DRAINAGE PLAN

CHANTILLY PLACE ADDITION

TO

WICHITA, SEDGWICK COUNTY, KANSAS

Prepared By

Baughman
ENGINEERING | SURVEYING | PLANNING
LANDSCAPE ARCHITECTURE

29 JANUARY 2007

Drainage Plan
CHANTILLY PLACE ADDITION
Wichita, Sedgwick County, Kansas

Baughman Company, P.A.
29 January, 2007

Project Narrative

The proposed Chantilly Place Addition is located at the corner of Pawnee Road and Webb Road.

The site consists of approximately 36 acres and is of Type D soils (Appendix A). The site soils were found using NRCS Soil Surveys and boring logs.

The site will consist of a residential subdivision with associated streets, utilities, and stormwater management systems (pipes, ponds, ditches, etc.). The addition will include approximately 64 lots and 2 ponds. A third pond, adjacent to the south of the proposed addition, is expected in future development.

The existing conditions of the site consist of farm/cropland and an existing waterway. There are no FEMA floodplain or floodway boundaries, as of this date, located on the property. There are no identifiable wetlands on the property. A preliminary on-site determination was made available at the time of this report and found there to be no intermittent streams on the property. An ephemeral stream is expected and may require a USACOE Nationwide Permit

The site currently discharges its runoff along the east property line onto an adjacent property. Upon development, the discharge will be equal to or less than existing conditions. The discharge of the future pond is expected to be a grass-lined, broadcrested overflow weir. There is an existing pond approximately 500 feet downstream to the southeast. The runoff will continue to feed this existing pond. Existing trees, where applicable, will be left at existing grades. Pipelines run along the north property line as well as the west property line. These areas will also be left at or near existing grades.

The proposed ponds will serve as sedimentation basins as well as for storage of storm water runoff. The ponds will be used for recreation purposes and will allow for pedestrian access. Overflow and drainage ditches will be utilized for conveyance as well as vegetative filter strips for water quality.

Existing Runoff Conditions

The project is bounded by Pawnee Road to the north, Webb Road to the west, a tree row and farmland to the east, and farmland to the south.

Offsite runoff enters the property at the following points of the property:

North There are approximately 16 acres draining onto the site from the north as well as 24" RCP from a construction/yard area. The curve number for this area

was considered to be 73 (Brush - good condition). The discharge from the 24" RCP was assumed to carry 22 cfs with a velocity of 7 ft/sec. The 24" RCP draining the yard area is approximately 500 feet north of Pawnee Road. The entire north offsite area drains onto the proposed site via a 60"x38" HERCP (48" equivalent). This area used a minimum Tc of 15 minutes.

East There is approximately 1 acre of drainage entering the property from the east Pawnee ditch ROW. This area drains via a 12" CMP and was assumed to have a CN of 80 (Pasture – good condition, or Row Crops – CR & CT). This area was assumed to have a minimum Tc of 15 minutes.

Pond runoff and existing conditions runoff was calculated using PondPack (Appendix C). Time of concentrations was calculated using TR-55 shallow concentrated flow and can also be found in the PondPack calculations in Appendix C. A minimum Tc of 15 minutes was used where applicable. For storm water sewer sizing, a 15 minute Tc was utilized throughout and the Rational Method was used (Appendix B). StormCad was utilized for pipe sizing.

The existing conditions curve number used was 80. This was obtained from TR-55 using a mixture of good condition pasture for grazing (80) and row crops contoured and terraced with crop residue (80). Curve numbers used for developed conditions was 87. This was also obtained from TR-55 using ¼ acre lots at Type D soil conditions.
If varying, runoff Curve Numbers can be obtained from the accompanying exhibits and plans.

Detention Facilities

Reserve E There is a pond and a drainage ditch located in Reserve E. A 1 acre pond will be located at the entrance off of Pawnee Avenue and drain into a pond located in Reserve F via a drainage ditch. The north entry pond will convey the offisite runoff from the 60"x38" RCPHE. The static water surface of this pond will be 1382.0 with a 100-yr elevation of 1384.6. The pond will drain into the ditch section via a 5' wide broadcrested weir. The ditch section will also include a 5' bottom with 4:1 sideslopes with a slope of 0.5%. The ditch was modeled with its minimal capacity and a 100-yr water surface was established. The ditch will drain into the Reserve F pond via 2-36" RCPs under the proposed Stoneybrook Ct.

Reserve F The proposed pond in Reserve F will be approximately 2 acres and drain to the south via a 36" RCP and 10'overflow weir and ditch section. This pond will have a static water surface of 1379.0 and a 100-yr water surface of 1382.7. With the current development, the 36" RCP will be installed as will the overflow section. The drainage will exit the property in the current channel/swale in which it currently does.

South Future Pond A future pond was modeled to serve the remaining the 40 acres to the south in this basin. The pond was modeled using a static water surface

of 1377.0 with a 20' grass lined, broadcrested weir at the same elevation. The pond will drain onto the adjacent east property at the current elevation (1376.2).

The future pond is subject to change and will not be required to for the proposed development to proceed. It was modeled for lowest opening elevations of the adjacent proposed lots and for tailwater concerns of the proposed ponds. The pond in Reserve F will drain to the south limits of the plat via the proposed 36" RCP and overflow section. An offsite drainage agreement will be needed.

Detention Summary

Pond System

POND	INFLOW	OUTFLOW	100-yr WSE	OUTLET
Entry Res E	105 cfs	46 cfs	1384.6	5' Weir
Ditch Res E	143 cfs	109 cfs	1384.4	2 - 36"
Res F	204 cfs	90 cfs	1382.7	36" w/10' weir

The proposed outflow to the south line of this plat is approximately 102 cfs (Pond F outflow plus developed Basin 13). The existing flow to this point currently is 365 cfs (Offsite flow plus 40 acres of runoff).

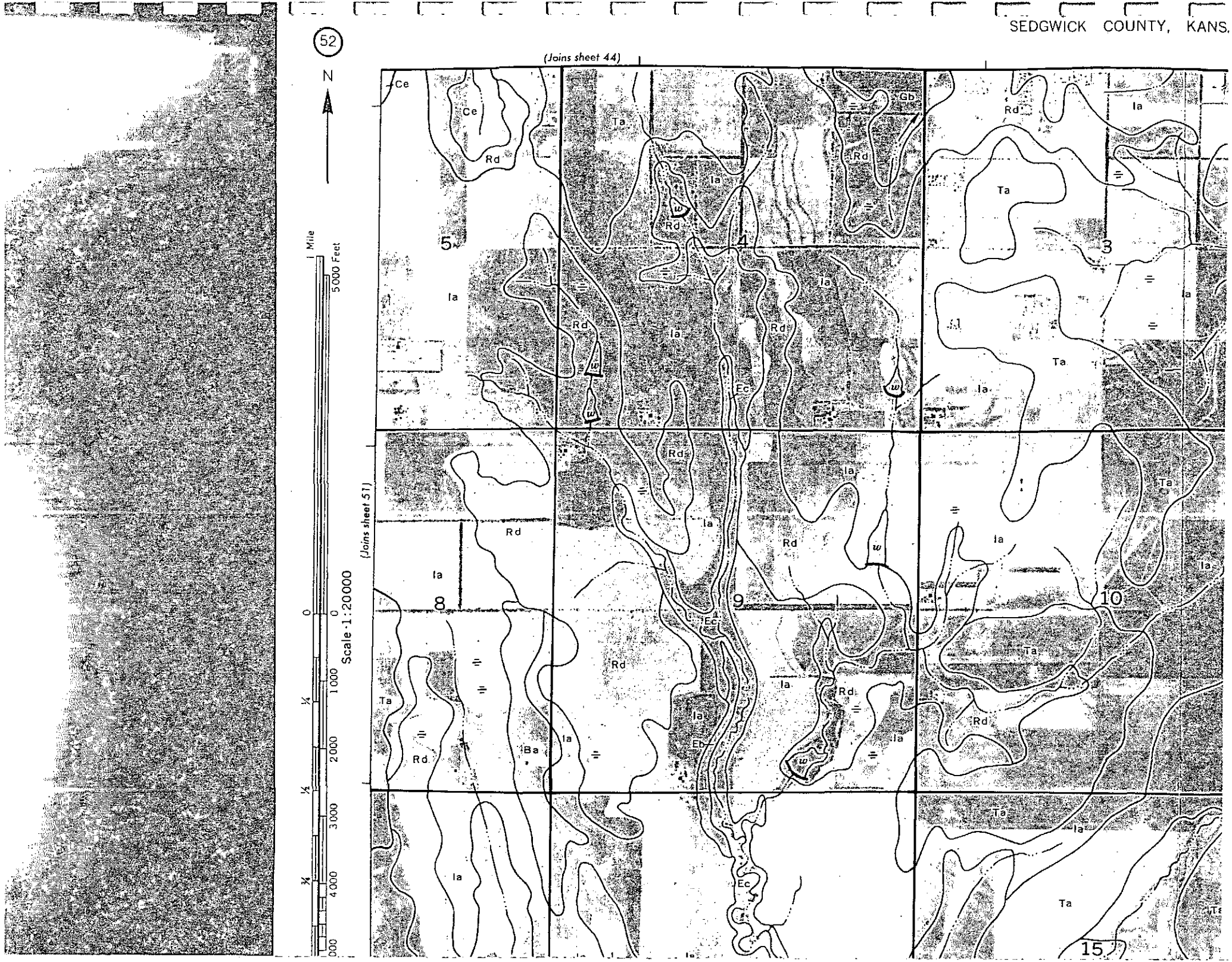
Discharge Points Summary

The flow to the east line discharge point is currently 630 cfs (total basin area). The flow to this point after development of the proposed site will be approximately 375 cfs (developed portion and remaining basin). There is an existing channel/swale that drains into the adjacent property. This swale will be left as existing.
The flow after the development of the future pond (as modeled here) will discharge approximately 178 cfs.

No upstream impacts are expected in the development of the proposed property. An existing pond is located approximately 500 feet downstream of the sites' discharge and may experience a water shortage if over-detention on the proposed site is done.

APPENDIX A

Soil Survey
Boring Logs


52
N
(Joins sheet 44)
(Joins sheet 51)
1 Mile
5000 Feet
Scale 1:20000
Ce
Rd
Ta
Gb
Ia
Ec
Ba
w
5
4
3
8
9
10
15

GSI

September 27, 2006

Mr. Trevor Wooten
Baughman Company, P.A.
315 Ellis
Wichita, KS 67211

SUBJECT: Geotechnical Drilling and Laboratory Services
Webb & Pawnee
Wichita, Kansas
GSI Job No. 067367

Dear Mr. Wooten:

Pursuant to your request, Geotechnical Services, Inc. has completed an investigation program consisting of drilling and laboratory analysis for the referenced project. The project is located at the southeast corner of Webb Road intersecting Pawnee in Wichita, Kansas. The field investigation was performed on September 14 and 15, 2006, and included the advancement of three exploratory auger borings to a depth of 20 feet below grade. The borings were drilled at locations specified by representatives of Baughman Company, P.A. and are shown on the attached Boring Location Plan.

Auger cuttings were collected at soil changes encountered during drilling. The samples were transported to the laboratory for visual classification in accordance with ASTM D 2488 and laboratory testing. The subsurface soil conditions generally consisted of lean clay (USCS symbol CL) and fat clay (CH). A graphical representation of the subsurface conditions is shown on the attached boring logs.

Plastic pipe was installed in the augered boreholes for 24-hour water level measurements. The water level measurements are tabulated below. The exploratory boreholes were plugged in accordance with Kansas State law.

A laboratory testing program that consisted of soil Plasticity Limits, determined in accordance with ASTM D4318, was performed on three samples of the predominant clay soils recovered during the drilling program. The results of this testing program are shown in the following table.

Table 1: Soil Plasticity Testing Results

Borehole No.	Sample ID.	Depth Below Grade (ft)	Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)
BH-A	A-2	5-13	36	14	22
	A-3	13-20	65	23	42
BH-C	A-2	4.5-13.5	43	16	27

Groundwater observations were made at the end of drilling and from the plastic pipe installed in the augered boreholes 24 hours following drilling. The following table summarizes the groundwater observations and measurements noted in feet below grade.

Table 2: Groundwater Depth Measurements

Borehole No.	Groundwater Depth (end of drilling) (ft)	Groundwater Depth (24 hours after drilling) (ft)
BH-A	--	18.1
BH-B	--	--
BH-C	--	17.7

Uncertainty is involved with short-term water level observations in boreholes. The groundwater level and the amount and level of any perched water on the site may be expected to fluctuate with variations in precipitation, site grading, drainage, and adjacent land use. Long-term monitoring in piezometers or observation wells would be required to evaluate the potential range of groundwater conditions.

GSI

Webb & Pawnee
Wichita, KS
September 27, 2006
GSI Project No. 067367

We appreciate this opportunity to be of service in the geotechnical drilling and laboratory phase of this project. Please contact us if you have any questions concerning this report or require additional information.

