Ruggles & Bohm, P.A
Engineering, Surveying, Land Planning
924 N. Main
Wichita, Kansas 67203

# MEMO

**Date:** Thursday, May 08, 2008

**To:** Scott Cinkelpak
7th Floor Engineering

**From:** Eric Glover

**Project:** Sierra Hills 2nd

**RB Project No.:**

**Other Project Reference No.:**

**Description:**
- ☐ Confirmation
- ☒ Transmittal
- ☐ Transmittal under separate cover by

**Purpose:**
- ☒ Approval
- ☐ Review & comment
- ☐ Use
- ☐ Other :
- ☐ Distribution
- ☐ Information
- ☐ Record

**Enclosures/Attachments:**
- ☐ Prints
- ☒ Originals
- ☐ Diskettes containing:
- ☐ Change Order
- ☐ Shop Drawings
- ☐ Other:

| Copies | Description |
|---|---|
| 1 | Drainage Plan |
| | |
| | |
| | |

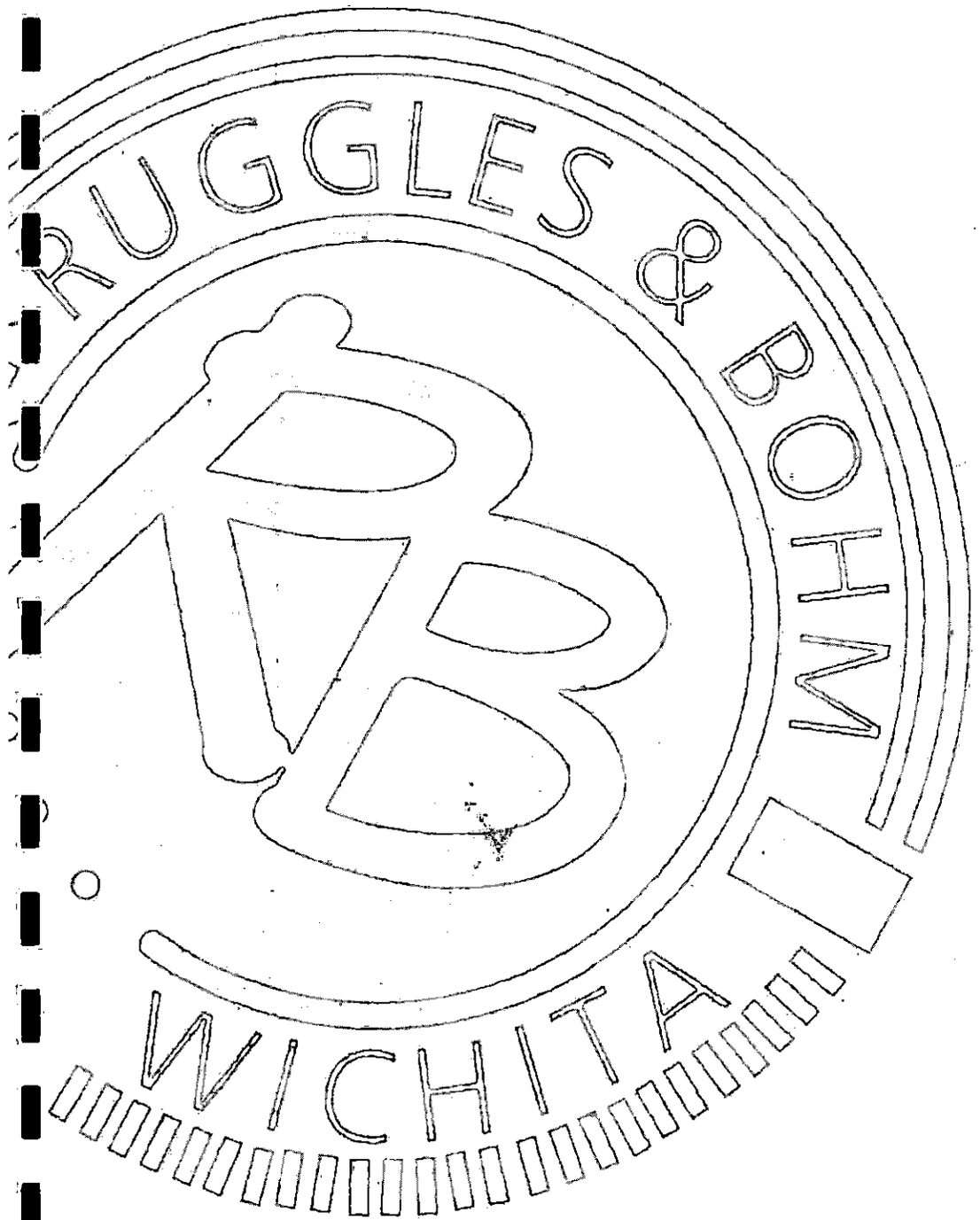
**Remarks:**

**Copies to:**

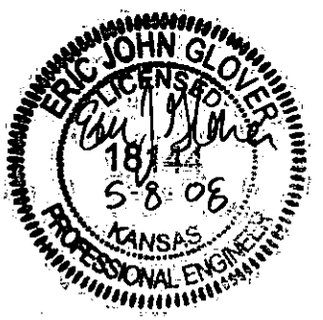
**If checked below, please:**
- ☐ Acknowledge receipt of enclosures
- ☐ Return enclosures to us.

Signed Eric J Glover

*If Enclosures are not as noted above, please inform us immediately*
*Phone (316) 264-8008 Fax (316) 264-4621*




Final Drainage Plan
CASA BELLA 2ND ADDITION
WICHITA, KANSAS
APRIL 2008




Ruggles & Bohm P.A.
Engineering, Surveying, Land Planning

Final Drainage Plan
CASA BELLA 2ND ADDITION
WICHITA, KANSAS
APRIL 2008

Final Drainage Plan
Casa Bella 2nd Addition
Wichita, Kansas

## Existing Conditions

Casa Bell 2nd Addition is a proposed 70 acre 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.

The entire site was graded with the Casa Bella Storm Water Project (COW project #468 84073). Ponds were constructed to handle drainage from Casa Bella and most of the future Casa Bella 2nd Addition. A pond was also constructed with the Tara Creek Addition Storm Water Drain Project (COW project #468 84358) that handles drainage from the Northeast portion of Casa Bella 2nd. The drainage plans for Casa Bella and Tara Creek were accepted by the City of Wichita. Therefore this drainage plan is a focus on the portions of Casa Bella 2nd Addition that do not drain through Casa Bella and/or Tara Creek and the Southeast portion of the plat that drains to the intersection of 127th Street East and Pawnee.

The Northeast corner of Casa Bella 2nd Addition drains undetained in the current state to a pond in Tara Falls Addition. The Tara Falls pond is sized for the pre-developed conditions of Casa Bella 2nd Addition. Considering any reduction in discharge from the existing drainage conditions, the Casa Bella 2nd Addition developed discharge will be well within the capacity of the Tara Falls pond. The undeveloped drainage area is 42 acres including offsite drainage. Offsite drainage comes from the adjacent property. Drainage flows across residential lots and into ditches adjacent to the street. Eventually it makes it to a drainage swale that directs the discharge to the rear lots adjoining Casa Bella 2nd. Using the velocity method the time of concentration was found to be 57.8 minutes. A curve number of 83 is used considering the site was not maintained and hydrologic group D type soils. The runoffs for each storm return period were found using HEC-HMS and can be found in Table-1.

Length of longest reach = 3000' (0.6% slope)

$$Tc = \underset{\text{(sheet flow)}}{400'/(0.21)(60)} + \underset{\text{(grassed waterway)}}{400'/(0.86)(60)} + \underset{\text{(channel flow)}}{2200'/(2.0)(60)} = 57.8 \text{ min}$$

| Storm Return Period | Existing Q (cfs) | Developed Q (cfs) |
|---|---|---|
| 2 year | 31.3 | 24.5 |
| 5 year | 46.3 | 36.1 |
| 10 year | 58.6 | 45.8 |
| 25 year | 71.1 | 55.5 |
| 100 year | 97.8 | 76.2 |

Table 1: Existing versus Developed storm runoff of the Northwest drainage basin of Casa Bella 2nd Addition to an existing pond in Tara Falls Addition

Final Drainage Plan
Casa Bella 2nd Addition
Wichita, Kansas

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 hydrologic group D type soils.

