

**BELLECHASE 2<sup>nd</sup> ADDITION**  
**WICHITA, SEDGWICK COUNTY, KANSAS**  
**DRAINAGE ANALYSIS**  
**NOVEMBER 2007**

Belle Chase Addition is located near the northwest corner of the intersection of 127<sup>th</sup> Street East and Harry Street. The total addition consists of approximately 100.8 acres. From the National Cooperative Web Soil Survey 2.0, the predominant on-site soils are Rosehill silty clay and Clime silty clay, hydrologic soils group D and C respectively. For the sake of drainage analysis type D hydrologic group characteristics will be used. The site is currently used as pasture.

Belle Chase Addition is situated immediately south of Country Hollow Addition, Wichita, Sedgwick County, Kansas. A small portion of the southernmost part of the plat is within the floodway.

In the pre-developed condition offsite drainage comes from Country Hollow Addition to the north of the site. Spring Branch Creek flows just south of the addition. The site drains from north to south into the Spring Branch.

In the developed condition, the site will be subdivided into 222 single family lots. There is an existing pond in the Northeast corner of the plat that will be improved. A detention pond will be constructed along the South edge of the plat. The site will be drained into storm water systems and then into the drainage ponds. Some drainage will flow to the Spring Branch undetained.

HEC-HMS 3.0.1 was used for the hydraulic analysis of the site. For all rainstorm events studied, the total discharge from the site was reduced in the developed condition.

Storm Return Period	Existing Runoff (cfs)	Developed Runoff (cfs)
2 yr	236.6	231.3
5 yr	329.6	314.8
10 yr	405.7	381.8
25 yr	480.8	448.9
100 yr	640.2	590.1

Table 1: Peak runoff for each studied rainfall event.

## Existing Conditions

The existing site is 100.8 acres of pasture with hydrologic group D and C soil. The Country Hollow Drainage plan was used to input discharge from Country Hollow onto Belle Chase. The time of concentration is 22.8 minutes for the West basin and 18.6 minutes for the East basin. Time of Concentration was found using the velocity method. Considering the soil types and land use, a curve number of 83 was used for the onsite areas. Existing runoff for each return period is shown in Table 1. Runoff from the West basin flows undetained to the Spring Branch. Runoff for the East basin flows into an existing pond. Existing Pond data is found in Table 2.

West Basin:

$T_c = 300' / 0.45 \text{ ft/sec (overland)} + 300' / 1.5 \text{ ft/sec (sheet flow)} + 1260' / 2.5 \text{ ft/sec (channel flow)} = 1370 \text{ seconds} = 22.8 \text{ minutes.}$

East Basin:

$T_c = 300' / 0.45 \text{ ft/sec (overland)} + 300' / 1.5 \text{ ft/sec (sheet flow)} + 630' / 2.5 \text{ ft/sec (channel flow)} = 1116 \text{ seconds} = 18.6 \text{ minutes.}$

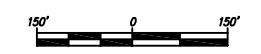
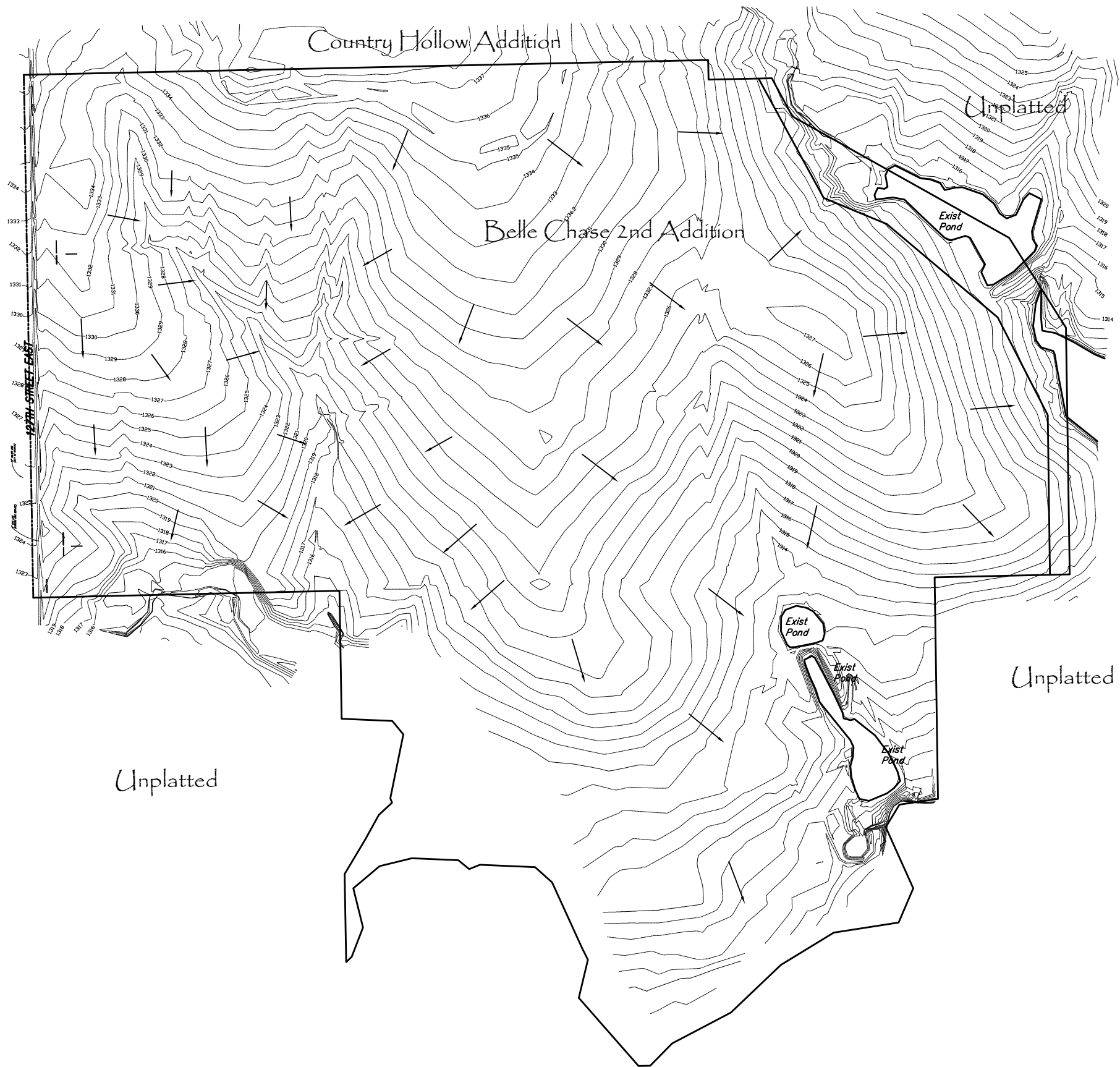
The existing pond is controlled by a 12" CMP and ultimately a low area acts as a weir.