Respectfully submitted,
Geotechnical Services, Inc.

Ky Louanghaksaphone, E.I.
Staff Engineer

Ryan M. Schaner, P.E.
Senior Engineer

KL/RMS

Attachments: Boring Location Plan (1)
Boring Logs (3)
Unified Soils Classification System (1)

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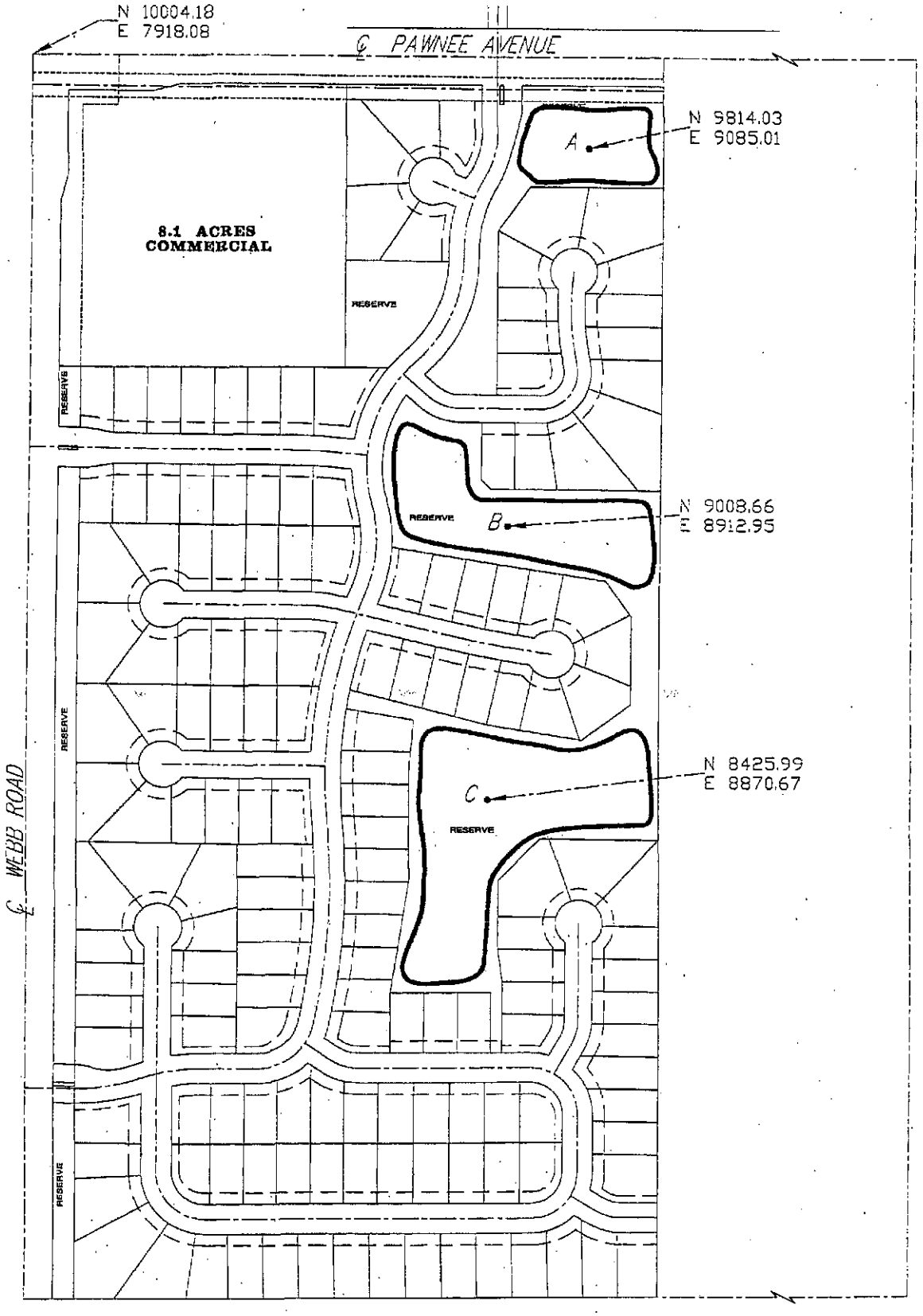
SKETCH PLAT

SLAWSON-WEBB & PAWNEE

WICHITA, SEDGWICK COUNTY, KANSAS



BORING LOCATION PLAN

SCALE: 1" = 200'

CONCEPT "A"

70'X130' LOTS: 160 LOTS

TOTAL LOTS: 160 LOTS

Baughman Company, P.A.

BORING NO. BH-A

DATE DRILLED	LOCATION	ELEVATION (ft)	DATUM	DRILLING EQUIPMENT
9/14/06	N. 9814.03, E. 9085.01			CME 45, with 6" Continuous Flight Augers

ELEVATION (ft) / DEPTH (ft)	SAMPLE NUMBER AND TYPE+	RECOVERY (%)	BLOWS/FOOT	USCS SYMBOL	MATERIAL DESCRIPTION	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	UNCONFINED COMPRESSIVE STRENGTH (ksf)	LAB TESTS++	DEPTH (ft)
					NORTHING - EASTING -					
	A-1				TOPSOIL FAT CLAY(CH)- very dark brown to dark brown, moist					
5										5
	A-2				LEAN CLAY(CL)- brown, moist, with 5% sand size calcareous fragments				LL=36 PI=22	
10										10
	A-3				FAT CLAY(CH)- olive brown, slightly moist with iron staining				LL=65 PI=42	
15										15
20										20
					END OF BORING 20 FEET					

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROVED: kl

BY: cab

BORING LOG LOGS.GPJ GSI.GDT 9/27/06

COMMENTS:

+ SAMPLER TYPE: Shelby Tube; SPT Sample; Auger Sample; NX Core; Ca. S.S. Sample

++ LAB TESTS: NR=No Recovery, A=Atterberg, W=Sieve Wash, C=Consolidation, P=Proctor, B=CBR, Sw=Swell, Tr=Triaxial Compression, S=Direct Shear, G=Grain Size, T=Torvane, R=Resistivity, Ch=Chemical

WATER LEVEL MEASUREMENTS (ft.)

WHILE DRILLING	END OF DRILLING	24 HOURS AFTER DRILLING	HOURS AFTER DRILLING
None ▽	None ▽	18.1 ▽	▽

GSI Geotechnical Services, Inc.

PROJECT NO.: 067367

WEBB AND PAWNEE
Wichita, KS
BORING LOG AND
TEST SUMMARY

PLATE
BH-1

BORING NO. BH-B

DATE DRILLED	LOCATION	ELEVATION (ft)	DATUM	DRILLING EQUIPMENT
9/14/06	N. 9008.66, E. 8912.95			CME 45, with 6" Continuous Flight Augers

NORTHING -

EASTING -

ELEVATION (ft.)	DEPTH (ft.)	SAMPLE NUMBER AND TYPE+	RECOVERY (%)	BLOWS/FOOT	USCS SYMBOL	MATERIAL DESCRIPTION	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	UNCONFINED COMPRESSIVE STRENGTH (ksf)	LAB TESTS++	DEPTH (ft.)
		A-1				TOPSOIL FAT CLAY(CH)- very dark brown, moist					
	5	A-2				LEAN CLAY(CL)- dark red brown, moist with 2% sand and gravel size calcareous fragments					5
		A-3				- brown, moist, few sand size calcareous fragments with iron staining					
	10										10
	15										15
		A-4				FAT CLAY(CH)- olive brown, moist with 1-2% sand size calcareous fragments and iron staining					
	20										20

END OF BORING 20 FEET
NO FREE WATER ENCOUNTERED

COMMENTS:

WATER LEVEL MEASUREMENTS (ft.)

WHILE DRILLING	END OF DRILLING	24 HOURS AFTER DRILLING	HOURS AFTER DRILLING
None ▽	None ▽	None ▽	▽

+ SAMPLER TYPE: Shelby Tube; SPT Sample; Auger Sample; NX Core; Ca. S.S. Sample

++ LAB TESTS: NR=No Recovery, A=Atterberg, W=Sieve Wash, C=Consolidation, P=Proctor, B=CBR, Sw=Swell, Tr=Triaxial Compression, S=Direct Shear, G=Grain Size, T=Torvane, R=Resistivity, Ch=Chemical

GSI Geotechnical Services, Inc.

PROJECT NO.: 067367

WEBB AND PAWNEE
Wichita, KS
BORING LOG AND
TEST SUMMARY

PLATE
BH-2

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: cao APPROVED: kl

BORING_LOG_LOGS.GPJ_GSI.GDT 9/27/06

BORING NO. BH-C

DATE DRILLED	LOCATION	ELEVATION (ft)	DATUM	DRILLING EQUIPMENT
9/14/06	N. 8425.99, E. 8870.67			CME 45, with 6" Continuous Flight Augers

NORTHING -

EASTING -

ELEVATION (ft)	DEPTH (ft)	SAMPLE NUMBER AND TYPE+	RECOVERY (%)	BLOWS/FOOT	USCS SYMBOL	MATERIAL DESCRIPTION	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	UNCONFINED COMPRESSIVE STRENGTH (ksf)	LAB TESTS++	DEPTH (ft)
		A-1				TOPSOIL FAT CLAY(CH)- very dark brown, moist					
	5	A-2				LEAN CLAY(CL)- dark red brown, moist with 1-5% sand size calcareous fragments				LL=43 PI=27	5
	10										10
		A-3				FAT CLAY(CH)- dark olive, moist with 1% sand size calcareous fragments, few iron stains					
	15										15
	20										20
						END OF BORING 20 FEET					

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: cab APPROVED: kl

COMMENTS:

+ SAMPLER TYPE: Shelby Tube; SPT Sample; Auger Sample; NX Core; Ca. S.S. Sample.

++ LAB TESTS: NR=No Recovery, A=Atterberg, W=Sieve Wash, C=Consolidation, P=Proctor, B=CBR, Sw=Swell, Tr=Triaxial Compression, S=Direct Shear, G=Grain Size, T=Torvane, R=Resistivity, Ch=Chemical

WATER LEVEL MEASUREMENTS (ft.)

WHILE DRILLING	END OF DRILLING	24 HOURS AFTER DRILLING	HOURS AFTER DRILLING
None ▽	None ▽	17.7 ▽	

GSI Geotechnical Services, Inc.

PROJECT NO.: 067367

WEBB AND PAWNEE
Wichita, KS
BORING LOG AND
TEST SUMMARY

PLATE
BH-3

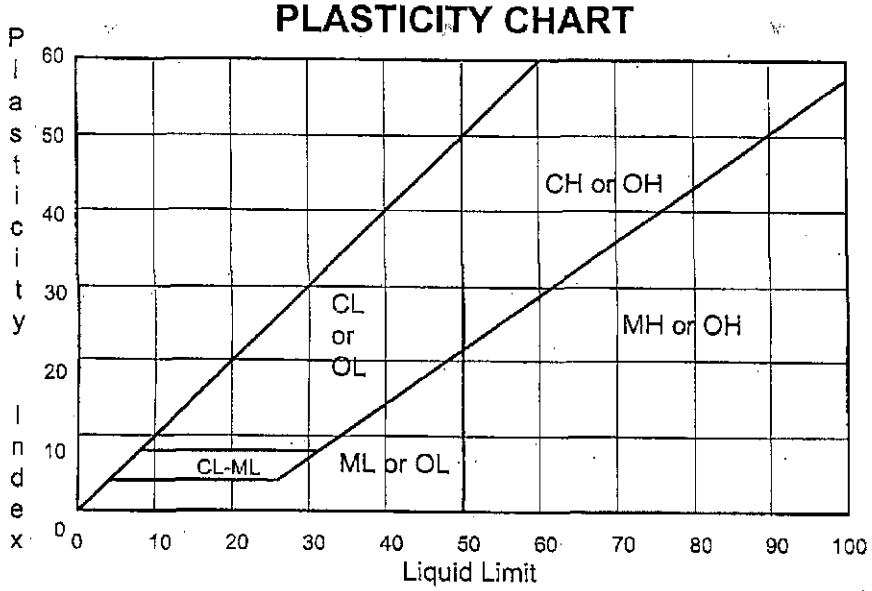
BORING LOG LOGS.GPJ GSI.GDT 9/27/06

UNIFIED SOIL CLASSIFICATION SYSTEM

GROUP NAME	GROUP SYMBOL	SOIL DESCRIPTION	COMMENTS
Peat	Pt	Highly organic soils	50% or more is smaller than No. 200 sieve
Fat Clay	CH	Clay - Liquid limit => 50 *	
Elastic Silt	MH	Silt - Liquid limit => 50 *	
Lean Clay	CL	Clay - Liquid limit < 50 *	
Silt	ML	Silt - Liquid limit < 50 *	
Silty Clay	CL-ML	Silty Clay *	
Clayey Sand	SC	Sands with 12 to 50 percent smaller than No. 200 sieve *	More than 50% is larger than No. 200 sieve and % sand > % gravel
Silty Sand	SM		
Poorly-graded Sand with Clay	SP-SC	Sands with 5 to 12 percent smaller than No. 200 sieve *	
Poorly-graded Sand with Silt	SP-SM		
Well-graded Sand with Clay **	SW-SC		
Well-graded Sand with Silt **	SW-SM		
Poorly-graded Sand	SP	Sands with less than 5 percent smaller than No. 200 sieve	
Well-graded Sand **	SW		
Clayey Gravel	GC	Gravels with 12 to 50 percent smaller than No. 200 sieve *	More than 50% is larger than No. 200 sieve and % gravel > % sand
Silty Gravel	GM		
Poorly-graded Gravel with Clay	GP-GC	Gravels with 5 to 12 percent smaller than No. 200 sieve *	
Poorly-graded Gravel with Silt	GP-GM		
Well-graded Gravel with Clay **	GW-GC		
Well-graded Gravel with Silt **	GW-GM		
Poorly Graded Gravel	GP	Gravels with less than 5 percent smaller than No. 200 sieve	
Well-graded Gravel **	GW		

* See Plasticity Chart for definition of silts and clays. If organic use OL or OH.
** See definition for well graded.

