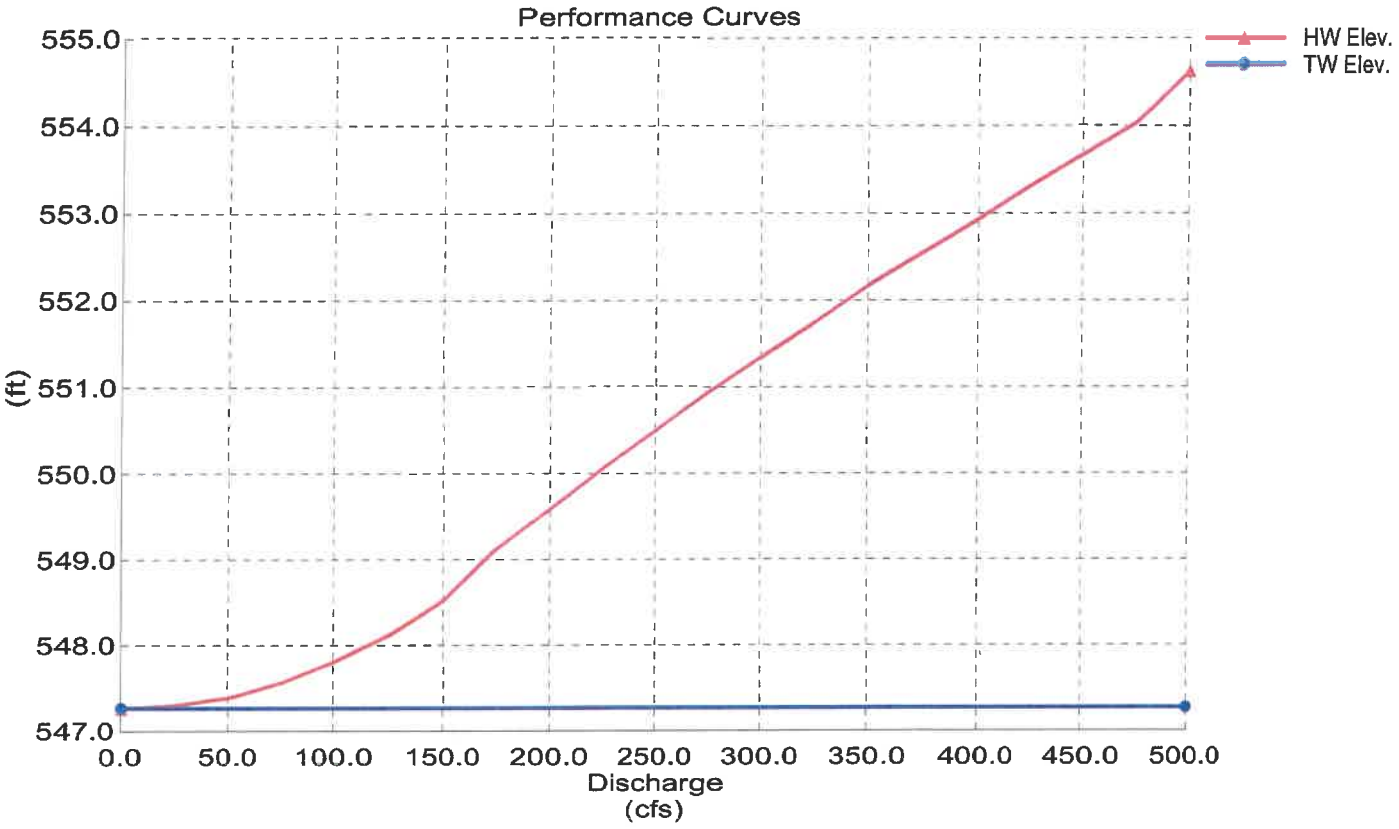


Exhibit 15B

Culvert Designer/Analyzer Report
BUS 55 w/ Proposed RR culvert

Component:Culvert-1

Culvert Summary					
Computed Headwater Elev	550.49	ft	Discharge	249.97	cfs
Inlet Control HW Elev.	550.01	ft	Tailwater Elevation	547.25	ft
Outlet Control HW Elev.	550.49	ft	Control Type	Entrance Control	
Headwater Depth/Height	1.10				

Grades					
Upstream Invert	543.88	ft	Downstream Invert	543.16	ft
Length	116.00	ft	Constructed Slope	0.006207	ft/ft

Hydraulic Profile					
Profile	CompositeS1S2		Depth, Downstream	4.09	ft
Slope Type	Steep		Normal Depth	3.39	ft
Flow Regime	N/A		Critical Depth	3.78	ft
Velocity Downstream	10.19	ft/s	Critical Slope	0.004688	ft/ft

Section					
Section Shape	Box		Mannings Coefficient	0.013	
Section Material	Concrete		Span	6.00	ft
Section Size	6 x 6 ft		Rise	6.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	550.49	ft	Upstream Velocity Head	1.89	ft
Ke	0.50		Entrance Loss	0.94	ft

Inlet Control Properties					
Inlet Control HW Elev.	550.01	ft	Flow Control	Unsubmerged	
Inlet Type	45° wingwall flare, d=0.0430		Area Full	36.0	ft²
K	0.51000		HDS 5 Chart	9	
M	0.66700		HDS 5 Scale	1	
C	0.03090		Equation Form	2	
Y	0.80000				

Exhibit 15C

Culvert Designer/Analyzer Report
BUS 55 w/ Proposed RR culvert

Component:Weir

Hydraulic Component(s): Roadway (Constant Elevation)					
Discharge	0.00	cfs	Allowable HW Elevation	550.49	ft
Roadway Width	100.00	ft	Overtopping Coefficient	2.90	US
Length	100.00	ft	Crest Elevation	556.50	ft
Headwater Elevation	N/A	ft	Discharge Coefficient (Cr)	2.90	
Submergence Factor (Kt)	1.00				

Sta (ft)	Elev. (ft)
0.00	556.50
100.00	556.50

Exhibit 150

QUAIL RIDGE

EXHIBITS

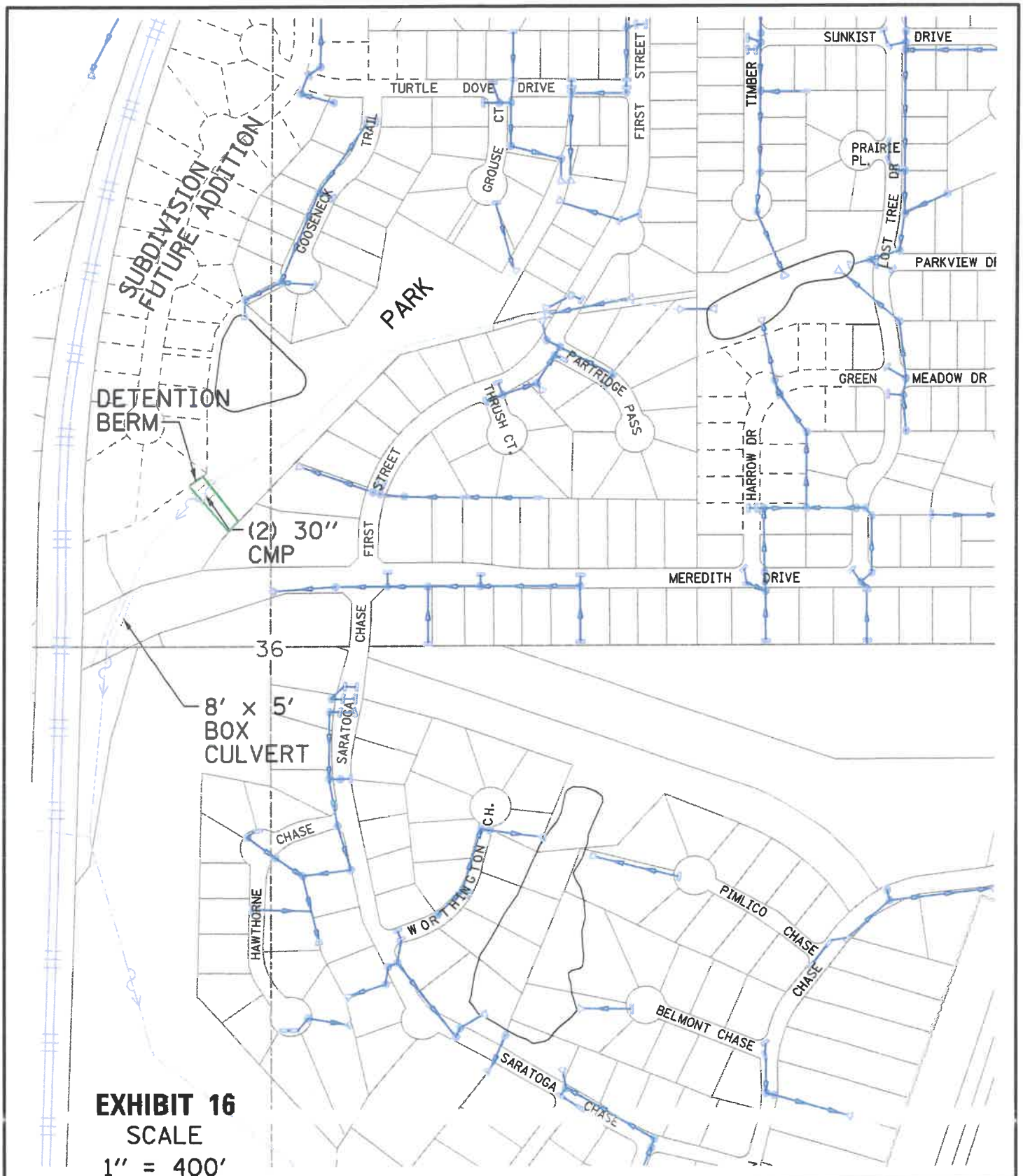


EXHIBIT 16
SCALE
1" = 400'

GREENE & BRADFORD, INC.
OF SPRINGFIELD
CONSULTING ENGINEERS
3501 CONSTITUTION DRIVE
SPRINGFIELD, ILLINOIS 62711
PROFESSIONAL DESIGN FIRM NO. 184-001179
PROFESSIONAL & STRUCTURAL ENGINEERING CORPORATION
(217) 793-8844, 793-6227 (F), E-MAIL - oad@greeneandbradford.com

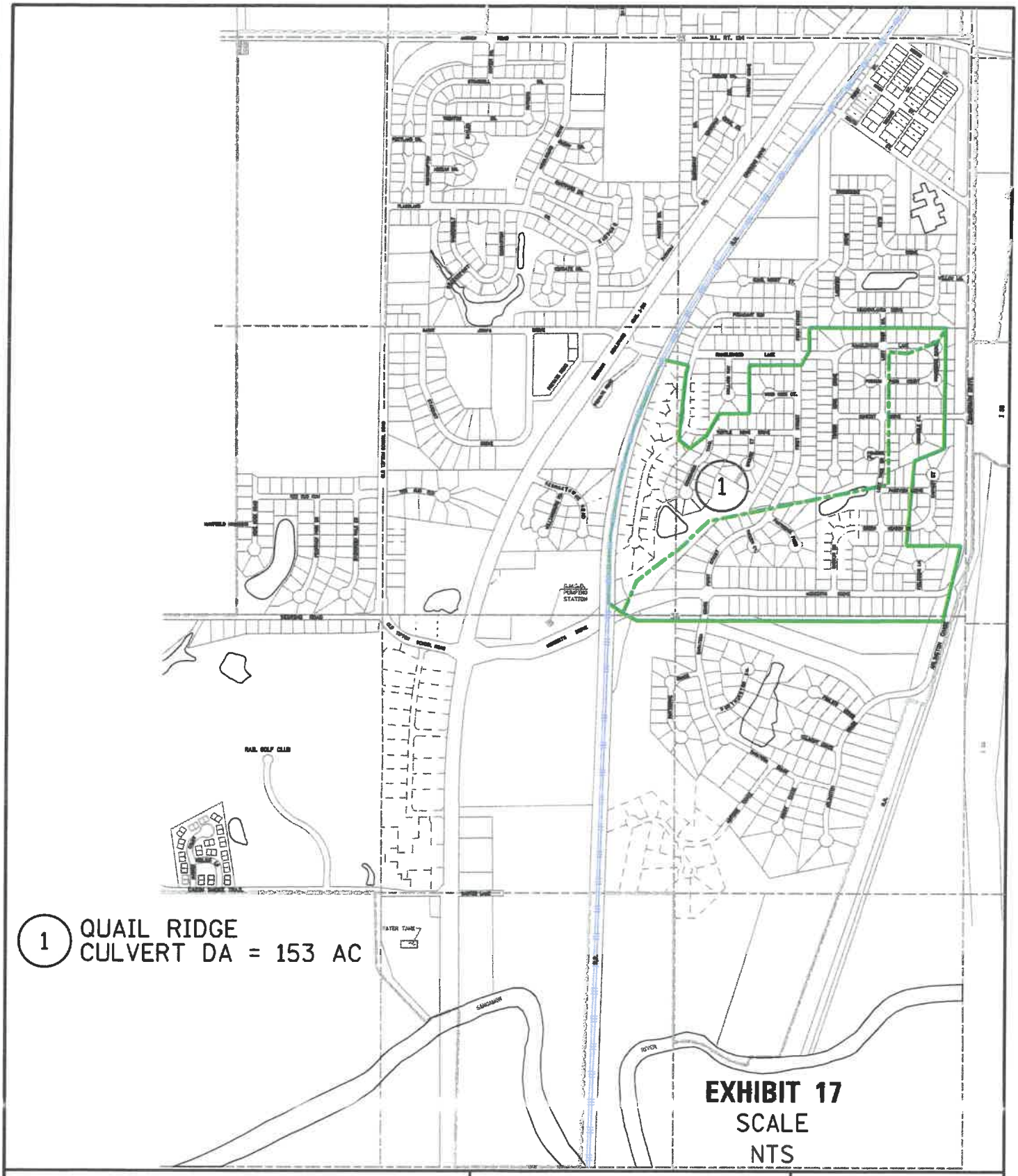
LOCATION MAP

VILLAGE OF SHERMAN
QUAIL RIDGE

COMPUTER FILE NO.
Exhibit 16.dgn

PROJECT: 08247
02/26/09 - FAV

ASONIC_SYSPRINT_BLACK_BORDER.PLT



1 QUAIL RIDGE
CULVERT DA = 153 AC

EXHIBIT 17
SCALE
NTS

GREENE & BRADFORD, INC.
OF SPRINGFIELD
CONSULTING ENGINEERS
3501 CONSTITUTION DRIVE
SPRINGFIELD, ILLINOIS 62711
PROFESSIONAL DESIGN FIRM NO. 184-001179
PROFESSIONAL & STRUCTURAL ENGINEERING CORPORATION
(217) 793-8844, 793-6227 (F), E-MAIL - cad@greeneandbradford.com

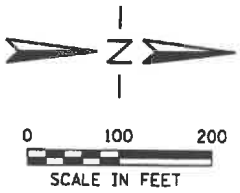
DRAINAGE AREAS

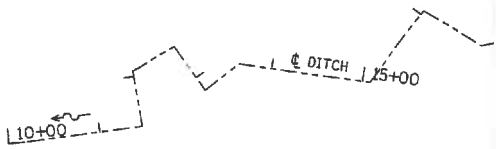
VILLAGE OF SHERMAN
QUAIL RIDGE

COMPUTER FILE NO.
Exhibit 17.dgn

PROJECT: 08247
02/26/09 - FAV

SONIC_SYSPRINT_BLACK_BORDER.PLT





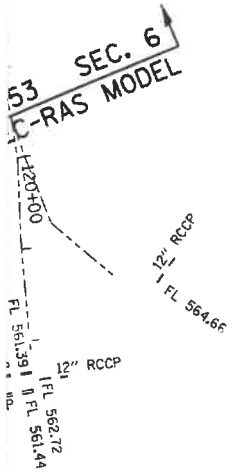


EXHIBIT 18

FILE NAME = J:\08247\DRAWINGS\08247-sht-planhyd02.dgn	USER NAME = dang	DES	F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		DRA					
	PLOT SCALE = 200.0000 ' / IN.	CHE			CONTRACT NO.		
G&B PROJECT:	PLOT DATE = 4/15/2009	DAT TO STA.	FED. ROAD DIST. NO.	ILLINOIS	FED. AID PROJECT		

PLOT DRIVER = TDS700_PS_LOCAL_HALFSIZE_IDOT.PLT

GARDEWINE & BANWART, INC.
CONSULTING ENGINEERS
OF ILLINOIS

Existing Quail Ridge

HEC-RAS Plan: Existing River: Trib Reach: Quail Ridge Park Profile: 100 yr With Dete

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Quail Ridge Park	11953	100 yr With Dete	121.00	558.28	560.57		561.04	0.012187	5.50	21.99	16.56	0.84
Quail Ridge Park	11850.6*	100 yr With Dete	121.00	557.19	559.44	559.21	559.85	0.010816	5.13	23.59	18.22	0.79
Quail Ridge Park	11748.3*	100 yr With Dete	121.00	556.10	558.16	558.03	558.61	0.013588	5.42	22.34	19.02	0.88
Quail Ridge Park	11646	100 yr With Dete	121.00	555.01	557.12		557.46	0.008978	4.64	26.34	24.47	0.73
Quail Ridge Park	11551.3*	100 yr With Dete	121.00	554.18	556.28		556.62	0.008788	4.66	26.08	23.52	0.72
Quail Ridge Park	11456.6*	100 yr With Dete	121.00	553.31	555.38		555.75	0.009577	4.90	24.69	18.86	0.75
Quail Ridge Park	11362	100 yr With Dete	121.00	552.46	554.73		555.02	0.005967	4.28	29.64	36.49	0.60
Quail Ridge Park	11343.5*	100 yr With Dete	121.00	550.90	554.62		554.84	0.000315	1.52	210.03	170.98	0.15
Quail Ridge Park	11123	100 yr With Dete	121.00	549.34	554.62		554.82	0.000051	0.78	450.10	194.83	0.07
Quail Ridge Park	11059.2*	100 yr With Dete	121.00	547.86	554.62	549.92	554.82	0.000014	0.50	728.50	229.53	0.04
Quail Ridge Park	11006		Culvert									
Quail Ridge Park	10927.4*	100 yr With Dete	121.00	546.38	548.40	548.34	548.95	0.015476	5.93	20.42	16.60	0.94
Quail Ridge Park	10829.6*	100 yr With Dete	121.00	544.89	546.75	546.75	547.32	0.017857	6.05	19.99	17.67	1.00
Quail Ridge Park	10731.8*	100 yr With Dete	121.00	543.41	546.34	545.16	546.44	0.001481	2.58	53.73	50.77	0.32
Quail Ridge Park	10634	100 yr With Dete	170.00	541.93	545.53	544.55	546.14	0.004310	6.27	27.13	88.55	0.60
Quail Ridge Park	10614		Culvert									
Quail Ridge Park	10434	100 yr With Dete	170.00	537.57	539.83	539.83	540.60	0.013498	7.30	25.68	17.85	0.95
Quail Ridge Park	10318.2*	100 yr With Dete	170.00	535.61	539.23		539.40	0.001534	3.48	56.08	25.46	0.35
Quail Ridge Park	10202.5*	100 yr With Dete	170.00	533.66	539.27		539.31	0.000186	1.67	124.99	40.15	0.13
Quail Ridge Park	10086.7*	100 yr With Dete	170.00	531.70	539.28		539.29	0.000040	0.96	237.54	67.98	0.06
Quail Ridge Park	9971	100 yr With Dete	1500.00	529.74	538.82	535.40	539.20	0.001083	5.81	362.24	82.73	0.34

Berm over Twin 30" CMPs => Elev. 554.62 ft

Exhibit 19

GREENE & BRADFORD, INC.
3501 CONSTITUTION DRIVE
SPRINGFIELD, IL. 62711-7007
(217) 793-8844
(217) 793-6227 FAX
www.greeneandbradford.com

PROJECT NO: 08-247
DESCRIPTION: Quail Ridge Cost Estimate
CALC. BY: KK DATE: 2/27/09
CHKED BY: DRG DATE:

Exhibit 20 - Quail Ridge

PRELIMINARY CONSTRUCTION COST ESTIMATE

QUAIL RIDGE

ITEM NO.	DESCRIPTION OF PAY ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
1	ADJUST TWIN 30" CMPs	1	EACH	$5,000.00	$5,000.00
	TOTAL				**$5,000.00**

ITEM NO.	DESCRIPTION OF PAY ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
	TOTAL				**$0.00**

ITEM NO.	DESCRIPTION OF PAY ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
	TOTAL				**$0.00**

ITEM NO.	DESCRIPTION OF PAY ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
	TOTAL				**$0.00**

ALL HIS CHILDREN DAYCARE CENTER

EXHIBITS

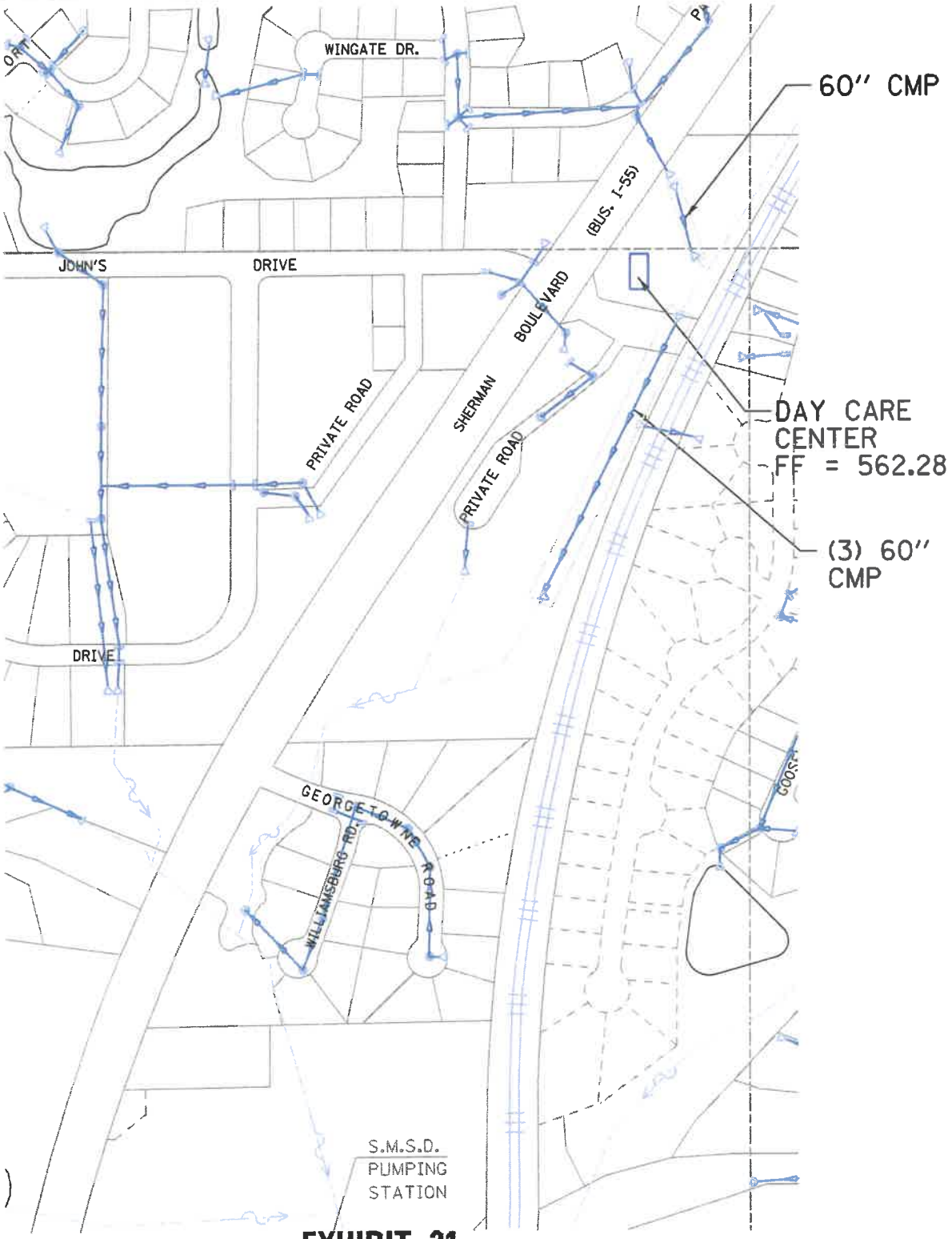


EXHIBIT 21

SCALE

1" = 400'