Elevation	Area (acres)	Discharge (cfs)
1313.5	1.16	0.0
1314.0	1.30	0.8
1314.5	1.63	2.1
1315.0	1.95	3.3
1315.5	2.37	54.0
1316.0	2.78	185.0
1316.5	3.33	425.0
1317.0	3.88	792.0

Table 2: Existing Pond data.



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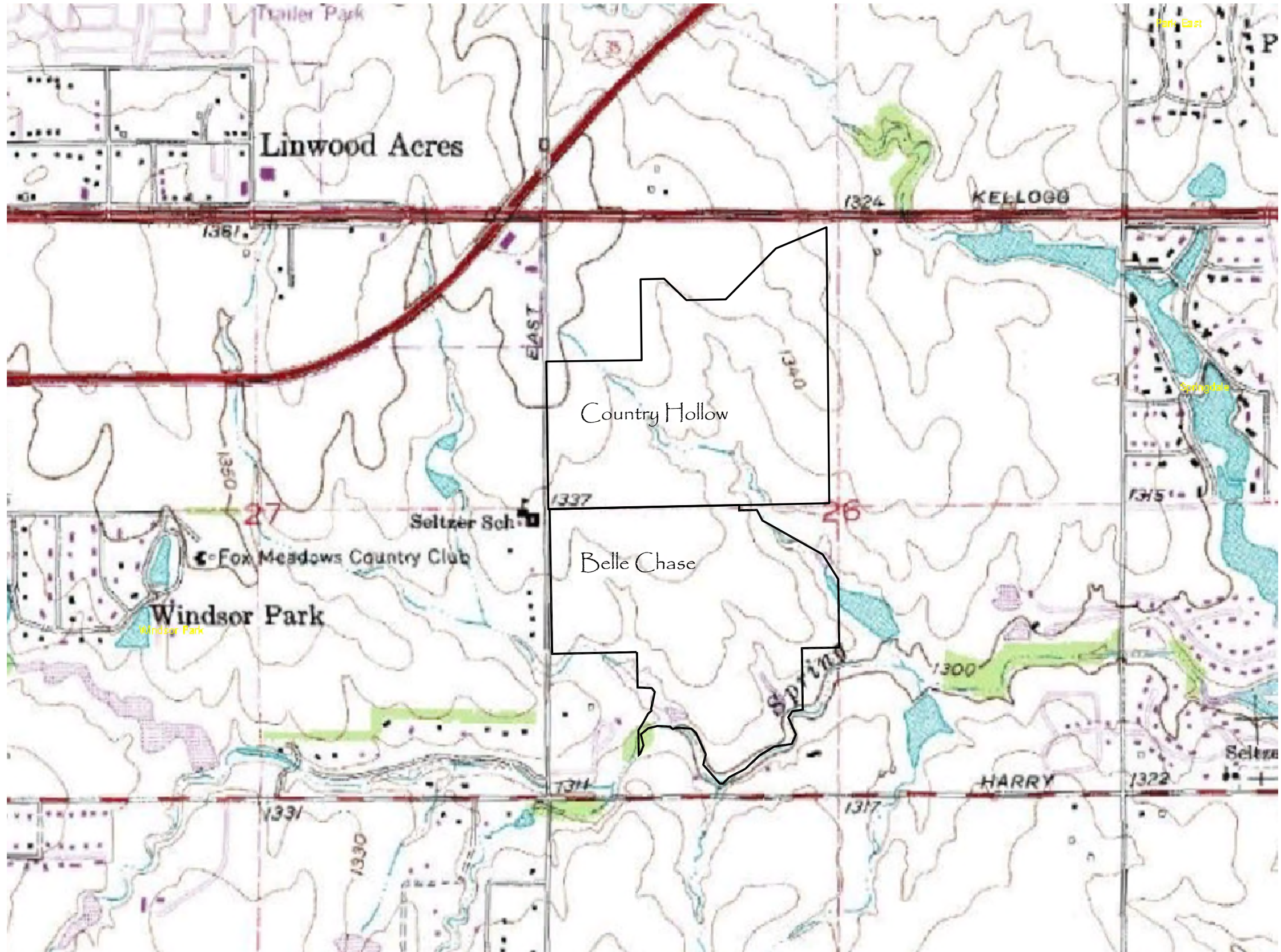


BELLECHASE 2ND ADDITION  
EXISTING CONTOURS  
WICHITA, KANSAS



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<b>BELLECHASE 2ND ADDITION USGS WICHITA, KANSAS</b>			
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### **Developed Conditions**

The developed condition for Belle Chase Addition is 222 single family residential lots. 80.0 acres will be developed into lots with the remaining 30.7 left as reserves. The existing detention pond will be improved and controlled with a weir. A new detention pond will be constructed and controlled by a weir. A portion of the site will continue to drain to the Spring Branch undetained, however the overall discharge for the developed site will be decreased from the existing condition. The Country Hollow runoff was recreated using drainage model information furnished by MKEC.

