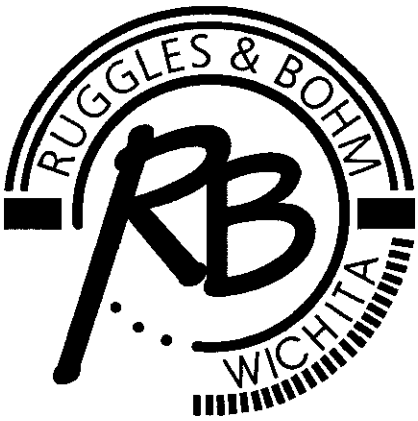
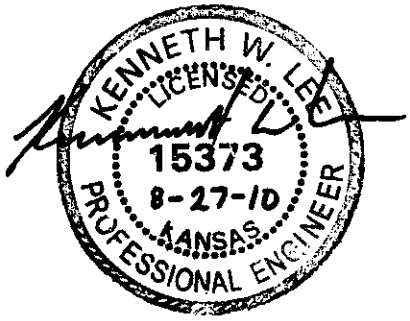




Drainage Plan

CASA BELLA 3rd ADDITION
WICHITA, SEDGWICK COUNTY, KANSAS

August 2010

Drainage Plan
Casa Bella 3rd Addition
Wichita, Sedgwick County, Kansas

Introduction

Casa Bella 3rd Addition is a proposed 13.8 acre replat of a portion of Casa Bella 2nd Addition in southeast Wichita. It is northwest of the intersection of Pawnee and 127th Street East. The site is not being used for any specific purpose at this time but was originally designed as single family residential lots. The new site will have 18 duplex lots and 28 single family residential lots. The entire site was originally graded with the Casa Bella Storm Water Project (COW project #468 84073). Ponds were constructed in Casa Bella to handle drainage from Casa Bella and most of Casa Bella 2nd Addition.

Existing Conditions

The majority of the site currently drains to the west into the previously mentioned ponds. There is no offsite drainage that enters this property. There are no floodplains, wetlands or riparian areas within the proposed area of work. A portion of the east half of the plat currently drains undetained to 127th Street but the construction of a detention pond was required when infrastructure improvements were installed. The existing conditions model of the site is based on the site before the grading was done with the first phase of Casa Bella. The onsite soils are Irwin Silty Clay Loam, which are Hydrologic Soil Group D. Aerial photos with contours showing both the pre-developed grading and current site conditions are included with this submittal.

The drainage basin in the Southeast corner of the Casa Bella 2nd Addition drains to the intersection of 127th Street East and Pawnee. There are 2 – 24" RCP and a 36" RCP to carry drainage under 127th Street. A total of 18.5 acres, including offsite areas, drains to the 127th Street RCPs. The capacity of the pipes was found to be 110 cfs using HY-8. The rating curves for the culvert pipes can be seen on the following pages. The Velocity Method was used to find the time of concentration of 32 minutes. A curve number of 83 was used considering the site was not maintained and the hydrologic group D type soils.

Length of longest reach = 1170' (0.5% slope)

Tc = 300'/(0.21)(60) + 200'/(1.0)(60) + 670'/(3.0)(60) = 32 min
(sheet flow) (grassed waterway) (channel flow)

Developed Conditions

As previously outlined, the proposed Casa Bella 3rd addition consists of 13.8 acres with a mix of single family and duplex residential lots. The proposed total impervious area is 4.6 acres (33%). Along the north line of the proposed plat, there is an existing reserve with berms and a swale to prevent offsite silt transport and keep storm water onsite. Rear

yard drains will be installed in backyard areas to pick up drainage and provide 1.5% rear yard slope where possible. A minimum of 1% grade will be provided in other rear yard areas. The drainage for the west half of the plat will be controlled by the existing ponds that were previously designed to handle the runoff. Because the proposed drainage basin to the west is unchanged and was included in the design of the original ponds, please refer to those drainage reports for detention calculations and analysis for runoff in that area. The drainage for the east half of the site will be detained by a new pond constructed in Reserve "E" of Casa Bella 2nd Addition that was proposed in that plat's drainage plan. The pond outfall structure and storm sewer serving the east portion of the property has been modified from the original plans and calculations are included here. The existing and proposed ponds will act as silt traps during construction, although silt fence and other BMP measures will be utilized to limit silt transport to the ponds.

The proposed pond was modeled using HEC-HMS. The runoff summary for the site can be seen in Table 1. The results for the detention pond can be seen in Table 2. Storm sewer systems are needed to drain proposed lots. Proposed Storm Sewer systems have been sized using StormCAD and those results can be found at the end of this drainage plan. System 100, which serves the west half of the site, is sized for the 100 year storm except for the last inlet on the north property line. That inlet is designed to handle smaller storms and excess runoff from it is allowed to overspill to the west along the rear easement. The time of concentration for the residential and commercial portions of the developed Southeast pond basin is 15 minutes. The time of concentration for the undetained areas is 24 minutes due to the length of the roadside ditches that carry the runoff to the junction point.

The developed runoff curve for the residential basin is assumed to be 86 and for the commercial basin its assumed to be 94. The Southeast pond will be controlled by an 18" culvert for smaller storms and a 36" culvert for larger storms. The 18" RCP will be set with an inlet elevation of 1352.0 and the 36" RCP will have an inlet elevation of 1352.5. The 100yr discharge of the Southeast basin of 76.3 cfs is easily handled by the existing culvert pipes under 127th Street. The capacity of the 127th Street culverts is 110 cfs. A copy of the HEC-HMS electronic data is included on the CD provided with the drainage plan.

Stormwater Runoff Summary

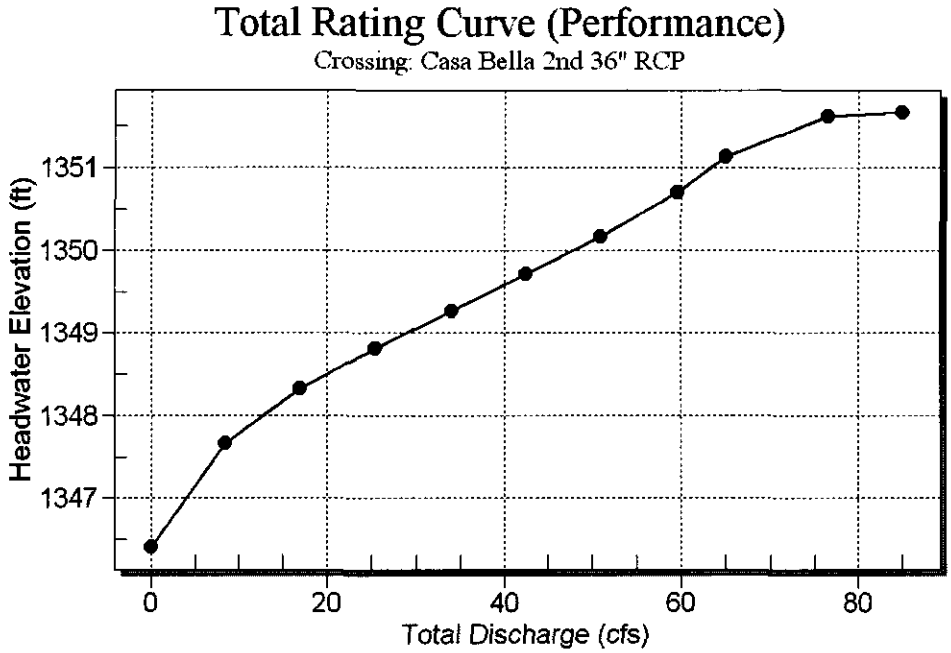
Storm Return Period	Existing Q (cfs)	Developed Q (cfs)
2 year	25.1	22.0
5 year	37.0	34.7
10 year	46.7	45.8
25 year	58.5	56.7
100 year	77.4	76.3