GREENE & BRADFORD, INC.
OF SPRINGFIELD
CONSULTING ENGINEERS
3501 CONSTITUTION DRIVE
SPRINGFIELD, ILLINOIS 62711
PROFESSIONAL DESIGN FIRM NO. 184-001179
PROFESSIONAL & STRUCTURAL ENGINEERING CORPORATION
(217) 793-8844, 793-6227 (F), E-MAIL - oad@greeneandbradford.com

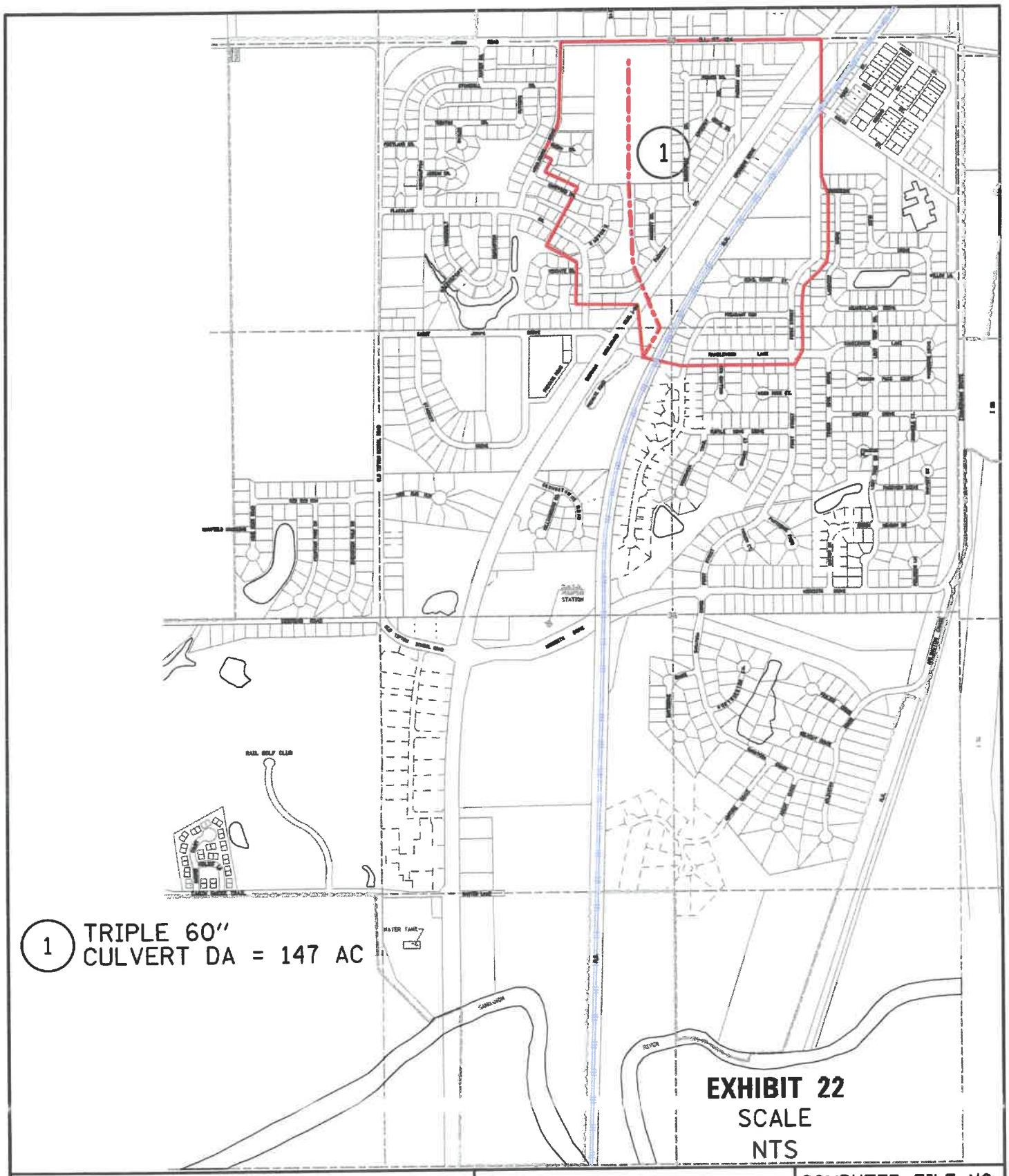
LOCATION MAP

VILLAGE OF SHERMAN
ALL HIS CHILDREN
DAY CARE

COMPUTER FILE NO.
Exhibit 21.dgn

PROJECT: 08247
02/26/09 - FAV

SONIC_SYSPRINT_BLACK_BORDER.PLT



1 TRIPLE 60" CULVERT DA = 147 AC

EXHIBIT 22
SCALE
NTS

GREENE & BRADFORD, INC.
OF SPRINGFIELD

CONSULTING ENGINEERS
3501 CONSTITUTION DRIVE
SPRINGFIELD, ILLINOIS 62711
PROFESSIONAL DESIGN FIRM NO. 184-001179
PROFESSIONAL & STRUCTURAL ENGINEERING CORPORATION
(217) 793-8844, 793-6227 (F), E-MAIL - cad@greeneandbradford.com

DRAINAGE AREAS

VILLAGE OF SHERMAN
ALL HIS CHILDREN
DAY CARE

COMPUTER FILE NO.
Exhibit 22.dgn

PROJECT: 08247
02/26/09 - FAV

PANASONIC_SYSPRINT_BLACK_BORDER.PLT

Rating Table Report
Trip Culverts Existing

Range Data:			
	Minimum	Maximum	Increment
Discharge	100.00	600.00	20.00 cfs

Discharge (cfs)	HW Elev. (ft)	TW Elev. (ft)
100.00	556.05	550.18
120.00	556.32	550.35
140.00	556.58	550.51
160.00	556.82	550.66
180.00	557.06	550.79
200.00	557.29	550.92
220.00	557.51	551.04
240.00	557.74	551.16
260.00	557.96	551.27
280.00	558.19	551.38
300.00	558.44	551.48
320.00	558.71	551.58
340.00	559.00	551.67
360.00	559.44	551.76
380.00	560.45	551.85
400.00	561.34	551.94
420.00	562.26	552.02
440.00	563.21	552.10
460.00	564.20	552.18
480.00	565.23	552.26
500.00	566.30	552.33
520.00	567.40	552.41
540.00	568.55	552.48
560.00	569.73	552.55
580.00	570.95	552.62
600.00	572.21	552.68

→ Finished Floor Elev. = 562.3 ft

Exhibit 23A

Performance Curves Report
Trip Culverts Existing

Range Data:			
	Minimum	Maximum	Increment
Discharge	100.00	600.00	20.00 cfs

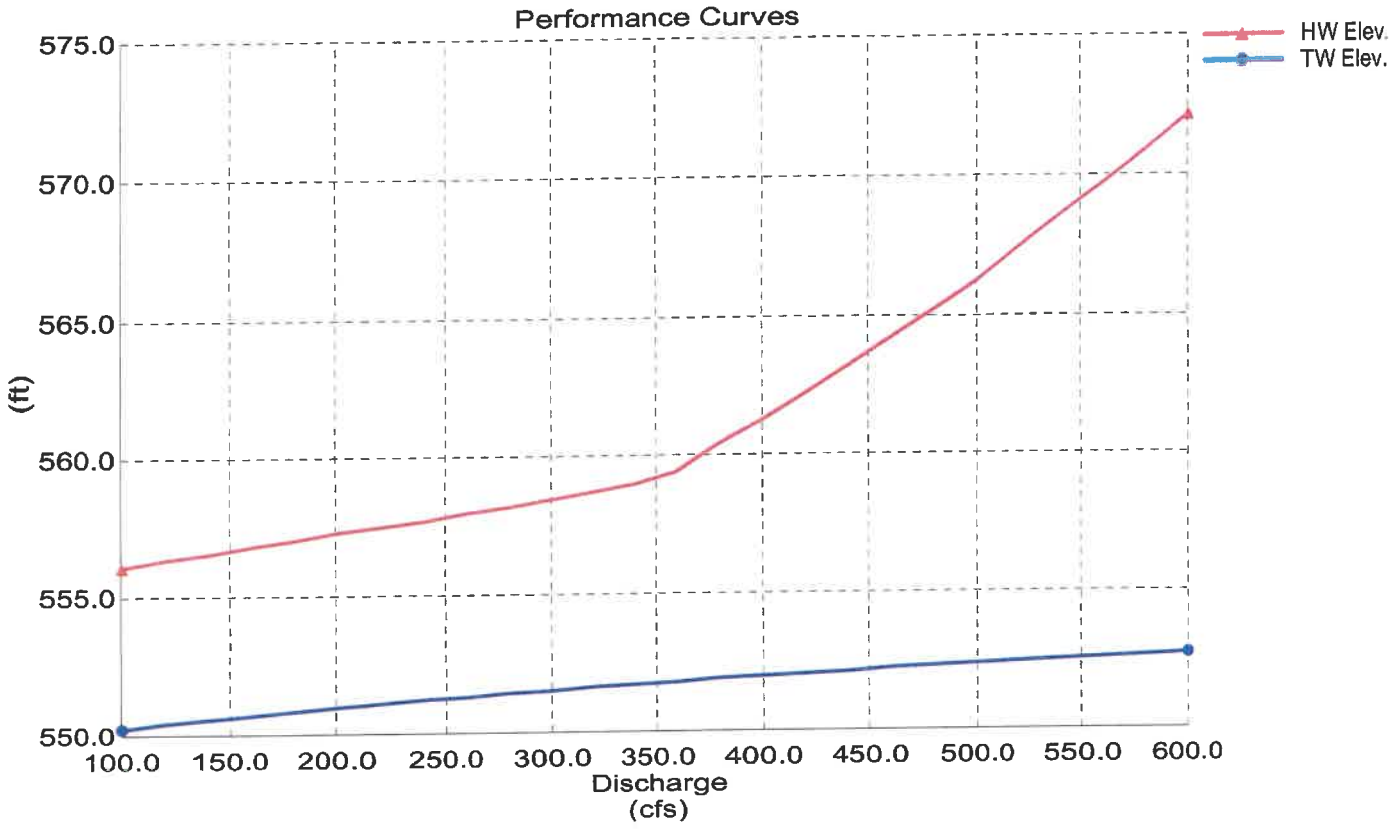


Exhibit 23B

Culvert Designer/Analyzer Report
Trip Culverts Existing

Analysis Component			
Storm Event	Design	Discharge	509.00 cfs

Peak Discharge Method: User-Specified			
Design Discharge	509.00 cfs	Check Discharge	231.00 cfs

Tailwater properties: Irregular Channel

Roughness Segments		
Start Station	End Station	Mannings Coefficient
-0+94	-0+18	0.035
-0+18	0+28	0.033
0+28	1+15	0.035

Natural Channel Points	
Station (ft)	Elevation (ft)
-0+94	564.90
-0+63	557.40
-0+18	557.10
0+00	548.34
0+08	548.62
0+28	556.96
0+73	555.78
1+15	556.07

Tailwater conditions for Design Storm.			
Discharge	509.00 cfs	Actual Depth	4.03 ft
Velocity	7.91 ft/s		

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	3-60 inch Circular	509.00 cfs	566.79 ft	10.79 ft/s
Weir	Not Considered	N/A	N/A	N/A

Exhibit 23C

Culvert Designer/Analyzer Report
Trip Culverts Existing

Component:Culvert-1

Culvert Summary					
Computed Headwater Elev	566.79	ft	Discharge	509.00	cfs
Inlet Control HW Elev.	560.34	ft	Tailwater Elevation	552.37	ft
Outlet Control HW Elev.	566.79	ft	Control Type	Outlet Control	
Headwater Depth/Height	2.67				

Grades					
Upstream Invert	553.45	ft	Downstream Invert	549.15	ft
Length	770.00	ft	Constructed Slope	0.005584	ft/ft

Hydraulic Profile					
Profile	CompositeM2PressureProfile		Depth, Downstream	3.73	ft
Slope Type	Mild		Normal Depth	N/A	ft
Flow Regime	Subcritical		Critical Depth	3.73	ft
Velocity Downstream	10.79	ft/s	Critical Slope	0.017569	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.024	
Section Material	CMP		Span	5.00	ft
Section Size	60 inch		Rise	5.00	ft
Number Sections	3				

Outlet Control Properties					
Outlet Control HW Elev.	566.79	ft	Upstream Velocity Head	1.16	ft
Ke	0.90		Entrance Loss	1.04	ft

Inlet Control Properties					
Inlet Control HW Elev.	560.34	ft	Flow Control	Transition	
Inlet Type	Projecting		Area Full	58.9	ft²
K	0.03400		HDS 5 Chart	2	
M	1.50000		HDS 5 Scale	3	
C	0.05530		Equation Form	1	
Y	0.54000				

Exhibit 23 D

Rating Table Report
Trip Culverts Proposed Added 60"

Range Data:			
	Minimum	Maximum	Increment
Discharge	100.00	600.00	20.00 cfs

Discharge (cfs)	HW Elev. (ft)	TW Elev. (ft)
100.00	555.68	550.18
120.00	555.91	550.35
140.00	556.12	550.51
160.00	556.32	550.66
180.00	556.52	550.79
200.00	556.70	550.92
220.00	556.88	551.04
240.00	557.06	551.16
260.00	557.23	551.27
280.00	557.40	551.38
300.00	557.57	551.48
320.00	557.74	551.58
340.00	557.91	551.67
360.00	558.08	551.76
380.00	558.25	551.85
400.00	558.44	551.94
420.00	558.64	552.02
440.00	558.85	552.10
460.00	559.10	552.18
480.00	559.44	552.26
500.00	560.22	552.33
520.00	560.89	552.41
540.00	561.57	552.48
560.00	562.26	552.55
580.00	562.97	552.62
600.00	563.70	552.68

→ Finished Floor Elev. = 562.3 ft

Exhibit 24 A

Performance Curves Report
Trip Culverts Proposed Added 60"

Range Data:			
	Minimum	Maximum	Increment
Discharge	100.00	600.00	20.00 cfs

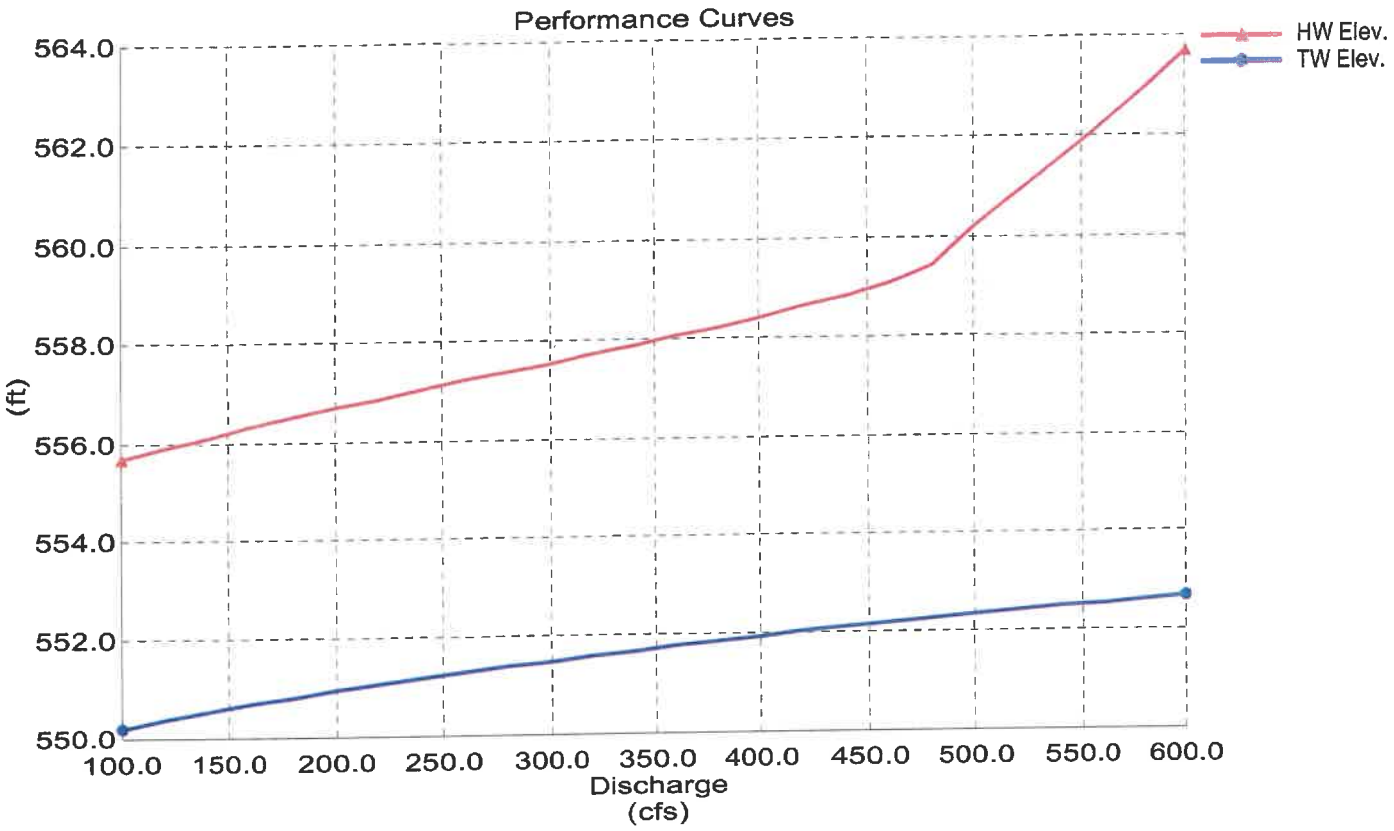


Exhibit 24B

Culvert Designer/Analyzer Report
Trip Culverts Proposed Added 60"

Analysis Component			
Storm Event	Design	Discharge	509.00 cfs

Peak Discharge Method: User-Specified			
Design Discharge	509.00 cfs	Check Discharge	231.00 cfs

Tailwater properties: Irregular Channel

Roughness Segments

Start Station	End Station	Mannings Coefficient
-0+94	-0+18	0.035
-0+18	0+28	0.033
0+28	1+15	0.035

Natural Channel Points

Station (ft)	Elevation (ft)
-0+94	564.90
-0+63	557.40
-0+18	557.10
0+00	548.34
0+08	548.62
0+28	556.96
0+73	555.78
1+15	556.07

Tailwater conditions for Design Storm.			
Discharge	509.00 cfs	Actual Depth	4.03 ft
Velocity	7.91 ft/s		

Name	Description	Discharge	HW Elev.	Velocity
Culvert-1	4-60 inch Circular	509.00 cfs	560.52 ft	9.49 ft/s
Weir	Not Considered	N/A	N/A	N/A

Exhibit 24C

Culvert Designer/Analyzer Report
Trip Culverts Proposed Added 60"

Component:Culvert-1

Culvert Summary			
Computed Headwater Elev:	560.52 ft	Discharge	509.00 cfs
Inlet Control HW Elev.	558.90 ft	Tailwater Elevation	552.37 ft
Outlet Control HW Elev.	560.52 ft	Control Type	Outlet Control
Headwater Depth/Height	1.41		

Grades			
Upstream Invert	553.45 ft	Downstream Invert	549.15 ft
Length	770.00 ft	Constructed Slope	0.005584 ft/ft

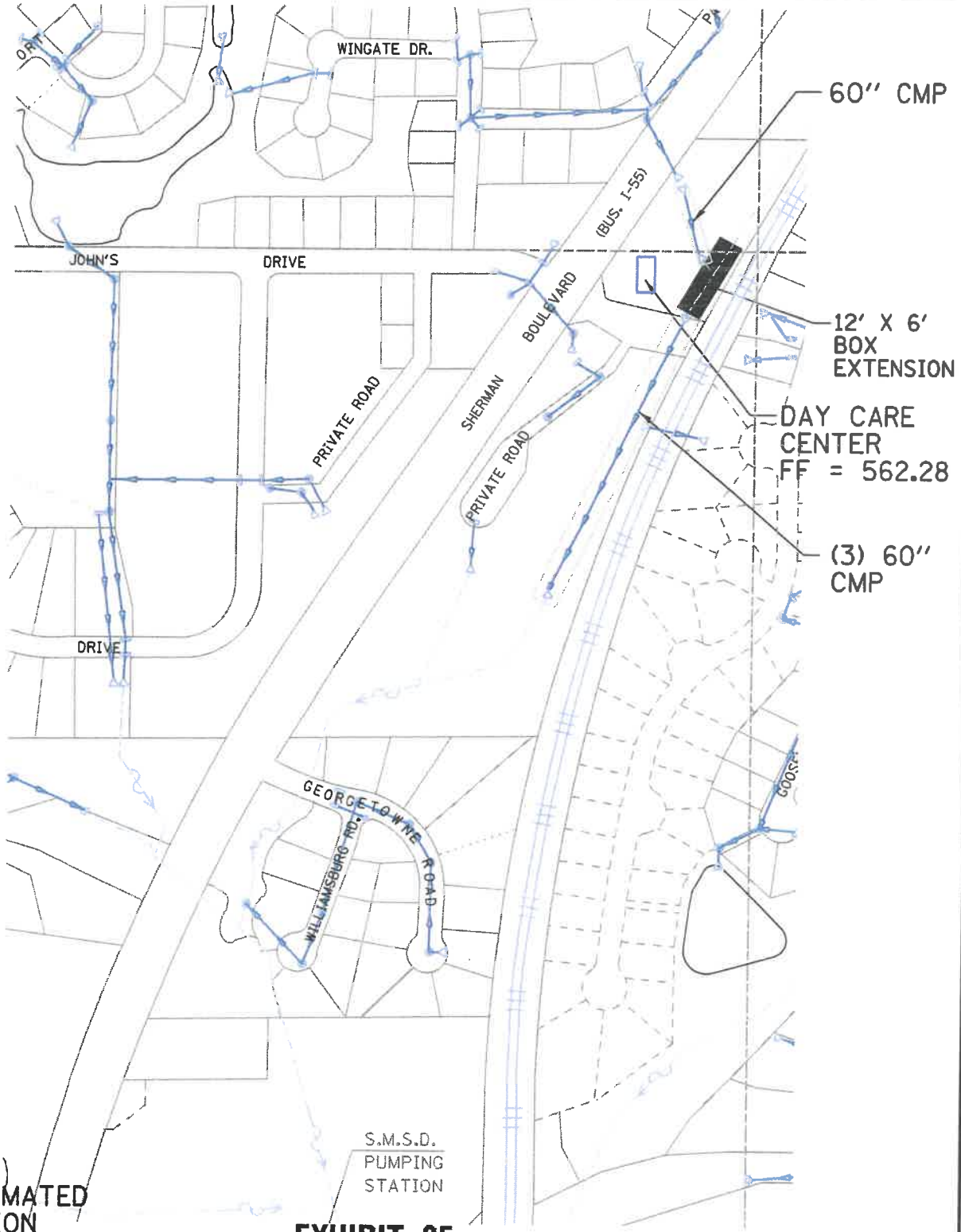
Hydraulic Profile			
Profile	CompositeM2PressureProfile	Depth, Downstream	3.23 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	3.23 ft
Velocity Downstream	9.49 ft/s	Critical Slope	0.014509 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	5.00 ft
Section Size	60 inch	Rise	5.00 ft
Number Sections	4		

Outlet Control Properties			
Outlet Control HW Elev.	560.52 ft	Upstream Velocity Head	0.65 ft
Ke	0.90	Entrance Loss	0.59 ft

Inlet Control Properties			
Inlet Control HW Elev.	558.90 ft	Flow Control	N/A
Inlet Type	Projecting	Area Full	78.5 ft²
K	0.03400	HDS 5 Chart	2
M	1.50000	HDS 5 Scale	3
C	0.05530	Equation Form	1
Y	0.54000		

Exhibit 240



TOTAL ESTIMATED CONSTRUCTION COST:
OPTION 1 = 100,000
OPTION 2 = 218,000

EXHIBIT 25
SCALE
1" = 400'

GREENE & BRADFORD, INC.
OF SPRINGFIELD
CONSULTING ENGINEERS
3501 CONSTITUTION DRIVE
SPRINGFIELD, ILLINOIS 62711
PROFESSIONAL DESIGN FIRM NO. 184-001179
PROFESSIONAL & STRUCTURAL ENGINEERING CORPORATION
(217) 793-8844, 793-6227 (F), E-MAIL - oad@greeneandbradford.com