Basin	Peak Discharge (cfs)				
	2-year	5-year	10-year	25-year	100-year
Onsite West	107.2	147.2	179.0	210.8	277.8
Pond Basin	27.2	37.3	45.3	53.3	70.2
Exist Pond	27.2	37.3	45.3	53.3	70.2
Onsite Southeast	19.6	27.9	32.7	38.5	50.6

Table 3 – Developed Basin Discharges.

## **Developed Drainage Basins**

### Onsite West

Undetained Drainage to Spring Branch

Area = 49.2 acres

CN = 90

Time of Concentration = 18 minutes

### Pond Basin

Onsite Drainage to Proposed Pond

Area = 11.3 acres

CN = 90

Time of Concentration = 15 minutes

### Existing Pond

Onsite Drainage to Existing Pond

Area = 11.3 acres

CN = 90

Time of Concentration = 15 minutes

### Southeast Basin

Undetained Drainage to Spring Branch

Area = 8.2 acres

CN = 90

Time of Concentration = 15 minutes

### **Pond Ratings**

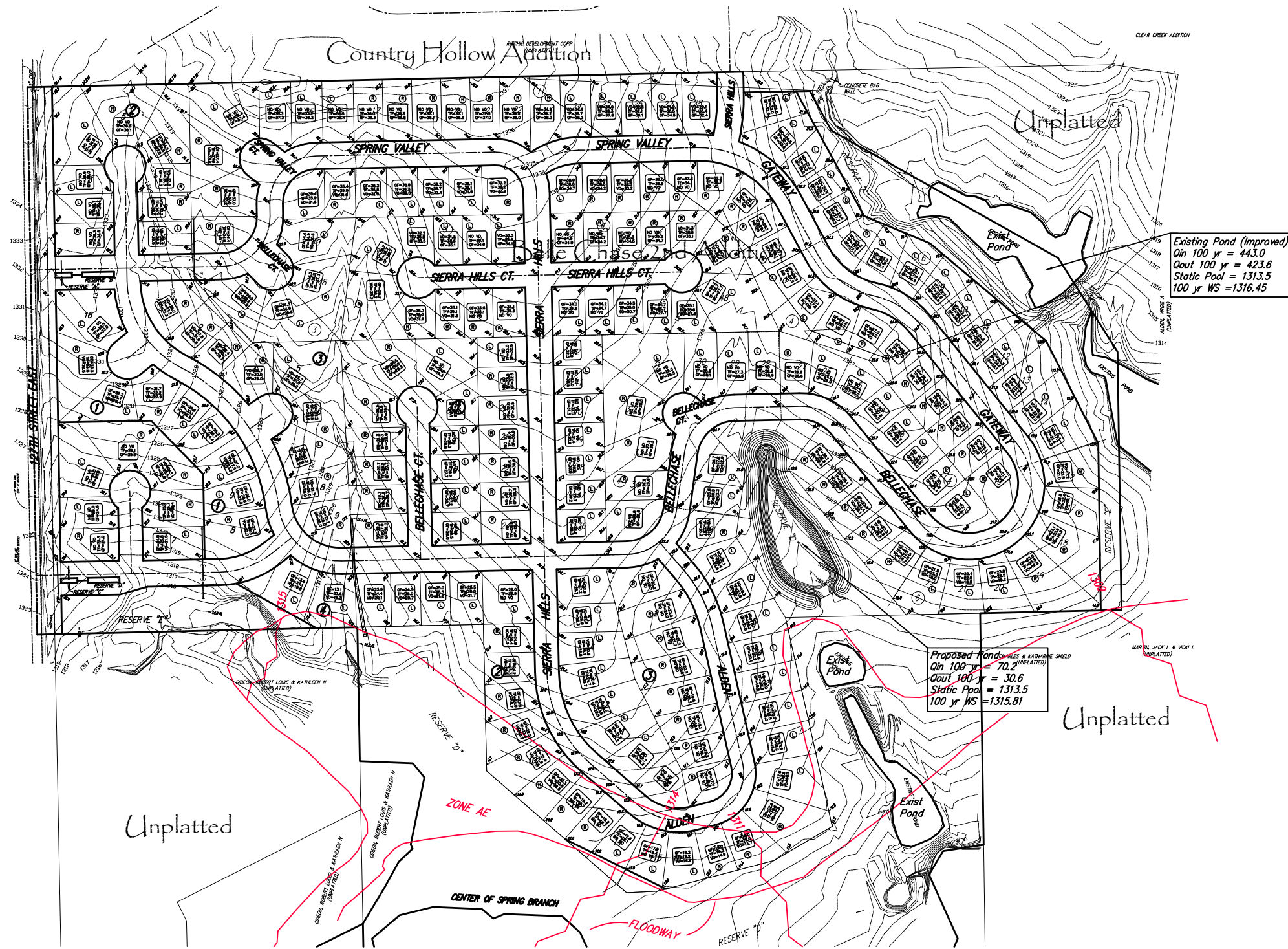
The following tables represent the data associated with the onsite detention ponds.

Elevation	Area (ac)	Discharge (cfs)	Storage (ac-ft)
1313.5	0.98	0.0	0
1314.0	1.55	29.5	0.63
1314.5	1.82	83.4	1.40
1315.0	2.09	153.3	2.30
1315.5	2.46	236.0	3.44
1316.0	2.83	329.8	4.76
1316.5	3.27	433.5	6.38
1317.0	3.71	546.3	8.21

Table 4 – Existing pond (Improved) data.