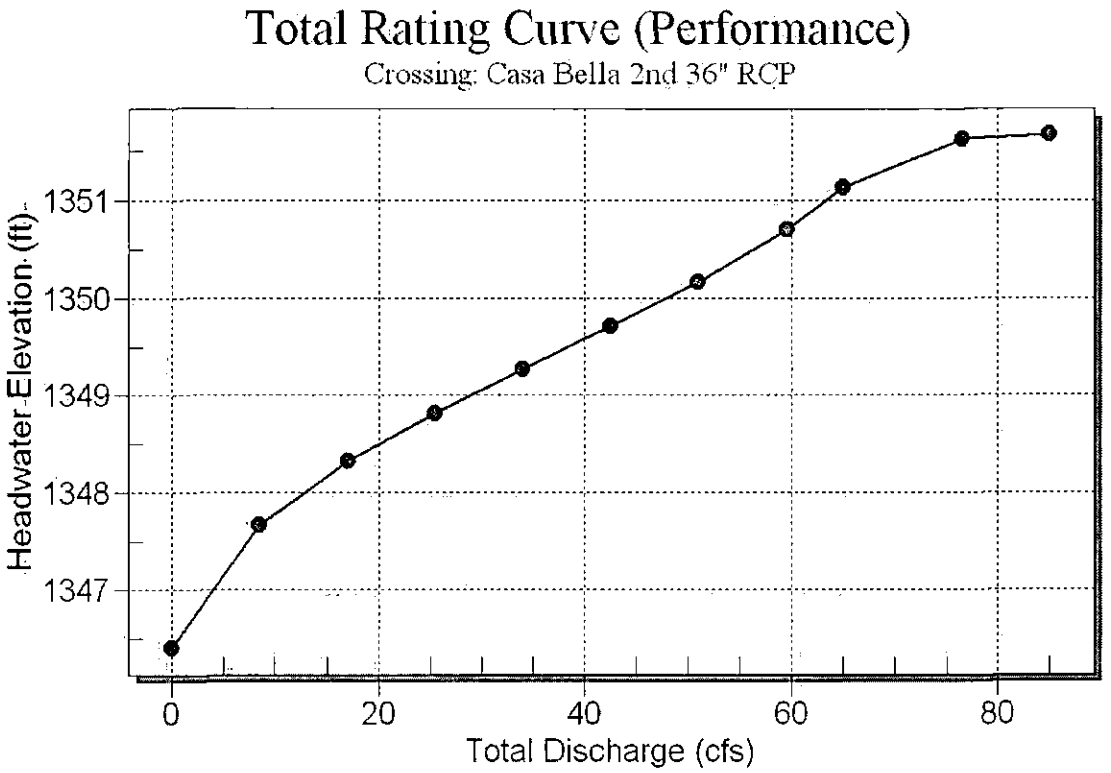
Length of longest reach = 1170' (0.5% slope)

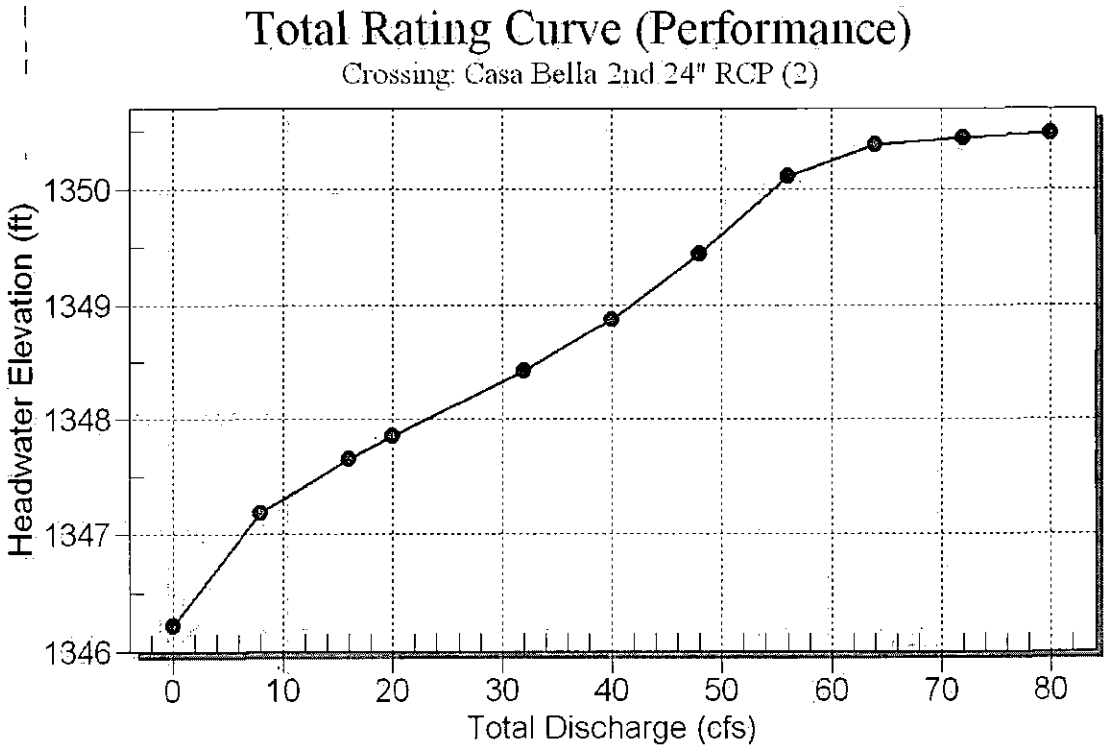
Tc = 300'/(0.21)(60) + 200'/(1.0)(60) + 670'/(3.0)(60) = 32 min
(sheet flow) (grassed waterway) (channel flow)

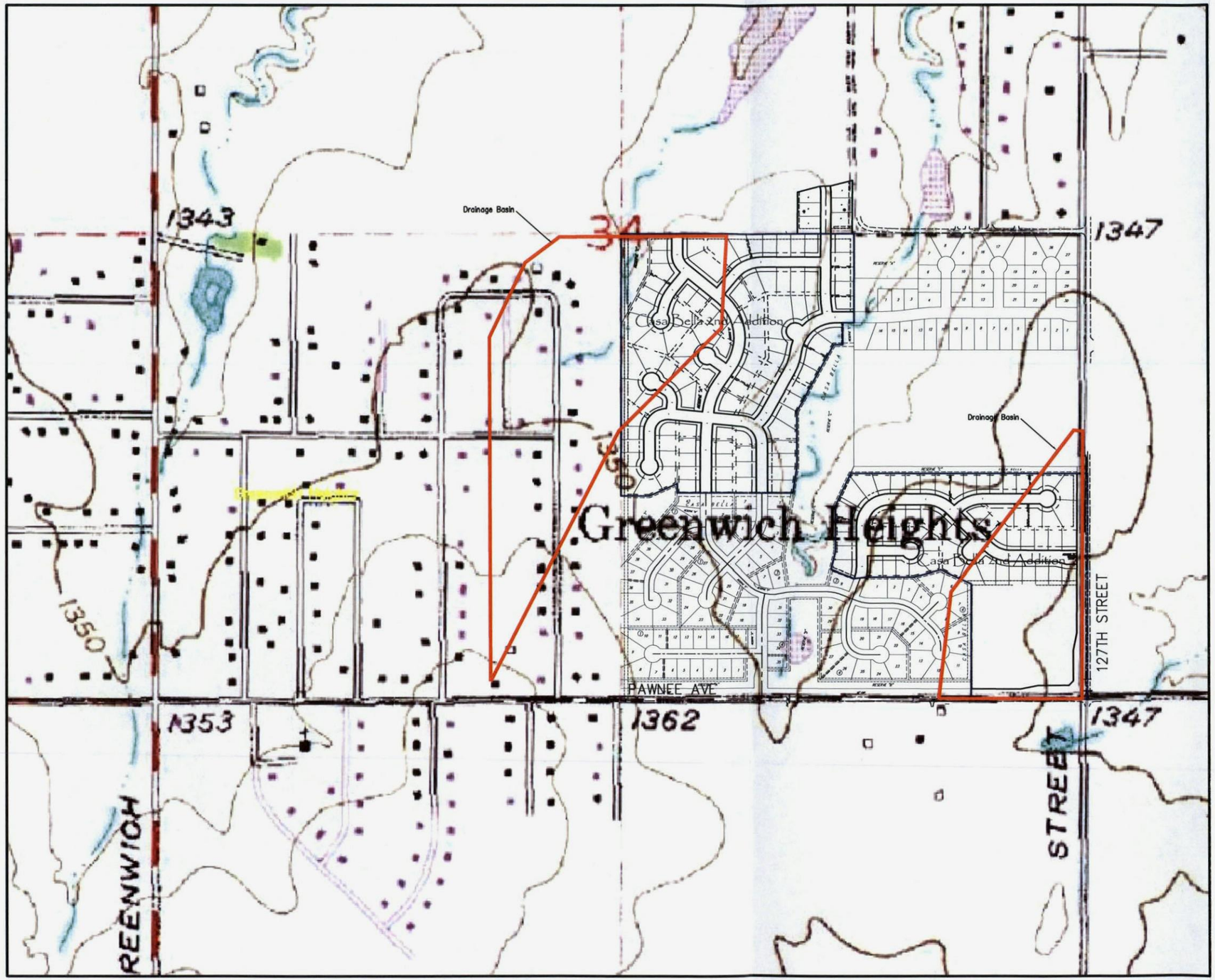
| Storm Return Period | Existing Q (cfs) | Developed Q (cfs) |
|---|---|---|
| 2 year | 25.1 | 24.4 |
| 5 year | 37.0 | 35.5 |
| 10 year | 46.7 | 44.5 |
| 25 year | 58.5 | 53.6 |
| 100 year | 77.5 | 73.0 |

Table 2: Existing versus Developed storm runoff of the Southeast drainage basin of Casa Bella 2nd Addition to an the intersection of 127th Street East and Pawnee.