PLASTICITY CHART



LEGEND OF TERMS

MOISTURE CONDITIONS
Dry, Slightly Moist, Moist, Very Moist, Wet (Saturated)

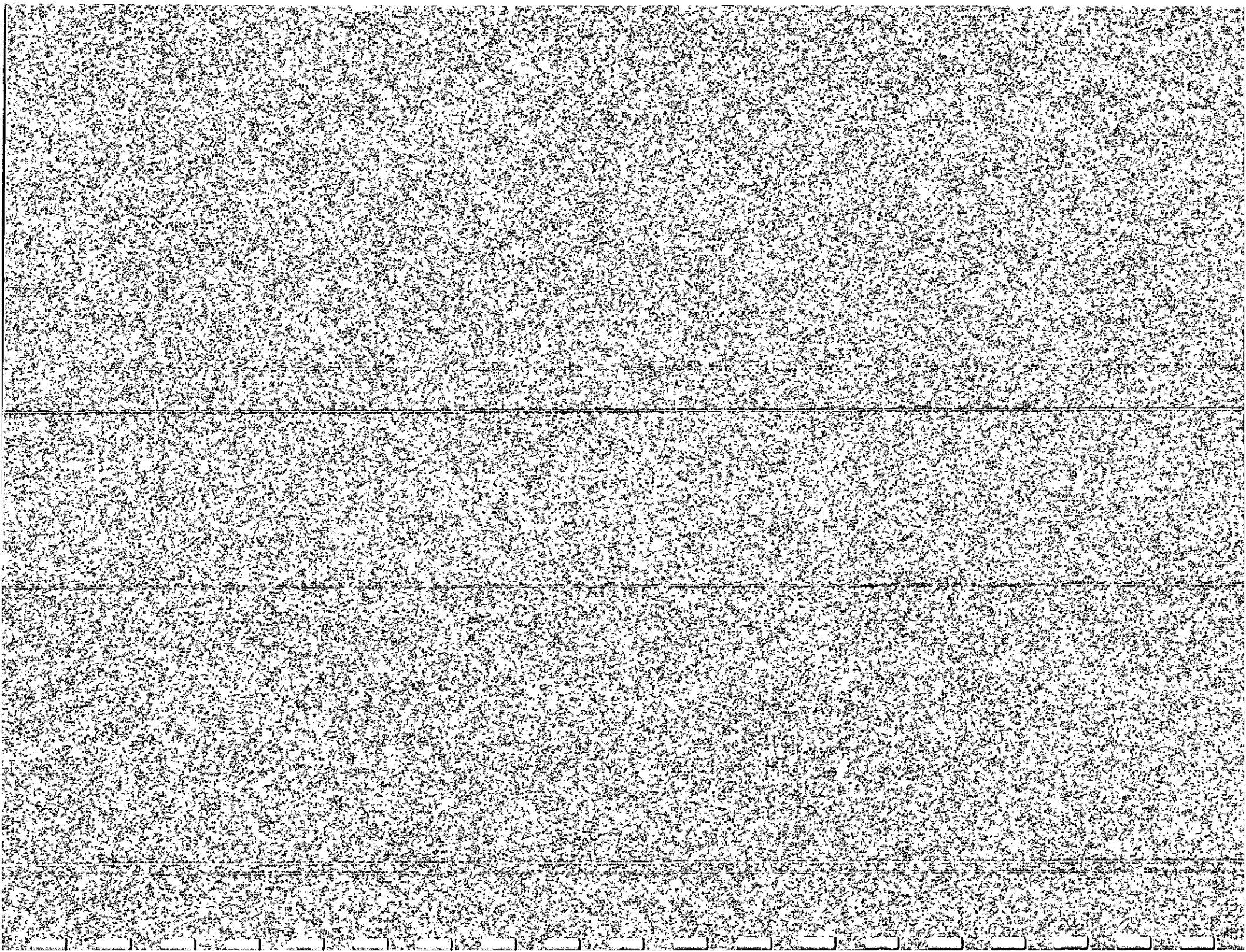
SOIL CONSISTENCY
Fine Grained Soils
Very Soft, Soft, Firm, Hard, Very Hard

Coarse Grained Soils
Very Loose, Loose, Medium Dense, Dense, Very Dense

CLASSIFICATION CRITERIA FOR SANDS AND GRAVELS

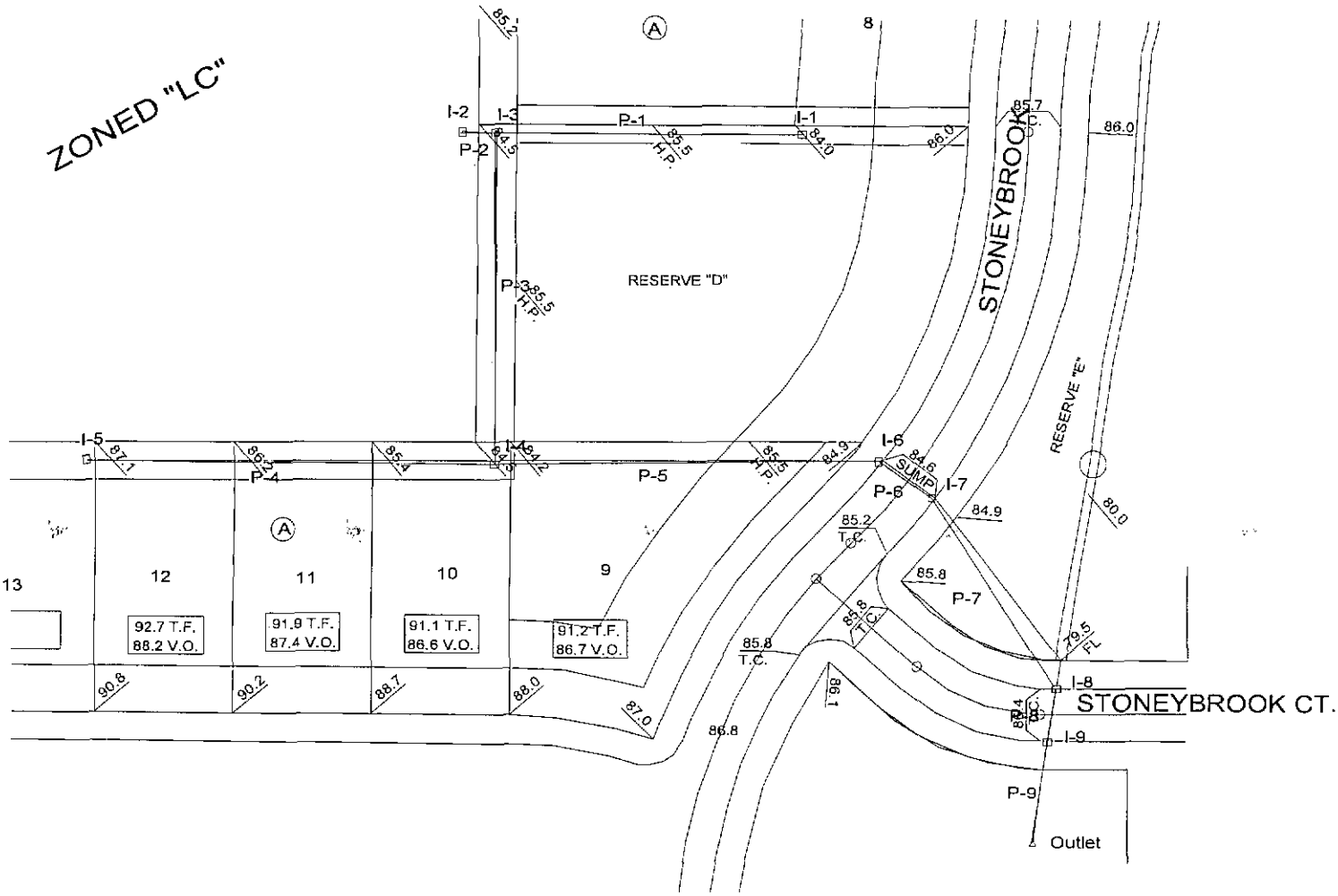
Well graded sands (SW) $C_u = D_{60}/D_{10} \geq 6$ and $C_c = (D_{30})^2/(D_{10} \times D_{60}) \leq 3$ and ≥ 1
Well graded gravels (GW) $C_u = D_{60}/D_{10} \geq 4$ and $C_c = (D_{30})^2/(D_{10} \times D_{60}) \leq 3$ and ≥ 1

Boulders	Cobbles	Coarse Gravel	Fine Gravel	Coarse Sand	Medium Sand	Fine Sand	FINES (silt or clay)
Sieve sizes 10"		3"	3/4"	#4	#10	#40	#200



