# Les Schwab Tire Center
# Storm Report


**7105 Old Meridian RD.**
**Falcon Colorado**

Prepared For:

**SFP-E, LLC**
PO Box 5350
20900 Cooley Road
Bend, OR 97701

Prepared By:

Cushing Terrell

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Cushing Terrell Project No. LSCO_21WIN
PCD FILLING NO. : PPR-21-023
JULY, 21, 2021

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### 1.0 CONTENTS



### LIST OF TABLES



### APPENDICES

Please place a page before this with design engineer signature block, owner signature block, and County signature block. Please see attached document for reference. Please submit them signed and stamped for final approval.

## 2.0 GENERAL LOCATION AND DESCRIPTION

### 2.1 Location

The project site is located at 7105 N Meridian Rd, Falcon, Colorado and falls withi
The parcel is part of the larger Meridian Crossing Development, which inclu
stormwater system infrastructure, including the treatment pond to the south. Th
on the northeast side of the intersection of Meridian Rd and N Meridian Rd. Th
to north of the existing storm water treatment facilities maintained by the M
Development and an existing storm line runs along the south west property line
property lies within the NE ¼ of Section 12, Township 13 S, Range 65 West of th
Meridian.

### 2.2 Description of Property

The existing site consists of an undeveloped 2.48 acre lot covered with native grasses and shrubs. In areas taken from the ALTA Survey the site consists of roughly 12% impervious road and sidewalk area with the remaining 88% being the native vegetation. There are no stream crossings or significant waterways located within the area being developed by this project. The site is accessed via the existing private roads that are centered on the north east and south east property lines of the site. These roads will provide means of vehicular ingress and egress. The site falls entirely with the Falcon Major Drainage Basin as identified by the Falcon Drainage Basin Planning Study dated September 2015.

The topography of the existing site consists of a roughly consistent grade which directs flow from the north of the site towards the south at slopes ranging from 2-5%. There is an existing storm PLD pond located to the south of the neighboring lot that ultimately then out falls to the existing detention pond WU. The site is not located in a floodway or flood plain and is designated as area of minimal flood hazard (Zone X) per FEMA FIRM panel 08041C0561G.

### 2.3 Existing PLD Condition Assessment

Runoff from this site will be collected via proposed curb and gutter and be routed overland to the existing Porous Landscape Detention pond. In field observations on 1/5/2021 and 06/18/2021 this pond has been determined to need maintenance as prescribed in the operation and maintenance manual that is included as appendix H of the Meridian Crossing Final Drainage Report (MCFDR). This full report is located as appendix E of this report. Specifically, we recommend the pond should be cleared of Debris and Litter and that landscaping should be removed and replaced for portions of the pond where the existing landscaping is failing. Photos showing the condition for this PLD are included in Appendix F of this report.

# 3.0 DRAINAGE BASINS

## 3.1 Reference Reports and Manuals

- Meridian Crossing Final Drainage Report (MCFDR)
- Colorado Springs Drainage Criteria (CSDC)
- El Paso County Drainage Criteria Manual (EPCSCM)
- Mile High Flood Control District Criteria Manual (MHFC)

## 3.2 Existing Drainage Basins

See appendix B for drainage maps showing basin locations, and appendix A for full drainage calculation sheets.

### *3.2.1 BASIN X*

Basin X is the sole existing basin that consists of the entire 2.48 acres site. The flow path of this basin is from north to south into the existing private drive at design points 1 and 2. Once leaving the property across the existing private drive runoff enters the adjacent lot. The groundcover of this basin is primarily native grasses but also contains a portion of the private drive. After flowing across the southern property, the runoff enters the PLD (porous landscape detention) before being captured by the existing outlet structure and being routed to detention pond WU. The rational calculation for the basin is shown below in table 3.1

Table 3.1

| RATIONAL CALC EXISTING | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basin | % Impervious | C5 | C100 | Area | TC | I 5 year | I 100 yesr | Q 5 | Q 100 |
| X | 12 | 0.28 | 0.42 | 2.48 | 25 | 2.6 | 4.5 | 1.81 | 4.69 |
| TOTAL | 12 | 0.28 | 0.42 | 2.48 | | | | 1.81 | 4.69 |

## 3.3 Proposed Drainage Basins

See appendix B for drainage maps showing basin locations, and appendix A for full drainage calculation sheets. In general, all basins flow to the south and outlet on the existing private road. These basins then flow through the neighboring property to the south and outfall at the existing PLD pond following the historic route. The exception to this being basin A which follows the historic drainage pattern for this area of the site and flows to Old Meridian Road where it is captured by existing storm infrastructure.

### *3.3.1 BASIN A*

Basin A consists of the proposed sidewalk connection and the landscaping along old meridian road. The runoff for this basin is captured by the curb and gutter and directed to the existing curb inlets in Old Meridian Road following the historic route.

### *3.3.2 BASIN B*

Basin B consists of a portion of the building roof flows which are released at grade via downspouts along the rear of the structure and the south west portion of the side parking and drive aisles. These flows are then conveyed to the private road on the south of the site at design point 1. The flows then follow the historic path across the private drive into the neighboring site and ultimately the PLD pond.

### *3.3.3 BASIN C*

Basin C consists of the parking, and drive aisles located along a portion of the front and east sides of the building. The flows are collected by curb and gutter and directed via a curb cut and concrete channel to the sidewalk chase at design point 3. The flows then follow the historic path across the private drive into the neighboring site and ultimately the PLD pond.

### *3.3.4 BASIN D*

Basin D consists of the remainder of the roof flows which are released at grade via downspouts along the rear of the structure and the drive aisle and parking off the rear of the building. These flows are captured by curb and gutter and directed to the sidewalk chase at design point 2. The flows then follow the historic path across the private drive into the neighboring site and ultimately the PLD pond.

### *3.3.5 BASIN E*

Basin E consists of the existing private drive on the north east edge of the site and a small portion on the landscaping adjacent to it. These flows are captured in the existing curb and gutter and are routed to the PLD through this existing curb.

Table 3.2

| RATIONAL CALC PROPOSED | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basin | % Impervious | C5 | C100 | Area | TC* | I 5 year | I 100 year | Q 5 | Q 100 |
| A | 8 | 0.15 | 0.4 | 0.20 | 5 | 5.2 | 9 | 0.16 | 0.72 |
| B | 88 | 0.80 | 0.89 | 0.54 | 6 | 5 | 8.8 | 2.16 | 4.23 |
| C | 54 | 0.52 | 0.68 | 1.01 | 11 | 3.7 | 7 | 1.94 | 4.81 |
| D | 90 | 0.82 | 0.9 | 0.56 | 5 | 5.2 | 9 | 2.39 | 4.54 |
| E | 87 | 0.79 | 0.88 | 0.17 | 5 | 5.2 | 9 | 0.70 | 1.35 |
| TOTAL | 68 | | | 2.48 | | | | 7.35 | 15.64 |

*Minimum value of 5 min used

## 4.0 DRAINAGE DESGIN CRITERIA

### 4.1 Development Criteria Reference

This report was prepared using the City of Colorado Springs Drainage Criteria (CSDC) chapter 6 and the Mile High Flood District Criteria Manual. In creating this report reference was made to the “Meridian Crossing Final Drainage Report” which is included in Appendix E and describes the existing stormwater quality treatment and detention facilities that will be used by this project.

### 4.2 Hydrologic Criteria

Because the site in question is under 100 acres, the rational method was used to determine the peak stormwater runoff for all basins. For the purposes of sizing proposed stormwater structures, the major 100-year storm as described in the CSDC was used. The rational method coefficients for these calculations were selected from Table 6-6 of the CSDC. Time of concentration was calculated per CSDC section 3.2 (See appendix A for calculation). All rainfall values were taken from Figure 6-6 of the CSDC.

## 5.0 DRAINAGE FACILITY DESIGN

The drainage facilities proposed for this project consist of curb and gutter, concrete channels, and sidewalk chases designed to collect the additional flows generated by development of the site. These facilities flow south following the historic route to the existing western PLD treatment facility. This PLD consists of a grassy swale and contains and outlet structure which outlets into a storm network under old meridian road that then discharges into a swale located to the west. This swale conveys water to the detention pond known as pond WU (page 11 of MCFDR).

The design and calculations of this existing stormwater treatment and detention facility are not within the scope of this report and can be found in the “Meridian Crossing Final Drainage Report” which is included in Appendix E.

The treatment facility is described as a “Porous Landscape Detention” (PLD) and is described in detail on page 16 of the referenced report. This facility was sized to include flows created by the future development we are now proposing. The proposed Les Schwab site can be described as the northern half of basin D-2 using the terminology of the referenced report. The assumed imperviousness for the tributary area to the PLD used in the referred report was 82% (see appendix E of MCFDR) our proposed design has a percent imperviousness of 68%. For the entire D-2 basin as described in the referenced report the assumed post development flows generated are 23.4 CFS for the minor event and 43.9 CFS for the major event (page 11). The Les Schwab site makes up roughly half of this basin (49%) and generates 7.35 CFS in the minor event and 15.64 CFS in the major event. These flows are well within the expected values for 49% of the basin which would be 11.5 CFS for minor and 21.5 CFS for major storm.  No improvements are proposed for this PLD or detention pond WU which are both owned and maintained by Park Place Enterprises, LLC.

## 6.0 FOUR STEP PROCESS

### 6.1 Step 1 Employ Runoff Reduction Methods

To reduce runoff peak flows and volume our site discharges to the preexisting grass lined PLD pond that infiltrates / treats the stormwater. Our site also uses a compact design for impervious areas with a total percent imperviousness of 68% which is 14% lower than design imperviousness used by the "Meridian Crossing Final Drainage Report" which sized the facilities for this project.

### 6.2 Step 2 Stabilize Drainageways

The internal drainageways to the Les Schwab site are stabilized via the use of concrete curb and gutter, concrete channels, and sidewalk chases. Once water leaves the site it flows overland to the existing PLD channel and ultimately to the existing pond WU through storm sewer and a grass lined swale.

Because the design for the overall development calls for overland flow from the Les Schwab site across the adjacent property to the southeast and ultimately to the water quality treatment pond on that property, we evaluated the erosion potential due to runoff across the adjacent property. The adjacent property is characterized by fine to course sandy loam soils with sparce native prairie grasses as indicated in the photo below:

In the existing condition, the existing road separating the two lots tends to concentrate runoff from the Les Schwab site at the approaches to the adjacent property such that the existing condition for runoff from the Les Schwab site should be considered shallow/concentrated flow as it flows through the adjacent property. Signs of light erosion are evident where runoff transitions from shallow/concentrated flow into the existing pond as indicated in the photo below:


This also shows that the vegetation in this pond could use maintenance to increase the overall density and efficacy of the growth.

While the proposed development will increase peak runoff flowrates and overall runoff volume, based on TR-55, the velocity of the shallow/concentrated condition does not increase, rather the flow widens over a larger area. The average slope across the adjacent lot is 1.5%. Based on Figure 3-1 of TR-55, this correlates to a velocity of 2 ft/sec. The maximum permissible velocity, for non-colloidal (assumed conservative condition) sandy loam, is 1.75 ft/s per Table 7-3 of Chow. However, because of the vegetative condition, the direction of flow is not direct across the gradually sloped surface resulting in a slower than 2 ft/s velocity. This is evidenced by lack of erosion in the existing condition. Based on the above analysis, I do not expect a general increase in erosion on the adjacent property beyond what might occur in the existing condition.

### 6.3 Step 3 Provide Water Quality Capture Volume

Water quality Capture Volume is provided by the existing southern Porous Landscape Detention. The design of this facility is not within the scope of this report but in summary the pond has a design capacity of 4,568 CF and is sized to provide water quality treatment for a post development basin D-2 with an 82% imperviousness. Please see the "Meridian Crossing Final Drainage Report" located in appendix E for more information regarding this pond.

### 6.4 Step 4 Consider Need for Industrial and Commercial BMPs

No industrial or commercial BMPs are proposed for this site. Potential pollutants such as oil fluids etc. are stored and handled inside the building and captured by floor drains directed to a sand oil separator before being outlet to the sanitary system. The outdoor storage of the site contains only used car tires which do not present the need for spill prevention or a roofed enclosure any more than a typical parking lot. The proposed CMU walls serve solely for visual screening / theft prevention.

## 7.0 CONCLUSIONS

The proposed design meets the design assumptions utilized in the "Meridian Crossing Final Drainage Report" that is included in Appendix E. The "West PLD", which this site is drains to, assumed a developed condition with a percent impervious area of 82%. The proposed design has a percent impervious area of 68%. Therefore, the anticipated peak runoff and water quality volume is less than what the PLD "West PLD" was originally designed to detain and treat from this development and no additional stormwater quality treatment or detention volume is required for this project.

Cushing Terrell

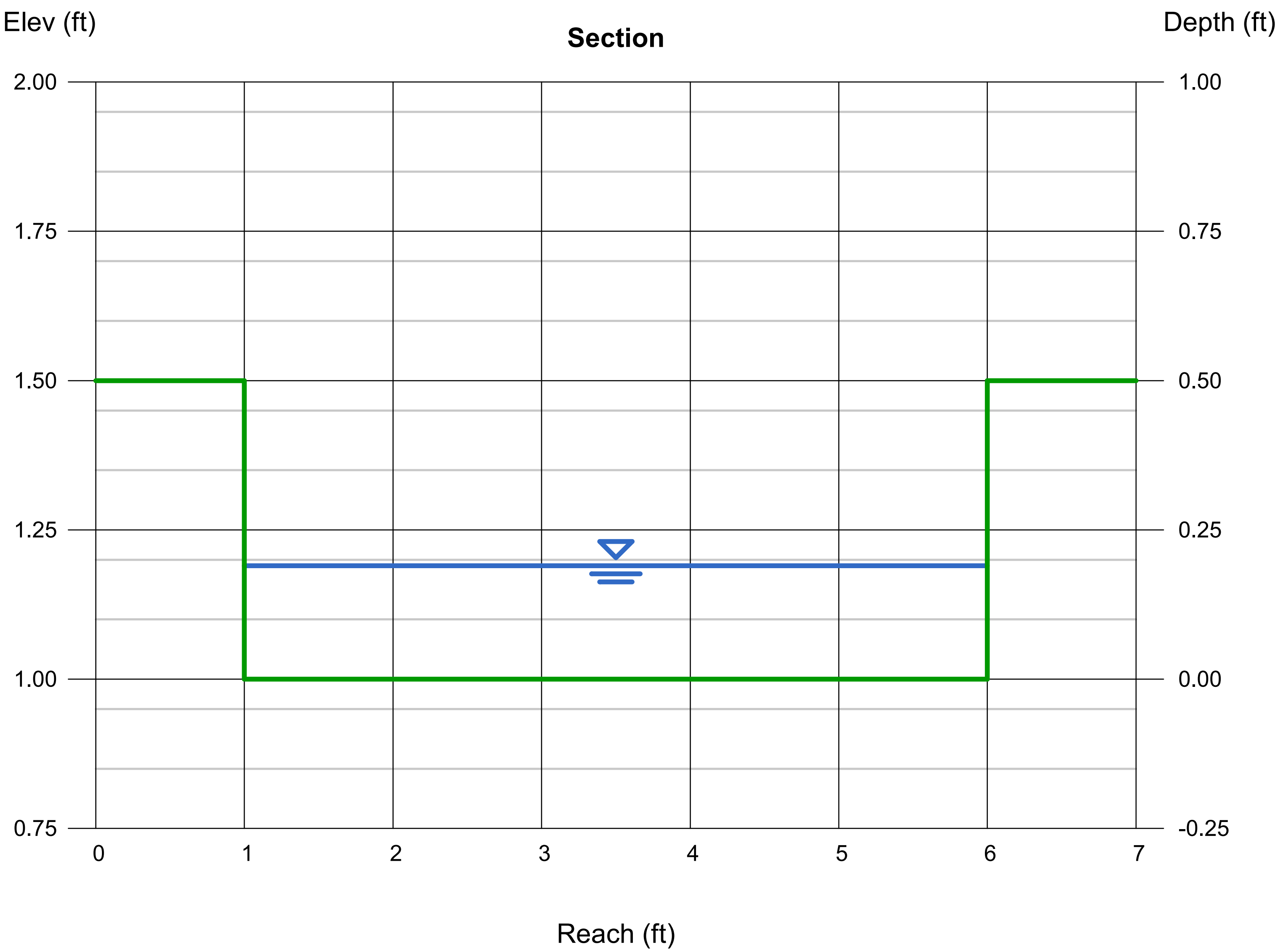
# APPENDIX A: HYDROLOGIC AND HYDRAULIC CALCULATIONS

# Channel Report



## 5 YEAR CONC CHANNEL

| | | | |
|---|---|---|---|
| **Rectangular** | | **Highlighted** | |
| Bottom Width (ft) | = 5.00 | Depth (ft) | = 0.19 |
| Total Depth (ft) | = 0.50 | Q (cfs) | = 1.940 |
| | | Area (sqft) | = 0.95 |
| Invert Elev (ft) | = 1.00 | Velocity (ft/s) | = 2.04 |
| Slope (%) | = 0.50 | Wetted Perim (ft) | = 5.38 |
| N-Value | = 0.016 | Crit Depth, Yc (ft) | = 0.17 |
| | | Top Width (ft) | = 5.00 |
| **Calculations** | | EGL (ft) | = 0.25 |
| Compute by: | Known Q | | |
| Known Q (cfs) | = 1.94 | | |



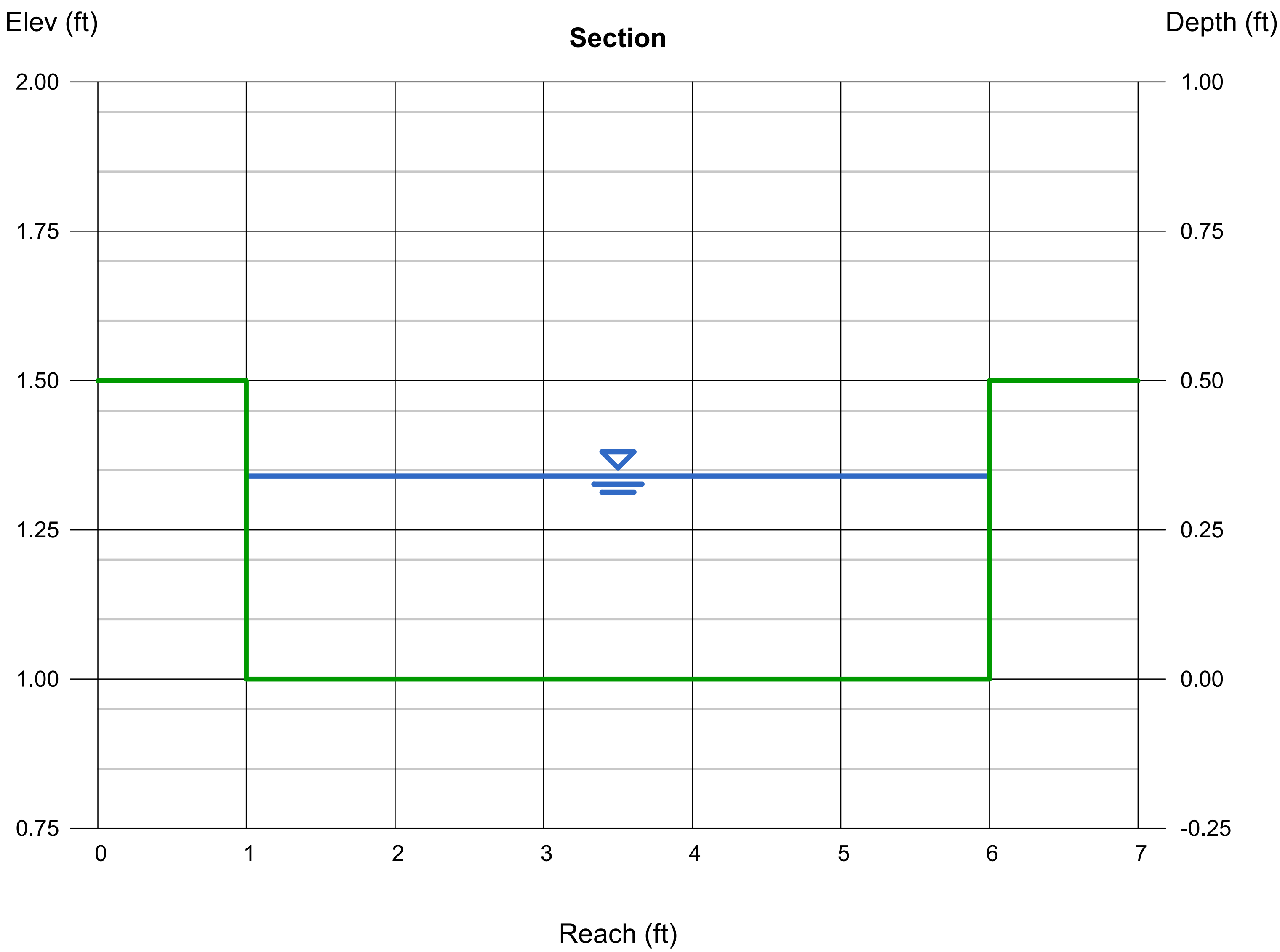
# Channel Report



## 100 YEAR CONC CHANNEL

| | |
|---|---|
| **Rectangular** | |
| Bottom Width (ft) | = 5.00 |
| Total Depth (ft) | = 0.50 |
| | |
| Invert Elev (ft) | = 1.00 |
| Slope (%) | = 0.50 |
| N-Value | = 0.016 |
| | |
| **Calculations** | |
| Compute by: | Known Q |
| Known Q (cfs) | = 4.81 |

| | |
|---|---|
| **Highlighted** | |
| Depth (ft) | = 0.34 |
| Q (cfs) | = 4.810 |
| Area (sqft) | = 1.70 |
| Velocity (ft/s) | = 2.83 |
| Wetted Perim (ft) | = 5.68 |
| Crit Depth, Yc (ft) | = 0.31 |
| Top Width (ft) | = 5.00 |
| EGL (ft) | = 0.46 |



# Channel Report

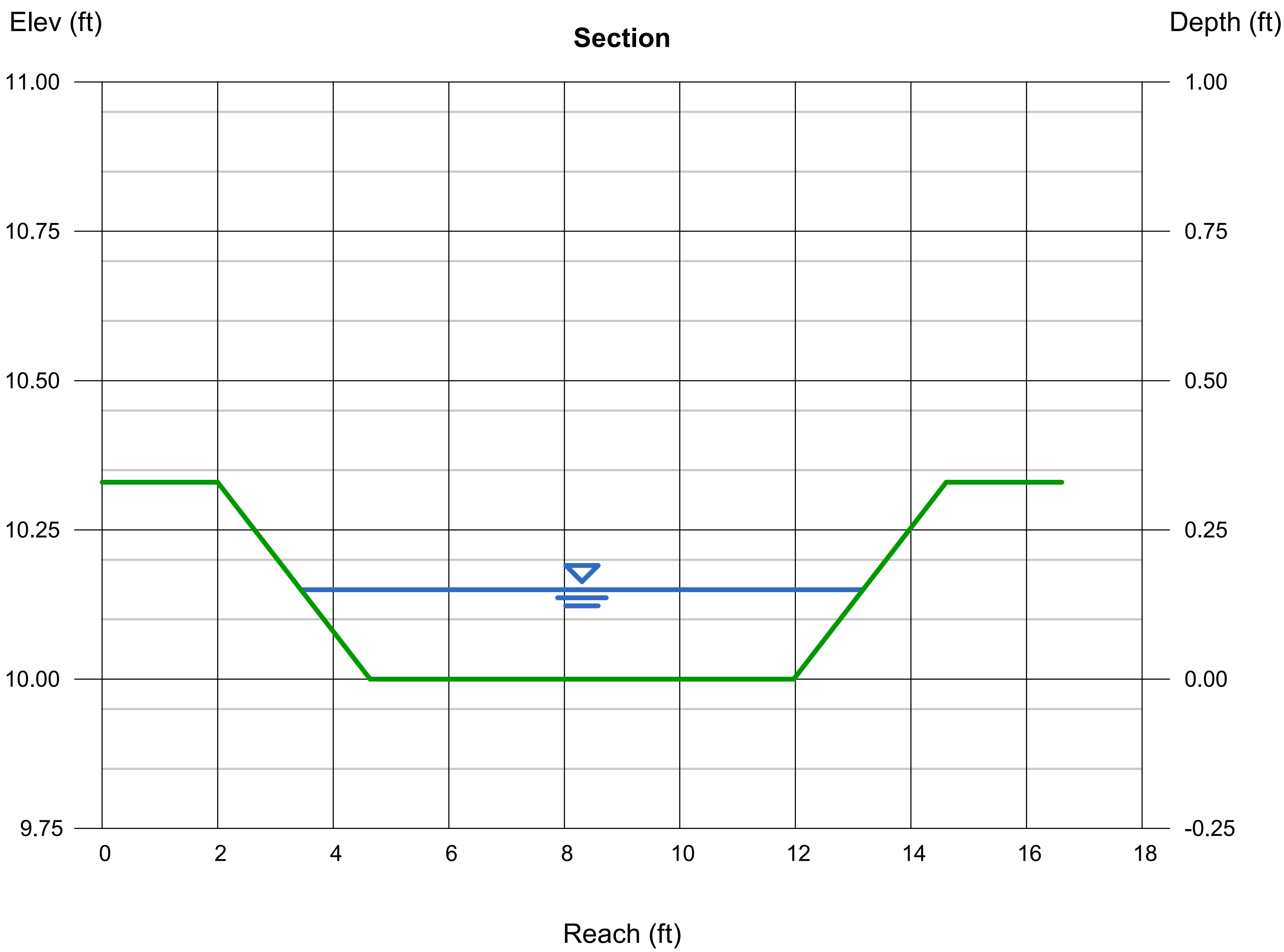


## CROSS PAN 5 YEAR

**Trapezoidal**
Bottom Width (ft) = 7.33
Side Slopes (z:1) = 8.00, 8.00
Total Depth (ft) = 0.33
Invert Elev (ft) = 10.00
Slope (%) = 0.50
N-Value = 0.016

**Calculations**
Compute by: Known Q
Known Q (cfs) = 1.94

**Highlighted**
Depth (ft) = 0.15
Q (cfs) = 1.940
Area (sqft) = 1.28
Velocity (ft/s) = 1.52
Wetted Perim (ft) = 9.75
Crit Depth, Yc (ft) = 0.13
Top Width (ft) = 9.73
EGL (ft) = 0.19



# Channel Report



## CROSS PAN 100 YEAR

**Trapezoidal**

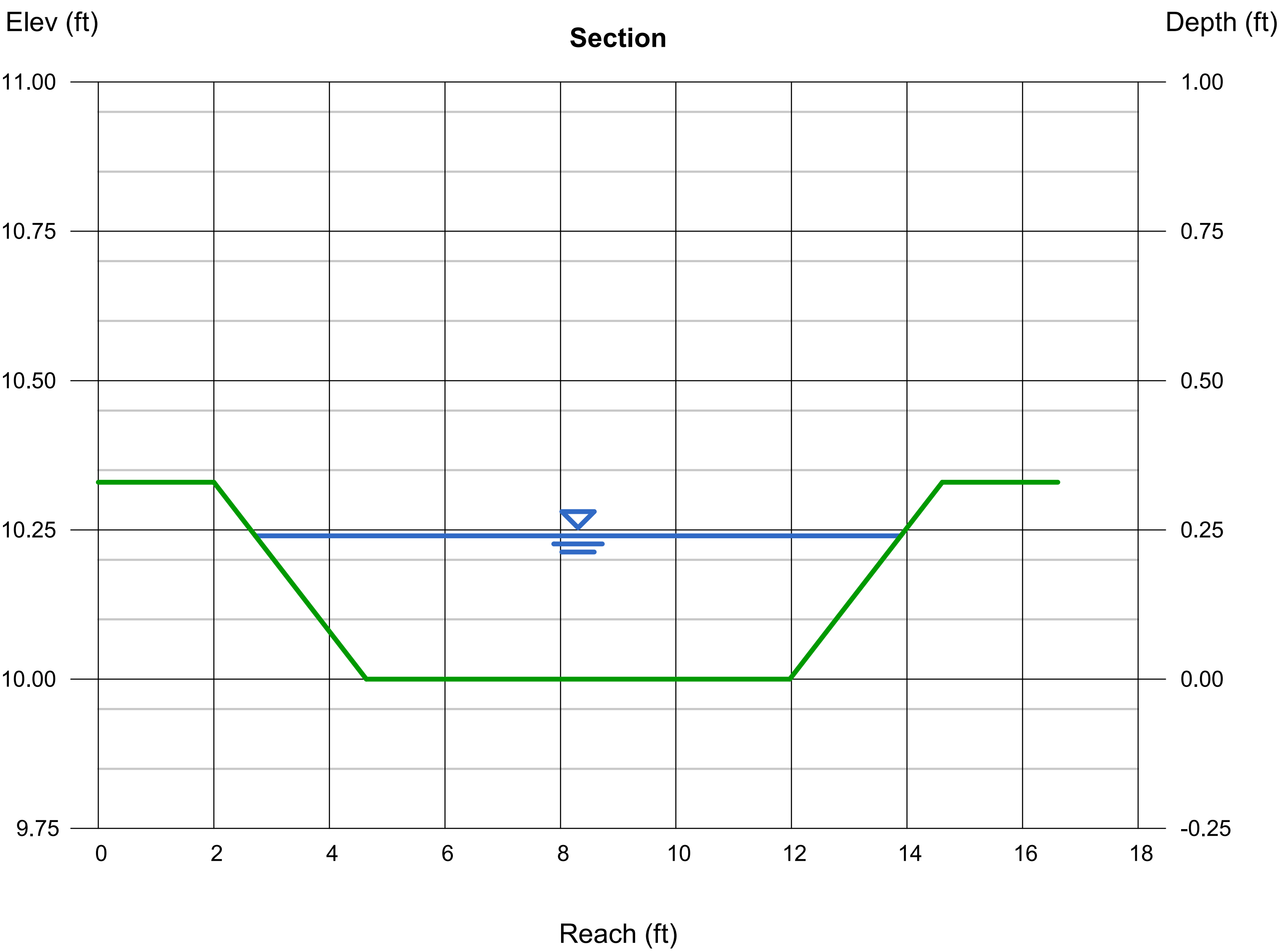
| | | |
|---|---|---|
| Bottom Width (ft) | = | 7.33 |
| Side Slopes (z:1) | = | 8.00, 8.00 |
| Total Depth (ft) | = | 0.33 |
| Invert Elev (ft) | = | 10.00 |
| Slope (%) | = | 0.50 |
| N-Value | = | 0.016 |

**Calculations**

| | | |
|---|---|---|
| Compute by: | | Known Q |
| Known Q (cfs) | = | 4.81 |

**Highlighted**

| | | |
|---|---|---|
| Depth (ft) | = | 0.24 |
| Q (cfs) | = | 4.810 |
| Area (sqft) | = | 2.22 |
| Velocity (ft/s) | = | 2.17 |
| Wetted Perim (ft) | = | 11.20 |
| Crit Depth, Yc (ft) | = | 0.22 |
| Top Width (ft) | = | 11.17 |
| EGL (ft) | = | 0.31 |



# Channel Report



## SINGLE SIDEWALK CHASE CAPACITY

**Rectangular**

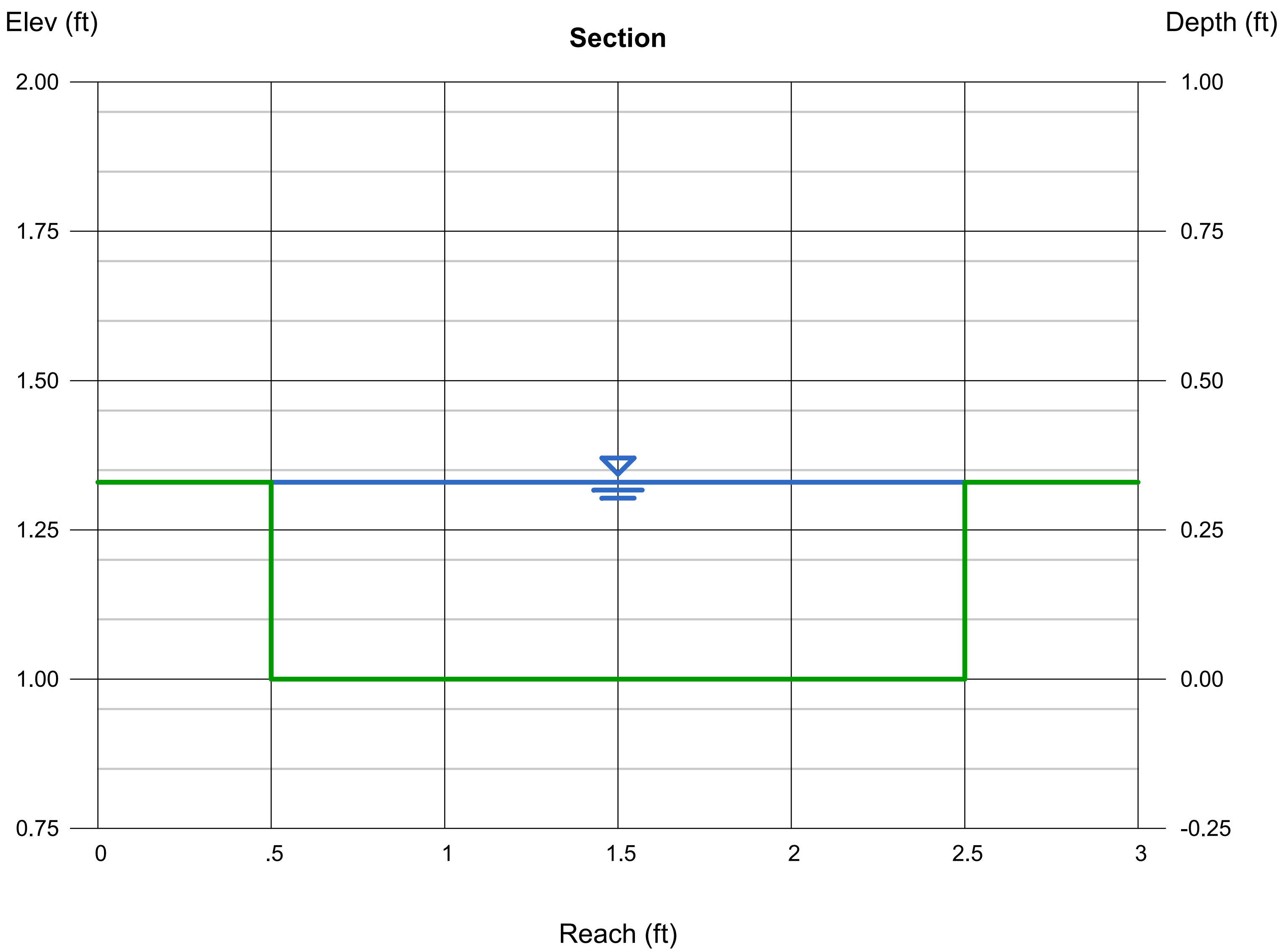
| | |
|---|---|
| Bottom Width (ft) | = 2.00 |
| Total Depth (ft) | = 0.33 |
| Invert Elev (ft) | = 1.00 |
| Slope (%) | = 0.50 |
| N-Value | = 0.016 |

**Calculations**

| | |
|---|---|
| Compute by: | Q vs Depth |
| No. Increments | = 1 |

**Highlighted**

| | |
|---|---|
| Depth (ft) | = 0.33 |
| Q (cfs) | = 1.711 |
| Area (sqft) | = 0.66 |
| Velocity (ft/s) | = 2.59 |
| Wetted Perim (ft) | = 2.66 |
| Crit Depth, Yc (ft) | = 0.29 |
| Top Width (ft) | = 2.00 |
| EGL (ft) | = 0.43 |



| Overland Velocity Calc | |
|---|---|
| SLOPE | VELOCITY |
| 0.015 | 1.98 |

Figure 3-1 (average velocities for estimating travel time for shallow concentrated flow):

Unpaved $V = 16.1345\,(s)^{0.5}$

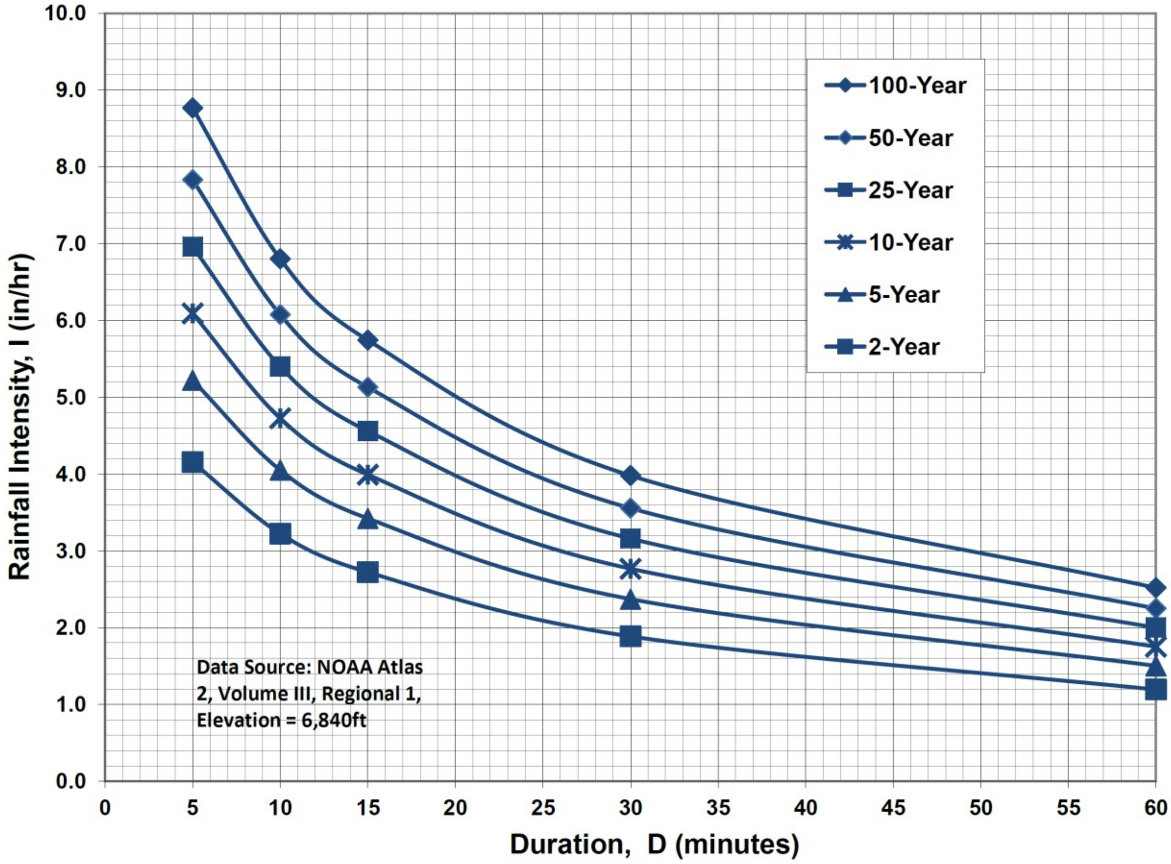
Paved $V = 20.3282\,(s)^{0.5}$

where

V= average velocity (ft/s)

s = slope of hydraulic grade line (watercourse slope, ft/ft)

**Figure 6-5. Colorado Springs Rainfall Intensity Duration Frequency**




**IDF Equations**

$I_{100} = -2.52 \ln(D) + 12.735$

$I_{50} = -2.25 \ln(D) + 11.375$

$I_{25} = -2.00 \ln(D) + 10.111$

$I_{10} = -1.75 \ln(D) + 8.847$

$I_{5} = -1.50 \ln(D) + 7.583$

$I_{2} = -1.19 \ln(D) + 6.035$

Note: Values calculated by equations may not precisely duplicate values read from figure.

| Subject: | RATIONAL METHOD CALCULATIONS | Page: | 1 |
|---|---|---|---|
| Project No. | LSCO_20FAL By: RW | Date: | 7.15.2021 |
| Project Nam | LES SCHWAB TIRE CENTER | | |

| RATIONAL CALC EXISTING | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basin | % Impervious | C5 | C100 | Area | TC | I 5 year | I 100 yesr | Q 5 | Q 100 |
| X | 12 | 0.28 | 0.42 | 2.48 | 25 | 2.6 | 4.5 | 1.81 | 4.69 |
| TOTAL | 12 | 0.28 | 0.42 | 2.48 | | | | 1.81 | 4.69 |

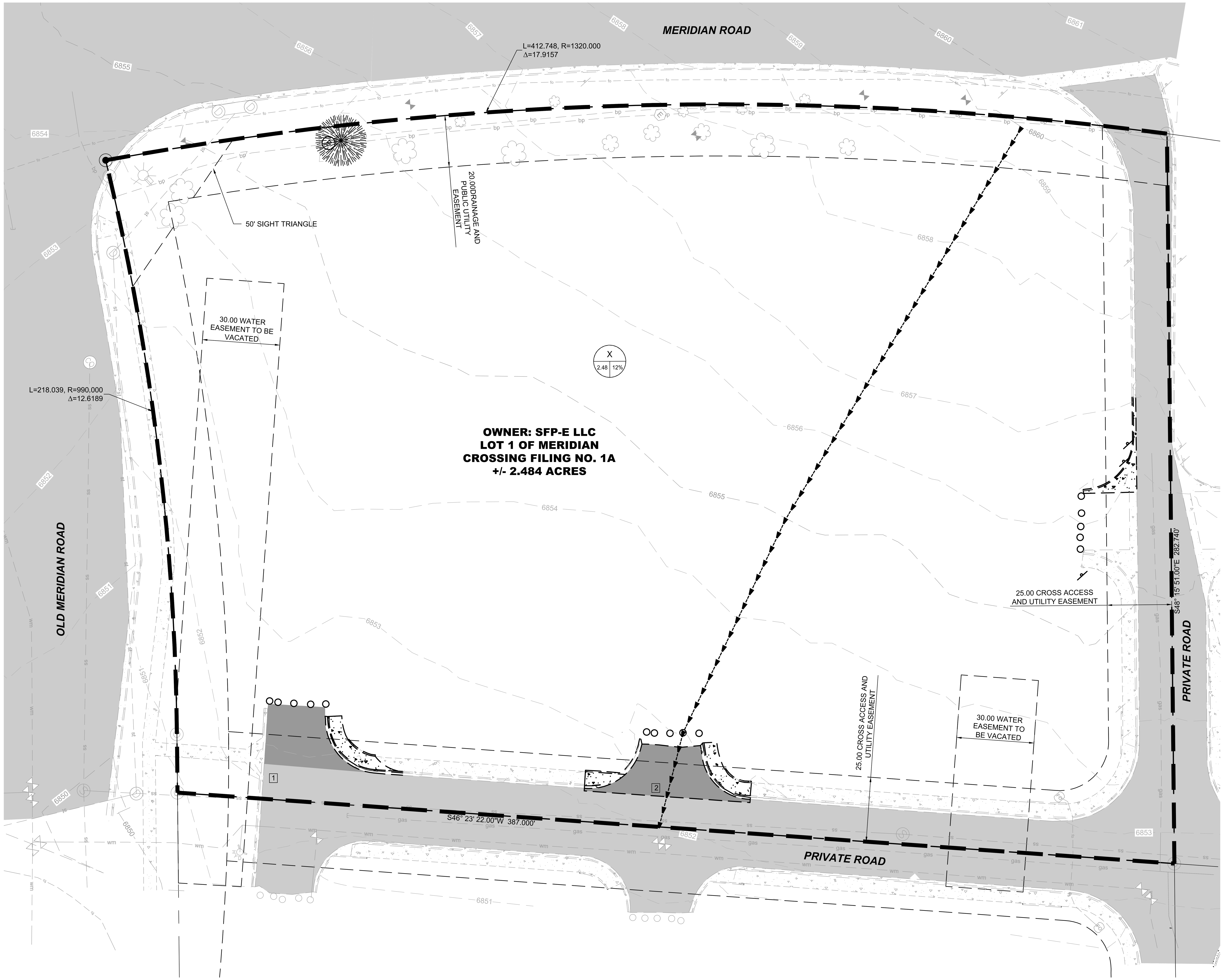
| RATIONAL CALC PROPOSED | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Basin | % Impervious | C5 | C100 | Area | TC* | I 5 year | I 100 year | Q 5 | Q 100 |
| A | 8 | 0.15 | 0.4 | 0.20 | 5 | 5.2 | 9 | 0.16 | 0.72 |
| B | 88 | 0.80 | 0.89 | 0.54 | 6 | 5 | 8.8 | 2.16 | 4.23 |
| C | 54 | 0.52 | 0.68 | 1.01 | 11 | 3.7 | 7 | 1.94 | 4.81 |
| D | 90 | 0.82 | 0.9 | 0.56 | 5 | 5.2 | 9 | 2.39 | 4.54 |
| E | 87 | 0.79 | 0.88 | 0.17 | 5 | 5.2 | 9 | 0.70 | 1.35 |
| TOTAL | 68 | | 0.77 | 2.48 | | | | 7.35 | 15.64 |

*Minimum value of 5 min used

| Proposed Time of Concentration | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | OVERLAND | | | | Concentrated Flow | | | | | | |
| BASIN | C5 | L | S | ti | N | S | R | V | L | tc | Tc |
| A | 0.15 | 33 | 9 | 4.9 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| B | 0.80 | 51 | 0.5 | 5.0 | 0.016 | 0.005 | 0.5 | 4.15 | 297 | 1.2 | 6 |
| C | 0.52 | 51 | 0.5 | 9.7 | 0.016 | 0.005 | 0.5 | 4.15 | 418 | 1.7 | 11 |
| D | 0.82 | 161 | 3.5 | 4.4 | 0.016 | 0.005 | 0.5 | 4.15 | 101 | 0.4 | 5 |
| E | 0.79 | 30 | 4 | 2.0 | 0.016 | 0.025 | 0.5 | 9.28 | 100 | 0.2 | 2 |

| Existing Time of Concentration | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | OVERLAND | | | | Concentrated Flow | | | | | | |
| BASIN | C5 | L | S | ti | N | S | R | V | L | tc | Tc |
| X | 0.28 | 307 | 3 | 25.1 | 0 | 0 | 0 | 0 | 0 | 0 | 25 |