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






Scale: 1" = 200'

Casa Bella 2nd Addition
USGS
WICHITA, KANSAS

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| | |
|---|---|
| DESIGN | EJG |
| DRAWN | EJG |
| REVIEW | |
| UTILITY | |
| DATE | Apr. 14, 2008 |
| JOB NO. | 3253P |
| SHEET | 5 OF 13 |
| DRAWING FILE | SURVEY BASE {USGS} |
| PROJECT NUMBER | . |


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
Aerial Image
WICHITA, KANSAS

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E-mail: info@rbkansas.com

DESIGN EJG
DRAWN EJG
REVIEW
UTILITY
DATE Apr. 14, 2006
PROJECT NUMBER .
DRAWING FILE SURVEY BASE {aerial}
PROJECT 3353P
SHEET 6 OF 13


*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

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| | |
|---|---|
| DESIGN | EJG |
| DRAWN | EJG |
| REVIEW | |
| UTILITY | |
| DATE | Apr. 14, 2008 |
| DRAWING FILE | SURVEY BASE (aerial (2)) |
| PROJECT NUMBER | . |
| RB JOB | 323.SP |
| SHEET | 7 OF 13 |

Final Drainage Plan
Casa Bella 2nd Addition
Wichita, Kansas

**Developed Conditions**

The proposed Casa Bella 2nd addition consists of 70 acres of single family residential lots. The proposed total impervious area = 28 acres. The drainage in the Northwest and Southeast portions of the plat will each be handled by a detention pond controlled by a concrete weir. Other storm sewer systems will be constructed to convey the interior drainage for the entire Casa Bella 2nd Addition. The ultimate discharge of these systems was included in the drainage study of Casa Bella and Tara Creek Additions. The proposed ponds were modeled using HEC-HMS. The results can be seen in Tables 1 and 2. Tables 3 through 6 show the data associated with each of the proposed ponds including discharges for the weir control. 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.

The time of concentration for the Northwest onsite pond basin is 15 minutes. The reach length of the offsite basin is unchanged from the pre-developed conditions. The time of concentration for the offsite basin is 57.8 minutes. The developed runoff curve number is assumed to be 87. The proposed pond will be controlled by a concrete weir with a 144" notch.

Proposed NW Pond Data:
Static Pool = 1337.00
Pond Bottom = 1332.00
100 year Water Surface = 1338.5

| Elevation | Area | Discharge (cfs) |
|---|---|---|
| 1337.0 | 0.48 | 0 |
| 1337.5 | 0.52 | 14 |
| 1338.0 | 0.57 | 41 |
| 1338.5 | 0.61 | 76 |
| 1339.0 | 0.66 | 118 |
| 1339.5 | 0.84 | 164 |

Table 3: NW Pond Stage-Area-Discharge.

| Design Storm | Peak Qin (cfs) | Peak Qout (cfs) | Peak Storage (ac-ft) | Peak Elevation |
|---|---|---|---|---|
| 2 yr | 24.9 | 24.5 | 0.36 | 1337.69 |
| 5 yr | 36.7 | 36.1 | 0.47 | 1337.91 |
| 10 yr | 46.3 | 45.8 | 0.56 | 1338.07 |
| 25 yr | 56.1 | 55.5 | 0.64 | 1338.21 |
| 100 yr | 77.0 | 76.2 | 0.82 | 1338.50 |

Table 4: NW Pond Information

The times of concentration for the developed Southeast pond basins are 15 minutes. 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 a concrete weir with a 24" notch. The 100yr discharge of the Southeast pond of 73.0 cfs is easily handled by the culvert pipes under 127th Street. The capacity of the 127th Street culverts is 110 cfs.

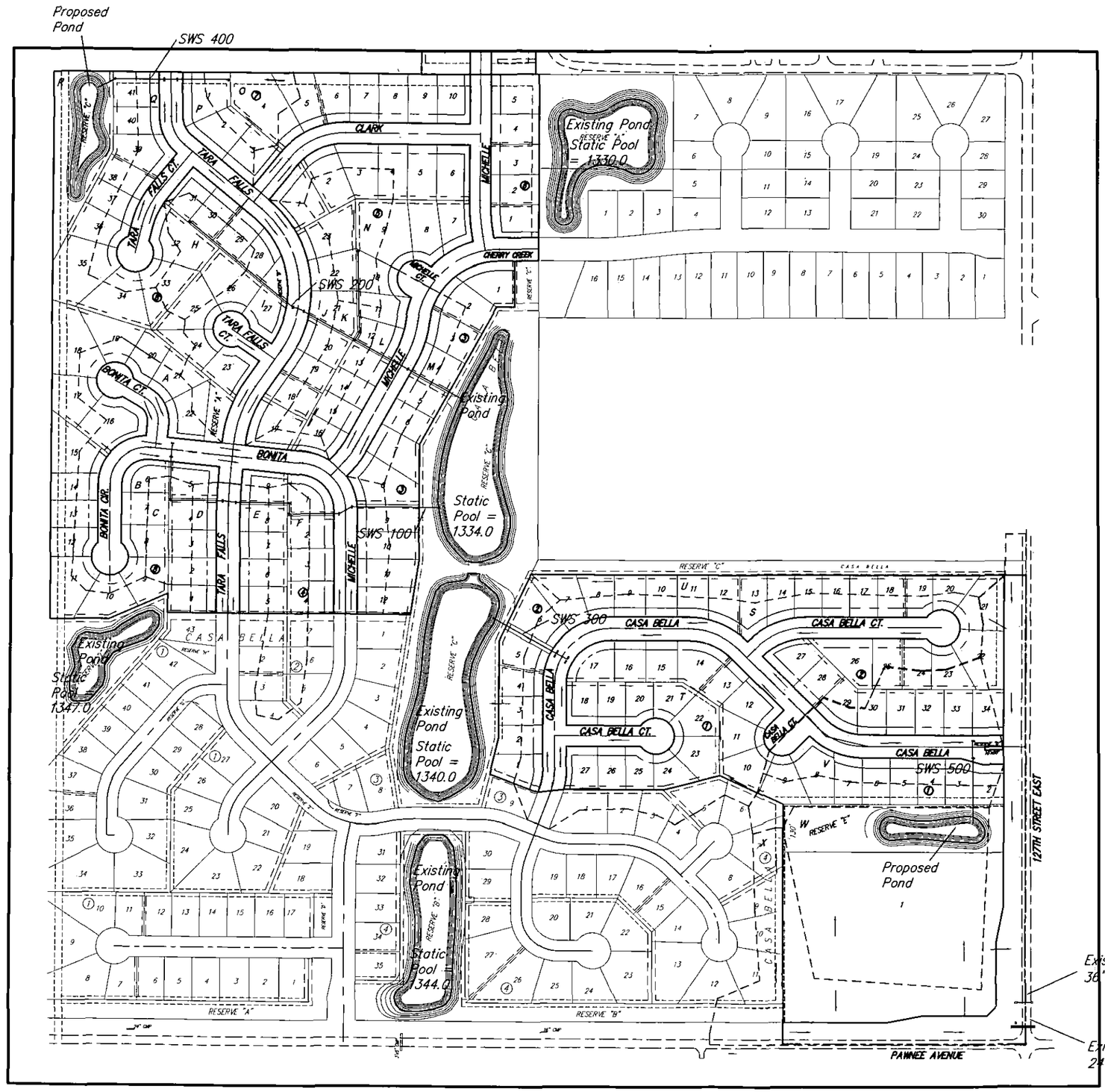
Proposed SE Pond Data:
Static Pool = 1354.0
Pond Bottom = 1348.0
100 yr Water Surface = 1356.8

| Elevation | Area (ac) | Discharge (cfs) |
|---|---|---|
| 1354.0 | 0.38 | 0 |
| 1354.5 | 0.43 | 3.0 |
| 1355.0 | 0.47 | 8.7 |
| 1355.5 | 0.51 | 16.0 |
| 1356.0 | 0.55 | 24.5 |
| 1356.5 | 0.59 | 34.3 |
| 1357.0 | 0.63 | 45.2 |

Table 5: SE Pond Stage-Area-Discharge

| Design Storm | Peak Qin (cfs) | Peak Qout (cfs) | Peak Storage (ac-ft) | Peak Elevation |
|---|---|---|---|---|
| 2 yr | 25.5 | 13.8 | 0.68 | 1355.35 |
| 5 yr | 34.8 | 19.8 | 0.79 | 1355.72 |
| 10 yr | 42.2 | 24.6 | 0.94 | 1356.00 |
| 25 yr | 49.6 | 29.5 | 1.08 | 1356.26 |
| 100 yr | 65.2 | 39.9 | 1.38 | 1356.76 |