Appendix B

StormCAD
-Proposed SWS Systems 1-4


ZONED "LC"
STONEYBROOK
RESERVE "D"
RESERVE "E"
STONEYBROOK CT.
Outlet
I-1
I-2
I-3
I-4
I-5
I-6
I-7
I-8
I-9
P-1
P-2
P-3
P-4
P-5
P-6
P-7
P-9
SUMP
H.P.
T.C.
F.L.
92.7 T.F.
88.2 V.O.
91.9 T.F.
87.4 V.O.
91.1 T.F.
86.6 V.O.
91.2 T.F.
86.7 V.O.
8
9
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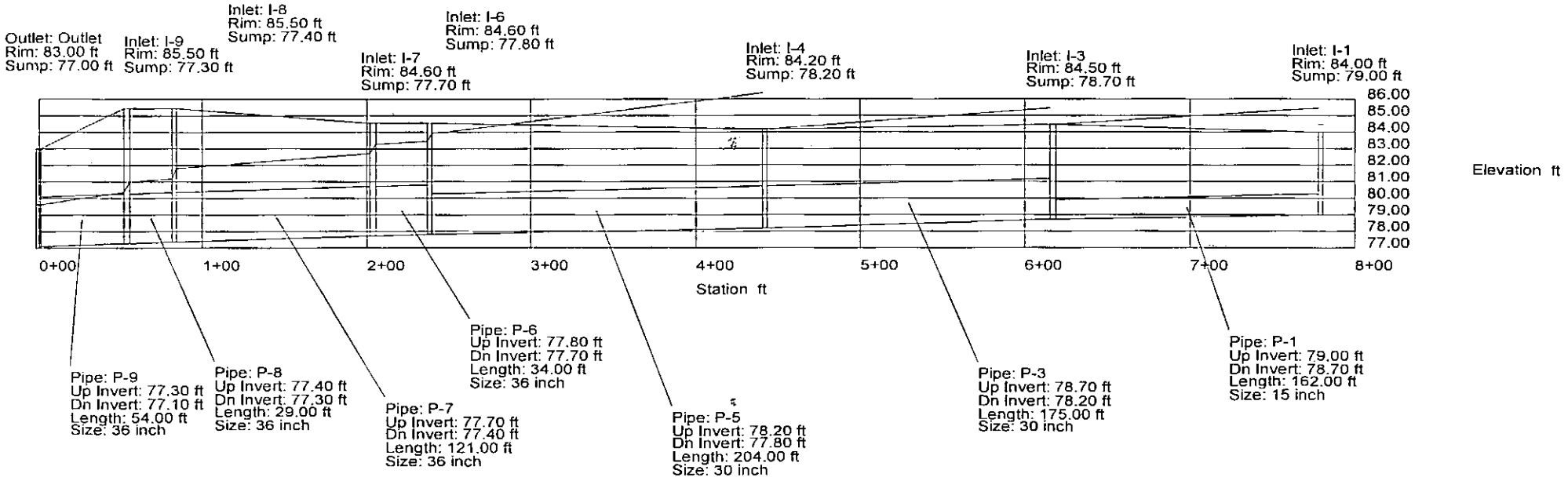
11
12
13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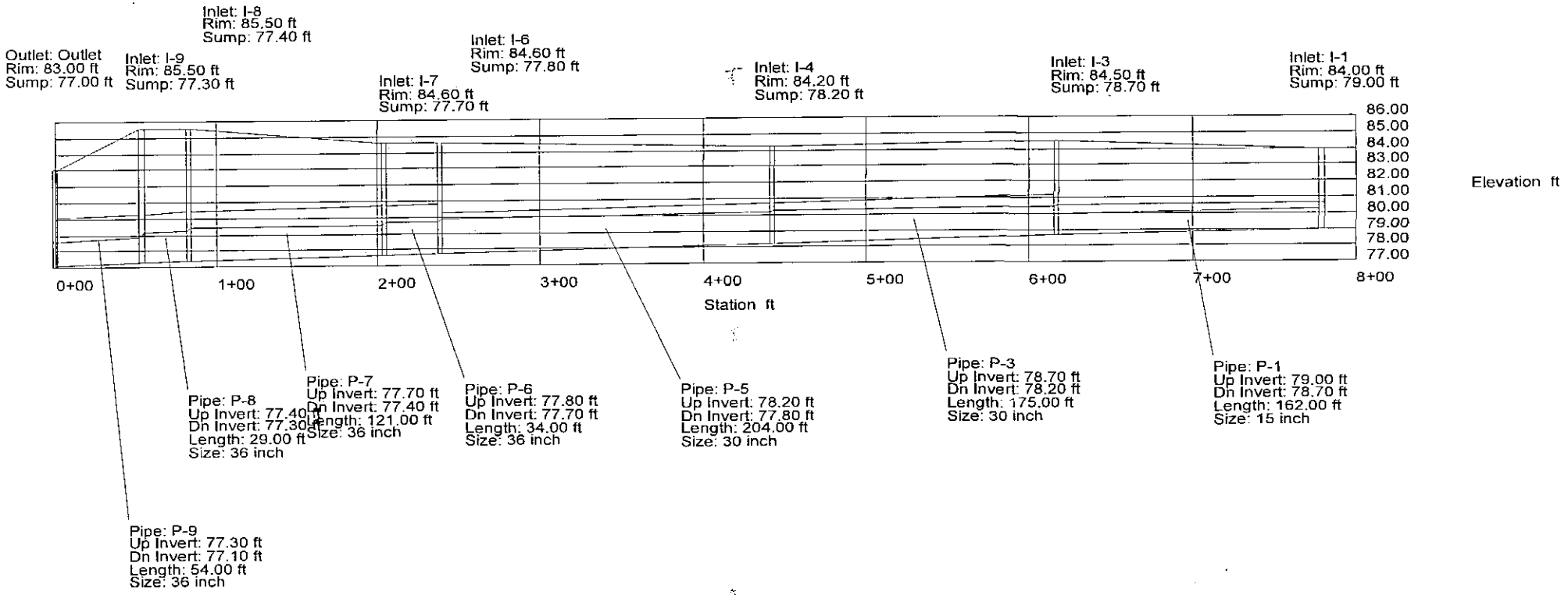
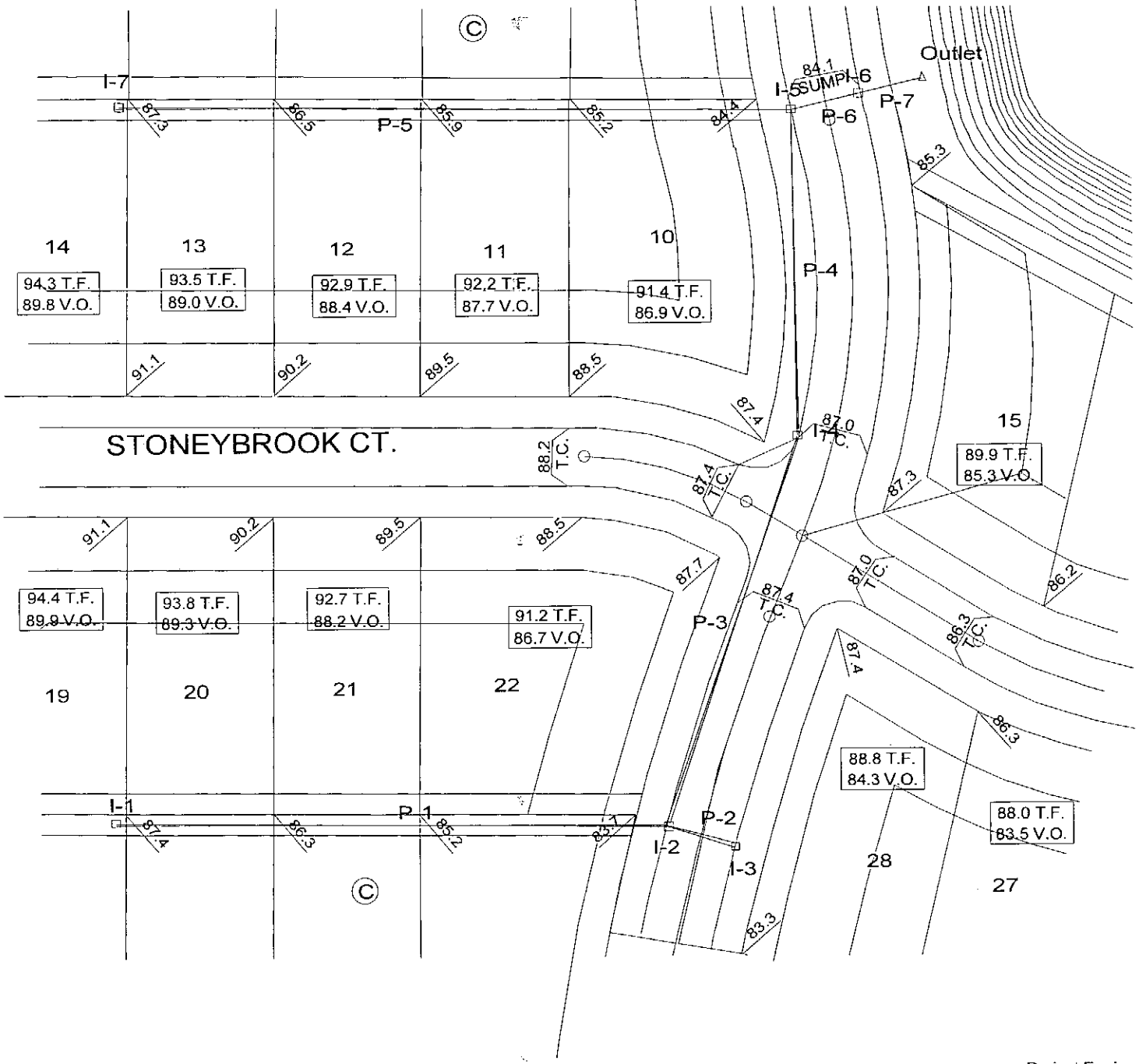
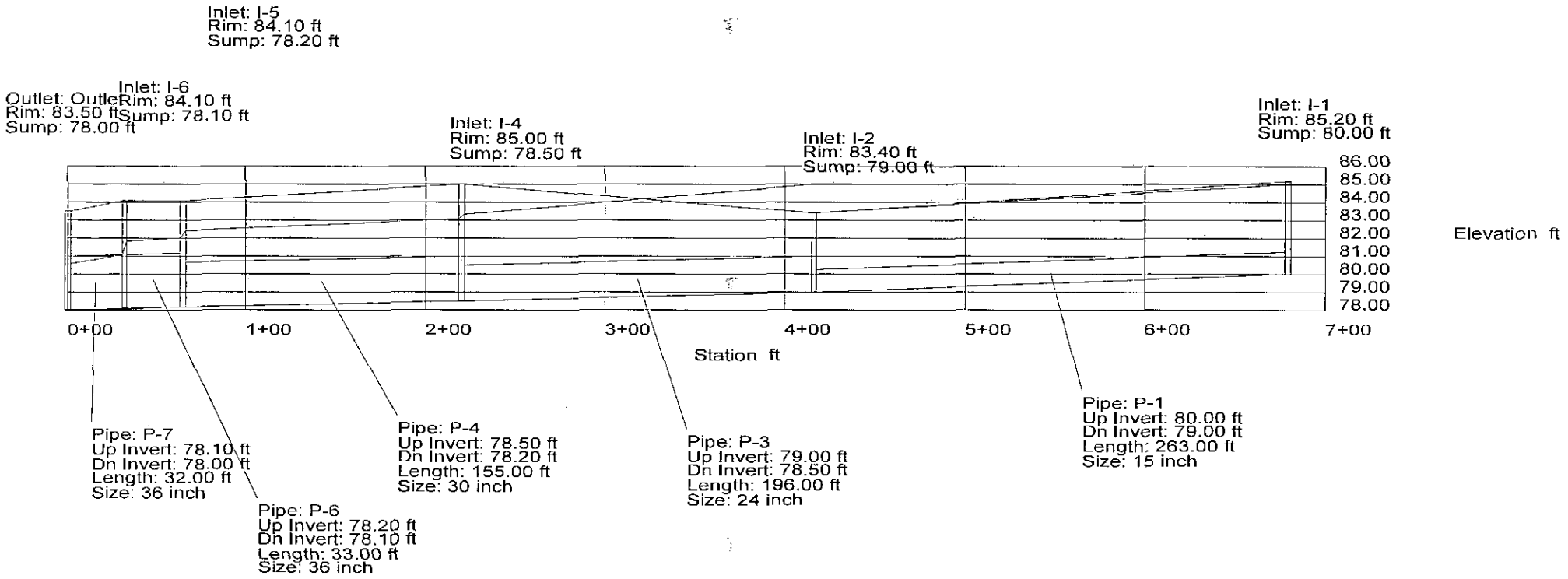
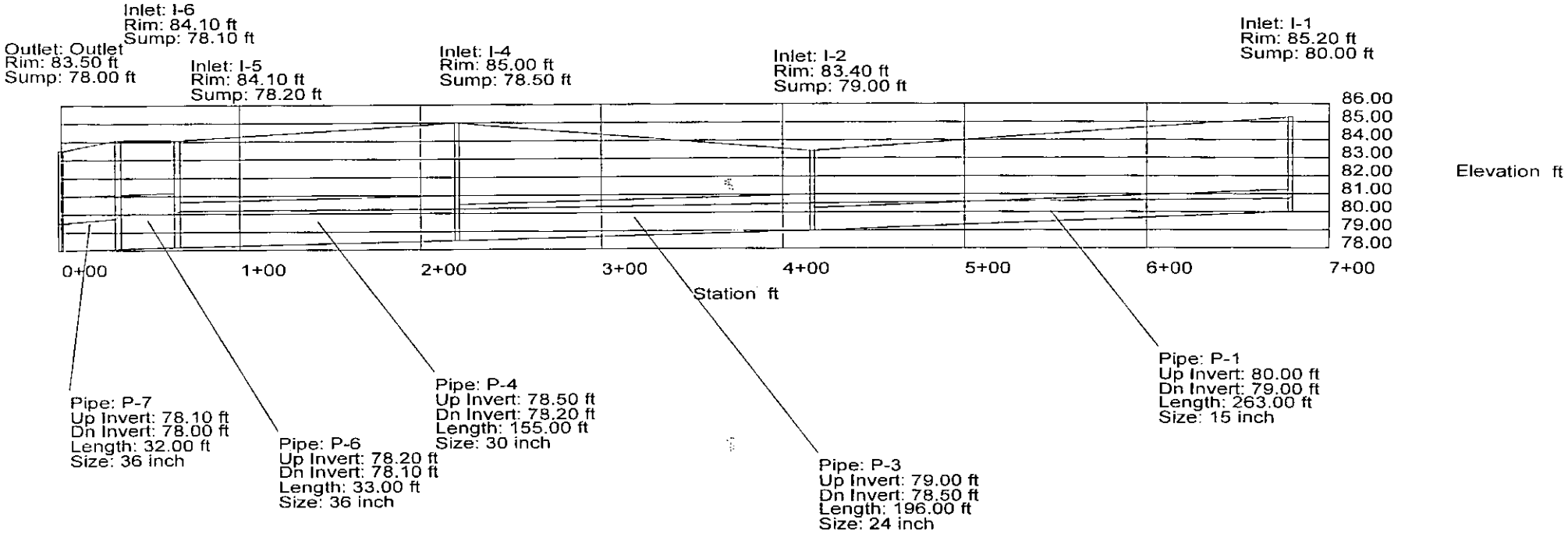
Sump: 77.00 ft
Inlet: I-9
Rim: 85.50 ft
Sump: 77.30 ft
Inlet: I-8
Rim: 85.50 ft
Sump: 77.40 ft
Inlet: I-7
Rim: 84.60 ft
Sump: 77.70 ft
Inlet: I-6
Rim: 84.60 ft
Sump: 77.80 ft
Inlet: I-4
Rim: 84.20 ft
Sump: 78.20 ft
Inlet: I-3
Rim: 84.50 ft
Sump: 78.70 ft
Inlet: I-1
Rim: 84.00 ft
Sump: 79.00 ft
86.00
85.00
84.00
83.00
82.00
81.00
80.00
79.00
78.00
77.00
Elevation ft
0+00
1+00
2+00
3+00
4+00
5+00
6+00
7+00
8+00
Station ft
Pipe: P-9
Up Invert: 77.30 ft
Dn Invert: 77.10 ft
Length: 54.00 ft
Size: 36 inch
Pipe: P-8
Up Invert: 77.40 ft
Dn Invert: 77.30 ft
Length: 29.00 ft
Size: 36 inch
Pipe: P-7
Up Invert: 77.70 ft
Dn Invert: 77.40 ft
Length: 121.00 ft
Size: 36 inch
Pipe: P-6
Up Invert: 77.80 ft
Dn Invert: 77.70 ft
Length: 34.00 ft
Size: 36 inch
Pipe: P-5
Up Invert: 78.20 ft
Dn Invert: 77.80 ft
Length: 204.00 ft
Size: 30 inch
Pipe: P-3
Up Invert: 78.70 ft
Dn Invert: 78.20 ft
Length: 175.00 ft
Size: 30 inch
Pipe: P-1
Up Invert: 79.00 ft
Dn Invert: 78.70 ft
Length: 162.00 ft
Size: 15 inch