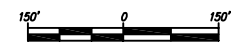
Elevation	Area (ac)	Discharge (cfs)	Storage (ac-ft)
1313.5	0.79	0.0	0.0
1314.0	0.84	3.1	0.41
1314.5	0.89	8.7	0.84
1315.0	0.94	16.0	1.30
1315.5	0.99	24.6	1.78
1316.0	1.04	34.4	2.29
1316.5	1.09	45.2	2.82
1317.0	1.14	56.9	3.38

Table 5 – Proposed Pond Data.



Existing Pond (Improved)  
 $Q_{in} 100 \text{ yr} = 443.0$   
 $Q_{out} 100 \text{ yr} = 423.6$   
 Static Pool = 1313.5  
 $100 \text{ yr WS} = 1316.45$

Proposed Pond  
 $Q_{in} 100 \text{ yr} = 70.2$   
 $Q_{out} 100 \text{ yr} = 30.6$   
 Static Pool = 1313.5  
 $100 \text{ yr WS} = 1315.81$

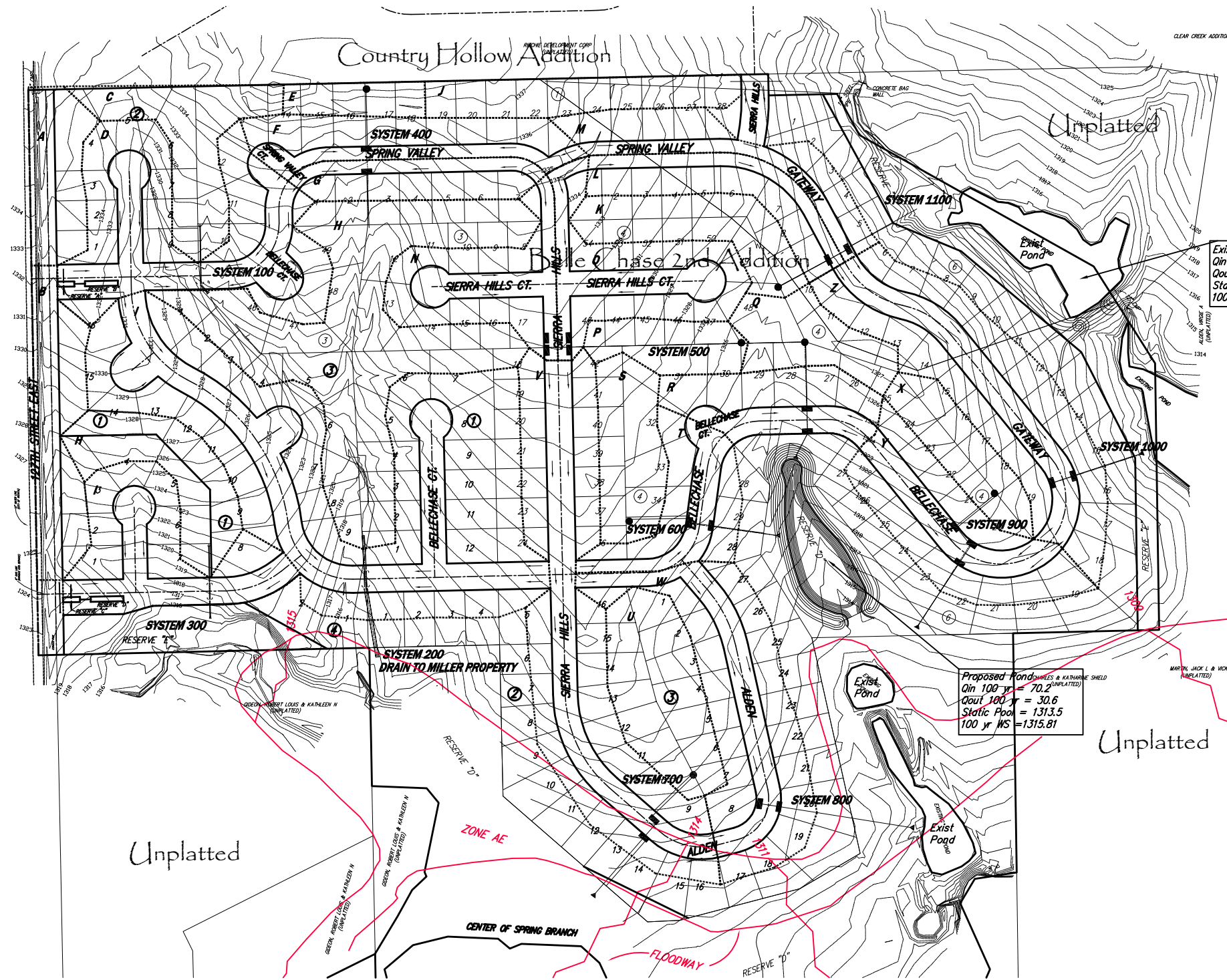


BELLECHASE 2ND ADDITION  
 4 CORNER LOT GRADING  
 WICHITA, KANSAS



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Basin	Area	C	I	$Q_m$
A	1.23	0.68	7.37	6.16
B	1.77	0.68	7.37	8.87
C	1.79	0.68	7.37	8.97
D	4.13	0.76	7.37	23.13
E	0.59	0.68	7.37	2.96
F	1.85	0.76	7.37	10.36
G	1.22	0.76	7.37	6.83
H	5.77	0.68	7.37	28.92
I	8.94	0.76	7.37	50.07
J	1.39	0.68	7.37	6.97
K	1.54	0.68	7.37	7.72
L	1.49	0.76	7.37	8.35
M	1.60	0.76	7.37	8.96
N	1.97	0.76	7.37	11.03
O	2.25	0.76	7.37	12.60
P	0.95	0.68	7.37	4.76
Q	1.26	0.68	7.37	6.31
R	1.63	0.76	7.37	9.13
S	1.43	0.68	7.37	7.17
T	1.65	0.76	7.37	9.24
U	2.08	0.68	7.37	10.42
V	5.31	0.76	7.37	29.74
W	3.69	0.76	7.37	20.67
X	1.19	0.68	7.37	3.96
Y	2.61	0.76	7.37	14.62
Z	4.19	0.76	7.37	23.47