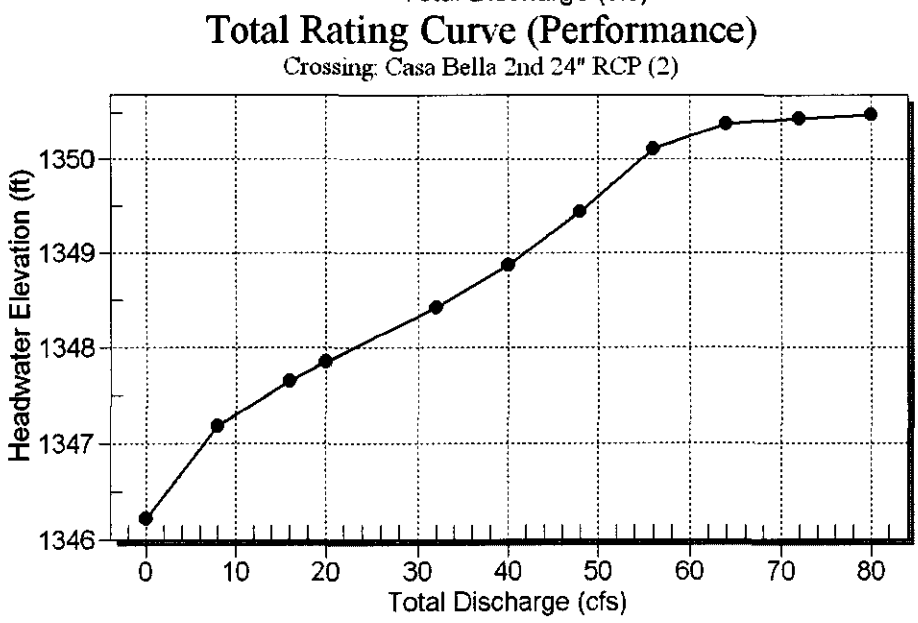
Table 1: Existing versus Developed storm runoff of the Southeast drainage basin of Casa Bella 3rd Addition to the intersection of 127th Street East and Pawnee.

Design Storm	Peak Qin (cfs)	Peak Qout (cfs)	Peak Storage (ac-ft)	Peak Elevation
2 yr	33.0	22.0	1.10	1354.0
5 yr	41.1	22.0	1.10	1354.0
10 yr	49.9	28.1	1.30	1354.2
25 yr	58.8	35.1	1.40	1354.5
100 yr	77.4	46.8	1.80	1355.0

Table 2: SE Pond Information

Rating Curves for 36" RCP & 24" RCPs under 127th Street East.





Proposed SE Pond Data:
Static Pool = 1352.0
Pond Bottom = 1346.0
100 yr Water Surface = 1355.0

Elevation	Area (ac)	Discharge (cfs)
1354.0	0.48	0
1354.5	0.52	3.0
1355.0	0.56	7.5
1355.5	0.60	14.5
1356.0	0.64	23.0
1356.5	0.68	37.5
1357.0	0.73	48.0

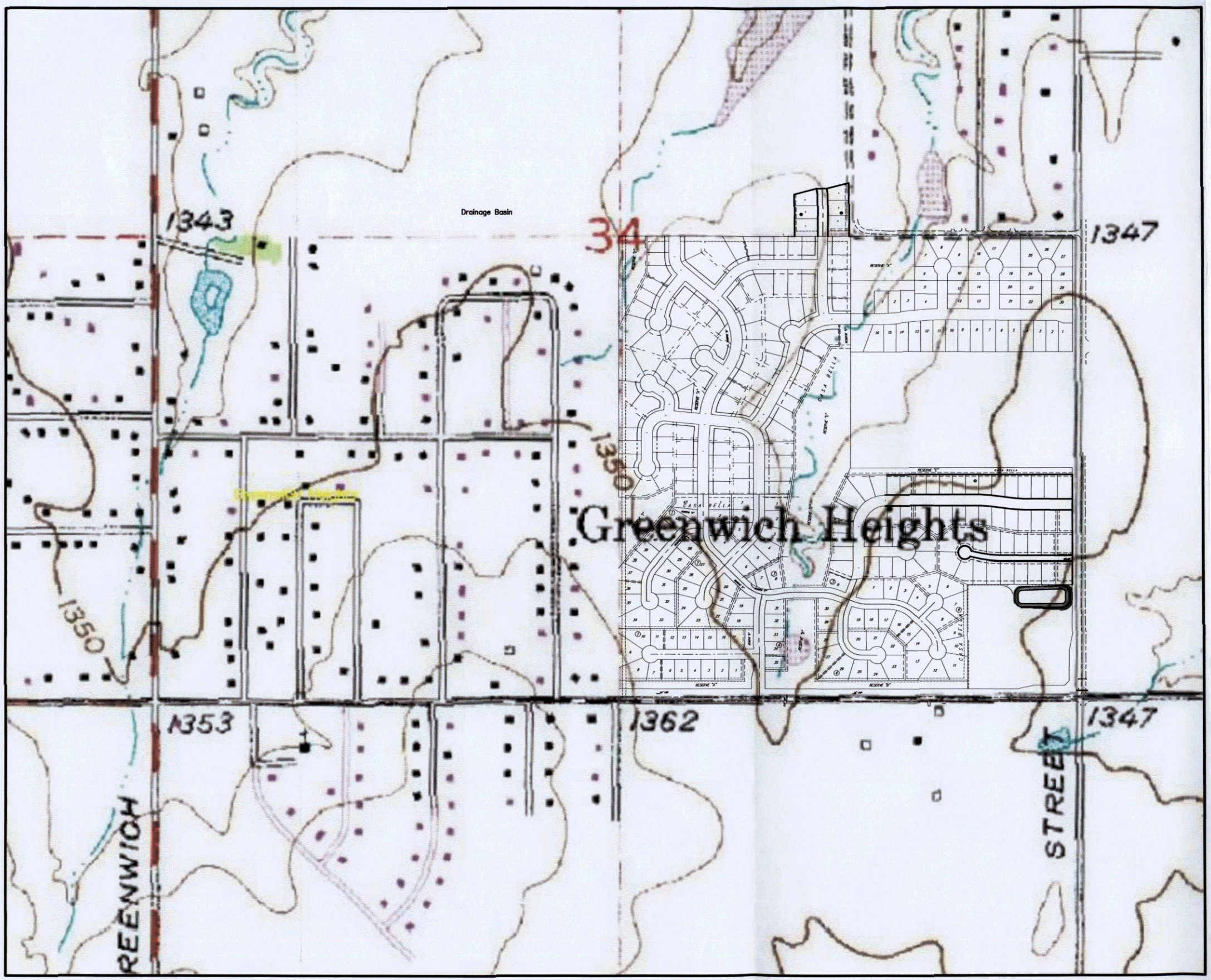
Table 1: SE Pond Stage-Area-Discharge

HY-8 Analysis Results

Crossing Summary Table

Culvert Crossing: Casa Bella3rd Pond Outlet

Headwater Elevation (ft)	Total Discharge (cfs)	24" Culvert Discharge (cfs)	36" Culvert Discharge (cfs)	Roadway Discharge (cfs)	Iterations
1352.00	0.00	0.00	0.00	0.00	0
1353.23	7.50	3.24	4.27	0.00	4
1353.64	15.00	6.01	8.97	0.00	5
1353.98	22.50	8.27	14.21	0.00	4
1354.22	30.00	9.87	20.15	0.00	4
1354.53	37.50	11.39	26.11	0.00	4
1354.64	40.00	11.75	28.25	0.00	3
1355.23	52.50	13.45	39.05	0.00	3
1355.57	60.00	14.39	45.56	0.00	12
1355.91	67.50	15.29	52.05	0.00	25
1356.07	75.00	15.55	54.93	4.43	9
1356.00	69.17	15.51	53.66	0.00	Overtopping