I-7
87.3
86.5
P-5
85.9
85.2
84.4
84.1
I-5
SUMP I-6
Outlet
P-6
P-7
85.3
14
13
12
11
10
94.3 T.F.
89.8 V.O.
93.5 T.F.
89.0 V.O.
92.9 T.F.
88.4 V.O.
92.2 T.F.
87.7 V.O.
91.4 T.F.
86.9 V.O.
P-4
91.1
90.2
89.5
88.5
87.4
87.0
T.C.
15
89.9 T.F.
85.3 V.O.
STONEYBROOK CT.
88.2
T.C.
87.4
T.C.
87.3
91.1
90.2
89.5
88.5
87.7
87.4
T.C.
87.0
T.C.
86.2
94.4 T.F.
89.9 V.O.
93.8 T.F.
89.3 V.O.
92.7 T.F.
88.2 V.O.
91.2 T.F.
86.7 V.O.
P-3
86.3
T.C.
87.4
19
20
21
22
88.8 T.F.
84.3 V.O.
86.3
I-1
87.4
86.3
P-1
85.2
83.1
P-2
88.0 T.F.
83.5 V.O.
I-2
I-3
28
27
83.3


Inlet: I-5
Rim: 84.10 ft
Sump: 78.20 ft
Inlet: I-6
Outlet: Outle Rim: 84.10 ft
Rim: 83.50 ft Sump: 78.10 ft
Sump: 78.00 ft
Inlet: I-4
Rim: 85.00 ft
Sump: 78.50 ft
Inlet: I-2
Rim: 83.40 ft
Sump: 79.00 ft
Inlet: I-1
Rim: 85.20 ft
Sump: 80.00 ft
86.00
85.00
84.00
83.00
82.00
81.00
80.00
79.00
78.00
Elevation ft
0+00
1+00
2+00
3+00
4+00
5+00
6+00
7+00
Station ft
Pipe: P-7
Up Invert: 78.10 ft
Dn Invert: 78.00 ft
Length: 32.00 ft
Size: 36 inch
Pipe: P-6
Up Invert: 78.20 ft
Dn Invert: 78.10 ft
Length: 33.00 ft
Size: 36 inch
Pipe: P-4
Up Invert: 78.50 ft
Dn Invert: 78.20 ft
Length: 155.00 ft
Size: 30 inch
Pipe: P-3
Up Invert: 79.00 ft
Dn Invert: 78.50 ft
Length: 196.00 ft
Size: 24 inch
Pipe: P-1
Up Invert: 80.00 ft
Dn Invert: 79.00 ft
Length: 263.00 ft
Size: 15 inch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Rim: 84.10 ft
Sump: 78.10 ft
Outlet: Outlet
Rim: 83.50 ft
Sump: 78.00 ft
Inlet: I-5
Rim: 84.10 ft
Sump: 78.20 ft
Inlet: I-4
Rim: 85.00 ft
Sump: 78.50 ft
Inlet: I-2
Rim: 83.40 ft
Sump: 79.00 ft
Inlet: I-1
Rim: 85.20 ft
Sump: 80.00 ft
86.00
85.00
84.00
83.00
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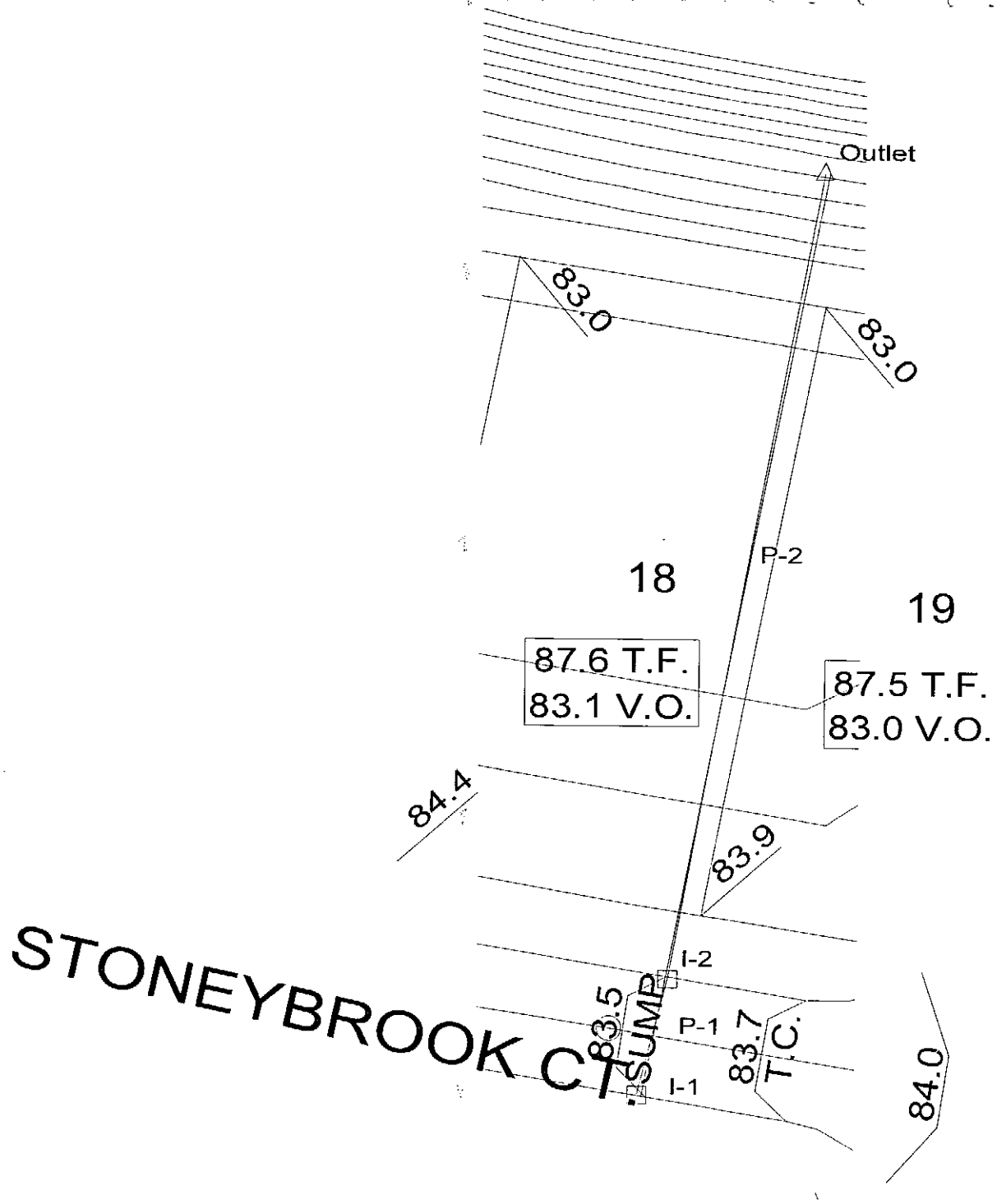
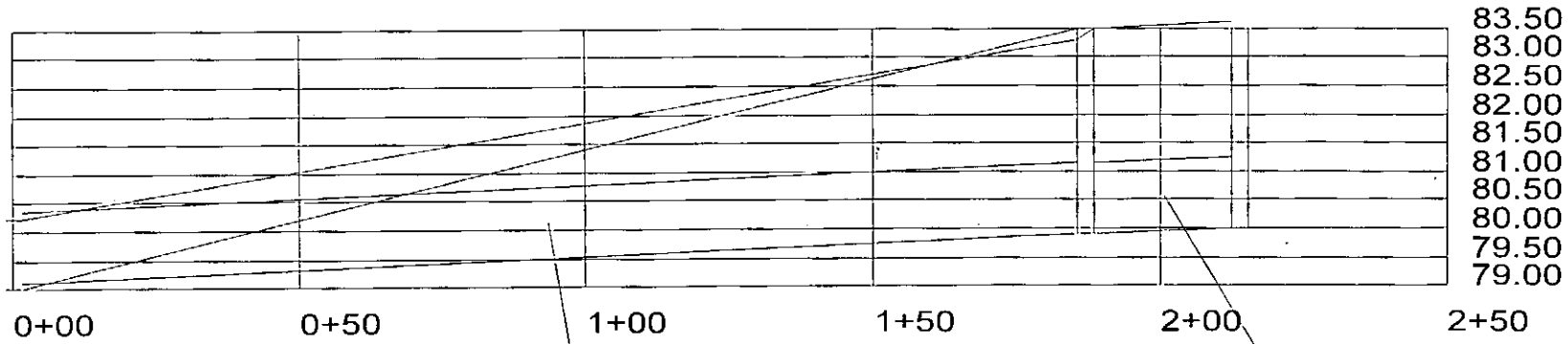
79.00
78.00
Elevation ft
0+00
1+00
2+00
3+00
4+00
5+00
6+00
7+00
Station ft
Pipe: P-7
Up Invert: 78.10 ft
Dn Invert: 78.00 ft
Length: 32.00 ft
Size: 36 inch
Pipe: P-6
Up Invert: 78.20 ft
Dn Invert: 78.10 ft
Length: 33.00 ft
Size: 36 inch
Pipe: P-4
Up Invert: 78.50 ft
Dn Invert: 78.20 ft
Length: 155.00 ft
Size: 30 inch
Pipe: P-3
Up Invert: 79.00 ft
Dn Invert: 78.50 ft
Length: 196.00 ft
Size: 24 inch
Pipe: P-1
Up Invert: 80.00 ft
Dn Invert: 79.00 ft
Length: 263.00 ft
Size: 15 inch


Outlet
83.0
83.0
18
19
P-2
87.6 T.F.
83.1 V.O.
87.5 T.F.
83.0 V.O.
84.4
83.9
STONEYBROOK CT
I-2
83.5
SUMP
P-1
83.7
T.C.
I-1
84.0

Inlet: I-2
Rim: 83.50 ft
Sump: 79.90 ft

Inlet: I-1
Rim: 83.50 ft
Sump: 80.00 ft



Outlet: Outlet
Rim: 79.00 ft
Sump: 79.00 ft

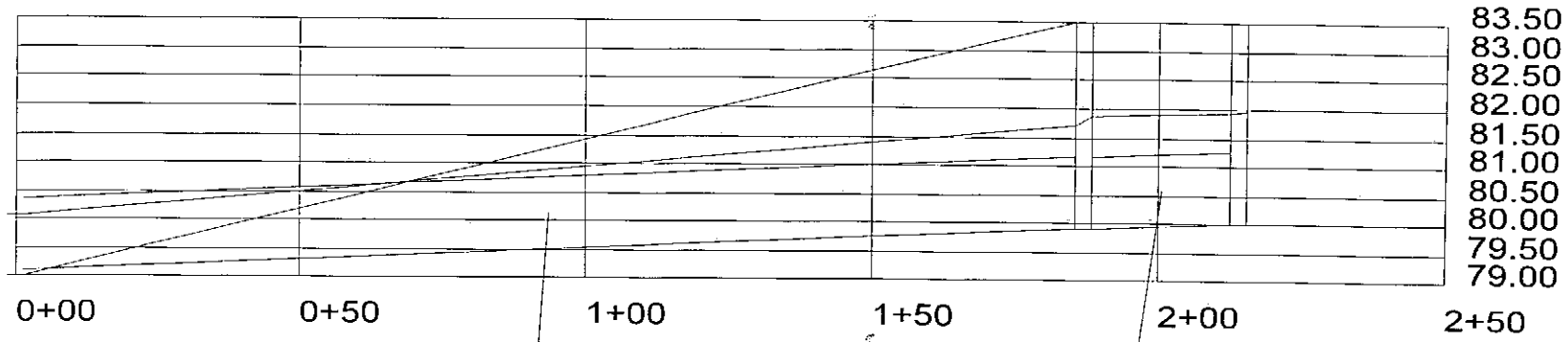
Pipe: P-2
Up Invert: 79.90 ft
Dn Invert: 79.10 ft
Length: 187.00 ft
Size: 15 inch