AREA OF CONCERN
OPTION 1
VILLAGE OF SHERMAN
ALL HIS CHILDREN
DAY CARE

COMPUTER FILE NO.
Exhibit 25.dgn

PROJECT: 08247
02/26/09 - FAV

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GREENE & BRADFORD, INC.
3501 CONSTITUTION DRIVE
SPRINGFIELD, IL. 62711-7007
(217) 793-8844
(217) 793-6227 FAX
www.greeneandbradford.com

PROJECT NO: 08-247
DESCRIPTION: All His Children Daycare Center Cost Estimate
CALC. BY: KK DATE: 2/27/09
CHKED BY: DRG DATE:

Exhibit 26 - Daycare Center

PRELIMINARY CONSTRUCTION COST ESTIMATE

ALL HIS CHILDERN DAYCARE CENTER - OPTION 1

ITEM NO.	DESCRIPTION OF PAY ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
1	60" CMP	800	FOOT	$120.00	$96,000.00
2	60" CMP END SECTION	2	EACH	$2,000.00	$4,000.00
	TOTAL				**$100,000.00**

ALL HIS CHILDERN DAYCARE CENTER - OPTION 2

ITEM NO.	DESCRIPTION OF PAY ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
1	12' X 6' BOX CULVERT	130	FOOT	$1,500.00	$195,000.00
2	60" CMP	100	FOOT	$120.00	$12,000.00
3	12' X 6' END SECTION	1	EACH	$11,000.00	$11,000.00
	TOTAL				**$218,000.00**

ITEM NO.	DESCRIPTION OF PAY ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
	TOTAL				**$0.00**

ITEM NO.	DESCRIPTION OF PAY ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
	TOTAL				**$0.00**

J:\08247\CALCS\08247 COST EST.xls

FLAGGLAND PARK

EXHIBITS

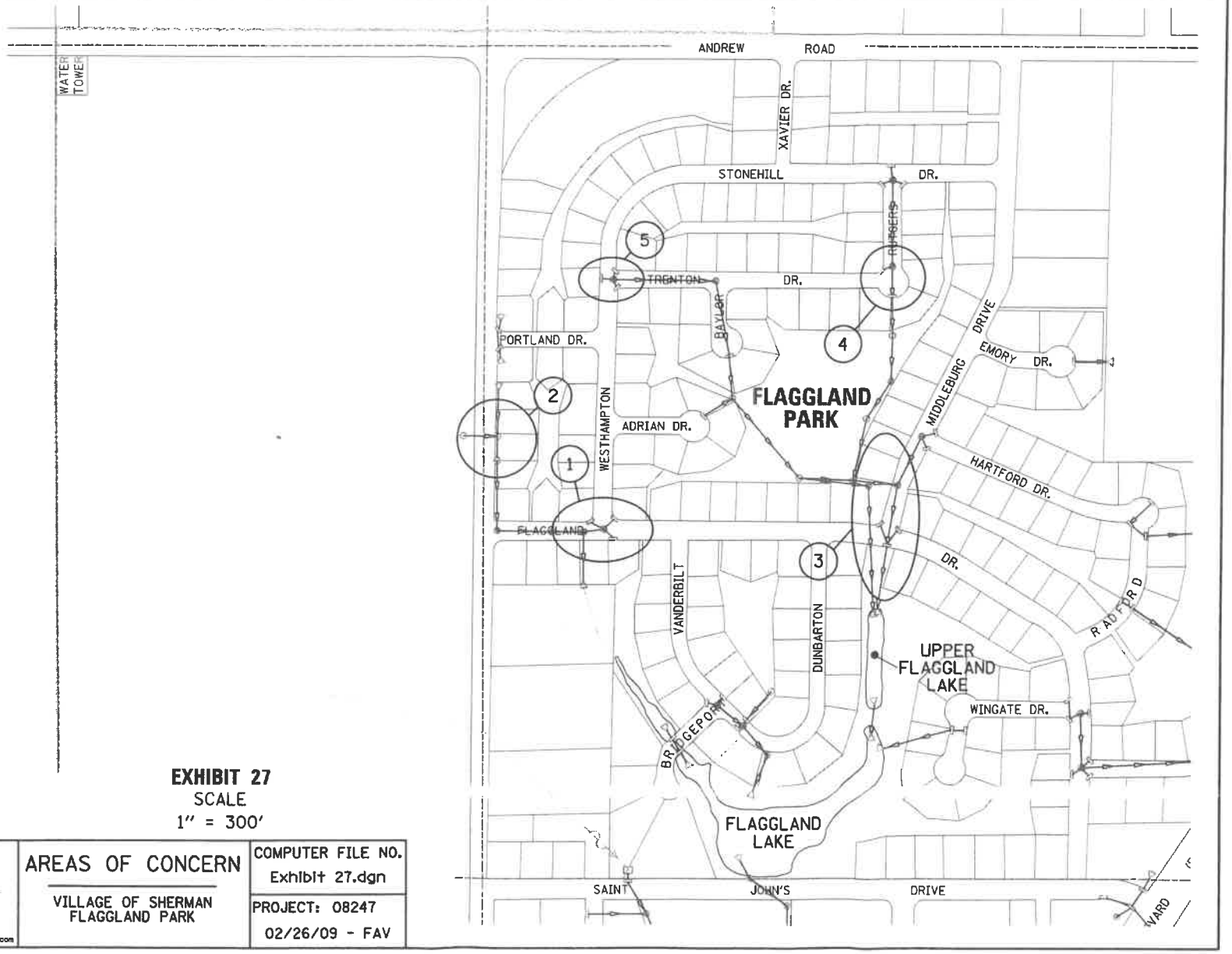


EXHIBIT 27
SCALE
1" = 300'

GREENE & BRADFORD, INC.
OF SPRINGFIELD
CONSULTING ENGINEERS
3501 CONSTITUTION DRIVE
SPRINGFIELD, ILLINOIS 62711
PROFESSIONAL DESIGN FIRM NO. 184-001179
PROFESSIONAL & STRUCTURAL ENGINEERING CORPORATION
(217) 793-8844, 793-8227 (F), E-MAIL - cadegreenandbradford.com

AREAS OF CONCERN

VILLAGE OF SHERMAN
FLAGGLAND PARK

COMPUTER FILE NO.
Exhibit 27.dgn

PROJECT: 08247
02/26/09 - FAV

EXHIBIT 28

SCALE

1" = 150'

GREENE & BRADFORD, INC.
OF SPRINGFIELD
CONSULTING ENGINEERS
3501 CONSTITUTION DRIVE
SPRINGFIELD, ILLINOIS 62711
PROFESSIONAL DESIGN FIRM NO. 184-001179
PROFESSIONAL & STRUCTURAL ENGINEERING CORPORATION
(217) 793-8844, 793-6227 (F), E-MAIL - oad@greeneandbradford.com

SMALL NETWORK

VILLAGE OF SHERMAN
FLAGGLAND PARK

COMPUTER FILE NO.
Exhibit 28.dgn

PROJECT: 08247
02/26/09 - FAV

PANASONIC_SYSPRINT_BLACK_BORDER.PLT

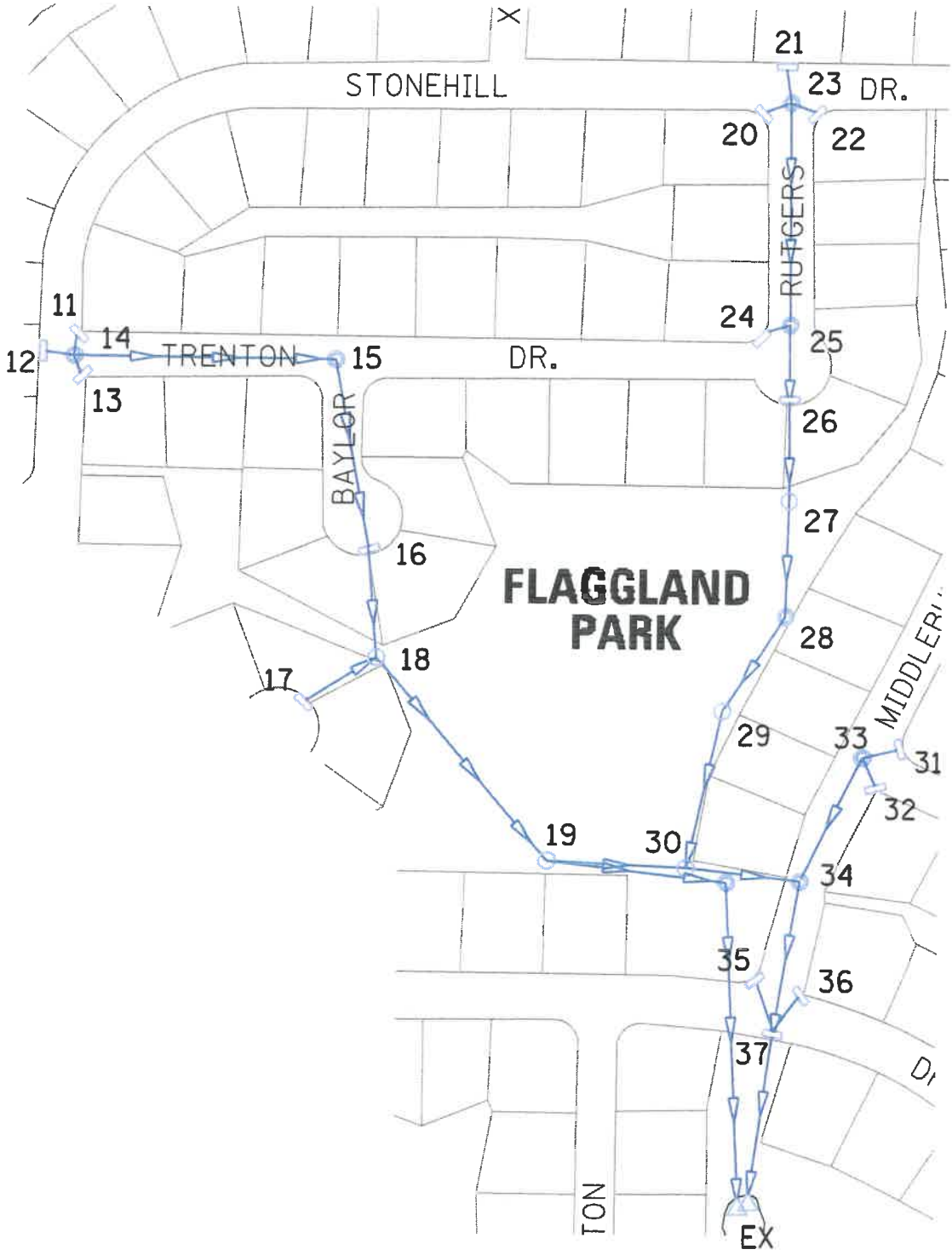


EXHIBIT 29

SCALE

1" = 200'

GREENE & BRADFORD, INC.
OF SPRINGFIELD
CONSULTING ENGINEERS
3501 CONSTITUTION DRIVE
SPRINGFIELD, ILLINOIS 62711
PROFESSIONAL DESIGN FIRM NO. 184-001179
PROFESSIONAL & STRUCTURAL ENGINEERING CORPORATION
(217) 793-8844, 793-6227 (F), E-MAIL - oad@greeneandbradford.com

LARGE NETWORK

VILLAGE OF SHERMAN
FLAGGLAND PARK

COMPUTER FILE NO.
Exhibit 29.dgn

PROJECT: 08247
02/26/09 - FAV

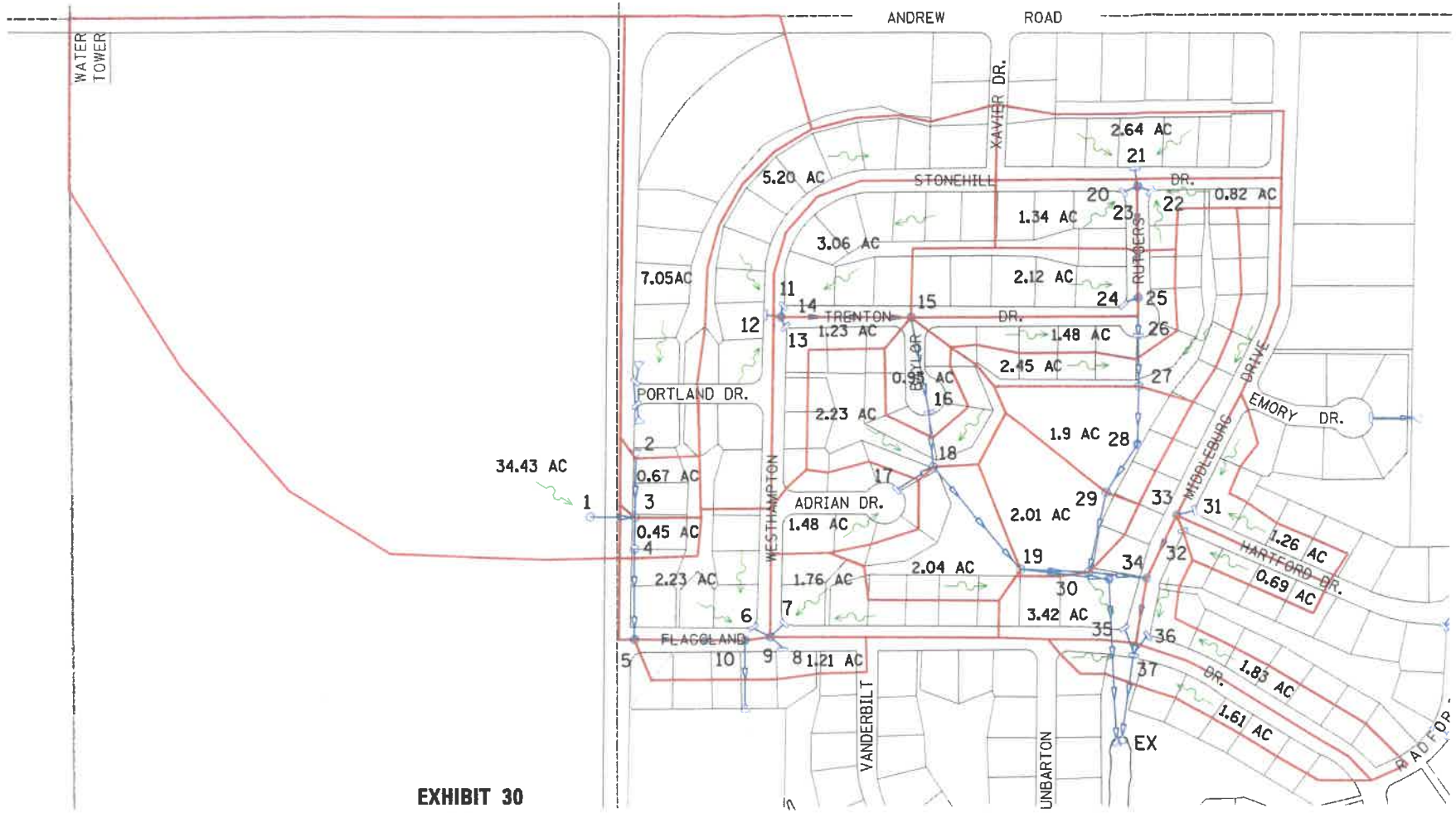


EXHIBIT 30

SCALE

1" = 250'

GREENE & BRADFORD, INC.
OF SPRINGFIELD
CONSULTING ENGINEERS
3501 CONSTITUTION DRIVE
SPRINGFIELD, ILLINOIS 62711
PROFESSIONAL DESIGN FIRM NO. 184-001179
PROFESSIONAL & STRUCTURAL ENGINEERING CORPORATION
(217) 793-8844, 793-6227 (F), E-MAIL - odd@greenandbradford.com

DRAINAGE AREAS

VILLAGE OF SHERMAN
FLAGGLAND PARK

COMPUTER FILE NO.
Exhibit 30.dgn

PROJECT: 08247
02/26/09 - FAV

Project: Flaggland Park - Small Network - Existing
Job No. 08-247

Calculated By: Gambill
Date: 1/29/2009

n = 0.013
Storm Frequency= 5 year

STRUCTURE NO.		Length	DRAINAGE AREA		Runoff	A x C		FLOW TIME		Rainfall	Total	Pipe	Capacity	VELOCITY		INVERT ELEV		RIM ELEV	Depth	Slope
From	To		Increment	Total	Coefficient	Increment	Total	To Upper End	In Section	Intensity	Runoff	Diameter	Full	Full	@ Runoff	Upper	Lower	Upper		
		Feet	Acres	Acres				min	min	in/hr	Q=CIA (cfs)	in	cfs	fps	fps				ft	ft/ft
1	3	54.0	34.43	34.43	0.25	8.61	8.61	30.00	0.25	2.92	25.13	36	9.07	1.28	3.58	575.97	575.96	580.52	4.55	0.000
2	3	144.0	7.05	7.05	0.36	2.54	2.54	20.00	0.44	3.80	9.64	18	14.86	8.41	5.46	578.89	576.01	578.89	0.00	0.020
3	4	25.0	0.67	42.15	0.45	0.30	11.45	30.25	0.09	2.91	33.32	36	63.28	8.95	4.71	575.97	575.75	580.79	4.82	0.009
4	5	237	0.45	42.60	0.45	0.20	11.65	30.34	0.82	2.91	33.91	36	0.02	0.00	4.80	575.31	575.31	580.55	5.24	0.000
5	10	286	0.00	42.60	0.00	0.00	11.65	31.16	1.00	2.88	33.60	36	3.95	0.56	4.75	575.39	575.38	582.60	7.21	0.000
6	9	32.0	2.23	2.23	0.40	0.89	0.89	15.00	0.11	4.24	3.78	12	2.62	3.21	4.82	576.08	575.92	577.80	1.72	0.005
7	9	30.0	1.76	1.76	0.55	0.97	0.97	15.00	0.10	4.24	4.10	12	#NUM!	#NUM!	5.23	575.78	575.93	577.65	1.87	-0.005
8	9	15.0	1.21	1.21	0.57	0.69	0.69	15.00	0.07	4.24	2.92	12	2.98	3.80	3.72	576.03	575.93	578.05	2.02	0.007
9	10	72	0.00	5.20	0.00	0.00	2.55	15.11	0.14	4.24	10.81	15	5.78	4.71	8.81	575.90	575.32	579.05	3.15	0.008
10	EX	154	0.00	47.80	0.00	0.00	14.20	32.17	0.45	2.85	40.45	36	40.02	5.66	5.72	575.38	574.83	579.40	4.02	0.004

Exhibit 31

Project: Flaggland Park - Small Network - Proposed No AG Runoff

Job No. 08-247

Calculated By: Gambill

Date: 1/28/2009

n = 0.013

Storm Frequency= 5 year

STRUCTURE NO.		Length	DRAINAGE AREA		Runoff	A x C		FLOW TIME		Rainfall	Total	Pipe	Capacity	VELOCITY		INVERT ELEV		RIM ELEV	Depth	Slope
From	To		Increment	Total	Coefficient	Increment	Total	To Upper End	In Section	Intensity	Runoff	Diameter	Full	Full	@ Runoff	Upper	Lower	Upper		
		Feet	Acres	Acres				min	min	in/hr	Q=CIA (cfs)	in	cfs	fps	fps				ft	ft/ft
2	3	144.0	7.05	7.05	0.36	2.54	2.54	20.00	0.44	3.80	9.64	18	14.86	8.41	5.46	578.89	576.01	578.89	0.00	0.020
3	4	25.0	0.67	7.72	0.45	0.30	2.84	20.44	0.27	3.78	10.73	36	63.28	8.95	1.52	575.97	575.75	580.79	4.82	0.009
4	5	237	0.45	8.17	0.45	0.20	3.04	20.71	2.44	3.76	11.43	36	0.02	0.00	1.62	575.31	575.31	580.55	5.24	0.000
5	10	286	0.00	8.17	0.00	0.00	3.04	23.16	3.13	3.54	10.76	36	3.95	0.56	1.52	575.39	575.38	582.60	7.21	0.000
6	9	32.0	2.23	2.23	0.40	0.89	0.89	15.00	0.11	4.24	3.78	12	2.52	3.21	4.82	576.08	575.92	577.80	1.72	0.005
7	9	30.0	1.76	1.76	0.55	0.97	0.97	15.00	0.10	4.24	4.10	12	#NUM!	#NUM!	5.23	575.78	575.93	577.65	1.87	-0.005
8	9	15.0	1.21	1.21	0.57	0.69	0.69	15.00	0.07	4.24	2.92	12	2.98	3.80	3.72	576.03	575.93	578.05	2.02	0.007
9	10	72	0.00	5.20	0.00	0.00	2.55	15.11	0.14	4.24	10.81	15	5.78	4.71	8.81	575.90	575.32	579.05	3.15	0.008
10	EX	154	0.00	13.37	0.00	0.00	5.59	26.29	1.00	3.25	18.17	36	40.02	5.66	2.57	575.38	574.83	579.40	4.02	0.004

Exhibit 32

Project: Flaggland Park - Existing - Large Network
Job No. 08-247

Calculated By: Gambill
Date: 1/29/2009

n = 0.013
Storm Frequency= 5 year

STRUCTURE NO.		Length	DRAINAGE AREA		Runoff	A x C		FLOW TIME		Rainfall	Total	Pipe	Capacity	VELOCITY		INVERT ELEV		RIM ELEV	Depth	Slope
From	To		Increment	Total	Coefficient	Increment	Total	To Upper End	In Section	Intensity	Runoff	Diameter	Full	Full	@ Runoff	Upper	Lower	Upper		
		Feet	Acres	Acres				min	min	in/hr	Q=CIA (cfs)	in	cfs	fps	fps				ft	ft/ft
11	14	27.0	3.06	3.06	0.40	1.22	1.22	15.00	0.07	4.24	5.19	12	9.01	11.48	6.61	579.72	577.99	582.42	2.70	0.064
12	14	78.0	5.20	5.20	0.52	2.70	2.70	15.00	0.09	4.24	11.46	12	4.36	5.56	14.60	579.17	578.00	582.75	3.58	0.015
13	14	23.0	1.23	1.23	0.57	0.70	0.70	15.00	0.10	4.24	2.97	12	11.60	14.77	3.78	580.34	577.90	582.49	2.15	0.106
14	15	313	0.00	9.49	0.00	0.00	4.63	15.10	0.33	4.24	19.63	15	5.78	4.71	15.99	577.99	575.49	582.99	5.00	0.008
15	16	243	0.00	9.49	0.00	0.00	4.63	15.43	0.37	4.22	19.53	18	4.70	2.66	11.05	575.37	574.88	584.69	9.32	0.002
16	18	140	0.93	10.42	0.57	0.53	5.16	15.79	0.19	4.17	21.53	18	6.64	3.76	12.19	574.79	574.23	581.19	6.40	0.004
17	18	122	1.48	1.48	0.57	0.84	0.84	15.00	0.45	4.24	3.58	12	5.16	6.57	4.55	576.74	574.18	580.74	4.00	0.021
18	19	344	2.23	14.13	0.25	0.56	6.56	20.00	0.41	3.80	24.93	18	5.75	3.26	14.11	574.17	573.14	580.10	5.93	0.003
19	30	204	2.04	16.17	0.15	0.31	6.87	20.41	0.23	3.78	25.94	18	7.43	4.20	14.68	573.14	572.12	578.64	5.50	0.005
20	23	23.0	1.34	1.34	0.50	0.67	0.67	15.00	0.11	4.24	2.84	12	7.47	9.52	3.62	579.78	578.77	582.90	3.12	0.044
21	23	39.0	2.64	2.64	0.52	1.37	1.37	15.00	0.09	4.24	5.82	12	5.56	7.59	7.41	579.66	578.57	583.21	3.55	0.028
22	23	23.0	0.82	0.82	0.57	0.47	0.47	15.00	0.15	4.24	1.98	12	7.21	9.19	2.52	579.71	578.77	583.11	3.40	0.041
23	25	295	0.00	4.80	0.00	0.00	2.51	15.15	0.57	4.24	10.64	15	6.78	5.52	8.67	578.77	575.53	583.53	4.76	0.011
24	25	22	2.12	2.12	0.50	1.06	1.06	15.00	0.06	4.24	4.49	12	#NUM!	#NUM!	5.72	575.77	575.52	582.07	6.30	-0.034
25	26	64	0.00	6.92	0.00	0.00	3.57	15.72	0.09	4.20	14.98	15	7.64	8.23	12.21	576.51	575.61	582.62	6.11	0.014
26	27	154	1.48	8.40	0.55	0.81	4.38	15.81	0.17	4.17	18.30	15	4.67	3.72	14.91	575.64	574.87	581.54	5.90	0.005
27	28	125	2.45	10.85	0.25	0.61	5.00	20.00	0.19	3.80	18.99	18	5.75	3.26	10.74	574.92	574.55	580.50	5.58	0.003
28	29	199	0.00	10.85	0.00	0.00	5.00	20.19	0.31	3.80	18.99	18	8.14	4.60	10.74	574.52	573.33	581.80	7.28	0.006
29	30	151	1.90	12.75	0.15	0.29	5.28	20.50	0.22	3.76	19.84	18	8.79	4.97	11.23	573.30	572.24	578.70	5.40	0.007
30	34	125	2.01	30.93	0.15	0.30	12.45	20.73	0.14	3.76	46.76	24	17.52	5.58	14.88	572.22	571.47	579.32	7.10	0.006
31	33	33.0	1.26	1.26	0.57	0.72	0.72	15.00	0.14	4.24	3.05	12	3.38	4.30	3.88	574.16	573.86	578.21	4.05	0.009
32	33	32.0	0.69	0.69	0.57	0.39	0.39	15.00	0.25	4.24	1.67	12	7.04	8.96	2.12	575.10	573.85	577.90	2.80	0.039
33	34	159.0	0.00	1.95	0.00	0.00	1.11	15.25	0.44	4.22	4.69	12	4.36	5.56	5.97	573.86	571.48	579.24	5.38	0.015
34	37	197.0	0.00	32.88	0.00	0.00	13.56	20.87	0.20	3.73	50.64	24	21.48	6.83	16.12	571.45	569.88	577.45	6.00	0.009
35	37	42.0	3.42	3.42	0.55	1.88	1.88	15.00	0.07	4.24	7.98	12	7.21	9.19	10.15	571.32	569.60	574.22	2.90	0.041
36	37	43.0	1.83	1.83	0.57	1.04	1.04	15.00	0.13	4.24	4.42	12	6.85	8.73	5.63	571.21	569.62	574.01	2.80	0.037
37	EX	262	1.61	39.74	0.57	0.92	17.40	21.07	0.21	3.71	64.60	24	16.00	5.09	20.56	569.61	568.30	573.86	4.25	0.005