**BELLECHASE 2ND ADDITION  
 DRAINAGE BASINS  
 WICHITA, KANSAS**



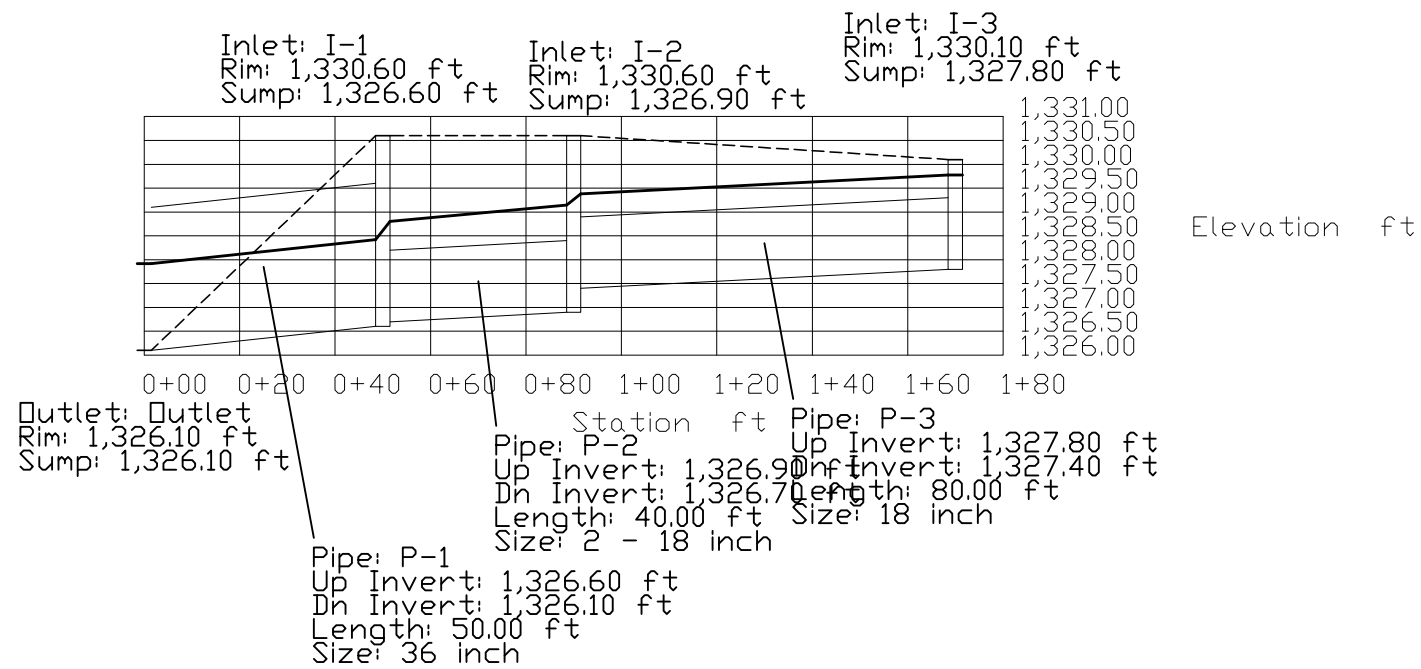
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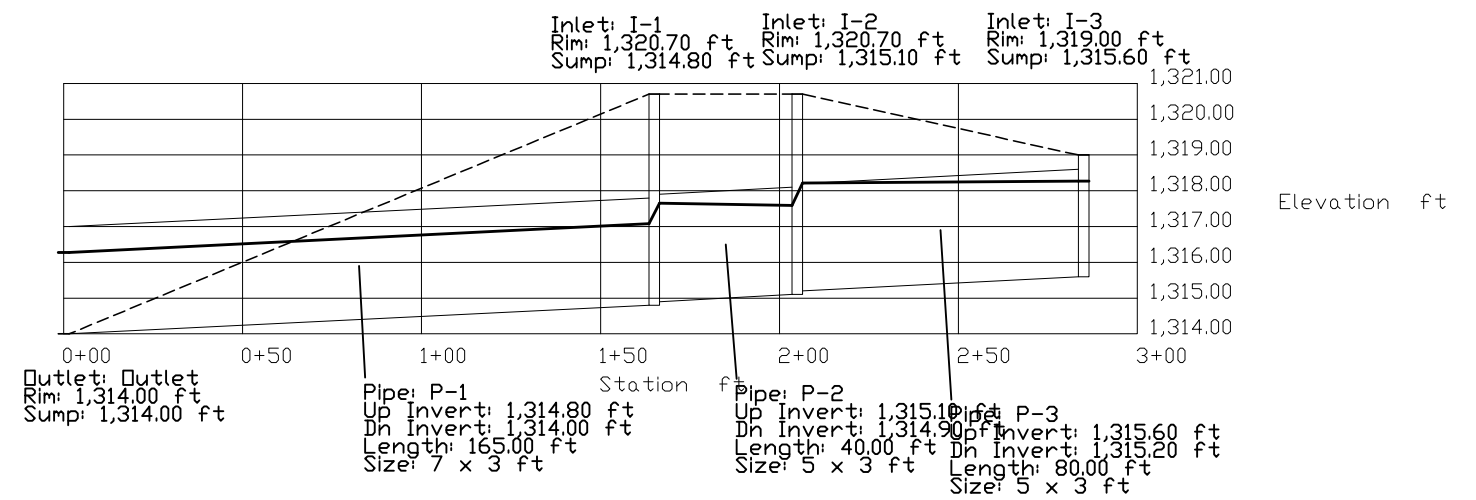
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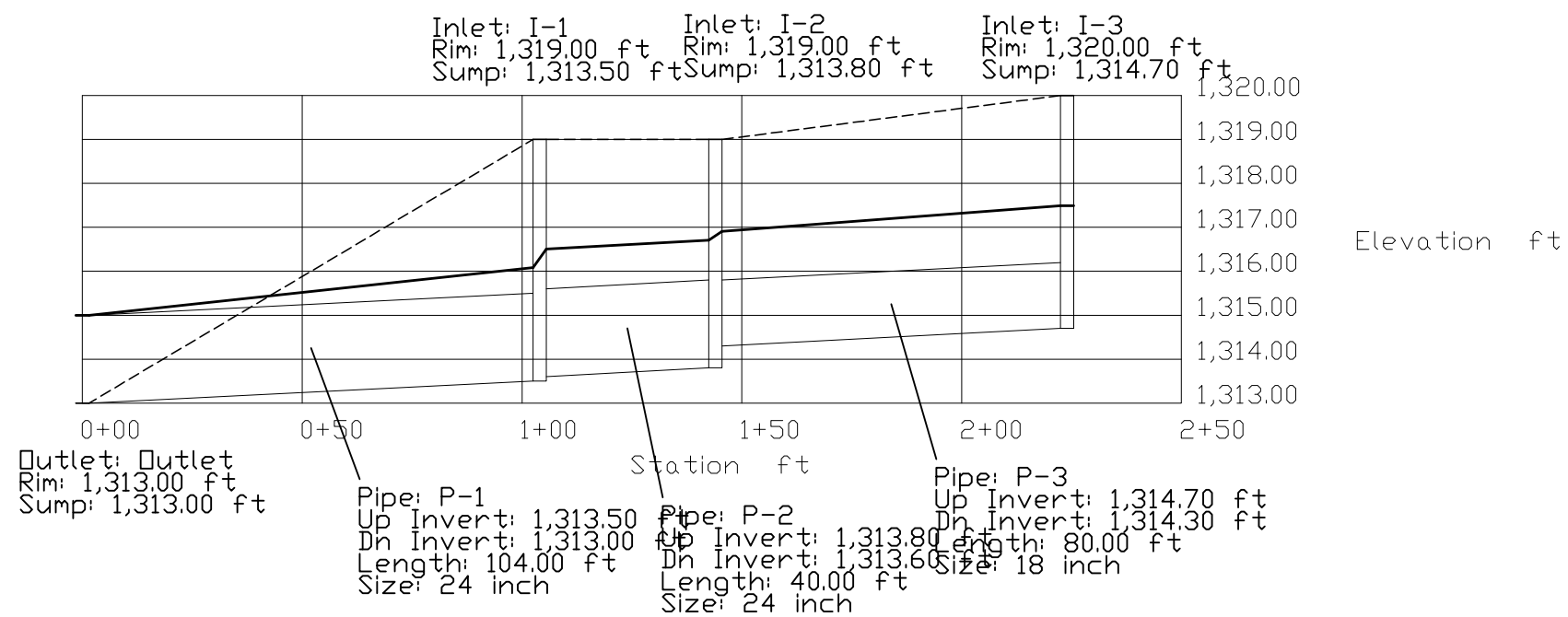
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**BELLE CHASE 2nd ADDITION  
SWS PROFILES**