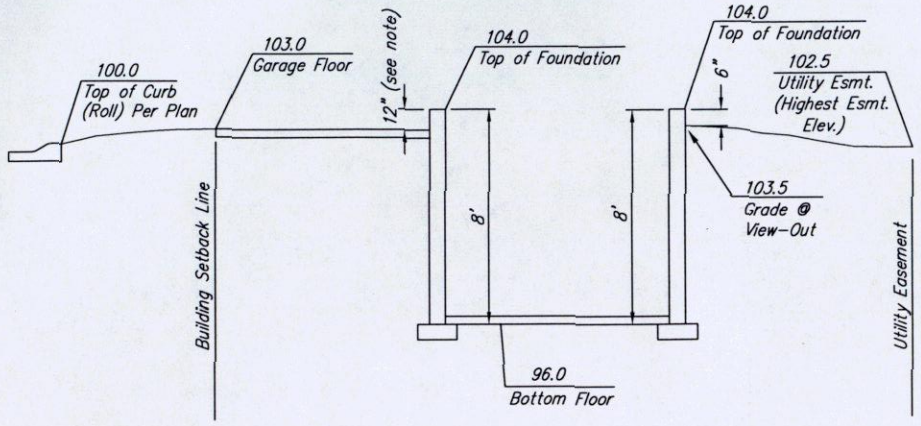
Scale: 1" = 200'

Casa Bella 3rd Addition
USGS Exhibit
WICHITA, KANSAS

Ruggles & Bohm, P.A.
Engineering, Surveying, Land Planning
924 North Main
Wichita, Kansas 67203
www.rbkansas.com
(316) 264-8008
(316) 264-4621 fax
E-mail: info@rbkansas.com

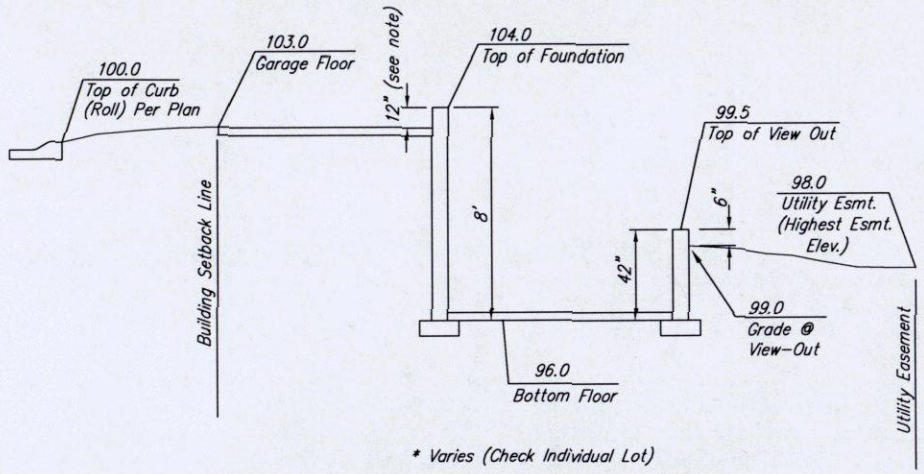
DESIGN EJG
DRAWN KWL
REVIEW
UTILITY
DATE Aug. 26, 20

DRAWING FILE Drainage Exhibits {USGS}
PROJECT NUMBER -



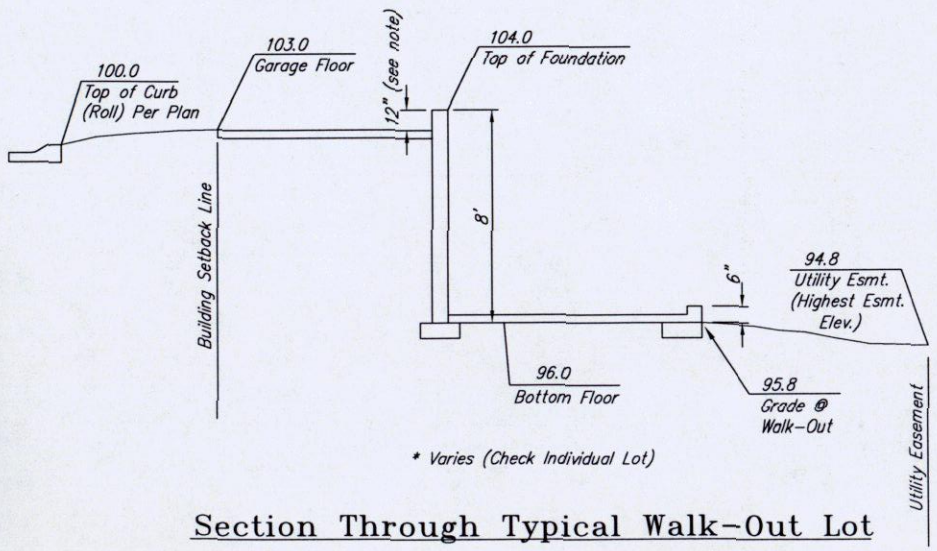
* Varies (Check Individual Lot)

Section Through Typical Full Basement



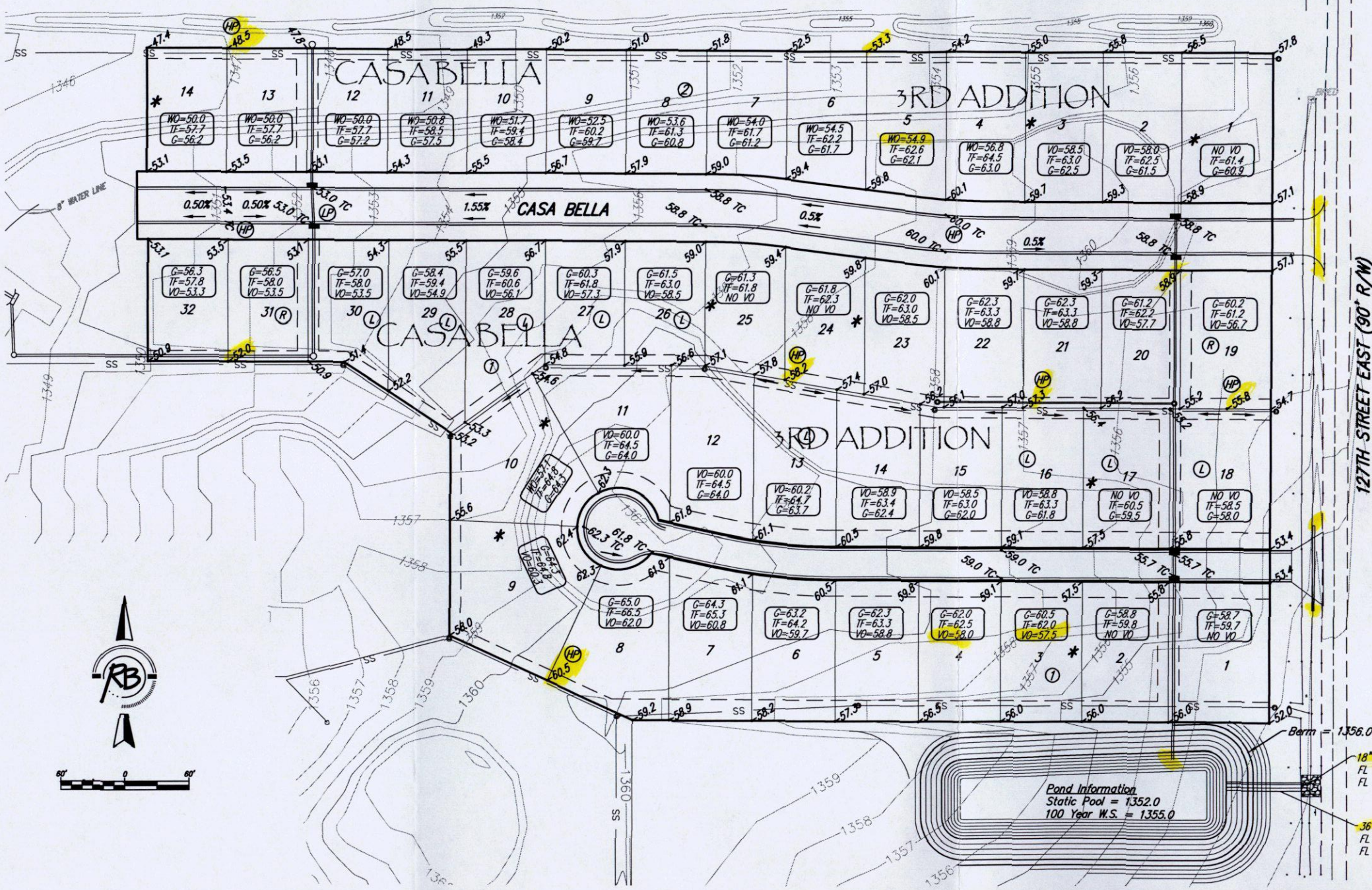
* Varies (Check Individual Lot)