Table 6: SE Pond Information




| Basin | Area (Ac) | Tc (min) | I2 (in/hr) | I100 (in/hr) | C2 | C100 | Q2 (cfs) | Q100 (cfs) |
|---|---|---|---|---|---|---|---|---|
| A | 4.2 | 15 | 3.83 | 7.37 | 0.5 | 0.76 | 8.0 | 23.5 |
| B | 2.5 | 15 | 3.83 | 7.37 | 0.5 | 0.76 | 4.8 | 14.0 |
| C | 0.8 | 15 | 3.83 | 7.37 | 0.5 | 0.76 | 1.5 | 4.5 |
| D | 0.8 | 15 | 3.83 | 7.37 | 0.5 | 0.76 | 1.5 | 4.5 |
| E | 0.9 | 15 | 3.83 | 7.37 | 0.5 | 0.76 | 1.7 | 5.0 |
| F | 1.7 | 15 | 3.83 | 7.37 | 0.5 | 0.76 | 3.3 | 9.5 |
| H | 1.3 | 15 | 3.83 | 7.37 | 0.5 | 0.76 | 2.5 | 7.3 |
| I | 2.6 | 15 | 3.83 | 7.37 | 0.5 | 0.76 | 5.0 | 14.6 |
| J | 1.7 | 15 | 3.83 | 7.37 | 0.5 | 0.76 | 3.3 | 9.5 |
| K | 1 | 15 | 3.83 | 7.37 | 0.5 | 0.76 | 1.9 | 5.6 |
| L | 1.3 | 15 | 3.83 | 7.37 | 0.5 | 0.76 | 2.5 | 7.3 |
| M | 1.3 | 15 | 3.83 | 7.37 | 0.5 | 0.76 | 2.5 | 7.3 |
| N | 1.4 | 15 | 3.83 | 7.37 | 0.5 | 0.76 | 2.7 | 7.8 |
| O | 0.9 | 15 | 3.83 | 7.37 | 0.5 | 0.76 | 1.7 | 5.0 |
| P | 0.9 | 15 | 3.83 | 7.37 | 0.5 | 0.76 | 1.7 | 5.0 |
| Q | 2.4 | 15 | 3.83 | 7.37 | 0.5 | 0.76 | 4.6 | 13.4 |
| R | 4.9 | 15 | 3.83 | 7.37 | 0.5 | 0.76 | 9.4 | 27.4 |
| S | 5.8 | 15 | 3.83 | 7.37 | 0.5 | 0.76 | 11.1 | 32.5 |
| T | 6.6 | 15 | 3.83 | 7.37 | 0.5 | 0.76 | 12.6 | 37.0 |
| U | 1.7 | 15 | 3.83 | 7.37 | 0.5 | 0.76 | 3.3 | 9.5 |
| V | 4.8 | 15 | 3.83 | 7.37 | 0.5 | 0.76 | 9.2 | 26.9 |
| W | 5.7 | 15 | 3.83 | 7.37 | 0.5 | 0.94 | 10.9 | 39.5 |
| X | 7.1 | 15 | 3.83 | 7.37 | 0.5 | 0.83 | 13.6 | 43.4 |

Scale: 1" = 200'

Casa Bella 2nd Addition
Drainage Basins
WICHITA, KANSAS

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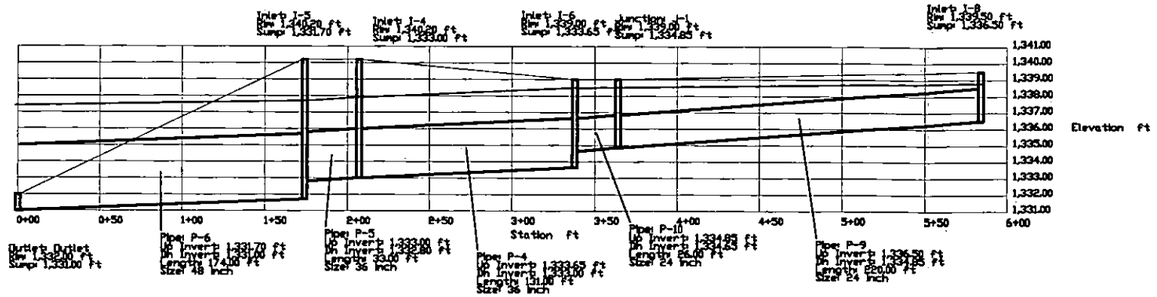
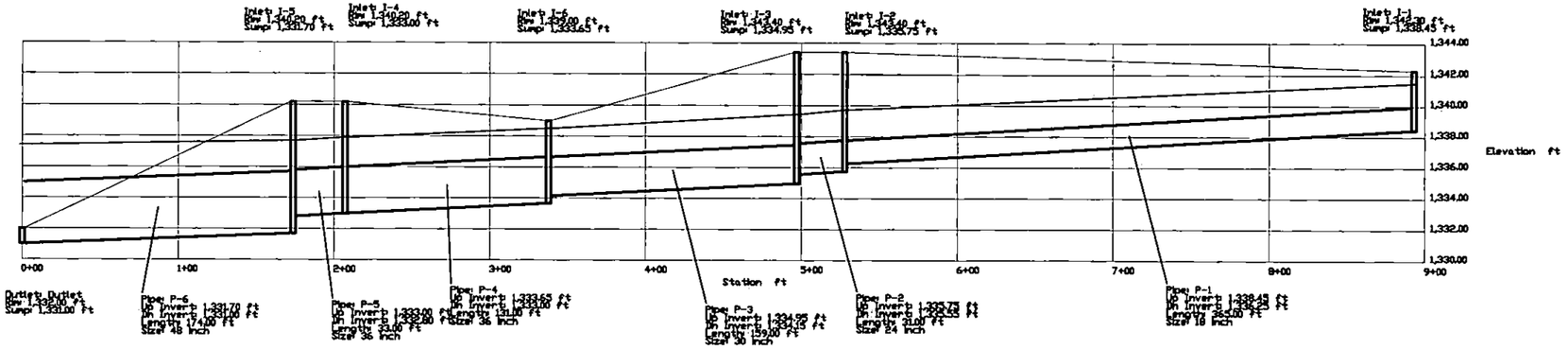
DESIGN: EJG
DRAWN: EJG
REVIEW:
UTILITY:
DATE: Apr. 14, 2008
RB JOB: 3253-P
SHEET: 10 OF 13
DRAWING FILE: SURVEY BASE (Basins)
PROJECT NUMBER:




System 200

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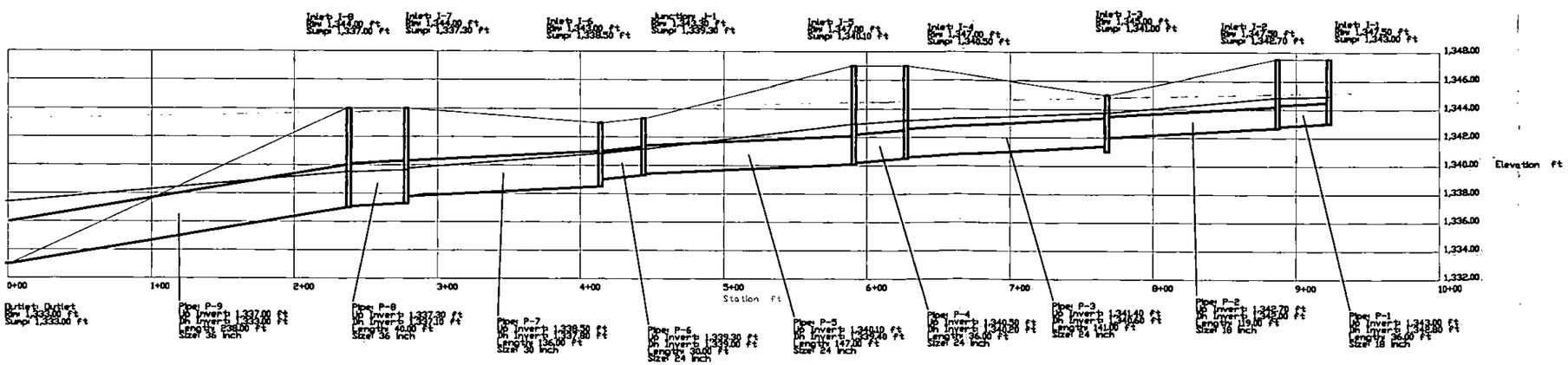