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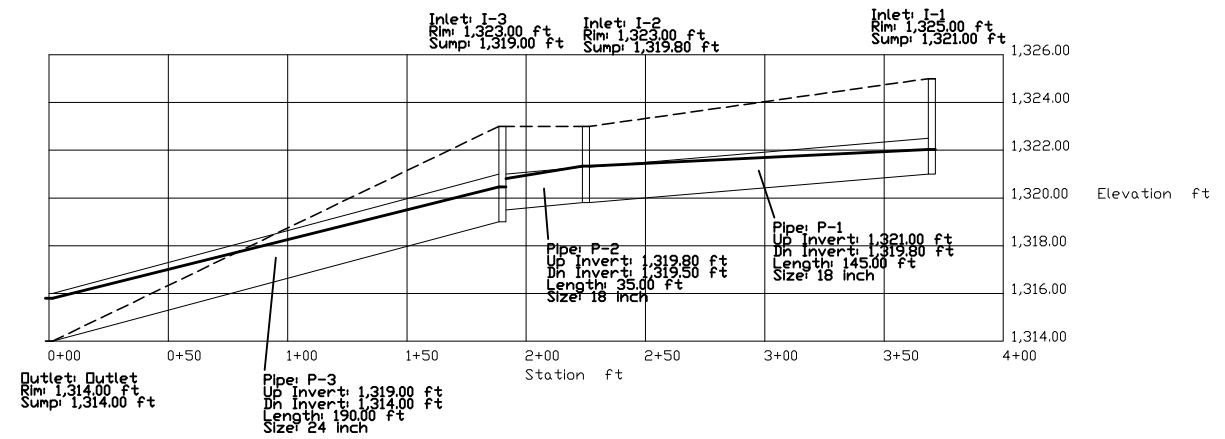
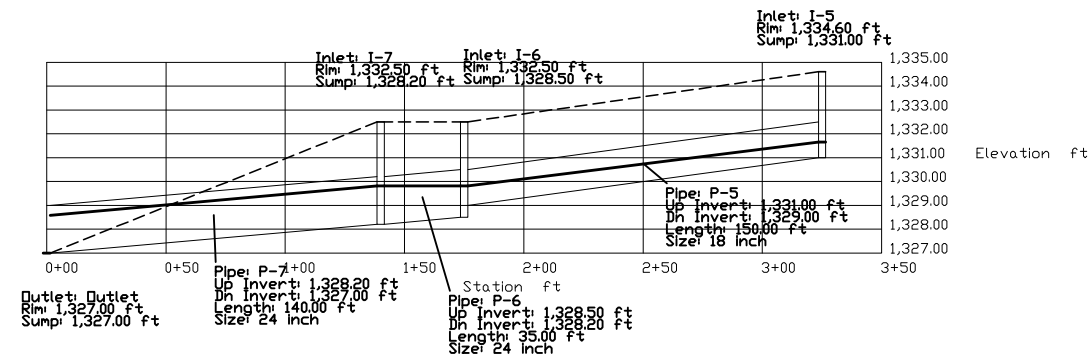
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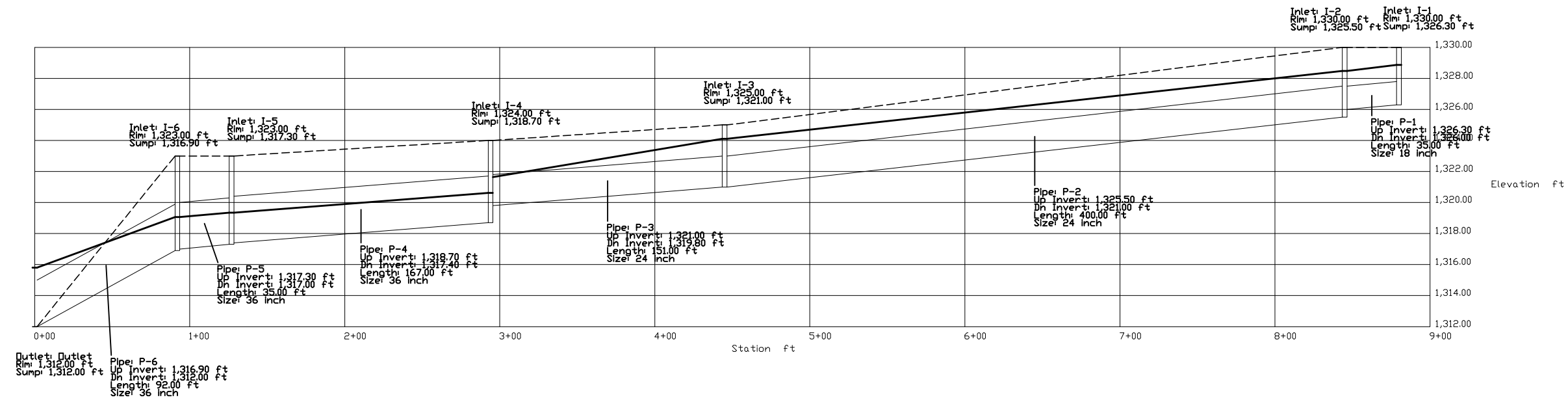
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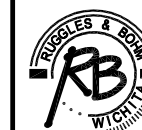
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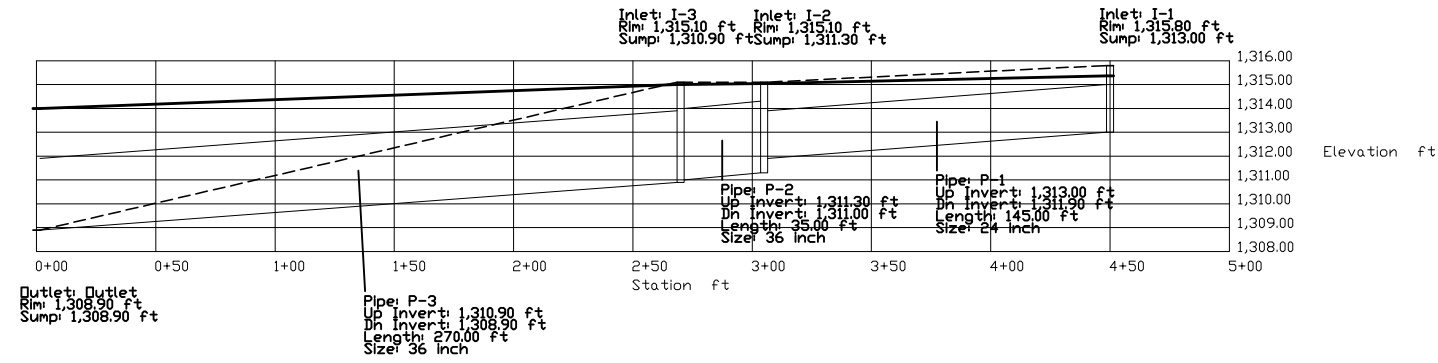