Exhibit 33

Project: Flaggland Park - Large Network - Proposed West Half
Job No. 08-247

Calculated By: Gambill
Date: 1/29/2009

n = 0.013
Storm Frequency= 5 year

STRUCTURE NO.		Length	DRAINAGE AREA		Runoff	A x C		FLOW TIME		Rainfall	Total	Pipe	Capacity	VELOCITY		INVERT ELEV		RIM ELEV	Depth	Slope
From	To		Increment	Total	Coefficient	Increment	Total	To Upper End	In Section	Intensity	Runoff	Diameter	Full	Full	@ Runoff	Upper	Lower	Upper		
		Feet	Acres	Acres				min	min	in/hr	Q=CIA (cfs)	in	cfs	fps	fps				ft	ft/ft
11	14	27.0	3.06	3.06	0.40	1.22	1.22	15.00	0.07	4.24	5.19	12	9.01	11.48	6.61			582.42		0.064
12b	12	12.0	2.60	2.60	0.52	1.35	1.35	15.00	0.06	4.24	5.73	18	7.43	4.20	3.24			582.75		0.005
12	14	78.0	2.60	5.20	0.52	1.35	2.70	15.06	0.20	4.24	11.46	18	12.87	7.28	6.49			583.75		0.015
13	14	23.0	1.23	1.23	0.57	0.70	0.70	15.00	0.10	4.24	2.97	12	11.60	14.77	3.78			582.49		0.106
14	15	313	0.00	9.49	0.00	0.00	4.63	15.26	0.84	4.22	19.53	24	20.23	6.44	6.22			582.99		0.008
15	16	243	0.00	9.49	0.00	0.00	4.63	16.10	1.03	4.15	19.22	30	18.34	3.74	3.92			584.69		0.002
16	18	140	0.93	10.42	0.57	0.53	5.16	17.14	0.55	4.08	20.97	30	25.94	5.28	4.27			581.19		0.004
17	18	122	1.48	1.48	0.57	0.84	0.84	15.00	0.45	4.24	3.58	12	5.18	6.57	4.55			580.74		0.021
18	19	344	2.23	14.13	0.25	0.56	6.56	20.00	1.13	3.80	24.93	30	34.32	6.99	5.08			580.10		0.007
19	19b	204	2.04	16.17	0.15	0.31	6.87	21.13	0.65	3.71	25.49	30	34.32	6.99	5.19			578.64		0.007
N1	EX	390	2.04	18.21	1.15	0.00	6.87	21.78	1.27	3.65	25.03	30	34.32	6.99	5.10			579..32		0.007

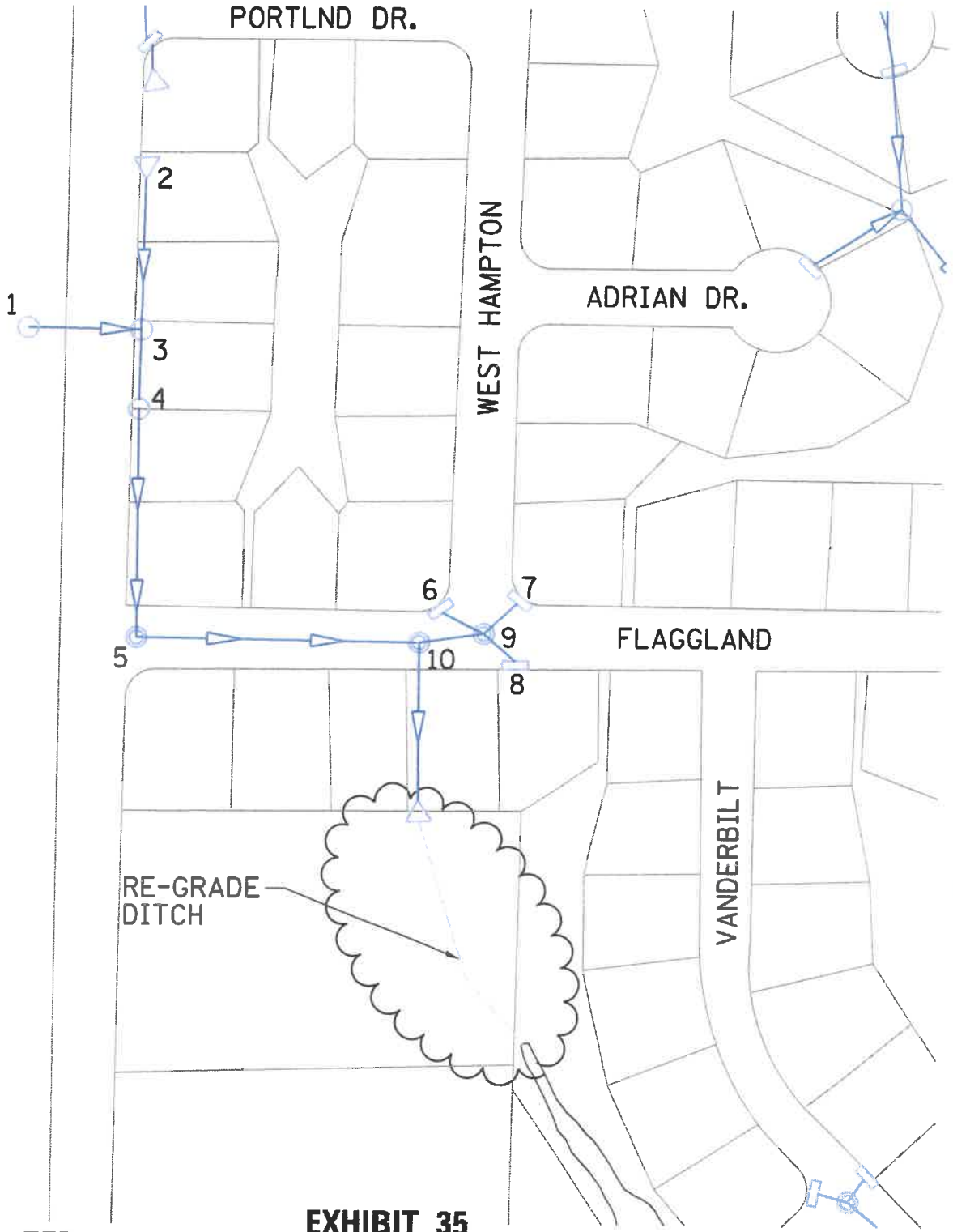
Project: Flaggland Park - Large Network - Proposed East Half
Job No. 08-247

Calculated By: Gambill
Date: 1/29/2009

n = 0.013
Storm Frequency= 5 year

STRUCTURE NO.		Length	DRAINAGE AREA		Runoff	A x C		FLOW TIME		Rainfall	Total	Pipe	Capacity	VELOCITY		INVERT ELEV		RIM ELEV	Depth	Slope
From	To		Increment	Total	Coefficient	Increment	Total	To Upper End	In Section	Intensity	Runoff	Diameter	Full	Full	@ Runoff	Upper	Lower	Upper		
		Feet	Acres	Acres				min	min	in/hr	Q=CIA (cfs)	in	cfs	fps	fps				ft	ft/ft
20	23	23.0	1.34	1.34	0.50	0.67	0.67	15.00	0.11	4.24	2.84	12	7.47	9.52	3.62			582.90		0.044
21	23	39.0	2.64	2.64	0.52	1.37	1.37	15.00	0.09	4.24	5.82	12	5.98	7.59	7.41			583.21		0.028
22	23	23.0	0.82	0.82	0.57	0.47	0.47	15.00	0.15	4.24	1.98	12	7.21	9.19	2.52			583.11		0.041
23	25	295	0.00	4.80	0.00	0.00	2.51	15.15	0.57	4.24	10.64	15	6.78	5.52	8.67			583.53		0.011
24	25	22	2.12	2.12	0.50	1.06	1.06	15.00	0.08	4.24	4.49	12	7.97	10.14	5.72			582.07		0.050
25	26	64	0.00	6.92	0.00	0.00	3.57	15.72	0.09	4.20	14.98	15	7.64	6.23	12.21			582.62		0.014
26	27	154	1.48	8.40	0.55	0.81	4.38	15.81	0.44	4.17	18.30	24	16.00	5.09	5.82			581.54		0.005
27	28	125	2.45	10.85	0.25	0.61	5.00	20.00	0.34	3.80	18.99	24	12.39	3.94	6.04			580.50		0.003
28	29	199	0.00	10.85	0.00	0.00	5.00	20.34	0.55	3.78	18.88	24	17.52	5.58	6.01			581.80		0.008
29	30	151	1.90	12.75	0.15	0.29	5.28	20.90	0.40	3.73	19.72	24	18.93	6.02	6.28			578.70		0.007
30	34	125	2.01	14.76	0.15	0.30	5.58	21.30	0.32	3.69	20.60	24	17.52	5.58	6.56			579.32		0.006
31	33	33.0	1.26	1.26	0.57	0.72	0.72	15.00	0.14	4.24	3.05	12	3.35	4.30	3.88			578.21		0.009
32	33	32.0	0.69	0.69	0.57	0.39	0.39	15.00	0.25	4.24	1.67	12	7.04	8.96	2.12			577.90		0.039
33	34	159.0	0.00	1.95	0.00	0.00	1.11	15.25	0.44	4.22	4.69	12	4.36	5.56	5.97			579.24		0.015
34	37	197.0	0.00	16.71	0.00	0.00	6.69	21.82	0.42	3.67	24.56	24	21.46	6.83	7.82			577.45		0.009
35	37	42.0	3.42	3.42	0.55	1.88	1.88	15.00	0.07	4.24	7.98	12	7.21	9.19	10.15			574.22		0.041
36	37	43.0	1.83	1.83	0.57	1.04	1.04	15.00	0.13	4.24	4.42	12	6.85	8.73	5.63			574.01		0.037
37	EX	262	1.61	23.57	0.57	0.92	10.54	22.04	0.56	3.62	38.18	30	36.69	7.47	7.78			573.86		0.008

Exhibit 34



TOTAL ESTIMATED
CONSTRUCTION
COST = $2,500

EXHIBIT 35

SCALE
1" = 150'

GREENE & BRADFORD, INC.
OF SPRINGFIELD
CONSULTING ENGINEERS
3501 CONSTITUTION DRIVE
SPRINGFIELD, ILLINOIS 62711
PROFESSIONAL DESIGN FIRM NO. 184-001179
PROFESSIONAL & STRUCTURAL ENGINEERING CORPORATION
(217) 793-8844, 793-6227 (F), E-MAIL - cad@greeneandbradford.com

SMALL NETWORK
PHASE 1
VILLAGE OF SHERMAN
FLAGGLAND PARK

COMPUTER FILE NO.
Exhibit 35.dgn

PROJECT: 08247
02/26/09 - FAV

MASONIC_SYSPRINT_BLACK_BORDER.PLT

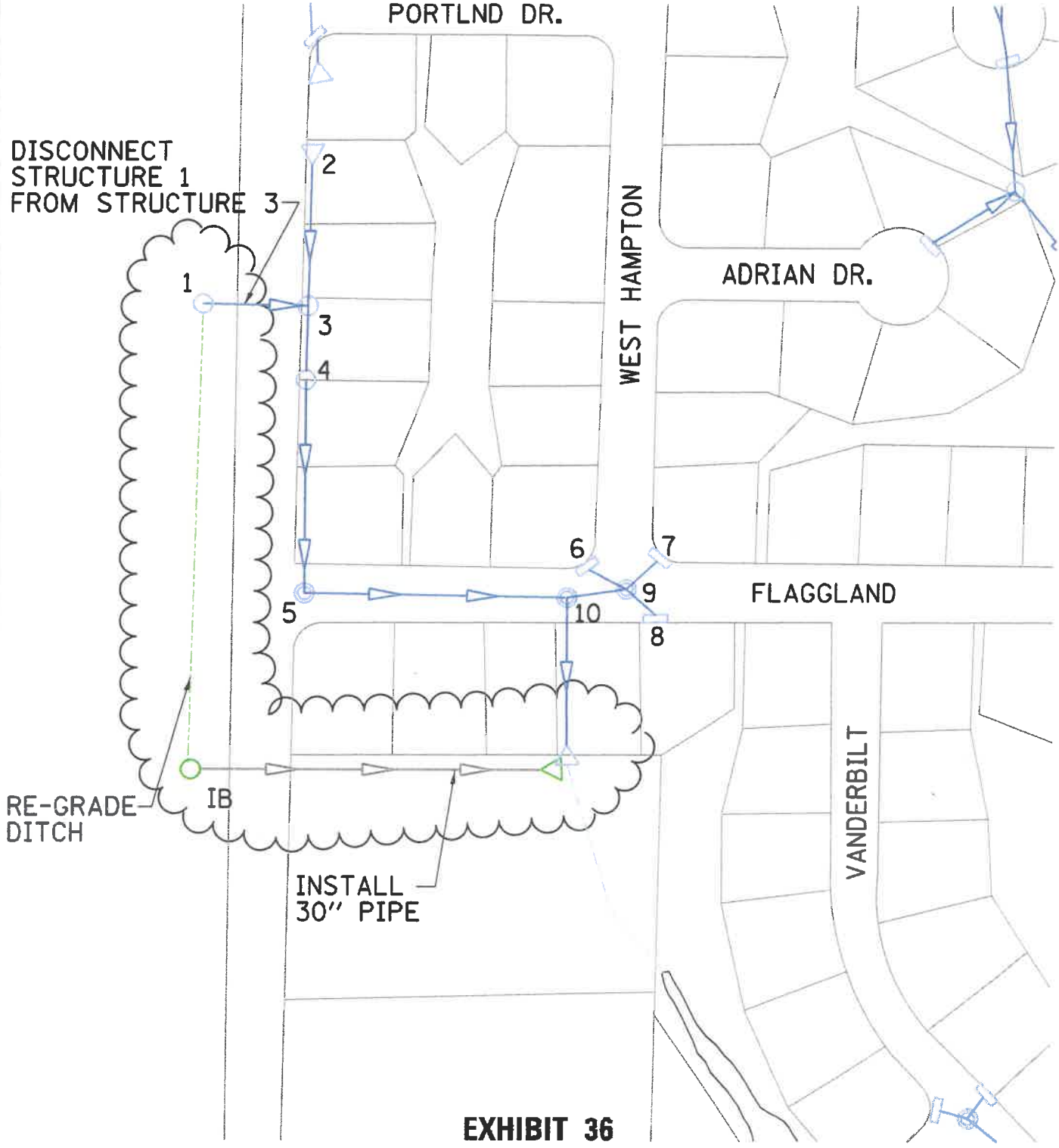


EXHIBIT 36

SCALE

1" = 150'

TOTAL ESTIMATED
CONSTRUCTION
COST = $35,000

GREENE & BRADFORD, INC.
OF SPRINGFIELD
CONSULTING ENGINEERS
3501 CONSTITUTION DRIVE
SPRINGFIELD, ILLINOIS 62711
PROFESSIONAL DESIGN FIRM NO. 184-001179
PROFESSIONAL & STRUCTURAL ENGINEERING CORPORATION
(217) 793-8844, 793-6227 (F), E-MAIL - cad@greeneandbradford.com

SMALL NETWORK
PHASE 2 - OPTION 1
VILLAGE OF SHERMAN
FLAGGLAND PARK

COMPUTER FILE NO.
Exhibit 36.dgn

PROJECT: 08247
02/26/09 - FAV

\MASONIC_SYSPRINT_BLACK_BORDER.PLT

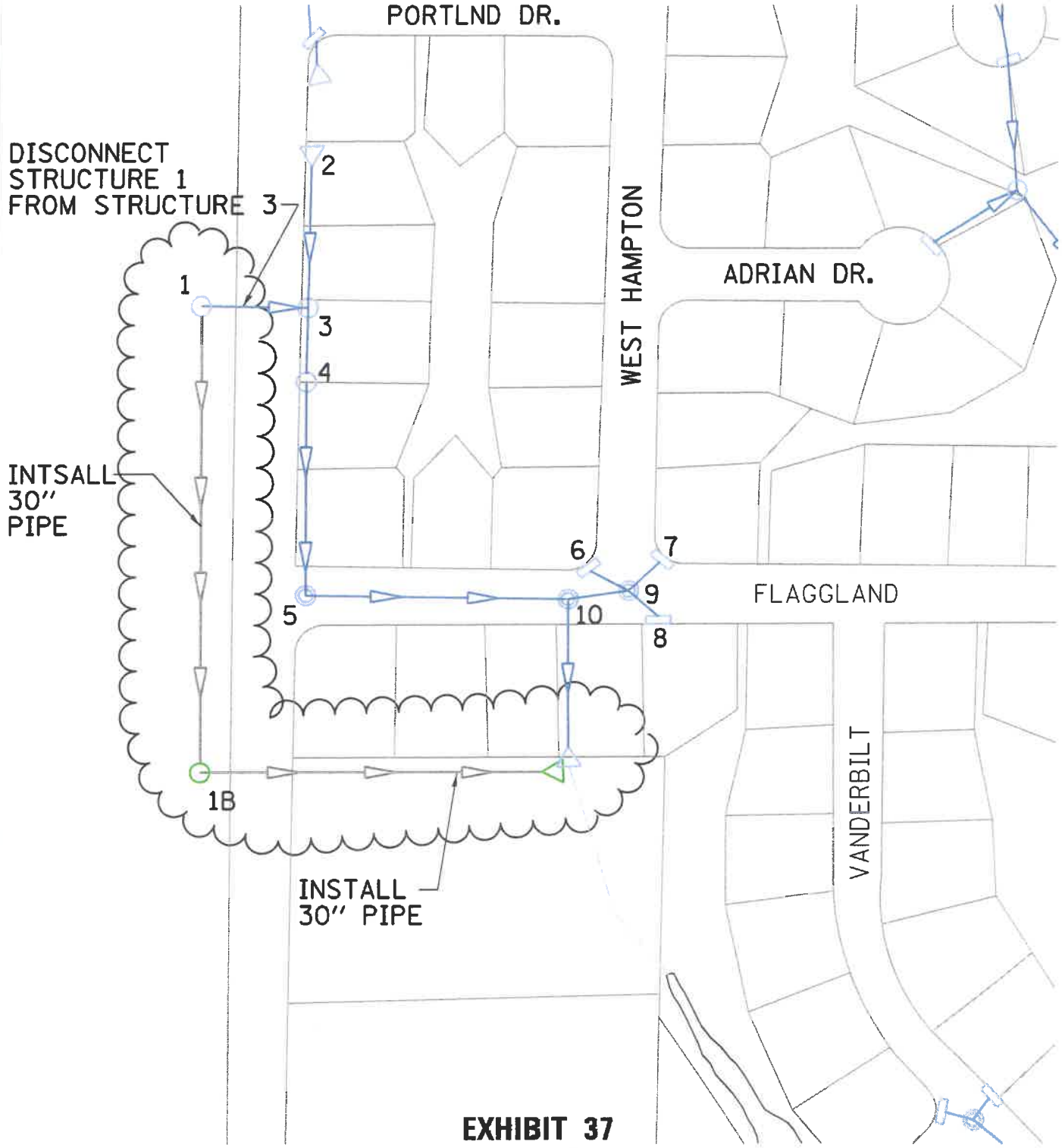


EXHIBIT 37

SCALE
1" = 150'

TOTAL ESTIMATED
CONSTRUCTION
COST = $69,200

GREENE & BRADFORD, INC.
OF SPRINGFIELD
CONSULTING ENGINEERS
3501 CONSTITUTION DRIVE
SPRINGFIELD, ILLINOIS 62711
PROFESSIONAL DESIGN FIRM NO. 184-001179
PROFESSIONAL & STRUCTURAL ENGINEERING CORPORATION
(217) 793-8844, 793-6227 (F), E-MAIL - cad@greeneandbradford.com

SMALL NETWORK
PHASE 2 - OPTION 2
VILLAGE OF SHERMAN
FLAGGLAND PARK

COMPUTER FILE NO.
Exhibit 37.dgn

PROJECT: 08247
02/26/09 - FAV

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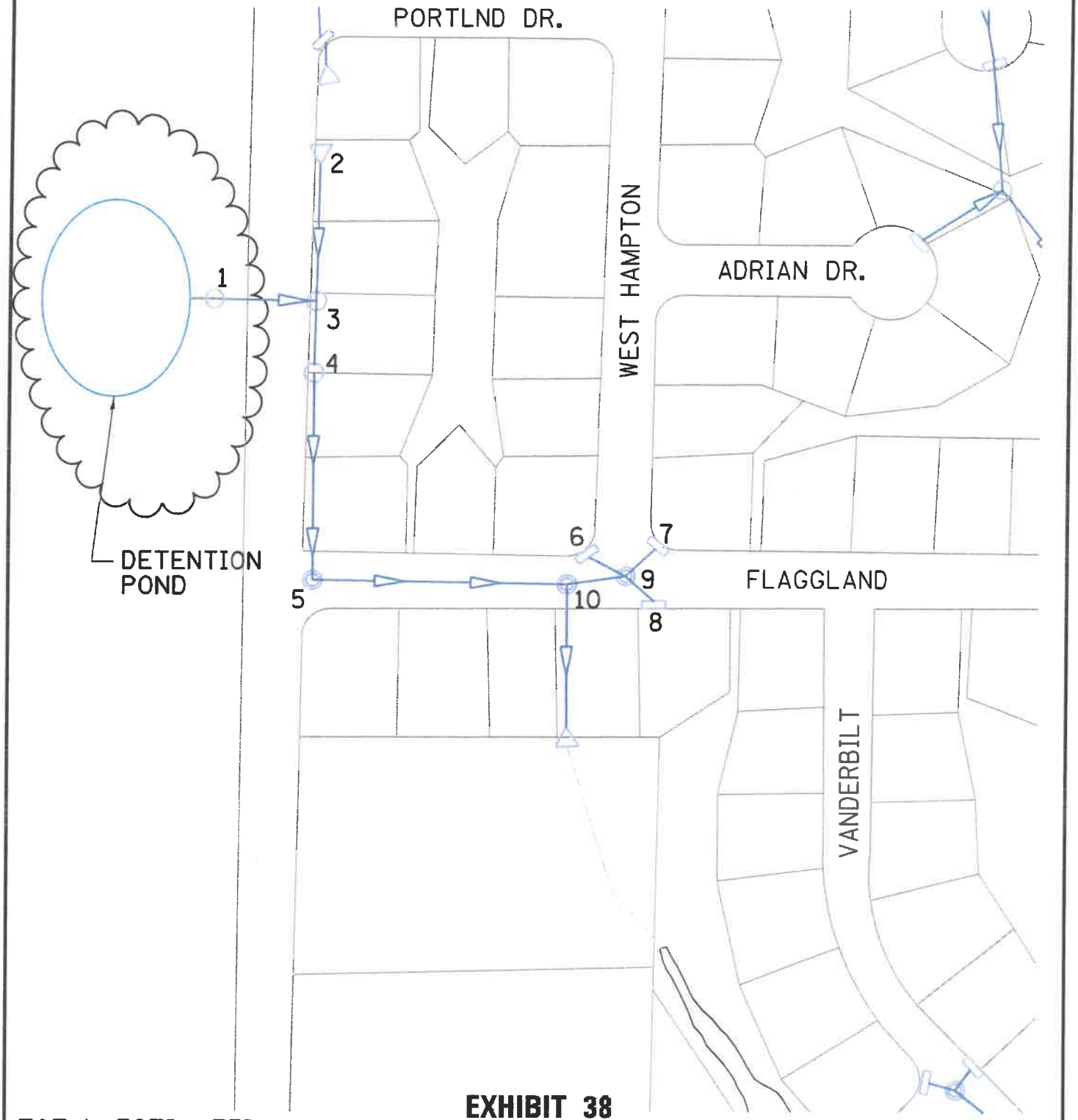