Pipe: P-1
Up Invert: 80.00 ft
Dn Invert: 79.90 ft
Length: 27.00 ft
Size: 15 inch

Outlet: Outlet
Rim: 79.00 ft
Sump: 79.00 ft

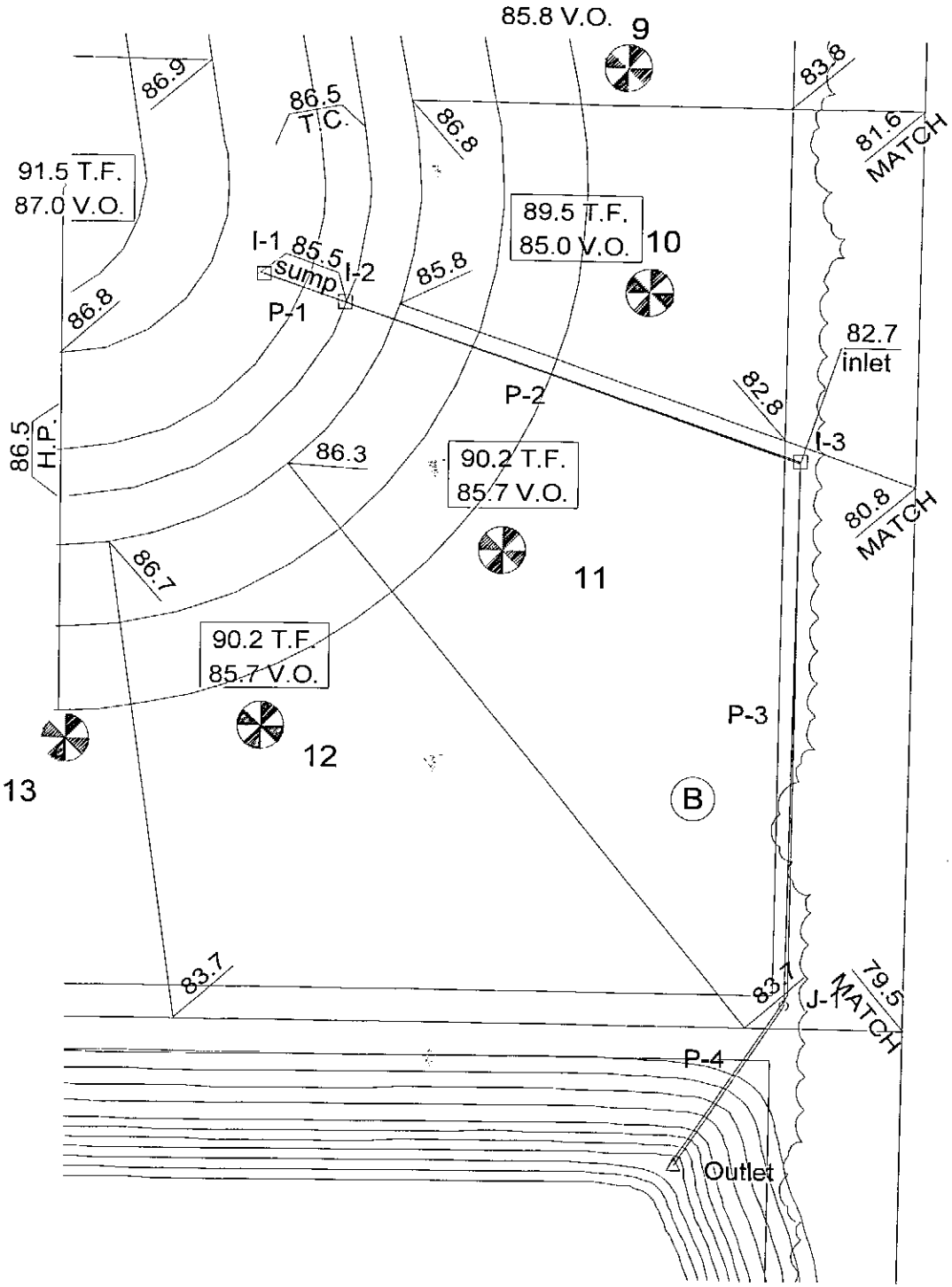
Inlet: I-2
Rim: 83.50 ft
Sump: 79.90 ft

Inlet: I-1
Rim: 83.50 ft
Sump: 80.00 ft



Pipe: P-2
Up Invert: 79.90 ft
Dn Invert: 79.10 ft
Length: 187.00 ft
Size: 15 inch

Pipe: P-1
Up Invert: 80.00 ft
Dn Invert: 79.90 ft
Length: 27.00 ft
Size: 15 inch



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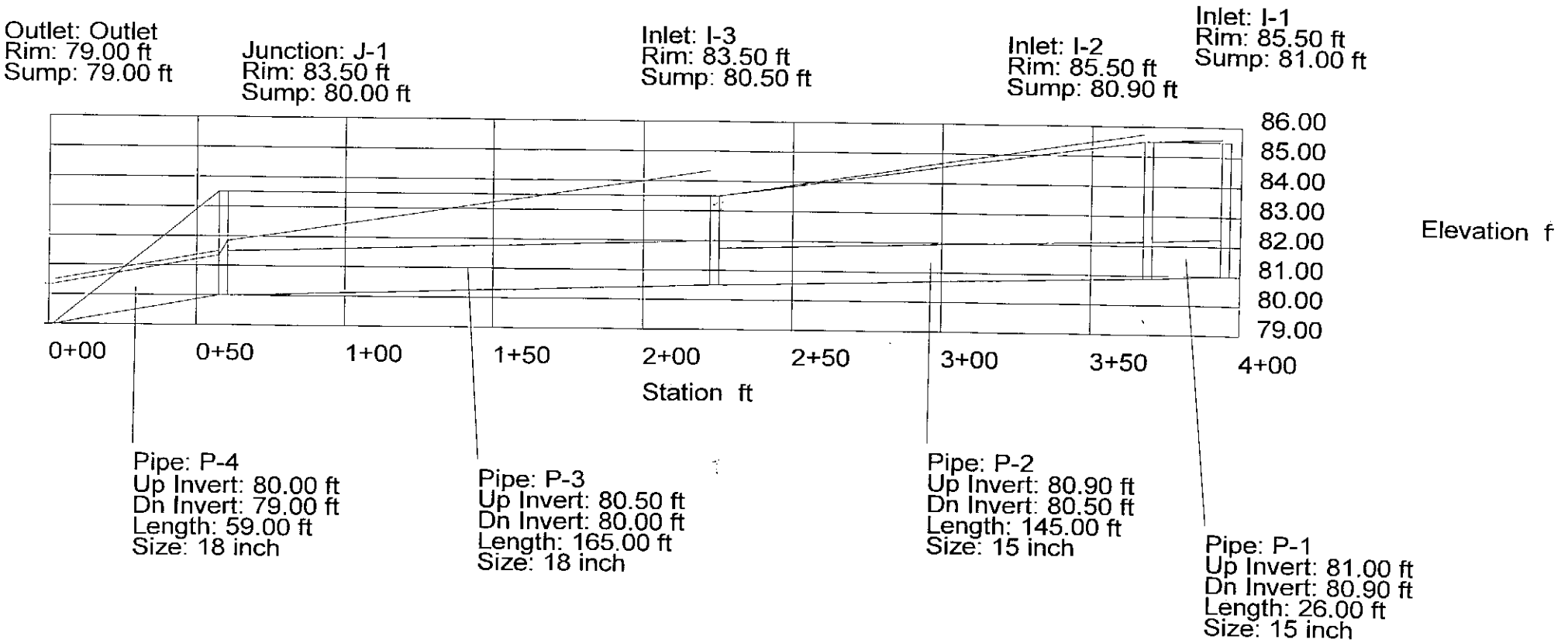
01/29/07 01:41:42 PM

 37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

Baughman Company, P.A.

Project Engineer: Baughman Company, P.A.
StormCAD v1.0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Sump: 79.00 ft
Junction: J-1
Rim: 83.50 ft
Sump: 80.00 ft
Inlet: I-3
Rim: 83.50 ft
Sump: 80.50 ft
Inlet: I-2
Rim: 85.50 ft
Sump: 80.90 ft
Inlet: I-1
Rim: 85.50 ft
Sump: 81.00 ft
86.00
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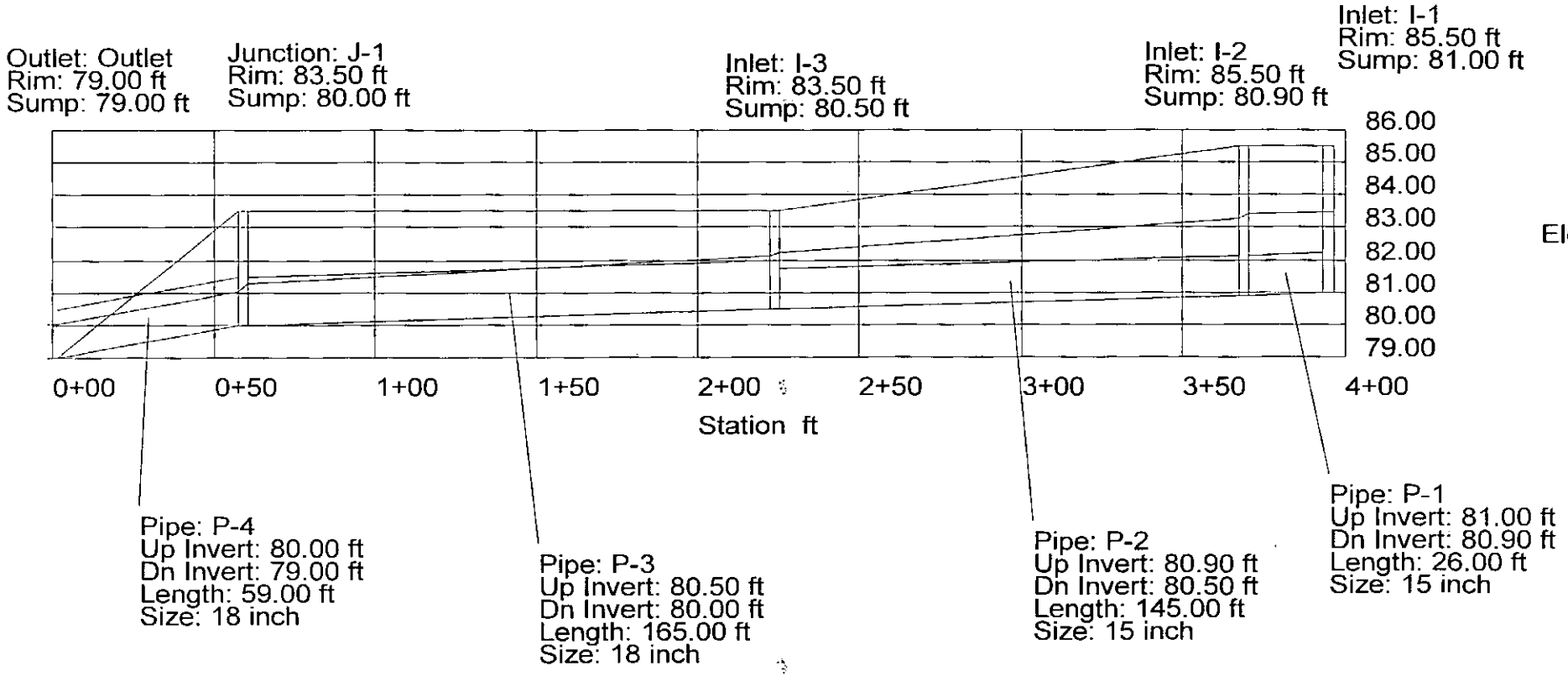
80.00
79.00
Elevation f
0+00
0+50
1+00
1+50
2+00
2+50
3+00
3+50
4+00
Station ft
Pipe: P-4
Up Invert: 80.00 ft
Dn Invert: 79.00 ft
Length: 59.00 ft
Size: 18 inch
Pipe: P-3
Up Invert: 80.50 ft
Dn Invert: 80.00 ft
Length: 165.00 ft
Size: 18 inch
Pipe: P-2
Up Invert: 80.90 ft
Dn Invert: 80.50 ft
Length: 145.00 ft
Size: 15 inch
Pipe: P-1
Up Invert: 81.00 ft
Dn Invert: 80.90 ft
Length: 26.00 ft
Size: 15 inch