# APPENDIX B: BASIN MAPS




LEGEND

TIME OF CONCENTRATION FLOW PATH

BASIN LIMITS

1 C001 EXISTING CONDITIONS PLAN

NORTH

SCALE: 1" = 20'

BASIN DESIGNATION

% IMPERVIOUS

BASIN AREA IN ACRES

DESIGN POINT

Cushing Terrell

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800.757.9522

LES SCHWAB TIRE CENTER

7105 N MERIDIAN RD.
FALCON, CO

NOT FOR CONSTRUCTION - PRELIMINARY DESIGN



SITE DEVELOPMENT PLANS

07.21.2021
DRAWN BY | WALKER
CHECKED BY | GRAHAM
REVISIONS
-

EXISTING BASIN MAP

PCD FILE NO. PPR-21-023

D.1

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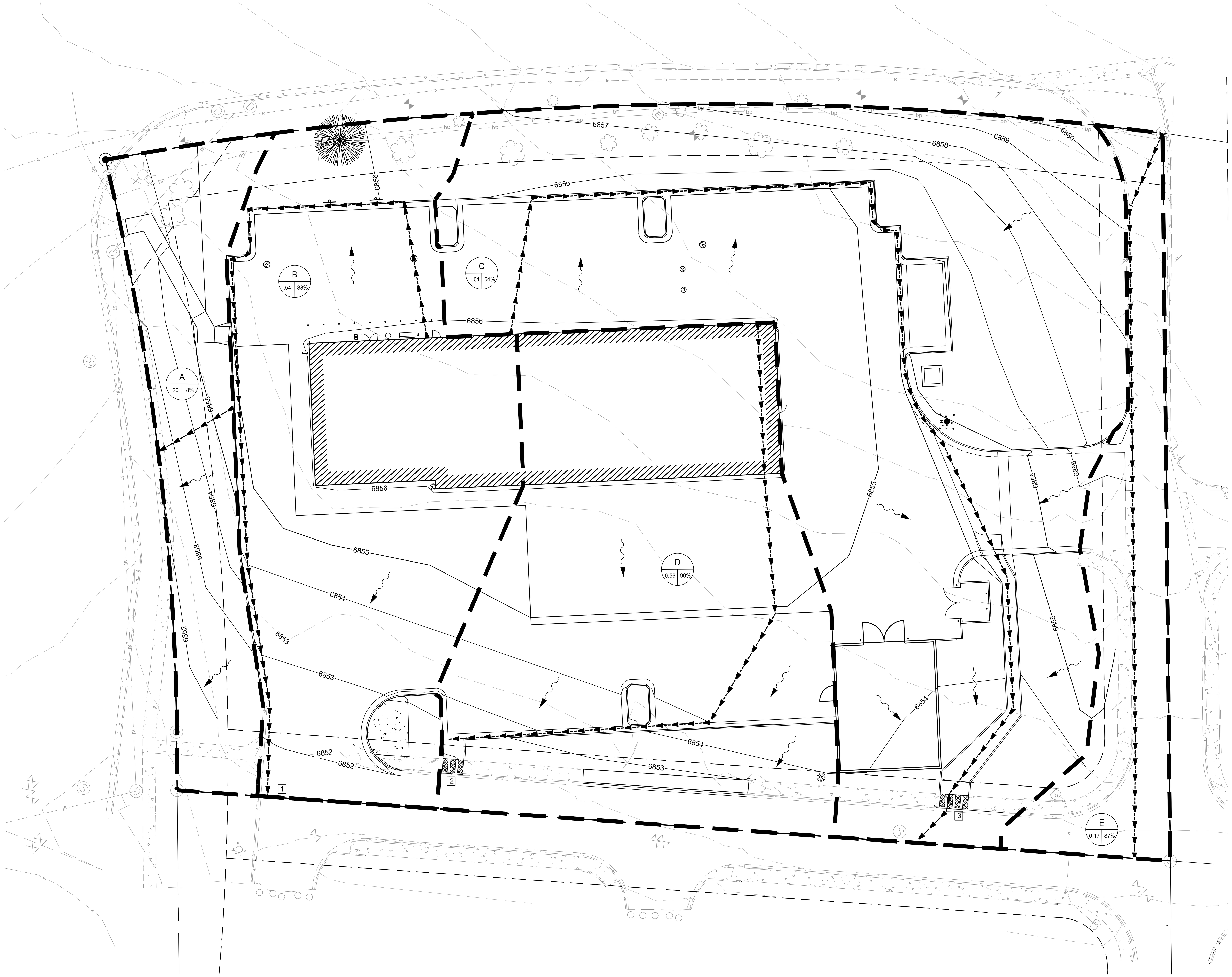


## LEGEND

- TIME OF CONCENTRATION FLOW PATH
- BASIN LIMITS

1 / C200 GRADING PLAN

NORTH

0 10 20 40
SCALE: 1" = 20'

1 — BASIN DESIGNATION
100 — % IMPERVIOUS
0.00 — BASIN AREA IN ACRES
3 — DESIGN POINT

Cushing Terrell.

cushingterrell.com
800.757.9522

Tires LES SCHWAB

# LES SCHWAB TIRE CENTER

7105 N MERIDIAN RD.
FALCON, CO



SITE DEVELOPMENT PLANS

09.01.2021
DRAWN BY | WALKER
CHECKED BY | GRAHAM
REVISIONS
-

EXISTING BASIN MAP

PCD FILE NO. PPR-21-023

D.2

9/2/2021 11:09 AM | L:\LesSchwab\New\LSCO_20FAL\BIMCAD\Civil\LSCO_20FAL_D.2.dwg

# APPENDIX C: FEMA FIRMETTE

# National Flood Hazard Layer FIRMette

FEMA

104°36'53"W 38°56'17"N


104°36'15"W 38°55'49"N

Feet 1:6,000

0 250 500 1,000 1,500 2,000

*Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020*

## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

**SPECIAL FLOOD HAZARD AREAS**
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

**OTHER AREAS OF FLOOD HAZARD**
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

**OTHER AREAS**
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

**GENERAL STRUCTURES**
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

**OTHER FEATURES**
- B 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- 8 Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

**MAP PANELS**
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 4/14/2021 at 9:15 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

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# APPENDIX D: WEB SOIL SURVEY


Map Scale: 1:1,160 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 15, 30, 60, 90

Feet: 0, 50, 100, 200, 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

- Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

**Soil Rating Lines**

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

**Soil Rating Points**

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

**Water Features**

- Streams and Canals

**Transportation**

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

**Background**

- Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 18, Jun 5, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 11, 2018—Oct 20, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

# Hydrologic Soil Group

| Map unit symbol | Map unit name | Rating | Acres in AOI | Percent of AOI |
|---|---|---|---|---|
| 8 | Blakeland loamy sand, 1 to 9 percent slopes | A | 0.3 | 13.1% |
| 9 | Blakeland-Fluvaquentic Haplaquolls | A | 2.2 | 86.9% |
| **Totals for Area of Interest** | | | **2.5** | **100.0%** |

## Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

## Rating Options

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff: None Specified*

*Tie-break Rule:* Higher

Cushing Terrell

# APPENDIX E: MERIDIAN CROSSING STORM REPORT

MERIDIAN CROSSING
FINAL DRAINAGE REPORT
EL PASO COUNTY, COLORADO

**July 2008**

PREPARED FOR:

**Park Place Enterprises**
15 Miranda Road
Colorado Springs, CO 80906

PREPARED BY:

*Springs Engineering*
31 N. Tejon, Suite 315
Colorado Springs, CO 80903
719.227.7388

PROJECT NO. 057-07-032

## CERTIFICATIONS

### Engineer's Statement:

The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the City/County for drainage reports and said report is in conformity with the master plan of the drainage basin. I accept responsibility for liability caused by negligent acts, errors or omissions on my part in preparing this report.

Charlene M. Sammons
Charlene M. Sammons, P.E. #36727

COLORADO REGISTERED PROFESSIONAL ENGINEER
CHARLENE M. SAMMONS
Seal
36727

### Developer's Statement:

I, the developer, have read and will comply with all the requirements specified in this drainage report.

By (signature): ______________________
Park Place Enterprises, LLC

Title: Managing Member

Address: 15 Mirada Rd.
Colorado Springs, CO 80906

### El Paso County's Statement:

Filed in accordance with Section 51.1 of the El Paso Land Development Code, as amended.

for ______________________ 8-19-08
John McCarty, County Engineer/Director Date

Conditions:

# Table of Contents

## List of Figures



## Appendix

## *EXECUTIVE SUMMARY*

The purpose of this Preliminary Drainage Report (PDR) and Final Drainage Report (FDR) is to present final drainage design and improvements for Meridian Crossing, located at the northeast corner of Meridian Road and Old Meridian Road, in the Falcon Highlands development. Runoff quantities and proposed facilities have been calculated using the current City of Colorado Springs/El Paso County Drainage Criteria Manual (DCM). Existing facilities have been analyzed to ensure they are able to function as designed with the new facilities and construction.

This report encompasses approximately 9.5 acres of proposed commercial development in the southeast corner of the Falcon Highlands development. A proposed collector (Flower Road) will traverse the site, connecting Meridian Road to McLaughlin Road. This development will also include improvements to McLaughlin Road.

Flower Road and McLaughlin Road are to be designed as Non-Residential Collectors, per the El Paso County Criteria Manual, with a design speed of 40 miles per hour (mph) and a posted speed of 35 mps. Curb and gutter will be installed along both of these roads.

## *INTRODUCTION*

The Meridian Crossing subdivision is a 9.5 acre commercial development located on the northwest side of the Town of Falcon. Meridian Crossing is located east and south of Falcon Highlands Market Place Filing No. 1 and adjacent to the southeast side of the "New" Meridian Road alignment. Existing development occurring in the area includes the Falcon Highlands subdivision to the west, the Beckett at Woodmen Hills development to the east and the Falcon Highlands Market Place to the west.

The area containing Meridian Crossing has been studied as part of the Falcon Area Drainage Basin Planning Study (DBPS)-Preliminary Design Report by URS, dated December 15, 2000 and Falcon Highlands Master Drainage and Development Plan (MDDP) by URS, dated October 2004.

### Purpose

The purpose of the following Final Drainage Report (FDR) is to present the final design drainage improvements for the Meridian Crossing commercial development. Drainage improvements will include curb inlets, roadside ditches, and Water Quality Capture Ponds.

Runoff quantities and proposed facilities have been calculated using the current City of Colorado Springs/El Paso County Drainage Criteria Manual (DCM) Volumes I and II.

### Limits of Study

The Meridian Crossing FDR details the hydrology and hydraulics for the West Tributary of the Falcon Basin. Storm flow is routed by and from the proposed site and then directed through the proposed and future developments to US Highway 24. This includes an analysis of the storm systems, which includes the culverts and inlets along Meridian Road and Rolling Thunder Way. The area of study is bounded by Flower Road to the north and east, Meridian Road to the north and west, Old Meridian Road to the west and McLaughlin Road on the south

*EXISTING CONDITIONS*

**General Location**

The proposed Meridian Crossing is approximately 9.5 acres and is located at the southeast corner of Meridian Road and Old Meridian Road in Falcon, Colorado, Section 12, Township 13 South, Range 65 West of the 6th Principal Meridian. Currently, the site is zoned CR.

Falcon Highlands, Woodmen Hills, Falcon Vista, Meridian Ranch, Elkhorn Estates and Falcon Hills are all developments within a 5-mile radius of the site.

**Land Use**

The proposed site has just recently been rezoned to a Commercial Regional (CR) zone.

**Topography and Floodplains**

The topography of the surrounding area is typical of a high desert, short prairie grass with relatively flat slopes generally ranging from 2% to 4%. The area generally drains to the south. The site combines with the outlet flow of Detention Pond WU prior to crossing through the existing box culverts at Highway 24. Existing drainage swales convey these flows.

The Flood Insurance Rate Map (FIRM No. 08041C0575-F dated 3/17/99) indicates that there is a floodplain north and east of the proposed site (Falcon Basin Middle Tributary). FEMA has approved a LOMR for the Middle Tributary Floodplain (Case No. 06-08-B427P, with an effective date of November 3, 2006). This flow will now be contained within a storm drainage system and detention pond, which realigns the floodplain to the east of the site. (See Figure 3: Floodplain Map) The floodplain ties in with the FIRM after the detention pond at McLaughlin Road.

**Geology**

Soil Conservation Service soil survey records indicate the project area is covered by soils classified in the Blakeland Series, which are categorized in the Hydrological Group B.

The Blakeland (8) loamy sand is a deep, excessively drained soil that can exceed depths of 60 inches. Permeability of this soil is rapid with an effective rooting depth of 60 inches. This soil has good potential for urban development. The available water capacity is moderate to low. Surface runoff is slow, and the hazard of erosion is moderate.

The Blakeland (9) complex soil is comprised of approximately 60 percent Blakeland loamy sand, 30 percent Fluvaquentic Haplaquolls and 10 percent other soils. This soil is found more in sloping areas. It is deep and somewhat excessively drained. It formed in sandy alluvium and eolian material derived from arkosic sedimentary rock. Permeability of Blakeland soils is rapid, with an effective rooting depth of 60 inches. The available water capacity is moderate to low. Surface runoff is slow, and the hazard of erosion is moderate. The Fluvaquentic Haplaquolls are generally located in swale areas, and are deep, poorly drained soils. They formed in alluvium derived from arkosic sedimentary rock.

The Blakeland soil is well suited to wildlife habitat, home sites, streets and roads. This soil needs to be protected from erosion when vegetation has been removed from building sites. The Fluvaquentic Haplaquolls soil is good for wetlands. This soil has poor potential for home sites. The main limitation of this soil is the high water table and potential for flooding.

Note: (#) indicated Soil Conservation Survey soil classification number. See Figure 2: SCS Soils Map.

**Climate**

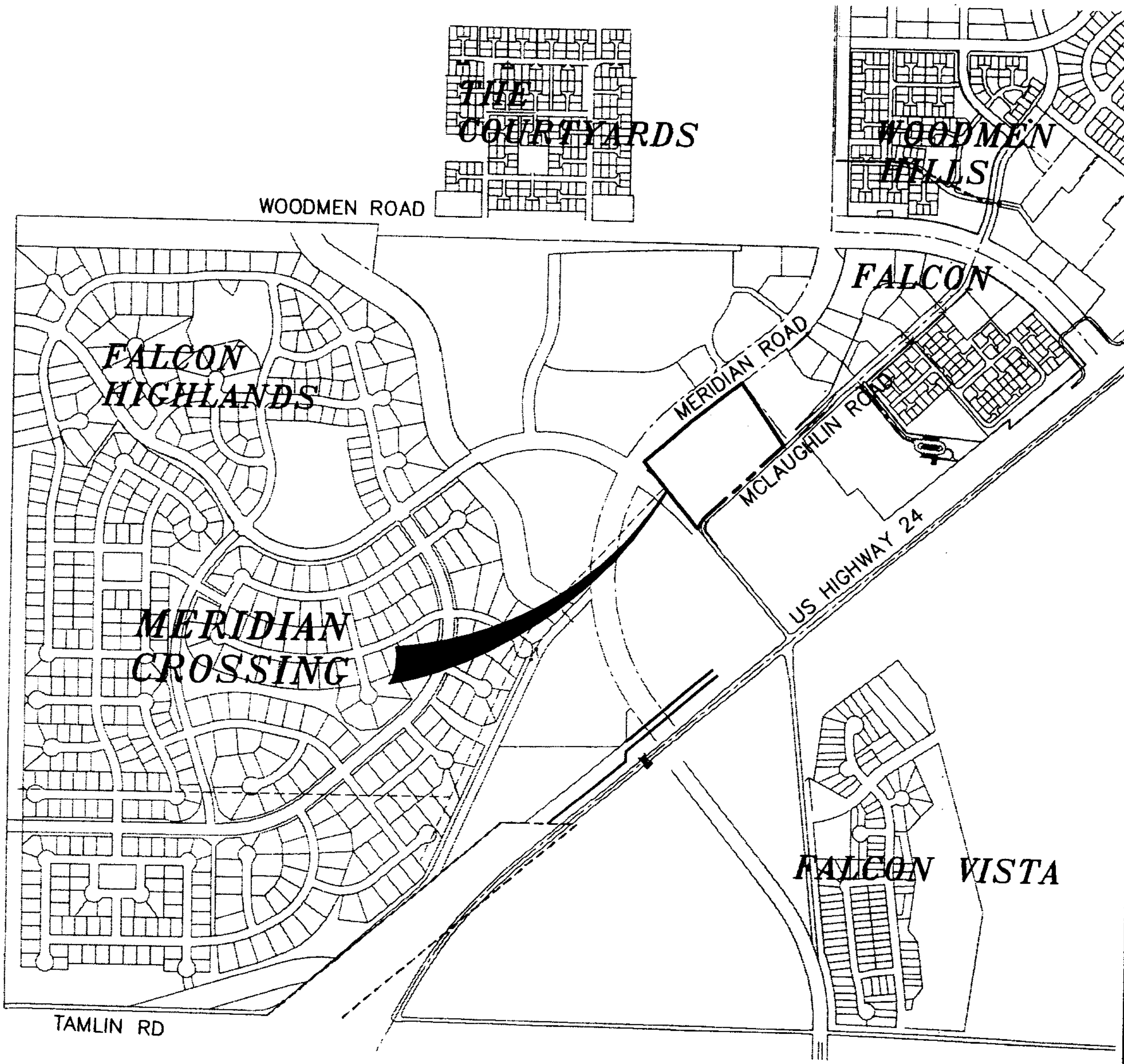
Mild summers and winters, light precipitation; high evaporation and moderately high wind velocities characterize the climate of the study area.

The average annual monthly temperature is 48.4 F with an average monthly low of 30.3 F in the winter and an average monthly high of 68.1 F in the summer. Two years in ten will have a maximum temperature higher than 98 F and a minimum temperature lower than –16 F. Precipitation averages 15.73 inches annually, with 80% of this occurring during the months of April through September. The average annual Class A pan evaporation is 45 inches.

**Natural Hazards Analysis**

Natural hazards analysis indicates that there is high ground water, potentially expansive claystone bedrock and wetlands located on or near the proposed site. Refer to the Geologic Hazards Evaluation Retail Site Woodmen Road and Meridian Road report by Entech Engineering. Usually, in areas where high ground water is an issue, underdrains are built to help alleviate the problem. However, since the proposed site is a commercial development, construction will be done as slab-on-grade and no basements. If lower levels are built, an underdrain system would be required. Wetland areas in the site have been identified and approved by Corps of Engineers. A mitigation plan for the site has been approved and implementation began in the fall of 2005. A copy of this plan is on file with the Falcon Highlands Metropolitan District.

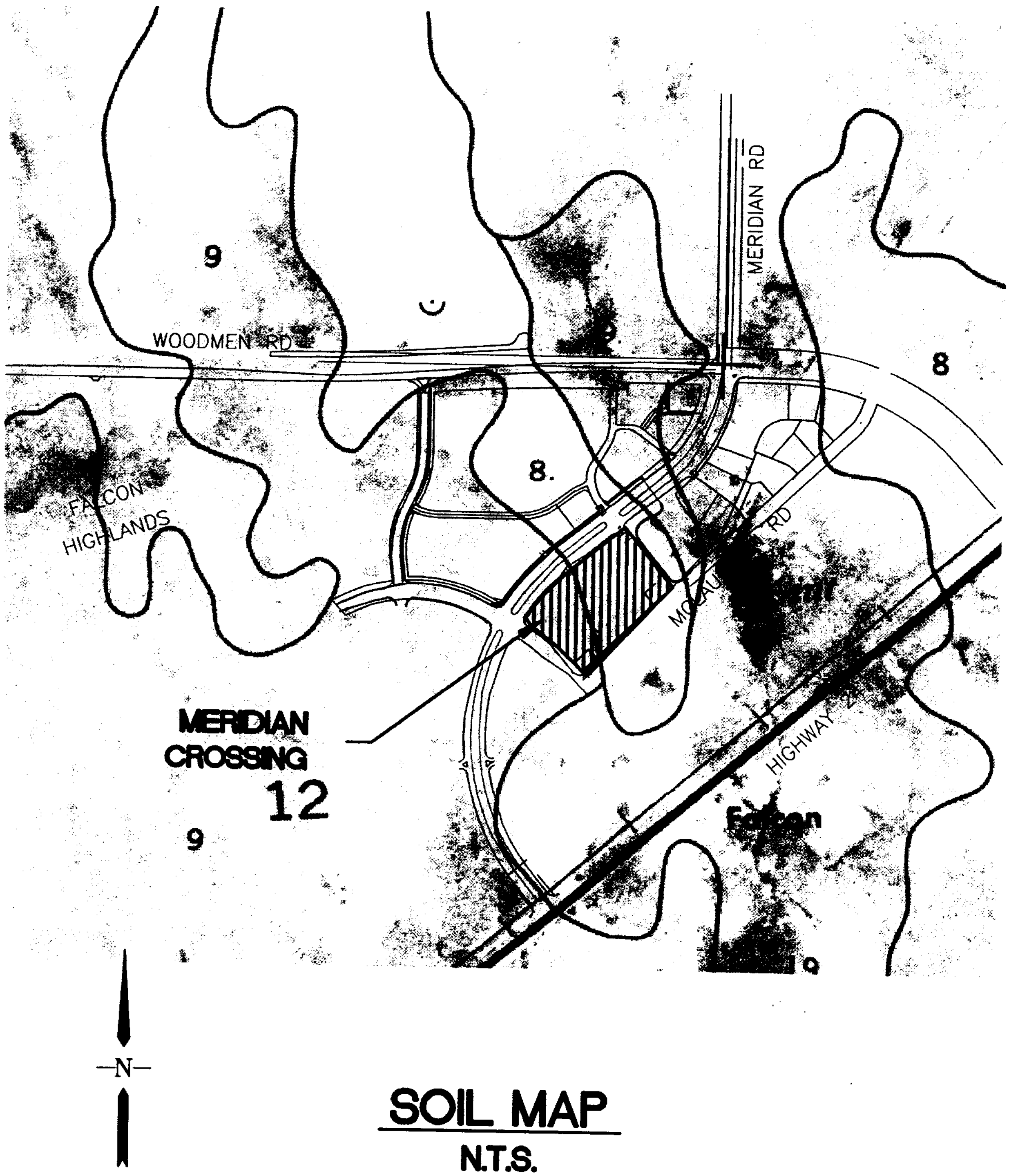
Soils in this area are cohesionless, sloughing of steep banks during drilling and/or excavation could occur. By siting improvements in a manner that provides an opportunity to lay the banks of excavations back at a 1:1 slope during construction, the problems associated with sloughing soils can be minimized.




# VICINITY MAP

N.T.S.

| MERIDIAN CROSSING | SE Springs Engineering — 31 NORTH TEJON, SUITE 315, COLORADO SPRINGS, CO 80903, TEL: (719) 227-7388, FAX: (719) 227-7392 |
| --- | --- |
| VICINITY MAP | FIGURE 1 |
| | PROJECT NO. 057-07-032 |




# SOIL MAP

**N.T.S.**

| MERIDIAN CROSSING | SE Springs Engineering 31 NORTH TEJON, SUITE 315 COLORADO SPRINGS, CO 80903 TEL: (719) 227-7388 FAX: (719) 227-7392 |
|---|---|
| SCS Soils Map | FIGURE 2 |
| | PROJECT NO. 057-07-032 |

## *DRAINAGE DESIGN CRITERIA*

### SCS Hydrograph Method

Hydrologic modeling was used to the West Tributary of the Falcon Basin, which routes through Meridian Crossing. Modeling was completed using The United States Army Corps of Engineers Hydrologic Engineering Center-HEC-1 version 4.1. The Soil Conservation Service (SCS) (since renamed National Resources Conservation Service (NRCS)) curve number method was selected for calculating the runoff volume from the drainage basins per the Drainage Criteria Manual (DCM). The precipitation data, basin delineation, CN runoff coefficients, and time of concentrations were taken from the Falcon Basin DBPS. Modifications have been performed on the original data, as new developments have been built and boundary lines have changed. The model has been updated to reflect the most current changes occurring in the Falcon area. The existing models in the appendix are those which were included in the FDR for Pond WU, as this report updated and modified the existing conditions of the West Tributary as originally analyzed in the Falcon Basin DBPS. Below is a summary of major design points entering the Falcon Highlands development, through the site, and where the flows exit the Falcon Highlands site. The Falcon Highlands Master Drainage Development Plan (MDDP) corrected an area in the volume of the Woodmen Hills detention pond (Pond W).

The West Tributary was analyzed in the MDDP/PDR/FDR for Falcon Highlands Filing No. 1. This report made the assumption that Pond WU would capture flows from Basins W-39, W-40, W-41 and W-42. With the construction of Meridian Road, flows from Basin W-42 do not release into the detention pond and instead combine with the outflow from the pond. With this change in routing, actual design point locations have changed slightly. The existing DBPS analysis and this report show design point WU as the flow at Highway 24 as it passes through the existing box culverts. The proposed DBPS analysis and the Market Place report have Design Point WU as the flows entering the pond with the pond release flows as the Highway 24 flows. This report made the change, as stated previously, Basin W-42 no longer enters the pond, but combines at Highway 24 and a design point was needed to evaluate flows at this location. See the table below for a summary of major design points through the West Tributary in the Falcon Highlands development. Pond WU will release at less than historic rates for both, the 5-year and 100-year events.

| Design Point | Existing* | | Proposed | | Location |
|---|---|---|---|---|---|
| | 5-Yr | 100-Yr | 5-Yr | 100-Yr | |
| WS | 137 | 1575 | 145 | 1705 | Woodmen |
| WT | 143 | 1621 | 244 | 1867 | Tamlin Road (Removed) |
| Pond WU | | | 118 | 1313 | Highway 24/Pond Outlet |
| WU | 148 | 1648 | 135 | 1339 | Highway 24 (Pr Condition) |
| WV | 149 | 1640 | 135 | 1338 | Falcon Highway |

*Existing flows have been modified per the approved Falcon Highlands Final Drainage Report for Regional Detention Pond WU. This report adjusted routing for Basin W-42 and has modified the existing flows at Design Point WU. The "existing" flows which will be the target in this report are those existing flows which have been identified in the previous mentioned report, not those which were stated in the DBPS.

### Rational Method

Because the Meridian Crossing is less than 100 acres, the rational method was used to estimate stormwater runoff for basins, and to size inlets, culverts and ditches, as required by the current

City of Colorado Springs/El Paso County Drainage Criteria Manual (DCM). The rational method coefficients "C" were selected from Table 5-1 of the DCM, the time of concentration was calculated per DCM requirements and intensities for each basin were calculated from storm intensity curve formulas provided by the City of Colorado Springs. The rational method was used to determine onsite flows. Rational Method results are shown in Appendix B and C.

**Water Quality Criteria**

The water quality capture volume (WQCV) was calculated based on equations found in the Drainage Criteria Manual Volume 2, Stormwater quality Policies, Procedures and Best Management Practices (BMP's). The WQCV allows suspended sediment and absorbed pollutants to settle out of the water and improve the overall quality of runoff leaving the facility and reduce the potential for erosion. The positive impact on water quality is significant see appendix for proposed pond calculations.

**Street Capacity**

Street capacity is based on the DCM criteria, as stated in Chapter 6. Capacity of the streets (Flower Road and McLaughlin Road) will be based on the minor and major storms. Minor storm criteria is based on pavement encroachment and the major storm criteria is based on allowable depth and pavement encroachment. In all cases, flow encroachment shall not extend past the right-of-way (R.O.W.). Mannings equation will be used to determine the street capacity based on the following criteria from the DCM. Flower and McLaughlin Roads are both collector roads. Both streets shall meet the following criteria from the Table 6-1 in the DCM:

| **Roadway** | **Use of street in storm** | | **Cross flow in streets for storm** | |
|---|---|---|---|---|
| **Classification** | **Initial** | **Major** | **Initial** | **Major** |
| Collector | No curb overtopping. Flow spread must be limited to a max. 20 foot spread from each curb face | Residential dwellings, public, commercial and industrial buildings shall not be inundated at the ground line. The depth of water at the gutter flow line shall not exceed 12 inches. | Where cross pans are allowed, depth of flow shall not exceed 6 inches at flow line. | 12 inches of depth at gutter flow line. |

## *DRAINAGE BASINS*

### Existing Drainage Analysis

Since the site is currently undeveloped, the existing drainage analysis was determined by analyzing existing runoff quantities and patterns. The site is covered predominantly with grasses. Existing storm runoff is generally from the north to the south through natural drainage swales, as well as gutter flow in a previously constructed roadway (Meridian Road). (See Figure 5: Existing Drainage Plan) On-site basins, being smaller than 100 acres, were analyzed using the rational method. See below for a brief discussion of each of these basins.

- Basin E-1 (2.18 acres) consists of the southeast half of Meridian Road, at a high point in the road adjacent to Pond MN. Basin E-1 slopes to the south to design point 1. An existing at grade inlet intercepts this flow. Any flow-by from this inlet will be directed onto Old Meridian Road. The remainder of the flow will continue east along Old Meridian Road, which allows street flow to runoff into an existing roadside ditch. This flow then enters a temporary culvert under Old Meridian Road. Basin E-1 produces runoff quantities of 9.4 cfs and 17.6 cfs for the 5-year and 100-year storms.

- Basin E-2 (8.76 acres) consists of an area just east of Old Meridian Road and between Meridian Road and McLaughlin Road. This area is currently undeveloped. Basin E-2 slopes to the southwest to design point 2. Currently, a temporary culvert exists to transfer flow from the east side of Old Meridian Road to the south side. An estimated 13.7 cfs and 31.4 cfs are produced for the 5-year and 100-year storms.

- Basin E-3 (13.96 acres) consists of an area northeast of Old Meridian and McLaughlin Roads in the "Town of Falcon". The flow from this basin will be directed towards the intersection of State Highway 24 and Meridian Road, where it is conveyed under an existing culvert under Old Meridian Road. This flow is directed towards the existing structure at Design Point 6. The basin generates 16.4 cfs and 37.5 cfs for the 5-year and 100-year storms.

- Basin E-4 (2.15 acres) consists of the east half of Meridian Road from Old Meridian Road to the right-in access point to the south. Basin E-4 slopes to the south. Flow from this basin will be conveyed through curb and gutter to the right in access drive, where a sump inlet intercepts the flow. An 18-inch rcp will then release into a temporary channel along Meridian Road, which conveys the flow to design point 6. An estimated 9.3 cfs and 17.5 cfs are produced for the 5-year and 100-year storms.

- Basin E-5 (9.41 acres) consists of an undeveloped native area just east and south of the Falcon Highlands detention pond (Pond WU). Runoff from this basin combines with flows from design point 7 and the detention pond outlet and crosses under US Highway 24 through existing culverts at design point 8. Basin E-5 generates 12.1 cfs and 27.8 cfs for the 5-year and 100-year storms.

- Basin E-6 (2.62 acres) consists of the west half of Meridian Road from the right-in access point to Highway 24. Basin E-6 slopes to the south to design point 4. Runoff will flow south via curb and gutter along this section of Meridian Road. A sump inlet at the low point, just before Highway 24, intercepts the runoff. This inlet connects to the box culvert under Meridian Road. This flow will continue to the existing box culverts at Highway 24. The Falcon Highlands detention pond also discharges to the existing culvert at Highway 24. However, the detention pond was designed to release flows at 80% of historic flow. The existing culvert under Highway 24 will have enough capacity, because the peak discharge from design point 7 will occur long before the peak discharge of the pond. An estimated 11.6 cfs and 21.7 cfs are produced for the 5-year and 100-year storms.

- Basin E-7 (2.32 acres) consists of the east half of Meridian Road from the right-in access point south to Highway 24. Basin E-7 slopes to the south to design point 15. Runoff will flow south through curb and gutter along this section of Meridian Road. A sump inlet intercepts this flow and connects to the box culvert under Meridian Road. An estimated 10.5 cfs and 19.7 cfs are produced from Basin E-7 for the 5-year and 100-year storms.

- Basin E-8 (23.89 acres) consists of the area south of Old Meridian Road and east of Meridian Road. This area is currently undeveloped. This flow sheetflows across the basin to design point 6. A concrete box culvert conveys the flow under Meridian Road to the existing culvert under Highway 24. An estimated 32.2 cfs and 73.7 cfs are produced for the 5-year and 100-year storms.

**Existing Design Points**

- Design Point 1 is an existing 15' on-grade inlet in Meridian Road, north of Old Meridian Road. This inlet intercepts flow from Basin E-1, street flow from Meridian Road, south of Pond MN to Old Meridian Road. The inlet releases the flow into a temporary ditch along Old Meridian Road, which conveys the flow to Design Point 2. Flows at this location are 9.4 and 17.6 cfs.

- Design Point 2 collects flow from Basin E-2 and combines it with the flow in the temporary channel from DP-1. A temporary 24-inch culvert under Old Meridian Road conveys the flow to the south towards Design Point 6. This design point has flows of 22.9 and 48.7 cfs.

- Design Point 3 is an existing 20' sump inlet that intercepts the street flow in Meridian Road from Basin D-4. The inlet releases flows into an existing temporary roadside ditch along Meridian Road to Design Point 6. Flows at this location are 9.3 and 17.5 cfs.

- Design Point 4 is an existing 25' sump inlet used to intercept the west side of Meridian Road, north of Highway 24 (Basin E-6). This flow enters the existing storm system and is conveyed to Design Point 7. This design point has flows of 11.6 and 21.7 cfs.

- Design Point 5 is an existing 20' sump inlet in Meridian Road opposite Design Point 4. This inlet intercepts street flow from Basin E-7 and combines with flows in the storm system under Meridian Road. Flows are released at Design Point 7. The design point generates flows of 10.5 and 19.7 cfs.

- Design Point 6 combines flows from Basins E-3 and E-8 with flows from Design Points 2 and 3. Two 12' (W) x 3' (H) reinforced concrete box culverts (RCBC's) convey the flow under Meridian Road to Design Point 7. Flows generated at this design point are 67.8 and 149.7 cfs.

- Design Point 7 is the location where the storm system releases flows. It is the combined flow from Design Points 4, 5 and 6. Once released, flows will continue through an existing ditch to Design Point 8 at Highway 24. Flows at this location are 67.0 and 148.5 cfs.

- Design Point 8 combines the flow from Basin E-5 with flows from Design Point 7 and Detention Pond WU. There are three 12' (W) x 6' (H) RCBC's under Highway 24 to convey flows. These flows will continue towards the south, in a FEMA floodplain, along their existing paths. Flows generated at this location are 147.7 and 1286.1 cfs. This design point corresponds to Design Point WU in the HEC models.

**Developed Drainage Analysis**

The proposed site was studied in the Falcon Basin DBPS. Efforts have been made to comply with the recommendations set forth in the approved DBPS. The flows in the commercial development will combine with the outlet flows of Detention Pond WU and continue under Highway 24 through the existing box culverts. Figure 6: Developed Drainage Plan illustrates the basin boundaries used for the rational hydrologic model.

Basins D-1 and D-4 through D-7 do not have any changes from the corresponding, existing basins (E-1 and E-4 through E-7), as they have already been developed and the drainage structures have been designed. Basin E-2, a proposed commercial site (Meridian Crossing, whose preliminary plan has been approved by the Board of County Commissioners (BOCC)), the proposed site and adjacent roadways, has been divided into five new developed basins. Changes to Basins D-3 and D-8, is the assumption that these basins will be developed in the future as commercial use. The description of these basins follows.

- Basin D-2 (5.14 acres) consists of approximately the south half of the Meridian Crossing commercial development. It is anticipated for this basin to drain towards the south, where it will be intercepted by a proposed water quality facility (Porous Landscape Detention – PLD). This storm system will release flows into a temporary drainage swale through Basin D-8. This drainage pattern is consistent with the approved Master Drainage Development Plan Amendment to Falcon Highlands, which shows these flows reaching the existing box culvert under Highway 24 at design point 8. This basin generates 23.4 cfs and 43.9 cfs for the 5-year and 100-year storm events.

- Basin D-3 (11.49 acres) consists of an area northeast of Old Meridian Road and McLaughlin Road in the "Town of Falcon". It is assumed that this area will be developed as commercial use in the future. The flow from this basin will be directed towards the intersection of Highway 24 and Meridian Road, where it is conveyed under a proposed culvert under Old Meridian Road. The flow is directed towards the existing structure at DP-6. The basin generates 34.7 and 65.1 cfs for the 5 and 100-year events.

intercepted by the temporary grated lid on the proposed manhole at DP-Z This flow will ultimately reach Highway 24. Flows at this location are 4.7 and 8.9 cfs.

- Design Point X is the released flow from the East PLD. Flow from this area combines with a storm system in Old Meridian Road via a 30" rcp. Flows generated in this location are 16.9 cfs and 31.8 cfs.

- Design Point Z is the flow from DP-B, DP-X intercepted flow from inlet 1 and the flow-by from inlet 1 combined with the released flow from the West PLD (Basin D-2). A 36" rcp connects and conveys this flow to a temporary culvert under Old Meridian Road which will release flows into a temporary ditch. Flows at this junction are 44.6 cfs and 83.8 cfs.

- Design Point Y is a proposed 54" rcp which releases flows across Old Meridian Road. The proposed pipe will replace an existing culvert, which is currently undersized, and intercepts flows from D-3. This design point has a flow of 34.7 cfs and 65.1 cfs. There is no corresponding design point in the Market Place Filing No. 1 drainage report.

- Design Point 3 is an existing 20' sump inlet that intercepts the street flow in Meridian Road from Basin D-4. The inlet currently combines with DP-Z and flows into an existing temporary roadside ditch along Meridian Road to Design Point 6. Flows at this location are 9.3 and 17.5 cfs. This design point corresponds to Design Point 13 in the Market Place FDR.

- Design Point E is the combination of D-3 and DP-Z. Flows are released into a temporary channel which conveys flows to a roadside ditch along Meridian Road. This flow is conveyed all the way to Design Point DP-8 at Highway 24 where flows are released from the Falcon Highlands site. Flows intercepted at this location are 46.938.3 cfs and 58.2 cfs. The Market Place Filing No. 1 report does not have any corresponding design points.

- Design Point 4 is an existing 25' sump inlet used to intercept the west side of Meridian Road, north of Highway 24 (Basin D-6). This flow enters the existing storm system and is conveyed to Design Point 7. This design point has flows of 11.6 and 21.7 cfs. This design point corresponds to Design Point 16 in the Market Place FDR. There is no difference in the drainage flows.

- Design Point 5 is an existing 20' sump inlet in Meridian Road opposite Design Point 4. This inlet intercepts street flow from Basin D-7 and combines with flows in the storm system under Meridian Road. Flows are released at Design Point 7. The design point generates flows of 10.5 and 19.7 cfs. This location corresponds to Design Point 15 in the Market Place FDR. There are no changes in the flows.

- Design Point 6 combines flow from Basin D-8 with DP-E and DP-Y. Two 12' (W) x 3' (H) reinforced concrete box culverts (RCBC's) convey the flow under Meridian Road to Design Point 7. Flows generated at this design point are 127.7 and 239.9 cfs. This location corresponds to Design Point 17 in the Market Place FDR. This report calculated flows to be 157.9 and 300.6 cfs.

## *DRAINAGE FACILITY DESIGN*

### General Concept

Meridian Crossing is located completely within the West Tributary of the Falcon Drainage Basin. The site drains towards the southwest where it is directed towards an existing drainage structure under Highway 24. This structure has been analyzed to ensure it still properly functions with the developed flow released here. The flow from these structures will continue along an existing swale to the south. There are two water quality facilities proposed for the site, prior to flows exiting.

### Storm Systems

There has been one storm system previously installed with the construction of Meridian Road. This system was designed in the Market Place Filing No. 1 FDR. One new culvert and a temporary culvert have been proposed with the development of this site. StormCAD and CulvertMaster calculations have been included at the end of the report analyzing all of these facilities to ensure they are still adequate for the developed flow associated with this development.

The first system is an existing system located at the intersection of Meridian Road and Highway 24. This system was initially designed in the Market Place Filing No. 1 FDR. The system has been analyzed to ensure it will still function properly with the development of The Shoppes at Falcon. A 20-foot sump inlet is located at DP-5 in Meridian Road. This inlet intercepts 10 cfs and 19 cfs. A 25-foot sump inlet is located on the other side of Meridian Road at DP-4. This inlet intercepts 12 and 22 cfs. Both of these inlets connect to an existing 12'(W) x 3' (H) box culvert under Meridian Road via 24-inch rcp's. This structure intercepts a total flow of 127.7 and 239.9 cfs. This system releases flows into an existing channel parallel to Highway 24 at DP-7. Flows at this location are 140.2 cfs and 264.8 cfs. The channel conveys this flow to DP-8 at Highway 24, where the flow exits Falcon Highlands and continues on its existing path to the south.

### Channel Improvements

The temporary channel from DP-Z has a 100-year flow of 73.3 cfs from the proposed storm system. The channel will be shaped similarly to the roadside ditch along the southeast side of Meridian Road, which it connects to. Velocity is this channel is 3.2 ft/s with a flow depth of 1.8 feet. A temporary drainage easement will be recorded on the final plat to accommodate this channel.

The existing roadside ditch along Basin D-7 is located east of Meridian Road from the right-in access point south to Highway 24. The ditch will carry the 100-year storm (88.2 cfs) at a depth of 1.8 feet to DP-6. The velocity in this channel is 5.5 fps. This channel will also be removed upon development of Basin D-8 and the construction of an internal storm drain system.

There is a series of onsite temporary swales in lots 3, 4 and 5. These swales will be utilized to ensure flows are conveyed to the west PLD. Once these lots develop, the swales will no longer be necessary and will be removed. Also, located outside of the Meridian Crossing right-of-way along Old Meridian Road are 3 temporary swales, which convey flows to storm inlets. These swales will be removed upon the construction of Old Meridian Road.

**Detention Pond WU**

Based on the current configuration of the basins, Pond WU does work as intended. The 5-year release rate is less than the existing flow rate. Refer to the table earlier in the report for flow rates at major design points. Based on the current analysis of the hydrology for the area no modifications will be necessary to the outlet structure of the detention pond as previously assumed. The 100-year storm also functions properly and has a release rate lower than the existing flows.

**Proposed Water Quality Pond**

Based on the City of Colorado Springs/El Paso County DCM Volume 2, a water quality pond is needed, as the development area is greater than 1.0 acre. There will be two water quality capture ponds (WQCP), which will be porous landscape detention (PLD). Both ponds structures will be located between the northern right of way of McLaughlin road and the proposed curb and gutter for lots 5 and 6. This will enable the ponds to be used for final construction of each of the building sites. The east and west pond combine for a total 8200 square feet.

**Ultimate Design**

Currently, there is evidence that Old Meridian Road will be improved. If this situation does not happen, there is an "ultimate design" scenario to account for this. Meridian Crossing will be responsible for installing curb and gutter and sidewalk for the portion of Old Meridian Road which fronts their property. The rcp stub behind inlet DP-1 will be extended via 18"rcp to the existing culvert under Old Meridian Road. A 5' type R inlet will be installed to catch the flows of Old Meridian Road (see appendix item I for StormCAD calculations). A 5' manhole will be installed to connect the new and existing pipes. The existing culvert will continue to convey the flow through an existing swale, which releases flows into the roadside swale along Meridian Road. This flow still reaches an ultimate location of DP-8, where all flows leave the Falcon Highlands development.

**Downstream Facilities**

Falcon West Tributary

Detention Pond WU discharges below the historical rate as described in the Falcon Highlands Filing No. 1 PDR and the Falcon Basin DBPS. Just downstream of Pond WU outlet works is an existing bridge at SH 24. At Highway 24 near Pond WU, triple 12' x 6' RCBC's were installed in 1999. This facility conveys the 1239 cfs 100-year design flow. An analysis of these structures in included in the appendix. The DBPS recommended installing a lined channel with geotextile fabric and grade control drop structures. Currently, this area has no real definable channels, but flows are allowed to spread once they are released through the structure at SH 24. This area is within a FEMA designated floodplain. Historic flows as stated in the DBPS are 1518 cfs.

Downstream of SH 24, flows follow a FEMA floodplain to Falcon Highway. At Falcon Highway there is a 36-inch cmp culvert that is inadequate to carry the 100-year design flow.

## *DRAINAGE FEES, COST ESTIMATE & MAINTENANCE*

### Maintenance

The streets and major improvements within this site will be maintained by the Meridian Crossing Property Owners Association (POA) for ownership and maintenance. This includes the roads, drainage facilities, and water quality ponds. The Falcon Highlands Metropolitan District will own and operate water and wastewater systems. The remaining utilities (gas, phone, electric, cable, etc) will be owned and maintained by their respective companies. Easements will be issued to ensure each entity is able to access and maintain their facilities.

### Drainage Fees

The proposed development is located within the Falcon Basin. The proposed commercial site encompasses approximately 9.5 acres. Fees will be based on 9.0 acres (95% imperviousness due to commercial development).

Drainage fees in the Falcon Basin are $6,925 and bridge fees are $2,659. Based on these numbers and an impervious area of 9.0 acres fees for this development are $62,325 for drainage and $25,261 for bridge fees. This gives a total fee of $87,586.

### Proposed Facilities Estimate

| ITEM | UNITS | UNIT COST | QUANTITY | ITEM COST |
|---|---|---|---|---|
| **DRAINAGE** | | | | |
| 5' STORM MANHOLE | EA | 2,800 | 1 | 2,800 |
| 30" RCP | LF | 55 | 435 | 23,925 |
| 36" RCP | LF | 65 | 60 | 3,900 |
| 42" RCP | LF | 80 | 105 | 8,400 |
| RIPRAP | CY | 45 | 30 | 1,350 |
| *SUBTOTAL DRAINAGE* | | | | *$40,375* |
| **GRADING AND EROSION CONTROL** | | | | |
| CLEARING AND GRUBBING | AC | $800 | 9.5 | $7,600 |
| EARTHWORK | CY | 3.50 | 13300 | 46,550 |
| WATER QUALITY PONDS | EA | 3,000 | 2 | 6,000 |
| CURB BACKFILL | LF | 2.50 | 3200 | 8,000 |
| MISC SEEDING AND MULCH | AC | 3,500 | 6 | 21,000 |
| HAY BALE CHECKS | EA | 10 | 37 | 370 |
| INLET PROTECTORS | EA | 200 | 4 | 800 |
| VEHICLE TRACKING CONTROL | EA | 1,500 | 1 | 1,500 |
| SILT FENCING | LF | 5 | 1800 | 9,000 |
| *SUBTOTAL GRADING & EROSION CONTROL* | | | | *$100,770* |
| **ULTIMATE DRAINAGE** | | | | |
| 5' STORM MANHOLE | EA | 2,800 | 1 | 2,800 |
| 30" RCP | LF | 40 | 259 | 10,360 |
| 5' TYPE R INLET | EA | 3,500 | 1 | 3,500 |
| *SUBTOTAL ULTIMATE DRAINAGE* | | | | *$16,660* |
| ***SUBTOTAL DRAINAGE & EROSION CONTROL*** | | | | ***$157,805*** |
| Engineering (10%) | | | | $15,781 |

| | | | | |
|---|---|---|---|---|
| Contingency (10%) | | | | |
| | | | | $15,781 |
| ***TOTAL*** | | | | |
| | | | | ***$189,367*** |

## *EROSION CONTROL*

### *General Concept*

During construction, best management practices for erosion control will be employed based on El Paso County criteria and the erosion control plan.