TOTAL ESTIMATED CONSTRUCTION COST = $40,000

EXHIBIT 38

SCALE
1" = 150'

GREENE & BRADFORD, INC.
OF SPRINGFIELD
CONSULTING ENGINEERS
3501 CONSTITUTION DRIVE
SPRINGFIELD, ILLINOIS 62711
PROFESSIONAL DESIGN FIRM NO. 184-001179
PROFESSIONAL & STRUCTURAL ENGINEERING CORPORATION
(217) 793-8844, 793-6227 (F), E-MAIL - cad@greeneandbradford.com

SMALL NETWORK
PHASE 2 - OPTION 3
VILLAGE OF SHERMAN
FLAGGLAND PARK

COMPUTER FILE NO.
Exhibit 38.dgn

PROJECT: 08247
02/26/09 - FAV

MASONIC_SYSPRINT_BLACK_BORDER.PLT

GREENE & BRADFORD, INC.
3501 CONSTITUTION DRIVE
SPRINGFIELD, IL. 62711-7007
(217) 793-8844
(217) 793-6227 FAX
www.greeneandbradford.com

PROJECT NO: 08-247
DESCRIPTION: Flaggland Cost Estimate
CALC. BY: KK DATE: 2/27/09
CHKED BY: DRG DATE:

Exhibit 39 - Small Network - Phase 1-2

PRELIMINARY CONSTRUCTION COST ESTIMATE

PHASE 1

ITEM NO.	DESCRIPTION OF PAY ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
1	REGRADE DITCH FROM 36" OUTLET TO FLAGGLAND LAKE	500	FOOT	$5.00	$2,500.00
	TOTAL				**$2,500.00**

PHASE 2 - OPTION 1

ITEM NO.	DESCRIPTION OF PAY ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
1	30" PIPE	360	FOOT	$75.00	$27,000.00
2	REGRADE DITCH WEST SIDE OF OLD TIPTON SCHOOL RD.	460	EACH	$5.00	$2,300.00
3	STRUCTURE	1	EACH	$2,000.00	$2,000.00
4	30" FLARED END SECTION WITH GRATE	1	EACH	$3,700.00	$3,700.00
	TOTAL				**$35,000.00**

PHASE 2 - OPTION 2

ITEM NO.	DESCRIPTION OF PAY ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
1	30" PIPE	820	FOOT	$75.00	$61,500.00
2	STRUCTURE	2	EACH	$2,000.00	$4,000.00
3	30" FLARED END SECTION WITH GRATE	1	EACH	$3,700.00	$3,700.00
	TOTAL				**$69,200.00**

PHASE 2 - OPTION 3

ITEM NO.	DESCRIPTION OF PAY ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
1	DETENTION POND W/ OUTLET STRUCTURE	1	EACH	$45,000.00	$40,000.00
	TOTAL				**$40,000.00**

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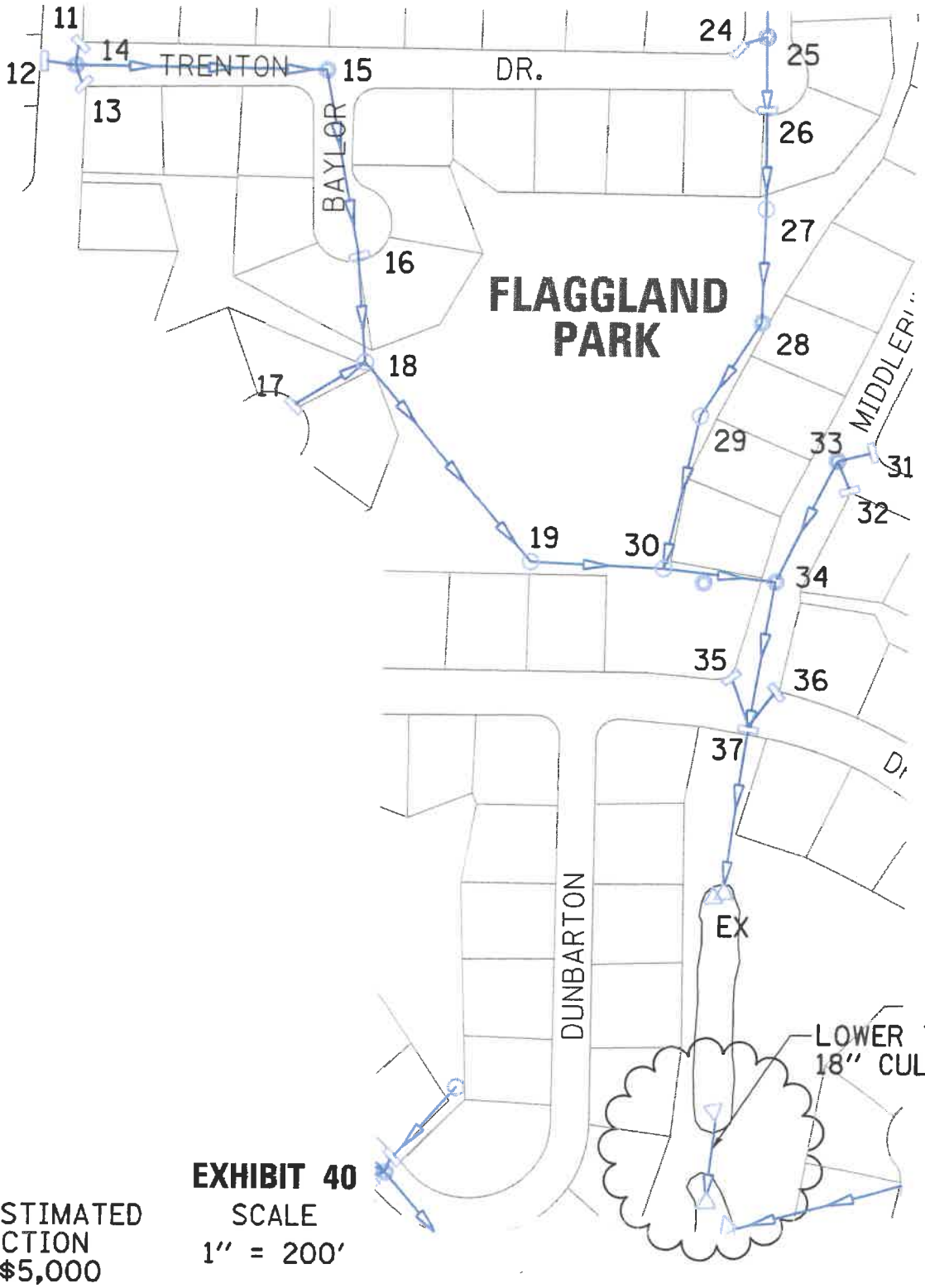


EXHIBIT 40

SCALE
1" = 200'

TOTAL ESTIMATED
CONSTRUCTION
COST = $5,000

GREENE & BRADFORD, INC.
OF SPRINGFIELD
CONSULTING ENGINEERS
3501 CONSTITUTION DRIVE
SPRINGFIELD, ILLINOIS 62711
PROFESSIONAL DESIGN FIRM NO. 184-001179
PROFESSIONAL & STRUCTURAL ENGINEERING CORPORATION
(217) 793-8844, 793-6227 (F), E-MAIL - cad@greeneandbradford.com

LARGE NETWORK
PHASE 3A
VILLAGE OF SHERMAN
FLAGGLAND PARK

COMPUTER FILE NO.
Exhibit 40.dgn

PROJECT: 08247
02/26/09 - FAV

MASONIC_SYSPRINT_BLACK_BORDER.PLT

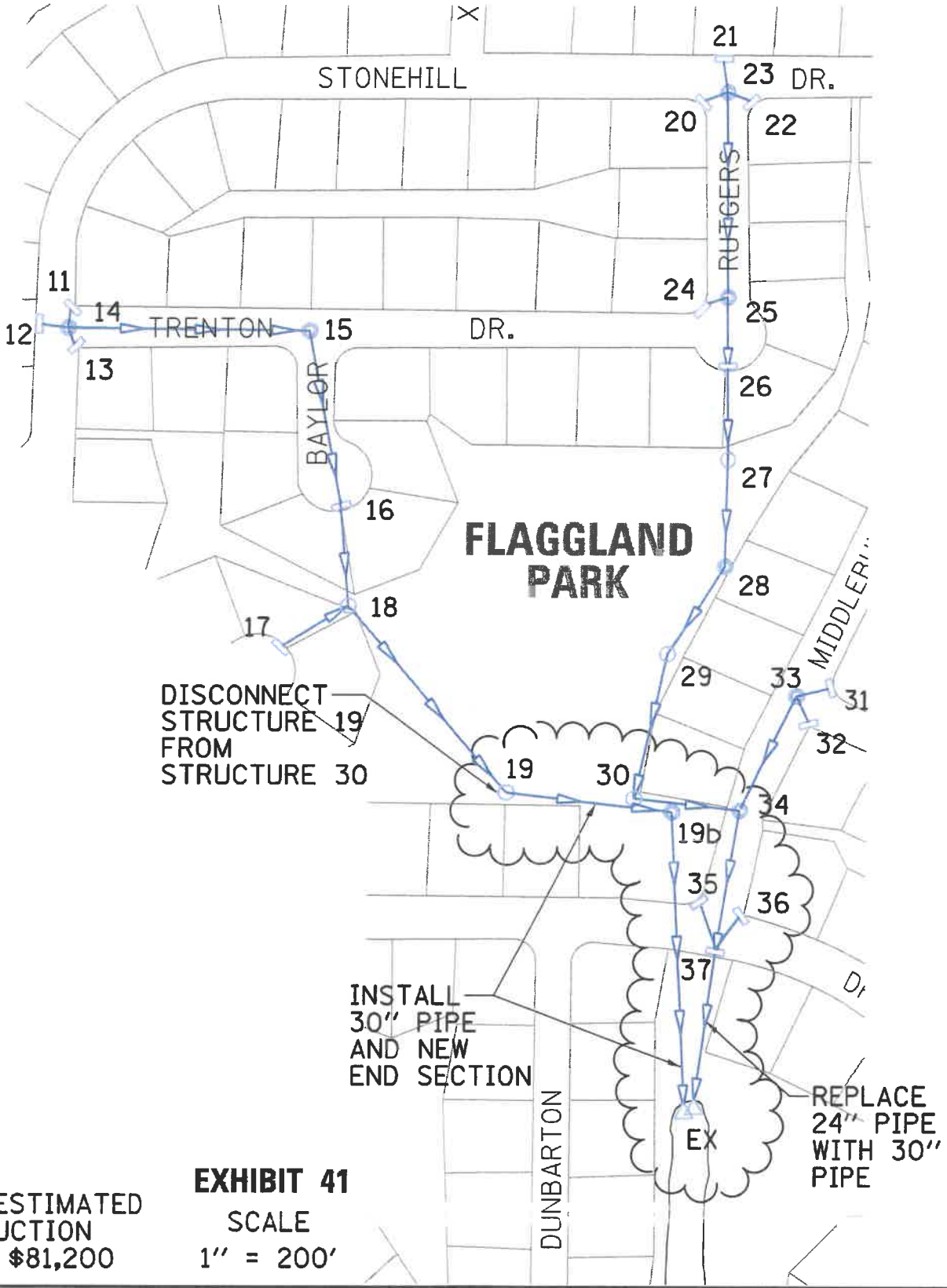


EXHIBIT 41

SCALE
1" = 200'

TOTAL ESTIMATED
CONSTRUCTION
COST = $81,200

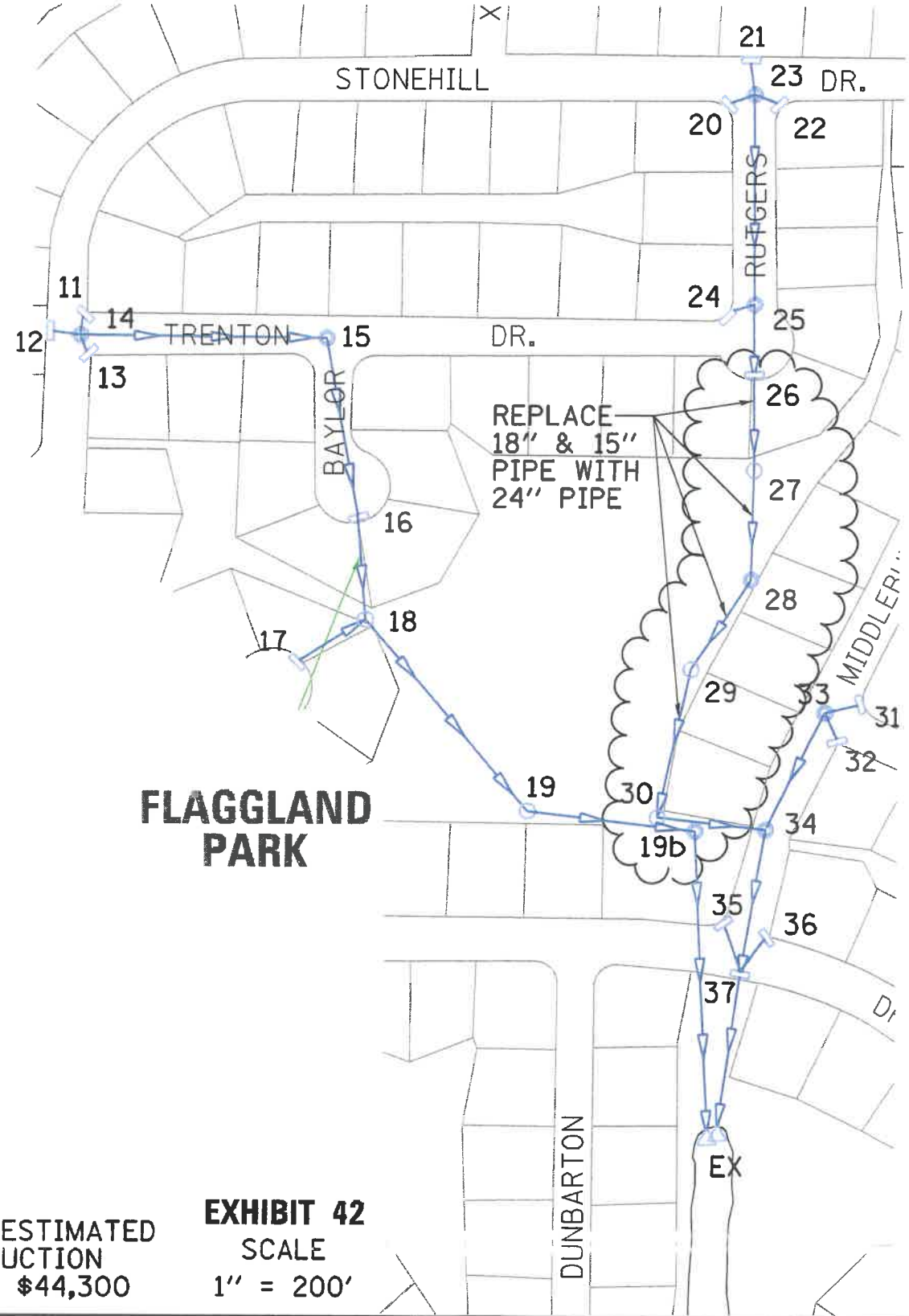
GREENE & BRADFORD, INC.
OF SPRINGFIELD
CONSULTING ENGINEERS
3501 CONSTITUTION DRIVE
SPRINGFIELD, ILLINOIS 62711
PROFESSIONAL DESIGN FIRM NO. 184-001179
PROFESSIONAL & STRUCTURAL ENGINEERING CORPORATION
(217) 793-8844, 793-6227 (F), E-MAIL - cad@greeneandbradford.com

LARGE NETWORK
PHASE 3B
VILLAGE OF SHERMAN
FLAGGLAND PARK

COMPUTER FILE NO.
Exhibit 41.dgn

PROJECT: 08247
02/26/09 - FAV

PANASONIC_SYSPRINT_BLACK_BORDER.PLT



TOTAL ESTIMATED CONSTRUCTION COST = $44,300

EXHIBIT 42
SCALE
1" = 200'

GREENE & BRADFORD, INC.
OF SPRINGFIELD
CONSULTING ENGINEERS
3501 CONSTITUTION DRIVE
SPRINGFIELD, ILLINOIS 62711
PROFESSIONAL DESIGN FIRM NO. 184-001179
PROFESSIONAL & STRUCTURAL ENGINEERING CORPORATION
(217) 793-8844, 793-6227 (F), E-MAIL - cad@greeneandbradford.com

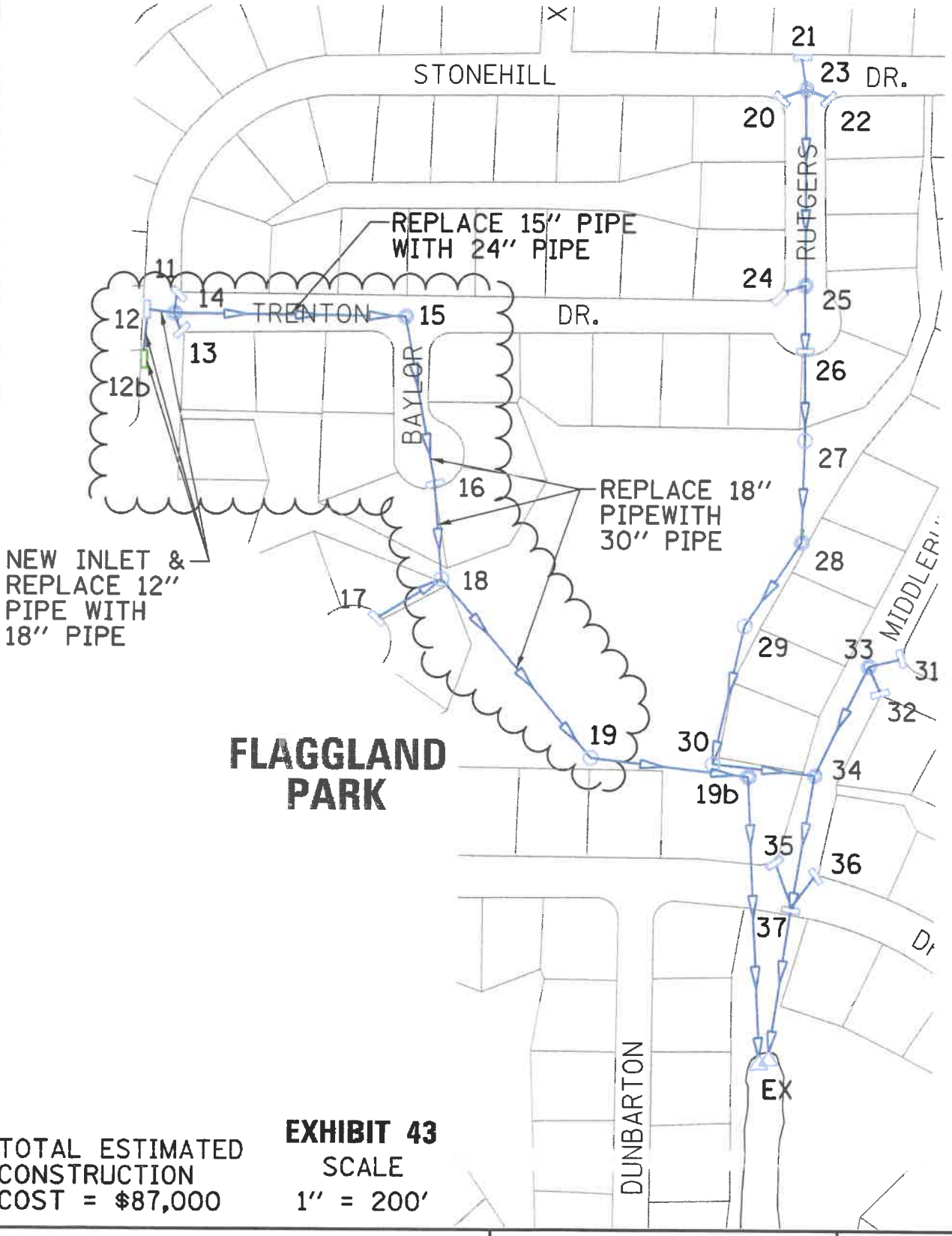
LARGE NETWORK
PHASE 4

VILLAGE OF SHERMAN
FLAGGLAND PARK

COMPUTER FILE NO.
Exhibit 42.dgn

PROJECT: 08247
02/26/09 - FAV

NASONIC_SYSPRINT_BLACK_BORDER.PLT



TOTAL ESTIMATED CONSTRUCTION COST = $87,000

EXHIBIT 43
SCALE
1" = 200'

GREENE & BRADFORD, INC.
OF SPRINGFIELD
CONSULTING ENGINEERS
3501 CONSTITUTION DRIVE
SPRINGFIELD, ILLINOIS 62711
PROFESSIONAL DESIGN FIRM NO. 184-001179
PROFESSIONAL & STRUCTURAL ENGINEERING CORPORATION
(217) 793-8844, 793-6227 (F), E-MAIL - cad@greeneandbradford.com

LARGE NETWORK
PHASE 5
VILLAGE OF SHERMAN
FLAGGLAND PARK

COMPUTER FILE NO.
Exhibit 43.dgn

PROJECT: 08247
02/26/09 - FAV

PANASONIC_SYSPRINT_BLACK_BORDER.PLT

GREENE & BRADFORD, INC.
3501 CONSTITUTION DRIVE
SPRINGFIELD, IL. 62711-7007
(217) 793-8844
(217) 793-6227 FAX
www.greeneandbradford.com

PROJECT NO: 08-247
DESCRIPTION: Flaggland Cost Estimate
CALC. BY: KK DATE: 2/27/09
CHKED BY: DRG DATE:

Exhibit 44 - Large Network - Phase 3-5

PRELIMINARY CONSTRUCTION COST ESTIMATE

PHASE 3

ITEM NO.	DESCRIPTION OF PAY ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
1	LOWER EXISTING TWIN 18" CULVERT OR REPLACE W/ EQUIVALENT	25	FOOT	$200.00	$5,000.00
2	30" PIPE	880	FOOT	$75.00	$66,000.00
3	30" FLARED END SECTION WITH GRATE	2	EACH	$3,700.00	$7,400.00
4	STRUCTURE	3	EACH	$2,000.00	$6,000.00
5	CLOSED LID	1	EACH	$500.00	$500.00
6	TYPE 8 GRATE	1	EACH	$500.00	$500.00
7	TYPE 9 FRAME AND GRATE	1	EACH	$800.00	$800.00
	TOTAL				**$86,200.00**