Section Through Typical View-Out Lot



* Varies (Check Individual Lot)

Section Through Typical Walk-Out Lot



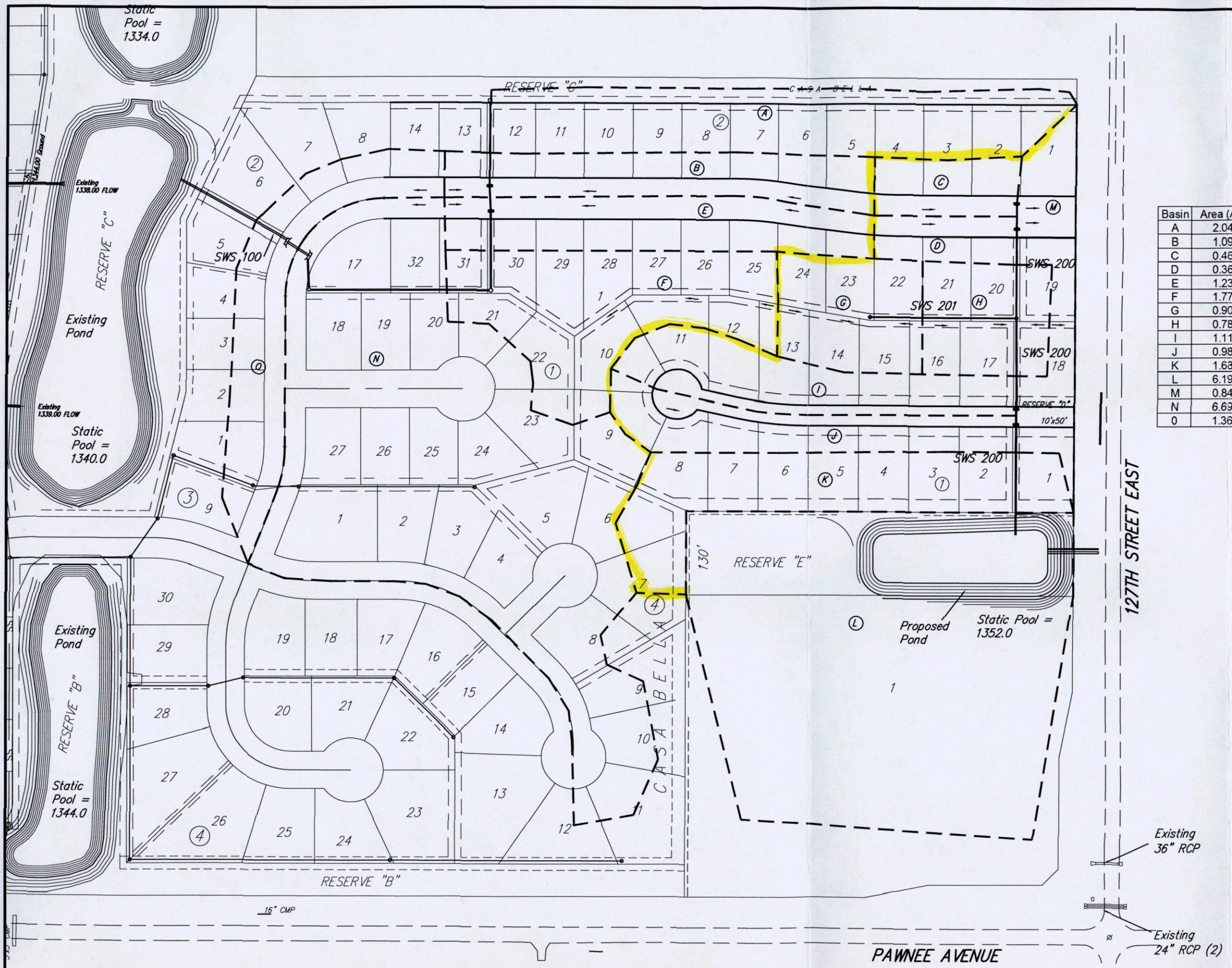
MINIMUM BUILDING PAD ELEVATION FOR LOWEST OPENING INTO STRUCTURES		
BLOCK	LOT NO.	ELEVATION (N.G.V.D.)
1	LOTS 1-8	1357.0

BENCHMARK: SRB BRASS DISC
55.45' E. & 5.13' S. OF THE N.W.
COR., SW 1/4 SEC 35, T27S, R2E.
ELEVATION = 1348.35 (NGVD29)

CASA BELLA THIRD ADDITION
PRELIMINARY GRADING PLAN
WICHITA, KANSAS

Ruggles & Bohm, P.A.
Engineering, Surveying, Land Planning
924 North Main
Wichita, Kansas 67203
www.rbkansas.com
(316) 264-8008
(316) 264-4621 fax
E-mail: info@rbkansas.com

DESIGN KWL
DRAWN MLP
REVIEW
UTILITY
DRAWING FILE
PROJECT NUMBER
DATE Aug. 26, 201



Basin	Area (Ac)	Tc (min)	I2 (in/hr)	I100 (in/hr)	C2	C100	Q2 (cfs)	Q100 (cf
A	2.04	15	3.83	7.37	0.5	0.76	3.9	11.4
B	1.09	15	3.83	7.37	0.5	0.76	2.1	6.1
C	0.46	15	3.83	7.37	0.5	0.76	0.9	2.6
D	0.36	15	3.83	7.37	0.5	0.76	0.7	2.0
E	1.23	15	3.83	7.37	0.5	0.76	2.4	6.9
F	1.77	15	3.83	7.37	0.5	0.76	3.4	9.9
G	0.90	15	3.83	7.37	0.5	0.76	1.7	5.0
H	0.78	15	3.83	7.37	0.5	0.76	1.5	4.4
I	1.11	15	3.83	7.37	0.5	0.76	2.1	6.2
J	0.98	15	3.83	7.37	0.5	0.76	1.9	5.5
K	1.63	15	3.83	7.37	0.5	0.76	3.2	9.4
L	6.19	20	3.33	6.53	0.5	0.76	10.3	30.7
M	0.84	15	3.83	7.37	0.5	0.76	1.6	4.7
N	6.69	20	3.33	6.53	0.5	0.76	11.1	33.2
O	1.36	15	3.83	7.37	0.5	0.76	2.6	7.6

Scale: 1" = 100'