Ditches will be designed to meet El Paso County criteria for slope and velocity, keeping velocities below scouring levels.

During construction, best management practices (BMP) for erosion control will be employed based on El Paso County Criteria. BMP's will be utilized as deemed necessary by the contractor and/or engineer and are not limited to measures shown on the construction drawing set. The contractor shall minimize the amount of area disturbed during all construction activities.

In general the following shall be applied in developing the sequence of major activities:

- Install downslope and sideslope perimeter BMP's before land disturbing activity occurs.
- Do not disturb an area until it is necessary for construction activity to proceed.
- Cover or stabilize as soon as possible.
- Time the construction activities to reduce the impacts from seasonal climatic changes or weather events.
- The construction of filtration BMP's should wait until the end of the construction project when upstream drainage areas have been stabilized.
- Do not remove temporary perimeter controls until after all upstream areas are stabilized.

### Silt Fence

Silt fence will be placed along downstream limits of disturbed areas. This will prevent suspended sediment from leaving the site during infrastructure construction. Silt fencing is to remain in place until vegetation is reestablished.

### Erosion Bales

Erosion bales will be placed ten (10) feet from the inlet of all culverts and inlets during construction to prevent culverts from filling with sediment. Erosion bales will remain in place until vegetation is reestablished in graded roadside ditches and channels. Erosion bale ditch checks will be used on slopes greater than 1% to reduce flow velocities until vegetation is reestablished.

### Vehicle Tracking Control

This BMP is used to stabilize construction entrances, roads, parking areas and staging areas to prevent the tracking of sediment from the construction site. A vehicle tracking control (VIC) is to be used at all locations where vehicles exit the construction site onto public roads, loading and unloading areas, storage and staging areas, where construction trailers are to be located, any construction area that receives high vehicular traffic, construction roads and parking areas. VTC's should not be installed in areas where soils erode easily or are wet.

## Sedimentation Pond

This BMP is used to detain runoff which has become laden with sediment long enough to allow the sediment to settle out. As the construction area is larger than 1 acre, a temporary sediment basin is required per Volume 2 of the Drainage Criteria Manual. The basin will be located in the area of the proposed water quality pond, as this area will need to be excavated and an embankment built. A temporary 8" pvc underdrain will be installed to drain this basin during construction.

*REFERENCE MATERIALS*


1. "City of Colorado Springs/El Paso County Drainage Criteria Manual" September 1987, Revised November 1991, Revised October 1994.

2. "City of Colorado Springs/El Paso County Drainage Criteria Manual, Volume 2: Stormwater Quality Policies, Procedures and Best Management Practices" November 1, 2002.

3. Soils Survey of El Paso County Area, Natural Resources Conservation Services of Colorado.

4. Flood Insurance Rate Study for El Paso County, Colorado and Incorporated Areas. Federal Emergency Management Agency, Revised March 17, 1997.

5. Falcon Area Drainage Basin Planning Study Preliminary Design Report, December 2000. Prepared by URS Corp.

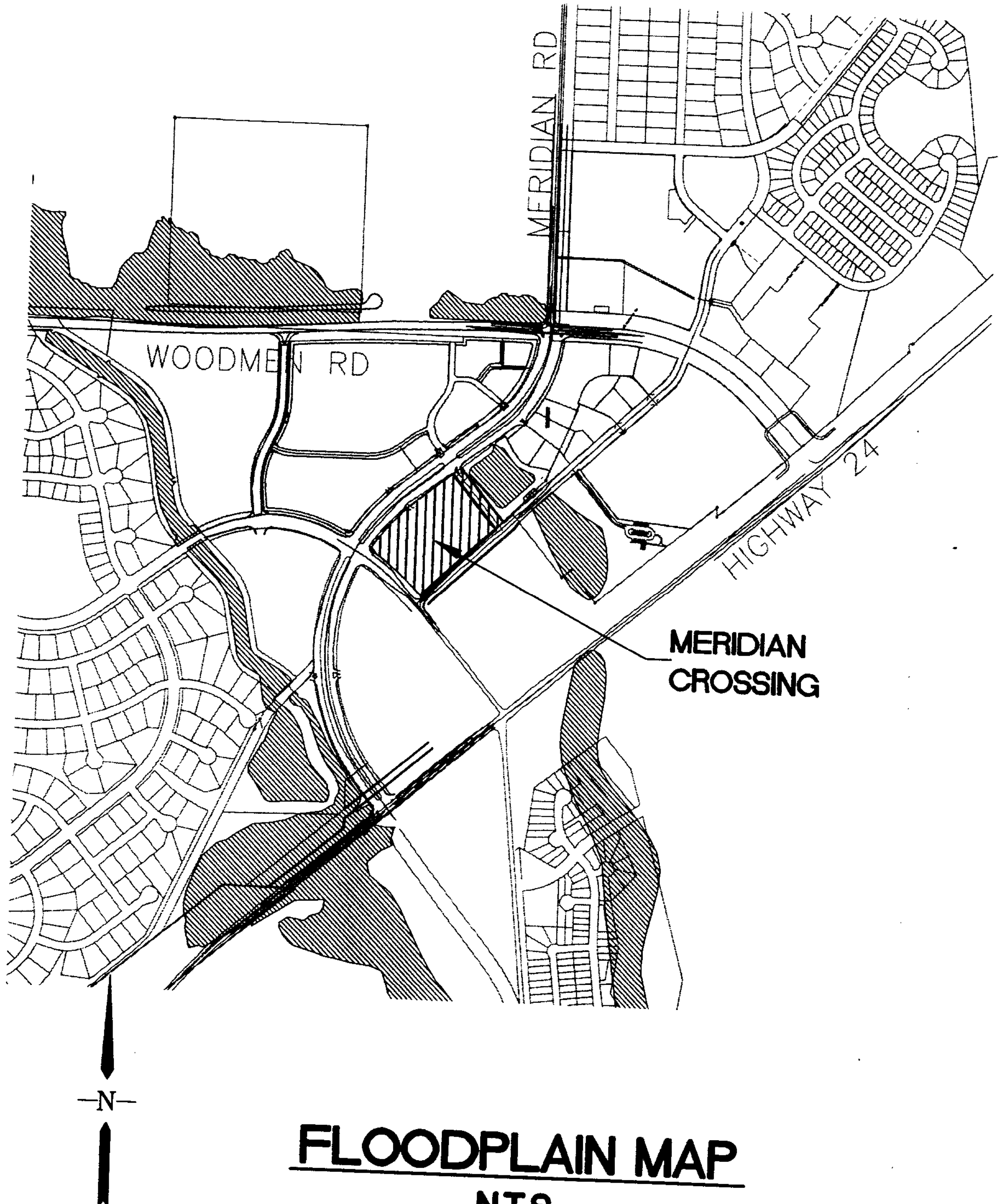
6. Master Development Drainage Plan, and Preliminary Drainage Report and Final Drainage Report for Falcon Highland Filing No. 1, October 2004. Prepared by URS Corp.

7. Floodplain Modification Study and Application for Conditional Letter of Map Revision for the Middle Tributary of the Falcon Basin-Regency Center, January 2005. Prepared by URS Corp.

8. Amendment to Falcon Highlands Master Drainage Development Plan, September 2005. Prepared by URS Corp.

9. Falcon Highlands Market Place Filing No. 1 Preliminary and Final Drainage Report, December 22, 2005. Prepared by URS Corp.

**Figure 3: FEMA Floodplain Map**

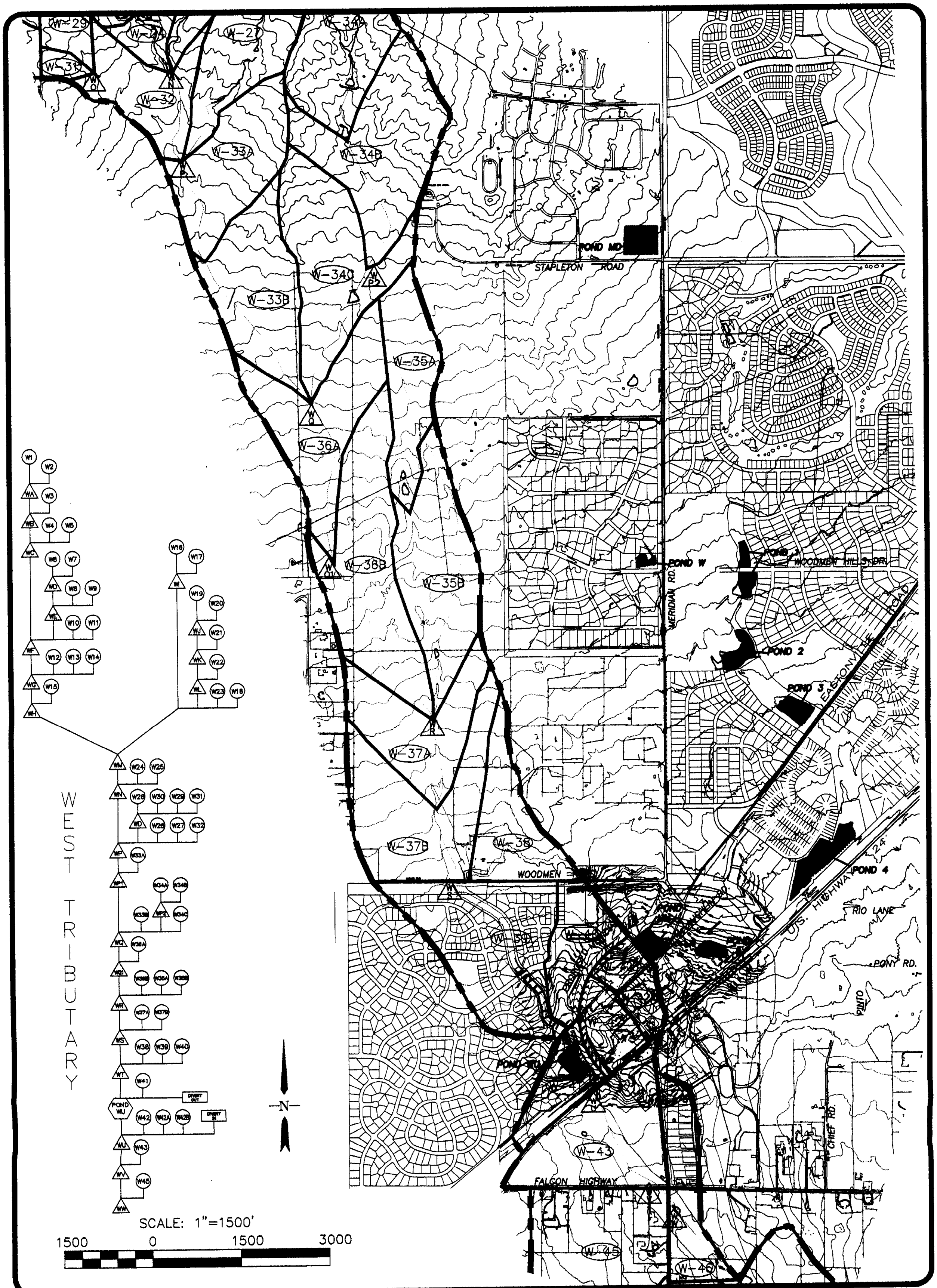



# FLOODPLAIN MAP

**N.T.S.**

| | |
|---|---|
| MERIDIAN CROSSING | SE Springs Engineering — 31 NORTH TEJON, SUITE 315, COLORADO SPRINGS, CO 80903, TEL: (719) 227-7388, FAX: (719) 227-7392 |
| FIRM MAP 08041C0575 REV 11/26/03 | FIGURE 3 |

PROJECT NO. 057-07-032




# MERIDIAN CROSSING

## HEC-1 HYDROLOGIC MODEL

SE Springs Engineering
31 NORTH TEJON, SUITE 315
COLORADO SPRINGS, COLORADO 80903
TEL: (719) 227-7388 FAX: (719) 227-7392

FIGURE 4

PROJECT NO. 06-0033

## Appendix A: Existing HEC-1 Calculations

```
1***************************************                         ***************************************
 *                                      *                        *                                     *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                        *  U.S. ARMY CORPS OF ENGINEERS       *
 *              JUN   1998              *                        *  HYDROLOGIC ENGINEERING CENTER      *
 *            VERSION 4.1               *                        *        609 SECOND STREET            *
 *                                      *                        *     DAVIS, CALIFORNIA 95616         *
 *  RUN DATE   28SEP07  TIME  11:57:06  *                        *         (916) 756-1104              *
 *                                      *                        *                                     *
 ***************************************                         ***************************************


                  X     X  XXXXXXX   XXXXX           X
                  X     X  X        X     X         XX
                  X     X  X        X                X
                  XXXXXXX  XXXX     X        XXXXX   X
                  X     X  X        X                X
                  X     X  X        X     X          X
                  X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL    LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   1          ID     FALCON BASIN 5-YR/ 24-HOUR FLOOD/ EXISTING CONDITIONS
   2          ID          UPPER EAST TRIBUTARY (WOODMEN HILLS) BASED ON CLOMR APPROVED 2/2/99
   3          ID          INCLUDING 2 EXISTING SCS STOCK PONDS, WEST WOODMEN HILLS POND
   4          ID          NOTE: M1-M4 (PAINT BRUSH HILLS) MODELED AS HISTORIC TO ACCOUNT FOR
   5          ID                 DETENTION POND AT MC
   6          ID          NOTE: NO CULVERT AT STAPLETON & MERIDIAN, TEMP CULVERTS AT MERIDIAN
   7          ID                 DOWNSTREAM OF WOODMEN HILLS DRIVE (DIVERSION)
              *DIAGRAM
   8          IT        5 14JUL99     800     300
   9          IO        5

  10          KK       W1
  11          KM
  12          BA    .0479
  13          PB      2.6
  14          IN       15
  15          PC    .0005   .0015   .0030   .0045   .0060   .0080   .0100   .0120   .0143   .0165
  16          PC    .0188   .0210   .0233   .0255   .0278   .0320   .0390   .0460   .0530   .0600
  17          PC    .0750   .1000   .4000   .7000   .7250   .7500   .7650   .7800   .7900   .8000
  18          PC    .8100   .8200   .8250   .8300   .8350   .8400   .8450   .8500   .8550   .8600
  19          PC    .8638   .8675   .8713   .8750   .8788   .8825   .8863   .8900   .8938   .8975
  20          PC    .9013   .9050   .9083   .9115   .9148   .9180   .9210   .9240   .9270   .9300
  21          PC    .9325   .9350   .9375   .9400   .9425   .9450   .9475   .9500   .9525   .9550
  22          PC    .9575   .9600   .9625   .9650   .9675   .9700   .9725   .9750   .9775   .9800
  23          PC    .9813   .9825   .9838   .9850   .9863   .9875   .9888   .9900   .9913   .9925
  24          PC    .9938   .9950   .9963   .9975   .9988   1.000
  25          LS               60
  26          UD     .097

  27          KK
  28          KM
  29          RK     1519   .0263    .035            TRAP       5       4

  30          KK       W2
  31          KM
  32          BA    .0278
  33          LS               60
  34          UD     .160

  35          KK       WA
  36          KM
  37          HC        2

  38          KK
  39          KM
  40          RK      464   .0151    .035            TRAP       5       4

  41          KK       W3
  42          KM
  43          BA    .0498
  44          LS               61
  45          UD     .139


  46          KK       WB
  47          KM
  48          HC        2

  49          KK
  50          KM
  51          RK      823   .0279    .035            TRAP       5       4                      54

  52          KK       W4
  53          KM
  54          BA    .0054
  55          LS               62
  56          UD     .044

  57          KK
  58          KM
  59          RK     1078   .0482    .035            TRAP       5       4

  60          KK       W5
  61          KM
  62          BA    .0159
  63          LS               60
  64          UD     .075

  65          KK       WC
  66          KM
  67          HC        3

  68          KK
  69          KM
  70          RK      557   .0449    .035            TRAP      10       4

  71          KK       W6
  72          KM
  73          BA    .0486
  74          LS               60
  75          UD     .085
```

```
 76    KK
 77    KM
 78    RK     592   .0372   .035    TRAP    5    4

 79    KK      W7
 80    KM
 81    BA   .0217
 82    LS              60
 83    UD    .074

 84    KK
 85    KM
 86    RK     464   .1466   .035    TRAP    5    4

 87    KK      WD
 88    KM
 89    HC       2

 90    KK     D-E
 91    KM
 92    RK    1044   .0479   .035    TRAP    5    4

 93    KK      W8
 94    KM
 95    BA   .0286
 96    LS              60
 97    UD    .069

 98    KK
 99    KM
100    RK    1449   .0504   .035    TRAP    5    4

101    KK      W9
102    KM
103    BA   .0402
104    LS              61
105    UD    .097

106    KK      WE
107    KM
108    HC       3

109    KK     E-F
110    KM
111    RK     789   .0038   .035    TRAP    5    4

112    KK     W10
113    KM
114    BA   .0431
115    LS              61
116    UD    .096

117    KK
118    KM
119    RK     824   .0388   .035    TRAP    5    4

120    KK     W11
121    KM
122    BA   .0314
123    LS              60
124    UD    .077

125    KK      WF
126    KM
127    HC       4

128    KK     F-G
129    KM
130    RK    2319   .0211   .035    TRAP   10    4

131    KK     W12
132    KM
133    BA   .0398
134    LS              60
135    UD    .095

136    KK
137    KM
138    RK    2478   .0307   .035    TRAP    5    4

139    KK     W14
140    KM
141    BA   .0473
142    LS              61
143    UD    .135

144    KK
145    KM
146    RK      81  0.0001   .035    TRAP    5    4

147    KK     W13
148    KM
149    BA   .1123
150    LS              61
```

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 151 | UD | .182 | | | | | |
| 152 | KK | WG | | | | | |
| 153 | KM | | | | | | |
| 154 | HC | 4 | | | | | |
| 155 | KK | G-H | | | | | |
| 156 | KM | | | | | | |
| 157 | RK | 2632 | .0217 | .035 | TRAP | 15 | 4 |
| 158 | KK | | | | | | |
| 159 | KM | | | | | | |
| 160 | RK | 2447 | .0372 | .035 | TRAP | 5 | 4 |
| 161 | KK | W15 | | | | | |
| 162 | KM | | | | | | |
| 163 | BA | .0881 | | | | | |
| 164 | LS | | 61 | | | | |
| 165 | UD | .141 | | | | | |
| 166 | KK | | | | | | |
| 167 | KM | | | | | | |
| 168 | RK | 1763 | .0289 | .035 | TRAP | 5 | 4 |
| 169 | KK | WH | | | | | |
| 170 | KM | | | | | | |
| 171 | HC | 2 | | | | | |
| 172 | KK | W16 | | | | | |
| 173 | KM | | | | | | |
| 174 | BA | .0292 | | | | | |
| 175 | LS | | 61 | | | | |
| 176 | UD | .092 | | | | | |
| 177 | KK | | | | | | |
| 178 | KM | | | | | | |
| 179 | RK | 1345 | .0260 | .035 | TRAP | 5 | 4 |
| 180 | KK | W17 | | | | | |
| 181 | KM | | | | | | |
| 182 | BA | .0184 | | | | | |
| 183 | LS | | 60 | | | | |
| 184 | UD | .085 | | | | | |
| 185 | KK | WI | | | | | |
| 186 | KM | | | | | | |
| 187 | HC | 2 | | | | | |
| 188 | KK | I-M | | | | | |
| 189 | KM | | | | | | |
| 190 | RK | 2650 | .0370 | .035 | TRAP | 15 | 4 |
| 191 | KK | W19 | | | | | |
| 192 | KM | | | | | | |
| 193 | BA | .0428 | | | | | |
| 194 | LS | | 61 | | | | |
| 195 | UD | .083 | | | | | |
| 196 | KK | | | | | | |
| 197 | KM | | | | | | |
| 198 | RK | 881 | .0329 | .035 | TRAP | 5 | 4 |
| 199 | KK | W20 | | | | | |
| 200 | KM | | | | | | |
| 201 | BA | .0315 | | | | | |
| 202 | LS | | 61 | | | | |
| 203 | UD | .071 | | | | | |
| 204 | KK | WJ | | | | | |
| 205 | KM | | | | | | |
| 206 | HC | 2 | | | | | |
| 207 | KK | | | | | | |
| 208 | KM | | | | | | |
| 209 | RK | 3061 | .0235 | .035 | TRAP | 5 | 4 |
| 210 | KK | W21 | | | | | |
| 211 | KM | | | | | | |
| 212 | BA | .1347 | | | | | |
| 213 | LS | | 60 | | | | |
| 214 | UD | .156 | | | | | |
| 215 | KK | WK | | | | | |
| 216 | KM | | | | | | |
| 217 | HC | 2 | | | | | |
| 218 | KK | | | | | | |
| 219 | KM | | | | | | |
| 220 | RK | 487 | .0246 | .035 | TRAP | 5 | 4 |
| 221 | KK | W22 | | | | | |
| 222 | KM | | | | | | |
| 223 | BA | .0086 | | | | | |
| 224 | LS | | 63 | | | | |
| 225 | UD | .055 | | | | | |

```
KK      WL
KM
HC       2

KK
KM
RK    1786   .0297    .035            TRAP       5        4

KK     W23
KM
BA   .0244
LS              60
UD    .112

KK     W18
KM
BA   .1251
LS              60
UD    .189

KK      WM
KM
HC       5

KK     M-N
KM
RK    1345   .0149    .035            TRAP      20        4

KK     W24
KM
BA   .0442
LS              60
UD    .140

KK     W25
KM
BA   .0957
LS              61
UD    .197

KK      WN
KM
HC       3

KK     N-P
KM
RK    1589    .017    .035            TRAP      20        4

KK     W28
KM
BA   .0397
LS              63
UD    .128

KK
KM
RK    1345   .0208    .035            TRAP       5        4

KK     W30
KM
BA   .0509
LS              63
UD    .123

KK
KM
RK    1078   .0074    .035            TRAP       5        4

KK     W29
KM
BA   .0409
LS              63
UD    .145

KK     W31
KM
BA   .0123
LS              63
UD    .073

KK      WO
KM
HC       4

KK     O-P
KM
RK    2169   .0226    .035            TRAP       5        4

KK     W26
KM
BA   .0301
LS              63
UD    .062
```

```
KK
KM
RK    4662   .0225    .035            TRAP     5     4

KK     W27
KM
BA   .1633
LS              60
UD    .253

KK     W32
KM
BA   .0890
LS              60
UD    .170

KK      WP
KM
HC       5

KK     P-Q
KM
RK    1925   .0182    .035            TRAP    25     4

KK    W33A
KM
BA   .1261
LS              60
UD    .186

KK     WP1
KM
HC       2

KK    P1-Q
KM
RK    3000    .020    .035            TRAP    25     4

KK    W33B
KM
BA   .1360
LS              60
UD    .225

KK    W34A
KM
BA   .1261
LS              60
UD    .173

KK  34A-P2
KM
RK    2550   .0176    .035            TRAP    25     4

KK    W34B
KM
BA   .1766
LS              60
UD    .224

KK     WP2
KM
HC       2

KK    P2-Q
KM
RK    2640    .021    .035            TRAP    25     4

KK    W34C
KM
BA   .1625
LS              60
UD    .244

KK      WQ
KM
HC       4

KK    Q-Q1
KM
RK    2940    .022    .035            TRAP    25     4

KK    W36A
KM
BA   .1429
LS              60
UD    .234

KK     WQ1
KM
HC       2

KK    Q1-R
KM
RK    3400    .022    .035            TRAP    25     4
```

```
377   KK   W36B
378   KM
379   BA  .1918
380   LS          60
381   UD   .306

382   KK   W35A
383   KM
384   BA  .0958
385   LS          60
386   UD   .187

387   KK 35A-WR
388   KM
389   RK   3715  .023   .035      TRAP   25   4

390   KK   W35B
391   KM
392   BA  .1507
393   LS      0   60
394   UD   .259

395   KK     WR
396   KM
397   HC      4

398   KK   WR-S
399   KM
400   RK   2922  .0168  .035      TRAP   25   4

401   KK   W37A
402   KM
403   BA  .1138
404   LS          60
405   UD   .185

406   KK  37A-S
407   KM
408   RK   1430  .014   .035      TRAP   25   4

409   KK   W37B
410   KM
411   BA  .1636
412   LS          61
413   UD   .218

414   KK     WS
415   KM
416   HC      3

417   KK    S-T
418   KM
419   RK   3653  .0164  .035      TRAP   25   4

420   KK    W38
421   KM
422   BA  .0907
423   LS          62
424   UD   .190

425   KK
426   KM
427   RK   2922  .0171  .035      TRAP    5   4

428   KK    W39
429   KM
430   BA  .1833
431   LS          60
432   UD   .251

433   KK    W40
434   KM
435   BA  .0964
436   LS          60
437   UD   .165

438   KK     WT
439   KM
440   HC      4

441   KK    T-U
442   KM
443   RK   1125  .0098  .035      TRAP   25   4

444   KK    W41
445   KM
446   BA  .0601
447   LS          60
448   UD   .117

449   KK    W42
450   KM
451   BA  .0581
452   LS          81
```

```
UD    .127

KK    U-V
KM
RK    2656   .0184    .035          TRAP        5       4

KK     WU
KM
HC      3

KK
KM
RK    2215   .0181    .035          TRAP       25       4

KK     W43
KM
BA   .1457
LS              61
UD    .169

KK     WV
KM
HC      2

KK    V-W
KM
RK     487   .0103    .035          TRAP       25       4

KK     W45
KM
BA   .1931
LS              61
UD    .189

KK      WW
KM
HC      2

KK    W-X
KM
RK    1542   .0149    .035          TRAP        5       4

KK     M1
KM
BA   .0665
LS              60
UD    .108

KK
KM
RK     650   .0308    .035          TRAP        5       4

KK     M2
KM
BA   .0273
LS              60
UD    .114

KK     MB
KM
HC      2

KK
KM
RK     928   .0302    .035          TRAP        5       4

KK     M4
KM
BA   .0346
LS              60
UD    .121

KK
KM
RK     406   .0197     .02          TRAP       40       0

KK     M3
KM
BA   .0149
LS              60
UD    .076

KK     MC
KM
HC      3

KK
KM
RK    1902   .0231    .035          TRAP        5       4

KK     M5
KM
BA   .0176
LS              69
UD    .108
```

```
KK
KM
RK     1717   .0186     .02          TRAP      40       0

KK      M6
KM
BA    .0637
LS               65
UD     .233

KK      MD
KM
HC        3

KK
KM
RK     2841    .019    .035          TRAP       5       4

KK      M7
KM
BA    .0524
LS               69
UD     .170

KK
KM
RK     1044   .0268     .02          TRAP      40       0

KK      M8
KM
BA    .0370
LS               61
UD     .126

KK      ME
KM
HC        2

KK
KM
RK     2992   .0187    .035          TRAP       5       4

KK      M9
KM
BA    .0169
LS               69
UD     .087

KK
KM
RK     3433   .0253     .03          TRAP       5       4

KK     M12A
KM
BA    .0658
LS               60
UD     .159

KK     M12B
KM
BA    .1481
LS               60
UD     .219

KK      MF
KM
HC        5

KK
KM
RK     2586   .0224    .035          TRAP      10       4

KK      M13
KM
BA    .0614
LS               64
UD     .165

KK
KM
RK     1700     .01    .035          TRAP       6       4

KK      M14
KM
BA    .1624
LS               64
UD     .228

KK       MG
KM
HC        2

KK    PONDW
KM          WOODMEN HILLS DETENTION POND WEST (FROM FDR WH FLG F4)
```

```
603          SV       0    .68    1.5    235    3.6    4.9    6.3   7.34   7.34
604          SE     968    969    970    971    972    973    974    975    976
605          SQ       0      8   15.5     41   84.4    110    138    152    205
606          RS       1   ELEV    968

607          KK      MH
608          KM
609          HC       2

610          KK
611          KM
612          RK    1276  .0212   .035          TRAP     15      4

613          KK   MH-P2
614          KM        DIVERT FLOW TO POND 2 VIA TWIN 23x47 ARCH CMPS UNDER MERIDIAN
615          DT  DIVRT1     90
616          DI       0     39     72    152    263    318    377    442    591
617          DQ       0     39     70     80     80     80     85     85     90

618          KK     M15
619          KM
620          BA   .1242
621          LS             64
622          UD    .203

623          KK      MI
624          KM
625          HC       2

626          KK
627          KM
628          RK    1995  .0165   .035          TRAP     15      4

629          KK     M19
630          KM
631          BA   .0499
632          LS             61
633          UD    .159

634          KK      MJ
635          KM
636          HC       2

637          KK
638          KM
639          RK    2215  .0158   .035          TRAP     15      4

640          KK     M10
641          KM
642          BA   .0581
643          LS             62
644          UD    .102

645          KK   M10-K
646          KM
647          RK    3150  .0255    .03          TRAP      5      4

648          KK    M11A
649          KM
650          BA   .1067
651          LS             61
652          UD    .231

653          KK      MK
654          KM
655          HC       2

656          KK   MK-K1
657          KM
658          RK    2300   .260    .03          TRAP      5      4

659          KK    M11B
660          KM
661          BA   .0879
662          LS             60
663          UD    .150

664          KK  11B-K1
665          KM
666          RK    2400   .025    .03          TRAP      5      4

667          KK    M11C
668          KM
669          BA   .0933
670          LS             60
671          UD    .160

672          KK     MK1
673          KM
674          HC       3

675          KK   K1-ML
676          KM
677          RK    1821   .028   .035          TRAP      5      4
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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 678 | KK | M16 | | | | | |
| 679 | KM | | | | | | |
| 680 | BA | .042 | | | | | |
| 681 | LS | | 60 | | | | |
| 682 | UD | .139 | | | | | |
| 683 | KK | ML | | | | | |
| 684 | KM | | | | | | |
| 685 | HC | 2 | | | | | |
| 686 | KK | | | | | | |
| 687 | KM | | | | | | |
| 688 | RK | 2099 | .02 | .035 | TRAP | 5 | 4 |
| 689 | KK | M17 | | | | | |
| 690 | KM | | | | | | |
| 691 | BA | .0765 | | | | | |
| 692 | LS | | 61 | | | | |
| 693 | UD | .133 | | | | | |
| 694 | KK | MM | | | | | |
| 695 | KM | | | | | | |
| 696 | HC | 2 | | | | | |
| 697 | KK | | | | | | |
| 698 | KM | | | | | | |
| 699 | RK | 2320 | .0121 | .035 | TRAP | 10 | 4 |
| 700 | KK | M18 | | | | | |
| 701 | KM | | | | | | |
| 702 | BA | .061 | | | | | |
| 703 | LS | | 61 | | | | |
| 704 | UD | .142 | | | | | |
| 705 | KK | | | | | | |
| 706 | KM | | | | | | |
| 707 | RK | 2122 | .017 | .035 | TRAP | 5 | 4 |
| 708 | KK | M20 | | | | | |
| 709 | KM | | | | | | |
| 710 | BA | .1341 | | | | | |
| 711 | LS | | 61 | | | | |
| 712 | UD | .211 | | | | | |
| 713 | KK | MN | | | | | |
| 714 | KM | | | | | | |
| 715 | HC | 4 | | | | | |
| 716 | KK | | | | | | |
| 717 | KM | | | | | | |
| 718 | RK | 1531 | .0202 | .035 | TRAP | 25 | 4 |
| 719 | KK | M21 | | | | | |
| 720 | KM | | | | | | |
| 721 | BA | .0241 | | | | | |
| 722 | LS | | 61 | | | | |
| 723 | UD | .125 | | | | | |
| 724 | KK | | | | | | |
| 725 | KM | | | | | | |
| 726 | RK | 1322 | .0212 | .035 | TRAP | 5 | 4 |
| 727 | KK | M23 | | | | | |
| 728 | KM | | | | | | |
| 729 | BA | .0461 | | | | | |
| 730 | LS | | 60 | | | | |
| 731 | UD | .120 | | | | | |
| 732 | KK | MO | | | | | |
| 733 | KM | | | | | | |
| 734 | HC | 3 | | | | | |
| 735 | KK | | | | | | |
| 736 | KM | | | | | | |
| 737 | RK | 974 | .0133 | .035 | TRAP | 25 | 4 |
| 738 | KK | M24 | | | | | |
| 739 | KM | | | | | | |
| 740 | BA | .0776 | | | | | |
| 741 | LS | | 60 | | | | |
| 742 | UD | .125 | | | | | |
| 743 | KK | MP | | | | | |
| 744 | KM | | | | | | |
| 745 | HC | 2 | | | | | |
| 746 | KK | | | | | | |
| 747 | KM | | | | | | |
| 748 | RK | 290 | .0138 | .035 | TRAP | 25 | 4 |
| 749 | KK | M25 | | | | | |
| 750 | KM | | | | | | |
| 751 | BA | .0105 | | | | | |
| 752 | LS | | 60 | | | | |
| 753 | UD | .130 | | | | | |

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754     KK      MQ
755     KM
756     HC       2

757     KK
758     KM
759     RK    3305   .0136    .035            TRAP      25       4

760     KK     M26
761     KM
762     BA   .1779
763     LS              65
764     UD    .250

765     KK      MR
766     KM
767     HC       2

768     KK     W44
769     KM
770     BA   .0384
771     LS              60
772     UD    .141

773     KK
774     KM
775     RK    2029   .0148    .035            TRAP       5       4

776     KK     W47
777     KM
778     BA   .0541
779     LS              60
780     UD    .148

781     KK
782     KM
783     RK    1438   .0223    .035            TRAP       5       4

784     KK     W46
785     KM
786     BA   .0418
787     LS              61
788     UD    .154

789     KK     M27
790     KM
791     BA   .0528
792     LS              60
793     UD    .132

794     KK      WX
795     KM
796     HC       6

797     KK
798     KM
799     RK    2563   .0125    .035            TRAP      40       4

800     KK     W48
801     KM
802     BA   .1179
803     LS              61
804     UD    .091

805     KK
806     KM
807     RK    2400   .0188    .035            TRAP       5       4

808     KK     W49
809     KM
810     BA   .2651
811     LS              61
812     UD    .181

813     KK      WZ
814     KM
815     HC       3

816     KK
817     KM
818     RK     800   .0125    .035            TRAP      40       4

819     KK     W50
820     KM
821     BA   .1061
822     LS              61
823     UD    .145

824     KK     WAB
825     KM
826     HC       2

827     KK
828     KM
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829          RK     742   .0108    .035          TRAP      40       4

830          KK     W51
831          KM
832          BA   .0546
833          LS              63
834          UD    .172

835          KK     WAC
836          KM
837          HC       2

838          KK
839          KM
840          RK     638   .0345    .035          TRAP      40       4

841          KK     W52
842          KM
843          BA   .0499
844          LS              63
845          UD    .109

846          KK
847          KM
848          RK    1171   .0205    .035          TRAP       5       4

849          KK     W53
850          KM
851          BA   .0531
852          LS              63
853          UD    .156

854          KK     WAD
855          KM
856          HC       2

857          KK
858          KM
859          RK     290   .0310    .035          TRAP      10       4

860          KK     W54
861          KM
862          BA   .0078
863          LS              60
864          UD    .050

865          KK     WAE
866          KM
867          HC       3

868          KK
869          KM
870          RK    1925   .0052    .035          TRAP      40       4

871          KK     W56
872          KM
873          BA   .1831
874          LS              60
875          UD    .191

876          KK     WAF
877          KM
878          HC       2

879          KK
880          KM
881          RK    1032   .0155    .035          TRAP      40       4

882          KK     W62
883          KM
884          BA   .0750
885          LS              60
886          UD    .090

887          KK
888          KM
889          RK    2169   .0203    .035          TRAP       5       4

890          KK     W63
891          KM
892          BA    .047
893          LS              60
894          UD    .109

895          KK
896          KM
897          RK    1450   .0131    .035          TRAP       5       4

898          KK     W61
899          KM
900          BA    .192
901          LS              60
902          UD    .251

903          KK     WAH
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```
KM
HC       3

KK
KM
RK    1241   .0153    .035           TRAP       5        4

KK     W57
KM
BA   .0732
LS              60
UD    .140

KK
KM
RK    5903   .0254    .035           TRAP       5        4

KK     W58
KM
BA   .2296
LS              60
UD    .251

KK     WAI
KM
HC       3

KK
KM
RK     232   .0086    .035           TRAP      15        4

KK     E1A
KM
BA   .1151
LS       0      60
UD    .234

KK  E1A-EA
KM
RK    4000    .022    .035           TRAP       5        4

KK     E1B
KM
BA   .1665
LS       0      60
UD    .233

KK      EA
KM
HC       2

KK   EA-EB
KM
RK    1900    .022    .035           TRAP       5        4

KK      E2
KM
BA    .104
LS       0      60
UD    .149

KK      EB
KM
HC       2

KK   POND1
KM       ROUTE FLOW THROUGH SCS POND 1
SV       0     .01     .28    1.12    2.70    5.18    6.00    6.94
SE   945.5     946     948     950     952     954   954.5     955
SQ       0       0       0       0       0    48.5   176.4   351.4
RS       1    ELEV   945.5

KK
KM
RK    1300   .0192    .035           TRAP       5        4

KK      E3
KM
BA    .090
LS              60
UD    .128

KK   MH-P2
KM       RETRIEVE DIVERSION FROM W. MERIDIAN RD DITCH
DR  DIVRT1

KK      EC
KM
HC       3

KK  POND2
KM       ROUTE FLOW THROUGH SCS POND 2
SV       0     .21    1.11    3.19    6.89    9.52   11.08   12.82   14.72   16.70
SE     920     922     924     926     928     929   929.5     930   930.5     931
SQ       0       0       0       0       0       0      25    86.5   186.2   308.4
```

```
980    RS       1   ELEV    920

981    KK
982    KM
983    RK    1700  .0141   .035      TRAP    5    4

984    KK     E1C
985    KM
986    BA   .0845
987    LS             60
988    UD    .200

989    KK  1C-ED1
990    KM
991    RK    3450   .022   .035      TRAP    5    4

992    KK      E4
993    KM
994    BA    .127
995    LS             60
996    UD    .200

997    KK     ED1
998    KM
999    HC       2

1000   KK  ED1-ED
1001   KM
1002   RK     450  .0178    .03      TRAP    5    4

1003   KK      E5
1004   KM
1005   BA    .094
1006   LS             60
1007   UD    .160

1008   KK      ED
1009   KM
1010   HC       3

1011   KK
1012   KM
1013   RK     950  .0211   .035      TRAP   10    4

1014   KK      E8
1015   KM
1016   BA   .0446
1017   LS             60
1018   UD    .139

1019   KK      EE
1020   KM
1021   HC       2

1022   KK
1023   KM
1024   RK    1500  .0127   .035      TRAP   10    4

1025   KK     E10
1026   KM
1027   BA    .029
1028   LS             60
1029   UD    .158

1030   KK      EF
1031   KM
1032   HC       2

1033   KK     F-G
1034   KM
1035   RK     950  .0074   .035      TRAP   15    4

1036   KK      E6
1037   KM
1038   BA    .119
1039   LS             60
1040   UD    .228

1041   KK      E7
1042   KM
1043   BA    .031
1044   LS             60
1045   UD    .082

1046   KK
1047   KM
1048   RK    1100  .0100   .035      TRAP    5    4

1049   KK     EG1
1050   KM
1051   HC       2

1052   KK    G1-G
1053   KM
1054   RK    1650  .0176   .035      TRAP    5    4
```