PHASE 4

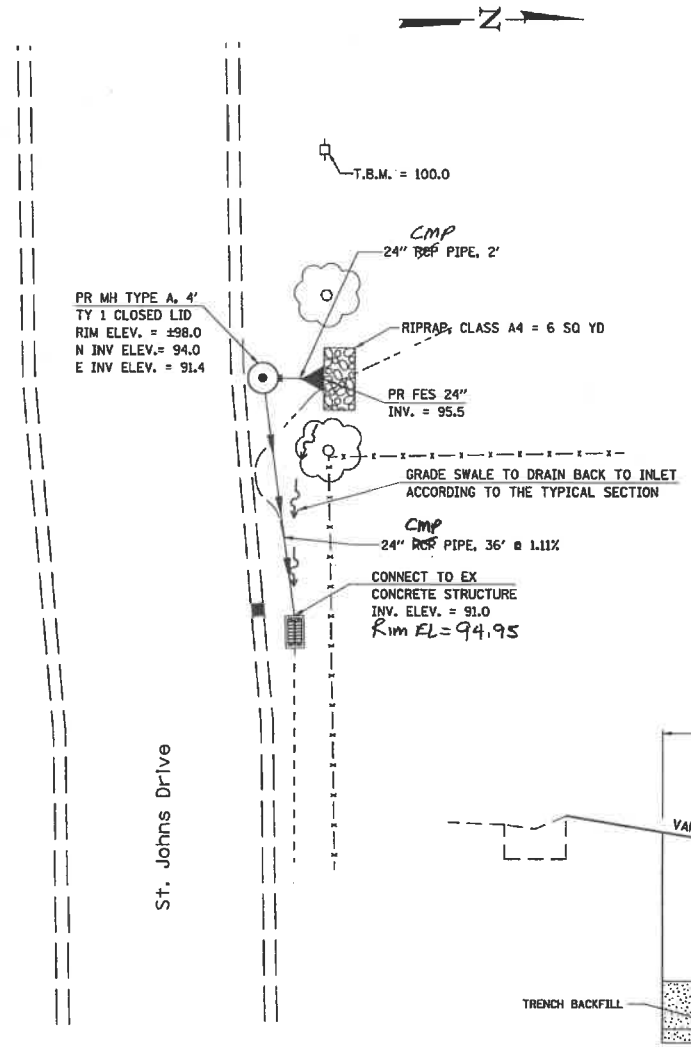
ITEM NO.	DESCRIPTION OF PAY ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
1	24" PIPE	630	FOOT	$50.00	$31,500.00
2	STRUCTURE	5	EACH	$2,000.00	$10,000.00
3	CLOSED LID	1	EACH	$500.00	$500.00
4	TYPE 8 GRATE	3	EACH	$500.00	$1,500.00
5	TYPE 9 FRAME AND GRATE	1	EACH	$800.00	$800.00
	TOTAL				**$44,300.00**

PHASE 5

ITEM NO.	DESCRIPTION OF PAY ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
1	18" PIPE	90	FOOT	$35.00	$3,150.00
2	24" PIPE	320	EACH	$50.00	$16,000.00
3	30" PIPE	730	EACH	$75.00	$54,750.00
4	STRUCTURE	5	EACH	$2,000.00	$10,000.00
5	CLOSED LID	2	EACH	$500.00	$1,000.00
6	TYPE 8 GRATE	1	EACH	$500.00	$500.00
	TYPE 9 FRAME AND GRATE	2	EACH	$800.00	$1,600.00
	TOTAL				**$87,000.00**

ITEM NO.	DESCRIPTION OF PAY ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
	TOTAL				**$0.00**

T.B.M. - R.R. SPIKE IN UTILITY POLE
ASSUMED ELEV = 100.00



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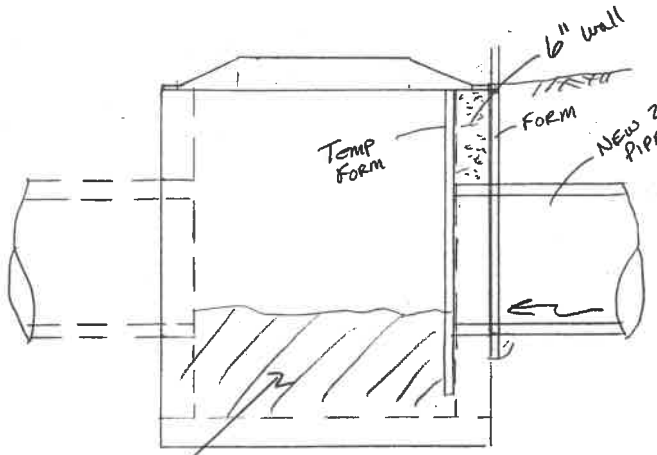
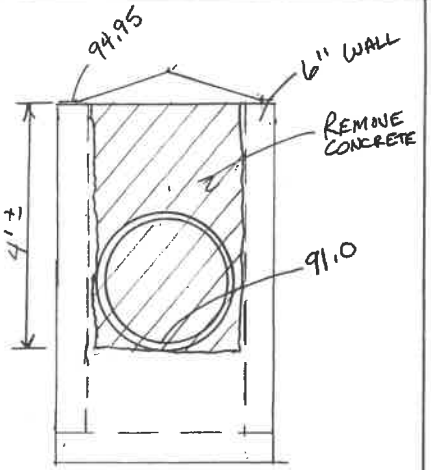
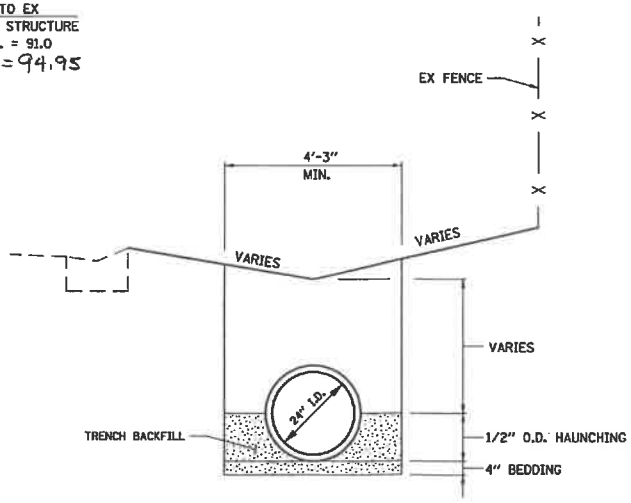


EXISTING INLET
LOOKING SOUTH



EXISTING INLET
LOOKING EAST



TYPICAL SECTION
SWALE & PIPE

GENERAL NOTES

AFTER THE PIPE IS INSTALLED AND THE FINAL GRADE IS ESTABLISHED, SEEDING SHALL BE PREFORMED TO MINIMIZE EROSION.

LIST OF MATERIALS AND EQUIPMENT

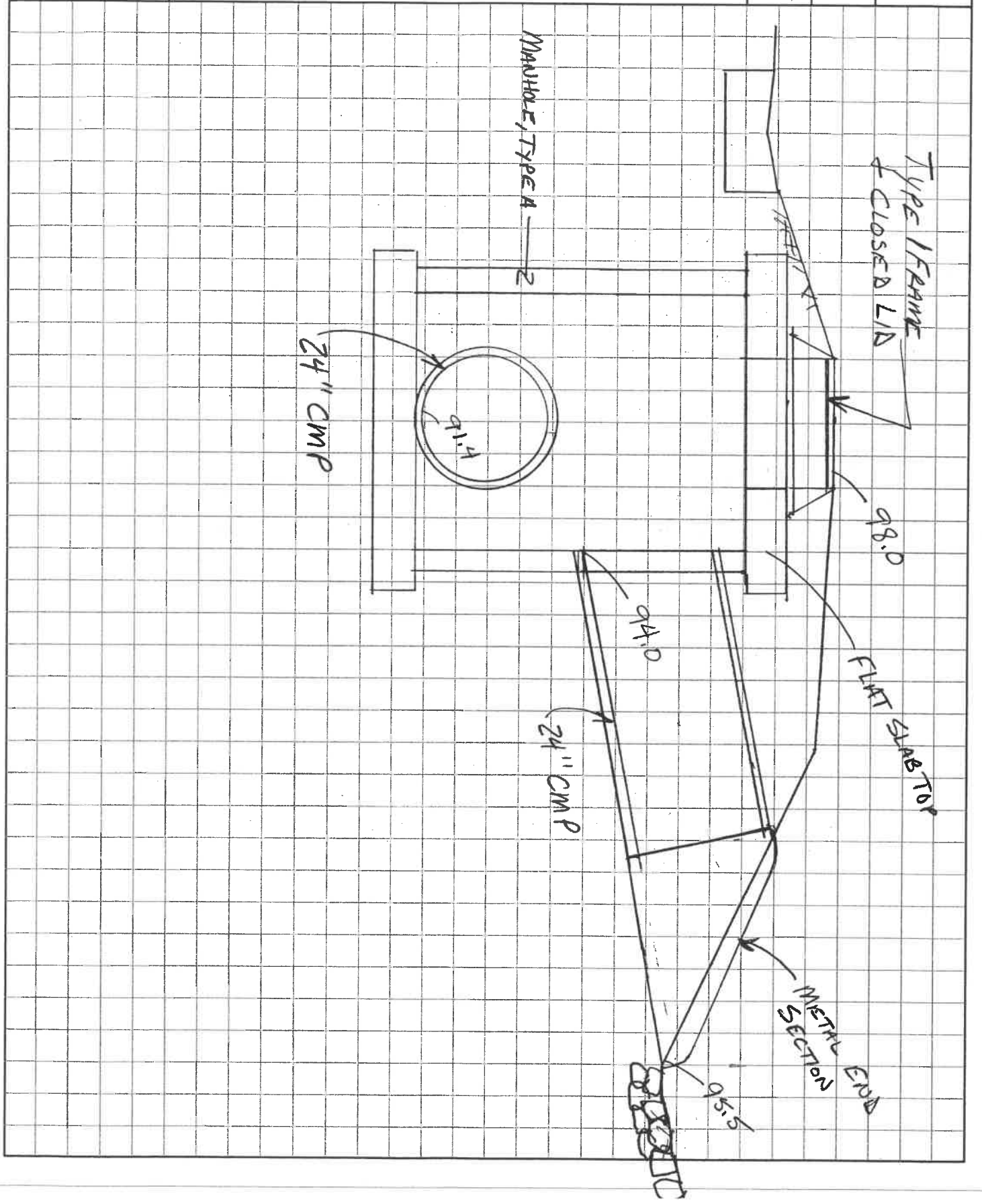
MANHOLES, TYPE A, 4' DIA., TYPE 1 FRAME, CLOSED LID	EACH	1
STORM SEWERS, CLASS A, TYPE 1, 24"	FOOT	41
~~PRECAST REINFORCED CONCRETE FLARED~~ END SECTION, 24"	EACH	1
SEEDING	POUNDS	5
TRENCH BACKFILL	CU YD	2.5

BACKHOE
TRENCH BACKFILL FOR PIPE BEDDING
SAND BAGS
JACK HAMMER
AIR COMPRESSOR
CONCRETE SAW

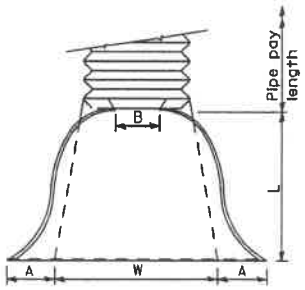
(1)

FILE NAME = G:\SHERMAN\2018\2018 DRAINAGE REPAIRS\ST.JOHNS.dgn	USER NAME = IE Consultants	DESIGNED -	REVISED -	ie	Village of Sherman ILLINOIS	ST. JOHNS DRIVE	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
	PLOT SCALE = 20.0000 ' / IN.	DRAWN -	REVISED -					Sangamon		
	PLOT DATE = 5/18/2018	CHECKED -	REVISED -			SCALE: SHEET NO. OF SHEETS STA. TO STA.		ILLINOIS		
		DATE -	REVISED -							

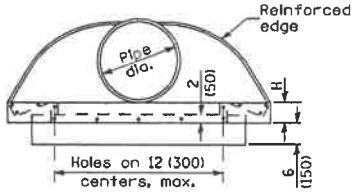
ie consultants	PROJECT: ST JOHNS DR.	SHEET		OF
	DESCR:		INIT	DATE
	COUNTY:	CALC		
	SECTION:	CHKD		



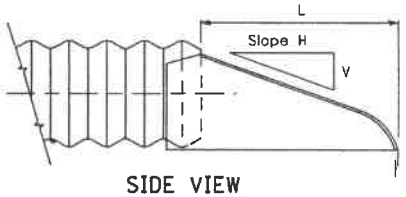
PIPE DIA.	THICK-NESS	DIMENSIONS A	B	H	L	W	SLOPE (Approx.) (V:H)	BODY
		1± (25)	(max.)	1± (25)	1½± (38)	2± (50)		
12 (300)	0.064 (1.63)	6 (150)	6 (150)	6 (150)	21 (535)	24 (610)	1:2½	1 Pc.
15 (375)	0.064 (1.63)	7 (180)	8 (205)	6 (150)	26 (660)	30 (760)	1:2½	1 Pc.
18 (450)	0.064 (1.63)	8 (205)	10 (255)	6 (150)	31 (785)	36 (915)	1:2½	1 Pc.
21 (525)	0.064 (1.63)	9 (230)	12 (305)	6 (150)	36 (915)	42 (1.065 m)	1:2½	1 Pc.
24 (600)	0.064 (1.63)	10 (255)	13 (330)	6 (150)	41 (1.040 m)	48 (1.220 m)	1:2½	1 Pc.
30 (750)	0.079 (2.01)	12 (305)	16 (405)	8 (205)	51 (1.295 m)	60 (1.525 m)	1:2½	1 Pc.
36 (900)	0.079 (2.01)	14 (355)	19 (480)	9 (230)	60 (1.525 m)	72 (1.830 m)	1:2½	2 Pc.
42 (1050)	0.109 (2.77)	16 (405)	22 (560)	11 (280)	69 (1.750 m)	84 (2.135 m)	1:2½	2 Pc.
48 (1200)	0.109 (2.77)	18 (455)	27 (685)	12 (305)	78 (1.980 m)	90 (2.285 m)	1:2¼	2 Pc.
54 (1350)	0.109 (2.77)	18 (455)	30 (760)	12 (305)	84 (2.135 m)	102 (2.590 m)	1:2	2 Pc.
60 (1500)	0.109 (2.77)	18 (455)	33 (840)	12 (305)	87 (2.210 m)	114 (2.895 m)	1:1¾	3 Pc.
66 (1650)	0.109 (2.77)	18 (455)	36 (915)	12 (305)	87 (2.210 m)	120 (3.050 m)	1:1½	3 Pc.
72 (1800)	0.109 (2.77)	18 (455)	39 (990)	12 (305)	87 (2.210 m)	126 (3.200 m)	1:1⅓	3 Pc.
78 (1950)	0.109 (2.77)	18 (455)	42 (1.065 m)	12 (305)	87 (2.210 m)	132 (3.355 m)	1:1¼	3 Pc.
84 (2250)	0.109 (2.77)	18 (455)	45 (1.145 m)	12 (305)	87 (2.210 m)	138 (3.505 m)	1:1⅙	3 Pc.



PLAN



END VIEW



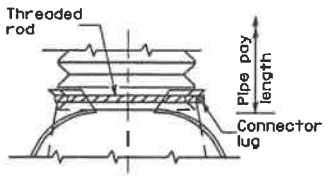
SIDE VIEW

END SECTION

NOTES

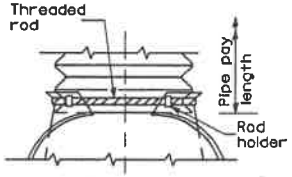
For 60 (1500) thru 84 (2250) sizes, reinforced edges shall be supplemented with stiffener angles. The angles shall be 2x2x¼ (51x51x6.4) for 60 (1500) thru 72 (1800) diameter and 2½x2½x¼ (64x64x6.4) for 78 (1950) thru 84 (2250) diameter. The angles shall be attached by ⅜ (M10) rivets or bolts.

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).



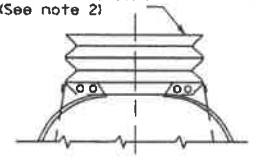
TYPE 1

For 12 (300) thru 24 (600) only (See Note 1)



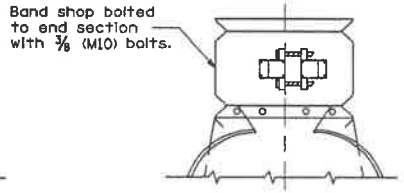
TYPE 2

For 30 (750) and 36 (900) only (See Note 1)



TYPE 3

(See Note 2)



TYPE 4

(See Note 3)

1 (25) wide, 0.109 (2.77) thick strap with standard ½x6 (M12x150) band bolt and nut.

ALTERNATE STRAP CONNECTOR

(For Type 1 only)

NOTES

1. Types 1 and 2 for pipes with annular ends only.
2. Type 3 connection may be used for all pipe sizes and includes 12 (300) of the pipe length. The connector section shall be attached to the end section by rivets or bolts and shall be the same metal thickness as the end section. Stub shall be either 2⅔ (68) pitch x ½ (13) depth or 3 (75) pitch x 1 (25) depth annular corrugated pipe.
3. Type 4 connection can be used for all pipe sizes. Coupler shall be 2⅔ x ½ (68x13) dimple, hugger, or annular band of 3x1 (75x25). The dimple, hugger, or annular band may be used with corrugated metal pipes having annular ends. For corrugated metal pipes having helical ends, only the dimple band will be allowed.

All dimensions are in inches (millimeters) unless otherwise shown.

CONNECTIONS OF END SECTIONS

Illinois Department of Transportation

PASSED January 1, 2009
ENGINEER OF POLICY AND PROCEDURES

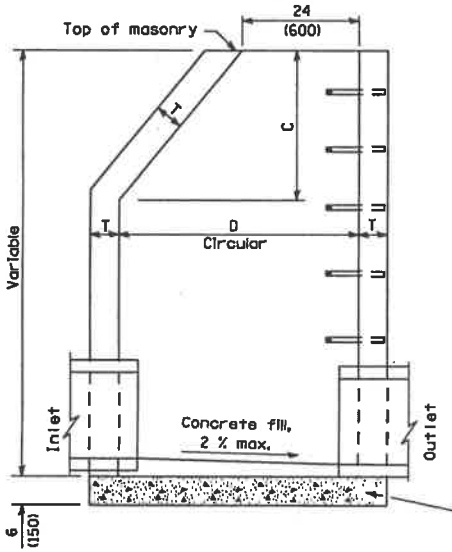
APPROVED January 1, 2009
ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-97

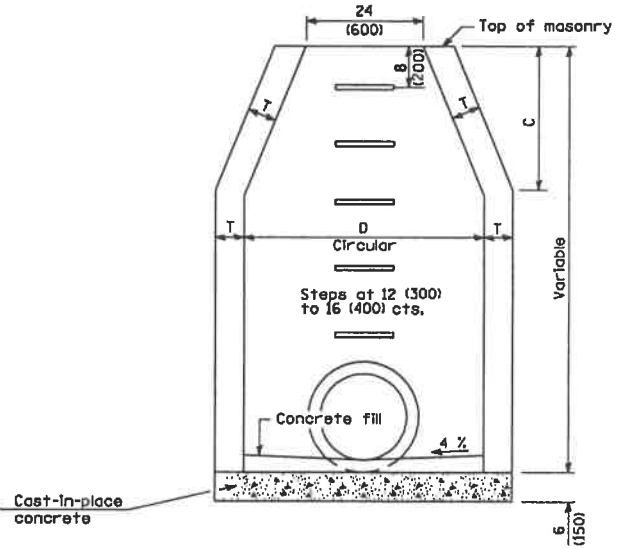
DATE	REVISIONS
1-1-09	Switched units to English (metric).
1-1-97	Renum. Standard 2228-5.

METAL END SECTION FOR PIPE CULVERTS

STANDARD 542401-01



ELEVATION - ECCENTRIC

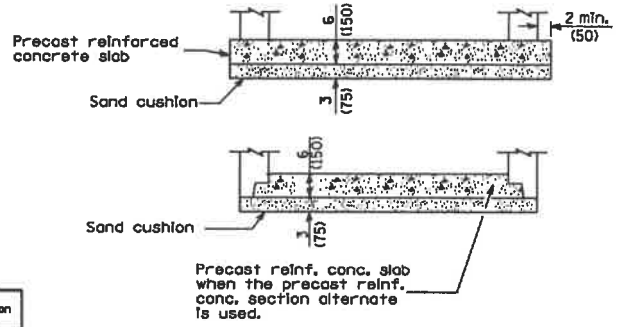


ELEVATION - CONCENTRIC

Cast-in-place concrete

ALTERNATE MATERIALS FOR WALLS	D	C*	T (min.)
Concrete Masonry Unit	4'-0" (1.2 m) 5'-0" (1.5 m)	30 (750) 3'-9" (1.15 m)	5 (125) 5 (125)
Brick Masonry	4'-0" (1.2 m) 5'-0" (1.5 m)	30 (750) 3'-9" (1.15 m)	8 (200) 8 (200)
Precast Reinforced Concrete Section	4'-0" (1.2 m) 5'-0" (1.5 m)	30 (750) 3'-9" (1.15 m)	4 (100) 5 (125)
Cast-in-place Concrete	4'-0" (1.2 m) 5'-0" (1.5 m)	30 (750) 3'-9" (1.15 m)	6 (150) 6 (150)

* For precast reinforced concrete sections, dimension "C" may vary from the dimension given to plus 6 (150).



ALTERNATE BOTTOM SLAB

GENERAL NOTES

See Standard 602701 for details of steps.

See Standard 602601 for optional Precast Reinforced Concrete Flat Slab Top.

All dimensions are in inches (millimeters) unless otherwise shown.

Illinois Department of Transportation

PASSED January 1, 2009
ENGINEER OF POLICY AND PROCEDURES

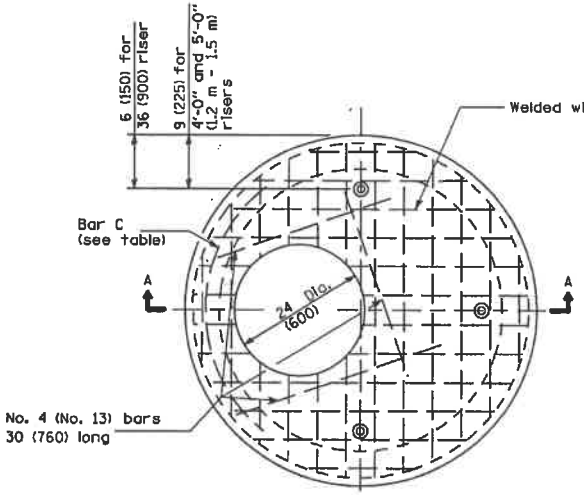
APPROVED January 1, 2009
ENGINEER OF BUREAU OF DESIGN AND ENVIRONMENT

ISSUED 1-1-09

DATE	REVISIONS
1-1-09	Switched units to English (metric).
4-1-06	Revised detail for concrete fill in elevation views.