System 100

Casa Bella 2nd Addition
StormCAD
WICHITA, KANSAS

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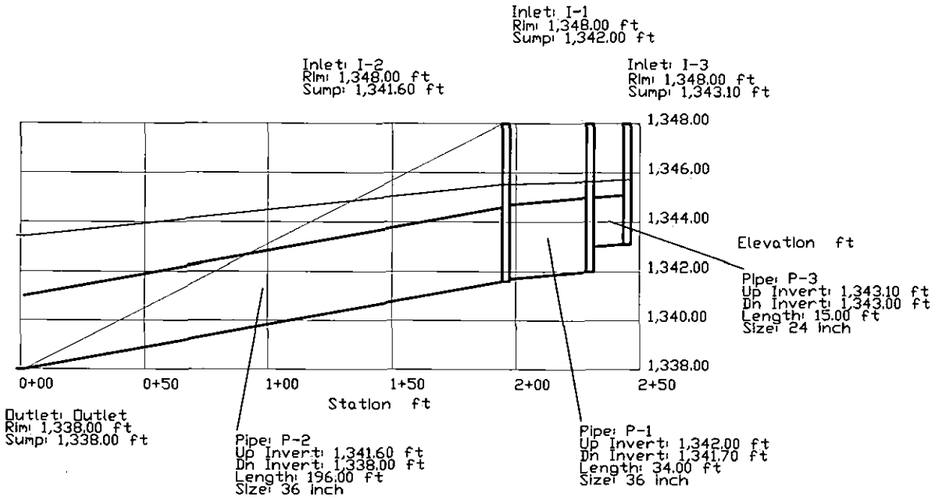
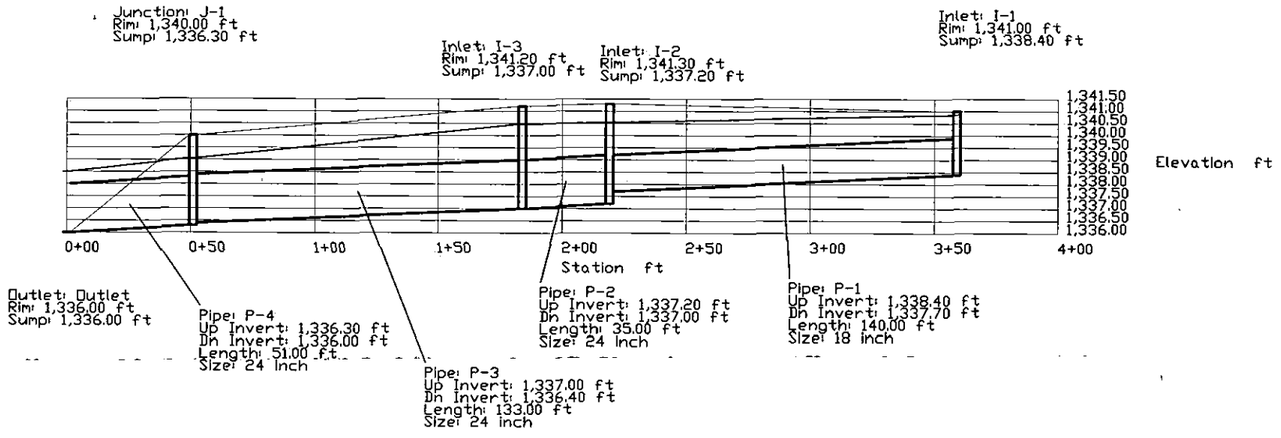
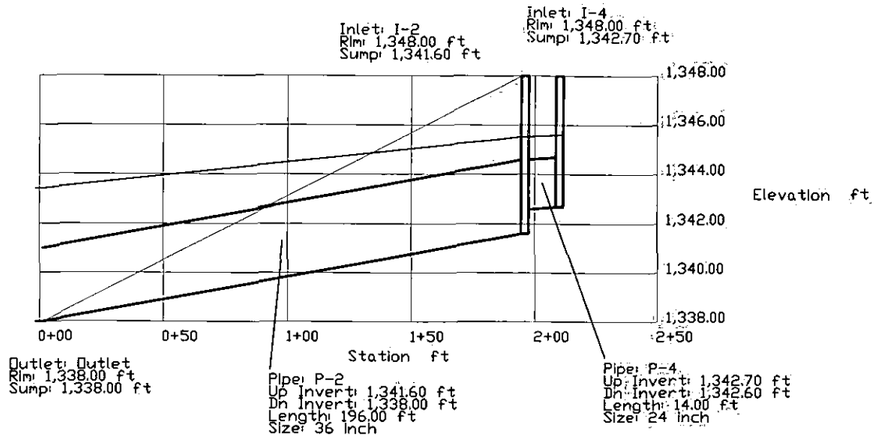
| | |
|---|---|
| DESIGN | EJG |
| DRAWN | EJG |
| REVIEW | |
| UTILITY | |
| DRAWING FILE | SURVEY BASE [StormCAD] |
| PROJECT NUMBER | |
| DATE | Apr. 14, 2008 |
| FB / PG | 325/P |
| SHEET | 12 OF 13 |




SYSTEM 300

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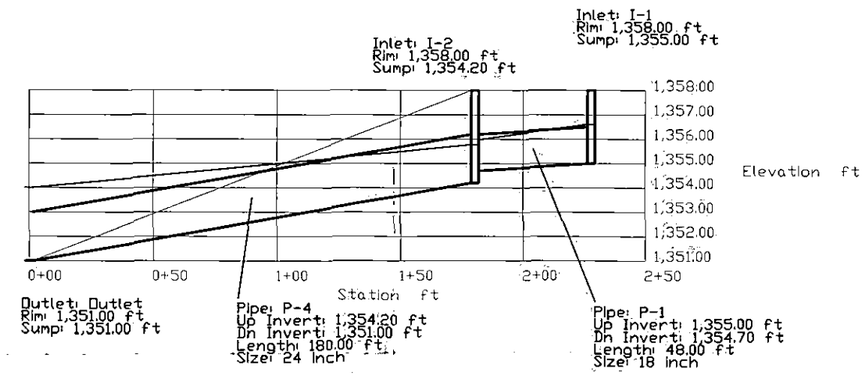


SYSTEM 500

Casa Bella 2nd Addition
StormCAD
WICHITA, KANSAS

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DESIGN: EJG
DRAWN: EJG
REVIEW:
UTILITY:
DRAWING FILE: SURVEY BASE (StormCAD)
PROJECT NUMBER:
DATE: Apr. 14, 2008
RB JOB: 3253P
SHEET: 13 OF 13

HEC-HMS

# Project : Casa Bella 2nd

Basin Model : Existing

May 07 15:10:27 CDT 2008

Project : Casa Bella 2nd Simulation Run : Exist 2 Subbasin: PreDeveloped

| | | | |
|---|---|---|---|
| Start of Run : | 01Jan2008, 12:00 | Basin Model : | Existing |
| End of Run : | 02Jan2008, 12:02 | Meteorologic Model : | 2 year |
| Compute Time : | 07May2008, 15:04:24 | Control Specifications : | Control 1 |

Volume Units : IN

Computed Results

| | | | |
|---|---|---|---|
| Peak Discharge : | 31.34 (CFS) | Date/Time of Peak Discharge : | 02Jan2008, 00:54 |
| Total Precipitation : | 3.50 (IN) | Total Direct Runoff : | 1.82 (IN) |
| Total Loss : | 1.64 (IN) | Total Baseflow : | 0.00 (IN) |
| Total Excess : | 1.86 (IN) | Discharge : | 1.82 (IN) |

Project : Casa Bella 2nd Simulation Run : Exist 5 Subbasin: PreDeveloped

| | | | |
|---|---|---|---|
| Start of Run : | 01Jan2008, 12:00 | Basin Model : | Existing |
| End of Run : | 02Jan2008, 12:02 | Meteorologic Model : | 5 year |
| Compute Time : | 07May2008, 15:04:59 | Control Specifications : | Control 1 |

Volume Units : IN

Computed Results

| | | | |
|---|---|---|---|
| Peak Discharge : | 46.33 (CFS) | Date/Time of Peak Discharge : | 02Jan2008, 00:52 |
| Total Precipitation : | 4.50 (IN) | Total Direct Runoff : | 2.67 (IN) |
| Total Loss : | 1.77 (IN) | Total Baseflow : | 0.00 (IN) |
| Total Excess : | 2.73 (IN) | Discharge : | 2.67 (IN) |

Project : Casa Bella 2nd Simulation Run : Exist 10 Subbasin: PreDeveloped

| | | | |
|---|---|---|---|
| Start of Run : | 01Jan2008, 12:00 | Basin Model : | Existing |
| End of Run : | 02Jan2008, 12:02 | Meteorologic Model : | 10 year |
| Compute Time : | 07May2008, 15:05:28 | Control Specifications : | Control 1 |

Volume Units : IN

Computed Results

| | | | |
|---|---|---|---|
| Peak Discharge : | 58.65 (CFS) | Date/Time of Peak Discharge : | 02Jan2008, 00:52 |
| Total Precipitation : | 5.30 (IN) | Total Direct Runoff : | 3.38 (IN) |
| Total Loss : | 1.85 (IN) | Total Baseflow : | 0.00 (IN) |
| Total Excess : | 3.45 (IN) | Discharge : | 3.38 (IN) |

Project : Casa Bella 2nd Simulation Run : Exist 25 Subbasin: PreDeveloped

| | | | |
|---|---|---|---|
| Start of Run : | 01Jan2008, 12:00 | Basin Model : | Existing |
| End of Run : | 02Jan2008, 12:02 | Meteorologic Model : | 25 year |
| Compute Time : | 07May2008, 15:06:07 | Control Specifications : | Control 1 |

Volume Units : IN

Computed Results

| | | | |
|---|---|---|---|
| Peak Discharge : | 71.11 (CFS) | Date/Time of Peak Discharge : | 02Jan2008, 00:52 |
| Total Precipitation : | 6.10 (IN) | Total Direct Runoff : | 4.11 (IN) |
| Total Loss : | 1.92 (IN) | Total Baseflow : | 0.00 (IN) |
| Total Excess : | 4.18 (IN) | Discharge : | 4.11 (IN) |

Project : Casa Bella 2nd Simulation Run : Exist 100 Subbasin: PreDeveloped

| | | | |
|---|---|---|---|
| Start of Run : | 01Jan2008, 12:00 | Basin Model : | Existing |
| End of Run : | 02Jan2008, 12:02 | Meteorologic Model : | 100 year |
| Compute Time : | 07May2008, 15:06:50 | Control Specifications : | Control 1 |