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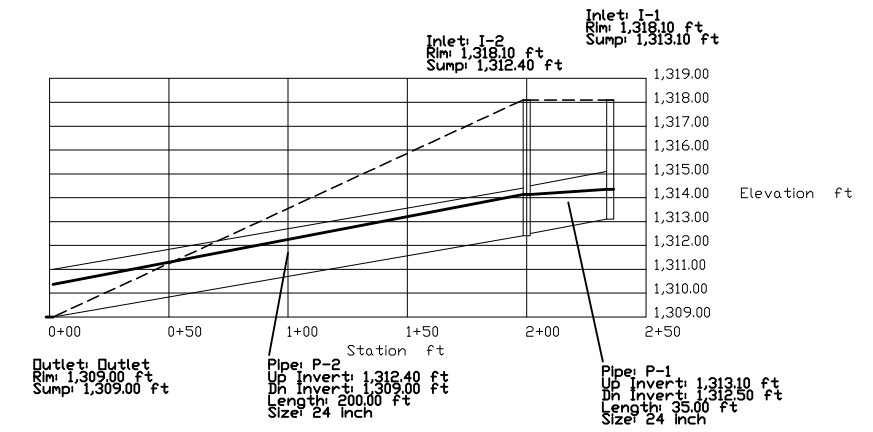
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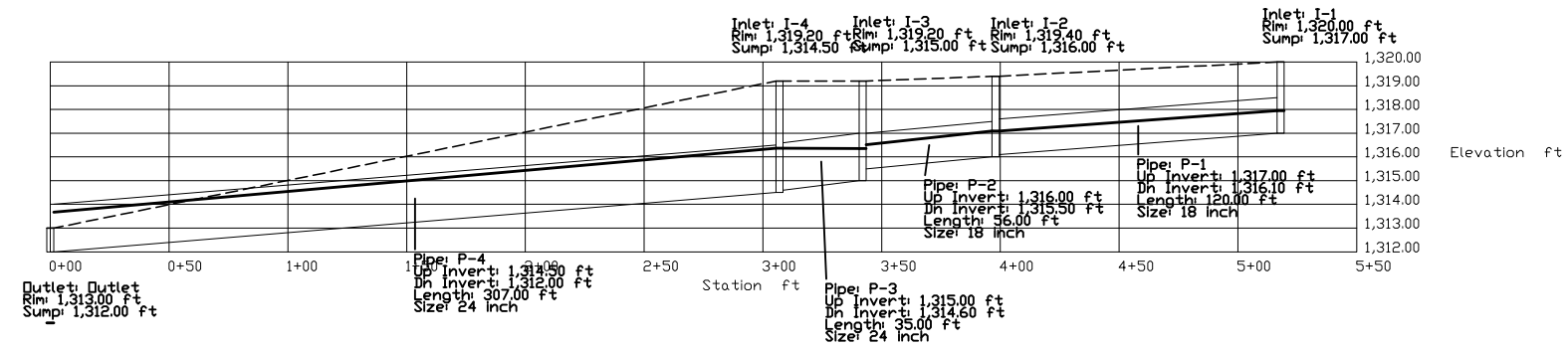
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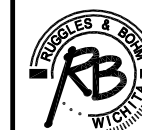
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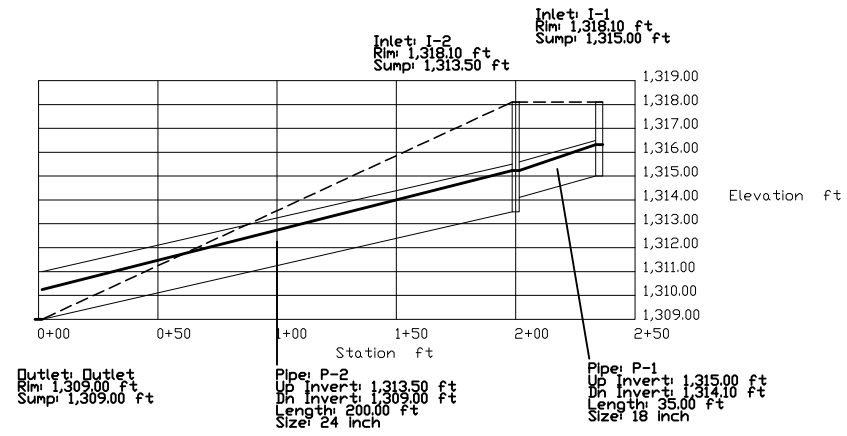