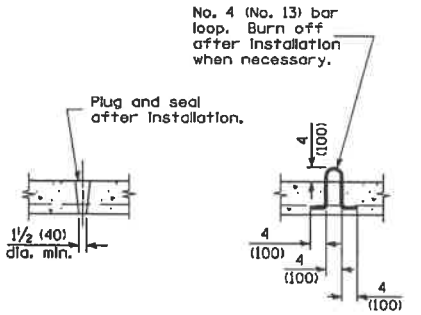
MANHOLE TYPE A

STANDARD 602401-02



PLAN

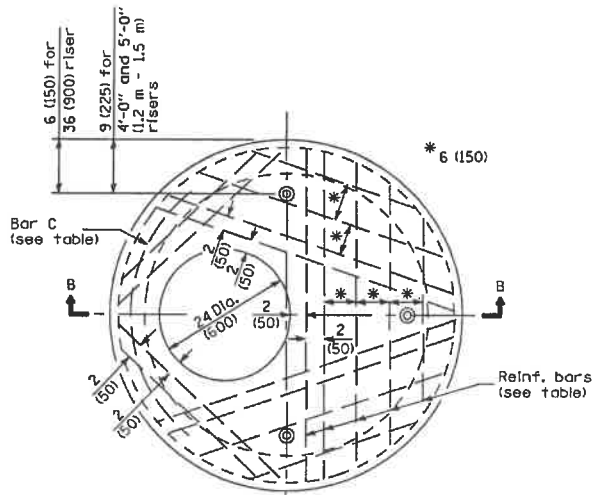
(WELDED WIRE FABRIC)



LIFTING HOLE OR LIFTING LOOP

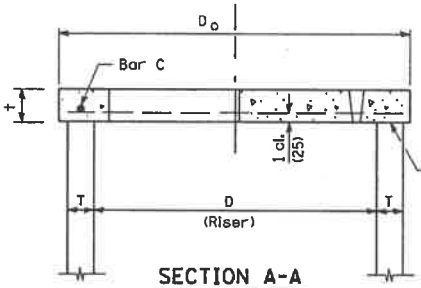
TYPICAL

(3 required per slab)

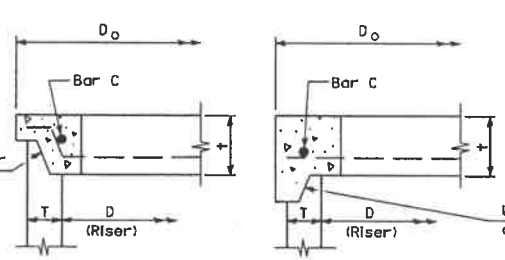


PLAN

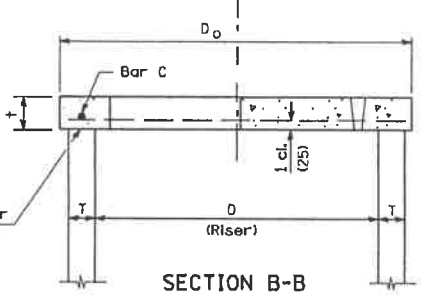
(REINFORCEMENT BARS)



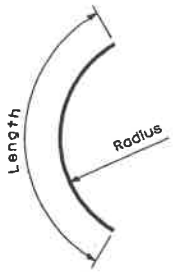
SECTION A-A



ALTERNATE JOINT CONFIGURATIONS



SECTION B-B



BAR C

TABLE

D	T	D_o (min.)	t	Reinforcement "A_s" W.W.F. each direction	OR Bar size	No. 4 (No. 13) Bar C Length	Radius
36 (900)	See applicable Standards	D + 2T	6 (150)	0.20 sq. in./ft. (425 sq. mm/m)	No. 4 (No. 13)	4'-0" (1.2 m)	19 (480)
4'-0" (1.2 m)			6 (150)	0.35 sq. in./ft. (740 sq. mm/m)	No. 5 (No. 16)	4'-6" (1.35 m)	26 (660)
5'-0" (1.5 m)			8 (200)	0.35 sq. in./ft. (740 sq. mm/m)	No. 5 (No. 16)	5'-0" (1.5 m)	32 (810)

GENERAL NOTES

The flat slab top may be used in lieu of the tapered tops shown on Standards 602001, 602011, 602016, 602306, 602401, or 602501 at the option of the Contractor or when field conditions prohibit the use of tapered tops.

All dimensions are in millimeters (inches) unless otherwise shown.

Illinois Department of Transportation

PASSED January 1, 2009
ENGINEER OF POLICY AND PROCEDURES

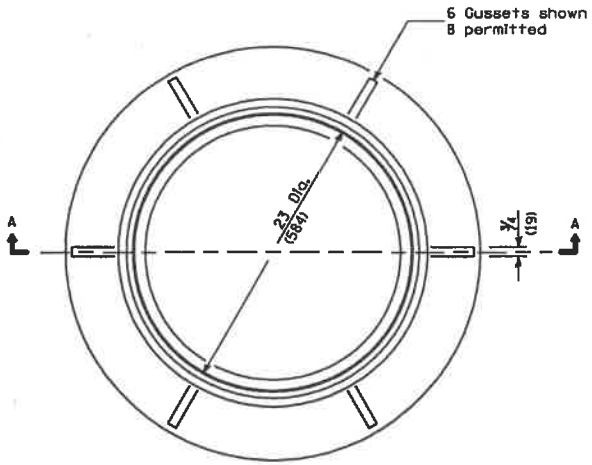
APPROVED January 1, 2009
ENGINEER OF DESIGN AND ENVIRONMENT

BSDSD 1-1-07

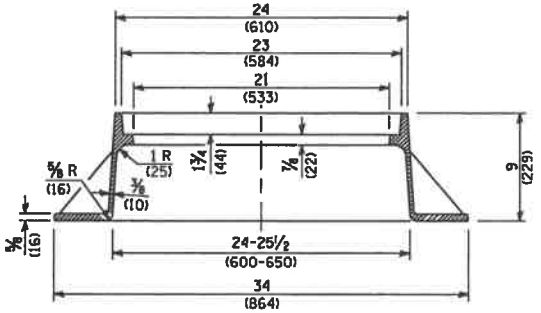
DATE	REVISIONS
1-1-09	Switched units to English (metric).
1-1-07	Soft converted metric reinforcement bars.

PRECAST REINFORCED CONCRETE FLAT SLAB TOP

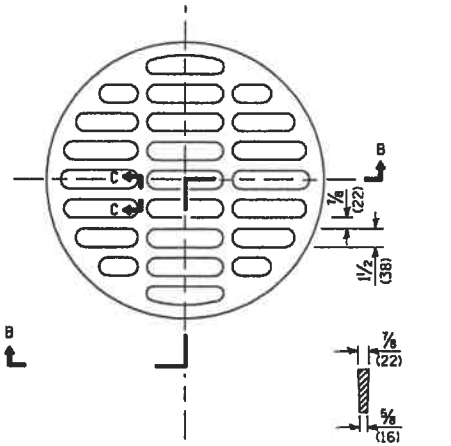
STANDARD 602601-02



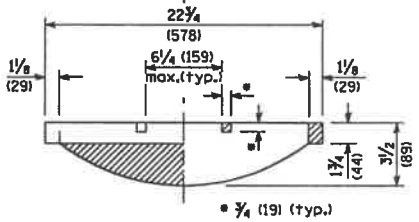
CAST FRAME



SECTION A-A
Gray Iron

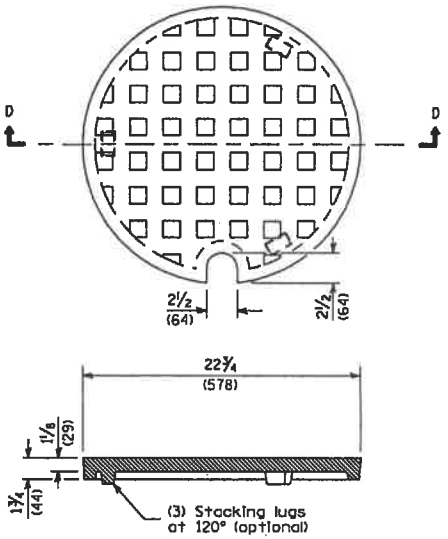


SECTION C-C



SECTION B-B

CAST OPEN LID



SECTION D-D

CAST CLOSED LID
Gray Iron Lid

All dimensions are in inches (millimeters) unless otherwise shown.

Illinois Department of Transportation

PASSED _____ January 1, 2009
ENGINEER OF POLICY AND PROCEDURES

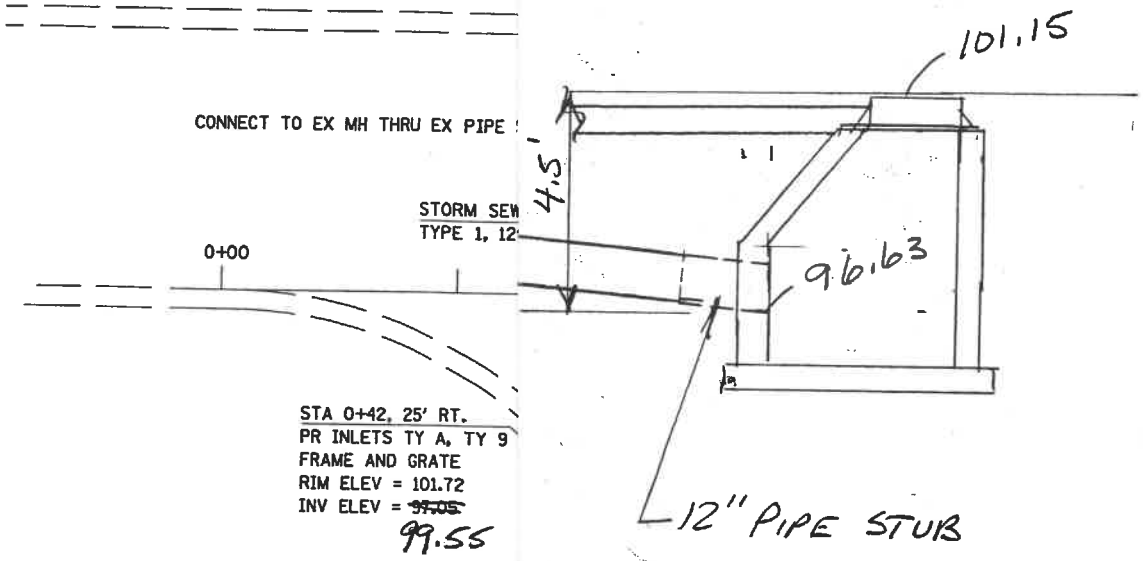
APPROVED _____ January 1, 2009
ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-09

DATE	REVISIONS
1-1-09	Switched units to English (metric).
1-1-04	Removed weights.

FRAME AND LIDS TYPE 1

STANDARD 604001-03



GENERAL NOTES

AVEMENT WITH 8" AGGREGATE BASE AND 3 1/2" BITUMINOUS PAVEMENT.

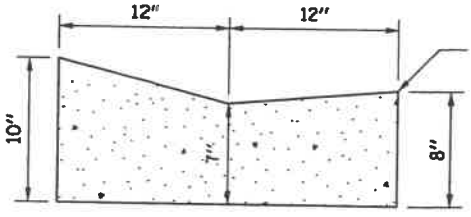
ACKFILL SHALL NOT BE PLACED IN GREATER THAN 12" LIFTS. EACH LIFT COMPACTED WITH A PLATE COMPACTOR.

IST OF MATERIALS AND EQUIPMENT

ACKFILL	CU YD	28.0
E BASE COURSE, TYPE B	TON	7.1
ACE COURSE, MIX "C", N50	TON	3.1
YPE A, TYPE 9 FRAME ATE	EACH	1
EOWERS, CLASS A, TYPE 1	FOOT	43
GUTTER	FOOT	8
REMOVAL	SQ YD	20.3

SAW

IPACTOR

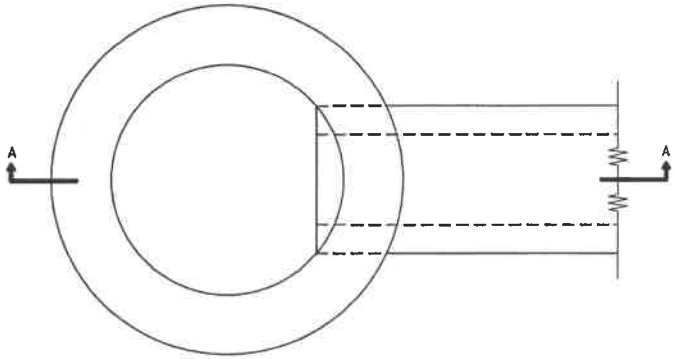


V GUTTER SECTION

2

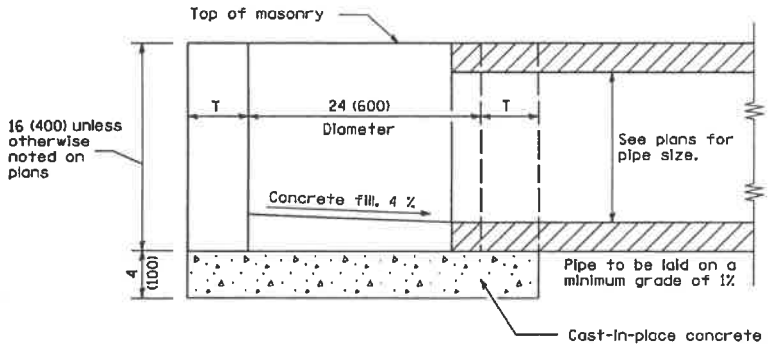
FILE NAME =	USER NAME = IE Consultants	DES
G:\S07009\2010\2010 DRAINAGE REPAIR\TIMBERCREST.dgn		DRA
	PLOT SCALE = 20.0000 ' / IN.	CHE
	PLOT DATE = 3/15/2010	DAT

		SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
			Sangamon		
TO STA.			ILLINOIS		

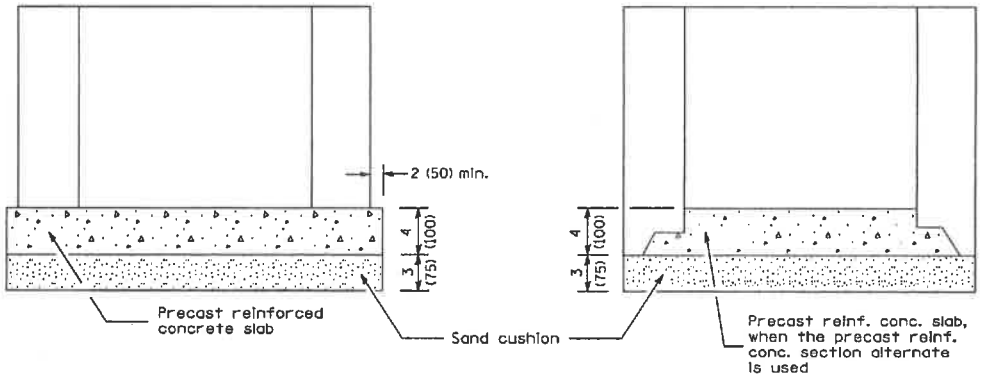


PLAN

ALTERNATE MATERIALS FOR WALLS	T
BRICK MASONRY	8 (200)
CAST-IN-PLACE CONCRETE	6 (150)
CONCRETE MASONRY UNIT	5 (125)
PRECAST REINFORCED CONCRETE SECTION	3 (75)



SECTION A-A



ALTERNATE METHODS

All dimensions are in inches (millimeters) unless otherwise shown.

Illinois Department of Transportation

PASSED January 1, 2009
ENGINEER OF POLICY AND PROCEDURES

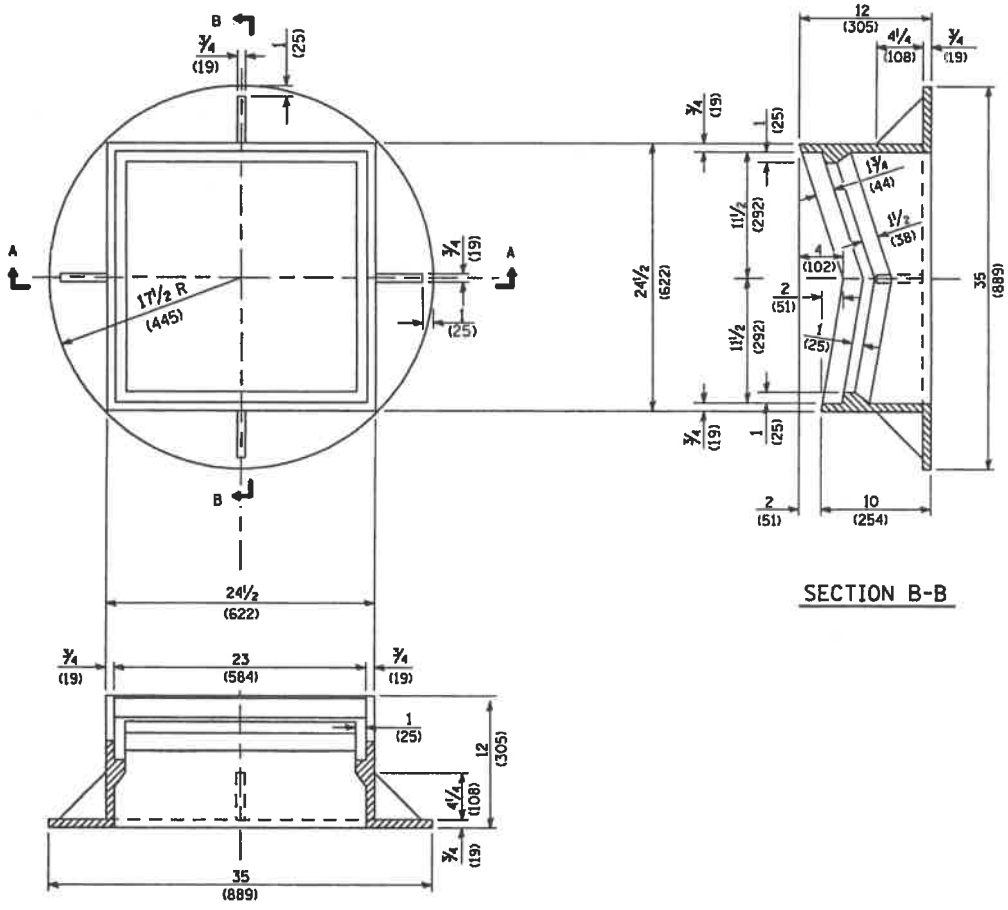
APPROVED January 1, 2009
ENGINEER OF DESIGN AND ENVIRONMENT

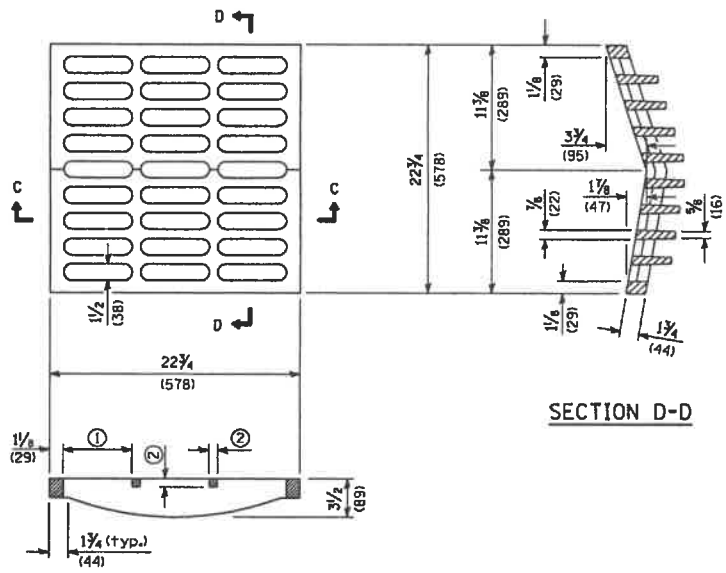
ISSUED 1-1-97

DATE	REVISIONS
1-1-09	Switched units to English (metric).
4-1-06	Added concrete fill in bottom of inlet.

INLET - TYPE A

STANDARD 602301-02





CAST FRAME

CAST GRATE

All dimensions are in inches (millimeters) unless otherwise shown.

Illinois Department of Transportation

PASSED January 1, 2009
ENGINEER OF POLICY AND PROCEDURES

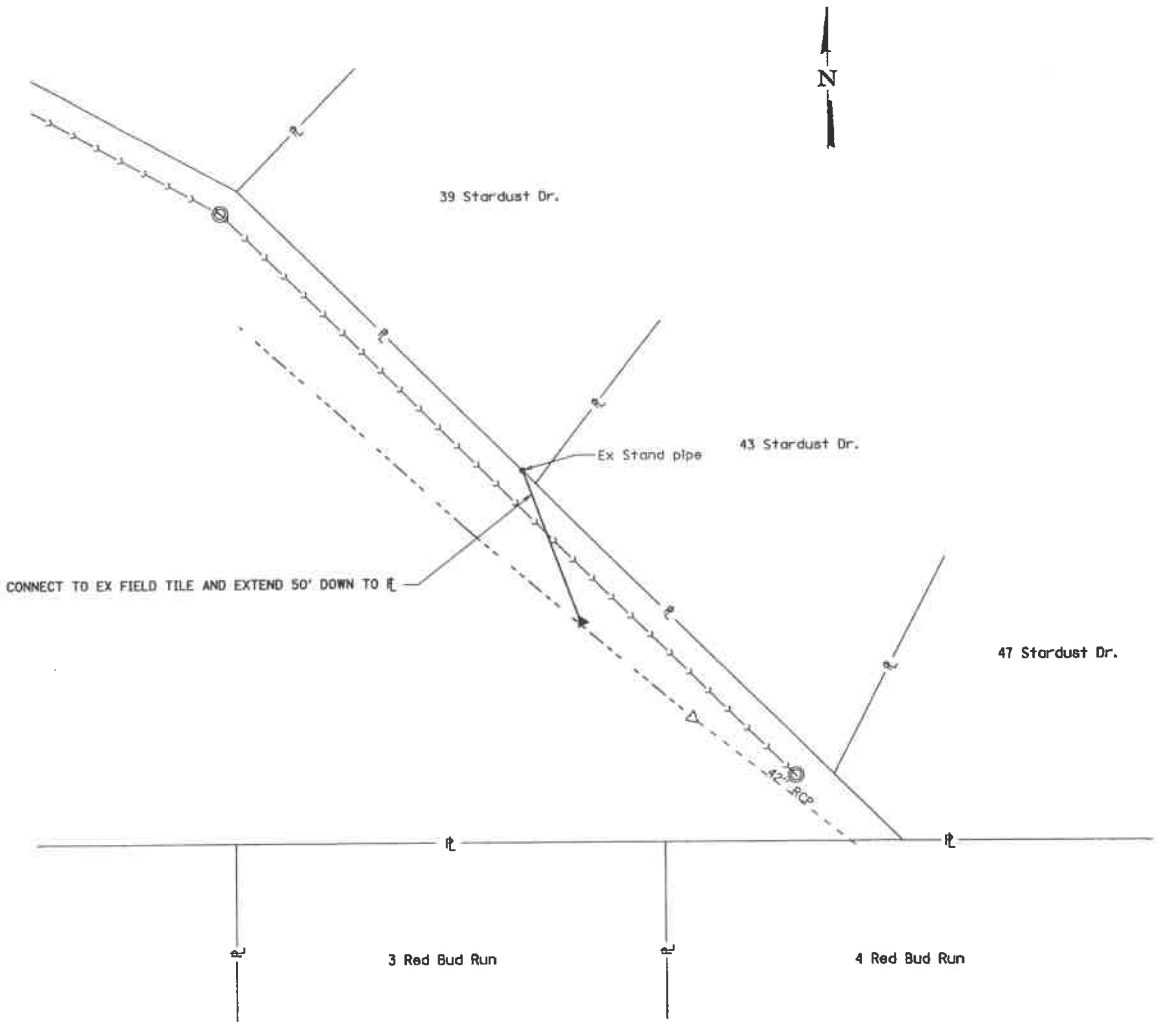
APPROVED January 1, 2009
ENGINEER OF DESIGN AND ENVIRONMENT

BS-1-1 (BBS)

DATE	REVISIONS
1-1-09	Switched units to English (metric).
1-1-04	Removed weights.

FRAME AND GRATE TYPE 9

STANDARD 604041-02



PLAN

GENERAL NOTES

FIND THE EX FIELD TILE THEN CONNECT PR PIPE TO IT. EXTEND PIPE APPROX 50' IN THE DIRECTION SHOWN TO THE DRAINAGE DITCH.