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1055 | KK | E9 | | | | | | |
| 1056 | KM | | | | | | | |
| 1057 | BA | .077 | | | | | | |
| 1058 | LS | | 60 | | | | | |
| 1059 | UD | .207 | | | | | | |
| 1060 | KK | | | | | | | |
| 1061 | KM | | | | | | | |
| 1062 | RK | 1500 | .0080 | .03 | | TRAP | 5 | 4 |
| 1063 | KK | E11 | | | | | | |
| 1064 | KM | | | | | | | |
| 1065 | BA | .045 | | | | | | |
| 1066 | LS | | 60 | | | | | |
| 1067 | UD | .195 | | | | | | |
| 1068 | KK | E12 | | | | | | |
| 1069 | KM | | | | | | | |
| 1070 | BA | .092 | | | | | | |
| 1071 | LS | | 60 | | | | | |
| 1072 | UD | .156 | | | | | | |
| 1073 | KK | EG | | | | | | |
| 1074 | KM | | | | | | | |
| 1075 | HC | 5 | | | | | | |
| 1076 | KK | E13 | | | | | | |
| 1077 | KM | | | | | | | |
| 1078 | BA | .0165 | | | | | | |
| 1079 | LS | | 60 | | | | | |
| 1080 | UD | .252 | | | | | | |
| 1081 | KK | E14 | | | | | | |
| 1082 | KM | | | | | | | |
| 1083 | BA | .0051 | | | | | | |
| 1084 | LS | | 60 | | | | | |
| 1085 | UD | .153 | | | | | | |
| 1086 | KK | | | | | | | |
| 1087 | KM | | | | | | | |
| 1088 | RK | 279 | .0108 | .03 | | TRAP | 5 | 4 |
| 1089 | KK | EH | | | | | | |
| 1090 | KM | | | | | | | |
| 1091 | HC | 3 | | | | | | |
| 1092 | KK | | | | | | | |
| 1093 | KM | | | | | | | |
| 1094 | RK | 2400 | .0204 | .035 | | TRAP | 10 | 4 |
| 1095 | KK | E19 | | | | | | |
| 1096 | KM | | | | | | | |
| 1097 | BA | .0406 | | | | | | |
| 1098 | LS | | 62 | | | | | |
| 1099 | UD | .127 | | | | | | |
| 1100 | KK | EJ1 | | | | | | |
| 1101 | KM | | | | | | | |
| 1102 | HC | 2 | | | | | | |
| 1103 | KK | J1-K | | | | | | |
| 1104 | KM | | | | | | | |
| 1105 | RK | 4013 | .013 | .035 | | TRAP | 10 | 4 |
| 1106 | KK | E15 | | | | | | |
| 1107 | KM | | | | | | | |
| 1108 | BA | .0355 | | | | | | |
| 1109 | LS | | 63 | | | | | |
| 1110 | UD | .097 | | | | | | |
| 1111 | KK | | | | | | | |
| 1112 | KM | | | | | | | |
| 1113 | RK | 951 | .0189 | .035 | | TRAP | 5 | 4 |
| 1114 | KK | E16 | | | | | | |
| 1115 | KM | | | | | | | |
| 1116 | BA | .0307 | | | | | | |
| 1117 | LS | | 63 | | | | | |
| 1118 | UD | .100 | | | | | | |
| 1119 | KK | EI | | | | | | |
| 1120 | KM | | | | | | | |
| 1121 | HC | 2 | | | | | | |
| 1122 | KK | | | | | | | |
| 1123 | KM | | | | | | | |
| 1124 | RK | 1334 | .0105 | .035 | | TRAP | 5 | 4 |
| 1125 | KK | E17 | | | | | | |
| 1126 | KM | | | | | | | |
| 1127 | BA | .0312 | | | | | | |
| 1128 | LS | | 63 | | | | | |
| 1129 | UD | .097 | | | | | | |

```
1130    KK
1131    KM
1132    RK    1728   .0145   .035         TRAP    5    4

1133    KK     E18
1134    KM
1135    BA   .0488
1136    LS            63
1137    UD    .180

1138    KK     EJ2
1139    KM
1140    HC       3

1141    KK
1142    KM
1143    RK    4221   .0123   .035         TRAP   20    4

1144    KK     E23
1145    KM
1146    BA   .1683
1147    LS            62
1148    UD    .250

1149    KK     E24
1150    KM
1151    BA    .140
1152    LS            63
1153    UD    .371

1154    KK      EK
1155    KM
1156    HC       4

1157    KK
1158    KM
1159    RK    2817   .0149   .035         TRAP   25    4

1160    KK     E21
1161    KM
1162    BA   .0873
1163    LS            60
1164    UD    .183

1165    KK
1166    KM
1167    RK    1647   .0121   .035         TRAP    5    4

1168    KK     E20
1169    KM
1170    BA   .0771
1171    LS            62
1172    UD    .219

1173    KK
1174    KM
1175    RK     569   .0141   .035         TRAP    5    4

1176    KK     E22
1177    KM
1178    BA   .0677
1179    LS            61
1180    UD    .240

1181    KK      EL
1182    KM
1183    HC       3

1184    KK
1185    KM
1186    RK    2041   .0162   .035         TRAP   25    4

1187    KK     E25
1188    KM
1189    BA   .1665
1190    LS            61
1191    UD    .176

1192    KK      EM
1193    KM
1194    HC       3

1195    KK
1196    KM
1197    RK     928   .0108   .035         TRAP   40    4

1198    KK     E26
1199    KM
1200    BA   .0361
1201    LS            63
1202    UD    .096

1203    KK      EN
1204    KM
1205    HC       2
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1206      KK
1207      KM
1208      RK    1832   .0126   .035         TRAP    40    4

1209      KK     E27
1210      KM
1211      BA   .1236
1212      LS             63
1213      UD    .172

1214      KK     EO
1215      KM
1216      HC       2

1217      KK
1218      KM
1219      RK    1625   .0133   .035         TRAP     5    3

1220      KK     W55
1221      KM
1222      BA   .0452
1223      LS             60
1224      UD    .093

1225      KK     WAG
1226      KM
1227      HC       2

1228      KK
1229      KM
1230      RK    2025   .0109   .035         TRAP     5    4

1231      KK     W59
1232      KM
1233      BA   .0705
1234      LS             60
1235      UD    .200

1236      KK     WAJ
1237      KM
1238      HC       4

1239      KK
1240      KM
1241      RK    1450   .0124   .035         TRAP    40    4

1242      KK     E28
1243      KM
1244      BA   .0718
1245      LS             61
1246      UD    .223

1247      KK
1248      KM
1249      RK    2064   .0165   .035         TRAP    40    4

1250      KK     E29
1251      KM
1252      BA   .0465
1253      LS             61
1254      UD    .166

1255      KK     EZZ
1256      KM        COMBINE E29 & E30 AT DP ZZ
1257      HC       2

1258      KK     W60
1259      KM
1260      BA   .0711
1261      LS             60
1262      UD    .182

1263      KK      ZZ
1264      KM        COMBINE ALL AT DP ZZ
1265      HC       3
1266      ZZ
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            .         V
            .         V
136         .
            .         .
            .         .
139         .         .       W14
            .         .         V
            .         .         V
144         .         .
            .         .         .
            .         .         .
147         .         .         .       W13
            .         .         .         .
            .         .         .         .
152       WG ..............................
            V
            V
155       G-H
            V
            V
158
            .
            .
161         .       W15
            .         V
            .         V
166         .
            .         .
            .         .
169       WH ..........
            .
            .
172         .       W16
            .         V
            .         V
177         .
            .         .
            .         .
180         .         .       W17
            .         .         .
            .         .         .
185         .       WI ..........
            .         V
            .         V
188         .       I-M
            .         .
            .         .
191         .         .       W19
            .         .         V
            .         .         V
196         .         .
            .         .         .
            .         .         .
199         .         .         .       W20
            .         .         .         .
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204         .         .       WJ ..........
            .         .         V
            .         .         V
207         .         .
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210         .         .         .       W21
            .         .         .         .
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215         .         .       WK ..........
            .         .         V
            .         .         V
218         .         .
            .         .         .
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221         .         .         .       W22
            .         .         .         .
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226         .         .       WL ..........
            .         .         V
            .         .         V
229         .         .
            .         .         .
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232         .         .         .       W23
            .         .         .         .
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237         .         .         .         .       W18
            .         .         .         .         .
            .         .         .         .         .
242       WM ........................................
            V
            V
245       M-N
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248         .       W24
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 377                .         W36B
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                    .           .
 382                .           .         W35A
                    .           .           V
                    .           .           V
 387                .           .        35A-WR
                    .           .           .
                    .           .           .
 390                .           .           .          W35B
                    .           .           .            .
                    .           .           .            .
 395              WR ........................................
                    V
                    V
 398             WR-S
                    .
                    .
 401                .         W37A
                    .           V
                    .           V
 406                .        37A-S
                    .           .
                    .           .
 409                .           .         W37B
                    .           .           .
                    .           .           .
 414              WS ..........................
                    V
                    V
 417              S-T
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 420                .         W38
                    .           V
                    .           V
 425                .
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                    .           .
 428                .           .         W39
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 433                .           .           .          W40
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 438              WT ........................................
                    V
                    V
 441              T-U
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                    .
 444                .         W41
                    .           .
                    .           .
 449                .           .         W42
                    .           .           V
                    .           .           V
 454                .           .         U-V
                    .           .           .
                    .           .           .
 457              WU ..........................
                    V
                    V
 460

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                    .
 463                .         W43
                    .           .
                    .           .
 468              WV ............
                    V
                    V
 471              V-W
                    .
                    .
 474                .         W45
                    .           .
                    .           .
 479              WW............
                    V
                    V
 482              W-X
                    .
                    .
 485                .         M1
                    .           V
                    .           V
 490                .
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 493                .           .         M2
                    .           .           .
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 498                .         MB ............
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              .           V
              .           V
501           .
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              .           .
504           .           .          M4
              .           .            V
              .           .            V
509           .           .
              .           .            .
              .           .            .
512           .           .            .          M3
              .           .            .            .
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517           .         MC .........................
              .           V
              .           V
520           .
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523           .           .          M5
              .           .            V
              .           .            V
528           .           .
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531           .           .            .          M6
              .           .            .            .
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536           .         MD .........................
              .           V
              .           V
539           .
              .           .
              .           .
542           .           .          M7
              .           .            V
              .           .            V
547           .           .
              .           .            .
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550           .           .            .          M8
              .           .            .            .
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555           .           .          ME .............
              .           .            V
              .           .            V
558           .           .
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              .           .            .
561           .           .            .          M9
              .           .            .            V
              .           .            .            V
566           .           .            .
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569           .           .            .            .          M12A
              .           .            .            .            .
              .           .            .            .            .
574           .           .            .            .            .          M12B
              .           .            .            .            .            .
              .           .            .            .            .            .
579           .         MF .................................................
              .           V
              .           V
582           .
              .           .
              .           .
585           .           .          M13
              .           .            V
              .           .            V
590           .           .
              .           .            .
              .           .            .
593           .           .            .          M14
              .           .            .            .
              .           .            .            .
598           .           .           MG.............
              .           .            V
              .           .            V
601           .           .         PONDW
              .           .            .
              .           .            .
607           .         MH .............
              .           V
              .           V
610           .
              .           .
              .           .
615           .           .-------> DIVRT1
613           .       MH-P2
              .           .
              .           .
618           .           .          M15
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 623          .          MI .........
              .           V
              .           V
 626          .
              .           .
 629          .           .        M19
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 634          .          MJ .........
              .           V
              .           V
 637          .
              .           .
 640          .           .        M10
              .           .         V
              .           .         V
 645          .           .       M10-K
              .           .         .
              .           .         .
 648          .           .         .        M11A
              .           .         .         .
              .           .         .         .
 653          .           .        MK.........
              .           .         V
              .           .         V
 656          .           .       MK-K1
              .           .         .
              .           .         .
 659          .           .         .        M11B
              .           .         .         V
              .           .         .         V
 664          .           .         .       11B-K1
              .           .         .         .
              .           .         .         .
 667          .           .         .         .        M11C
              .           .         .         .         .
              .           .         .         .         .
 672          .           .        MK1...................
              .           .         V
              .           .         V
 675          .           .       K1-ML
              .           .         .
              .           .         .
 678          .           .         .        M16
              .           .         .         .
              .           .         .         .
 683          .           .        ML .........
              .           .         V
              .           .         V
 686          .           .
              .           .         .
              .           .         .
 689          .           .         .        M17
              .           .         .         .
              .           .         .         .
 694          .           .        MM .........
              .           .         V
              .           .         V
 697          .           .
              .           .         .
              .           .         .
 700          .           .         .        M18
              .           .         .         V
              .           .         .         V
 705          .           .         .
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 708          .           .         .         .        M20
              .           .         .         .         .
              .           .         .         .         .
 713          .          MN .............................
              .           V
              .           V
 716          .
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              .           .
 719          .           .        M21
              .           .         V
              .           .         V
 724          .           .
              .           .         .
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 727          .           .         .        M23
              .           .         .         .
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 732          .          MO ...................
              .           V
              .           V
 735          .
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              .           .
 738          .           .        M24
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860         .         .       W54
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            .         .         .
865       WAE......................
            V
            V
868
            .
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871         .       W56
            .         .
            .         .
876       WAF..........
            V
            V
879
            .
            .
882         .       W62
            .         V
            .         V
887         .
            .         .
            .         .
890         .         .       W63
            .         .         V
            .         .         V
895         .         .
            .         .         .
            .         .         .
898         .         .         .       W61
            .         .         .         .
            .         .         .         .
903         .       WAH......................
            .         V
            .         V
906         .
            .         .
            .         .
909         .         .       W57
            .         .         V
            .         .         V
914         .         .
            .         .         .
            .         .         .
917         .         .         .       W58
            .         .         .         .
            .         .         .         .
922         .       WAI......................
            .         V
            .         V
925         .
            .         .
            .         .
928         .         .       E1A
            .         .         V
            .         .         V
933         .         .    E1A-EA
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            .         .         .
936         .         .         .       E1B
            .         .         .         .
            .         .         .         .
941         .         .        EA..........
            .         .         V
            .         .         V
944         .         .     EA-EB
            .         .         .
            .         .         .
947         .         .         .        E2
            .         .         .         .
            .         .         .         .
952         .         .       EB ..........
            .         .         V
            .         .         V
955         .         .     POND1
            .         .         V
            .         .         V
961         .         .
            .         .         .
            .         .         .
964         .         .         .        E3
            .         .         .         .
            .         .         .         .
971         .         .         .         .         .<-------  DIVRT1
969         .         .         .         .     MH-P2
            .         .         .         .         .
            .         .         .         .         .
972         .         .       EC  ......................
            .         .         V
            .         .         V
975         .         .     POND2
            .         .         V
            .         .         V
981         .         .
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                 .          .          .
                 .          .          .
  984            .          .          .       E1C
                 .          .          .         V
                 .          .          .         V
  989            .          .          .     1C-ED1
                 .          .          .         .
                 .          .          .         .
  992            .          .          .         .          E4
                 .          .          .         .           .
                 .          .          .         .           .
  997            .          .          .       ED1............
                 .          .          .         V
                 .          .          .         V
 1000            .          .          .     ED1-ED
                 .          .          .         .
                 .          .          .         .
 1003            .          .          .         .          E5
                 .          .          .         .           .
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 1008            .          .         ED ......................
                 .          .          V
                 .          .          V
 1011            .          .
                 .          .          .
                 .          .          .
 1014            .          .          .        E8
                 .          .          .         .
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 1019            .          .         EE ...........
                 .          .          V
                 .          .          V
 1022            .          .
                 .          .          .
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 1025            .          .          .       E10
                 .          .          .         .
                 .          .          .         .
 1030            .          .         EF ...........
                 .          .          V
                 .          .          V
 1033            .          .         F-G
                 .          .          .
                 .          .          .
 1036            .          .          .        E6
                 .          .          .         .
                 .          .          .         .
 1041            .          .          .         .          E7
                 .          .          .         .           V
                 .          .          .         .           V
 1046            .          .          .         .
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                 .          .          .         .           .
 1049            .          .          .       EG1............
                 .          .          .         V
                 .          .          .         V
 1052            .          .          .      G1-G
                 .          .          .         .
                 .          .          .         .
 1055            .          .          .         .          E9
                 .          .          .         .           V
                 .          .          .         .           V
 1060            .          .          .         .
                 .          .          .         .           .
                 .          .          .         .           .
 1063            .          .          .         .           .          E11
                 .          .          .         .           .           .
                 .          .          .         .           .           .
 1068            .          .          .         .           .           .          E12
                 .          .          .         .           .           .           .
                 .          .          .         .           .           .           .
 1073            .          .         EG ..............................................
                 .          .          .
                 .          .          .
 1076            .          .          .       E13
                 .          .          .         .
                 .          .          .         .
 1081            .          .          .         .          E14
                 .          .          .         .           V
                 .          .          .         .           V
 1086            .          .          .         .
                 .          .          .         .           .
                 .          .          .         .           .
 1089            .          .         EH ......................
                 .          .          V
                 .          .          V
 1092            .          .
                 .          .          .
                 .          .          .
 1095            .          .          .       E19
                 .          .          .         .
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 1100            .          .         EJ1...........
                 .          .          V
                 .          .          V
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1103        .         .        J1-K
            .         .          .
            .         .          .
1106        .         .          .          E15
            .         .          .           V
            .         .          .           V
1111        .         .          .
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1114        .         .          .           .          E16
            .         .          .           .           .
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1119        .         .          .          EI ..........
            .         .          .           V
            .         .          .           V
1122        .         .          .
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1125        .         .          .           .          E17
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            .         .          .           .           V
1130        .         .          .           .
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1133        .         .          .           .           .          E18
            .         .          .           .           .           .
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1138        .         .          .          EJ2.......................
            .         .          .           V
            .         .          .           V
1141        .         .          .
            .         .          .           .
            .         .          .           .
1144        .         .          .           .          E23
            .         .          .           .           .
            .         .          .           .           .
1149        .         .          .           .           .          E24
            .         .          .           .           .           .
            .         .          .           .           .           .
1154        .         .         EK ..................................
            .         .          V
            .         .          V
1157        .         .
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1160        .         .          .          E21
            .         .          .           V
            .         .          .           V
1165        .         .          .
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1168        .         .          .           .          E20
            .         .          .           .           V
            .         .          .           .           V
1173        .         .          .           .
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            .         .          .           .           .
1176        .         .          .           .           .          E22
            .         .          .           .           .           .
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1181        .         .          .          EL .......................
            .         .          .           V
            .         .          .           V
1184        .         .          .
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1187        .         .          .           .          E25
            .         .          .           .           .
            .         .          .           .           .
1192        .         .         EM .......................
            .         .          V
            .         .          V
1195        .         .
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1198        .         .          .          E26
            .         .          .           .
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1203        .         .         EN ...........
            .         .          V
            .         .          V
1206        .         .
            .         .          .
            .         .          .
1209        .         .          .          E27
            .         .          .           .
            .         .          .           .
1214        .         .         EO ...........
            .         .          V
            .         .          V
1217        .         .
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1220        .         .          .          W55
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1225         .         .       WAG..........
             .         .         V
             .         .         V
1228         .         .
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1231         .         .         .       W59
             .         .         .         .
             .         .         .         .
1236       WAJ..............................
             V
             V
1239

             .
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1242         .       E28
             .         V
             .         V
1247         .
             .         .
             .         .
1250         .         .       E29
             .         .         .
             .         .         .
1255         .       EZZ..........
             .         .
             .         .
1258         .         .       W60
             .         .         .
             .         .         .
1263        ZZ.....................

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
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1**************************************                    **************************************
*                                      *                    *                                    *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                    *  U.S. ARMY CORPS OF ENGINEERS      *
*           JUN   1998                 *                    *  HYDROLOGIC ENGINEERING CENTER     *
*          VERSION 4.1                 *                    *       609 SECOND STREET            *
*                                      *                    *    DAVIS, CALIFORNIA 95616         *
* RUN DATE   28SEP07  TIME  11:57:06   *                    *       (916) 756-1104               *
*                                      *                    *                                    *
**************************************                    **************************************
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                    FALCON BASIN 5-YR/ 24-HOUR FLOOD/ EXISTING CONDITIONS
                        UPPER EAST TRIBUTARY (WOODMEN HILLS) BASED ON CLOMR APPROVED 2/2/99
                        INCLUDING 2 EXISTING SCS STOCK PONDS, WEST WOODMEN HILLS POND
                        NOTE: M1-M4 (PAINT BRUSH HILLS) MODELED AS HISTORIC TO ACCOUNT FOR
                              DETENTION POND AT MC
                        NOTE: NO CULVERT AT STAPLETON & MERIDIAN, TEMP CULVERTS AT MERIDIAN
                              DOWNSTREAM OF WOODMEN HILLS DRIVE (DIVERSION)

  9 IO         OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE

    IT         HYDROGRAPH TIME DATA
                      NMIN          5  MINUTES IN COMPUTATION INTERVAL
                     IDATE    14JUL99  STARTING DATE
                     ITIME       0800  STARTING TIME
                        NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE    15JUL99  ENDING DATE
                    NDTIME       0855  ENDING TIME
                     ICENT         19  CENTURY MARK

                COMPUTATION INTERVAL     .08 HOURS
                     TOTAL TIME BASE   24.92 HOURS

       ENGLISH UNITS
            DRAINAGE AREA          SQUARE MILES
            PRECIPITATION DEPTH    INCHES
            LENGTH, ELEVATION      FEET
            FLOW                   CUBIC FEET PER SECOND
            STORAGE VOLUME         ACRE-FEET
            SURFACE AREA           ACRES
            TEMPERATURE            DEGREES FAHRENHEIT
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RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

| | OPERATION | STATION | PEAK FLOW | TIME OF PEAK | AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR | 24-HOUR | 72-HOUR | BASIN AREA | MAXIMUM STAGE | TIME OF MAX STAGE |
|---|---|---|---|---|---|---|---|---|---|---|
| + | HYDROGRAPH AT | W1 | 5. | 5.83 | 1. | 0. | 0. | .05 | | |
| + | ROUTED TO | | 4. | 5.92 | 1. | 0. | 0. | .05 | | |
| + | HYDROGRAPH AT | W2 | 2. | 5.83 | 0. | 0. | 0. | .03 | | |
| + | 2 COMBINED AT | WA | 6. | 5.92 | 1. | 0. | 0. | .08 | | |
| + | ROUTED TO | | 6. | 5.92 | 1. | 0. | 0. | .08 | | |
| + | HYDROGRAPH AT | W3 | 5. | 5.83 | 1. | 0. | 0. | .05 | | |
| + | 2 COMBINED AT | WB | 11. | 5.92 | 2. | 1. | 1. | .13 | | |
| + | ROUTED TO | | 10. | 5.92 | 2. | 1. | 1. | .13 | | |
| + | HYDROGRAPH AT | W4 | 1. | 5.75 | 0. | 0. | 0. | .01 | | |
| + | ROUTED TO | | 1. | 5.83 | 0. | 0. | 0. | .01 | | |
| + | HYDROGRAPH AT | W5 | 2. | 5.75 | 0. | 0. | 0. | .02 | | |
| + | 3 COMBINED AT | WC | 11. | 5.92 | 2. | 1. | 1. | .15 | | |
| | ROUTED TO | | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| + | | | 11. | 5.92 | 2. | 1. | 1. | .15 |
| + | HYDROGRAPH AT | W6 | 5. | 5.83 | 1. | 0. | 0. | .05 |
| + | ROUTED TO | | 5. | 5.83 | 1. | 0. | 0. | .05 |
| + | HYDROGRAPH AT | W7 | 2. | 5.75 | 0. | 0. | 0. | .02 |
| + | ROUTED TO | | 2. | 5.83 | 0. | 0. | 0. | .02 |
| + | 2 COMBINED AT | WD | 7. | 5.83 | 1. | 0. | 0. | .07 |
| + | ROUTED TO | D-E | 6. | 5.83 | 1. | 0. | 0. | .07 |
| + | HYDROGRAPH AT | W8 | 3. | 5.75 | 0. | 0. | 0. | .03 |
| + | ROUTED TO | | 3. | 5.83 | 0. | 0. | 0. | .03 |
| + | HYDROGRAPH AT | W9 | 5. | 5.83 | 1. | 0. | 0. | .04 |
| + | 3 COMBINED AT | WE | 14. | 5.83 | 2. | 1. | 1. | .14 |
| + | ROUTED TO | E-F | 13. | 5.92 | 2. | 1. | 1. | .14 |
| + | HYDROGRAPH AT | W10 | 5. | 5.83 | 1. | 0. | 0. | .04 |
| + | ROUTED TO | | 5. | 5.83 | 1. | 0. | 0. | .04 |
| + | HYDROGRAPH AT | W11 | 3. | 5.75 | 0. | 0. | 0. | .03 |
| + | 4 COMBINED AT | WF | 29. | 5.92 | 5. | 2. | 2. | .36 |
| + | ROUTED TO | F-G | 28. | 6.00 | 5. | 2. | 2. | .36 |
| + | HYDROGRAPH AT | W12 | 4. | 5.83 | 1. | 0. | 0. | .04 |
| + | ROUTED TO | | 4. | 5.92 | 1. | 0. | 0. | .04 |
| + | HYDROGRAPH AT | W14 | 5. | 5.83 | 1. | 0. | 0. | .05 |
| + | ROUTED TO | | 5. | 5.92 | 1. | 0. | 0. | .05 |
| + | HYDROGRAPH AT | W13 | 10. | 5.92 | 2. | 1. | 1. | .11 |
| + | 4 COMBINED AT | WG | 43. | 6.00 | 8. | 3. | 3. | .56 |
| + | ROUTED TO | G-H | 41. | 6.08 | 8. | 3. | 3. | .56 |
| + | ROUTED TO | | 39. | 6.17 | 8. | 3. | 3. | .56 |
| + | HYDROGRAPH AT | W15 | 10. | 5.83 | 1. | 1. | 1. | .09 |
| + | ROUTED TO | | 9. | 5.92 | 1. | 1. | 1. | .09 |
| + | 2 COMBINED AT | WH | 43. | 6.17 | 9. | 4. | 4. | .65 |
| + | HYDROGRAPH AT | W16 | 4. | 5.83 | 0. | 0. | 0. | .03 |
| + | ROUTED TO | | 3. | 5.92 | 0. | 0. | 0. | .03 |
| + | HYDROGRAPH AT | W17 | 2. | 5.83 | 0. | 0. | 0. | .02 |
| + | 2 COMBINED AT | WI | 5. | 5.83 | 1. | 0. | 0. | .05 |

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|---|---|---|---|---|---|---|---|---|
| | ROUTED TO | | | | | | | |
| + | | I-M | 5. | 6.00 | 1. | 0. | 0. | .05 |
| | HYDROGRAPH AT | | | | | | | |
| + | | W19 | 5. | 5.75 | 1. | 0. | 0. | .04 |
| | ROUTED TO | | | | | | | |
| + | | | 5. | 5.83 | 1. | 0. | 0. | .04 |
| | HYDROGRAPH AT | | | | | | | |
| + | | W20 | 5. | 5.75 | 0. | 0. | 0. | .03 |
| | 2 COMBINED AT | | | | | | | |
| + | | WJ | 9. | 5.83 | 1. | 0. | 0. | .07 |
| | ROUTED TO | | | | | | | |
| + | | | 9. | 6.00 | 1. | 0. | 0. | .07 |
| | HYDROGRAPH AT | | | | | | | |
| + | | W21 | 11. | 5.83 | 2. | 1. | 1. | .13 |
| | 2 COMBINED AT | | | | | | | |
| + | | WK | 18. | 5.92 | 3. | 1. | 1. | .21 |
| | ROUTED TO | | | | | | | |
| + | | | 16. | 5.92 | 3. | 1. | 1. | .21 |
| | HYDROGRAPH AT | | | | | | | |
| + | | W22 | 2. | 5.75 | 0. | 0. | 0. | .01 |
| | 2 COMBINED AT | | | | | | | |
| + | | WL | 17. | 5.92 | 3. | 1. | 1. | .22 |
| | ROUTED TO | | | | | | | |
| + | | | 17. | 6.00 | 3. | 1. | 1. | .22 |
| | HYDROGRAPH AT | | | | | | | |
| + | | W23 | 2. | 5.83 | 0. | 0. | 0. | .02 |
| | HYDROGRAPH AT | | | | | | | |
| + | | W18 | 9. | 5.92 | 2. | 1. | 1. | .13 |
| | 5 COMBINED AT | | | | | | | |
| + | | WM | 66. | 6.08 | 15. | 6. | 6. | 1.06 |
| | ROUTED TO | | | | | | | |
| + | | M-N | 65. | 6.17 | 15. | 6. | 6. | 1.06 |
| | HYDROGRAPH AT | | | | | | | |
| + | | W24 | 4. | 5.83 | 1. | 0. | 0. | .04 |
| | HYDROGRAPH AT | | | | | | | |
| + | | W25 | 8. | 5.92 | 1. | 1. | 1. | .10 |
| | 3 COMBINED AT | | | | | | | |
| + | | WN | 70. | 6.17 | 17. | 7. | 7. | 1.20 |
| | ROUTED TO | | | | | | | |
| + | | N-P | 67. | 6.25 | 16. | 7. | 7. | 1.20 |
| | HYDROGRAPH AT | | | | | | | |
| + | | W28 | 7. | 5.83 | 1. | 0. | 0. | .04 |
| | ROUTED TO | | | | | | | |
| + | | | 6. | 5.92 | 1. | 0. | 0. | .04 |
| | HYDROGRAPH AT | | | | | | | |
| + | | W30 | 9. | 5.83 | 1. | 0. | 0. | .05 |
| | ROUTED TO | | | | | | | |
| + | | | 8. | 5.92 | 1. | 0. | 0. | .05 |
| | HYDROGRAPH AT | | | | | | | |
| + | | W29 | 6. | 5.83 | 1. | 0. | 0. | .04 |
| | HYDROGRAPH AT | | | | | | | |
| + | | W31 | 3. | 5.75 | 0. | 0. | 0. | .01 |
| | 4 COMBINED AT | | | | | | | |
| + | | WO | 20. | 5.92 | 3. | 1. | 1. | .14 |
| | ROUTED TO | | | | | | | |
| + | | O-P | 20. | 6.00 | 3. | 1. | 1. | .14 |
| | HYDROGRAPH AT | | | | | | | |
| + | | W26 | 7. | 5.75 | 1. | 0. | 0. | .03 |
| | ROUTED TO | | | | | | | |
| + | | | 6. | 6.08 | 1. | 0. | 0. | .03 |
| | HYDROGRAPH AT | | | | | | | |
| + | | W27 | 10. | 6.00 | 2. | 1. | 1. | .16 |
| | HYDROGRAPH AT | | | | | | | |
| + | | W32 | 7. | 5.92 | 1. | 0. | 0. | .09 |

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|---|---|---|---|---|---|---|---|---|
| + | 5 COMBINED AT | WP | 88. | 6.17 | 23. | 10. | 9. | 1.63 |
| + | ROUTED TO | P-Q | 87. | 6.25 | 23. | 10. | 9. | 1.63 |
| + | HYDROGRAPH AT | W33A | 9. | 5.92 | 2. | 1. | 1. | .13 |
| + | 2 COMBINED AT | WP1 | 91. | 6.25 | 24. | 10. | 10. | 1.75 |
| + | ROUTED TO | P1-Q | 90. | 6.33 | 24. | 10. | 10. | 1.75 |
| + | HYDROGRAPH AT | W33B | 9. | 5.92 | 2. | 1. | 1. | .14 |
| + | HYDROGRAPH AT | W34A | 9. | 5.92 | 2. | 1. | 1. | .13 |
| + | ROUTED TO | 34A-P2 | 9. | 6.08 | 2. | 1. | 1. | .13 |
| + | HYDROGRAPH AT | W34B | 11. | 5.92 | 2. | 1. | 1. | .18 |
| + | 2 COMBINED AT | WP2 | 18. | 6.00 | 4. | 2. | 2. | .30 |
| + | ROUTED TO | P2-Q | 18. | 6.17 | 4. | 2. | 2. | .30 |
| + | HYDROGRAPH AT | W34C | 10. | 6.00 | 2. | 1. | 1. | .16 |
| + | 4 COMBINED AT | WQ | 114. | 6.25 | 32. | 13. | 13. | 2.36 |
| + | ROUTED TO | Q-Q1 | 113. | 6.33 | 32. | 13. | 13. | 2.36 |
| + | HYDROGRAPH AT | W36A | 9. | 5.92 | 2. | 1. | 1. | .14 |
| + | 2 COMBINED AT | WQ1 | 118. | 6.33 | 33. | 14. | 14. | 2.50 |
| + | ROUTED TO | Q1-R | 117. | 6.42 | 33. | 14. | 14. | 2.50 |
| + | HYDROGRAPH AT | W36B | 10. | 6.00 | 2. | 1. | 1. | .19 |
| + | HYDROGRAPH AT | W35A | 7. | 5.92 | 1. | 1. | 1. | .10 |
| + | ROUTED TO | 35A-WR | 6. | 6.25 | 1. | 1. | 1. | .10 |
| + | HYDROGRAPH AT | W35B | 9. | 6.00 | 2. | 1. | 1. | .15 |
| + | 4 COMBINED AT | WR | 131. | 6.42 | 38. | 17. | 16. | 2.94 |
| + | ROUTED TO | WR-S | 130. | 6.50 | 38. | 16. | 16. | 2.94 |
| + | HYDROGRAPH AT | W37A | 8. | 5.92 | 1. | 1. | 1. | .11 |
| + | ROUTED TO | 37A-S | 8. | 6.00 | 1. | 1. | 1. | .11 |
| + | HYDROGRAPH AT | W37B | 13. | 5.92 | 2. | 1. | 1. | .16 |
| + | 3 COMBINED AT | WS | 137. | 6.50 | 42. | 18. | 17. | 3.21 |
| + | ROUTED TO | S-T | 134. | 6.67 | 42. | 18. | 17. | 3.21 |
| + | HYDROGRAPH AT | W38 | 10. | 5.92 | 2. | 1. | 1. | .09 |
| + | ROUTED TO | | 9. | 6.08 | 2. | 1. | 1. | .09 |
| + | HYDROGRAPH AT | W39 | 11. | 6.00 | 2. | 1. | 1. | .18 |
| | HYDROGRAPH AT | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|
| + | | W40 | 7. | 5.83 | 1. | 1. | 1. | .10 |
| + | 4 COMBINED AT | WT | 143. | 6.58 | 46. | 20. | 19. | 3.59 |
| + | ROUTED TO | T-U | 142. | 6.67 | 46. | 20. | 19. | 3.59 |
| + | HYDROGRAPH AT | W41 | 6. | 5.83 | 1. | 0. | 0. | .06 |
| + | HYDROGRAPH AT | W42 | 50. | 5.75 | 5. | 2. | 2. | .06 |
| + | ROUTED TO | U-V | 49. | 5.83 | 5. | 2. | 2. | .06 |
| + | 3 COMBINED AT | WU | 148. | 6.67 | 51. | 22. | 21. | 3.70 |
| + | ROUTED TO | | 146. | 6.75 | 51. | 22. | 21. | 3.70 |
| + | HYDROGRAPH AT | W43 | 13. | 5.83 | 2. | 1. | 1. | .15 |
| + | 2 COMBINED AT | WV | 149. | 6.75 | 53. | 23. | 22. | 3.85 |
| + | ROUTED TO | V-W | 148. | 6.75 | 53. | 23. | 22. | 3.85 |
| + | HYDROGRAPH AT | W45 | 17. | 5.92 | 3. | 1. | 1. | .19 |
| + | 2 COMBINED AT | WW | 152. | 6.75 | 56. | 24. | 23. | 4.04 |
| + | ROUTED TO | W-X | 149. | 6.83 | 55. | 24. | 23. | 4.04 |
| + | HYDROGRAPH AT | M1 | 7. | 5.83 | 1. | 0. | 0. | .07 |
| + | ROUTED TO | | 6. | 5.83 | 1. | 0. | 0. | .07 |
| + | HYDROGRAPH AT | M2 | 3. | 5.83 | 0. | 0. | 0. | .03 |
| + | 2 COMBINED AT | MB | 9. | 5.83 | 1. | 1. | 0. | .09 |
| + | ROUTED TO | | 8. | 5.92 | 1. | 1. | 0. | .09 |
| + | HYDROGRAPH AT | M4 | 3. | 5.83 | 0. | 0. | 0. | .03 |
| + | ROUTED TO | | 3. | 5.83 | 0. | 0. | 0. | .03 |
| + | HYDROGRAPH AT | M3 | 2. | 5.75 | 0. | 0. | 0. | .01 |
| + | 3 COMBINED AT | MC | 11. | 5.83 | 2. | 1. | 1. | .14 |
| + | ROUTED TO | | 11. | 6.00 | 2. | 1. | 1. | .14 |
| + | HYDROGRAPH AT | M5 | 6. | 5.75 | 1. | 0. | 0. | .02 |
| + | ROUTED TO | | 6. | 5.92 | 1. | 0. | 0. | .02 |
| + | HYDROGRAPH AT | M6 | 10. | 5.92 | 2. | 1. | 1. | .06 |
| + | 3 COMBINED AT | MD | 26. | 5.92 | 4. | 2. | 2. | .22 |
| + | ROUTED TO | | 25. | 6.08 | 4. | 2. | 2. | .22 |
| + | HYDROGRAPH AT | M7 | 16. | 5.83 | 2. | 1. | 1. | .05 |
| + | ROUTED TO | | 15. | 5.92 | 2. | 1. | 1. | .05 |
| + | HYDROGRAPH AT | M8 | 4. | 5.83 | 1. | 0. | 0. | .04 |

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|---|---|---|---|---|---|---|---|---|---|---|
| + | 2 COMBINED AT | ME | 18. | 5.83 | 2. | 1. | 1. | .09 | | |
| + | ROUTED TO | | 18. | 6.00 | 2. | 1. | 1. | .09 | | |
| + | HYDROGRAPH AT | M9 | 7. | 5.75 | 1. | 0. | 0. | .02 | | |
| + | ROUTED TO | | 6. | 5.92 | 1. | 0. | 0. | .02 | | |
| + | HYDROGRAPH AT | M12A | 5. | 5.83 | 1. | 0. | 0. | .07 | | |
| + | HYDROGRAPH AT | M12B | 10. | 5.92 | 2. | 1. | 1. | .15 | | |
| + | 5 COMBINED AT | MF | 59. | 6.00 | 10. | 4. | 4. | .54 | | |
| + | ROUTED TO | | 57. | 6.08 | 10. | 4. | 4. | .54 | | |
| + | HYDROGRAPH AT | M13 | 10. | 5.83 | 1. | 1. | 0. | .06 | | |
| + | ROUTED TO | | 9. | 6.00 | 1. | 1. | 0. | .06 | | |
| + | HYDROGRAPH AT | M14 | 22. | 5.92 | 4. | 1. | 1. | .16 | | |
| + | 2 COMBINED AT | MG | 30. | 5.92 | 5. | 2. | 2. | .22 | | |
| + | ROUTED TO | PONDW | 9. | 6.50 | 5. | 2. | 2. | .22 | | |
| + | | | | | | | | | 969.11 | 6.50 |
| + | 2 COMBINED AT | MH | 64. | 6.08 | 14. | 6. | 5. | .77 | | |
| + | ROUTED TO | | 62. | 6.17 | 14. | 6. | 5. | .77 | | |
| + | DIVERSION TO | DIVRT1 | 61. | 6.17 | 14. | 6. | 5. | .77 | | |
| + | HYDROGRAPH AT | MH-P2 | 1. | 6.17 | 0. | 0. | 0. | .77 | | |
| + | HYDROGRAPH AT | M15 | 18. | 5.92 | 3. | 1. | 1. | .12 | | |
| + | 2 COMBINED AT | MI | 18. | 5.92 | 3. | 1. | 1. | .89 | | |
| + | ROUTED TO | | 17. | 6.00 | 3. | 1. | 1. | .89 | | |
| + | HYDROGRAPH AT | M19 | 5. | 5.83 | 1. | 0. | 0. | .05 | | |
| + | 2 COMBINED AT | MJ | 20. | 6.00 | 3. | 1. | 1. | .94 | | |
| + | ROUTED TO | | 20. | 6.08 | 3. | 1. | 1. | .94 | | |
| + | HYDROGRAPH AT | M10 | 8. | 5.83 | 1. | 0. | 0. | .06 | | |
| + | ROUTED TO | M10-K | 8. | 5.92 | 1. | 0. | 0. | .06 | | |
| + | HYDROGRAPH AT | M11A | 8. | 5.92 | 2. | 1. | 1. | .11 | | |
| + | 2 COMBINED AT | MK | 16. | 5.92 | 3. | 1. | 1. | .16 | | |
| + | ROUTED TO | MK-K1 | 16. | 6.00 | 3. | 1. | 1. | .16 | | |
| + | HYDROGRAPH AT | M11B | 7. | 5.83 | 1. | 0. | 0. | .09 | | |
| + | ROUTED TO | 11B-K1 | 7. | 6.00 | 1. | 0. | 0. | .09 | | |
| + | HYDROGRAPH AT | M11C | 7. | 5.83 | 1. | 1. | 0. | .09 | | |
| | 3 COMBINED AT | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|
| + | | MK1 | 27. | 6.00 | 5. | 2. | 2. | .35 |
| + | ROUTED TO | K1-ML | 26. | 6.00 | 5. | 2. | 2. | .35 |
| + | HYDROGRAPH AT | M16 | 4. | 5.83 | 1. | 0. | 0. | .04 |
| + | 2 COMBINED AT | ML | 28. | 6.00 | 5. | 2. | 2. | .39 |
| + | ROUTED TO | | 28. | 6.08 | 5. | 2. | 2. | .39 |
| + | HYDROGRAPH AT | M17 | 9. | 5.83 | 1. | 0. | 0. | .08 |
| + | 2 COMBINED AT | MM | 31. | 6.08 | 7. | 3. | 3. | .46 |
| + | ROUTED TO | | 29. | 6.17 | 7. | 3. | 3. | .46 |
| + | HYDROGRAPH AT | M18 | 7. | 5.83 | 1. | 0. | 0. | .06 |
| + | ROUTED TO | | 6. | 6.00 | 1. | 0. | 0. | .06 |
| + | HYDROGRAPH AT | M20 | 11. | 5.92 | 2. | 1. | 1. | .13 |
| + | 4 COMBINED AT | MN | 57. | 6.17 | 13. | 5. | 5. | 1.60 |
| + | ROUTED TO | | 55. | 6.25 | 13. | 5. | 5. | 1.60 |
| + | HYDROGRAPH AT | M21 | 3. | 5.83 | 0. | 0. | 0. | .02 |
| + | ROUTED TO | | 3. | 5.92 | 0. | 0. | 0. | .02 |
| + | HYDROGRAPH AT | M23 | 4. | 5.83 | 1. | 0. | 0. | .05 |
| + | 3 COMBINED AT | MO | 57. | 6.25 | 14. | 6. | 5. | 1.67 |
| + | ROUTED TO | | 56. | 6.25 | 14. | 6. | 5. | 1.67 |
| + | HYDROGRAPH AT | M24 | 7. | 5.83 | 1. | 0. | 0. | .08 |
| + | 2 COMBINED AT | MP | 58. | 6.25 | 15. | 6. | 6. | 1.75 |
| + | ROUTED TO | | 57. | 6.25 | 15. | 6. | 6. | 1.75 |
| + | HYDROGRAPH AT | M25 | 1. | 5.83 | 0. | 0. | 0. | .01 |
| + | 2 COMBINED AT | MQ | 58. | 6.25 | 15. | 6. | 6. | 1.76 |
| + | ROUTED TO | | 57. | 6.42 | 15. | 6. | 6. | 1.76 |
| + | HYDROGRAPH AT | M26 | 26. | 5.92 | 4. | 2. | 2. | .18 |
| + | 2 COMBINED AT | MR | 66. | 6.42 | 18. | 8. | 7. | 1.94 |
| + | HYDROGRAPH AT | W44 | 3. | 5.83 | 1. | 0. | 0. | .04 |
| + | ROUTED TO | | 3. | 6.00 | 1. | 0. | 0. | .04 |
| + | HYDROGRAPH AT | W47 | 4. | 5.83 | 1. | 0. | 0. | .05 |
| + | ROUTED TO | | 4. | 5.92 | 1. | 0. | 0. | .05 |
| + | HYDROGRAPH AT | W46 | 4. | 5.83 | 1. | 0. | 0. | .04 |
| + | HYDROGRAPH AT | M27 | 5. | 5.83 | 1. | 0. | 0. | .05 |

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|---|---|---|---|---|---|---|---|---|
| + | 6 COMBINED AT | WX | 192. | 6.75 | 76. | 33. | 31. | 6.17 |
| + | ROUTED TO | | 191. | 6.83 | 76. | 32. | 31. | 6.17 |
| + | HYDROGRAPH AT | W48 | 14. | 5.83 | 2. | 1. | 1. | .12 |
| + | ROUTED TO | | 14. | 5.92 | 2. | 1. | 1. | .12 |
| + | HYDROGRAPH AT | W49 | 24. | 5.92 | 4. | 2. | 2. | .27 |
| + | 3 COMBINED AT | WZ | 199. | 6.83 | 81. | 35. | 34. | 6.55 |
| + | ROUTED TO | | 196. | 6.92 | 81. | 35. | 34. | 6.55 |
| + | HYDROGRAPH AT | W50 | 11. | 5.83 | 2. | 1. | 1. | .11 |
| + | 2 COMBINED AT | WAB | 198. | 6.92 | 83. | 35. | 34. | 6.66 |
| + | ROUTED TO | | 198. | 6.92 | 83. | 35. | 34. | 6.66 |
| + | HYDROGRAPH AT | W51 | 7. | 5.83 | 1. | 0. | 0. | .05 |
| + | 2 COMBINED AT | WAC | 199. | 6.92 | 83. | 36. | 34. | 6.71 |
| + | ROUTED TO | | 198. | 6.92 | 83. | 36. | 34. | 6.71 |
| + | HYDROGRAPH AT | W52 | 9. | 5.83 | 1. | 0. | 0. | .05 |
| + | ROUTED TO | | 8. | 5.83 | 1. | 0. | 0. | .05 |
| + | HYDROGRAPH AT | W53 | 8. | 5.83 | 1. | 0. | 0. | .05 |
| + | 2 COMBINED AT | WAD | 16. | 5.83 | 2. | 1. | 1. | .10 |
| + | ROUTED TO | | 14. | 5.83 | 2. | 1. | 1. | .10 |
| + | HYDROGRAPH AT | W54 | 1. | 5.75 | 0. | 0. | 0. | .01 |
| + | 3 COMBINED AT | WAE | 200. | 6.92 | 85. | 37. | 35. | 6.82 |
| + | ROUTED TO | | 199. | 7.00 | 85. | 36. | 35. | 6.82 |
| + | HYDROGRAPH AT | W56 | 13. | 5.92 | 2. | 1. | 1. | .18 |
| + | 2 COMBINED AT | WAF | 202. | 7.00 | 87. | 37. | 36. | 7.01 |
| + | ROUTED TO | | 200. | 7.00 | 87. | 37. | 36. | 7.01 |
| + | HYDROGRAPH AT | W62 | 7. | 5.83 | 1. | 0. | 0. | .08 |
| + | ROUTED TO | | 7. | 5.92 | 1. | 0. | 0. | .08 |
| + | HYDROGRAPH AT | W63 | 5. | 5.83 | 1. | 0. | 0. | .05 |
| + | ROUTED TO | | 4. | 5.92 | 1. | 0. | 0. | .05 |
| + | HYDROGRAPH AT | W61 | 11. | 6.00 | 3. | 1. | 1. | .19 |
| + | 3 COMBINED AT | WAH | 22. | 5.92 | 4. | 2. | 2. | .31 |
| + | ROUTED TO | | 21. | 6.00 | 4. | 2. | 2. | .31 |
| + | HYDROGRAPH AT | W57 | 6. | 5.83 | 1. | 0. | 0. | .07 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| + | ROUTED TO | | 6. | 6.25 | 1. | 0. | 0. | .07 | | |
| + | HYDROGRAPH AT | W58 | 13. | 6.00 | 3. | 1. | 1. | .23 | | |
| + | 3 COMBINED AT | WAI | 35. | 6.00 | 8. | 3. | 3. | .62 | | |
| + | ROUTED TO | | 34. | 6.00 | 8. | 3. | 3. | .62 | | |
| + | HYDROGRAPH AT | E1A | 7. | 5.92 | 2. | 1. | 1. | .12 | | |
| + | ROUTED TO | E1A-EA | 7. | 6.17 | 1. | 1. | 1. | .12 | | |
| + | HYDROGRAPH AT | E1B | 10. | 5.92 | 2. | 1. | 1. | .17 | | |
| + | 2 COMBINED AT | EA | 13. | 6.17 | 4. | 2. | 1. | .28 | | |
| + | ROUTED TO | EA-EB | 13. | 6.25 | 4. | 2. | 1. | .28 | | |
| + | HYDROGRAPH AT | E2 | 9. | 5.83 | 1. | 1. | 1. | .10 | | |
| + | 2 COMBINED AT | EB | 16. | 6.25 | 5. | 2. | 2. | .39 | | |
| + | ROUTED TO | POND1 | 2. | 14.92 | 2. | 1. | 1. | .39 | | |
| + | | | | | | | | | 952.08 | 14.92 |
| + | ROUTED TO | | 2. | 15.00 | 2. | 1. | 1. | .39 | | |
| + | HYDROGRAPH AT | E3 | 8. | 5.83 | 1. | 0. | 0. | .09 | | |
| + | HYDROGRAPH AT | MH-P2 | 61. | 6.17 | 14. | 6. | 5. | .00 | | |
| + | 3 COMBINED AT | EC | 64. | 6.17 | 15. | 7. | 7. | .48 | | |
| + | ROUTED TO | POND2 | 6. | 19.83 | 6. | 2. | 2. | .48 | | |
| + | | | | | | | | | 929.13 | 19.83 |
| + | ROUTED TO | | 6. | 20.00 | 6. | 2. | 2. | .48 | | |
| + | HYDROGRAPH AT | E1C | 6. | 5.92 | 1. | 0. | 0. | .08 | | |
| + | ROUTED TO | 1C-ED1 | 5. | 6.17 | 1. | 0. | 0. | .08 | | |
| + | HYDROGRAPH AT | E4 | 9. | 5.92 | 2. | 1. | 1. | .13 | | |
| + | 2 COMBINED AT | ED1 | 10. | 6.17 | 3. | 1. | 1. | .21 | | |
| + | ROUTED TO | ED1-ED | 10. | 6.17 | 3. | 1. | 1. | .21 | | |
| + | HYDROGRAPH AT | E5 | 7. | 5.83 | 1. | 1. | 0. | .09 | | |
| + | 3 COMBINED AT | ED | 15. | 5.92 | 7. | 4. | 3. | .78 | | |
| + | ROUTED TO | | 14. | 5.92 | 7. | 4. | 3. | .78 | | |
| + | HYDROGRAPH AT | E8 | 4. | 5.83 | 1. | 0. | 0. | .04 | | |
| + | 2 COMBINED AT | EE | 18. | 5.92 | 7. | 4. | 4. | .83 | | |
| + | ROUTED TO | | 17. | 6.00 | 7. | 4. | 4. | .83 | | |
| + | HYDROGRAPH AT | E10 | 2. | 5.83 | 0. | 0. | 0. | .03 | | |
| + | 2 COMBINED AT | EF | 19. | 6.00 | 7. | 4. | 4. | .85 | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| + | ROUTED TO | F-G | 18. | 6.08 | 7. | 4. | 4. | .85 |
| + | HYDROGRAPH AT | E6 | 7. | 5.92 | 2. | 1. | 1. | .12 |
| + | HYDROGRAPH AT | E7 | 3. | 5.75 | 0. | 0. | 0. | .03 |
| + | ROUTED TO | | 3. | 5.92 | 0. | 0. | 0. | .03 |
| + | 2 COMBINED AT | EG1 | 10. | 5.92 | 2. | 1. | 1. | .15 |
| + | ROUTED TO | G1-G | 10. | 6.00 | 2. | 1. | 1. | .15 |
| + | HYDROGRAPH AT | E9 | 5. | 5.92 | 1. | 0. | 0. | .08 |
| + | ROUTED TO | | 5. | 6.00 | 1. | 0. | 0. | .08 |
| + | HYDROGRAPH AT | E11 | 3. | 5.92 | 1. | 0. | 0. | .05 |
| + | HYDROGRAPH AT | E12 | 7. | 5.83 | 1. | 1. | 0. | .09 |
| + | 5 COMBINED AT | EG | 37. | 6.08 | 10. | 6. | 6. | 1.22 |
| + | HYDROGRAPH AT | E13 | 1. | 6.00 | 0. | 0. | 0. | .02 |
| + | HYDROGRAPH AT | E14 | 0. | 5.83 | 0. | 0. | 0. | .01 |
| + | ROUTED TO | | 0. | 5.92 | 0. | 0. | 0. | .01 |
| + | 3 COMBINED AT | EH | 39. | 6.00 | 10. | 6. | 6. | 1.24 |
| + | ROUTED TO | | 38. | 6.17 | 10. | 6. | 6. | 1.24 |
| + | HYDROGRAPH AT | E19 | 6. | 5.83 | 1. | 0. | 0. | .04 |
| + | 2 COMBINED AT | EJ1 | 39. | 6.17 | 10. | 6. | 6. | 1.28 |
| + | ROUTED TO | J1-K | 39. | 6.25 | 10. | 6. | 6. | 1.28 |
| + | HYDROGRAPH AT | E15 | 6. | 5.83 | 1. | 0. | 0. | .04 |
| + | ROUTED TO | | 6. | 5.83 | 1. | 0. | 0. | .04 |
| + | HYDROGRAPH AT | E16 | 5. | 5.83 | 1. | 0. | 0. | .03 |
| + | 2 COMBINED AT | EI | 11. | 5.83 | 1. | 0. | 0. | .07 |
| + | ROUTED TO | | 10. | 5.92 | 1. | 0. | 0. | .07 |
| + | HYDROGRAPH AT | E17 | 5. | 5.83 | 1. | 0. | 0. | .03 |
| + | ROUTED TO | | 5. | 5.92 | 1. | 0. | 0. | .03 |
| + | HYDROGRAPH AT | E18 | 6. | 5.92 | 1. | 0. | 0. | .05 |
| + | 3 COMBINED AT | EJ2 | 22. | 5.92 | 3. | 1. | 1. | .15 |
| + | ROUTED TO | | 19. | 6.25 | 3. | 1. | 1. | .15 |
| + | HYDROGRAPH AT | E23 | 15. | 5.92 | 3. | 1. | 1. | .17 |
| + | HYDROGRAPH AT | E24 | 11. | 6.08 | 3. | 1. | 1. | .14 |
| | 4 COMBINED AT | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| + | | EK | 76. | 6.25 | 18. | 10. | 9. | 1.74 |
| + | ROUTED TO | | 69. | 6.42 | 18. | 9. | 9. | 1.74 |
| + | HYDROGRAPH AT | E21 | 6. | 5.92 | 1. | 0. | 0. | .09 |
| + | ROUTED TO | | 6. | 6.00 | 1. | 0. | 0. | .09 |
| + | HYDROGRAPH AT | E20 | 8. | 5.92 | 1. | 1. | 1. | .08 |
| + | ROUTED TO | | 7. | 6.00 | 1. | 1. | 1. | .08 |
| + | HYDROGRAPH AT | E22 | 5. | 5.92 | 1. | 0. | 0. | .07 |
| + | 3 COMBINED AT | EL | 18. | 6.00 | 3. | 1. | 1. | .23 |
| + | ROUTED TO | | 17. | 6.08 | 3. | 1. | 1. | .23 |
| + | HYDROGRAPH AT | E25 | 15. | 5.92 | 3. | 1. | 1. | .17 |
| + | 3 COMBINED AT | EM | 85. | 6.33 | 24. | 12. | 11. | 2.13 |
| + | ROUTED TO | | 84. | 6.42 | 24. | 12. | 11. | 2.13 |
| + | HYDROGRAPH AT | E26 | 6. | 5.83 | 1. | 0. | 0. | .04 |
| + | 2 COMBINED AT | EN | 85. | 6.42 | 25. | 12. | 12. | 2.17 |
| + | ROUTED TO | | 84. | 6.50 | 24. | 12. | 12. | 2.17 |
| + | HYDROGRAPH AT | E27 | 17. | 5.83 | 2. | 1. | 1. | .12 |
| + | 2 COMBINED AT | EO | 87. | 6.50 | 26. | 13. | 13. | 2.29 |
| + | ROUTED TO | | 84. | 6.58 | 26. | 13. | 12. | 2.29 |
| + | HYDROGRAPH AT | W55 | 5. | 5.83 | 1. | 0. | 0. | .05 |
| + | 2 COMBINED AT | WAG | 85. | 6.58 | 27. | 13. | 13. | 2.34 |
| + | ROUTED TO | | 84. | 6.58 | 27. | 13. | 13. | 2.34 |
| + | HYDROGRAPH AT | W59 | 5. | 5.92 | 1. | 0. | 0. | .07 |
| + | 4 COMBINED AT | WAJ | 269. | 7.00 | 122. | 54. | 52. | 10.03 |
| + | ROUTED TO | | 267. | 7.00 | 122. | 54. | 52. | 10.03 |
| + | HYDROGRAPH AT | E28 | 6. | 5.92 | 1. | 0. | 0. | .07 |
| + | ROUTED TO | | 6. | 6.17 | 1. | 0. | 0. | .07 |
| + | HYDROGRAPH AT | E29 | 4. | 5.83 | 1. | 0. | 0. | .05 |
| + | 2 COMBINED AT | EZZ | 7. | 6.17 | 2. | 1. | 1. | .12 |
| + | HYDROGRAPH AT | W60 | 5. | 5.92 | 1. | 0. | 0. | .07 |
| + | 3 COMBINED AT | ZZ | 271. | 7.00 | 125. | 55. | 53. | 10.22 |

*** NORMAL END OF HEC-1 ***

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1***************************************                       ***************************************
 *                                     *                       *                                     *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1) *                       *   U.S. ARMY CORPS OF ENGINEERS      *
 *             JUN   1998              *                       *   HYDROLOGIC ENGINEERING CENTER     *
 *           VERSION 4.1               *                       *         609 SECOND STREET           *
 *                                     *                       *      DAVIS, CALIFORNIA 95616        *
 * RUN DATE   28SEP07  TIME  11:49:21  *                       *          (916) 756-1104             *
 *                                     *                       *                                     *
***************************************                       ***************************************


                   X     X  XXXXXXX   XXXXX          X
                   X     X  X        X     X        XX
                   X     X  X        X               X
                   XXXXXXX  XXXX     X       XXXXX   X
                   X     X  X        X               X
                   X     X  X        X     X         X
                   X     X  XXXXXXX   XXXXX         XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

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ID    FALCON BASIN 100-YR/ 24-HOUR FLOOD/ EXISTING CONDITIONS
ID         UPPER EAST TRIBUTARY (WOODMEN HILLS) BASED ON CLOMR APPROVED 2/2/99
ID         INCLUDING 2 EXISTING SCS STOCK PONDS, WEST WOODMEN HILLS POND
ID         NOTE: M1-M4 (PAINT BRUSH HILLS) MODELED AS HISTORIC TO ACCOUNT FOR
ID                DETENTION POND AT MC
ID         NOTE: NO CULVERT AT STAPLETON & MERIDIAN, TEMP CULVERTS AT MERIDIAN
ID                DOWNSTREAM OF WOODMEN HILLS DRIVE (DIVERSION)
*DIAGRAM
IT       5 14JUL99     800      300
IO       5

KK      W1
KM
BA   .0479
PB     4.4
IN      15
PC   .0005   .0015   .0030   .0045   .0060   .0080   .0100   .0120   .0143   .0165
PC   .0188   .0210   .0233   .0255   .0278   .0320   .0390   .0460   .0530   .0600
PC   .0750   .1000   .4000   .7000   .7250   .7500   .7650   .7800   .7900   .8000
PC   .8100   .8200   .8250   .8300   .8350   .8400   .8450   .8500   .8550   .8600
PC   .8638   .8675   .8713   .8750   .8788   .8825   .8863   .8900   .8938   .8975
PC   .9013   .9050   .9083   .9115   .9148   .9180   .9210   .9240   .9270   .9300
PC   .9325   .9350   .9375   .9400   .9425   .9450   .9475   .9500   .9525   .9550
PC   .9575   .9600   .9625   .9650   .9675   .9700   .9725   .9750   .9775   .9800
PC   .9813   .9825   .9838   .9850   .9863   .9875   .9888   .9900   .9913   .9925
PC   .9938   .9950   .9963   .9975   .9988   1.000
LS              60
UD    .097

KK
KM
RK    1519   .0263    .035            TRAP       5       4

KK      W2
KM
BA   .0278
LS              60
UD    .160

KK      WA
KM
HC       2

KK
KM
RK     464   .0151    .035            TRAP       5       4

KK      W3
KM
BA   .0498
LS              61
UD    .139

KK      WB
KM
HC       2

KK
KM
RK     823   .0279    .035            TRAP       5       4                54

KK      W4
KM
BA   .0054
LS              62
UD    .044

KK
KM
RK    1078   .0482    .035            TRAP       5       4

KK      W5
KM
BA   .0159
LS              60
UD    .075

KK      WC
KM
HC       3

KK
KM
RK     557   .0449    .035            TRAP      10       4

KK      W6
KM
BA   .0486
LS              60
UD    .085

KK
KM
RK     592   .0372    .035            TRAP       5       4
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 79          KK     W7
 80          KM
 81          BA   .0217
 82          LS             60
 83          UD    .074

 84          KK
 85          KM
 86          RK     464   .1466    .035          TRAP       5       4

 87          KK     WD
 88          KM
 89          HC       2

 90          KK     D-E
 91          KM
 92          RK    1044   .0479    .035          TRAP       5       4

 93          KK     W8
 94          KM
 95          BA   .0286
 96          LS             60
 97          UD    .069

 98          KK
 99          KM
100          RK    1449   .0504    .035          TRAP       5       4

101          KK     W9
102          KM
103          BA   .0402
104          LS             61
105          UD    .097

106          KK     WE
107          KM
108          HC       3

109          KK     E-F
110          KM
111          RK     789   .0038    .035          TRAP       5       4

112          KK     W10
113          KM
114          BA   .0431
115          LS             61
116          UD    .096

117          KK
118          KM
119          RK     824   .0388    .035          TRAP       5       4

120          KK     W11
121          KM
122          BA   .0314
123          LS             60
124          UD    .077

125          KK     WF
126          KM
127          HC       4

128          KK     F-G
129          KM
130          RK    2319   .0211    .035          TRAP      10       4

131          KK     W12
132          KM
133          BA   .0398
134          LS             60
135          UD    .095

136          KK
137          KM
138          RK    2478   .0307    .035          TRAP       5       4

139          KK     W14
140          KM
141          BA   .0473
142          LS             61
143          UD    .135

144          KK
145          KM
146          RK      81  0.0001    .035          TRAP       5       4

147          KK     W13
148          KM
149          BA   .1123
150          LS             61
151          UD    .182

152          KK     WG
153          KM
154          HC       4
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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 155 | KK | G-H | | | | | |
| 156 | KM | | | | | | |
| 157 | RK | 2632 | .0217 | .035 | TRAP | 15 | 4 |
| 158 | KK | | | | | | |
| 159 | KM | | | | | | |
| 160 | RK | 2447 | .0372 | .035 | TRAP | 5 | 4 |
| 161 | KK | W15 | | | | | |
| 162 | KM | | | | | | |
| 163 | BA | .0881 | | | | | |
| 164 | LS | | 61 | | | | |
| 165 | UD | .141 | | | | | |
| 166 | KK | | | | | | |
| 167 | KM | | | | | | |
| 168 | RK | 1763 | .0289 | .035 | TRAP | 5 | 4 |
| 169 | KK | WH | | | | | |
| 170 | KM | | | | | | |
| 171 | HC | 2 | | | | | |
| 172 | KK | W16 | | | | | |
| 173 | KM | | | | | | |
| 174 | BA | .0292 | | | | | |
| 175 | LS | | 61 | | | | |
| 176 | UD | .092 | | | | | |
| 177 | KK | | | | | | |
| 178 | KM | | | | | | |
| 179 | RK | 1345 | .0260 | .035 | TRAP | 5 | 4 |
| 180 | KK | W17 | | | | | |
| 181 | KM | | | | | | |
| 182 | BA | .0184 | | | | | |
| 183 | LS | | 60 | | | | |
| 184 | UD | .085 | | | | | |
| 185 | KK | WI | | | | | |
| 186 | KM | | | | | | |
| 187 | HC | 2 | | | | | |
| 188 | KK | I-M | | | | | |
| 189 | KM | | | | | | |
| 190 | RK | 2650 | .0370 | .035 | TRAP | 15 | 4 |
| 191 | KK | W19 | | | | | |
| 192 | KM | | | | | | |
| 193 | BA | .0428 | | | | | |
| 194 | LS | | 61 | | | | |
| 195 | UD | .083 | | | | | |
| 196 | KK | | | | | | |
| 197 | KM | | | | | | |
| 198 | RK | 881 | .0329 | .035 | TRAP | 5 | 4 |
| 199 | KK | W20 | | | | | |
| 200 | KM | | | | | | |
| 201 | BA | .0315 | | | | | |
| 202 | LS | | 61 | | | | |
| 203 | UD | .071 | | | | | |
| 204 | KK | WJ | | | | | |
| 205 | KM | | | | | | |
| 206 | HC | 2 | | | | | |
| 207 | KK | | | | | | |
| 208 | KM | | | | | | |
| 209 | RK | 3061 | .0235 | .035 | TRAP | 5 | 4 |
| 210 | KK | W21 | | | | | |
| 211 | KM | | | | | | |
| 212 | BA | .1347 | | | | | |
| 213 | LS | | 60 | | | | |
| 214 | UD | .156 | | | | | |
| 215 | KK | WK | | | | | |
| 216 | KM | | | | | | |
| 217 | HC | 2 | | | | | |
| 218 | KK | | | | | | |
| 219 | KM | | | | | | |
| 220 | RK | 487 | .0246 | .035 | TRAP | 5 | 4 |
| 221 | KK | W22 | | | | | |
| 222 | KM | | | | | | |
| 223 | BA | .0086 | | | | | |
| 224 | LS | | 63 | | | | |
| 225 | UD | .055 | | | | | |
| 226 | KK | WL | | | | | |
| 227 | KM | | | | | | |
| 228 | HC | 2 | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 229 | KK | | | | | | |
| 230 | KM | | | | | | |
| 231 | RK | 1786 | .0297 | .035 | TRAP | 5 | 4 |
| 232 | KK | W23 | | | | | |
| 233 | KM | | | | | | |
| 234 | BA | .0244 | | | | | |
| 235 | LS | | 60 | | | | |
| 236 | UD | .112 | | | | | |
| 237 | KK | W18 | | | | | |
| 238 | KM | | | | | | |
| 239 | BA | .1251 | | | | | |
| 240 | LS | | 60 | | | | |
| 241 | UD | .189 | | | | | |
| 242 | KK | WM | | | | | |
| 243 | KM | | | | | | |
| 244 | HC | 5 | | | | | |
| 245 | KK | M-N | | | | | |
| 246 | KM | | | | | | |
| 247 | RK | 1345 | .0149 | .035 | TRAP | 20 | 4 |
| 248 | KK | W24 | | | | | |
| 249 | KM | | | | | | |
| 250 | BA | .0442 | | | | | |
| 251 | LS | | 60 | | | | |
| 252 | UD | .140 | | | | | |
| 253 | KK | W25 | | | | | |
| 254 | KM | | | | | | |
| 255 | BA | .0957 | | | | | |
| 256 | LS | | 61 | | | | |
| 257 | UD | .197 | | | | | |
| 258 | KK | WN | | | | | |
| 259 | KM | | | | | | |
| 260 | HC | 3 | | | | | |
| 261 | KK | N-P | | | | | |
| 262 | KM | | | | | | |
| 263 | RK | 1589 | .017 | .035 | TRAP | 20 | 4 |
| 264 | KK | W28 | | | | | |
| 265 | KM | | | | | | |
| 266 | BA | .0397 | | | | | |
| 267 | LS | | 63 | | | | |
| 268 | UD | .128 | | | | | |
| 269 | KK | | | | | | |
| 270 | KM | | | | | | |
| 271 | RK | 1345 | .0208 | .035 | TRAP | 5 | 4 |
| 272 | KK | W30 | | | | | |
| 273 | KM | | | | | | |
| 274 | BA | .0509 | | | | | |
| 275 | LS | | 63 | | | | |
| 276 | UD | .123 | | | | | |
| 277 | KK | | | | | | |
| 278 | KM | | | | | | |
| 279 | RK | 1078 | .0074 | .035 | TRAP | 5 | 4 |
| 280 | KK | W29 | | | | | |
| 281 | KM | | | | | | |
| 282 | BA | .0409 | | | | | |
| 283 | LS | | 63 | | | | |
| 284 | UD | .145 | | | | | |
| 285 | KK | W31 | | | | | |
| 286 | KM | | | | | | |
| 287 | BA | .0123 | | | | | |
| 288 | LS | | 63 | | | | |
| 289 | UD | .073 | | | | | |
| 290 | KK | WO | | | | | |
| 291 | KM | | | | | | |
| 292 | HC | 4 | | | | | |
| 293 | KK | O-P | | | | | |
| 294 | KM | | | | | | |
| 295 | RK | 2169 | .0226 | .035 | TRAP | 5 | 4 |
| 296 | KK | W26 | | | | | |
| 297 | KM | | | | | | |
| 298 | BA | .0301 | | | | | |
| 299 | LS | | 63 | | | | |
| 300 | UD | .062 | | | | | |
| 301 | KK | | | | | | |
| 302 | KM | | | | | | |
| 303 | RK | 4662 | .0225 | .035 | TRAP | 5 | 4 |
| 304 | KK | W27 | | | | | |