Volume Units : IN

Computed Results

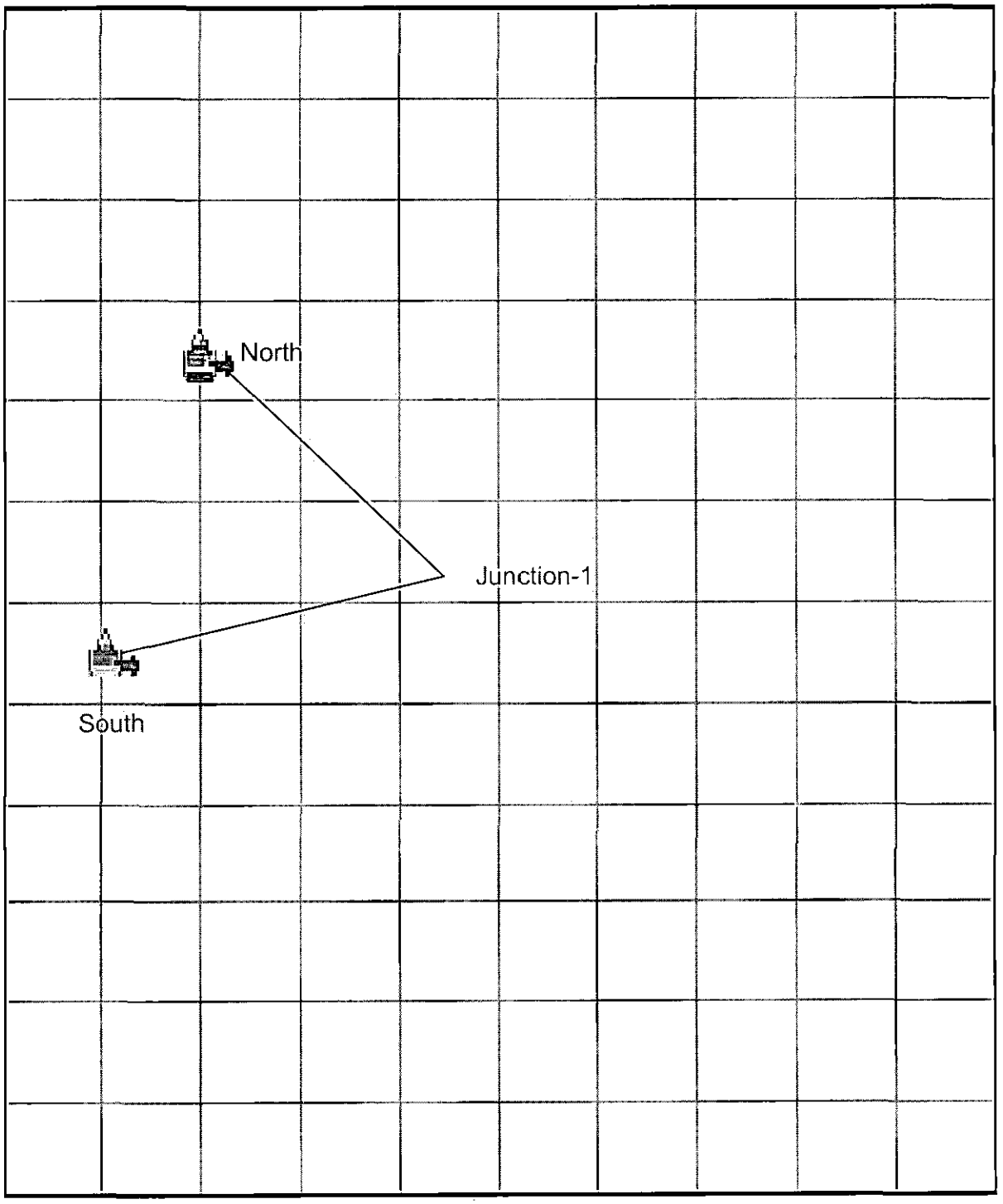
| | | | |
|---|---|---|---|
| Peak Discharge : | 97.79 (CFS) | Date/Time of Peak Discharge : | 02Jan2008, 00:50 |
| Total Precipitation : | 7.80 (IN) | Total Direct Runoff : | 5.68 (IN) |
| Total Loss : | 2.01 (IN) | Total Baseflow : | 0.00 (IN) |
| Total Excess : | 5.79 (IN) | Discharge : | 5.68 (IN) |

HEC-HMS

# Project : Casa Bella 2nd

Basin Model : Pre Dev 127thandPawnee

May 07 15:10:07 CDT 2008



Project : Casa Bella 2nd Simulation Run : PreDev 127th 2yr Junction: Junction-1

| | | | |
|---|---|---|---|
| Start of Run : | 01Jan2008, 12:00 | Basin Model : | Pre Dev 127thandPawnee |
| End of Run : | 02Jan2008, 12:02 | Meteorologic Model : | 2 year |
| Compute Time : | 07May2008, 15:07:31 | Control Specifications : | Control 1 |

Volume Units : IN

Computed Results

Peak Outflow : 25.08 (CFS) Date/Time of Peak Outflow : 02Jan2008, 00:16

Total Outflow : 1.84 (IN)

Project : Casa Bella 2nd Simulation Run : PreDev 127th 5yr Junction: Junction-1

| | | | |
|---|---|---|---|
| Start of Run : | 01Jan2008, 12:00 | Basin Model : | Pre Dev 127thandPawnee |
| End of Run : | 02Jan2008, 12:02 | Meteorologic Model : | 5 year |
| Compute Time : | 07May2008, 15:08:11 | Control Specifications : | Control 1 |

Volume Units : IN

Computed Results

Peak Outflow : 36.95 (CFS) Date/Time of Peak Outflow : 02Jan2008, 00:16

Total Outflow : 2.70 (IN)

Project : Casa Bella 2nd Simulation Run : PreDev 127th 10yr Junction: Junction-1

| | | | |
|---|---|---|---|
| Start of Run : | 01Jan2008, 12:00 | Basin Model : | Pre Dev 127thandPawnee |
| End of Run : | 02Jan2008, 12:02 | Meteorologic Model : | 10 year |
| Compute Time : | 07May2008, 15:08:38 | Control Specifications : | Control 1 |

Volume Units : IN

Computed Results

Peak Outflow : 46.67 (CFS) Date/Time of Peak Outflow : 02Jan2008, 00:16

Total Outflow : 3.42 (IN)

Project : Casa Bella 2nd Simulation Run : PreDev 127th 25yr Junction: Junction-1

| | | | |
|---|---|---|---|
| Start of Run : | 01Jan2008, 12:00 | Basin Model : | Pre Dev 127thandPawnee |
| End of Run : | 02Jan2008, 12:02 | Meteorologic Model : | 25 year |
| Compute Time : | 07May2008, 15:09:08 | Control Specifications : | Control 1 |

Volume Units : IN

Computed Results

Peak Outflow : 56.48 (CFS) Date/Time of Peak Outflow : 02Jan2008, 00:16

Total Outflow : 4.15 (IN)

Project : Casa Bella 2nd Simulation Run : PreDev 127th 100yr Junction: Junction-1

| | | | |
|---|---|---|---|
| Start of Run : | 01Jan2008, 12:00 | Basin Model : | Pre Dev 127thandPawnee |
| End of Run : | 02Jan2008, 12:02 | Meteorologic Model : | 100 year |
| Compute Time : | 07May2008, 15:09:34 | Control Specifications : | Control 1 |