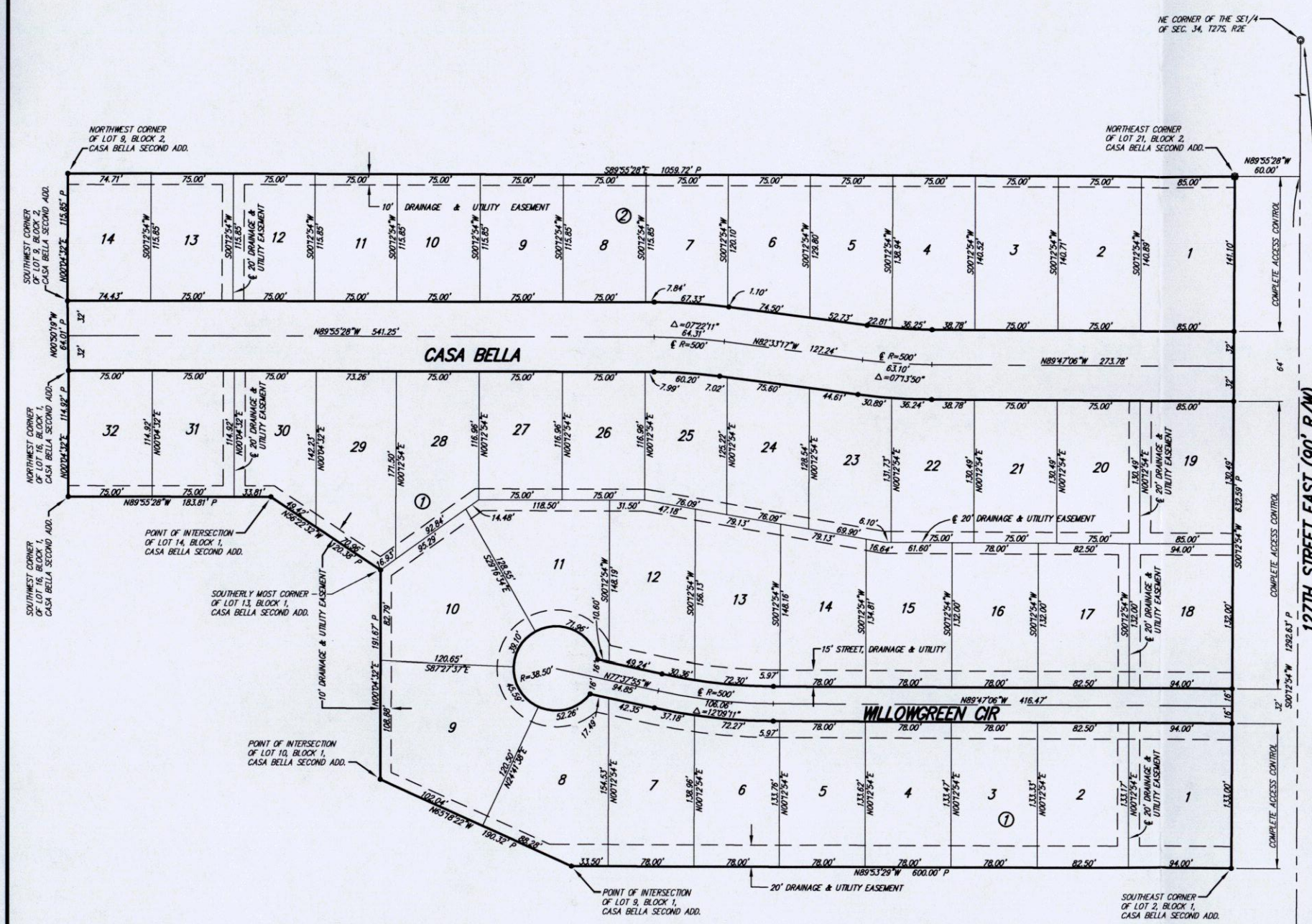
Casa Bella 2nd Addition
Drainage Basins
WICHITA, KANSAS

Ruggles & Bohm, P.A.
Engineering, Surveying, Land Planning
924 North Main
Wichita, Kansas 67203
www.rbkansas.com
(316) 264-8008
(316) 264-4621 fax
E-mail: info@rbkansas.com

DESIGN KWL
DRAWN KWL
REVIEW
UTILITY
DRAWING FILE Drainage Exhibits (Basins)
PROJECT NUMBER .
DATE Aug. 27,

CASA BELLA THIRD ADDITION

Wichita, Sedgwick County, Kansas



P = Platted (Casa Bella 2nd Addition)
M = Measured

SURVEY MARKER LEGEND

- ○ ..... 3/4" IRON PIPE (FOUND - ORIGIN UNKNOWN)
- ø ..... 5/8" REBAR W/GARBER CAP (FOUND)
- ● ..... 5/8" REBAR W/RUGGLES & BOHM CAP (FOUND)
- • ..... 5/8" REBAR W/RUGGLES & BOHM CAP (SET)

MINIMUM BUILDING PAD ELEVATION FOR LOWEST OPENING INTO STRUCTURES		
BLOCK	LOT NO.	ELEVATION (NGVD29)
1	1, 2, 3, 4, 5, 6, 7, 8	1357.0

BENCH MARK: SRB BRASS DISC 55.45' E. & 5.13' S. OF THE N.W. COR., SW1/4, SEC. 35, T27S, R2E
ELEVATION = 1348.35 (NGVD29)

State of Kansas)
SS Sedgwick County)

We, Ruggles & Bohm, P.A., Land Surveyors in aforesaid county and state, do hereby certify that, under the supervision of the undersigned, we have surveyed and platted "CASA BELLA THIRD ADDITION", Wichita, Sedgwick County, Kansas, and that the accompanying plat is a true and correct exhibit of the property surveyed, described as follows:

A replat of part of Casa Bella Second Addition, Wichita, Sedgwick County, Kansas, described as beginning at the northeast corner of Lot 21, Block 2, in said addition; thence S00°12'54"W along the east line of said Lot 21 and extended, 632.59 feet to the southeast corner of Lot 2, Block 1, in said addition; thence N89°53'29"W along the south line of said Lot 2 and extended, 600.00 feet to a point of intersection on the south line of Lot 9, Block 1, in said addition; thence N63°18'22"W along the southwest line of said Lot 9 and extended, 190.32 feet to a point of intersection on the west line of Lot 10, Block 1, in said addition; thence N00°04'32"E along the west line of said Lot 10 and extended, 191.67 feet to the southerly most corner of Lot 13, Block 1, in said addition; thence N56°22'32"W along the southwest line of said Lot 13, 120.38 feet to a point of intersection on the south line of Lot 14, Block 1, in said addition; thence N89°55'28"W along the south line of said Lot 14 and extended, 183.81 feet to the southwest corner of Lot 16, Block 1, in said addition; thence N00°04'32"E along the west line of said Lot 16, 114.92 feet to the northwest corner of said Lot 16; thence N00°50'19"W, 64.01 feet to the southwest corner of Lot 9, Block 2, in said addition; thence N00°04'32"E along the west line of said Lot 9, 115.85 feet to the northwest corner of said Lot 9; thence S89°55'28"E along the north line of said Lot 9 and extended, 1059.72 feet to the place of beginning.

All public easements and dedications are hereby vacated by virtue of K.S.A. 12-512(b).

Ruggles & Bohm, P.A.

_____ Land Surveyor
James D. Hestermann

Know all men by these presents that we, the undersigned, have caused the land described in the surveyor's certificate to be platted into Lots, Blocks and Streets, to be known as "CASA BELLA THIRD ADDITION", Wichita, Sedgwick County, Kansas. The utility easements are hereby granted for the construction and maintenance of all public utilities. The drainage easements are hereby granted to the public as indicated for drainage purposes. The street, drainage & utility easements are hereby granted to the public as indicated for street improvements, public utilities and drainage purposes. Access Controls as indicated are hereby granted to the appropriate governing body. The streets are hereby dedicated to and for the use of the public. A drainage plan has been developed for this plat and all drainage easements shall remain at established grades, or as modified with the approval of the City Engineer, and unobstructed to allow for the conveyance of storm water.

Tara Development Inc.

_____ President
Eugene Vitarelli

State of Kansas)
SS
Sedgwick County)

The foregoing instrument acknowledged before me, this _____ day of _____, 2010, by Eugene Vitarelli, President, on behalf of Tara Development Inc.

_____ Notary Public

My appointment expires _____ .

We the undersigned, holders of a mortgage on a portion of the above described property, do hereby consent to this plat of "CASA BELLA THIRD ADDITION", Wichita, Sedgwick County, Kansas.

Commerce Bank, N.A.

_____, Senior Vice President
Collin Stieben

State of Kansas)
SS
Sedgwick County)

The foregoing instrument acknowledged before me this _____ day of _____, 2010, by Collin Stieben, Senior Vice President of Commerce Bank, N.A., on behalf of the Bank.

_____, Notary Publi

My appointment expires _____ .

This plat of "CASA BELLA THIRD ADDITION", Wichita, Sedgwick County, Kansas, has been submitted to and approved by the Wichita-Sedgwick County Metropolitan Area Planning Commission, Wichita, Kansas.

Dated this ___ day of _____, 2010.