```
305     KM
306     BA   .1633
307     LS             60
308     UD    .253

309     KK     W32
310     KM
311     BA   .0890
312     LS             60
313     UD    .170

314     KK      WP
315     KM
316     HC       5

317     KK     P-Q
318     KM
319     RK    1925  .0182   .035          TRAP     25     4

320     KK    W33A
321     KM
322     BA   .1261
323     LS             60
324     UD    .186

325     KK     WP1
326     KM
327     HC       2

328     KK    P1-Q
329     KM
330     RK    3000   .020   .035          TRAP     25     4

331     KK    W33B
332     KM
333     BA   .1360
334     LS             60
335     UD    .225

336     KK    W34A
337     KM
338     BA   .1261
339     LS             60
340     UD    .173

341     KK  34A-P2
342     KM
343     RK    2550  .0176   .035          TRAP     25     4

344     KK    W34B
345     KM
346     BA   .1766
347     LS             60
348     UD    .224

349     KK     WP2
350     KM
351     HC       2

352     KK    P2-Q
353     KM
354     RK    2640   .021   .035          TRAP     25     4

355     KK    W34C
356     KM
357     BA   .1625
358     LS             60
359     UD    .244

360     KK      WQ
361     KM
362     HC       4

363     KK    Q-Q1
364     KM
365     RK    2940   .022   .035          TRAP     25     4

366     KK    W36A
367     KM
368     BA   .1429
369     LS             60
370     UD    .234

371     KK     WQ1
372     KM
373     HC       2

374     KK    Q1-R
375     KM
376     RK    3400   .022   .035          TRAP     25     4

377     KK    W36B
378     KM
379     BA   .1918
380     LS             60
```

```
UD    .306

KK    W35A
KM
BA   .0958
LS               60
UD    .187

KK  35A-WR
KM
RK    3715    .023    .035          TRAP      25      4

KK    W35B
KM
BA   .1507
LS       0       60
UD    .259

KK      WR
KM
HC       4

KK    WR-S
KM
RK    2922   .0168    .035          TRAP      25      4

KK    W37A
KM
BA   .1138
LS               60
UD    .185

KK   37A-S
KM
RK    1430    .014    .035          TRAP      25      4

KK    W37B
KM
BA   .1636
LS               61
UD    .218

KK      WS
KM
HC       3

KK     S-T
KM
RK    3653   .0164    .035          TRAP      25      4

KK     W38
KM
BA   .0907
LS               62
UD    .190

KK
KM
RK    2922   .0171    .035          TRAP       5      4

KK     W39
KM
BA   .1833
LS               60
UD    .251

KK     W40
KM
BA   .0964
LS               60
UD    .165

KK      WT
KM
HC       4

KK     T-U
KM
RK    1125   .0098    .035          TRAP      25      4

KK     W41
KM
BA   .0601
LS               60
UD    .117

KK     W42
KM
BA   .0581
LS               81
UD    .127

KK     U-V
KM
RK    2656   .0184    .035          TRAP       5      4
```

```
457        KK     WU
458        KM
459        HC      3

460        KK
461        KM
462        RK   2215  .0181   .035        TRAP     25      4

463        KK    W43
464        KM
465        BA  .1457
466        LS           61
467        UD   .169

468        KK     WV
469        KM
470        HC      2

471        KK    V-W
472        KM
473        RK    487  .0103   .035        TRAP     25      4

474        KK    W45
475        KM
476        BA  .1931
477        LS           61
478        UD   .189

479        KK     WW
480        KM
481        HC      2

482        KK    W-X
483        KM
484        RK   1542  .0149   .035        TRAP      5      4

485        KK     M1
486        KM
487        BA  .0665
488        LS           60
489        UD   .108

490        KK
491        KM
492        RK    650  .0308   .035        TRAP      5      4

493        KK     M2
494        KM
495        BA  .0273
496        LS           60
497        UD   .114
```



```
LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

498        KK     MB
499        KM
500        HC      2

501        KK
502        KM
503        RK    928  .0302   .035        TRAP      5      4

504        KK     M4
505        KM
506        BA  .0346
507        LS           60
508        UD   .121

509        KK
510        KM
511        RK    406  .0197    .02        TRAP     40      0

512        KK     M3
513        KM
514        BA  .0149
515        LS           60
516        UD   .076

517        KK     MC
518        KM
519        HC      3

520        KK
521        KM
522        RK   1902  .0231   .035        TRAP      5      4

523        KK     M5
524        KM
525        BA  .0176
526        LS           69
527        UD   .108
```

```
528          KK
529          KM
530          RK    1717   .0186    .02          TRAP      40       0

531          KK     M6
532          KM
533          BA   .0637
534          LS             65
535          UD    .233

536          KK     MD
537          KM
538          HC       3

539          KK
540          KM
541          RK    2841    .019    .035         TRAP       5       4

542          KK     M7
543          KM
544          BA   .0524
545          LS             69
546          UD    .170

547          KK
548          KM
549          RK    1044   .0268    .02          TRAP      40       0

550          KK     M8
551          KM
552          BA   .0370
553          LS             61
554          UD    .126

555 -        KK     ME
556          KM
557          HC       2

558          KK
559          KM
560          RK    2992   .0187    .035         TRAP       5       4

561          KK     M9
562          KM
563          BA   .0169
564          LS             69
565          UD    .087

566          KK
567          KM
568          RK    3433   .0253    .03          TRAP       5       4

569          KK    M12A
570          KM
571          BA   .0658
572          LS             60
573          UD    .159

574          KK    M12B
575          KM
576          BA   .1481
577          LS             60

579          KK     MF
580          KM
581          HC       5

582          KK
583          KM
584          RK    2586   .0224    .035         TRAP      10       4

585          KK     M13
586          KM
587          BA   .0614
588          LS             64
589          UD    .165

590          KK
591          KM
592          RK    1700     .01    .035         TRAP       6       4

593          KK     M14
594          KM
595          BA   .1624
596          LS             64
597          UD    .228

598          KK      MG
599          KM
600          HC       2

601          KK   PONDW
602          KM          WOODMEN HILLS DETENTION POND WEST  (FROM FDR WH FLG F4)
603          SV       0     .68     1.5     235     3.6     4.9     6.3    7.34    7.34
604          SE     968     969     970     971     972     973     974     975     976
```

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 680 | BA | .042 | | | | | |
| 681 | LS | | 60 | | | | |
| 682 | UD | .139 | | | | | |
| 683 | KK | ML | | | | | |
| 684 | KM | | | | | | |
| 685 | HC | 2 | | | | | |
| 686 | KK | | | | | | |
| 687 | KM | | | | | | |
| 688 | RK | 2099 | .02 | .035 | TRAP | 5 | 4 |
| 689 | KK | M17 | | | | | |
| 690 | KM | | | | | | |
| 691 | BA | .0765 | | | | | |
| 692 | LS | | 61 | | | | |
| 693 | UD | .133 | | | | | |
| 694 | KK | MM | | | | | |
| 695 | KM | | | | | | |
| 696 | HC | 2 | | | | | |
| 697 | KK | | | | | | |
| 698 | KM | | | | | | |
| 699 | RK | 2320 | .0121 | .035 | TRAP | 10 | 4 |
| 700 | KK | M18 | | | | | |
| 701 | KM | | | | | | |
| 702 | BA | .061 | | | | | |
| 703 | LS | | 61 | | | | |
| 704 | UD | .142 | | | | | |
| 705 | KK | | | | | | |
| 706 | KM | | | | | | |
| 707 | RK | 2122 | .017 | .035 | TRAP | 5 | 4 |
| 708 | KK | M20 | | | | | |
| 709 | KM | | | | | | |
| 710 | BA | .1341 | | | | | |
| 711 | LS | | 61 | | | | |
| 712 | UD | .211 | | | | | |
| 713 | KK | MN | | | | | |
| 714 | KM | | | | | | |
| 715 | HC | 4 | | | | | |
| 716 | KK | | | | | | |
| 717 | KM | | | | | | |
| 718 | RK | 1531 | .0202 | .035 | TRAP | 25 | 4 |
| 719 | KK | M21 | | | | | |
| 720 | KM | | | | | | |
| 721 | BA | .0241 | | | | | |
| 722 | LS | | 61 | | | | |
| 723 | UD | .125 | | | | | |
| 724 | KK | | | | | | |
| 725 | KM | | | | | | |
| 726 | RK | 1322 | .0212 | .035 | TRAP | 5 | 4 |
| 727 | KK | M23 | | | | | |
| 728 | KM | | | | | | |
| 729 | BA | .0461 | | | | | |
| 730 | LS | | 60 | | | | |
| 731 | UD | .120 | | | | | |
| 732 | KK | MO | | | | | |
| 733 | KM | | | | | | |
| 734 | HC | 3 | | | | | |
| 735 | KK | | | | | | |
| 736 | KM | | | | | | |
| 737 | RK | 974 | .0133 | .035 | TRAP | 25 | 4 |
| 738 | KK | M24 | | | | | |
| 739 | KM | | | | | | |
| 740 | BA | .0776 | | | | | |
| 741 | LS | | 60 | | | | |
| 742 | UD | .125 | | | | | |
| 743 | KK | MP | | | | | |
| 744 | KM | | | | | | |
| 745 | HC | 2 | | | | | |
| 746 | KK | | | | | | |
| 747 | KM | | | | | | |
| 748 | RK | 290 | .0138 | .035 | TRAP | 25 | 4 |
| 749 | KK | M25 | | | | | |
| 750 | KM | | | | | | |
| 751 | BA | .0105 | | | | | |
| 752 | LS | | 60 | | | | |
| 753 | UD | .130 | | | | | |
| 754 | KK | MQ | | | | | |

```
KM
HC       2

KK
KM
RK    3305   .0136   .035          TRAP     25     4

KK     M26
KM
BA   .1779
LS              65
UD    .250

KK      MR
KM
HC       2

KK     W44
KM
BA   .0384
LS              60
UD    .141

KK
KM
RK    2029   .0148   .035          TRAP      5     4

KK     W47
KM
BA   .0541
LS              60
UD    .148

KK
KM
RK    1438   .0223   .035          TRAP      5     4

KK     W46
KM
BA   .0418
LS              61
UD    .154

KK     M27
KM
BA   .0528
LS              60
UD    .132

KK      WX
KM
HC       6

KK
KM
RK    2563   .0125   .035          TRAP     40     4

KK     W48
KM
BA   .1179
LS              61
UD    .091

KK
KM
RK    2400   .0188   .035          TRAP      5     4

KK     W49
KM
BA   .2651
LS              61
UD    .181

KK      WZ
KM
HC       3

KK
KM
RK     800   .0125   .035          TRAP     40     4

KK     W50
KM
BA   .1061
LS              61
UD    .145

KK     WAB
KM
HC       2

KK
KM
RK     742   .0108   .035          TRAP     40     4
```

```
830      KK     W51
831      KM
832      BA   .0546
833      LS              63
834      UD    .172

835      KK     WAC
836      KM
837      HC       2

838      KK
839      KM
840      RK     638   .0345    .035          TRAP      40      4

841      KK     W52
842      KM
843      BA   .0499
844      LS              63
845      UD    .109

846      KK
847      KM
848      RK    1171   .0205    .035          TRAP       5      4

849      KK     W53
850      KM
851      BA   .0531
852      LS              63
853      UD    .156

854      KK     WAD
855      KM
856      HC       2

857      KK
858      KM
859      RK     290   .0310    .035          TRAP      10      4

860      KK     W54
861      KM
862      BA   .0078
863      LS              60
864      UD    .050

865      KK     WAE
866      KM
867      HC       3

868      KK
869      KM
870      RK    1925   .0052    .035          TRAP      40      4

871      KK     W56
872      KM
873      BA   .1831
874      LS              60
875      UD    .191

876      KK     WAF
877      KM
878      HC       2

879      KK
880      KM
881      RK    1032   .0155    .035          TRAP      40      4

882      KK     W62
883      KM
884      BA   .0750
885      LS              60
886      UD    .090

887      KK
888      KM
889      RK    2169   .0203    .035          TRAP       5      4

890      KK     W63
891      KM
892      BA    .047
893      LS              60
894      UD    .109

895      KK
896      KM
897      RK    1450   .0131    .035          TRAP       5      4

898      KK     W61
899      KM
900      BA    .192
901      LS              60
902      UD    .251

903      KK     WAH
904      KM
905      HC       3
```

```
 906          KK
 907          KM
 908          RK     1241   .0153    .035           TRAP        5        4

 909          KK      W57
 910          KM
 911          BA    .0732
 912          LS               60
 913          UD     .140

 914          KK
 915          KM
 916          RK     5903   .0254    .035           TRAP        5        4

 917          KK      W58
 918          KM
 919          BA    .2296
 920          LS               60
 921          UD     .251

 922          KK      WAI
 923          KM
 924          HC        3

 925          KK
 926          KM
 927          RK      232   .0086    .035           TRAP       15        4

 928          KK      E1A
 929          KM
 930          BA    .1151
 931          LS        0      60
 932          UD     .234

 933          KK   E1A-EA
 934          KM
 935          RK     4000    .022    .035           TRAP        5        4

 936          KK      E1B
 937          KM
 938          BA    .1665
 939          LS        0      60
 940          UD     .233

 941          KK       EA
 942          KM
 943          HC        2

 944          KK    EA-EB
 945          KM
 946          RK     1900    .022    .035           TRAP        5        4
```



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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 947          KK       E2
 948          KM
 949          BA     .104
 950          LS        0      60
 951          UD     .149

 952          KK       EB
 953          KM
 954          HC        2

 955          KK    POND1
 956          KM         ROUTE FLOW THROUGH SCS POND 1
 957          SV        0     .01     .28    1.12    2.70    5.18    6.00    6.94
 958          SE    945.5     946     948     950     952     954   954.5     955
 959          SQ        0       0       0       0       0    48.5   176.4   351.4
 960          RS        1    ELEV   945.5

 961          KK
 962          KM
 963          RK     1300   .0192    .035           TRAP        5        4

 964          KK       E3
 965          KM
 966          BA     .090
 967          LS               60
 968          UD     .128

 969          KK    MH-P2
 970          KM         RETRIEVE DIVERSION FROM W. MERIDIAN RD DITCH
 971          DR   DIVRT1

 972          KK       EC
 973          KM
 974          HC        3

 975          KK    POND2
 976          KM         ROUTE FLOW THROUGH SCS POND 2
 977          SV        0     .21    1.11    3.19    6.89    9.52   11.08   12.82   14.72   16.70
```

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 978 | SE | 920 | 922 | 924 | 926 | 928 | 929 | 929.5 | 930 | 930.5 | 931 |
| 979 | SQ | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 86.5 | 186.2 | 308.4 |
| 980 | RS | 1 | ELEV | 920 | | | | | | | |
| 981 | KK | | | | | | | | | | |
| 982 | KM | | | | | | | | | | |
| 983 | RK | 1700 | .0141 | .035 | | TRAP | 5 | 4 | | | |
| 984 | KK | E1C | | | | | | | | | |
| 985 | KM | | | | | | | | | | |
| 986 | BA | .0845 | | | | | | | | | |
| 987 | LS | | 60 | | | | | | | | |
| 988 | UD | .200 | | | | | | | | | |
| 989 | KK | 1C-ED1 | | | | | | | | | |
| 990 | KM | | | | | | | | | | |
| 991 | RK | 3450 | .022 | .035 | | TRAP | 5 | 4 | | | |
| 992 | KK | E4 | | | | | | | | | |
| 993 | KM | | | | | | | | | | |
| 994 | BA | .127 | | | | | | | | | |
| 995 | LS | | 60 | | | | | | | | |
| 996 | UD | .200 | | | | | | | | | |
| 997 | KK | ED1 | | | | | | | | | |
| 998 | KM | | | | | | | | | | |
| 999 | HC | 2 | | | | | | | | | |
| 1000 | KK | ED1-ED | | | | | | | | | |
| 1001 | KM | | | | | | | | | | |
| 1002 | RK | 450 | .0178 | .03 | | TRAP | 5 | 4 | | | |
| 1003 | KK | E5 | | | | | | | | | |
| 1004 | KM | | | | | | | | | | |
| 1005 | BA | .094 | | | | | | | | | |
| 1006 | LS | | 60 | | | | | | | | |
| 1007 | UD | .160 | | | | | | | | | |
| 1008 | KK | ED | | | | | | | | | |
| 1009 | KM | | | | | | | | | | |
| 1010 | HC | 3 | | | | | | | | | |
| 1011 | KK | | | | | | | | | | |
| 1012 | KM | | | | | | | | | | |
| 1013 | RK | 950 | .0211 | .035 | | TRAP | 10 | 4 | | | |
| 1014 | KK | E8 | | | | | | | | | |
| 1015 | KM | | | | | | | | | | |
| 1016 | BA | .0446 | | | | | | | | | |
| 1017 | LS | | 60 | | | | | | | | |
| 1018 | UD | .139 | | | | | | | | | |
| 1019 | KK | EE | | | | | | | | | |
| 1020 | KM | | | | | | | | | | |
| 1021 | HC | 2 | | | | | | | | | |
| 1022 | KK | | | | | | | | | | |
| 1023 | KM | | | | | | | | | | |
| 1024 | RK | 1500 | .0127 | .035 | | TRAP | 10 | 4 | | | |
| 1025 | KK | E10 | | | | | | | | | |
| 1026 | KM | | | | | | | | | | |
| 1027 | BA | .029 | | | | | | | | | |
| 1028 | LS | | 60 | | | | | | | | |
| 1029 | UD | .158 | | | | | | | | | |
| 1030 | KK | EF | | | | | | | | | |
| 1031 | KM | | | | | | | | | | |
| 1032 | HC | 2 | | | | | | | | | |
| 1033 | KK | F-G | | | | | | | | | |
| 1034 | KM | | | | | | | | | | |
| 1035 | RK | 950 | .0074 | .035 | | TRAP | 15 | 4 | | | |
| 1036 | KK | E6 | | | | | | | | | |
| 1037 | KM | | | | | | | | | | |
| 1038 | BA | .119 | | | | | | | | | |
| 1039 | LS | | 60 | | | | | | | | |
| 1040 | UD | .228 | | | | | | | | | |
| 1041 | KK | E7 | | | | | | | | | |
| 1042 | KM | | | | | | | | | | |
| 1043 | BA | .031 | | | | | | | | | |
| 1044 | LS | | 60 | | | | | | | | |
| 1045 | UD | .082 | | | | | | | | | |
| 1046 | KK | | | | | | | | | | |
| 1047 | KM | | | | | | | | | | |
| 1048 | RK | 1100 | .0100 | .035 | | TRAP | 5 | 4 | | | |
| 1049 | KK | EG1 | | | | | | | | | |
| 1050 | KM | | | | | | | | | | |
| 1051 | HC | 2 | | | | | | | | | |
| 1052 | KK | G1-G | | | | | | | | | |

```
1204          KM
1205          HC       2

1206          KK
1207          KM
1208          RK    1832   .0126   .035        TRAP     40     4

1209          KK     E27
1210          KM
1211          BA   .1236
1212          LS             63
1213          UD    .172

1214          KK     EO
1215          KM
1216          HC       2

1217          KK
1218          KM
1219          RK    1625   .0133   .035        TRAP      5     3

1220          KK     W55
1221          KM
1222          BA   .0452
1223          LS             60
1224          UD    .093

1225          KK     WAG
1226          KM
1227          HC       2

1228          KK
1229          KM
1230          RK    2025   .0109   .035        TRAP      5     4

1231          KK     W59
1232          KM
1233          BA   .0705
1234          LS             60
1235          UD    .200

1236          KK     WAJ
1237          KM
1238          HC       4

1239          KK
1240          KM
1241          RK    1450   .0124   .035        TRAP     40     4

1242          KK     E28
1243          KM
1244          BA   .0718
1245          LS             61
1246          UD    .223

1247          KK
1248          KM
1249          RK    2064   .0165   .035        TRAP     40     4

1250          KK     E29
1251          KM
1252          BA   .0465
1253          LS             61
1254          UD    .166

1255          KK     EZZ
1256          KM       COMBINE E29 & E30 AT DP ZZ
1257          HC       2

1258          KK     W60
1259          KM
1260          BA   .0711
1261          LS             60
1262          UD    .182

1263          KK      ZZ
1264          KM       COMBINE ALL AT DP ZZ
1265          HC       3
1266          ZZ
```

```
1
             SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
 LINE    (V) ROUTING       (--->) DIVERSION OR PUMP FLOW

  NO.    (.) CONNECTOR     (<---) RETURN OF DIVERTED OR PUMPED FLOW

   10       W1
              V
              V
   27
              .
              .
   30         .       W2
              .         .
              .         .
   35       WA ..........
              V
              V
   38
              .
              .
   41         .       W3
              .         .
              .         .
   46       WB ..........
              V
              V
   49
              .
              .
   52         .       W4
              .         V
              .         V
   57         .
              .         .
              .         .
   60         .         .       W5
              .         .         .
              .         .         .
   65       WC ....................
              V
              V
   68
              .
              .
   71         .       W6
              .         V
              .         V
   76         .
              .         .
              .         .
   79         .         .       W7
              .         .         V
              .         .         V
   84         .         .
              .         .         .
              .         .         .
   87         .       WD ..........
              .         V
              .         V
   90         .       D-E
              .         .
              .         .
   93         .         .       W8
              .         .         V
              .         .         V
   98         .         .
              .         .         .
              .         .         .
  101         .         .         .       W9
              .         .         .         .
              .         .         .         .
  106         .       WE ....................
              .         V
              .         V
  109         .       E-F
              .         .
              .         .
  112         .         .       W10
              .         .         V
              .         .         V
  117         .         .
              .         .         .
              .         .         .
  120         .         .         .       W11
              .         .         .         .
              .         .         .         .
  125       WF ..............................
              V
              V
  128       F-G
              .
              .
  131         .       W12
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               .           V
               .           V
501            .
               .           .
               .           .
504            .           .         M4
               .           .           V
               .           .           V
509            .           .
               .           .           .
               .           .           .
512            .           .           .         M3
               .           .           .           .
               .           .           .           .
517            .        MC .........................
               .           V
               .           V
520            .
               .           .
               .           .
523            .           .         M5
               .           .           V
               .           .           V
528            .           .
               .           .           .
               .           .           .
531            .           .           .         M6
               .           .           .           .
               .           .           .           .
536            .        MD .........................
               .           V
               .           V
539            .
               .           .
               .           .
542            .           .         M7
               .           .           V
               .           .           V
547            .           .
               .           .           .
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550            .           .           .         M8
               .           .           .           .
               .           .           .           .
555            .           .         ME ............
               .           .           V
               .           .           V
558            .           .
               .           .           .
               .           .           .
561            .           .           .         M9
               .           .           .           V
               .           .           .           V
566            .           .           .
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               .           .           .           .
569            .           .           .           .        M12A
               .           .           .           .           .
               .           .           .           .           .
574            .           .           .           .           .        M12B
               .           .           .           .           .           .
               .           .           .           .           .           .
579            .        MF .................................................
               .           V
               .           V
582            .
               .           .
               .           .
585            .           .        M13
               .           .           V
               .           .           V
590            .           .
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593            .           .           .        M14
               .           .           .           .
               .           .           .           .
598            .           .         MG............
               .           .           V
               .           .           V
601            .           .       PONDW
               .           .           .
               .           .           .
607            .        MH ............
               .           V
               .           V
610            .
               .           .
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615            .           .------->  DIVRT1
613            .      MH-P2
               .           .
               .           .
618            .           .        M15
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 623        .        MI ............
            .         V
            .         V
 626        .
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            .         .
 629        .         .        M19
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            .         .         .
 634        .        MJ ............
            .         V
            .         V
 637        .
            .         .
            .         .
 640        .         .        M10
            .         .         V
            .         .         V
 645        .         .       M10-K
            .         .         .
            .         .         .
 648        .         .         .        M11A
            .         .         .         .
            .         .         .         .
 653        .         .        MK............
            .         .         V
            .         .         V
 656        .         .       MK-K1
            .         .         .
            .         .         .
 659        .         .         .        M11B
            .         .         .         V
            .         .         .         V
 664        .         .         .       11B-K1
            .         .         .         .
            .         .         .         .
 667        .         .         .         .        M11C
            .         .         .         .         .
            .         .         .         .         .
 672        .         .        MK1.......................
            .         .         V
            .         .         V
 675        .         .       K1-ML
            .         .         .
            .         .         .
 678        .         .         .        M16
            .         .         .         .
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 683        .         .        ML ............
            .         .         V
            .         .         V
 686        .         .
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 689        .         .         .        M17
            .         .         .         .
            .         .         .         .
 694        .         .        MM ............
            .         .         V
            .         .         V
 697        .         .
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            .         .         .
 700        .         .         .        M18
            .         .         .         V
            .         .         .         V
 705        .         .         .
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 708        .         .         .         .        M20
            .         .         .         .         .
            .         .         .         .         .
 713        .        MN ..................................
            .         V
            .         V
 716        .
            .         .
            .         .
 719        .         .        M21
            .         .         V
            .         .         V
 724        .         .
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            .         .         .
 727        .         .         .        M23
            .         .         .         .
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 732        .        MO .......................
            .         V
            .         V
 735        .
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 738        .         .        M24
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 860        .         .         W54
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 865      WAE......................
            V
            V
 868

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 871        .        W56
            .         .
            .         .
 876      WAF...........
            V
            V
 879

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 882        .        W62
            .         V
            .         V
 887        .
            .         .
            .         .
 890        .         .         W63
            .         .          V
            .         .          V
 895        .         .
            .         .          .
            .         .          .
 898        .         .          .         W61
            .         .          .          .
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 903        .        WAH.......................
            .         V
            .         V
 906        .
            .         .
            .         .
 909        .         .         W57
            .         .          V
            .         .          V
 914        .         .
            .         .          .
            .         .          .
 917        .         .          .         W58
            .         .          .          .
            .         .          .          .
 922        .        WAI.......................
            .         V
            .         V
 925        .
            .         .
            .         .
 928        .         .         E1A
            .         .          V
            .         .          V
 933        .         .       E1A-EA
            .         .          .
            .         .          .
 936        .         .          .         E1B
            .         .          .          .
            .         .          .          .
 941        .         .          EA............
            .         .          V
            .         .          V
 944        .         .        EA-EB
            .         .          .
            .         .          .
 947        .         .          .         E2
            .         .          .          .
            .         .          .          .
 952        .         .         EB ............
            .         .          V
            .         .          V
 955        .         .        POND1
            .         .          V
            .         .          V
 961        .         .
            .         .          .
            .         .          .
 964        .         .          .         E3
            .         .          .          .
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 971        .         .          .          .          .<-------  DIVRT1
 969        .         .          .          .        MH-P2
            .         .          .          .          .
            .         .          .          .          .
 972        .         .         EC ........................
            .         .          V
            .         .          V
 975        .         .        POND2
            .         .          V
            .         .          V
 981        .         .
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1103            .           .        J1-K
                .           .           .
                .           .           .
1106            .           .           .        E15
                .           .           .           V
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1111            .           .           .
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1114            .           .           .           .        E16
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1119            .           .           .        EI ............
                .           .           .           V
                .           .           .           V
1122            .           .           .
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1125            .           .           .           .        E17
                .           .           .           .           V
                .           .           .           .           V
1130            .           .           .           .
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1133            .           .           .           .           .        E18
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1138            .           .           .        EJ2........................
                .           .           .           V
                .           .           .           V
1141            .           .           .
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1144            .           .           .           .        E23
                .           .           .           .           .
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1149            .           .           .           .           .        E24
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1154            .           .        EK ....................................
                .           .           V
                .           .           V
1157            .           .
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1160            .           .           .        E21
                .           .           .           V
                .           .           .           V
1165            .           .           .
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1168            .           .           .           .        E20
                .           .           .           .           V
                .           .           .           .           V
1173            .           .           .           .
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1176            .           .           .           .           .        E22
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1181            .           .           .        EL ........................
                .           .           .           V
                .           .           .           V
1184            .           .           .
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1187            .           .           .           .        E25
                .           .           .           .           .
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1192            .           .        EM ........................
                .           .           V
                .           .           V
1195            .           .
                .           .           .
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1198            .           .           .        E26
                .           .           .           .
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1203            .           .        EN ............
                .           .           V
                .           .           V
1206            .           .
                .           .           .
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1209            .           .           .        E27
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1214            .           .        EO ............
                .           .           V
                .           .           V
1217            .           .
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1220            .           .           .        W55
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1225              .          .         WAG...........
                  .          .          V
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1228              .          .
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1231              .          .          .        W59
                  .          .          .          .
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1236             WAJ.................................
                  V
                  V
1239
                  .
                  .
1242              .         E28
                  .          V
                  .          V
1247              .
                  .          .
                  .          .
1250              .          .         E29
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1255              .         EZZ...........
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1258              .          .         W60
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                  .          .          .
1263             ZZ......................

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
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1***************************************                                    ***************************************
 *                                     *                                    *                                     *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1) *                                    *   U.S. ARMY CORPS OF ENGINEERS      *
 *             JUN    1998             *                                    *   HYDROLOGIC ENGINEERING CENTER     *
 *           VERSION 4.1               *                                    *       609 SECOND STREET             *
 *                                     *                                    *    DAVIS, CALIFORNIA 95616          *
 *  RUN DATE   28SEP07  TIME  11:49:21 *                                    *        (916) 756-1104               *
 *                                     *                                    *                                     *
***************************************                                    ***************************************


                          FALCON BASIN 100-YR/ 24-HOUR FLOOD/ EXISTING CONDITIONS
                              UPPER EAST TRIBUTARY (WOODMEN HILLS) BASED ON CLOMR APPROVED 2/2/99
                              INCLUDING 2 EXISTING SCS STOCK PONDS, WEST WOODMEN HILLS POND
                              NOTE: M1-M4 (PAINT BRUSH HILLS) MODELED AS HISTORIC TO ACCOUNT FOR
                                    DETENTION POND AT MC
                              NOTE: NO CULVERT AT STAPLETON & MERIDIAN, TEMP CULVERTS AT MERIDIAN
                                    DOWNSTREAM OF WOODMEN HILLS DRIVE (DIVERSION)

   9 IO          OUTPUT CONTROL VARIABLES
                       IPRNT            5  PRINT CONTROL
                       IPLOT            0  PLOT CONTROL
                       QSCAL           0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                        NMIN            5  MINUTES IN COMPUTATION INTERVAL
                       IDATE      14JUL99  STARTING DATE
                       ITIME         0800  STARTING TIME
                          NQ          300  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      15JUL99  ENDING DATE
                      NDTIME         0855  ENDING TIME
                       ICENT           19  CENTURY MARK

                   COMPUTATION INTERVAL      .08 HOURS
                        TOTAL TIME BASE    24.92 HOURS

          ENGLISH UNITS
               DRAINAGE AREA          SQUARE MILES
               PRECIPITATION DEPTH    INCHES
               LENGTH, ELEVATION      FEET
               FLOW                   CUBIC FEET PER SECOND
               STORAGE VOLUME         ACRE-FEET
               SURFACE AREA           ACRES
               TEMPERATURE            DEGREES FAHRENHEIT
```