Volume Units : IN

Computed Results

Peak Outflow : 77.44 (CFS) Date/Time of Peak Outflow : 02Jan2008, 00:16

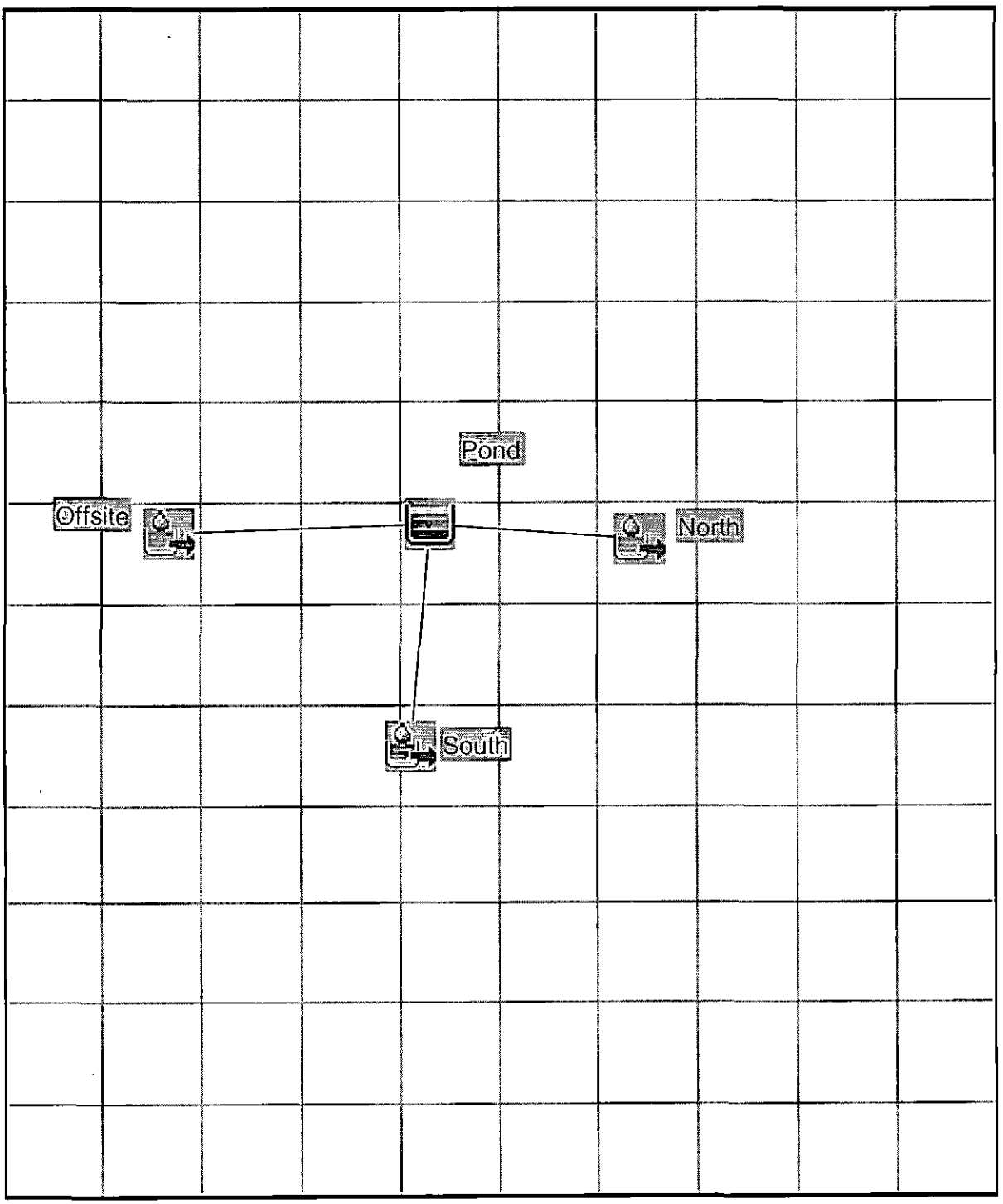
Total Outflow : 5.75 (IN)

HEC-HMS

# Project : Casa Bella 2nd

Basin Model : Developed

May 07 15:04:01 CDT 2008



Project : Casa Bella 2nd Simulation Run : Dev 2 Reservoir: Pond

| | | | |
|---|---|---|---|
| Start of Run : | 01Jan2008, 12:00 | Basin Model : | Developed |
| End of Run : | 02Jan2008, 12:02 | Meteorologic Model : | 2 year |
| Compute Time : | 07May2008, 14:48:53 | Control Specifications : | Control 1 |

Volume Units : IN

Computed Results

| | | | |
|---|---|---|---|
| Peak Inflow : | 24.88 (CFS) | Date/Time of Peak Inflow : | 02Jan2008, 00:40 |
| Peak Outflow : | 24.50 (CFS) | Date/Time of Peak Outflow : | 02Jan2008, 00:48 |
| Total Inflow : | 1.87 (IN) | Peak Storage : | 0.36 (AC-FT) |
| Total Outflow : | 1.87 (IN) | Peak Elevation : | 1337.69 (FT) |

Project : Casa Bella 2nd Simulation Run : Dev 5 Reservoir: Pond

| | | | |
|---|---|---|---|
| Start of Run : | 01Jan2008, 12:00 | Basin Model : | Developed |
| End of Run : | 02Jan2008, 12:02 | Meteorologic Model : | 5 year |
| Compute Time : | 07May2008, 11:04:01 | Control Specifications : | Control 1 |

Volume Units : IN

Computed Results

| | | | |
|---|---|---|---|
| Peak Inflow : | 36.66 (CFS) | Date/Time of Peak Inflow : | 02Jan2008, 00:40 |
| Peak Outflow : | 36.11 (CFS) | Date/Time of Peak Outflow : | 02Jan2008, 00:48 |
| Total Inflow : | 2.73 (IN) | Peak Storage : | 0.47 (AC-FT) |
| Total Outflow : | 2.72 (IN) | Peak Elevation : | 1337.91 (FT) |

Project : Casa Bella 2nd Simulation Run : Dev 10 Reservoir: Pond

| | | | |
|---|---|---|---|
| Start of Run : | 01Jan2008, 12:00 | Basin Model : | Developed |
| End of Run : | 02Jan2008, 12:02 | Meteorologic Model : | 10 year |
| Compute Time : | 07May2008, 14:55:50 | Control Specifications : | Control 1 |

Volume Units : IN

Computed Results

| | | | |
|---|---|---|---|
| Peak Inflow : | 46.32 (CFS) | Date/Time of Peak Inflow : | 02Jan2008, 00:40 |
| Peak Outflow : | 45.80 (CFS) | Date/Time of Peak Outflow : | 02Jan2008, 00:46 |
| Total Inflow : | 3.45 (IN) | Peak Storage : | 0.56 (AC-FT) |
| Total Outflow : | 3.44 (IN) | Peak Elevation : | 1338.07 (FT) |

Project : Casa Bella 2nd Simulation Run : Dev 25 Reservoir: Pond

| | | | |
|---|---|---|---|
| Start of Run : | 01Jan2008, 12:00 | Basin Model : | Developed |
| End of Run : | 02Jan2008, 12:02 | Meteorologic Model : | 25 year |
| Compute Time : | 07May2008, 14:56:16 | Control Specifications : | Control 1 |

Volume Units : IN

Computed Results

| | | | |
|---|---|---|---|
| Peak Inflow : | 56.10 (CFS) | Date/Time of Peak Inflow : | 02Jan2008, 00:40 |
| Peak Outflow : | 55.49 (CFS) | Date/Time of Peak Outflow : | 02Jan2008, 00:46 |
| Total Inflow : | 4.18 (IN) | Peak Storage : | 0.64 (AC-FT) |
| Total Outflow : | 4.17 (IN) | Peak Elevation : | 1338.21 (FT) |

Project : Casa Bella 2nd Simulation Run : Dev 100 Reservoir: Pond

| | | | |
|---|---|---|---|
| Start of Run : | 01Jan2008, 12:00 | Basin Model : | Developed |
| End of Run : | 02Jan2008, 12:02 | Meteorologic Model : | 100 year |
| Compute Time : | 07May2008, 14:56:52 | Control Specifications : | Control 1 |

Volume Units : IN

Computed Results

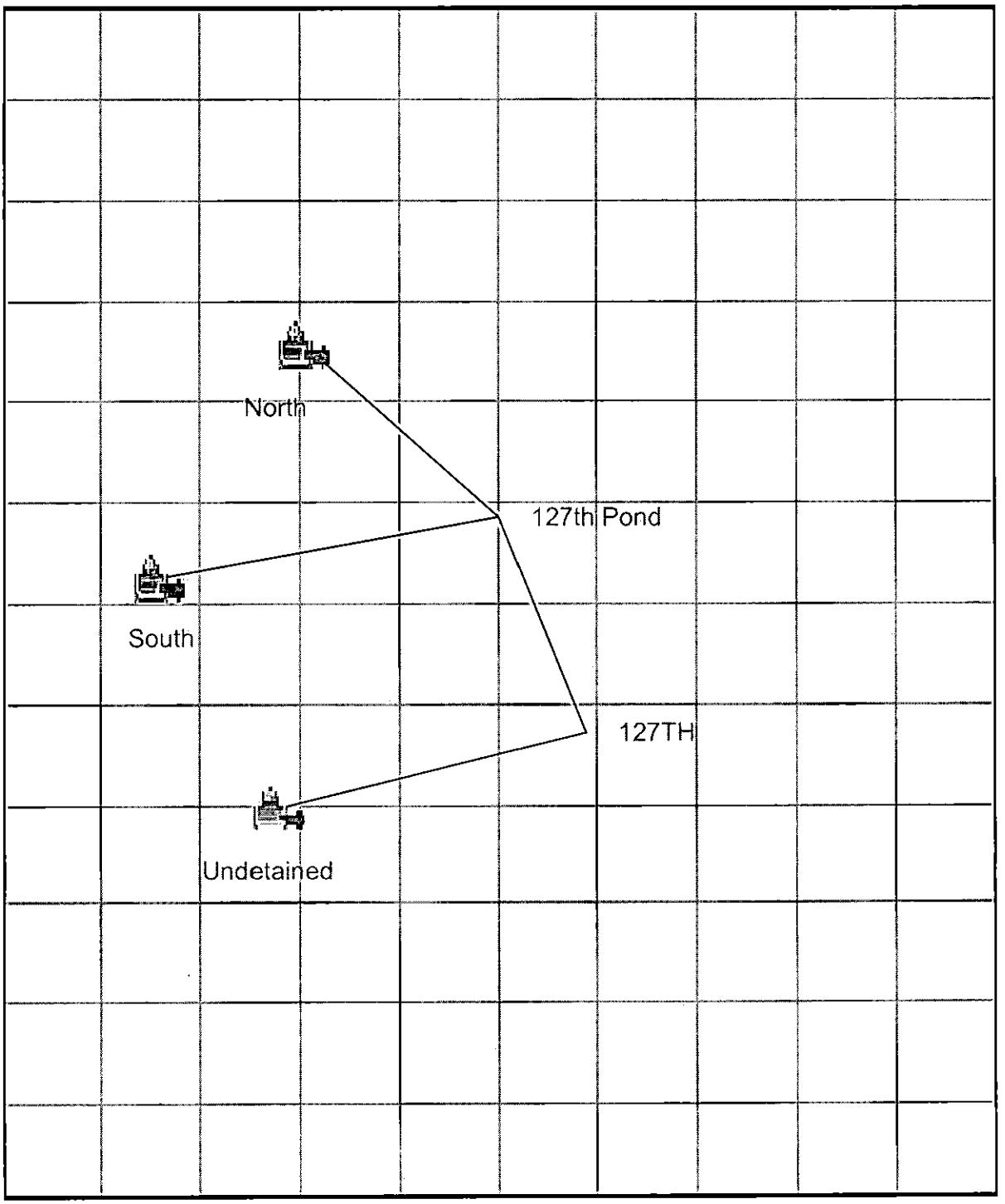
| | | | |
|---|---|---|---|
| Peak Inflow : | 77.03 (CFS) | Date/Time of Peak Inflow : | 02Jan2008, 00:38 |
| Peak Outflow : | 76.21 (CFS) | Date/Time of Peak Outflow : | 02Jan2008, 00:46 |
| Total Inflow : | 5.77 (IN) | Peak Storage : | 0.82 (AC-FT) |
| Total Outflow : | 5.75 (IN) | Peak Elevation : | 1338.50 (FT) |