Outlet: Outlet
Rim: 79.00 ft
Sump: 79.00 ft
Junction: J-1
Rim: 83.50 ft
Sump: 80.00 ft
Inlet: I-3
Rim: 83.50 ft
Sump: 80.50 ft
Inlet: I-2
Rim: 85.50 ft
Sump: 80.90 ft
Inlet: I-1
Rim: 85.50 ft
Sump: 81.00 ft
86.00
85.00
84.00
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81.00
80.00
79.00
Elevation f
0+00
0+50
1+00
1+50
2+00
2+50
3+00
3+50
4+00
Station ft
Pipe: P-4
Up Invert: 80.00 ft
Dn Invert: 79.00 ft
Length: 59.00 ft
Size: 18 inch
Pipe: P-3
Up Invert: 80.50 ft
Dn Invert: 80.00 ft
Length: 165.00 ft
Size: 18 inch
Pipe: P-2
Up Invert: 80.90 ft
Dn Invert: 80.50 ft
Length: 145.00 ft
Size: 15 inch
Pipe: P-1
Up Invert: 81.00 ft
Dn Invert: 80.90 ft
Length: 26.00 ft
Size: 15 inch

Appendix C

PondPack

Table of Contents

MASTER DESIGN STORM SUMMARY

Default Network Design Storm File, ID SEDGWICK.RNQ Sedgwick24

Return Event	Total Depth in	Rainfall Type	RNF File	RNF ID
2y24h	3.5000	Synthetic Curve	SCSTYPES	TypeII 24hr
5y24h	4.5000	Synthetic Curve	SCSTYPES	TypeII 24hr
10y24h	5.3000	Synthetic Curve	SCSTYPES	TypeII 24hr
25y24h	6.1000	Synthetic Curve	SCS	SCSII
50y24h	7.0000	Synthetic Curve	SCSTYPES	TypeII 24hr
100y24	7.9000	Synthetic Curve	SCSTYPES	TypeII 24hr

ICPM CALCULATION TOLERANCES

Target Convergence=	.000	cfs +/-
Max. Iterations =	35	loops
ICPM Time Step =	.0500	hrs
Output Time Step =	.0500	hrs
ICPM Ending Time =	35.0000	hrs

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond ac-ft
24" RCP	AREA	2	.564		11.9000	8.96		
24" RCP	AREA	5	.730		11.9000	11.53		
24" RCP	AREA	10	.863		11.9000	13.59		
24" RCP	AREA	25	.997		11.7000	5.26		
24" RCP	AREA	50	1.147		11.9000	17.96		
24" RCP	AREA	100	1.297		11.9000	20.27		
DITCH	POND	2	5.417		12.0500	54.85		
DITCH	POND	5	7.913		12.0500	77.31		
DITCH	POND	10	10.005		12.0000	93.89		
DITCH	POND	25	12.149		12.0500	62.30		
DITCH	POND	50	14.623		12.0000	126.59		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond ac-ft
DITCH	POND	100	17.131		12.0000	142.99		
DITCH OUT	POND	2	5.418		12.1500	43.56	1382.38	.315
DITCH OUT	POND	5	7.913		12.1000	60.47	1382.89	.442
DITCH OUT	POND	10	10.007		12.1500	72.48	1383.24	.552
DITCH OUT	POND	25	12.149		12.1000	59.78	1382.87	.437
DITCH OUT	POND	50	14.624		12.1500	98.39	1383.98	.809
DITCH OUT	POND	100	17.133		12.1500	108.57	1384.37	.984
EXISTING 24" RCP AREA		2	.564		11.9000	8.96		
EXISTING 24" RCP AREA		5	.730		11.9000	11.53		
EXISTING 24" RCP AREA		10	.863		11.9000	13.59		
EXISTING 24" RCP AREA		25	.997		11.7000	5.26		
EXISTING 24" RCP AREA		50	1.147		11.9000	17.96		
EXISTING 24" RCP AREA		100	1.297		11.9000	20.27		
EXISTING OFFSITE AREA		2	1.573		12.0500	22.32		
EXISTING OFFSITE AREA		5	2.527		12.0500	36.72		
EXISTING OFFSITE AREA		10	3.357		12.0500	49.03		
EXISTING OFFSITE AREA		25	4.229		12.0000	28.31		
EXISTING OFFSITE AREA		50	5.247		12.0500	76.50		
EXISTING OFFSITE AREA		100	6.295		12.0500	91.44		
*EXISTING OUT	JCT	2	13.046		12.0500	185.46		
*EXISTING OUT	JCT	5	19.668		12.0500	281.30		
*EXISTING OUT	JCT	10	25.262		12.0500	360.80		
*EXISTING OUT	JCT	25	31.037		12.0000	200.67		
*EXISTING OUT	JCT	50	37.690		12.0500	533.56		
*EXISTING OUT	JCT	100	44.467		12.0500	625.92		
EXISTING SITE	AREA	2	10.910		12.0500	158.36		
EXISTING SITE	AREA	5	16.411		12.0500	238.42		
EXISTING SITE	AREA	10	21.042		12.0500	304.51		
EXISTING SITE	AREA	25	25.811		12.0000	167.10		
EXISTING SITE	AREA	50	31.297		12.0500	447.48		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond ac-ft
EXISTING SITE	AREA	100	36.876		12.0500	523.67		
MID DEVELOPED	AREA	2	2.546		12.0500	36.71		
MID DEVELOPED	AREA	5	3.615		12.0500	51.49		
MID DEVELOPED	AREA	10	4.492		12.0500	63.34		
MID DEVELOPED	AREA	25	5.382		12.0000	33.12		
MID DEVELOPED	AREA	50	6.393		12.0500	88.45		
MID DEVELOPED	AREA	100	7.411		12.0500	101.68		
MIDDLE POND	POND	2	7.964		12.1000	76.33		
MIDDLE POND	POND	5	11.529		12.1000	107.17		
MIDDLE POND	POND	10	14.499		12.0500	131.29		
MIDDLE POND	POND	25	17.531		12.0500	91.70		
MIDDLE POND	POND	50	21.017		12.0500	180.14		
MIDDLE POND	POND	100	24.544		12.0500	204.35		
MIDDLE POND OUT	POND	2	7.570		13.0000	14.22	1380.87	3.533
MIDDLE POND OUT	POND	5	11.094		12.8500	25.94	1381.50	4.898
MIDDLE POND OUT	POND	10	14.041		12.7000	41.10	1381.86	5.681
MIDDLE POND OUT	POND	25	17.053		12.4500	48.81	1382.03	6.065
MIDDLE POND OUT	POND	50	20.522		12.5500	73.29	1382.47	7.124
MIDDLE POND OUT	POND	100	24.030		12.5000	89.70	1382.73	7.745
N DEVELOPED	AREA	2	3.274		12.0500	47.20		
N DEVELOPED	AREA	5	4.648		12.0500	66.20		
N DEVELOPED	AREA	10	5.776		12.0500	81.44		
N DEVELOPED	AREA	25	6.919		12.0000	42.58		
N DEVELOPED	AREA	50	8.219		12.0500	113.73		
N DEVELOPED	AREA	100	9.529		12.0500	130.73		
NORTH OFFSITE	AREA	2	1.573		12.0500	22.32		
NORTH OFFSITE	AREA	5	2.527		12.0500	36.72		
NORTH OFFSITE	AREA	10	3.357		12.0500	49.03		
NORTH OFFSITE	AREA	25	4.229		12.0000	28.31		
NORTH OFFSITE	AREA	50	5.247		12.0500	76.50		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond ac-ft
NORTH OFFSITE	AREA	100	6.295		12.0500	91.44		
NORTH POND	POND	2	2.136		12.0000	27.63		
NORTH POND	POND	5	3.257		12.0000	43.68		
NORTH POND	POND	10	4.220		12.0000	57.38		
NORTH POND	POND	25	5.226		12.0000	33.56		
NORTH POND	POND	50	6.393		12.0000	87.97		
NORTH POND	POND	100	7.591		12.0000	104.64		
NORTH POND	OUT POND	2	2.143		12.4000	12.32	1382.65	.602
NORTH POND	OUT POND	5	3.265		12.4000	21.62	1383.08	1.022
NORTH POND	OUT POND	10	4.229		12.5500	26.85	1383.42	1.390
NORTH POND	OUT POND	25	5.229		12.3500	25.30	1383.25	1.205
NORTH POND	OUT POND	50	6.404		12.4000	42.88	1384.15	2.223
NORTH POND	OUT POND	100	7.602		12.4000	46.11	1384.55	2.736
*OFFSITE	JCT	2	14.973		12.3000	42.64		
*OFFSITE	JCT	5	21.626		12.3000	67.96		
*OFFSITE	JCT	10	27.139		12.3000	90.08		
*OFFSITE	JCT	25	32.751		12.2000	94.45		
*OFFSITE	JCT	50	39.182		12.3000	145.28		
*OFFSITE	JCT	100	45.670		12.3000	177.66		
S DEVELOPED	AREA	2	7.457		12.0500	107.52		
S DEVELOPED	AREA	5	10.588		12.0500	150.78		
S DEVELOPED	AREA	10	13.157		12.0500	185.50		
S DEVELOPED	AREA	25	15.761		12.0000	96.98		
S DEVELOPED	AREA	50	18.721		12.0500	259.05		
S DEVELOPED	AREA	100	21.704		12.0500	297.76		
SOUTH POND	POND	2	15.027		12.0500	111.45		
SOUTH POND	POND	5	21.682		12.0500	158.90		
SOUTH POND	POND	10	27.197		12.0500	197.89		
SOUTH POND	POND	25	32.814		12.0500	128.48		
SOUTH POND	POND	50	39.243		12.0500	282.97		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond ac-ft
SOUTH POND	POND	100	45.734		12.0500	334.32		
SOUTH POND	OUT POND	2	14.973		12.3000	42.64	1377.36	2.568
SOUTH POND	OUT POND	5	21.626		12.3000	67.96	1377.68	3.568
SOUTH POND	OUT POND	10	27.139		12.3000	90.08	1377.94	4.355
SOUTH POND	OUT POND	25	32.751		12.2000	94.45	1377.99	4.511
SOUTH POND	OUT POND	50	39.182		12.3000	145.28	1378.48	6.141
SOUTH POND	OUT POND	100	45.670		12.3000	177.66	1378.76	7.062

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Title...

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Click Project Summary on the File Menu to enter title

DESIGN STORMS SUMMARY

Design Storm File,ID = SEDGWICK.RNQ Sedgwick24

Storm Tag Name = 2y24h

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 2 yr
Total Rainfall Depth= 3.5000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 5y24h
Description: Sedgwick County 5-yr 24 hour Duration

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 5 yr
Total Rainfall Depth= 4.5000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 10y24h

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 10 yr
Total Rainfall Depth= 5.3000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 25y24h
Description: Sedgwick County - 25 year - 24hour

Data Type, File, ID = Synthetic Storm SCS.RNF SCSII
Storm Frequency = 25 yr
Total Rainfall Depth= 6.1000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= 1.0000 hrs End= 24.0000 hrs

Type.... Design Storms
Name.... Sedgwick24

File.... C:\HAESTAD\PPKW\RAINFALL\SEDGWICK.RNQ
Title...

JOB TITLE NOT SPECIFIED
Click Project Summary on the File Menu to enter title

DESIGN STORMS SUMMARY

Design Storm File,ID = SEDGWICK.RNQ Sedgwick24

Storm Tag Name = 50y24h

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 50 yr
Total Rainfall Depth= 7.0000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 100y24

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 7.9000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

DESIGN STORMS SUMMARY

Design Storm File,ID = SEDGWICK.RNQ Sedgwick24

Storm Tag Name = 2y24h

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 2 yr
Total Rainfall Depth= 3.5000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 5y24h
Description: Sedgwick County 5-yr 24 hour Duration

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 5 yr
Total Rainfall Depth= 4.5000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 10y24h

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 10 yr
Total Rainfall Depth= 5.3000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 25y24h
Description: Sedgwick County - 25 year - 24hour

Data Type, File, ID = Synthetic Storm SCS.RNF SCSII
Storm Frequency = 25 yr
Total Rainfall Depth= 6.1000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= 1.0000 hrs End= 24.0000 hrs

Storm Tag Name = 50y24h

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 50 yr
Total Rainfall Depth= 7.0000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

DESIGN STORMS SUMMARY

Design Storm File,ID = SEDGWICK.RNQ Sedgwick24

Storm Tag Name = 100y24

Data Type, File, ID = Synthetic Storm SCSTYPES.RNF TypeII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 7.9000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

File.... F:\HYDRO\PROJECTS\CHANTILLY PLACE\PONDPACK\PONDS.PPW

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: TR-55 Shallow

Hydraulic Length 1000.00 ft
Slope .005000 ft/ft
Unpaved

Avg.Velocity 1.14 ft/sec

Segment #1 Time: .2435 hrs

Total Tc: .2435 hrs

File.... F:\HYDRO\PROJECTS\CHANTILLY PLACE\PONDPACK\PONDS.PPW

Tc Equations used...