1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

| | OPERATION | STATION | PEAK FLOW | TIME OF PEAK | AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR | 24-HOUR | 72-HOUR | BASIN AREA | MAXIMUM STAGE | TIME OF MAX STAGE |
|---|---|---|---|---|---|---|---|---|---|---|
| + | HYDROGRAPH AT | W1 | 40. | 5.75 | 4. | 1. | 1. | .05 | | |
| + | ROUTED TO | | 37. | 5.83 | 4. | 1. | 1. | .05 | | |
| + | HYDROGRAPH AT | W2 | 20. | 5.83 | 2. | 1. | 1. | .03 | | |
| + | 2 COMBINED AT | WA | 57. | 5.83 | 6. | 2. | 2. | .08 | | |
| + | ROUTED TO | | 55. | 5.83 | 6. | 2. | 2. | .08 | | |
| + | HYDROGRAPH AT | W3 | 39. | 5.83 | 4. | 1. | 1. | .05 | | |
| + | 2 COMBINED AT | WB | 95. | 5.83 | 10. | 3. | 3. | .13 | | |
| + | ROUTED TO | | 91. | 5.83 | 10. | 3. | 3. | .13 | | |
| + | HYDROGRAPH AT | W4 | 6. | 5.75 | 0. | 0. | 0. | .01 | | |
| + | ROUTED TO | | 6. | 5.75 | 0. | 0. | 0. | .01 | | |
| + | HYDROGRAPH AT | W5 | 15. | 5.75 | 1. | 0. | 0. | .02 | | |
| + | 3 COMBINED AT | WC | 105. | 5.83 | 11. | 4. | 4. | .15 | | |
| + | ROUTED TO | | 103. | 5.83 | 11. | 4. | 4. | .15 | | |
| + | HYDROGRAPH AT | W6 | 43. | 5.75 | 4. | 1. | 1. | .05 | | |
| + | ROUTED TO | | 40. | 5.75 | 4. | 1. | 1. | .05 | | |
| + | HYDROGRAPH AT | W7 | 20. | 5.75 | 2. | 1. | 1. | .02 | | |
| + | ROUTED TO | | 20. | 5.75 | 2. | 1. | 1. | .02 | | |
| + | 2 COMBINED AT | WD | 60. | 5.75 | 5. | 2. | 2. | .07 | | |
| + | ROUTED TO | D-E | 55. | 5.75 | 5. | 2. | 2. | .07 | | |
| + | HYDROGRAPH AT | W8 | 27. | 5.75 | 2. | 1. | 1. | .03 | | |
| + | ROUTED TO | | 24. | 5.75 | 2. | 1. | 1. | .03 | | |
| + | HYDROGRAPH AT | W9 | 36. | 5.75 | 3. | 1. | 1. | .04 | | |
| + | 3 COMBINED AT | WE | 114. | 5.75 | 11. | 4. | 4. | .14 | | |
| + | ROUTED TO | E-F | 108. | 5.83 | 11. | 4. | 4. | .14 | | |
| + | HYDROGRAPH AT | W10 | 39. | 5.75 | 3. | 1. | 1. | .04 | | |
| + | ROUTED TO | | 36. | 5.75 | 4. | 1. | 1. | .04 | | |
| + | HYDROGRAPH AT | W11 | 29. | 5.75 | 2. | 1. | 1. | .03 | | |
| + | 4 COMBINED AT | WF | 265. | 5.83 | 28. | 10. | 9. | .36 | | |
| | ROUTED TO | | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| + | | F-G | 255. | 5.83 | 28. | 10. | 9. | .36 |
| + | HYDROGRAPH AT | W12 | 33. | 5.75 | 3. | 1. | 1. | .04 |
| + | ROUTED TO | | 32. | 5.83 | 3. | 1. | 1. | .04 |
| + | HYDROGRAPH AT | W14 | 38. | 5.83 | 4. | 1. | 1. | .05 |
| + | ROUTED TO | | 37. | 5.83 | 4. | 1. | 1. | .05 |
| + | HYDROGRAPH AT | W13 | 80. | 5.83 | 9. | 3. | 3. | .11 |
| + | 4 COMBINED AT | WG | 403. | 5.83 | 44. | 15. | 14. | .56 |
| + | ROUTED TO | G-H | 382. | 5.92 | 44. | 15. | 14. | .56 |
| + | ROUTED TO | | 368. | 5.92 | 44. | 15. | 14. | .56 |
| + | HYDROGRAPH AT | W15 | 70. | 5.83 | 7. | 2. | 2. | .09 |
| + | ROUTED TO | | 66. | 5.83 | 7. | 2. | 2. | .09 |
| + | 2 COMBINED AT | WH | 428. | 5.92 | 51. | 17. | 17. | .65 |
| + | HYDROGRAPH AT | W16 | 27. | 5.75 | 2. | 1. | 1. | .03 |
| + | ROUTED TO | | 24. | 5.83 | 2. | 1. | 1. | .03 |
| + | HYDROGRAPH AT | W17 | 16. | 5.75 | 1. | 0. | 0. | .02 |
| + | 2 COMBINED AT | WI | 38. | 5.75 | 4. | 1. | 1. | .05 |
| + | ROUTED TO | I-M | 37. | 5.83 | 4. | 1. | 1. | .05 |
| + | HYDROGRAPH AT | W19 | 41. | 5.75 | 3. | 1. | 1. | .04 |
| + | ROUTED TO | | 37. | 5.75 | 3. | 1. | 1. | .04 |
| + | HYDROGRAPH AT | W20 | 32. | 5.75 | 3. | 1. | 1. | .03 |
| + | 2 COMBINED AT | WJ | 69. | 5.75 | 6. | 2. | 2. | .07 |
| + | ROUTED TO | | 65. | 5.83 | 6. | 2. | 2. | .07 |
| + | HYDROGRAPH AT | W21 | 96. | 5.83 | 10. | 3. | 3. | .13 |
| + | 2 COMBINED AT | WK | 161. | 5.83 | 16. | 6. | 5. | .21 |
| + | ROUTED TO | | 156. | 5.83 | 16. | 6. | 5. | .21 |
| + | HYDROGRAPH AT | W22 | 10. | 5.75 | 1. | 0. | 0. | .01 |
| + | 2 COMBINED AT | WL | 161. | 5.83 | 17. | 6. | 6. | .22 |
| + | ROUTED TO | | 147. | 5.83 | 17. | 6. | 6. | .22 |
| + | HYDROGRAPH AT | W23 | 19. | 5.75 | 2. | 1. | 1. | .02 |
| + | HYDROGRAPH AT | W18 | 80. | 5.83 | 9. | 3. | 3. | .13 |
| + | 5 COMBINED AT | WM | 690. | 5.92 | 83. | 28. | 27. | 1.06 |
| + | ROUTED TO | M-N | 673. | 5.92 | 83. | 28. | 27. | 1.06 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| + | HYDROGRAPH AT | W24 | 33. | 5.83 | 3. | 1. | 1. | .04 |
| + | HYDROGRAPH AT | W25 | 64. | 5.83 | 8. | 3. | 3. | .10 |
| + | 3 COMBINED AT | WN | 756. | 5.92 | 94. | 32. | 31. | 1.20 |
| + | ROUTED TO | N-P | 722. | 5.92 | 94. | 32. | 31. | 1.20 |
| + | HYDROGRAPH AT | W28 | 36. | 5.83 | 4. | 1. | 1. | .04 |
| + | ROUTED TO | | 35. | 5.83 | 4. | 1. | 1. | .04 |
| + | HYDROGRAPH AT | W30 | 46. | 5.83 | 5. | 2. | 2. | .05 |
| + | ROUTED TO | | 46. | 5.83 | 5. | 2. | 2. | .05 |
| + | HYDROGRAPH AT | W29 | 37. | 5.83 | 4. | 1. | 1. | .04 |
| + | HYDROGRAPH AT | W31 | 14. | 5.75 | 1. | 0. | 0. | .01 |
| + | 4 COMBINED AT | WO | 127. | 5.83 | 13. | 4. | 4. | .14 |
| + | ROUTED TO | O-P | 118. | 5.83 | 13. | 4. | 4. | .14 |
| + | HYDROGRAPH AT | W26 | 36. | 5.75 | 3. | 1. | 1. | .03 |
| + | ROUTED TO | | 35. | 5.92 | 3. | 1. | 1. | .03 |
| + | HYDROGRAPH AT | W27 | 89. | 5.92 | 12. | 4. | 4. | .16 |
| + | HYDROGRAPH AT | W32 | 61. | 5.83 | 7. | 2. | 2. | .09 |
| + | 5 COMBINED AT | WP | 1012. | 5.92 | 128. | 44. | 43. | 1.63 |
| + | ROUTED TO | P-Q | 950. | 5.92 | 128. | 44. | 43. | 1.63 |
| + | HYDROGRAPH AT | W33A | 82. | 5.83 | 10. | 3. | 3. | .13 |
| + | 2 COMBINED AT | WP1 | 1023. | 5.92 | 138. | 47. | 46. | 1.75 |
| + | ROUTED TO | P1-Q | 1007. | 6.00 | 137. | 47. | 46. | 1.75 |
| + | HYDROGRAPH AT | W33B | 78. | 5.92 | 10. | 4. | 3. | .14 |
| + | HYDROGRAPH AT | W34A | 86. | 5.83 | 10. | 3. | 3. | .13 |
| + | ROUTED TO | 34A-P2 | 82. | 5.92 | 9. | 3. | 3. | .13 |
| + | HYDROGRAPH AT | W34B | 101. | 5.92 | 13. | 5. | 4. | .18 |
| + | 2 COMBINED AT | WP2 | 183. | 5.92 | 23. | 8. | 8. | .30 |
| + | ROUTED TO | P2-Q | 175. | 6.00 | 23. | 8. | 8. | .30 |
| + | HYDROGRAPH AT | W34C | 90. | 5.92 | 12. | 4. | 4. | .16 |
| + | 4 COMBINED AT | WQ | 1325. | 6.00 | 181. | 63. | 61. | 2.36 |
| + | ROUTED TO | Q-Q1 | 1284. | 6.00 | 181. | 63. | 60. | 2.36 |
| + | HYDROGRAPH AT | W36A | 81. | 5.92 | 11. | 4. | 4. | .14 |
| + | 2 COMBINED AT | WQ1 | 1352. | 6.00 | 191. | 66. | 64. | 2.50 |

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|---|---|---|---|---|---|---|---|---|
| + | ROUTED TO | Q1-R | 1311. | 6.08 | 190. | 66. | 64. | 2.50 |
| + | HYDROGRAPH AT | W36B | 91. | 6.00 | 14. | 5. | 5. | .19 |
| + | HYDROGRAPH AT | W35A | 62. | 5.83 | 7. | 2. | 2. | .10 |
| + | ROUTED TO | 35A-WR | 58. | 6.00 | 7. | 2. | 2. | .10 |
| + | HYDROGRAPH AT | W35B | 81. | 5.92 | 11. | 4. | 4. | .15 |
| + | 4 COMBINED AT | WR | 1497. | 6.08 | 222. | 78. | 75. | 2.94 |
| + | ROUTED TO | WR-S | 1475. | 6.08 | 222. | 77. | 75. | 2.94 |
| + | HYDROGRAPH AT | W37A | 74. | 5.83 | 9. | 3. | 3. | .11 |
| + | ROUTED TO | 37A-S | 71. | 5.92 | 9. | 3. | 3. | .11 |
| + | HYDROGRAPH AT | W37B | 102. | 5.92 | 13. | 5. | 4. | .16 |
| + | 3 COMBINED AT | WS | 1575. | 6.08 | 242. | 85. | 82. | 3.21 |
| + | ROUTED TO | S-T | 1522. | 6.17 | 242. | 85. | 81. | 3.21 |
| + | HYDROGRAPH AT | W38 | 67. | 5.83 | 8. | 3. | 3. | .09 |
| + | ROUTED TO | | 66. | 5.92 | 8. | 3. | 3. | .09 |
| + | HYDROGRAPH AT | W39 | 100. | 5.92 | 14. | 5. | 5. | .18 |
| + | HYDROGRAPH AT | W40 | 67. | 5.83 | 7. | 3. | 2. | .10 |
| + | 4 COMBINED AT | WT | 1621. | 6.17 | 269. | 95. | 91. | 3.59 |
| + | ROUTED TO | T-U | 1613. | 6.17 | 269. | 95. | 91. | 3.59 |
| + | HYDROGRAPH AT | W41 | 45. | 5.83 | 5. | 2. | 2. | .06 |
| + | HYDROGRAPH AT | W42 | 125. | 5.75 | 13. | 4. | 4. | .06 |
| + | ROUTED TO | U-V | 122. | 5.83 | 13. | 4. | 4. | .06 |
| + | 3 COMBINED AT | WU | 1648. | 6.17 | 285. | 100. | 96. | 3.70 |
| + | ROUTED TO | | 1612. | 6.17 | 285. | 100. | 96. | 3.70 |
| + | HYDROGRAPH AT | W43 | 108. | 5.83 | 12. | 4. | 4. | .15 |
| + | 2 COMBINED AT | WV | 1640. | 6.17 | 296. | 104. | 100. | 3.85 |
| + | ROUTED TO | V-W | 1621. | 6.17 | 296. | 104. | 100. | 3.85 |
| + | HYDROGRAPH AT | W45 | 134. | 5.83 | 16. | 5. | 5. | .19 |
| + | 2 COMBINED AT | WW | 1663. | 6.17 | 311. | 109. | 105. | 4.04 |
| + | ROUTED TO | W-X | 1621. | 6.25 | 311. | 109. | 105. | 4.04 |
| + | HYDROGRAPH AT | M1 | 52. | 5.75 | 5. | 2. | 2. | .07 |
| + | ROUTED TO | | 50. | 5.83 | 5. | 2. | 2. | .07 |
| | HYDROGRAPH AT | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|
| + | | M2 | 21. | 5.75 | 2. | 1. | 1. | .03 | | |
| + | 2 COMBINED AT | MB | 70. | 5.83 | 7. | 2. | 2. | .09 | | |
| + | ROUTED TO | | 70. | 5.83 | 7. | 2. | 2. | .09 | | |
| + | HYDROGRAPH AT | M4 | 26. | 5.83 | 3. | 1. | 1. | .03 | | |
| + | ROUTED TO | | 26. | 5.83 | 3. | 1. | 1. | .03 | | |
| + | HYDROGRAPH AT | M3 | 14. | 5.75 | 1. | 0. | 0. | .01 | | |
| + | 3 COMBINED AT | MC | 105. | 5.83 | 11. | 4. | 4. | .14 | | |
| + | ROUTED TO | | 102. | 5.83 | 11. | 4. | 4. | .14 | | |
| + | HYDROGRAPH AT | M5 | 24. | 5.75 | 2. | 1. | 1. | .02 | | |
| + | ROUTED TO | | 23. | 5.83 | 2. | 1. | 1. | .02 | | |
| + | HYDROGRAPH AT | M6 | 51. | 5.92 | 7. | 2. | 2. | .06 | | |
| + | 3 COMBINED AT | MD | 175. | 5.83 | 20. | 7. | 6. | .22 | | |
| + | ROUTED TO | | 170. | 5.92 | 20. | 7. | 6. | .22 | | |
| + | HYDROGRAPH AT | M7 | 63. | 5.83 | 7. | 2. | 2. | .05 | | |
| + | ROUTED TO | | 61. | 5.83 | 7. | 2. | 2. | .05 | | |
| + | HYDROGRAPH AT | M8 | 30. | 5.83 | 3. | 1. | 1. | .04 | | |
| + | 2 COMBINED AT | ME | 91. | 5.83 | 10. | 3. | 3. | .09 | | |
| + | ROUTED TO | | 89. | 5.92 | 10. | 3. | 3. | .09 | | |
| + | HYDROGRAPH AT | M9 | 25. | 5.75 | 2. | 1. | 1. | .02 | | |
| + | ROUTED TO | | 23. | 5.83 | 2. | 1. | 1. | .02 | | |
| + | HYDROGRAPH AT | M12A | 47. | 5.83 | 5. | 2. | 2. | .07 | | |
| + | HYDROGRAPH AT | M12B | 86. | 5.92 | 11. | 4. | 4. | .15 | | |
| + | 5 COMBINED AT | MF | 401. | 5.92 | 47. | 16. | 15. | .54 | | |
| + | ROUTED TO | | 388. | 5.92 | 47. | 16. | 15. | .54 | | |
| + | HYDROGRAPH AT | M13 | 56. | 5.83 | 6. | 2. | 2. | .06 | | |
| + | ROUTED TO | | 53. | 5.92 | 6. | 2. | 2. | .06 | | |
| + | HYDROGRAPH AT | M14 | 122. | 5.92 | 16. | 5. | 5. | .16 | | |
| + | 2 COMBINED AT | MG | 176. | 5.92 | 22. | 7. | 7. | .22 | | |
| + | ROUTED TO | PONDW | 16. | 7.00 | 16. | 7. | 7. | .22 | | |
| + | | | | | | | | | 970.02 | 7.00 |
| + | 2 COMBINED AT | MH | 403. | 5.92 | 63. | 23. | 22. | .77 | | |
| + | ROUTED TO | | 385. | 6.00 | 63. | 23. | 22. | .77 | | |
| + | DIVERSION TO | DIVRT1 | 85. | 6.00 | 43. | 18. | 18. | .77 | | |

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| + | HYDROGRAPH AT | MH-P2 | 300. | 6.00 | 20. | 5. | 5. | .77 |
| + | HYDROGRAPH AT | M15 | 101. | 5.83 | 12. | 4. | 4. | .12 |
| + | 2 COMBINED AT | MI | 388. | 5.92 | 32. | 9. | 9. | .89 |
| + | ROUTED TO | | 378. | 6.00 | 32. | 9. | 9. | .89 |
| + | HYDROGRAPH AT | M19 | 38. | 5.83 | 4. | 1. | 1. | .05 |
| + | 2 COMBINED AT | MJ | 397. | 6.00 | 36. | 10. | 10. | .94 |
| + | ROUTED TO | | 381. | 6.00 | 36. | 10. | 10. | .94 |
| + | HYDROGRAPH AT | M10 | 54. | 5.75 | 5. | 2. | 2. | .06 |
| + | ROUTED TO | M10-K | 53. | 5.83 | 5. | 2. | 2. | .06 |
| + | HYDROGRAPH AT | M11A | 65. | 5.92 | 9. | 3. | 3. | .11 |
| + | 2 COMBINED AT | MK | 115. | 5.83 | 14. | 5. | 4. | .16 |
| + | ROUTED TO | MK-K1 | 111. | 5.92 | 14. | 5. | 4. | .16 |
| + | HYDROGRAPH AT | M11B | 64. | 5.83 | 7. | 2. | 2. | .09 |
| + | ROUTED TO | 11B-K1 | 58. | 5.92 | 7. | 2. | 2. | .09 |
| + | HYDROGRAPH AT | M11C | 66. | 5.83 | 7. | 2. | 2. | .09 |
| + | 3 COMBINED AT | MK1 | 230. | 5.83 | 27. | 9. | 9. | .35 |
| + | ROUTED TO | K1-ML | 225. | 5.92 | 27. | 9. | 9. | .35 |
| + | HYDROGRAPH AT | M16 | 31. | 5.83 | 3. | 1. | 1. | .04 |
| + | 2 COMBINED AT | ML | 247. | 5.92 | 30. | 10. | 10. | .39 |
| + | ROUTED TO | | 240. | 5.92 | 30. | 10. | 10. | .39 |
| + | HYDROGRAPH AT | M17 | 61. | 5.83 | 6. | 2. | 2. | .08 |
| + | 2 COMBINED AT | MM | 282. | 5.92 | 36. | 13. | 12. | .46 |
| + | ROUTED TO | | 268. | 6.00 | 36. | 12. | 12. | .46 |
| + | HYDROGRAPH AT | M18 | 48. | 5.83 | 5. | 2. | 2. | .06 |
| + | ROUTED TO | | 45. | 5.92 | 5. | 2. | 2. | .06 |
| + | HYDROGRAPH AT | M20 | 85. | 5.83 | 11. | 4. | 4. | .13 |
| + | 4 COMBINED AT | MN | 747. | 6.00 | 88. | 28. | 27. | 1.60 |
| + | ROUTED TO | | 724. | 6.00 | 88. | 28. | 27. | 1.60 |
| + | HYDROGRAPH AT | M21 | 19. | 5.83 | 2. | 1. | 1. | .02 |
| + | ROUTED TO | | 19. | 5.83 | 2. | 1. | 1. | .02 |
| + | HYDROGRAPH AT | M23 | 34. | 5.83 | 3. | 1. | 1. | .05 |
| | 3 COMBINED AT | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|
| + | | MO | 747. | 6.00 | 93. | 30. | 29. | 1.67 |
| + | ROUTED TO | | 724. | 6.00 | 93. | 30. | 29. | 1.67 |
| + | HYDROGRAPH AT | M24 | 58. | 5.83 | 6. | 2. | 2. | .08 |
| + | 2 COMBINED AT | MP | 744. | 6.00 | 99. | 32. | 31. | 1.75 |
| + | ROUTED TO | | 736. | 6.00 | 99. | 32. | 31. | 1.75 |
| + | HYDROGRAPH AT | M25 | 8. | 5.83 | 1. | 0. | 0. | .01 |
| + | 2 COMBINED AT | MQ | 739. | 6.00 | 100. | 32. | 31. | 1.76 |
| + | ROUTED TO | | 734. | 6.08 | 99. | 32. | 31. | 1.76 |
| + | HYDROGRAPH AT | M26 | 139. | 5.92 | 18. | 6. | 6. | .18 |
| + | 2 COMBINED AT | MR | 825. | 6.08 | 117. | 38. | 37. | 1.94 |
| + | HYDROGRAPH AT | W44 | 28. | 5.83 | 3. | 1. | 1. | .04 |
| + | ROUTED TO | | 27. | 5.92 | 3. | 1. | 1. | .04 |
| + | HYDROGRAPH AT | W47 | 39. | 5.83 | 4. | 1. | 1. | .05 |
| + | ROUTED TO | | 36. | 5.83 | 4. | 1. | 1. | .05 |
| + | HYDROGRAPH AT | W46 | 32. | 5.83 | 3. | 1. | 1. | .04 |
| + | HYDROGRAPH AT | M27 | 39. | 5.83 | 4. | 1. | 1. | .05 |
| + | 6 COMBINED AT | WX | 2398. | 6.17 | 442. | 153. | 147. | 6.17 |
| + | ROUTED TO | | 2323. | 6.25 | 441. | 152. | 147. | 6.17 |
| + | HYDROGRAPH AT | W48 | 108. | 5.75 | 10. | 3. | 3. | .12 |
| + | ROUTED TO | | 102. | 5.83 | 10. | 3. | 3. | .12 |
| + | HYDROGRAPH AT | W49 | 189. | 5.83 | 21. | 7. | 7. | .27 |
| + | 3 COMBINED AT | WZ | 2392. | 6.17 | 471. | 163. | 157. | 6.55 |
| + | ROUTED TO | | 2383. | 6.25 | 471. | 163. | 157. | 6.55 |
| + | HYDROGRAPH AT | W50 | 83. | 5.83 | 9. | 3. | 3. | .11 |
| + | 2 COMBINED AT | WAB | 2399. | 6.25 | 480. | 166. | 160. | 6.66 |
| + | ROUTED TO | | 2396. | 6.25 | 480. | 166. | 160. | 6.66 |
| + | HYDROGRAPH AT | W51 | 46. | 5.83 | 5. | 2. | 2. | .05 |
| + | 2 COMBINED AT | WAC | 2406. | 6.25 | 484. | 168. | 161. | 6.71 |
| + | ROUTED TO | | 2402. | 6.25 | 485. | 168. | 161. | 6.71 |
| + | HYDROGRAPH AT | W52 | 48. | 5.75 | 5. | 2. | 1. | .05 |
| + | ROUTED TO | | 46. | 5.83 | 5. | 2. | 1. | .05 |
| + | HYDROGRAPH AT | W53 | 47. | 5.83 | 5. | 2. | 2. | .05 |

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| + 2 COMBINED AT | WAD | 92. | 5.83 | 9. | 3. | 3. | .10 | | |
| + ROUTED TO | | 92. | 5.83 | 9. | 3. | 3. | .10 | | |
| + HYDROGRAPH AT | W54 | 8. | 5.75 | 1. | 0. | 0. | .01 | | |
| + 3 COMBINED AT | WAE | 2419. | 6.25 | 494. | 171. | 165. | 6.82 | | |
| + ROUTED TO | | 2396. | 6.25 | 493. | 171. | 164. | 6.82 | | |
| + HYDROGRAPH AT | W56 | 116. | 5.83 | 14. | 5. | 5. | .18 | | |
| + 2 COMBINED AT | WAF | 2426. | 6.25 | 506. | 175. | 169. | 7.01 | | |
| + ROUTED TO | | 2405. | 6.25 | 506. | 175. | 169. | 7.01 | | |
| + HYDROGRAPH AT | W62 | 64. | 5.75 | 6. | 2. | 2. | .08 | | |
| + ROUTED TO | | 61. | 5.83 | 6. | 2. | 2. | .08 | | |
| + HYDROGRAPH AT | W63 | 36. | 5.75 | 4. | 1. | 1. | .05 | | |
| + ROUTED TO | | 36. | 5.83 | 4. | 1. | 1. | .05 | | |
| + HYDROGRAPH AT | W61 | 105. | 5.92 | 14. | 5. | 5. | .19 | | |
| + 3 COMBINED AT | WAH | 190. | 5.83 | 24. | 8. | 8. | .31 | | |
| + ROUTED TO | | 183. | 5.92 | 24. | 8. | 8. | .31 | | |
| + HYDROGRAPH AT | W57 | 54. | 5.83 | 6. | 2. | 2. | .07 | | |
| + ROUTED TO | | 51. | 6.00 | 6. | 2. | 2. | .07 | | |
| + HYDROGRAPH AT | W58 | 126. | 5.92 | 17. | 6. | 6. | .23 | | |
| + 3 COMBINED AT | WAI | 345. | 5.92 | 46. | 16. | 15. | .62 | | |
| + ROUTED TO | | 341. | 5.92 | 47. | 16. | 15. | .62 | | |
| + HYDROGRAPH AT | E1A | 65. | 5.92 | 9. | 3. | 3. | .12 | | |
| + ROUTED TO | E1A-EA | 64. | 6.00 | 9. | 3. | 3. | .12 | | |
| + HYDROGRAPH AT | E1B | 94. | 5.92 | 13. | 4. | 4. | .17 | | |
| + 2 COMBINED AT | EA | 147. | 5.92 | 21. | 7. | 7. | .28 | | |
| + ROUTED TO | EA-EB | 145. | 6.00 | 21. | 7. | 7. | .28 | | |
| + HYDROGRAPH AT | E2 | 75. | 5.83 | 8. | 3. | 3. | .10 | | |
| + 2 COMBINED AT | EB | 187. | 5.92 | 29. | 10. | 10. | .39 | | |
| + ROUTED TO | POND1 | 101. | 6.25 | 23. | 9. | 8. | .39 | | |
| + | | | | | | | | 954.20 | 6.25 |
| + ROUTED TO | | 95. | 6.25 | 23. | 9. | 8. | .39 | | |
| + HYDROGRAPH AT | E3 | 67. | 5.83 | 7. | 2. | 2. | .09 | | |
| + HYDROGRAPH AT | MH-P2 | 85. | 5.92 | 43. | 18. | 18. | .00 | | |
| 3 COMBINED AT | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|
| + | | EC | 187. | 6.25 | 72. | 29. | 28. | .48 | | |
| + | ROUTED TO | POND2 | 95. | 7.17 | 55. | 24. | 23. | .48 | | |
| + | | | | | | | | | 930.04 | 7.17 |
| + | ROUTED TO | | 94. | 7.25 | 55. | 24. | 23. | .48 | | |
| + | HYDROGRAPH AT | E1C | 52. | 5.83 | 6. | 2. | 2. | .08 | | |
| + | ROUTED TO | 1C-ED1 | 50. | 6.00 | 6. | 2. | 2. | .08 | | |
| + | HYDROGRAPH AT | E4 | 78. | 5.83 | 10. | 3. | 3. | .13 | | |
| + | 2 COMBINED AT | ED1 | 123. | 5.92 | 16. | 5. | 5. | .21 | | |
| + | ROUTED TO | ED1-ED | 121. | 5.92 | 16. | 6. | 5. | .21 | | |
| + | HYDROGRAPH AT | E5 | 66. | 5.83 | 7. | 2. | 2. | .09 | | |
| + | 3 COMBINED AT | ED | 174. | 5.92 | 72. | 32. | 31. | .78 | | |
| + | ROUTED TO | | 172. | 5.92 | 72. | 32. | 31. | .78 | | |
| + | HYDROGRAPH AT | E8 | 33. | 5.83 | 3. | 1. | 1. | .04 | | |
| + | 2 COMBINED AT | EE | 196. | 5.92 | 75. | 33. | 32. | .83 | | |
| + | ROUTED TO | | 192. | 5.92 | 75. | 33. | 32. | .83 | | |
| + | HYDROGRAPH AT | E10 | 21. | 5.83 | 2. | 1. | 1. | .03 | | |
| + | 2 COMBINED AT | EF | 208. | 5.92 | 77. | 34. | 33. | .85 | | |
| + | ROUTED TO | F-G | 199. | 5.92 | 77. | 34. | 33. | .85 | | |
| + | HYDROGRAPH AT | E6 | 68. | 5.92 | 9. | 3. | 3. | .12 | | |
| + | HYDROGRAPH AT | E7 | 28. | 5.75 | 2. | 1. | 1. | .03 | | |
| + | ROUTED TO | | 25. | 5.83 | 2. | 1. | 1. | .03 | | |
| + | 2 COMBINED AT | EG1 | 89. | 5.83 | 11. | 4. | 4. | .15 | | |
| + | ROUTED TO | G1-G | 87. | 5.92 | 11. | 4. | 4. | .15 | | |
| + | HYDROGRAPH AT | E9 | 46. | 5.83 | 6. | 2. | 2. | .08 | | |
| + | ROUTED TO | | 46. | 5.92 | 6. | 2. | 2. | .08 | | |
| + | HYDROGRAPH AT | E11 | 28. | 5.83 | 3. | 1. | 1. | .05 | | |
| + | HYDROGRAPH AT | E12 | 66. | 5.83 | 7. | 2. | 2. | .09 | | |
| + | 5 COMBINED AT | EG | 409. | 5.92 | 103. | 43. | 42. | 1.22 | | |
| + | HYDROGRAPH AT | E13 | 9. | 5.92 | 1. | 0. | 0. | .02 | | |
| + | HYDROGRAPH AT | E14 | 4. | 5.83 | 0. | 0. | 0. | .01 | | |
| + | ROUTED TO | | 4. | 5.83 | 0. | 0. | 0. | .01 | | |
| + | 3 COMBINED AT | EH | 421. | 5.92 | 105. | 44. | 42. | 1.24 | | |
| + | ROUTED TO | | 398. | 5.92 | 105. | 44. | 42. | 1.24 | | |

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|---|---|---|---|---|---|---|---|---|---|
| + | HYDROGRAPH AT | E19 | 35. | 5.83 | 4. | 1. | 1. | .04 | |
| + | 2 COMBINED AT | EJ1 | 421. | 5.92 | 108. | 45. | 43. | 1.28 | |
| + | ROUTED TO | J1-K | 411. | 6.00 | 107. | 45. | 43. | 1.28 | |
| + | HYDROGRAPH AT | E15 | 36. | 5.75 | 3. | 1. | 1. | .04 | |
| + | ROUTED TO | | 33. | 5.83 | 3. | 1. | 1. | .04 | |
| + | HYDROGRAPH AT | E16 | 31. | 5.75 | 3. | 1. | 1. | .03 | |
| + | 2 COMBINED AT | EI | 63. | 5.75 | 6. | 2. | 2. | .07 | |
| + | ROUTED TO | | 61. | 5.83 | 6. | 2. | 2. | .07 | |
| + | HYDROGRAPH AT | E17 | 32. | 5.75 | 3. | 1. | 1. | .03 | |
| + | ROUTED TO | | 31. | 5.83 | 3. | 1. | 1. | .03 | |
| + | HYDROGRAPH AT | E18 | 40. | 5.83 | 4. | 2. | 1. | .05 | |
| + | 3 COMBINED AT | EJ2 | 132. | 5.83 | 13. | 4. | 4. | .15 | |
| + | ROUTED TO | | 119. | 6.00 | 13. | 4. | 4. | .15 | |
| + | HYDROGRAPH AT | E23 | 108. | 5.92 | 14. | 5. | 5. | .17 | |
| + | HYDROGRAPH AT | E24 | 74. | 6.00 | 13. | 4. | 4. | .14 | |
| + | 4 COMBINED AT | EK | 698. | 6.00 | 147. | 59. | 56. | 1.74 | |
| + | ROUTED TO | | 671. | 6.08 | 146. | 58. | 56. | 1.74 | |
| + | HYDROGRAPH AT | E21 | 57. | 5.83 | 7. | 2. | 2. | .09 | |
| + | ROUTED TO | | 55. | 5.92 | 7. | 2. | 2. | .09 | |
| + | HYDROGRAPH AT | E20 | 51. | 5.92 | 7. | 2. | 2. | .08 | |
| + | ROUTED TO | | 51. | 5.92 | 7. | 2. | 2. | .08 | |
| + | HYDROGRAPH AT | E22 | 41. | 5.92 | 5. | 2. | 2. | .07 | |
| + | 3 COMBINED AT | EL | 147. | 5.92 | 19. | 6. | 6. | .23 | |
| + | ROUTED TO | | 140. | 6.00 | 19. | 6. | 6. | .23 | |
| + | HYDROGRAPH AT | E25 | 121. | 5.83 | 13. | 5. | 4. | .17 | |
| + | 3 COMBINED AT | EM | 845. | 6.00 | 177. | 69. | 67. | 2.13 | |
| + | ROUTED TO | | 834. | 6.08 | 177. | 69. | 67. | 2.13 | |
| + | HYDROGRAPH AT | E26 | 37. | 5.75 | 3. | 1. | 1. | .04 | |
| + | 2 COMBINED AT | EN | 840. | 6.08 | 180. | 70. | 68. | 2.17 | |
| + | ROUTED TO | | 826. | 6.08 | 179. | 70. | 68. | 2.17 | |
| + | HYDROGRAPH AT | E27 | 104. | 5.83 | 11. | 4. | 4. | .12 | |
| | 2 COMBINED AT | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|
| + | | EO | 863. | 6.08 | 189. | 74. | 71. | 2.29 |
| | ROUTED TO | | | | | | | |
| + | | | 835. | 6.08 | 189. | 74. | 71. | 2.29 |
| | HYDROGRAPH AT | | | | | | | |
| + | | W55 | 38. | 5.75 | 3. | 1. | 1. | .05 |
| | 2 COMBINED AT | | | | | | | |
| + | | WAG | 841. | 6.08 | 192. | 75. | 72. | 2.34 |
| | ROUTED TO | | | | | | | |
| + | | | 833. | 6.17 | 192. | 75. | 72. | 2.34 |
| | HYDROGRAPH AT | | | | | | | |
| + | | W59 | 43. | 5.83 | 5. | 2. | 2. | .07 |
| | 4 COMBINED AT | | | | | | | |
| + | | WAJ | 3321. | 6.25 | 749. | 268. | 259. | 10.03 |
| | ROUTED TO | | | | | | | |
| + | | | 3310. | 6.25 | 749. | 268. | 259. | 10.03 |
| | HYDROGRAPH AT | | | | | | | |
| + | | E28 | 44. | 5.92 | 6. | 2. | 2. | .07 |
| | ROUTED TO | | | | | | | |
| + | | | 44. | 6.00 | 6. | 2. | 2. | .07 |
| | HYDROGRAPH AT | | | | | | | |
| + | | E29 | 35. | 5.83 | 4. | 1. | 1. | .05 |
| | 2 COMBINED AT | | | | | | | |
| + | | EZZ | 69. | 5.92 | 9. | 3. | 3. | .12 |
| | HYDROGRAPH AT | | | | | | | |
| + | | W60 | 47. | 5.83 | 5. | 2. | 2. | .07 |
| | 3 COMBINED AT | | | | | | | |
| + | | ZZ | 3350. | 6.25 | 763. | 274. | 263. | 10.22 |