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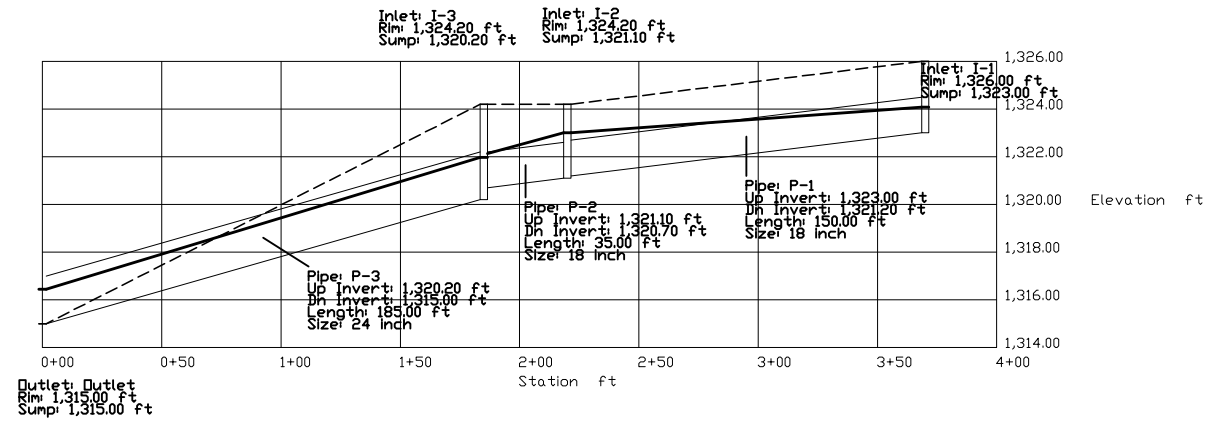
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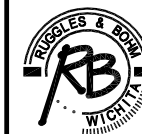
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