Wichita-Sedgwick County Metropolitan Area Planning Commission

_____ Chair
G. Nelson Van Fleet

_____ Secretar
John L. Schlegel

This plat approved and all dedications shown hereon accepted by the City Council of the City of Wichita, Kansas, this ___ day of _____, 2010

At the Direction of the City Counc

_____ Mayor
Carl Brewer

_____ City Cler
Karen Sublett

Reviewed in accordance with K.S.A. 58-2005 on this _____ day of _____, 2010.

Deputy County Surveyor
_____ Sedgwick County Kansas
Tricia L. Robello, LS #1246

Entered on transfer record this ___ day of _____, 2010.

_____ County Clerk
Kelly B. Arnold

State of Kansas)
SS
Sedgwick County)

This is to certify that this plat has been filed for record in the office of the Register of Deeds, this ___ day of _____, 2010, at _____ o'clock __ M, and is duly recorded.

_____ Register of Deeds
Bill Meek

_____ Deputy
Tonya Buckingham

Approved as to form:

_____ City Attorney
Gary E. Rebenstorf,

DWG FILE: SURVEY BASE
PROJECT NO. 3655P
AUGUST 26, 2010

Ruggles & Bohm, P.A.
Engineering, Surveying, Land Pla
924 North Main (316) 264-8008
Wichita, Kansas 67203 (316) 264-4621
www.rbkansas.com E-mail: info@rbka

Existing Conditions
Area = 13.8 acres
0.0 acres Impervious

The contours on this sheet represent the natural site as it was prior to the the Casa Bella Addition Storm Water Drain Project.

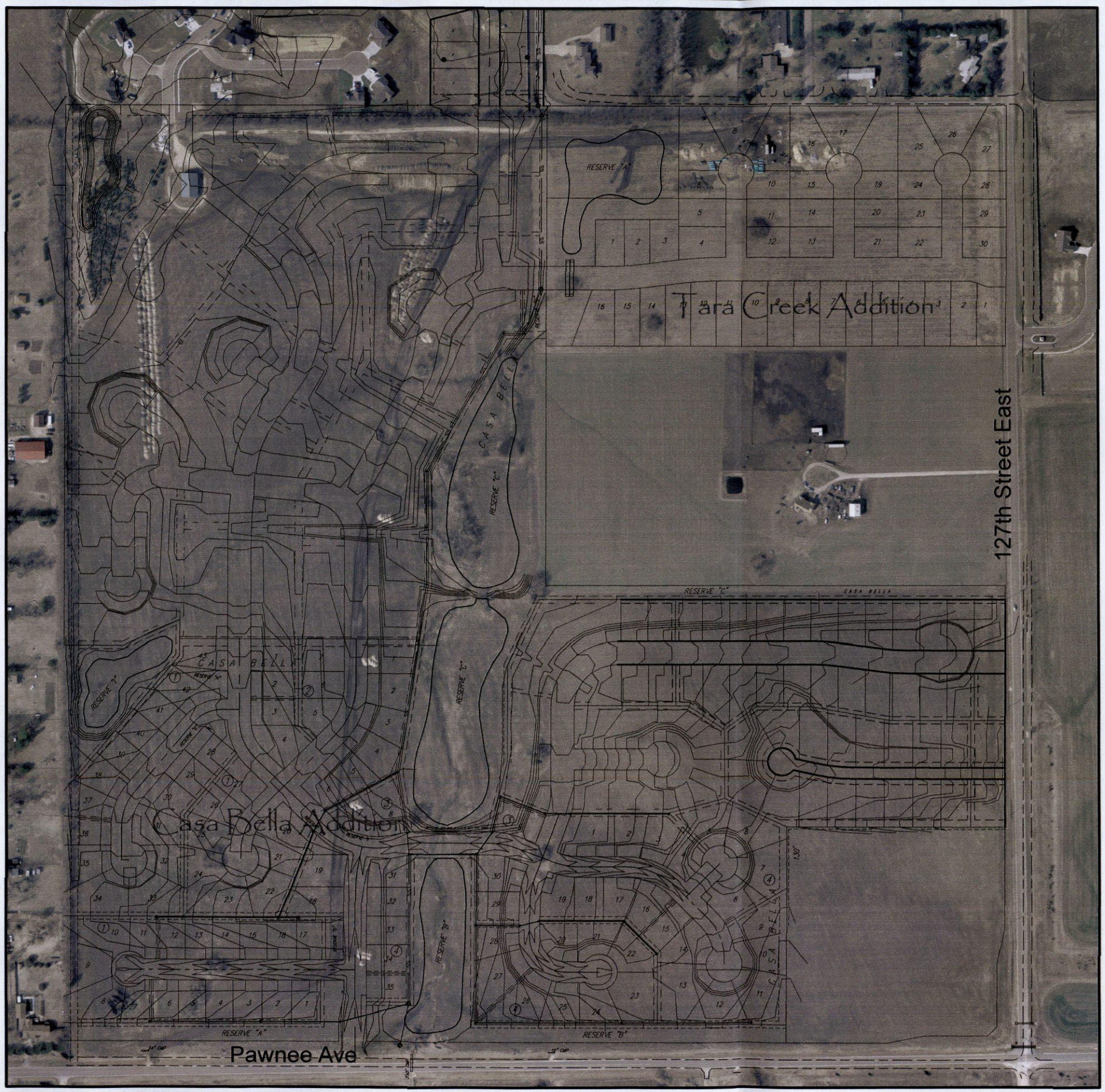
Scale: 1" = 200'

Casa Bella 2nd Addition
Pre-Development Aerial
WICHITA, KANSAS

Ruggles & Bohm, P.A.
Engineering, Surveying, Land Planning
924 North Main
Wichita, Kansas 67203
www.rbkansas.com
(316) 264-8008
(316) 264-4621 fax
E-mail: info@rbkansas.com

DESIGN KWL
DRAWN KWL
REVIEW
UTILITY
DATE Aug. 26, 2

DRAWING FILE Drainage Exhibits {aerial}
PROJECT NUMBER .



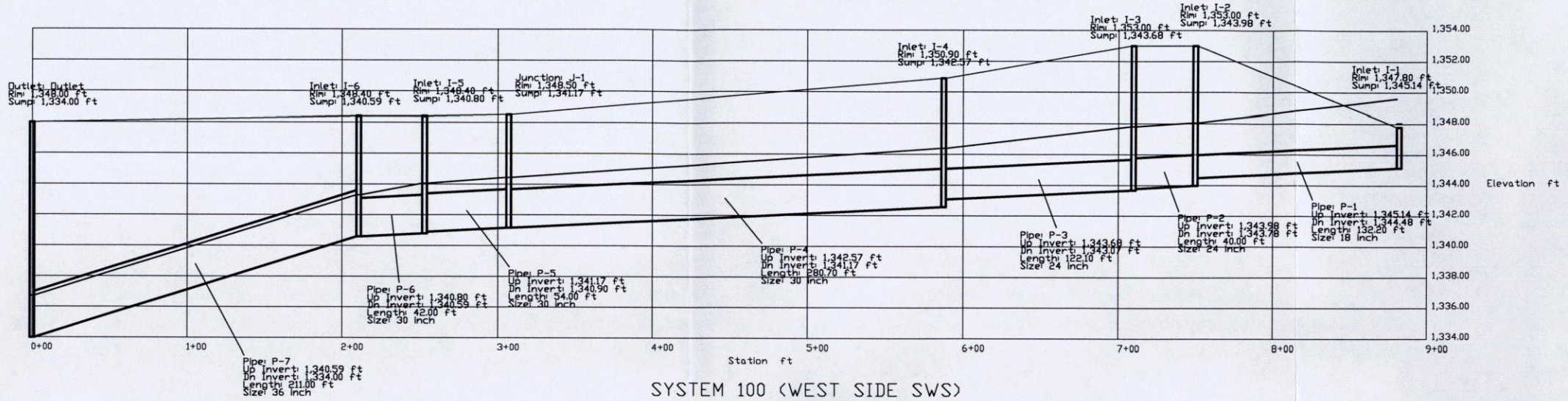
The contours on this sheet represent the site grading done with the Casa Bella Addition Storm Water Drain Project.