1

*** NORMAL END OF HEC-1 ***

## Appendix B: Proposed HEC-1 Calculations

```
1**************************************                    **************************************
*                                      *                    *                                    *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                    *   U.S. ARMY CORPS OF ENGINEERS     *
*              JUN   1998              *                    *   HYDROLOGIC ENGINEERING CENTER    *
*            VERSION 4.1               *                    *         609 SECOND STREET          *
*                                      *                    *     DAVIS, CALIFORNIA 95616        *
*  RUN DATE   20MAY08  TIME  08:48:57  *                    *         (916) 756-1104             *
*                                      *                    *                                    *
**************************************                    **************************************


                              X       X  XXXXXXX   XXXXX          X
                              X       X  X        X     X        XX
                              X       X  X        X               X
                              XXXXXXX  XXXX       X        XXXXX  X
                              X       X  X        X               X
                              X       X  X        X     X         X
                              X       X  XXXXXXX   XXXXX         XXX


         THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

         THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
         THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
         NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
         DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
         KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


1                                             HEC-1 INPUT                                          PAGE  1

         LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

           1        ID    FALCON HIGHLANDS PRELIMINARY DRAINAGE PLAN - BASED ON DBPS MODEL F100FNLQ
           2        ID         ** DETENTION POND AT WU (BETWEEN SH 24 AND TAMLIN RD)
           3        ID         ** 2 Year, 5 Year and 100 Year Storm Events (24hr Storm)
           4        ID         **Basins W40 & W42 revised due to Meridian Crossing development
                    *DIAGRAM
           5        IT       5 25MAY05     800     300
           6        IO       5
           7        JR    PREC       1  1.2381  2.0952

           8        KK     W1
           9        KM
          10        BA   .0479
          11        PB     2.1
          12        IN      15
          13        PC   .0005   .0015   .0030   .0045   .0060   .0080   .0100   .0120   .0143   .0165
          14        PC   .0188   .0210   .0233   .0255   .0278   .0320   .0390   .0460   .0530   .0600
          15        PC   .0750   .1000   .4000   .7000   .7250   .7500   .7650   .7800   .7900   .8000
          16        PC   .8100   .8200   .8250   .8300   .8350   .8400   .8450   .8500   .8550   .8600
          17        PC   .8638   .8675   .8713   .8750   .8788   .8825   .8863   .8900   .8938   .8975
          18        PC   .9013   .9050   .9083   .9115   .9148   .9180   .9210   .9240   .9270   .9300
          19        PC   .9325   .9350   .9375   .9400   .9425   .9450   .9475   .9500   .9525   .9550
          20        PC   .9575   .9600   .9625   .9650   .9675   .9700   .9725   .9750   .9775   .9800
          21        PC   .9813   .9825   .9838   .9850   .9863   .9875   .9888   .9900   .9913   .9925
          22        PC   .9938   .9950   .9963   .9975   .9988   1.000
          23        LS              60
          24        UD    .097

          25        KK
          26        KM
          27        RK    1519   .0263    .035            TRAP       5       4

          28        KK     W2
          29        KM
          30        BA   .0278
          31        LS              60
          32        UD    .160

          33        KK     WA
          34        KM
          35        HC       2

          36        KK
          37        KM
          38        RK     464   .0151    .035            TRAP       5       4

          39        KK     W3
          40        KM
          41        BA   .0498
          42        LS              61
          43        UD    .139
1                                             HEC-1 INPUT                                          PAGE  2

         LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


          44        KK     WB
          45        KM
```

```
 46        HC       2

 47        KK
 48        KM
 49        RK     823   .0279   .035          TRAP      5      4              54

 50        KK      W4
 51        KM
 52        BA   .0054
 53        LS             62
 54        UD    .044

 55        KK
 56        KM
 57        RK    1078   .0482   .035          TRAP      5      4

 58        KK      W5
 59        KM
 60        BA   .0159
 61        LS             60
 62        UD    .075

 63        KK      WC
 64        KM
 65        HC       3

 66        KK
 67        KM
 68        RK     557   .0449   .035          TRAP     10      4

 69        KK      W6
 70        KM
 71        BA   .0486
 72        LS             60
 73        UD    .085

 74        KK
 75        KM
 76        RK     592   .0372   .035          TRAP      5      4

 77        KK      W7
 78        KM
 79        BA   .0217
 80        LS             60
 81        UD    .074

 82        KK
 83        KM
 84        RK     464   .1466   .035          TRAP      5      4
1                                      HEC-1 INPUT                                    PAGE  3

 LINE      ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 85        KK      WD
 86        KM
 87        HC       2

 88        KK     D-E
 89        KM
 90        RK    1044   .0479   .035          TRAP      5      4

 91        KK      W8
 92        KM
 93        BA   .0286
 94        LS             60
 95        UD    .069

 96        KK
 97        KM
 98        RK    1449   .0504   .035          TRAP      5      4

 99        KK      W9
100        KM
101        BA   .0402
102        LS             61
103        UD    .097

104        KK      WE
105        KM
106        HC       3

107        KK     E-F
108        KM
109        RK     789   .0038   .035          TRAP      5      4

110        KK     W10
111        KM
112        BA   .0431
113        LS             61
114        UD    .096

115        KK
116        KM
117        RK     824   .0388   .035          TRAP      5      4
```

```
     118          KK     W11
     119          KM
     120          BA   .0314
     121          LS             60
     122          UD    .077

     123          KK     WF
     124          KM
     125          HC       4
1                                          HEC-1 INPUT                                            PAGE  4

   LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


     126          KK     F-G
     127          KM
     128          RK    2319   .0211    .035          TRAP      10       4

     129          KK     W12
     130          KM
     131          BA   .0398
     132          LS             60
     133          UD    .095

     134          KK
     135          KM
     136          RK    2478   .0307    .035          TRAP       5       4

     137          KK     W14
     138          KM
     139          BA   .0473
     140          LS             61
     141          UD    .135

     142          KK
     143          KM
     144          RK      81  0.0001    .035          TRAP       5       4

     145          KK     W13
     146          KM
     147          BA   .1123
     148          LS             61
     149          UD    .182

     150          KK     WG
     151          KM
     152          HC       4

     153          KK     G-H
     154          KM
     155          RK    2632   .0217    .035          TRAP      15       4

     156          KK
     157          KM
     158          RK    2447   .0372    .035          TRAP       5       4

     159          KK     W15
     160          KM
     161          BA   .0881
     162          LS             61
     163          UD    .141

     164          KK
     165          KM
     166          RK    1763   .0289    .035          TRAP       5       4
1                                          HEC-1 INPUT                                            PAGE  5

   LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


     167          KK     WH
     168          KM
     169          HC       2

     170          KK     W16
     171          KM
     172          BA   .0292
     173          LS             61
     174          UD    .092

     175          KK
     176          KM
     177          RK    1345   .0260    .035          TRAP       5       4

     178          KK     W17
     179          KM
     180          BA   .0184
     181          LS             60
     182          UD    .085

     183          KK     WI
     184          KM
     185          HC       2
```

```
 186          KK      I-M
 187          KM
 188          RK     2650   .0370    .035          TRAP       15        4

 189          KK      W19
 190          KM
 191          BA    .0428
 192          LS              61
 193          UD     .083

 194          KK
 195          KM
 196          RK      881   .0329    .035          TRAP        5        4

 197          KK      W20
 198          KM
 199          BA    .0315
 200          LS              61
 201          UD     .071

 202          KK      WJ
 203          KM
 204          HC        2

 205          KK
 206          KM
 207          RK     3061   .0235    .035          TRAP        5        4
1                                          HEC-1 INPUT                                         PAGE  6

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 208          KK      W21
 209          KM
 210          BA    .1347
 211          LS              60
 212          UD     .156

 213          KK      WK
 214          KM
 215          HC        2

 216          KK
 217          KM
 218          RK      487   .0246    .035          TRAP        5        4

 219          KK      W22
 220          KM
 221          BA    .0086
 222          LS              63
 223          UD     .055

 224          KK      WL
 225          KM
 226          HC        2

 227          KK
 228          KM
 229          RK     1786   .0297    .035          TRAP        5        4

 230          KK      W23
 231          KM
 232          BA    .0244
 233          LS              60
 234          UD     .112

 235          KK      W18
 236          KM
 237          BA    .1251
 238          LS              60
 239          UD     .189

 240          KK      WM
 241          KM
 242          HC        5

 243          KK      M-N
 244          KM
 245          RK     1345   .0149    .035          TRAP       20        4

 246          KK      W24
 247          KM
 248          BA    .0442
 249          LS              60
 250          UD     .140
1                                          HEC-1 INPUT                                         PAGE  7

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 251          KK      W25
 252          KM
 253          BA    .0957
 254          LS              61
 255          UD     .197
```

```
 256           KK      WN
 257           KM
 258           HC       3

 259           KK     N-P
 260           KM
 261           RK    1589   .017    .035             TRAP       20        4

 262           KK     W28
 263           KM
 264           BA   .0397
 265           LS             63
 266           UD    .128

 267           KK
 268           KM
 269           RK    1345  .0208    .035             TRAP        5        4

 270           KK     W30
 271           KM
 272           BA   .0509
 273           LS             63
 274           UD    .123

 275           KK
 276           KM
 277           RK    1078  .0074    .035             TRAP        5        4

 278           KK     W29
 279           KM
 280           BA   .0409
 281           LS             63
 282           UD    .145

 283           KK     W31
 284           KM
 285           BA   .0123
 286           LS             63
 287           UD    .073

 288           KK      WO
 289           KM
 290           HC       4
1                                          HEC-1 INPUT                                         PAGE  8

LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 291           KK     O-P
 292           KM
 293           RK    2169  .0226    .035             TRAP        5        4

 294           KK     W26
 295           KM
 296           BA   .0301
 297           LS             63
 298           UD    .062

 299           KK
 300           KM
 301           RK    4662  .0225    .035             TRAP        5        4

 302           KK     W27
 303           KM
 304           BA   .1633
 305           LS             60
 306           UD    .253

 307           KK     W32
 308           KM
 309           BA   .0890
 310           LS             60
 311           UD    .170

 312           KK      WP
 313           KM
 314           HC       5

 315           KK     P-Q
 316           KM
 317           RK    1925  .0182    .035             TRAP       25        4

 318           KK    W33A
 319           KM
 320           BA   .1261
 321           LS             60
 322           UD    .186

 323           KK     WP1
 324           KM
 325           HC       2

 326           KK    P1-Q
 327           KM
```

```
 328          RK    3000    .020    .035          TRAP      25       4

 329          KK    W33B
 330          KM
 331          BA   .1360
 332          LS             60
 333          UD    .225
1                                      HEC-1 INPUT                                            PAGE  9

 LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 334          KK    W34A
 335          KM
 336          BA   .1418
 337          LS             60
 338          UD    .173

 339          KK  34A-P2
 340          KM
 341          RK    2550   .0176    .035          TRAP      25       4

 342          KK    W34B
 343          KM
 344          BA   .1766
 345          LS             60
 346          UD    .224

 347          KK     WP2
 348          KM
 349          HC       2

 350          KK    P2-Q
 351          KM
 352          RK    2640    .021    .035          TRAP      25       4

 353          KK    W34C
 354          KM
 355          BA   .1625
 356          LS             60
 357          UD    .244

 358          KK      WQ
 359          KM
 360          HC       4

 361          KK    Q-Q1
 362          KM
 363          RK    2940    .022    .035          TRAP      25       4

 364          KK    W36A
 365          KM
 366          BA   .1429
 367          LS             60
 368          UD    .234

 369          KK     WQ1
 370          KM
 371          HC       2

 372          KK    Q1-R
 373          KM
 374          RK    3400    .022    .035          TRAP      25       4
1                                      HEC-1 INPUT                                            PAGE 10

 LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 375          KK    W36B
 376          KM
 377          BA   .1918
 378          LS             60
 379          UD    .306

 380          KK    W35A
 381          KM
 382          BA   .0958
 383          LS             60
 384          UD    .187

 385          KK  35A-WR
 386          KM
 387          RK    3715    .023    .035          TRAP      25       4

 388          KK    W35B
 389          KM
 390          BA   .1507
 391          LS       0     60
 392          UD    .259

 393          KK      WR
 394          KM
 395          HC       4

 396          KK    WR-S
```

```
 397          KM
 398          RK    2922   .0168    .035          TRAP       25        4

 399          KK    W37A
 400          KM
 401          BA   .1138
 402          LS              60
 403          UD    .185

 404          KK   37A-S
 405          KM
 406          RK    1430    .014    .035          TRAP       25        4

 407          KK    W37B
 408          KM
 409          BA   .1636
 410          LS              90
 411          UD    .218

 412          KK     WS
 413          KM
 414          HC       3
1                                                  HEC-1 INPUT                                        PAGE 11

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 415          KK     S-T
 416          KM
 417          RK    3653   .0164    .035          TRAP       25        4

 418          KK     W38
 419          KM
 420          BA   .0907
 421          LS              62
 422          UD    .190

 423          KK
 424          KM
 425          RK    2922   .0171    .035          TRAP        5        4

 426          KK     W39
 427          KM
 428          BA   .1833
 429          LS              76
 430          UD    .251

 431          KK     W40
 432          KM
 433          BA   .0706
 434          LS              92
 435          UD    .165

 436          KK      WT
 437          KM
 438          HC       4

 439          KK   T-U
 440          KM
 441          RK    1125   .0098    .035          TRAP       25        4

 442          KK     W41
 443          KM
 444          BA   .0601
 445          LS              83
 446          UD    .117

 447          KK    POND
 448          KM
 449          HC       2

 450          KK   DIVOUT
 451          KM   DIVERT 35.8 CFS (2-YR HISTORIC FLOW) FROM DETENTION POND
 452          DT   DIVERT        0    35.8
 453          DI       0    35.8
 454          DQ       0    35.8
1                                                  HEC-1 INPUT                                        PAGE 12

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 455          KK   PONDWU
 456          KM         REGIONAL DETENTION POND  Q5=94, Q100=1214
 457          SV     0.0   0.006     .09     .40    1.19    3.31    7.12   11.50   16.05
 458          SV   20.76   25.61   30.61   35.77   40.99
 459          SE    16.5      17      18      19      20      21      22      23      24
 460          SE      25      26      27      28      29
 461          SQ       0       0   27.40   46.66   67.77   81.84  249.51  544.89  923.33
 462          SQ  1090.5 1212.93 1323.91 1426.18 1521.53
 463          RS       1    ELEV    16.5

 464          KK    B-WU
 465          KM
 466          RK    2215   .0181    .035          TRAP       25        4
```

```
467          KK   DIVIN
468          KM   RETRIEVE 35.8 CFS DIVERTED IN CHANNEL
469          DR   DIVERT

470          KK     W42A
471          KM
472          BA    .0127
473          LS              92
474          UD     .180

475          KK   42A-WU
476          KM
477          RK     1970  .0090    .013           TRAP       4        4

478          KK      W42
479          KM
480          BA    .0519
481          LS              92
482          UD     .127

483          KK     W42B
484          KM
485          BA    .0195
486          LS              92
487          UD     .180

488          KK   42B-WU
489          KM
490          RK     2770  .0100     .013           TRAP       4        4

491          KK       WU
492          KM
493          HC        5

494          KK     U-V
495          KM
496          RK     2200   .0145     .035           TRAP      25        4
1                                              HEC-1 INPUT                                         PAGE 13

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


497          KK      W43
498          KM
499          BA    .1457
500          LS              64
501          UD     .169

502          KK       WV
503          KM
504          HC        2

505          KK      V-W
506          KM
507          RK      487   .0103     .035           TRAP      25        4

508          KK      W45
509          KM
510          BA    .1931
511          LS              61
512          UD     .189

513          KK       WW
514          KM
515          HC        2
516          ZZ
1
          SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
 LINE     (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.     (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   8        W1
             V
             V
  25

             .
             .
  28         .         W2
             .           .
             .           .
  33        WA ...........
             V
             V
  36

             .
             .
  39         .         W3
             .           .
             .           .
  44        WB ...........
             V
             V
  47
```

```
                  .
                  .
50                .           W4
                  .              V
                  .              V
55                .
                  .              .
                  .              .
58                .              .             W5
                  .              .               .
                  .              .               .
63             WC ................................
                  V
                  V
66
                  .
                  .
69                .           W6
                  .              V
                  .              V
74                .
                  .              .
                  .              .
77                .              .             W7
                  .              .               V
                  .              .               V
82                .              .
                  .              .               .
                  .              .               .
85                .           WD .................
                  .              V
                  .              V
88                .            D-E
                  .              .
                  .              .
91                .              .             W8
                  .              .               V
                  .              .               V
96                .              .
                  .              .               .
                  .              .               .
99                .              .               .             W9
                  .              .               .               .
                  .              .               .               .
104               .           WE ................................
                  .              V
                  .              V
107               .            E-F
                  .              .
                  .              .
110               .              .             W10
                  .              .               V
                  .              .               V
115               .              .
                  .              .               .
                  .              .               .
118               .              .               .             W11
                  .              .               .               .
                  .              .               .               .
123            WF ...............................................
                  V
                  V
126            F-G
                  .
                  .
129               .           W12
                  .              V
                  .              V
134               .
                  .              .
                  .              .
137               .              .             W14
                  .              .               V
                  .              .               V
142               .              .
                  .              .               .
                  .              .               .
145               .              .               .             W13
                  .              .               .               .
                  .              .               .               .
150            WG ...............................................
                  V
                  V
153            G-H
                  V
                  V
156
                  .
                  .
159               .           W15
                  .              V
                  .              V
164               .
                  .              .
                  .              .
```

```
  167        WH ............
                .
  170           .        W16
                .         V
                .         V
  175           .
                .         .
                .         .
  178           .         .        W17
                .         .         .
                .         .         .
  183           .        WI ............
                .         V
                .         V
  186           .        I-M
                .         .
                .         .
  189           .         .        W19
                .         .         V
                .         .         V
  194           .         .
                .         .         .
                .         .         .
  197           .         .         .        W20
                .         .         .         .
                .         .         .         .
  202           .         .        WJ ............
                .         .         V
                .         .         V
  205           .         .
                .         .         .
                .         .         .
  208           .         .         .        W21
                .         .         .         .
                .         .         .         .
  213           .         .        WK ............
                .         .         V
                .         .         V
  216           .         .
                .         .         .
                .         .         .
  219           .         .         .        W22
                .         .         .         .
                .         .         .         .
  224           .         .        WL ............
                .         .         V
                .         .         V
  227           .         .
                .         .         .
                .         .         .
  230           .         .         .        W23
                .         .         .         .
                .         .         .         .
  235           .         .         .         .        W18
                .         .         .         .         .
                .         .         .         .         .
  240        WM ...............................................
                V
                V
  243          M-N
                .
                .
  246           .        W24
                .         .
                .         .
  251           .         .        W25
                .         .         .
                .         .         .
  256        WN ........................
                V
                V
  259          N-P
                .
                .
  262           .        W28
                .         V
                .         V
  267           .
                .         .
                .         .
  270           .         .        W30
                .         .         V
                .         .         V
  275           .         .
                .         .         .
                .         .         .
  278           .         .         .        W29
                .         .         .         .
                .         .         .         .
  283           .         .         .         .        W31
                .         .         .         .         .
                .         .         .         .         .
  288           .        WO ....................................
                .         V
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```
                            V
 291            .          O-P
                .           .
                .           .
 294            .           .         W26
                .           .           V
                .           .           V
 299            .           .
                .           .           .
                .           .           .
 302            .           .           .         W27
                .           .           .           .
                .           .           .           .
 307            .           .           .           .         W32
                .           .           .           .           .
                .           .           .           .           .
 312          WP ................................................
                V
                V
 315          P-Q
                .
                .
 318            .         W33A
                .           .
                .           .
 323          WP1............
                V
                V
 326         P1-Q
                .
                .
 329            .         W33B
                .           .
                .           .
 334            .           .         W34A
                .           .           V
                .           .           V
 339            .           .      34A-P2
                .           .           .
                .           .           .
 342            .           .           .         W34B
                .           .           .           .
                .           .           .           .
 347            .           .         WP2............
                .           .           V
                .           .           V
 350            .           .        P2-Q
                .           .           .
                .           .           .
 353            .           .           .         W34C
                .           .           .           .
                .           .           .           .
 358          WQ ....................................
                V
                V
 361         Q-Q1
                .
                .
 364            .         W36A
                .           .
                .           .
 369          WQ1............
                V
                V
 372         Q1-R
                .
                .
 375            .         W36B
                .           .
                .           .
 380            .           .         W35A
                .           .           V
                .           .           V
 385            .           .      35A-WR
                .           .           .
                .           .           .
 388            .           .           .         W35B
                .           .           .           .
                .           .           .           .
 393          WR ....................................
                V
                V
 396         WR-S
                .
                .
 399            .         W37A
                .           V
                .           V
 404            .       37A-S
                .           .
                .           .
 407            .           .         W37B
                .           .           .
                .           .           .
 412          WS ........................
```

```
                V
                V
 415          S-T
                .
                .
 418            .          W38
                .            V
                .            V
 423            .
                .            .
                .            .
 426            .            .          W39
                .            .            .
                .            .            .
 431            .            .            .          W40
                .            .            .            .
                .            .            .            .
 436           WT ...................................
                V
                V
 439        T-U
                .
                .
 442            .          W41
                .            .
                .            .
 447         POND............
                .
                .
 452            .------->  DIVERT
 450        DIVOU
                V
                V
 455       PONDWU
                V
                V
 464        B-WU
                .
                .
 469            .            .<-------  DIVERT
 467            .        DIVIN
                .            .
                .            .
 470            .            .        W42A
                .            .            V
                .            .            V
 475            .            .       42A-WU
                .            .            .
                .            .            .
 478            .            .            .          W42
                .            .            .            .
                .            .            .            .
 483            .            .            .            .          W42B
                .            .            .            .            V
                .            .            .            .            V
 488            .            .            .            .       42B-WU
                .            .            .            .            .
                .            .            .            .            .
 491           WU.............................................
                V
                V
 494        U-V
                .
                .
 497            .          W43
                .            .
                .            .
 502           WV ............
                V
                V
 505          V-W
                .
                .
 508            .          W45
                .            .
                .            .
 513           WW ............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1****************************************          ****************************************
*                                       *          *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *          *   U.S. ARMY CORPS OF ENGINEERS       *
*             JUN   1998                *          *   HYDROLOGIC ENGINEERING CENTER      *
*           VERSION 4.1                 *          *        609 SECOND STREET             *
*                                       *          *     DAVIS, CALIFORNIA 95616          *
*  RUN DATE   20MAY08   TIME  08:48:57  *          *        (916) 756-1104                *
*                                       *          *                                      *
*****************************************          ****************************************
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FALCON HIGHLANDS PRELIMINARY DRAINAGE PLAN - BASED ON DBPS MODEL F100FNLQ
** DETENTION POND AT WU (BETWEEN SH 24 AND TAMLIN RD)

** 2 Year, 5 Year and 100 Year Storm Events (24hr Storm)
**Basins W40 & W42 revised due to Meridian Crossing development

```
  6 IO          OUTPUT CONTROL VARIABLES
                      IPRNT            5  PRINT CONTROL
                      IPLOT            0  PLOT CONTROL
                      QSCAL           0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                       NMIN            5  MINUTES IN COMPUTATION INTERVAL
                      IDATE     25MAY 5  STARTING DATE
                      ITIME         0800  STARTING TIME
                         NQ          300  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE     26MAY 5  ENDING DATE
                     NDTIME         0855  ENDING TIME
                      ICENT           19  CENTURY MARK

                COMPUTATION INTERVAL      .08 HOURS
                     TOTAL TIME BASE   24.92 HOURS

          ENGLISH UNITS
               DRAINAGE AREA          SQUARE MILES
               PRECIPITATION DEPTH    INCHES
               LENGTH, ELEVATION      FEET
               FLOW                   CUBIC FEET PER SECOND
               STORAGE VOLUME         ACRE-FEET
               SURFACE AREA           ACRES
               TEMPERATURE            DEGREES FAHRENHEIT