==== SCS TR-55 Shallow Concentrated Flow ==========

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved surface:
V = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

File.... F:\HYDRO\PROJECTS\CHANTILLY PLACE\PONDPACK\PONDS.PPW

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
1380.00	-----	.0500	.0000	.000	.000
1381.00	-----	.1000	.2207	.074	.074
1382.00	-----	.2000	.4414	.147	.221
1383.00	-----	.3000	.7449	.248	.469
1384.00	-----	.4000	1.0464	.349	.818
1385.00	-----	.5000	1.3472	.449	1.267

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
1379.00	-----	1.7000	.0000	.000	.000
1379.50	-----	1.8000	5.2493	.875	.875
1380.00	-----	1.9000	5.5493	.925	1.800
1381.00	-----	2.1000	5.9975	1.999	3.799
1382.00	-----	2.3000	6.5977	2.199	5.998
1383.00	-----	2.5000	7.1979	2.399	8.397

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
1382.00	-----	.8600	.0000	.000	.000
1383.00	-----	1.0000	2.7874	.929	.929
1384.00	-----	1.2000	3.2954	1.098	2.028
1385.00	-----	1.4000	3.8961	1.299	3.326

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
1376.50	-----	2.8000	.0000	.000	.000
1377.00	-----	3.0000	8.6983	1.450	1.450
1378.00	-----	3.2000	9.2984	3.099	4.549
1379.00	-----	3.4000	9.8985	3.299	7.849
1380.00	-----	3.6000	10.4986	3.500	11.348

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

File.... F:\HYDRO\PROJECTS\CHANTILLY PLACE\PONDPACK\PONDS.PPW

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 1376.50 ft
Increment = .50 ft
Max. Elev.= 1380.00 ft

****
OUTLET CONNECTIVITY
****

---> Forward Flow Only (UpStream to DnStream)
<--- Reverse Flow Only (DnStream to UpStream)
<---> Forward and Reverse Both Allowed

Structure	No.		Outfall	E1, ft	E2, ft
Weir-Rectangular	wr	--->	TW	1376.500	1380.000

TW SETUP, DS Channel

File.... F:\HYDRO\PROJECTS\CHANTILLY PLACE\PONDPACK\PONDS.PPW

OUTLET STRUCTURE INPUT DATA

Structure ID = wr
Structure Type = Weir-Rectangular

# of Openings = 1
Crest Elev. = 1376.50 ft
Weir Length = 20.00 ft
Weir Coeff. = 2.600000

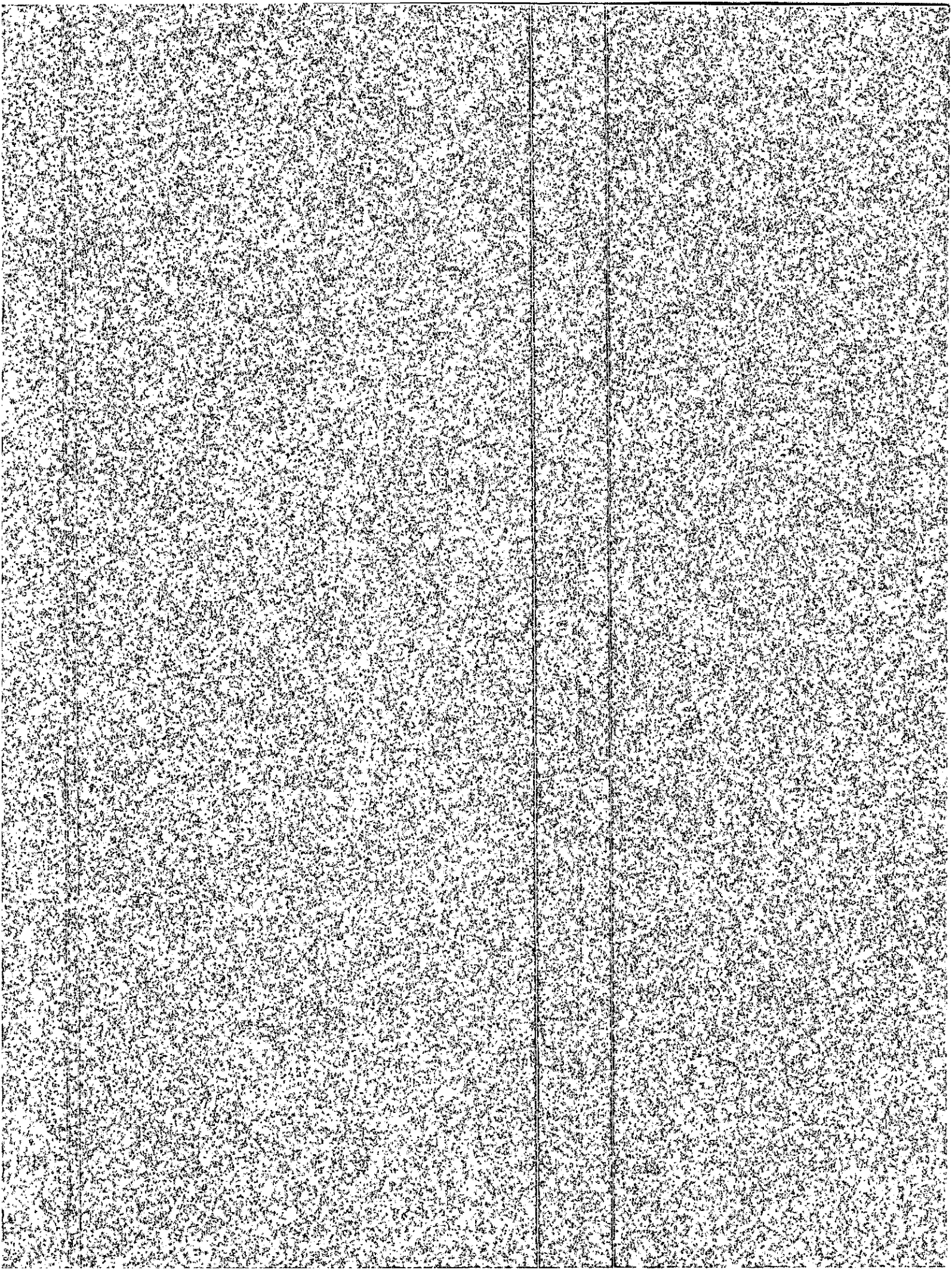
Weir TW effects (Use adjustment equation)

Structure ID = TW
Structure Type = TW SETUP, DS Channel

FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...
Maximum Iterations= 30
Min. TW tolerance = .01 ft
Max. TW tolerance = .01 ft
Min. HW tolerance = .01 ft
Max. HW tolerance = .01 ft
Min. Q tolerance = .10 cfs
Max. Q tolerance = .10 cfs

Index of Starting Page Numbers for ID Names



Appendix D

HY-8

-Existing Structures

CURRENT DATE: 01-30-2007 FILE DATE: 01-30-2007
CURRENT TIME: 08:00:25 FILE NAME: CHANTIL

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.1

CULVERT NO.	INLET ELEV. (ft)	OUTLET ELEV. (ft)	CULVERT LENGTH (ft)	BARRELS SHAPE MATERIAL	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	1382.56	1382.19	35.00	1 RCP	4.00	4.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (cfs) FILE: CHANTIL DATE: 01-30-2007

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
1382.56	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	1
1384.03	15.0	15.0	0.0	0.0	0.0	0.0	0.0	0.00	1
1384.81	30.0	30.0	0.0	0.0	0.0	0.0	0.0	0.00	1
1385.41	45.0	45.0	0.0	0.0	0.0	0.0	0.0	0.00	1
1385.93	60.0	60.0	0.0	0.0	0.0	0.0	0.0	0.00	1
1386.42	75.0	75.0	0.0	0.0	0.0	0.0	0.0	0.00	1
1386.93	90.0	90.0	0.0	0.0	0.0	0.0	0.0	0.00	1
1387.34	105.0	100.6	0.0	0.0	0.0	0.0	0.0	0.00	30
1387.54	120.0	105.7	0.0	0.0	0.0	0.0	0.0	13.53	22
1387.57	135.0	106.3	0.0	0.0	0.0	0.0	0.0	27.51	7
1387.59	150.0	106.8	0.0	0.0	0.0	0.0	0.0	41.88	6
1387.50	104.6	104.6	0.0	0.0	0.0	0.0	0.0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: CHANTIL DATE: 01-30-2007

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
1382.56	0.000	0.00	0.00	0.00
1384.03	0.000	15.00	0.00	0.00
1384.81	0.000	30.00	0.00	0.00
1385.41	0.000	45.00	0.00	0.00
1385.93	0.000	60.00	0.00	0.00
1386.42	0.000	75.00	0.00	0.00
1386.93	0.000	90.00	0.00	0.00
1387.34	-0.006	105.00	4.41	4.20
1387.54	-0.001	120.00	0.79	0.66
1387.57	-0.001	135.00	1.21	0.90
1387.59	-0.001	150.00	1.33	0.89

<1> TOLERANCE (ft) = 0.010 <2> TOLERANCE (%) = 1.000

CURRENT DATE: 01-30-2007 FILE DATE: 01-30-2007
CURRENT TIME: 08:00:25 FILE NAME: CHANTIL

PERFORMANCE CURVE FOR CULVERT 1 - 1(4.00 (ft) BY 4.00 (ft)) RCP

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
0.00	1382.56	0.00	0.00	0-NF	0.00	0.00	0.00	0.00	0.00	0.00
15.00	1384.03	1.47	1.47	1-S2n	0.82	1.12	0.88	0.58	7.21	1.48
30.00	1384.81	2.25	2.25	1-S2n	1.17	1.62	1.30	0.87	8.43	1.87
45.00	1385.41	2.85	2.85	1-S2n	1.44	2.01	1.65	1.09	9.24	2.13
60.00	1385.93	3.37	3.37	1-S2n	1.69	2.33	1.93	1.28	10.00	2.34
75.00	1386.42	3.86	3.86	1-S2n	1.92	2.61	2.20	1.44	10.58	2.50
90.00	1386.93	4.37	4.37	5-S2n	2.14	2.87	2.46	1.59	11.11	2.64
100.59	1387.34	4.78	4.78	5-S2n	2.29	3.03	2.63	1.73	11.51	2.77
105.68	1387.54	4.98	4.98	5-S2n	2.37	3.10	2.70	1.86	11.71	2.88
106.28	1387.57	5.01	5.01	5-S2n	2.38	3.11	2.71	1.98	11.73	2.98
106.79	1387.59	5.03	5.03	5-S2n	2.38	3.12	2.72	2.09	11.75	3.07

El. inlet face invert 1382.56 ft El. outlet invert 1382.19 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **********

INLET STATION	0.00 ft
INLET ELEVATION	1382.56 ft
OUTLET STATION	35.00 ft
OUTLET ELEVATION	1382.19 ft
NUMBER OF BARRELS	1
SLOPE (V/H)	0.0106
CULVERT LENGTH ALONG SLOPE	35.00 ft

***** CULVERT DATA SUMMARY **********

BARREL SHAPE	CIRCULAR
BARREL DIAMETER	4.00 ft
BARREL MATERIAL	CONCRETE
BARREL MANNING'S n	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	GROOVED END PROJECTION
INLET DEPRESSION	NONE

CURRENT DATE: 01-30-2007 FILE DATE: 01-30-2007
CURRENT TIME: 08:00:25 FILE NAME: CHANTIL

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******* REGULAR CHANNEL CROSS SECTION ****************

BOTTOM WIDTH	15.00 ft
SIDE SLOPE H/V (X:1)	4.0
CHANNEL SLOPE V/H (ft/ft)	0.003
MANNING'S n (.01-0.1)	0.035
CHANNEL INVERT ELEVATION	1382.19 ft
CULVERT NO.1 OUTLET INVERT ELEVATION	1382.19 ft

******* UNIFORM FLOW RATING CURVE FOR DOWNSTREAM CHANNEL

FLOW (cfs)	W.S.E. (ft)	FROUDE NUMBER	DEPTH (ft)	VEL. (f/s)	SHEAR (psf)
0.00	1382.19	0.000	0.00	0.00	0.00
15.00	1382.77	0.342	0.58	1.48	0.11
30.00	1383.06	0.354	0.87	1.87	0.16
45.00	1383.28	0.360	1.09	2.13	0.20
60.00	1383.47	0.364	1.28	2.34	0.24
75.00	1383.63	0.367	1.44	2.50	0.27
90.00	1383.78	0.369	1.59	2.64	0.30
105.00	1383.92	0.370	1.73	2.77	0.32
120.00	1384.05	0.372	1.86	2.88	0.35
135.00	1384.17	0.373	1.98	2.98	0.37
150.00	1384.28	0.374	2.09	3.07	0.39

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ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ ROADWAY OVERTOPPING DATA ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
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ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH	20.00 ft
CREST LENGTH	500.00 ft
OVERTOPPING CREST ELEVATION	1387.50 ft

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