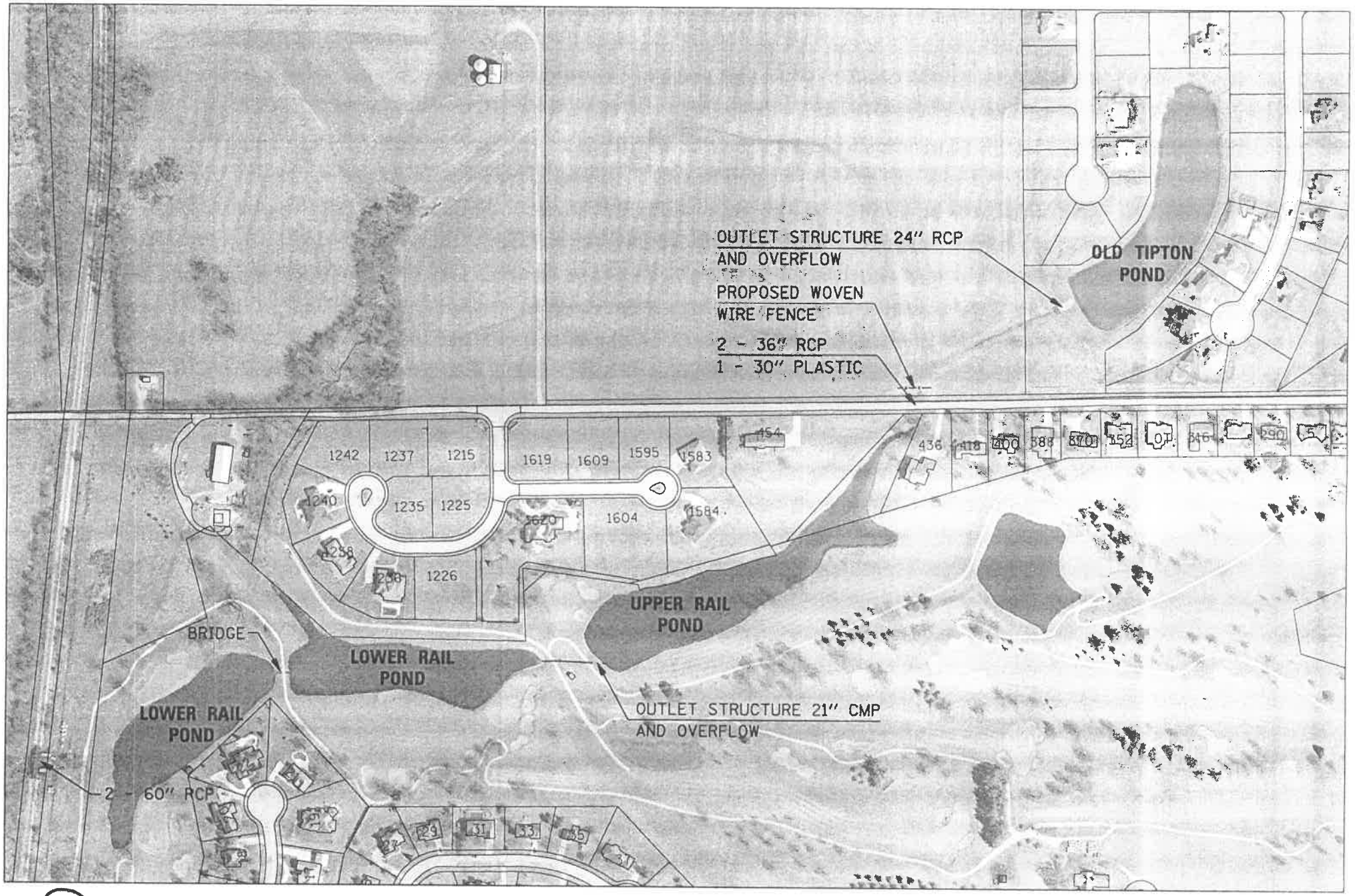
LIST OF MATERIALS AND EQUIPMENT

CORRUGATED POLYETHYLENE DRAINAGE PIPE (SWP)	FOOT	50

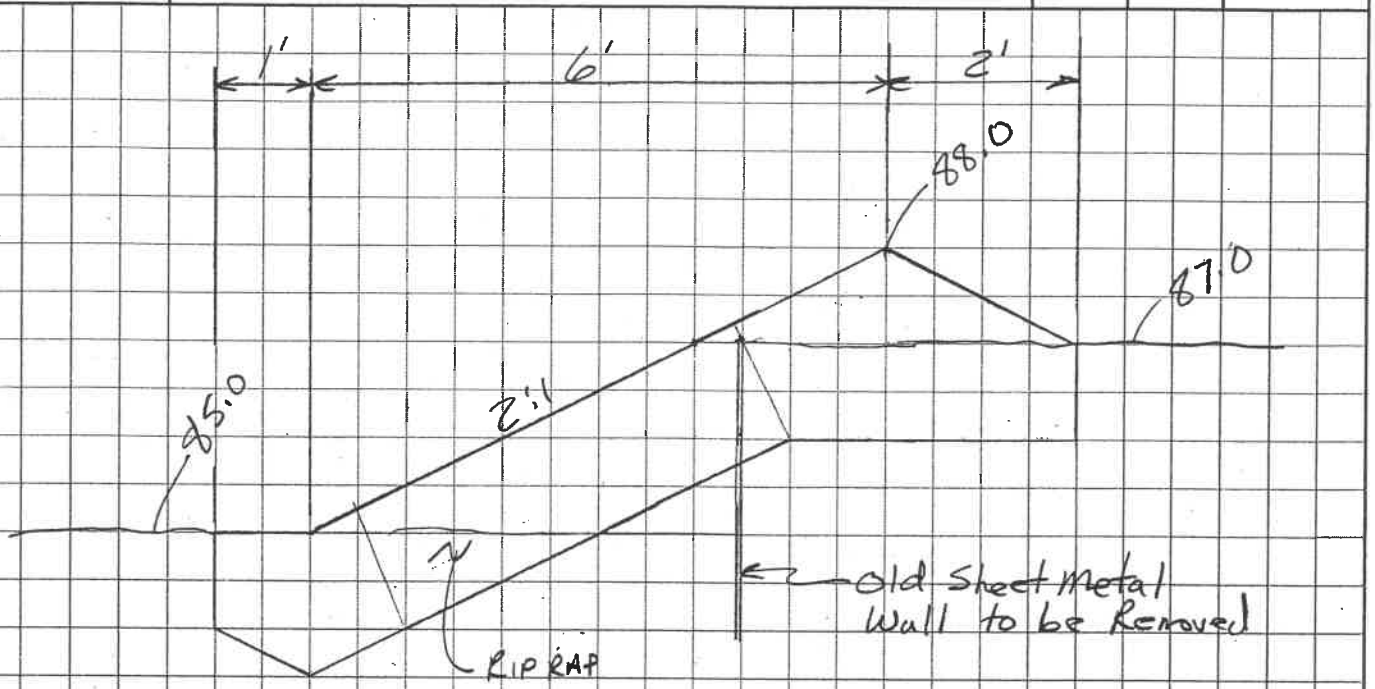
BACKHOE

(3)

FILE NAME = G:\5878891\2018\2018 DRAINAGE REPAIR\NORTH HAVEN.dgn	USER NAME = IE Consultants	DESIGNED -	REVISED -	ie	Village of Sherman ILLINOIS	NORTH HAVEN FIELD TILE	SECTION	COUNTY: Sangamon
	PLOT SCALE = 40.0000 ' / IN.	DRAWN -	REVISED -			SCALE:	SHEET NO. OF SHEETS	STA. TO STA.
	PLOT DATE = 3/15/2018	CHECKED -	REVISED -					ILLINOIS
		DATE -	REVISED -					


OUTLET STRUCTURE 24" RCP
AND OVERFLOW
PROPOSED WOVEN
WIRE FENCE
2 - 36" RCP
1 - 30" PLASTIC
OLD TIPTON
POND
1242
1237
1215
1619
1609
1595
1583
1240
1235
1225
1620
1604
1584
1258
1226
UPPER RAIL
POND
BRIDGE
LOWER RAIL
POND
LOWER RAIL
POND
OUTLET STRUCTURE 21" CMP
AND OVERFLOW
2 - 60" RCP

ie consultants	PROJECT: SEBRING ROAD	SHEET	OF
	DESCR: CHECK DAM		INIT / DATE
	COUNTY:	CALC	DRB / 4-6-09
	SECTION:	CHKD	



RIP RAP QUANTITY

AREA

$\frac{3+3.5}{2} \times 1 = 3.25$

$1/2 \times 4 \times 1 = 2$

$1.5 \times 4.5 = 6.75$

$\frac{1.5+2}{2} \times 1 = 1.5$

13.5 ft²

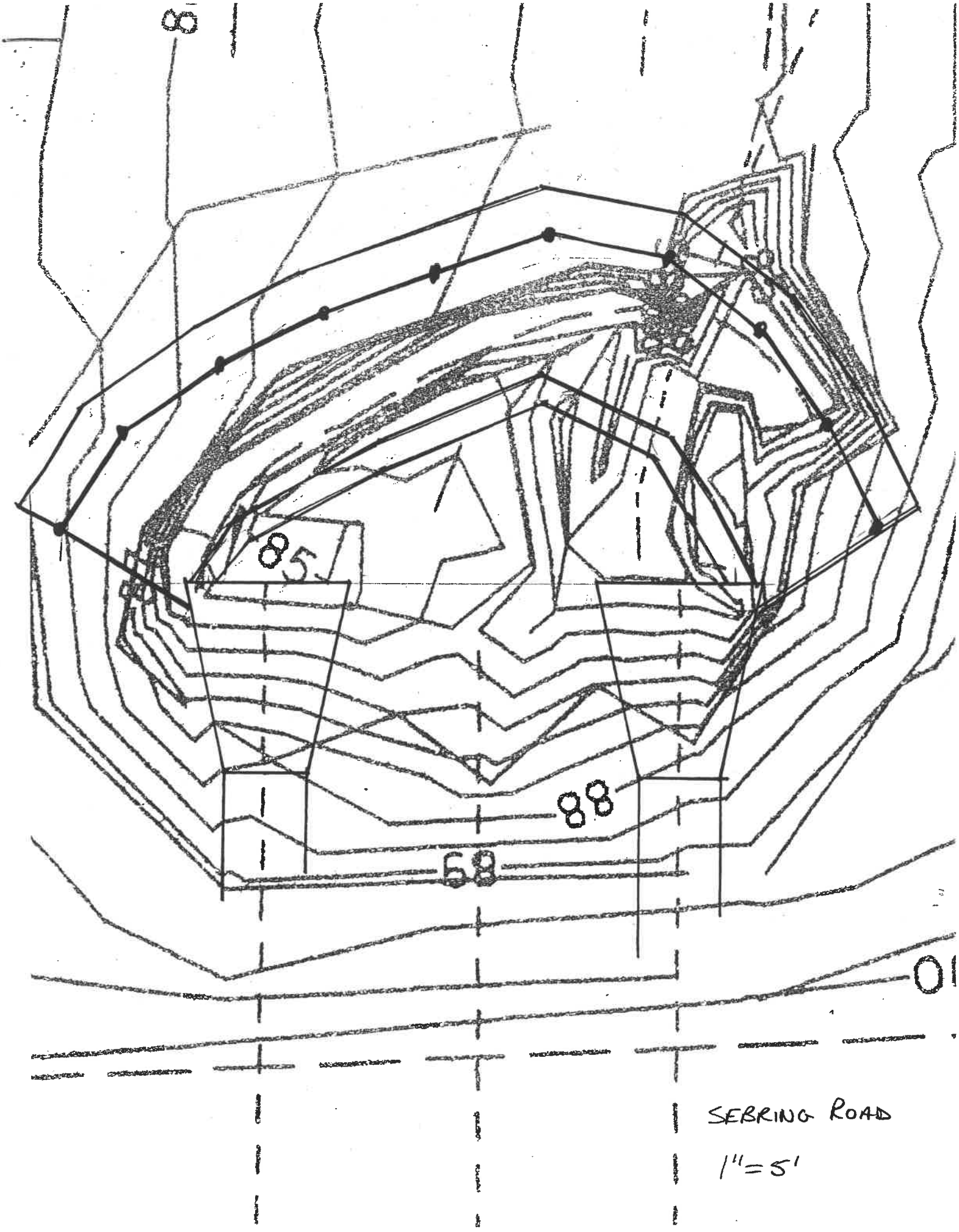
VOLUME

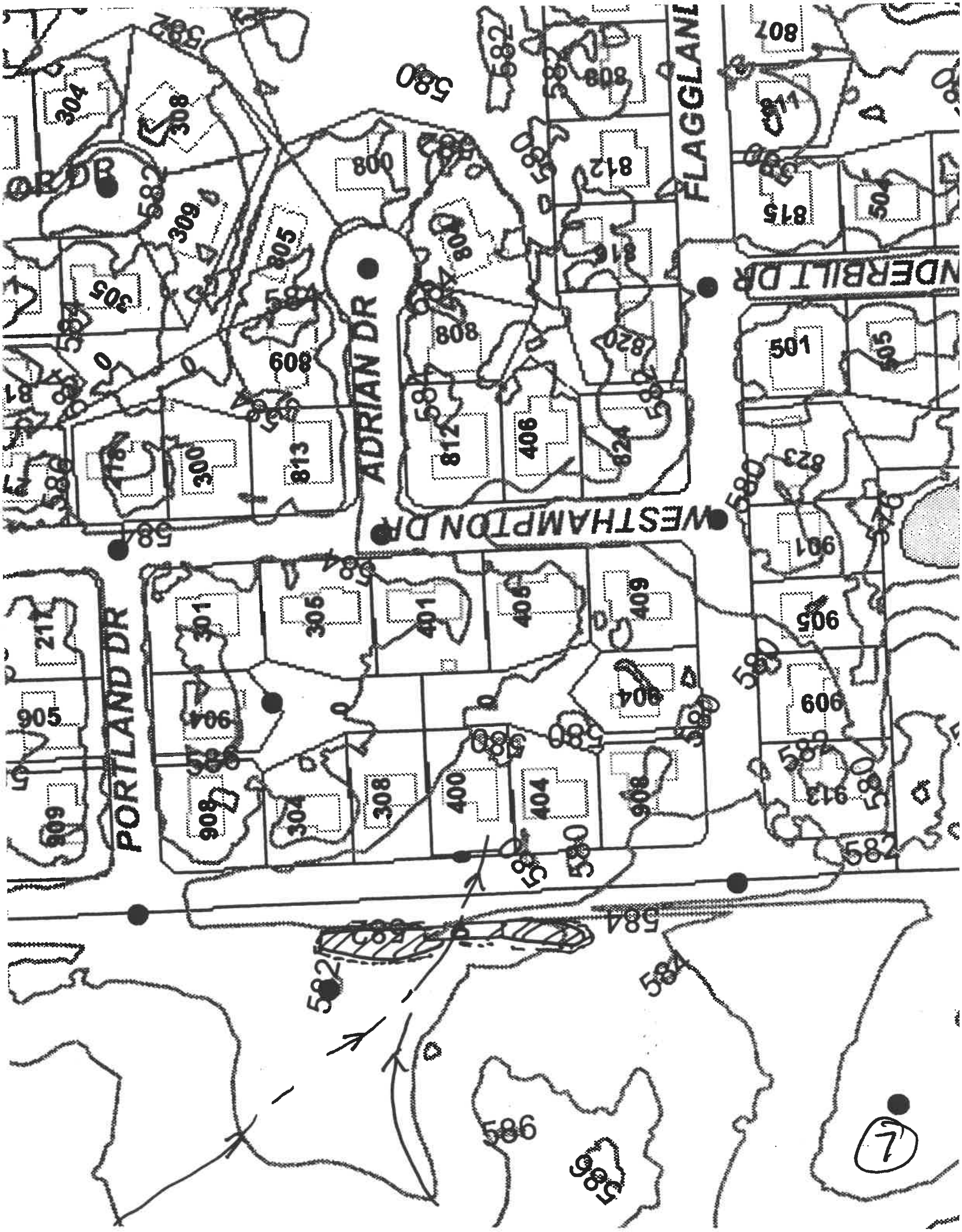
$13.5 ft^2 \times 52' = 702 ft^3$

$\div 27 = 26$ C.Y.

26 C.Y. $\times$ 2 TON/CY $=$ 52 TON

52 TON. $\times$ \$13.50 $=$ \$702


85
88
SEBRING ROAD
1"=5'


PORTLAND DR
ADRIAN DR
WESTHAMPTON DR
FLAGGLANE
NDERBILT DR
304
308
309
305
805
800
804
808
812
816
820
824
406
608
813
300
807
811
815
504
501
505
823
901
905
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582
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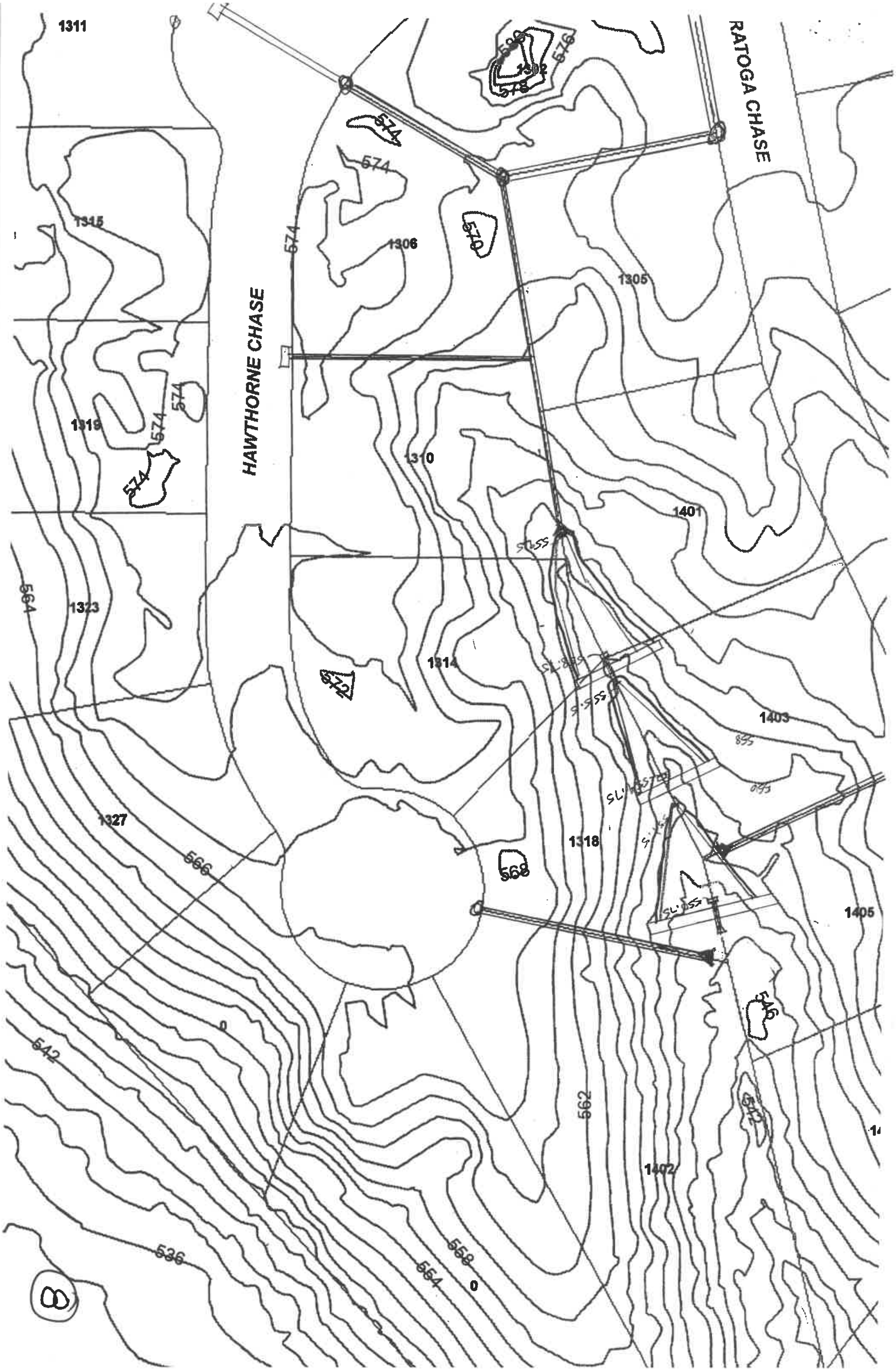
586
7


HAWTHORNE CHASE
RATOGA CHASE
1311
1315
1319
1323
1327
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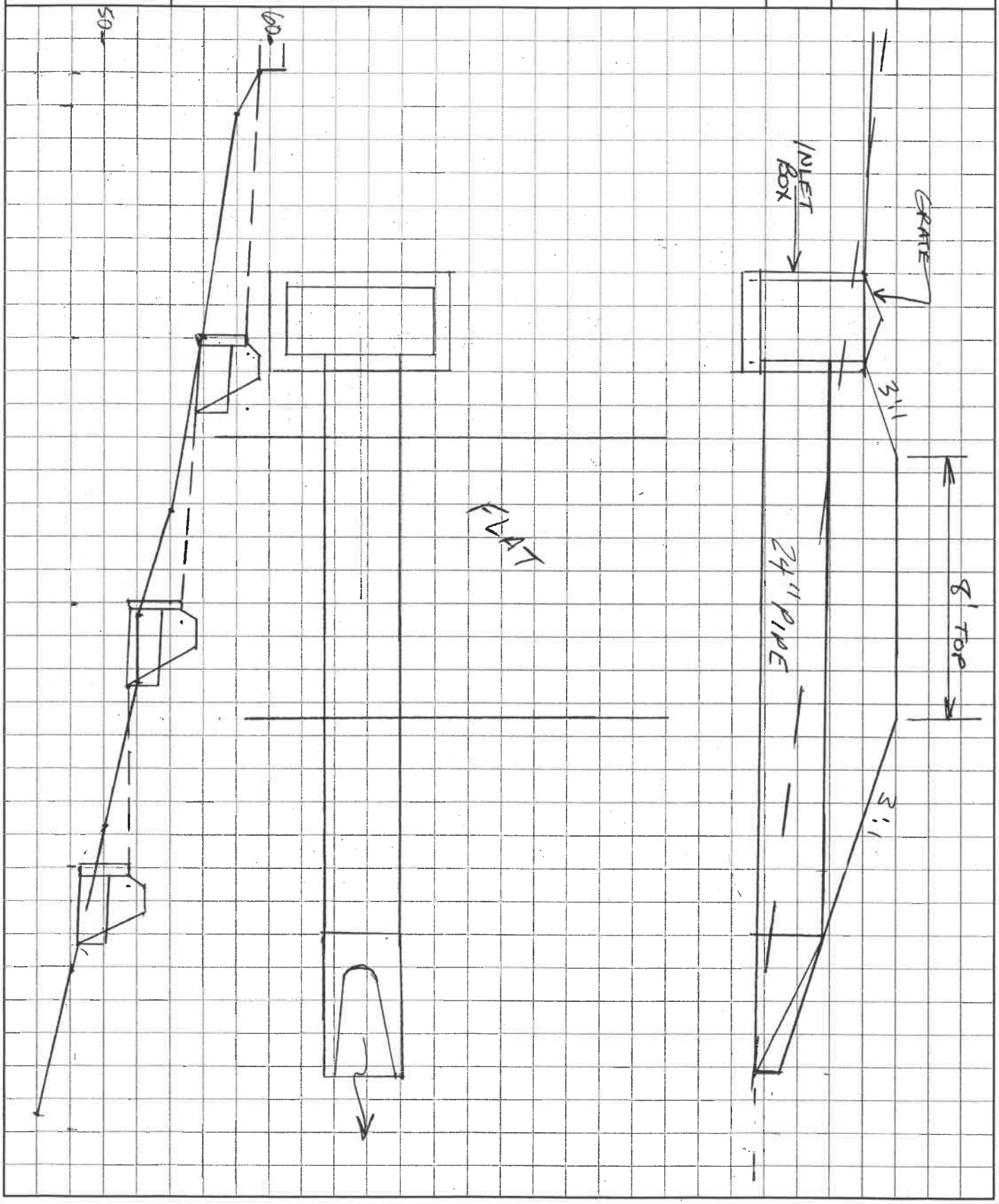
ie consultants

PROJECT: SARATOGA CHASE	SHEET		OF
DESCR:		INIT	DATE
COUNTY:	CALC		
SECTION:	CHKD		




REST STOP
REST STOP
I 55
I 55
PINE DR
TIMBERCREST DR
RIDGEVIEW DR
WOODS MILL DR
HILL TOP DR
Ditch Slope 0.6%
9


PINE DR
TIMBERCREST DR
RIDGEVIEW DR
WOODS MILL DR

ie consultants

PROJECT: WOOD'S MILL	SHEET		OF
DESCR:		INIT	DATE
COUNTY:	CALC		
SECTION:	CHKD		

EXCAVATION

4 x 2' = 8
½ x 2 x 6 = 6
½ x 1.5 x 4.5 = 4
} 18 ft²

18 ft² x 700' = 12600 ft³
÷ 27 = 467 c.y.

FILL = 467 c.y ±