HEC-HMS

# Project : Casa Bella 2nd

Basin Model : Developed 127th

May 07 15:03:10 CDT 2008



Project : Casa Bella 2nd Simulation Run : Developed 127th 2yr Junction: 127TH

| | | | |
|---|---|---|---|
| Start of Run : | 01Jan2008, 12:00 | Basin Model : | Developed 127th |
| End of Run : | 02Jan2008, 12:02 | Meteorologic Model : | 2 year |
| Compute Time : | 07May2008, 14:59:26 | Control Specifications : | Control 1 |

Volume Units : IN

Computed Results

Peak Outflow : 24.44 (CFS) Date/Time of Peak Outflow : 02Jan2008, 00:14

Total Outflow : 2.24 (IN)

Project : Casa Bella 2nd Simulation Run : Developed 127th 5yr Junction: 127TH

| | | | |
|---|---|---|---|
| Start of Run : | 01Jan2008, 12:00 | Basin Model : | Developed 127th |
| End of Run : | 02Jan2008, 12:02 | Meteorologic Model : | 5 year |
| Compute Time : | 07May2008, 14:57:55 | Control Specifications : | Control 1 |

Volume Units : IN

Computed Results

Peak Outflow : 35.50 (CFS) Date/Time of Peak Outflow : 02Jan2008, 00:14

Total Outflow : 3.15 (IN)

Project : Casa Bella 2nd Simulation Run : Developed 127th 10yr Junction: 127TH

| | | | |
|---|---|---|---|
| Start of Run : | 01Jan2008, 12:00 | Basin Model : | Developed 127th |
| End of Run : | 02Jan2008, 12:02 | Meteorologic Model : | 10 year |
| Compute Time : | 07May2008, 14:59:52 | Control Specifications : | Control 1 |

Volume Units : IN

Computed Results

Peak Outflow : 44.47 (CFS) Date/Time of Peak Outflow : 02Jan2008, 00:14

Total Outflow : 3.90 (IN)

Project : Casa Bella 2nd Simulation Run : Developed 127th 25yr Junction: 127TH

| | | | |
|---|---|---|---|
| Start of Run : | 01Jan2008, 12:00 | Basin Model : | Developed 127th |
| End of Run : | 02Jan2008, 12:02 | Meteorologic Model : | 25 year |
| Compute Time : | 07May2008, 15:00:49 | Control Specifications : | Control 1 |

Volume Units : IN

Computed Results

Peak Outflow : 53.59 (CFS) Date/Time of Peak Outflow : 02Jan2008, 00:14

Total Outflow : 4.65 (IN)

Project : Casa Bella 2nd Simulation Run : Developed 127th 100yr Junction: 127TH

| | | | |
|---|---|---|---|
| Start of Run : | 01Jan2008, 12:00 | Basin Model : | Developed 127th |
| End of Run : | 02Jan2008, 12:02 | Meteorologic Model : | 100 year |
| Compute Time : | 07May2008, 15:01:45 | Control Specifications : | Control 1 |

Volume Units : IN

Computed Results

Peak Outflow : 72.95 (CFS) Date/Time of Peak Outflow : 02Jan2008, 00:14

Total Outflow : 6.28 (IN)

Project : Casa Bella 2nd Simulation Run : Developed 127th 2yr Reservoir: 127th Pond

| | | | |
|---|---|---|---|
| Start of Run : | 01Jan2008, 12:00 | Basin Model : | Developed 127th |
| End of Run : | 02Jan2008, 12:02 | Meteorologic Model : | 2 year |
| Compute Time : | 07May2008, 14:57:24 | Control Specifications : | Control 1 |

Volume Units : IN

Computed Results

| | | | |
|---|---|---|---|
| Peak Inflow : | 25.51 (CFS) | Date/Time of Peak Inflow : | 02Jan2008, 00:08 |
| Peak Outflow : | 13.79 (CFS) | Date/Time of Peak Outflow : | 02Jan2008, 00:22 |
| Total Inflow : | 2.49 (IN) | Peak Storage : | 0.60 (AC-FT) |
| Total Outflow : | 2.46 (IN) | Peak Elevation : | 1355.35 (FT) |

Project : Casa Bella 2nd Simulation Run : Developed 127th 5yr Reservoir: 127th Pond

| | | | |
|---|---|---|---|
| Start of Run : | 01Jan2008, 12:00 | Basin Model : | Developed 127th |
| End of Run : | 02Jan2008, 12:02 | Meteorologic Model : | 5 year |
| Compute Time : | 07May2008, 14:57:55 | Control Specifications : | Control 1 |

Volume Units : IN

Computed Results

| | | | |
|---|---|---|---|
| Peak Inflow : | 34.77 (CFS) | Date/Time of Peak Inflow : | 02Jan2008, 00:08 |
| Peak Outflow : | 19.77 (CFS) | Date/Time of Peak Outflow : | 02Jan2008, 00:20 |
| Total Inflow : | 3.43 (IN) | Peak Storage : | 0.79 (AC-FT) |
| Total Outflow : | 3.39 (IN) | Peak Elevation : | 1355.72 (FT) |

Project : Casa Bella 2nd Simulation Run : Developed 127th 10yr Reservoir: 127th Pond

| | | | |
|---|---|---|---|
| Start of Run : | 01Jan2008, 12:00 | Basin Model : | Developed 127th |
| End of Run : | 02Jan2008, 12:02 | Meteorologic Model : | 10 year |
| Compute Time : | 07May2008, 14:59:52 | Control Specifications : | Control 1 |

Volume Units : IN

Computed Results

| | | | |
|---|---|---|---|
| Peak Inflow : | 42.18 (CFS) | Date/Time of Peak Inflow : | 02Jan2008, 00:08 |
| Peak Outflow : | 24.55 (CFS) | Date/Time of Peak Outflow : | 02Jan2008, 00:20 |
| Total Inflow : | 4.20 (IN) | Peak Storage : | 0.94 (AC-FT) |
| Total Outflow : | 4.15 (IN) | Peak Elevation : | 1356.00 (FT) |

Project : Casa Bella 2nd Simulation Run : Developed 127th 25yr Reservoir: 127th Pond

| | | | |
|---|---|---|---|
| Start of Run : | 01Jan2008, 12:00 | Basin Model : | Developed 127th |
| End of Run : | 02Jan2008, 12:02 | Meteorologic Model : | 25 year |
| Compute Time : | 07May2008, 15:00:49 | Control Specifications : | Control 1 |

Volume Units : IN

Computed Results

| | | | |
|---|---|---|---|
| Peak Inflow : | 49.58 (CFS) | Date/Time of Peak Inflow : | 02Jan2008, 00:08 |
| Peak Outflow : | 29.50 (CFS) | Date/Time of Peak Outflow : | 02Jan2008, 00:20 |
| Total Inflow : | 4.97 (IN) | Peak Storage : | 1.08 (AC-FT) |
| Total Outflow : | 4.91 (IN) | Peak Elevation : | 1356.26 (FT) |

Project : Casa Bella 2nd Simulation Run : Developed 127th 100yr Reservoir: 127th Pond

| | | | |
|---|---|---|---|
| Start of Run : | 01Jan2008, 12:00 | Basin Model : | Developed 127th |
| End of Run : | 02Jan2008, 12:02 | Meteorologic Model : | 100 year |
| Compute Time : | 07May2008, 15:01:45 | Control Specifications : | Control 1 |

Volume Units : IN

Computed Results

| | | | |
|---|---|---|---|
| Peak Inflow : | 65.23 (CFS) | Date/Time of Peak Inflow : | 02Jan2008, 00:08 |
| Peak Outflow : | 39.89 (CFS) | Date/Time of Peak Outflow : | 02Jan2008, 00:18 |
| Total Inflow : | 6.63 (IN) | Peak Storage : | 1.38 (AC-FT) |
| Total Outflow : | 6.55 (IN) | Peak Elevation : | 1356.76 (FT) |