Scale: 1" = 200'

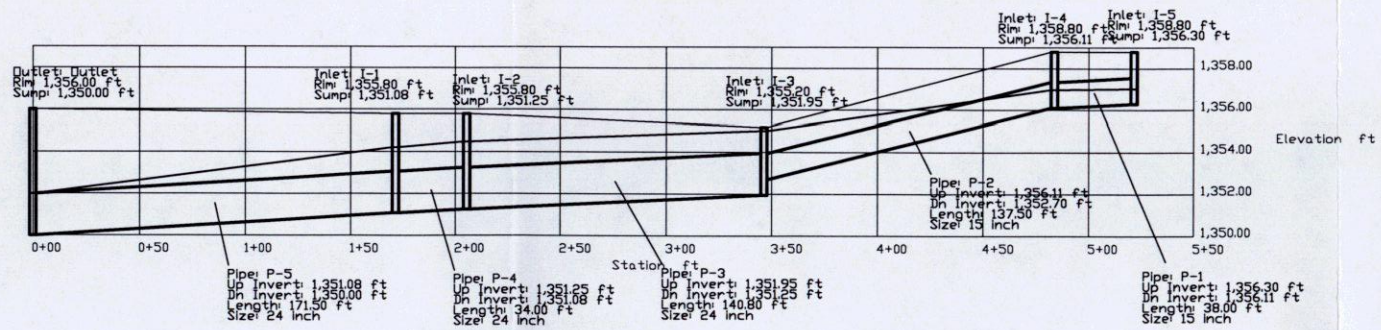
Casa Bella 2nd Addition
Current Site Conditions
WICHITA, KANSAS

Ruggles & Bohm, P.A.
Engineering, Surveying, Land Planning
924 North Main
Wichita, Kansas 67203
www.rbkansas.com
(316) 264-8008
(316) 264-4621 fax
E-mail: info@rbkansas.com

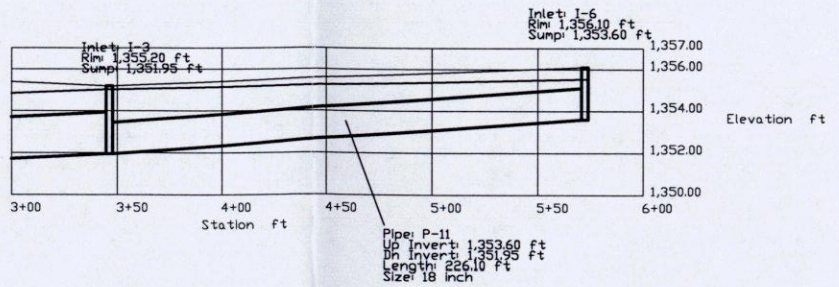
DESIGN	EJG
DRAWN	EJG
REVIEW	
UTILITY	
DATE	Aug. 27,
DRAWING FILE	Drainage Exhibits {aerial (2)}
PROJECT NUMBER	.



SYSTEM 100 (WEST SIDE SWS)



SYSTEM 200 (WEST SIDE SWS)



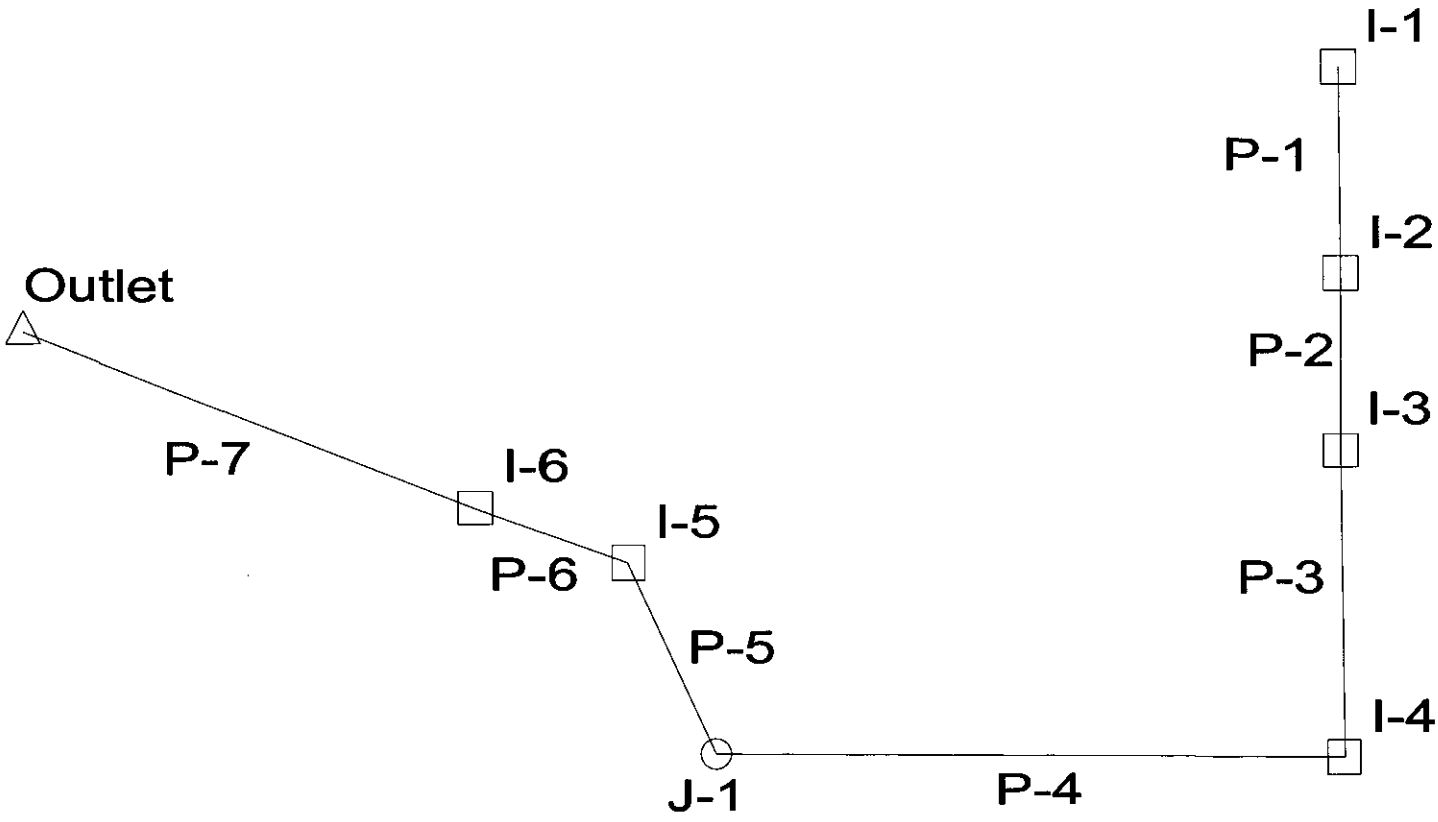
SYSTEM 201 (WEST SIDE SWS)

Casa Bella 2nd Addition
StormCAD
WICHITA, KANSAS

Ruggles & Bohm, P.A.
Engineering, Surveying, Land Planning
924 North Main
Wichita, Kansas 67203
www.rbkansas.com
(316) 264-8008
(316) 264-4621 fax
E-mail: info@rbkansas.com

DESIGN KWL
DRAWN KWL
REVIEW
UTILITY
DATE Aug. 27, 2

DRAWING FILE Drainage Exhibits [StormCAD]
PROJECT NUMBER .

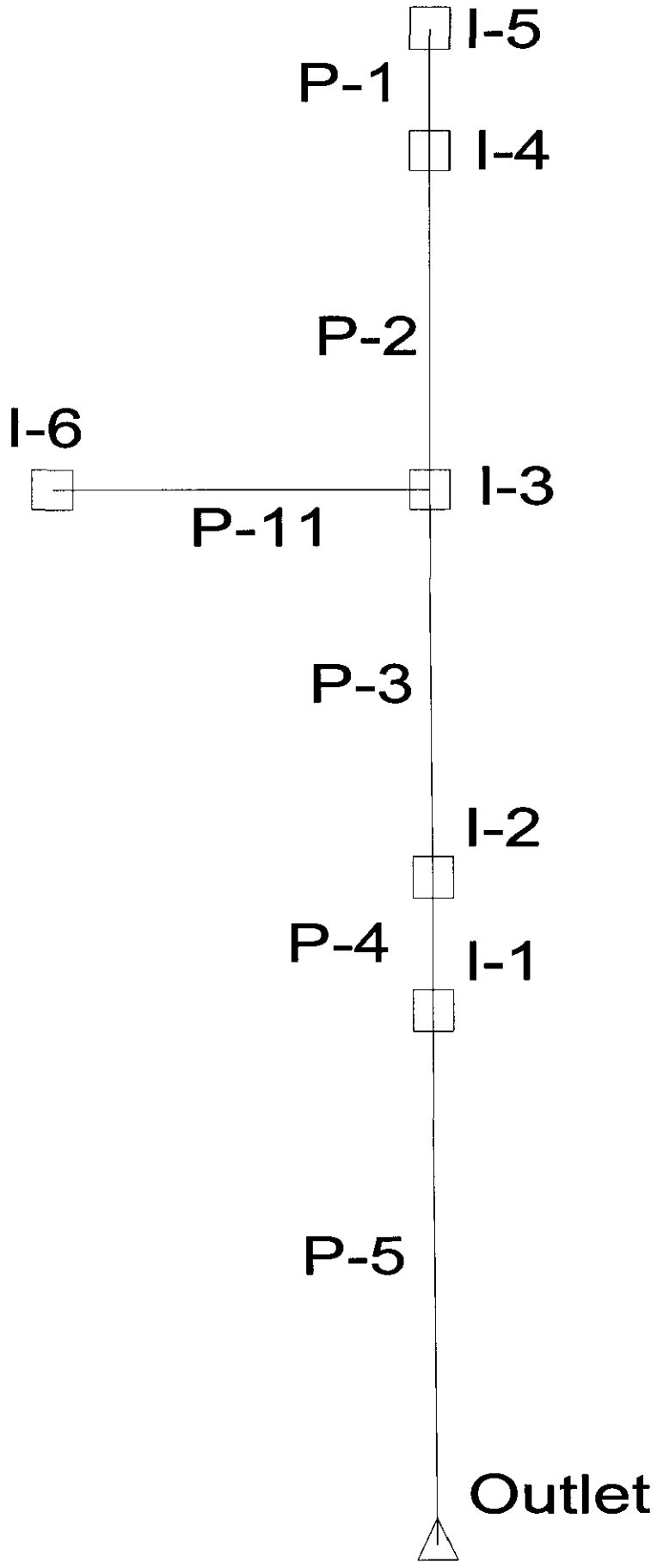

I-1
P-1
I-2
P-2
I-3
P-3
I-4
P-4
J-1
P-5
I-5
P-6
I-6
P-7
Outlet

Combined Pipe/Node Report

Pipe	Up Node	Dn Node	Length (ft)	Size	Cap (cfs)	V avg (ft/s)	Up Invert (ft)	Dn Invert (ft)	S (ft/ft)	Description	Q (cfs)
P-1	I-1	I-2	132.20	18 inch	7.42	6.45	1,345.14	1,344.48	0.004992		11.40
P-2	I-2	I-3	40.00	24 inch	16.00	5.57	1,343.98	1,343.78	0.005000		17.50
P-3	I-3	I-4	122.10	24 inch	15.99	7.77	1,343.68	1,343.07	0.004996		24.40
P-4	I-4	J-1	280.70	30 inch	28.97	6.99	1,342.57	1,341.17	0.004988		34.30
P-5	J-1	I-5	54.00	30 inch	29.00	6.99	1,341.17	1,340.90	0.005000		34.30
P-6	I-5	I-6	42.00	30 inch	29.00	11.14	1,340.80	1,340.59	0.005000		54.70
P-7	I-6	Outlet	211.00	36 inch	117.87	11.15	1,340.59	1,334.00	0.031232		75.10

Pipe Report

Pipe	Up Node	Dn Node	Q (cfs)	Length (ft)	S (ft/ft)	Size	Roughness	Cap (cfs)	Up Invert (ft)	Dn Invert (ft)	Up Cover (ft)	Dn Cover (ft)	Up HGL (ft)	Dn HGL (ft)
P-1	I-1	I-2	11.40	132.20	0.004992	18 inch	0.013	7.42	1,345.14	1,344.48	1.16	7.02	1,349.62	1,348.06
P-2	I-2	I-3	17.50	40.00	0.005000	24 inch	0.013	16.00	1,343.98	1,343.78	7.02	7.22	1,348.06	1,347.82
P-3	I-3	I-4	24.40	122.10	0.004996	24 inch	0.013	15.99	1,343.68	1,343.07	7.32	5.83	1,347.82	1,346.40
P-4	I-4	J-1	34.30	280.70	0.004988	30 inch	0.013	28.97	1,342.57	1,341.17	5.83	4.83	1,346.40	1,344.44
P-5	J-1	I-5	34.30	54.00	0.005000	30 inch	0.013	29.00	1,341.17	1,340.90	4.83	5.00	1,344.44	1,344.06
P-6	I-5	I-6	54.70	42.00	0.005000	30 inch	0.013	29.00	1,340.80	1,340.59	5.10	5.31	1,344.06	1,343.31
P-7	I-6	Outlet	75.10	211.00	0.031232	36 inch	0.013	117.87	1,340.59	1,334.00	4.81	11.00	1,343.31	1,336.72
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A


I-5
P-1
I-4
P-2
I-6
I-3
P-11
P-3
I-2
P-4
I-1
P-5
Outlet

Combined Pipe/Node Report

Pipe	Up Node	Dn Node	Length (ft)	Size	Cap (cfs)	V avg (ft/s)	Up Invert (ft)	Dn Invert (ft)	S (ft/ft)	Description	Q (cfs)
P-11	I-6	I-3	226.10	18 inch	8.97	2.83	1,353.60	1,351.95	0.007298		5.00
P-1	I-5	I-4	38.00	15 inch	4.57	3.16	1,356.30	1,356.11	0.005000		2.60
P-2	I-4	I-3	137.50	15 inch	10.17	4.40	1,356.11	1,352.70	0.024800		4.60
P-3	I-3	I-2	140.80	24 inch	16.00	4.46	1,351.95	1,351.25	0.005000		14.00
P-4	I-2	I-1	34.00	24 inch	16.00	6.43	1,351.25	1,351.08	0.005000		20.20
P-5	I-1	Outlet	171.50	24 inch	17.92	8.18	1,351.08	1,350.00	0.006274		25.70

Pipe Report

Pipe	Up Node	Dn Node	Q (cfs)	Length (ft)	S (ft/ft)	Size	Roughness	Cap (cfs)	Up Invert (ft)	Dn Invert (ft)	Up Cover (ft)	Dn Cover (ft)	Up HGL (ft)	Dn HGL (ft)
P-11	I-6	I-3	5.00	226.10	0.007298	18 inch	0.013	8.97	1,353.60	1,351.95	1.00	1.75	1,355.54	1,355.02
P-1	I-5	I-4	2.60	38.00	0.005000	15 inch	0.013	4.57	1,356.30	1,356.11	1.25	1.44	1,357.03	1,356.98
P-2	I-4	I-3	4.60	137.50	0.024800	15 inch	0.013	10.17	1,356.11	1,352.70	1.44	1.25	1,356.98	1,355.02
P-3	I-3	I-2	14.00	140.80	0.005000	24 inch	0.013	16.00	1,351.95	1,351.25	1.25	2.55	1,355.02	1,354.48
P-4	I-2	I-1	20.20	34.00	0.005000	24 inch	0.013	16.00	1,351.25	1,351.08	2.55	2.72	1,354.48	1,354.21
P-5	I-1	Outlet	25.70	171.50	0.006274	24 inch	0.013	17.92	1,351.08	1,350.00	2.72	4.00	1,354.21	1,352.00
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A