    JP          MULTI-PLAN OPTION
                      NPLAN            1  NUMBER OF PLANS

    JR          MULTI-RATIO OPTION
                   RATIOS OF PRECIPITATION
                  1.00     1.24      2.10

          *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  1

          *** FDKRUT - NEWTON RAPHSON FAILEDFIXED POINT ITERATION USED - ITERATION=  1

1
```

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

| OPERATION | STATION | AREA | PLAN | | RATIOS APPLIED TO PRECIPITATION RATIO 1 1.00 | RATIO 2 1.24 | RATIO 3 2.10 |
|---|---|---|---|---|---|---|---|
| HYDROGRAPH AT + | W1 | .05 | 1 | FLOW | 1. | 5. | 40. |
| | | | | TIME | 5.83 | 5.83 | 5.75 |
| ROUTED TO + | | .05 | 1 | FLOW | 0. | 4. | 37. |
| | | | | TIME | 6.00 | 5.92 | 5.83 |
| HYDROGRAPH AT + | W2 | .03 | 1 | FLOW | 0. | 2. | 20. |
| | | | | TIME | 5.92 | 5.83 | 5.83 |
| 2 COMBINED AT + | WA | .08 | 1 | FLOW | 1. | 6. | 57. |
| | | | | TIME | 6.00 | 5.92 | 5.83 |
| ROUTED TO + | | .08 | 1 | FLOW | 1. | 6. | 55. |
| | | | | TIME | 6.08 | 5.92 | 5.83 |
| HYDROGRAPH AT + | W3 | .05 | 1 | FLOW | 1. | 5. | 39. |
| | | | | TIME | 5.83 | 5.83 | 5.83 |
| 2 COMBINED AT + | WB | .13 | 1 | FLOW | 1. | 11. | 95. |
| | | | | TIME | 6.08 | 5.92 | 5.83 |
| ROUTED TO + | | .13 | 1 | FLOW | 1. | 10. | 91. |
| | | | | TIME | 6.17 | 5.92 | 5.83 |
| HYDROGRAPH AT + | W4 | .01 | 1 | FLOW | 0. | 1. | 6. |
| | | | | TIME | 5.75 | 5.75 | 5.75 |
| ROUTED TO + | | .01 | 1 | FLOW | 0. | 1. | 6. |
| | | | | TIME | 5.92 | 5.83 | 5.75 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| HYDROGRAPH AT + | W5 | .02 | 1 | FLOW | 0. | 2. | 15. |
| | | | | TIME | 5.83 | 5.75 | 5.75 |
| 3 COMBINED AT + | WC | .15 | 1 | FLOW | 1. | 11. | 105. |
| | | | | TIME | 6.17 | 5.92 | 5.83 |
| ROUTED TO + | | .15 | 1 | FLOW | 1. | 11. | 103. |
| | | | | TIME | 6.25 | 5.92 | 5.83 |
| HYDROGRAPH AT + | W6 | .05 | 1 | FLOW | 1. | 5. | 43. |
| | | | | TIME | 5.83 | 5.83 | 5.75 |
| ROUTED TO + | | .05 | 1 | FLOW | 0. | 5. | 40. |
| | | | | TIME | 5.92 | 5.83 | 5.75 |
| HYDROGRAPH AT + | W7 | .02 | 1 | FLOW | 0. | 2. | 20. |
| | | | | TIME | 5.83 | 5.75 | 5.75 |
| ROUTED TO + | | .02 | 1 | FLOW | 0. | 2. | 20. |
| | | | | TIME | 5.83 | 5.83 | 5.75 |
| 2 COMBINED AT + | WD | .07 | 1 | FLOW | 1. | 7. | 60. |
| | | | | TIME | 5.83 | 5.83 | 5.75 |
| ROUTED TO + | D-E | .07 | 1 | FLOW | 1. | 6. | 55. |
| | | | | TIME | 5.92 | 5.83 | 5.75 |
| HYDROGRAPH AT + | W8 | .03 | 1 | FLOW | 0. | 3. | 27. |
| | | | | TIME | 5.83 | 5.75 | 5.75 |
| ROUTED TO + | | .03 | 1 | FLOW | 0. | 3. | 24. |
| | | | | TIME | 5.92 | 5.83 | 5.75 |
| HYDROGRAPH AT + | W9 | .04 | 1 | FLOW | 1. | 5. | 36. |
| | | | | TIME | 5.83 | 5.83 | 5.75 |
| 3 COMBINED AT + | WE | .14 | 1 | FLOW | 1. | 14. | 114. |
| | | | | TIME | 5.92 | 5.83 | 5.75 |
| ROUTED TO + | E-F | .14 | 1 | FLOW | 1. | 13. | 108. |
| | | | | TIME | 6.08 | 5.92 | 5.83 |
| HYDROGRAPH AT + | W10 | .04 | 1 | FLOW | 1. | 5. | 39. |
| | | | | TIME | 5.83 | 5.83 | 5.75 |
| ROUTED TO + | | .04 | 1 | FLOW | 1. | 5. | 36. |
| | | | | TIME | 5.92 | 5.83 | 5.75 |
| HYDROGRAPH AT + | W11 | .03 | 1 | FLOW | 0. | 3. | 29. |
| | | | | TIME | 5.83 | 5.75 | 5.75 |
| 4 COMBINED AT + | WF | .36 | 1 | FLOW | 3. | 29. | 265. |
| | | | | TIME | 6.08 | 5.92 | 5.83 |
| ROUTED TO + | F-G | .36 | 1 | FLOW | 3. | 28. | 255. |
| | | | | TIME | 6.25 | 6.00 | 5.83 |
| HYDROGRAPH AT + | W12 | .04 | 1 | FLOW | 0. | 4. | 33. |
| | | | | TIME | 5.83 | 5.83 | 5.75 |
| ROUTED TO + | | .04 | 1 | FLOW | 0. | 4. | 32. |
| | | | | TIME | 6.17 | 5.92 | 5.83 |
| HYDROGRAPH AT + | W14 | .05 | 1 | FLOW | 1. | 5. | 38. |
| | | | | TIME | 5.83 | 5.83 | 5.83 |
| ROUTED TO + | | .05 | 1 | FLOW | 1. | 5. | 37. |
| | | | | TIME | 5.92 | 5.92 | 5.83 |
| HYDROGRAPH AT + | W13 | .11 | 1 | FLOW | 2. | 10. | 80. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| HYDROGRAPH AT + | W33B | .14 | 1 | FLOW | 1. | 9. | 78. |
| | | | | TIME | 6.33 | 5.92 | 5.92 |
| HYDROGRAPH AT + | W34A | .14 | 1 | FLOW | 1. | 10. | 96. |
| | | | | TIME | 6.33 | 5.92 | 5.83 |
| ROUTED TO + | 34A-P2 | .14 | 1 | FLOW | 1. | 10. | 93. |
| | | | | TIME | 6.33 | 6.08 | 5.92 |
| HYDROGRAPH AT + | W34B | .18 | 1 | FLOW | 1. | 11. | 101. |
| | | | | TIME | 6.33 | 5.92 | 5.92 |
| 2 COMBINED AT + | WP2 | .32 | 1 | FLOW | 2. | 20. | 195. |
| | | | | TIME | 6.33 | 6.00 | 5.92 |
| ROUTED TO + | P2-Q | .32 | 1 | FLOW | 2. | 19. | 186. |
| | | | | TIME | 6.75 | 6.17 | 6.00 |
| HYDROGRAPH AT + | W34C | .16 | 1 | FLOW | 1. | 10. | 90. |
| | | | | TIME | 6.33 | 6.00 | 5.92 |
| 4 COMBINED AT + | WQ | 2.37 | 1 | FLOW | 19. | 115. | 1336. |
| | | | | TIME | 6.92 | 6.25 | 6.00 |
| ROUTED TO + | Q-Q1 | 2.37 | 1 | FLOW | 19. | 114. | 1294. |
| | | | | TIME | 7.08 | 6.33 | 6.00 |
| HYDROGRAPH AT + | W36A | .14 | 1 | FLOW | 1. | 9. | 81. |
| | | | | TIME | 6.33 | 5.92 | 5.92 |
| 2 COMBINED AT + | WQ1 | 2.51 | 1 | FLOW | 20. | 118. | 1363. |
| | | | | TIME | 7.08 | 6.33 | 6.00 |
| ROUTED TO + | Q1-R | 2.51 | 1 | FLOW | 20. | 117. | 1320. |
| | | | | TIME | 7.25 | 6.42 | 6.08 |
| HYDROGRAPH AT + | W36B | .19 | 1 | FLOW | 1. | 10. | 91. |
| | | | | TIME | 6.42 | 6.00 | 6.00 |
| HYDROGRAPH AT + | W35A | .10 | 1 | FLOW | 1. | 7. | 62. |
| | | | | TIME | 6.33 | 5.92 | 5.83 |
| ROUTED TO + | 35A-WR | .10 | 1 | FLOW | 1. | 6. | 58. |
| | | | | TIME | 6.92 | 6.25 | 6.00 |
| HYDROGRAPH AT + | W35B | .15 | 1 | FLOW | 1. | 9. | 81. |
| | | | | TIME | 6.42 | 6.00 | 5.92 |
| 4 COMBINED AT + | WR | 2.95 | 1 | FLOW | 22. | 132. | 1506. |
| | | | | TIME | 7.17 | 6.42 | 6.08 |
| ROUTED TO + | WR-S | 2.95 | 1 | FLOW | 22. | 131. | 1485. |
| | | | | TIME | 7.33 | 6.50 | 6.08 |
| HYDROGRAPH AT + | W37A | .11 | 1 | FLOW | 1. | 8. | 74. |
| | | | | TIME | 6.33 | 5.92 | 5.83 |
| ROUTED TO + | 37A-S | .11 | 1 | FLOW | 1. | 8. | 71. |
| | | | | TIME | 6.58 | 6.00 | 5.92 |
| HYDROGRAPH AT + | W37B | .16 | 1 | FLOW | 145. | 201. | 410. |
| | | | | TIME | 5.83 | 5.83 | 5.83 |
| 3 COMBINED AT + | WS | 3.23 | 1 | FLOW | 145. | 201. | 1705. |
| | | | | TIME | 5.83 | 5.83 | 6.08 |
| ROUTED TO + | S-T | 3.23 | 1 | FLOW | 140. | 197. | 1632. |
| | | | | TIME | 5.92 | 5.92 | 6.17 |
| HYDROGRAPH AT + | W38 | .09 | 1 | FLOW | 2. | 10. | 67. |
| | | | | TIME | 5.92 | 5.92 | 5.83 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ROUTED TO | | | | | | | |
| + | | .09 | 1 | FLOW | 2. | 9. | 66. |
| | | | | TIME | 6.25 | 6.08 | 5.92 |
| HYDROGRAPH AT | | | | | | | |
| + | W39 | .18 | 1 | FLOW | 49. | 85. | 251. |
| | | | | TIME | 5.92 | 5.92 | 5.92 |
| HYDROGRAPH AT | | | | | | | |
| + | W40 | .07 | 1 | FLOW | 76. | 102. | 201. |
| | | | | TIME | 5.75 | 5.75 | 5.75 |
| 4 COMBINED AT | | | | | | | |
| + | WT | 3.57 | 1 | FLOW | 244. | 359. | 1867. |
| | | | | TIME | 5.92 | 5.83 | 6.08 |
| ROUTED TO | | | | | | | |
| + | T-U | 3.57 | 1 | FLOW | 243. | 358. | 1821. |
| | | | | TIME | 5.92 | 5.92 | 6.17 |
| HYDROGRAPH AT | | | | | | | |
| + | W41 | .06 | 1 | FLOW | 40. | 60. | 142. |
| | | | | TIME | 5.75 | 5.75 | 5.75 |
| 2 COMBINED AT | | | | | | | |
| + | POND | 3.63 | 1 | FLOW | 264. | 392. | 1839. |
| | | | | TIME | 5.92 | 5.83 | 6.17 |
| DIVERSION TO | | | | | | | |
| + | DIVERT | 3.63 | 1 | FLOW | 36. | 36. | 36. |
| | | | | TIME | 5.58 | 5.50 | 5.42 |
| HYDROGRAPH AT | | | | | | | |
| + - | DIVOU | 3.63 | 1 | FLOW | 229. | 356. | 1804. |
| | | | | TIME | 5.92 | 5.83 | 6.17 |
| ROUTED TO | | | | | | | |
| + | PONDWU | 3.63 | 1 | FLOW | 118. | 223. | 1313. |
| | | | | TIME | 6.17 | 6.08 | 6.33 |
| | | | ** PEAK STAGES IN FEET ** | | | | |
| | | | 1 | STAGE | 20.68 | 7.42 | 26.90 |
| | | | | TIME | 5.92 | 6.08 | 6.33 |
| ROUTED TO | | | | | | | |
| + | B-WU | 3.63 | 1 | FLOW | 116. | 219. | 1298. |
| | | | | TIME | 10.58 | 9.92 | 8.75 |
| HYDROGRAPH AT | | | | | | | |
| + | DIVIN | .00 | 1 | FLOW | 36. | 36. | 36. |
| | | | | TIME | 5.58 | 5.50 | 5.42 |
| HYDROGRAPH AT | | | | | | | |
| + | W42A | .01 | 1 | FLOW | 13. | 18. | 35. |
| | | | | TIME | 5.83 | 5.83 | 5.75 |
| ROUTED TO | | | | | | | |
| + | 42A-WU | .01 | 1 | FLOW | 13. | 18. | 35. |
| | | | | TIME | 6.17 | 6.17 | 6.08 |
| HYDROGRAPH AT | | | | | | | |
| + | W42 | .05 | 1 | FLOW | 60. | 81. | 156. |
| | | | | TIME | 5.75 | 5.75 | 5.75 |
| HYDROGRAPH AT | | | | | | | |
| + | W42B | .02 | 1 | FLOW | 21. | 28. | 54. |
| | | | | TIME | 5.83 | 5.83 | 5.75 |
| ROUTED TO | | | | | | | |
| + | 42B-WU | .02 | 1 | FLOW | 20. | 27. | 54. |
| | | | | TIME | 5.92 | 5.92 | 5.83 |
| 5 COMBINED AT | | | | | | | |
| + | WU | 3.72 | 1 | FLOW | 135. | 256. | 1339. |
| | | | | TIME | 10.58 | 9.92 | 8.75 |
| ROUTED TO | | | | | | | |
| + | U-V | 3.72 | 1 | FLOW | 135. | 253. | 1333. |
| | | | | TIME | 10.67 | 10.00 | 8.75 |
| HYDROGRAPH AT | | | | | | | |
| + | W43 | .15 | 1 | FLOW | 7. | 24. | 132. |
| | | | | TIME | 5.92 | 5.83 | 5.83 |
| 2 COMBINED AT | | | | | | | |
| + | WV | 3.86 | 1 | FLOW | 135. | 254. | 1338. |
| | | | | TIME | 10.67 | 10.00 | 8.75 |
| ROUTED TO | | | | | | | |
| + | V-W | 3.86 | 1 | FLOW | 133. | 249. | 1334. |
| | | | | TIME | 10.75 | 10.00 | 8.75 |
| HYDROGRAPH AT | | | | | | | |
| + | W45 | .19 | 1 | FLOW | 3. | 17. | 134. |

# MERIDIAN CROSSING FILING NO. 1 - FDR - EXISTING CONDITIONS
# SURFACE ROUTING

| DESIGN POINT | CONTRIBUTING BASINS | CA(equivalent) | | Tc | INTENSITY | | TOTAL FLOWS | |
|---|---|---|---|---|---|---|---|---|
| | | CA(5) | CA(100) | (min.) | I(5) (in/hr) | I(100) (in/hr) | Q(5) (cfs) | Q(100) (cfs) |
| 1 | E-1 | 1.96 | 2.07 | 6.4 | 4.8 | 8.5 | 9.4 | 17.6 |
| | | | | TRAVEL TIME | | | | |
| | | 1.96 | 2.07 | Type/flow | Length (ft) | Velocity (fps) | d. Time (min) | T. Time (min) |
| | | | | | 265 | 4.2 | 1.1 | 7.4 |
| 2 | DP-1 | 1.96 | 2.07 | 7.4 | 4.6 | 8.1 | 22.9 | 48.7 |
| | E-2 | 3.07 | 3.94 | TRAVEL TIME | | | | |
| | | 5.03 | 6.01 | Type/flow | Length (ft) | Velocity (fps) | d. Time (min) | T. Time (min) |
| | | | | | 1500 | 4.7 | 5.3 | 12.7 |
| 3 | E-4 | 1.94 | 2.04 | 6.3 | 4.8 | 8.5 | 9.3 | 17.5 |
| | | | | TRAVEL TIME | | | | |
| | | 1.94 | 2.04 | Type/flow | Length (ft) | Velocity (fps) | d. Time (min) | T. Time (min) |
| | | | | | 900 | 4.1 | 3.7 | 9.9 |
| 5 | E-7 | 2.09 | 2.20 | 5.4 | 5.0 | 8.9 | 10.5 | 19.7 |
| | | | | TRAVEL TIME | | | | |
| | | 2.09 | 2.20 | Type/flow | Length (ft) | Velocity (fps) | d. Time (min) | T. Time (min) |
| | | | | | 347 | 2.0 | 2.9 | 8.3 |
| 4 | E-6 | 2.36 | 2.49 | 5.8 | 4.9 | 8.7 | 11.6 | 21.7 |
| | | | | TRAVEL TIME | | | | |
| | | 2.36 | 2.49 | Type/flow | Length (ft) | Velocity (fps) | d. Time (min) | T. Time (min) |
| | | | | | 62 | 9.0 | 0.1 | 5.9 |
| 6 | DP-2 | 5.03 | 6.01 | 16.1 | 3.4 | 6.0 | 67.8 | 149.7 |
| | DP-3 | 1.94 | 2.04 | | | | | |
| | E-8 | 8.36 | 10.75 | | | | | |
| | E-3 | 4.89 | 6.28 | TRAVEL TIME | | | | |
| | | 20.21 | 25.09 | Type/flow | Length (ft) | Velocity (fps) | d. Time (min) | T. Time (min) |
| | | | | | 36 | 1.5 | 0.4 | 16.5 |
| 7 | DP-6 | 20.21 | 25.09 | 16.5 | 3.3 | 5.9 | 67.0 | 148.5 |
| | DP-5 (INLET) | 0.00 | 0.08 | | | | | |
| | DP-4 (INLET) | 0.00 | 0.00 | TRAVEL TIME | | | | |
| | | 20.21 | 25.17 | Type/flow | Length (ft) | Velocity (fps) | d. Time (min) | T. Time (min) |
| | | | | | 139 | 8.4 | 0.3 | 16.8 |
| 8 | DP-7 | 20.21 | 25.17 | 16.8 | 3.3 | 5.9 | 147.7 | 1286.1 |
| | POND WU* | 19.44 | 188.25 | | | | | |
| | WEST TRIB CHAN.* | 1.96 | 2.07 | | | | | |
| | E-5 | 3.29 | 4.23 | | | | | |
| | | | | TRAVEL TIME | | | | |
| | | 44.91 | 219.72 | Type/flow | Length (ft) | Velocity (fps) | d. Time (min) | T. Time (min) |
| | | | | | 83 | 5.8 | 0.2 | 17.0 |

* VALUES WERE OBTAINED FROM THE APPROVED MARKET PLACE FILING NO. 1 DRAINAGE REPORT

# MERIDIAN CROSSING FILING NO. 1 - FDR - EXISTING CONDITIONS
## INLET CALCULATIONS

| | | | | | | | $Q_5$ | | | | | | $Q_{100}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DP | Inlet size L(i) | INLET TYPE | CROSS SLOPE | STREET SLOPE | Q(5) | Q(100) | Qi | CA(eqv.) | FB | CA(eqv.) | DEPTH (max) | SPREAD | Qi | CA(eqv.) | FB | CA(eqv.) | DEPTH (max) | SPREAD |
| 1 | 15 | FLOW-BY | 2.0% | 1.0% | 9 | 18 | 6.4 | 1.34 | 3 | 0.62 | 0.42 | 16.7 | 10.8 | 1.27 | 7 | 0.80 | 0.51 | 21.1 |
| 3 | 20 | SUMP | 2.0% | SAG | 9 | 17 | 9.3 | 1.94 | 0 | 0.00 | 0.50 | | 17.5 | 2.04 | 0 | 0.00 | 0.50 | |
| 4 | 25 | SUMP | 2.0% | SAG | 12 | 22 | 11.6 | 2.36 | 0 | 0.00 | 0.50 | | 21.7 | 2.49 | 0 | 0.00 | 0.50 | |
| 5 | 20 | SUMP | 2.0% | SAG | 10 | 20 | 10.5 | 2.09 | 0 | 0.00 | 0.50 | | 18.9 | 2.12 | 1 | 0.08 | 0.50 | |

## Appendix D: Proposed Rational Calculations

# MERIDIAN CROSSING - FDR - PROPOSED CONDITIONS
## (RATIONAL METHOD Q=CIA)

| BASIN | TOTAL FLOWS | | | | AREA | WEIGHTED | | OVERLAND | | | | CHANNEL | | | | Tc | INTENSITY | | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $Q_5$ | $Q_{100}$ | CA(equiv.) | | TOTAL | $C_5$ | $C_{100}$ | $C_5$ | Length | Slope | Tco | Length | Slope | Velocity | Tcc | TOTAL | $I_5$ | $I_{100}$ | |
| | (c.f.s.) | (c.f.s.) | 5 YR | 100 YR | (Ac) | | | | (ft) | (ft) | (min) | (ft) | (%) | (fps) | (min) | (min) | (in/hr) | (in/hr) | |
| D-1 | 9.4 | 17.6 | 1.96 | 2.07 | 2.18 | 0.90 | 0.95 | 0.90 | 5 | 2.0% | 0.7 | 867 | 1.6% | 2.5 | 5.7 | 6.4 | 4.8 | 8.5 | |
| D-2 | 23.4 | 43.9 | 4.63 | 4.88 | 5.14 | 0.90 | 0.95 | 0.90 | 10 | 2.0% | 0.9 | 675 | 1.8% | 2.6 | 4.3 | 5.2 | 5.1 | 9.0 | |
| D-3 | 34.7 | 65.1 | 10.34 | 10.92 | 11.49 | 0.90 | 0.95 | 0.25 | 20 | 2.0% | 5.7 | 1,370 | 1.2% | 2.2 | 10.4 | 16.1 | 3.4 | 6.0 | |
| D-4 | 9.3 | 17.5 | 1.94 | 2.04 | 2.15 | 0.90 | 0.95 | 0.90 | 5 | 2.0% | 0.7 | 848 | 1.6% | 2.5 | 5.6 | 6.3 | 4.8 | 8.5 | |
| D-5 | 12.1 | 27.8 | 3.29 | 4.23 | 9.41 | 0.35 | 0.45 | 0.25 | 60 | 10.0% | 5.8 | 1,020 | 1.4% | 2.3 | 7.3 | 13.0 | 3.7 | 6.6 | |
| D-6 | 11.6 | 21.7 | 2.36 | 2.49 | 2.62 | 0.90 | 0.95 | 0.90 | 5 | 2.0% | 0.7 | 873 | 2.0% | 2.8 | 5.1 | 5.8 | 4.9 | 8.7 | |
| D-7 | 10.5 | 19.7 | 2.09 | 2.20 | 2.32 | 0.90 | 0.95 | 0.90 | 5 | 2.0% | 0.7 | 797 | 2.0% | 2.8 | 4.7 | 5.4 | 5.0 | 8.9 | |
| D-8 | 82.8 | 155.5 | 21.50 | 22.70 | 23.89 | 0.90 | 0.95 | 0.25 | 10 | 2.0% | 4.0 | 1,315 | 2.0% | 2.8 | 7.7 | 11.7 | 3.8 | 6.9 | |
| D-9 | 16.9 | 31.8 | 3.31 | 3.50 | 3.68 | 0.90 | 0.95 | 0.90 | 5 | 2.0% | 0.7 | 525 | 1.2% | 2.2 | 4.0 | 5.0 | 5.1 | 9.1 | |
| D-10 | 1.9 | 3.6 | 0.38 | 0.40 | 0.42 | 0.90 | 0.95 | 0.90 | 5 | 2.0% | 0.7 | 400 | 4.0% | 4.0 | 1.7 | 5.0 | 5.1 | 9.1 | |
| D-11 | 1.8 | 3.4 | 0.35 | 0.37 | 0.39 | 0.90 | 0.95 | 0.90 | 5 | 2.0% | 0.7 | 400 | 4.0% | 4.0 | 1.7 | 5.0 | 5.1 | 9.1 | |
| D-12 | 1.8 | 3.3 | 0.43 | 0.45 | 0.48 | 0.90 | 0.95 | 0.90 | 5 | 2.0% | 0.7 | 800 | 0.5% | 1.4 | 9.4 | 10.1 | 4.1 | 7.3 | |
| D-20 | 5.9 | 11.2 | 1.47 | 1.55 | 1.63 | 0.90 | 0.95 | 0.90 | 10 | 2.0% | 0.9 | 800 | 0.5% | 1.4 | 9.4 | 10.4 | 4.0 | 7.2 | |
| | | | | | | | | | | | | | | | | | | | |
| Formula: | C*I*A | C*I*A | Q/I | Q/I | 65.80 | | | | | | *1 | | | *2 20 | *3 | Tco+Tcc | *4 1.5 | *6 2.67 | |

1* Tco = 1.87*(1.1-C5)*(L^0.5)*((S*100)^-0.33) (DCM page 5-11)
2* Vc = 20*S^0.5 (USDCM RO-4)
3* Tcc = 1/V*L/60
4* $I_5$ = (26.65*1.50)/(10+Tc)^0.76 (City Letter of 1/7/2003)
6* $I_{100}$ =(26.65*2.67)/(10+Tc)^0.76 (City Letter of 1/7/2003)

# MERIDIAN CROSSING - FDR - PROPOSED CONDITIONS
## SURFACE ROUTING

| DESIGN POINT | CONTRIBUTING BASINS | CA(equivalent) | | Tc | INTENSITY | | TOTAL FLOWS | |
|---|---|---|---|---|---|---|---|---|
| | | CA(5) | CA(100) | (min.) | I(5) (in/hr) | I(100) (in/hr) | Q(5) (cfs) | Q(100) (cfs) |
| 1 | D-1 | 1.96 | 2.07 | 6.4 | 4.8 | 8.5 | 9.4 | 17.6 |
| | | | | TRAVEL TIME | | | | |
| | | 1.96 | 2.07 | Type/flow | Length (ft) | Velocity (fps) | d. Time (min) | T. Time (min) |
| | | | | | 250 | 4.2 | 1.0 | 7.4 |
| J | D-10 | 0.38 | 0.40 | 5.0 | 5.1 | 9.1 | 3.7 | 7.0 |
| | D-11 | 0.35 | 0.37 | TRAVEL TIME | | | | |
| | | 0.73 | 0.77 | Type/flow | Length (ft) | Velocity (fps) | d. Time (min) | T. Time (min) |
| | | | | Gutter | 820 | 5.0 | 2.7 | 7.7 |
| B | D-12 | 0.43 | 0.45 | 10.1 | 4.1 | 7.3 | 4.7 | 8.9 |
| | DP-J | 0.73 | 0.77 | | | | | |
| | | | | TRAVEL TIME | | | | |
| | | 1.16 | 1.22 | Type/flow | Length (ft) | Velocity (fps) | d. Time (min) | T. Time (min) |
| | | | | Channel | 40 | 1.8 | 0.4 | 10.5 |
| X | D-9 | 3.31 | 3.50 | 5.0 | 5.1 | 9.1 | 16.9 | 31.8 |
| | | | | TRAVEL TIME | | | | |
| | | 3.31 | 3.50 | Type/flow | Length (ft) | Velocity (fps) | d. Time (min) | T. Time (min) |
| | | | | Pipe | 420 | 7.9 | 0.9 | 5.9 |
| Z | D-2 | 4.63 | 4.88 | 10.5 | 4.0 | 7.2 | 44.6 | 83.8 |
| | DP-X | 3.31 | 3.50 | | | | | |
| | Inlet 1 Flowby | 0.62 | 0.80 | | | | | |
| | Inlet 1 | 1.34 | 1.27 | | | | | |
| | DP-B | 1.16 | 1.22 | TRAVEL TIME | | | | |
| | | 11.06 | 11.67 | Type/flow | Length (ft) | Velocity (fps) | d. Time (min) | T. Time (min) |
| | | | | Channel | 725 | 3.8 | 3.2 | 13.6 |
| Y | D-3 | 10.34 | 10.92 | 16.1 | 3.4 | 6.0 | 34.7 | 65.1 |
| | | | | TRAVEL TIME | | | | |
| | | 10.34 | 10.92 | Type/flow | Length (ft) | Velocity (fps) | d. Time (min) | T. Time (min) |
| | | | | Channel | 895 | 2.4 | 6.2 | 22.3 |
| 3 | D-4 | 1.94 | 2.04 | 6.3 | 4.8 | 8.5 | 9.3 | 17.5 |
| | | | | TRAVEL TIME | | | | |
| | | 1.94 | 2.04 | Type/flow | Length (ft) | Velocity (fps) | d. Time (min) | T. Time (min) |
| | | | | | | 0.0 | 0.0 | 6.3 |

| DESIGN POINT | CONTRIBUTING BASINS | CA(equivalent) CA(5) | CA(100) | Tc (min.) | INTENSITY I(5) (in/hr) | I(100) (in/hr) | TOTAL FLOWS Q(5) (cfs) | Q(100) (cfs) |
|---|---|---|---|---|---|---|---|---|
| E | DP-3 | 1.94 | 2.04 | 13.6 | 3.6 | 6.4 | 46.9 | 88.2 |
| | DP-Z | 11.06 | 11.67 | TRAVEL TIME | | | | |
| | | 12.99 | 13.71 | Type/flow | Length (ft) | Velocity (fps) | d. Time (min) | T. Time (min) |
| | | | | Channel | 750 | 5.8 | 2.1 | 15.8 |
| 5 | D-7 | 2.09 | 2.20 | 5.4 | 5.0 | 8.9 | 10.5 | 19.7 |
| | | | | TRAVEL TIME | | | | |
| | | 2.09 | 2.20 | Type/flow | Length (ft) | Velocity (fps) | d. Time (min) | T. Time (min) |
| | | | | | 150 | 2.0 | 1.3 | 6.6 |
| 4 | D-6 | 2.36 | 2.49 | 5.8 | 4.9 | 8.7 | 11.6 | 21.7 |
| | | | | TRAVEL TIME | | | | |
| | | 2.36 | 2.49 | Type/flow | Length (ft) | Velocity (fps) | d. Time (min) | T. Time (min) |
| | | | | | 85 | 9.0 | 0.2 | 6.0 |
| 6 | D-8 | 21.50 | 22.70 | 22.3 | 2.8 | 5.1 | 127.7 | 239.9 |
| | DP-E | 12.99 | 13.71 | | | | | |
| | DP-Y | 10.34 | 10.92 | TRAVEL TIME | | | | |
| | | 44.83 | 47.33 | Type/flow | Length (ft) | Velocity (fps) | d. Time (min) | T. Time (min) |
| | | | | Pipe | 36 | 10.0 | 0.1 | 22.4 |
| 7 | DP-6 | 44.83 | 47.33 | 22.4 | 2.8 | 5.1 | 140.2 | 264.8 |
| | DP-5 (INLET) | 2.09 | 2.49 | | | | | |
| | DP-4 (INLET) | 2.36 | 2.49 | TRAVEL TIME | | | | |
| | | 49.28 | 52.30 | Type/flow | Length (ft) | Velocity (fps) | d. Time (min) | T. Time (min) |
| | | | | Channel | 110 | 8.4 | 0.2 | 22.6 |
| 8 | DP-7 | 49.28 | 52.30 | 22.6 | 2.8 | 5.0 | 209.4 | 1243.5 |
| | POND WU* | 19.44 | 188.25 | | | | | |
| | WEST TRIB CHAN.* | 1.96 | 2.07 | | | | | |
| | D-5 | 3.29 | 4.23 | TRAVEL TIME | | | | |
| | | 73.98 | 246.86 | Type/flow | Length (ft) | Velocity (fps) | d. Time (min) | T. Time (min) |
| | | | | | 83 | 5.8 | 0.2 | 22.8 |

* VALUES WERE OBTAINED FROM THE APPROVED MARKET PLACE FILING NO. 1 DRAINAGE REPORT

** VALUES WERE OBTAINED FROM LOWES DRAINAGE REPORT

# MERIDIAN CROSSING - FDR - PROPOSED CONDITIONS
## INLET CALCULATIONS

| | | | | | | | $Q_5$ | | | | | | $Q_{100}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DP | Inlet size L(i) | INLET TYPE | CROSS SLOPE | STREET SLOPE | Q(5) | Q(100) | Qi | CA(eqv.) | FB | CA(eqv.) | DEPTH (max) | SPREAD | Qi | CA(eqv.) | FB | CA(eqv.) | DEPTH (max) | SPREAD |
| 1 | 15 | FLOW-BY | 2.0% | 1.0% | 9 | 18 | 6.4 | 1.34 | 3 | 0.62 | 0.42 | 16.7 | 10.8 | 1.27 | 7 | 0.80 | 0.51 | 21.1 |
| 3 | 20 | SUMP | 2.0% | SAG | 9 | 17 | 9.3 | 1.94 | 0 | 0.00 | 0.50 | | 17.5 | 2.04 | 0 | 0.00 | 0.50 | |
| 4 | 25 | SUMP | 2.0% | SAG | 12 | 22 | 11.6 | 2.36 | 0 | 0.00 | 0.50 | | 21.7 | 2.49 | 0 | 0.00 | 0.50 | |
| 5 | 20 | SUMP | 2.0% | SAG | 10 | 20 | 10.5 | 2.09 | 0 | 0.00 | 0.50 | | 18.9 | 2.12 | 0.7 | 0.08 | 0.50 | |

# MERIDIAN CROSSING - FDR - PROPOSED CONDITIONS
# PIPE ROUTING

| DESIGN POINT | CONTRIBUTING BASINS | CA(equivalent) CA(5) | CA(equivalent) CA(100) | Tc (min.) | INTENSITY I(5) (in/hr) | INTENSITY I(100) (in/hr) | TOTAL FLOWS Q(5) (cfs) | TOTAL FLOWS Q(100) (cfs) |
|---|---|---|---|---|---|---|---|---|
| 1 | INLET DP-1 | 1.34 | 1.27 | 6.4 | 4.8 | 8.5 | 6 | 11 |
| | | | | TRAVEL TIME | | | | |
| | | 1.34 | 1.27 | Type/flow | Length (ft) | Velocity (fps) | d. Time (min) | T. Time (min) |
| | | | | 18" RCP | 270 | 7.1 | 0.6 | 7.0 |
| X | DP-X | 3.31 | 3.50 | 5.0 | 5.1 | 9.1 | 17 | 32 |
| | | | | TRAVEL TIME | | | | |
| | | 3.31 | 3.50 | Type/flow | Length (ft) | Velocity (fps) | d. Time (min) | T. Time (min) |
| | | | | 30" RCP | 400 | 7.1 | 0.9 | 5.9 |
| Z | DP-B | 1.16 | 1.22 | 10.5 | 4.0 | 7.2 | 37 | 69 |
| | DP-2 | 4.63 | 4.88 | | | | | |
| | DP-X | 3.31 | 3.50 | TRAVEL TIME | | | | |
| | | 9.10 | 9.60 | Type/flow | Length (ft) | Velocity (fps) | d. Time (min) | T. Time (min) |
| | | | | 36" RCP | 400 | 7.1 | 0.9 | 11.4 |

# STREET CAPACITY
## VERTICAL CURB
## FOR 1/2 STREET SECTION

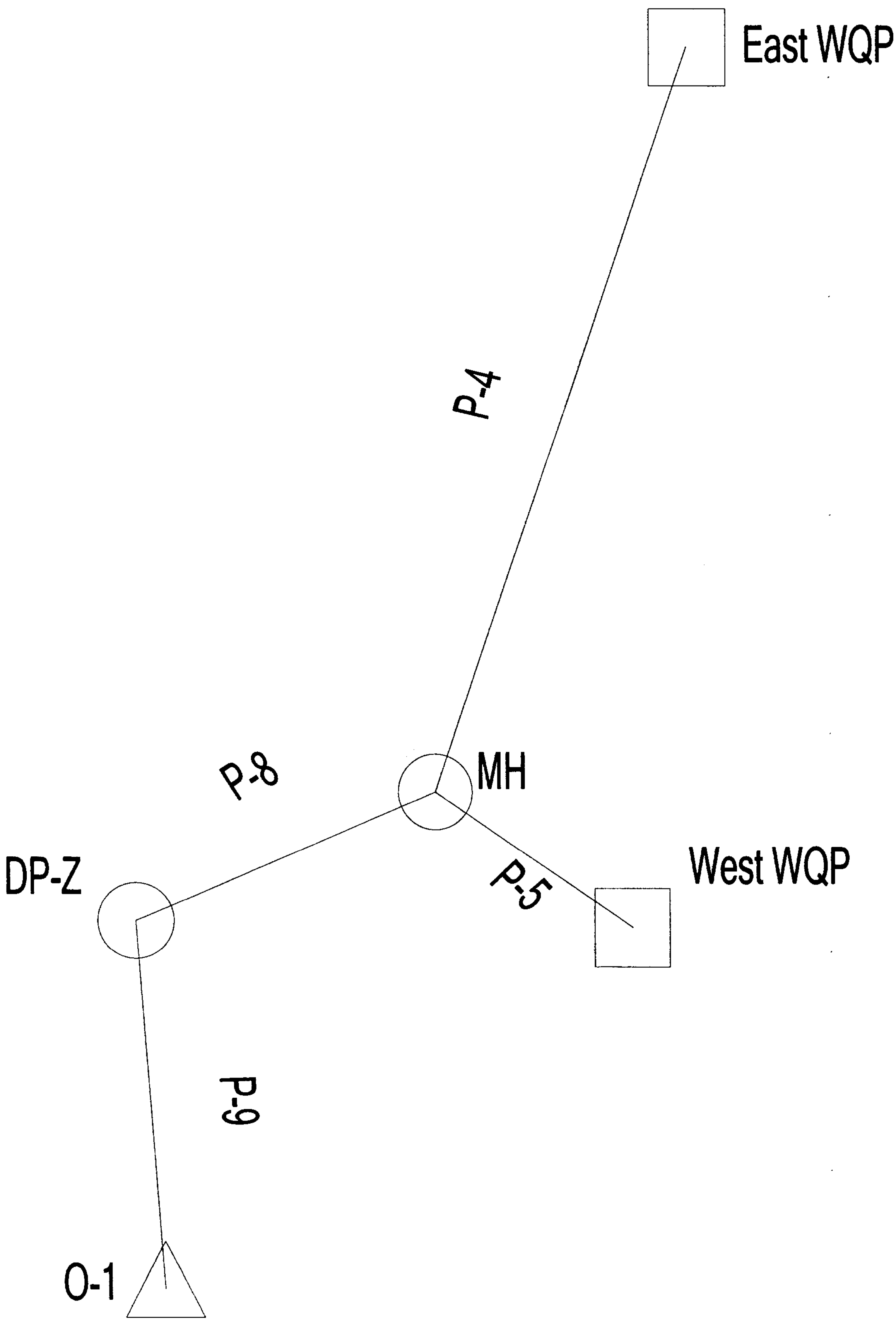
| | Formula | Slope | Slope | n | Type | flow | $Q_{max}$ | Q | Comments |
|---|---|---|---|---|---|---|---|---|---|
| Residential | $Q=171.7\ S^{1/2}$ | 0.5% | 0.02 | 0.016 | V | 0.5 | 34 | 12.0 | |
| | | 1.0% | | | | | 34 | 17.0 | |
| | | 1.5% | | | | | 34 | 20.8 | |
| | | 2.0% | | | | | 34 | 24.1 | |
| | | 2.5% | | | | | 34 | 26.9 | |
| | | 3.0% | | | | | 34 | 29.5 | |
| | | 3.5% | | | | | 34 | 31.8 | |
| | | 4.0% | | | | | 34 | 34.0 | |
| Collector/Arterial | $Q=171.7\ S^{1/2}$ | 0.5% | 0.02 | 0.016 | V | 0.5 | 34 | 12.0 | |
| | | 1.0% | | | | | 34 | 17.0 | |
| | | 1.5% | | | | | 34 | 20.8 | |
| | | 2.0% | | | | | 34 | 24.1 | |
| | | 2.5% | | | | | 34 | 26.9 | |
| | | 3.0% | | | | | 34 | 29.5 | |
| | | 3.5% | | | | | 34 | 31.8 | |
| | | 4.0% | | | | | 34 | 34.0 | |

# STREET CAPACITY
## RAMP CURB
## FOR 1/2 STREET SECTION

| | Formula | Slope | Slope | n | Type | flow | $Q_{max}$ | Q | Comments |
|---|---|---|---|---|---|---|---|---|---|
| Residential | $Q=112.6\ S^{1/2}$ | 0.5% | 0.02 | 0.016 | R | 0.5 | 20 | 8.0 | County ramp curb is 6" |
| | | 1.0% | | | | | 20 | 11.3 | |
| | | 1.5% | | | | | 20 | 13.8 | |
| | | 2.0% | | | | | 20 | 15.9 | |
| | | 2.5% | | | | | 20 | 17.8 | |
| | | 3.0% | | | | | 20 | 19.5 | |
| | | 3.15% | | | | | 20 | 20.0 | |

## Appendix E: StormCAD Calculations

**Scenario: 100-year**



# Analysis Results
## Scenario: 100-year

Note:
The input data may have been modified since the last calculation was performed.
The calculated results may be outdated.

| | |
|---|---|
| Title: | Old Meridian Road |
| Project Engineer: | Charlene Sammons |
| Project Date: | 11/14/07 |
| Comments: | Storm in Old Meridian Road for Meridian Crossing Storm Sewer |

**Scenario Summary**

| | |
|---|---|
| Scenario | 100-year |
| Physical Properties Alternat | Base-Physical Properties |
| Catchments Alternative | Catchments-100-year |
| System Flows Alternative | Base-System Flows |
| Structure Headlosses Alterr | Base-Structure Headlosses |
| Boundary Conditions Altern | Base-Boundary Conditions |
| Design Constraints Alternat | Base-Design Constraints |
| Capital Cost Alternative | Base-Cost |
| User Data Alternative | Base-User Data |

**Network Inventory**

| | | | |
|---|---|---|---|
| Number of Pipes | 4 | Number of Inlets | 2 |
| - Circular Pipes: | 4 | - Grate Inlets: | 0 |
| - Box Pipes: | 0 | - Curb Inlets: | 0 |
| - Arch Pipes: | 0 | - Combination Inlets: | 0 |
| - Vertical Elliptical Pipes: | 0 | - Slot Inlets: | 0 |
| - Horizontal Elliptical Pipes: | 0 | - Grate Inlets in Ditch: | 0 |
| Number of Junctions | 2 | - Generic Inlets: | 2 |
| Number of Outlets | 1 | | |

**Circular Pipes Inventory**

| | | | |
|---|---|---|---|
| 30 inch | 426.11 ft | 42 inch | 167.58 ft |
| 36 inch | 5.58 ft | | |
| Total Length | 599.27 ft | | |

**Generic Inlet Inventory**

| | |
|---|---|
| Default 100% | 2 |

**Junction elements for network with outlet: O-1**

| Label | Hydraulic Grade Line In (ft) | Hydraulic Grade Line Out (ft) | Gravity Element Headloss (ft) | Headloss Method | System Additional Flow (cfs) | System Known Flow (cfs) | System Rational Flow (cfs) | System Intensity (in/hr) | System Flow Time (min) | System CA (acres) |
|---|---|---|---|---|---|---|---|---|---|---|
| DP-Z | 5,841.13 | 5,840.07 | 1.06 | Standai | 0.00 | 0.00 | 72.94 | 8.64 | 6.22 | 8.38 |
| MH | 5,842.25 | 5,841.42 | 0.83 | Standai | 0.00 | 0.00 | 73.34 | 8.68 | 6.09 | 8.38 |

**Inlet elements for network with outlet: O-1**

| Label | Inlet | Total System Flow (cfs) | Total Intercepted Flow (cfs) | Total Bypassed Flow (cfs) | Bypass Target | Capture Efficiency (%) | Hydraulic Grade Line In (ft) | Hydraulic Grade Line Out (ft) | Gravity Element Headloss (ft) | Headloss Method |
|---|---|---|---|---|---|---|---|---|---|---|
| East WQP | Generic Default 1 | 32.00 | 32.00 | 0.00 | N/A | 100.0 | 5,844.85 | 5,844.85 | 0.00 | Absolut |
| West WQP | Generic Default 1 | 44.27 | 44.27 | 0.00 | N/A | 100.0 | 5,842.28 | 5,842.28 | 0.00 | Absolut |

# Analysis Results
## Scenario: 100-year

**Outlet: O-1**

| Label | Hydraulic Grade Line In (ft) | Hydraulic Grade Line Out (ft) | Gravity Element Headloss (ft) | System Additional Flow (cfs) | System Known Flow (cfs) | System Rational Flow (cfs) | System Intensity (in/hr) | System Flow Time (min) | System CA (acres) |
|---|---|---|---|---|---|---|---|---|---|
| O-1 | 3,836.40 | 3,836.40 | 0.00 | 0.00 | 0.00 | 72.41 | 8.57 | 6.40 | 8.38 |

**Pipe elements for network with outlet: O-1**

| Label | Section Shape | Section Size | Length (ft) | Number of Sections | Constructed Slope (ft/ft) | Energy Slope (ft/ft) | Total System Flow (cfs) | Average Velocity (ft/s) | Upstream Invert Elevation (ft) | Downstream Invert Elevation (ft) | Hydraulic Grade Line In (ft) | Hydraulic Grade Line Out (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P-4 | Circular | 30 inch | 26.11 | 1 | 0.008 | 0.006 | 32.00 | 6.52 | 3,842.25 | 6,839.05 | 3,844.85 | 3,842.25 |
| P-5 | Circular | 36 inch | 5.58 | 1 | 0.047 | 0.004 | 44.27 | 6.26 | 3,839.11 | 6,838.85 | 3,842.28 | 3,842.25 |
| P-8 | Circular | 42 inch | 60.40 | 1 | 0.011 | 0.005 | 73.34 | 7.67 | 3,838.05 | 6,837.39 | 3,841.42 | 3,841.13 |
| P-9 | Circular | 42 inch | 07.18 | 1 | 0.009 | 0.008 | 72.94 | 10.03 | 3,837.39 | 6,836.40 | 3,840.07 | 3,838.71 |

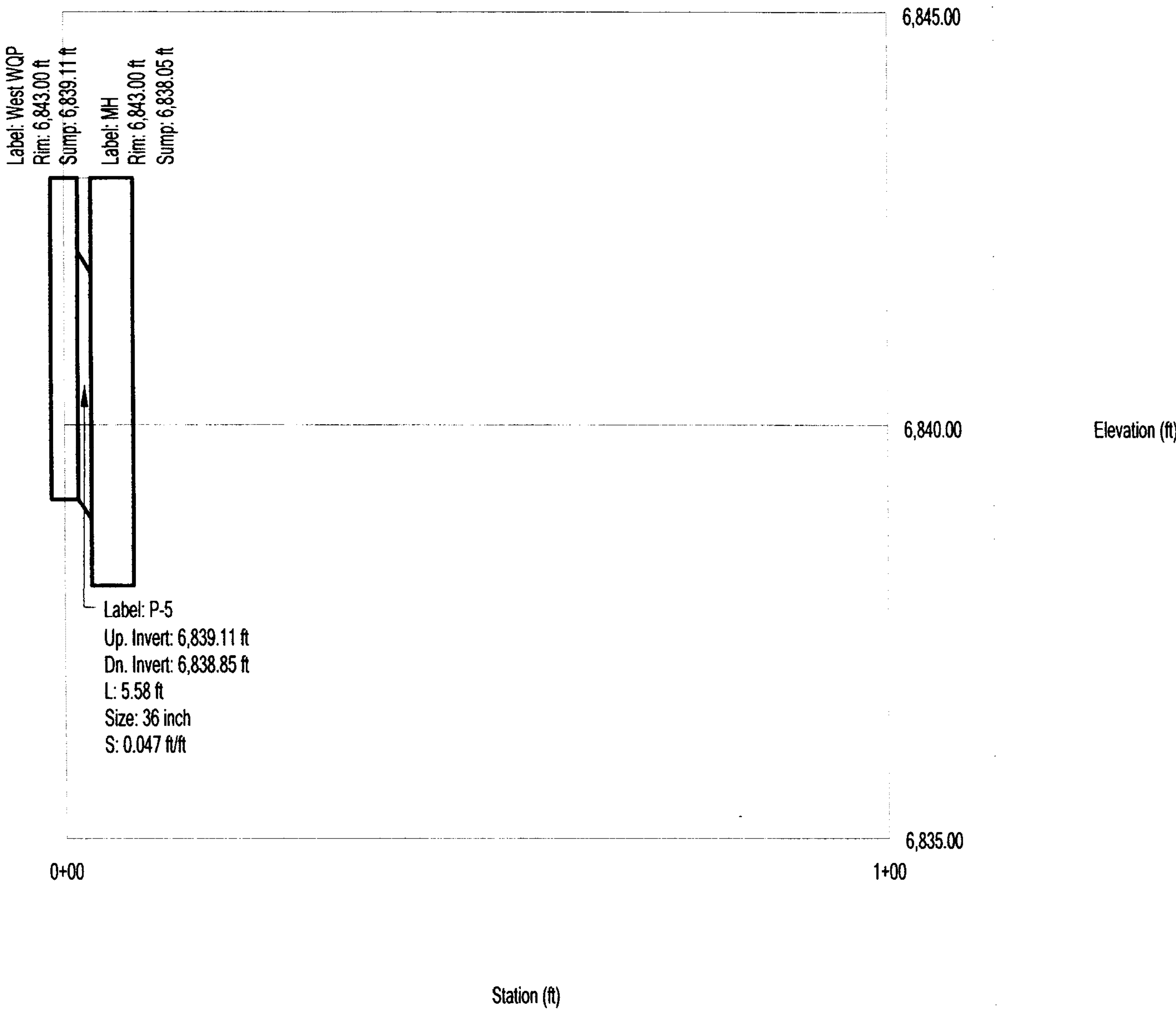
## Scenario: 100-year

# Combined Pipe\Node Report

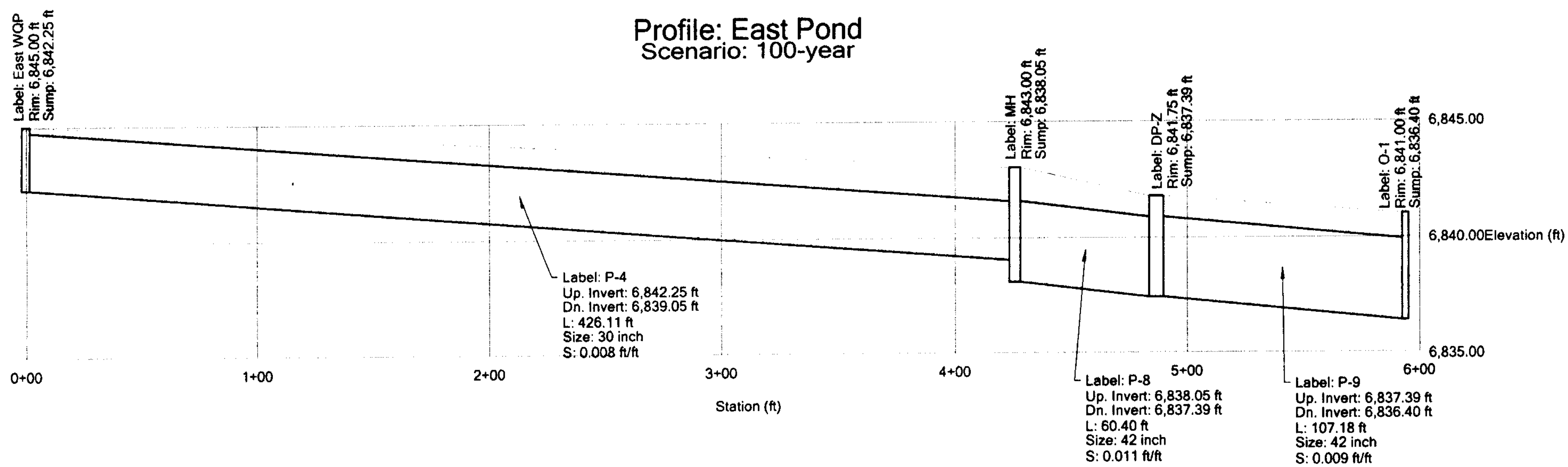
| Label | Up. Node | Dn. Node | L (ft) | Up. Inlet Area (acres) | Up. Inlet Rat. Coef. | Up. Inlet Area (acres) | Up. Calc. Sys. CA (acres) | Up.Inlet Rat. Q (cfs) | Size | Q Full (cfs) | Avg. v (ft/s) | Up. Gr Elev. (ft) | HGL In (ft) | Up. Invert (ft) | Dn. Gr. Elev. (ft) | HGL Out (ft) | Dn. Invert (ft) | S (ft/ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P-4 | East WQF | MH | 426.11 | 3.50 | 1.00 | 3.50 | 3.50 | 32.00 | 30 inch | 35.54 | 6.52 | 6,845.00 | 6,844.85 | 6,842.25 | 6,843.00 | 6,842.25 | 6,839.05 | 0.008 |
| P-5 | West WQI | MH | 5.58 | 4.88 | 1.00 | 4.88 | 4.88 | 44.27 | 36 inch | 143.97 | 6.26 | 6,843.00 | 6,842.28 | 6,839.11 | 6,843.00 | 6,842.25 | 6,838.85 | 0.047 |
| P-8 | MH | DP-Z | 60.40 | N/A | N/A | N/A | 8.38 | N/A | 42 inch | 105.16 | 7.67 | 6,843.00 | 6,841.42 | 6,838.05 | 6,841.75 | 6,841.13 | 6,837.39 | 0.011 |
| P-9 | DP-Z | O-1 | 107.18 | N/A | N/A | N/A | 8.38 | N/A | 42 inch | 96.69 | 10.03 | 6,841.75 | 6,840.07 | 6,837.39 | 6,841.00 | 6,838.71 | 6,836.40 | 0.009 |

# Profile: West Pond

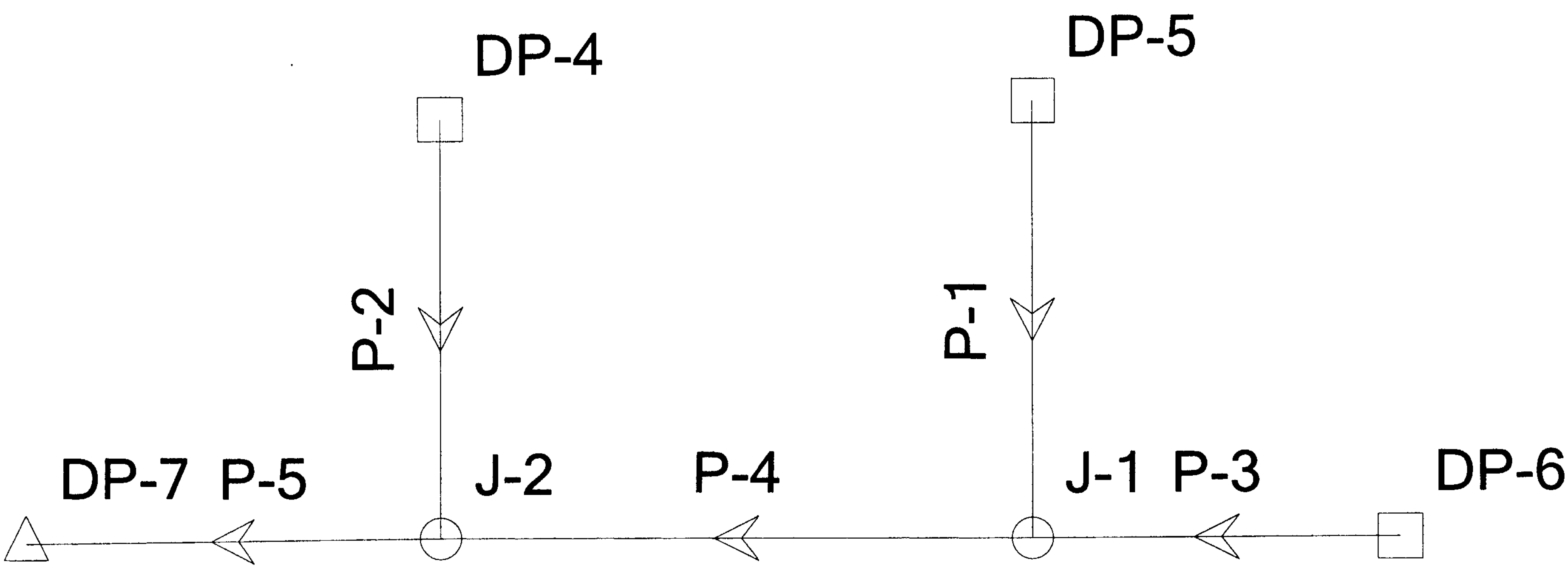
## Scenario: 100-year



# Profile
## Scenario: 100-year



**Scenario: 100-year**



# Analysis Results
# Scenario: 100-year

Title: Meridian Crossing
Project Engineer: Charlene Sammons
Project Date: 01/31/05
Comments: Analysis of existing storm system downstream of Meridian Crossing Project in Falcon, CO

| Scenario Summary | |
|---|---|
| Scenario | 100-year |
| Physical Properties Alternat | Base-Physical Properties |
| Catchments Alternative | Catchments-100-year |
| System Flows Alternative | Base-System Flows |
| Structure Headlosses Alterr | Base-Structure Headlosses |
| Boundary Conditions Altern | Base-Boundary Conditions |
| Design Constraints Alternat | Base-Design Constraints |
| Capital Cost Alternative | Base-Cost |
| User Data Alternative | Base-User Data |

| Network Inventory | | | |
|---|---|---|---|
| Number of Pipes | 5 | Number of Inlets | 3 |
| - Circular Pipes: | 2 | - Grate Inlets: | 0 |
| - Box Pipes: | 3 | - Curb Inlets: | 2 |
| - Arch Pipes: | 0 | - Combination Inlets: | 0 |
| - Vertical Elliptical Pipes: | 0 | - Slot Inlets: | 0 |
| - Horizontal Elliptical Pipes: | 0 | - Grate Inlets in Ditch: | 0 |
| Number of Junctions | 2 | - Generic Inlets: | 1 |
| Number of Outlets | 1 | | |

| Circular Pipes Inventory | |
|---|---|
| 24 inch | 185.50 ft |
| Total Length | 185.50 ft |

| Box Pipes Inventory | |
|---|---|
| 6 x 3 ft | 366.02 ft |
| Total Length | 366.02 ft |

| Curb Inlet Inventory | |
|---|---|
| Type R 10' | 2 |

| Generic Inlet Inventory | |
|---|---|
| Default 100% | 1 |

**Inlet elements for network with outlet: DP-7**

| Label | Inlet | Total System Flow (cfs) | Total Intercepted Flow (cfs) | Total Bypassed Flow (cfs) | Bypass Target | Capture Efficiency (%) | Hydraulic Grade Line In (ft) | Hydraulic Grade Line Out (ft) | Gravity Element Headloss (ft) | Headloss Method |
|---|---|---|---|---|---|---|---|---|---|---|
| DP-4 | Curb Type R 10' | 22.05 | 22.05 | 0.00 | N/A | 100.0 | 3,818.78 | 3,818.78 | 0.00 | Absolut |
| DP-5 | Curb Type R 10' | 19.80 | 19.80 | 0.00 | N/A | 100.0 | 3,818.70 | 3,818.70 | 0.00 | Absolut |
| DP-6 | Generic Default 1 | 250.69 | 250.69 | 0.00 | N/A | 100.0 | 3,817.78 | 3,817.78 | 0.00 | Absolut |

# Analysis Results
## Scenario: 100-year

**Outlet: DP-7**

| Label | Hydraulic Grade Line In (ft) | Hydraulic Grade Line Out (ft) | Gravity Element Headloss (ft) | System Additional Flow (cfs) | System Known Flow (cfs) | System Rational Flow (cfs) | System Intensity (in/hr) | System Flow Time (min) | System CA (acres) |
|---|---|---|---|---|---|---|---|---|---|
| DP-7 | 3,814.44 | 3,814.44 | 0.00 | 0.00 | 0.00 | 273.30 | 5.21 | 22.65 | 52.02 |

**Junction elements for network with outlet: DP-7**

| Label | Hydraulic Grade Line In (ft) | Hydraulic Grade Line Out (ft) | Gravity Element Headloss (ft) | Headloss Method | System Additional Flow (cfs) | System Known Flow (cfs) | System Rational Flow (cfs) | System Intensity (in/hr) | System Flow Time (min) | System CA (acres) |
|---|---|---|---|---|---|---|---|---|---|---|
| J-1 | 3,817.71 | 3,817.71 | 0.00 | Absolut | 0.00 | 0.00 | 262.00 | 5.25 | 22.36 | 49.53 |
| J-2 | 3,817.08 | 3,817.08 | 0.00 | Absolut | 0.00 | 0.00 | 273.54 | 5.22 | 22.61 | 52.02 |

**Pipe elements for network with outlet: DP-7**

| Label | Section Shape | Section Size | Length (ft) | Number of Sections | Constructed Slope (ft/ft) | Energy Slope (ft/ft) | Total System Flow (cfs) | Average Velocity (ft/s) | Upstream Invert Elevation (ft) | Downstream Invert Elevation (ft) | Hydraulic Grade Line In (ft) | Hydraulic Grade Line Out (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P-1 | Circular | 24 inch | 94.00 | 1 | 0.009043 | 008925 | 19.80 | 7.56 | 3,817.10 | 6,816.25 | 3,818.70 | 3,817.76 |
| P-2 | Circular | 24 inch | 91.50 | 1 | 0.016940 | 014085 | 22.05 | 8.96 | 3,817.10 | 6,815.55 | 3,818.78 | 3,816.86 |
| P-3 | Box | 6 x 3 ft | 28.85 | 2 | 0.005199 | 005093 | :50.69 | 8.63 | 3,815.40 | 6,815.25 | 3,817.78 | 3,817.71 |
| P-4 | Box | 6 x 3 ft | 33.50 | 2 | 0.005243 | 005221 | :62.00 | 8.76 | 3,815.25 | 6,814.55 | 3,817.71 | 3,817.08 |
| P-5 | Box | 6 x 3 ft | 20.66 | 2 | 0.005324 | 004607 | :73.54 | 9.31 | 3,814.55 | 6,814.44 | 3,817.08 | 3,816.82 |

## Scenario: 100-year

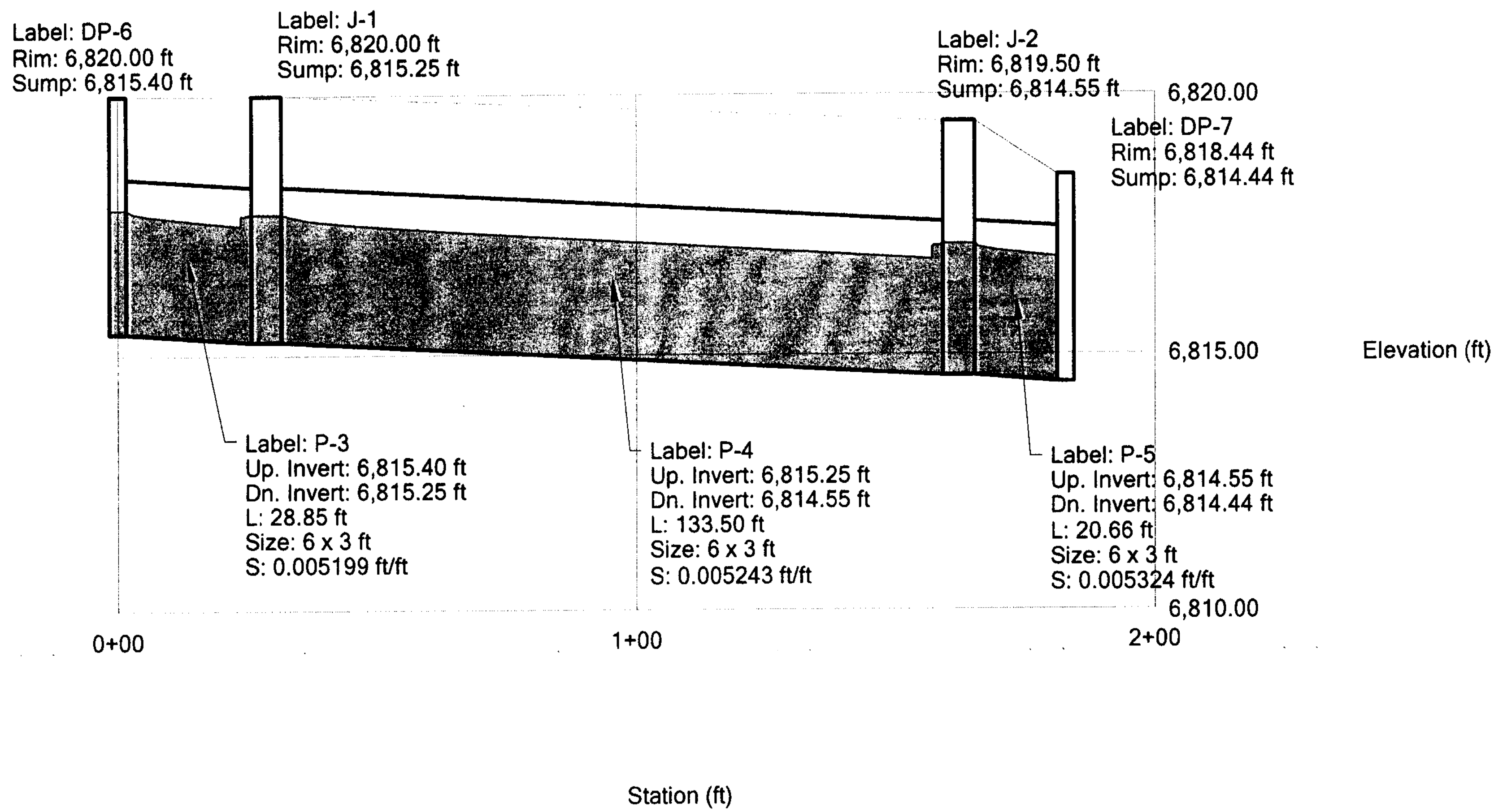
# Combined Pipe\Node Report

| Label | Up. Node | Dn. Node | L (ft) | Up. Inlet Area (acres) | Up. Inlet Rat. Coef. | Up. Inlet Area (acres) | Up. Calc. Sys. CA (acres) | Up.Inlet Rat. Q (cfs) | Size | Q Full (cfs) | Avg. v (ft/s) | Up. Gr Elev. (ft) | HGL In (ft) | Up. Invert (ft) | Dn. Gr. Elev. (ft) | HGL Out (ft) | Dn. Invert (ft) | S (ft/ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P-2 | DP-4 | J-2 | 91.50 | 2.49 | 1.00 | 2.49 | 2.49 | 22.05 | 24 inch | 29.44 | 8.96 | 6,821.16 | 6,818.78 | 6,817.10 | 6,819.50 | 6,816.86 | 6,815.55 | ).016940 |
| P-1 | DP-5 | J-1 | 94.00 | 2.20 | 1.00 | 2.20 | 2.20 | 19.80 | 24 inch | 21.51 | 7.56 | 6,821.16 | 6,818.70 | 6,817.10 | 6,820.00 | 6,817.76 | 6,816.25 | ).009043 |
| P-3 | DP-6 | J-1 | 28.85 | 47.33 | 1.00 | 47.33 | 47.33 | 250.69 | 6 x 3 ft | 296.71 | 8.63 | 6,820.00 | 6,817.78 | 6,815.40 | 6,820.00 | 6,817.71 | 6,815.25 | ).005199 |
| P-4 | J-1 | J-2 | 133.50 | N/A | N/A | N/A | 49.53 | N/A | 6 x 3 ft | 297.96 | 8.76 | 6,820.00 | 6,817.71 | 6,815.25 | 6,819.50 | 6,817.08 | 6,814.55 | ).005243 |
| P-5 | J-2 | DP-7 | 20.66 | N/A | N/A | N/A | 52.02 | N/A | 6 x 3 ft | 300.25 | 9.31 | 6,819.50 | 6,817.08 | 6,814.55 | 6,818.44 | 6,816.82 | 6,814.44 | ).005324 |

**Profile**
**Scenario: 100-year**

# Profile: RCB @ Highway 24

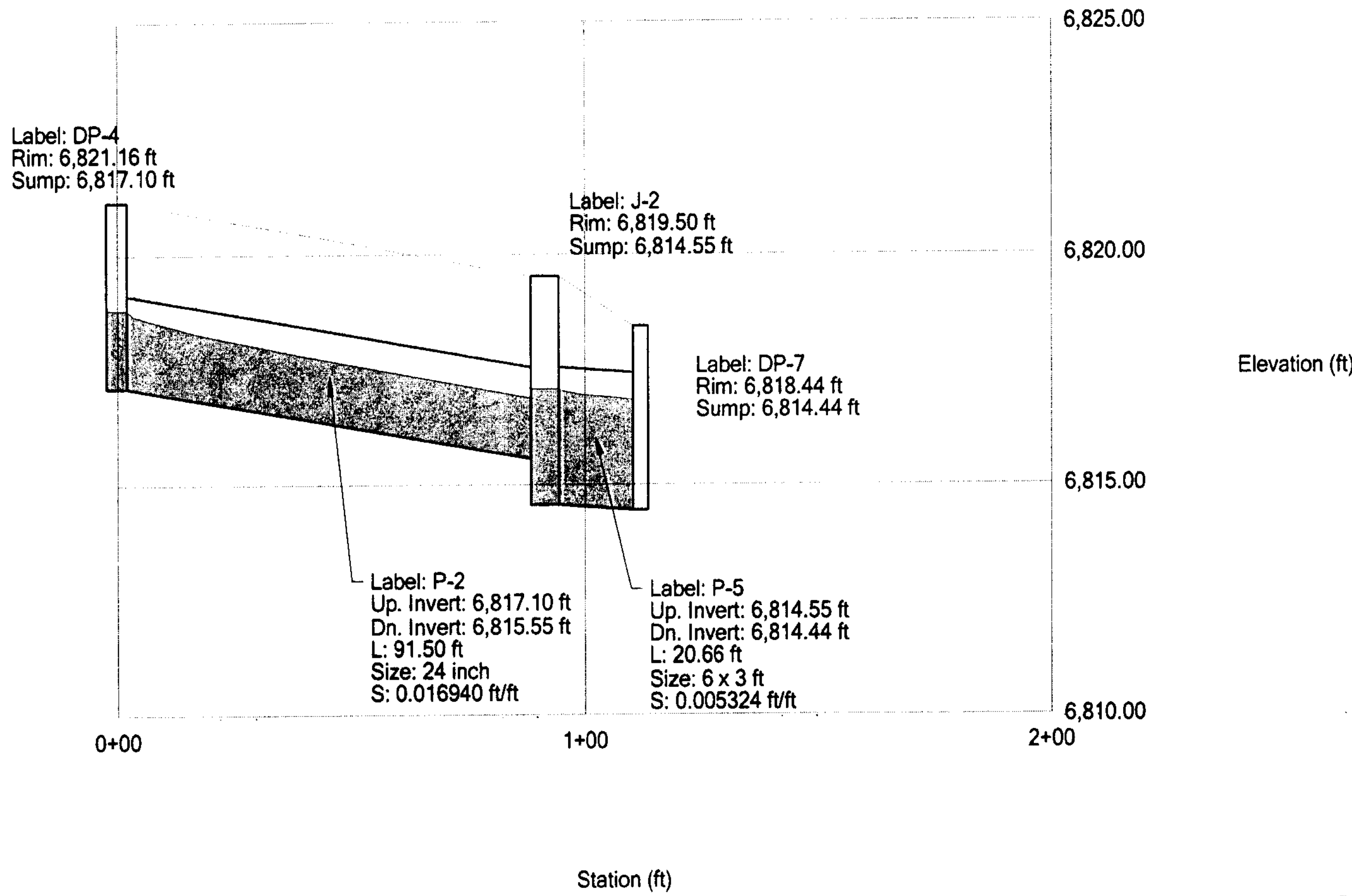
Scenario: 100-year



**Profile**
**Scenario: 100-year**

# Profile: Sump Inlet Left

Scenario: 100-year

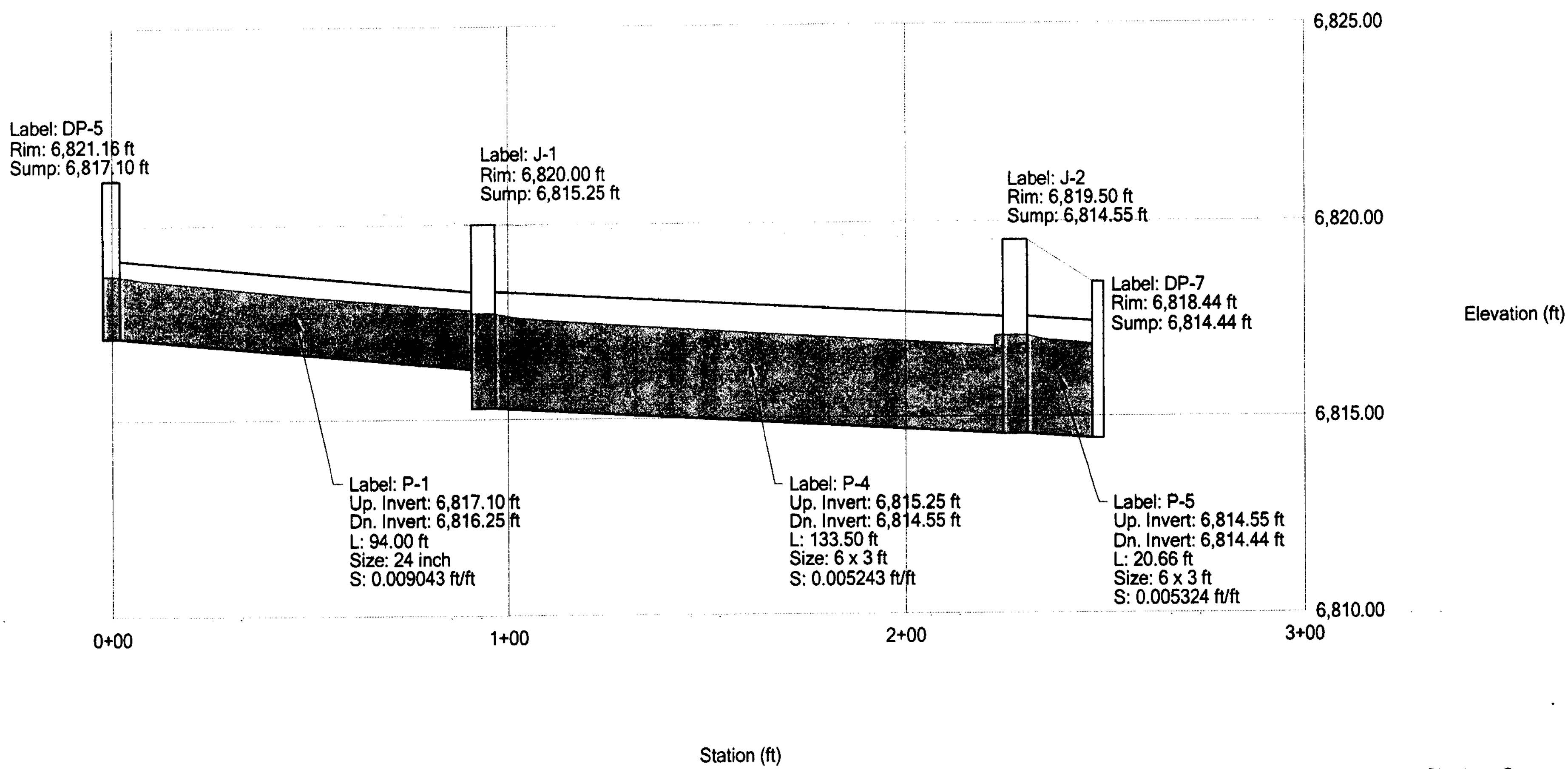


**Profile**

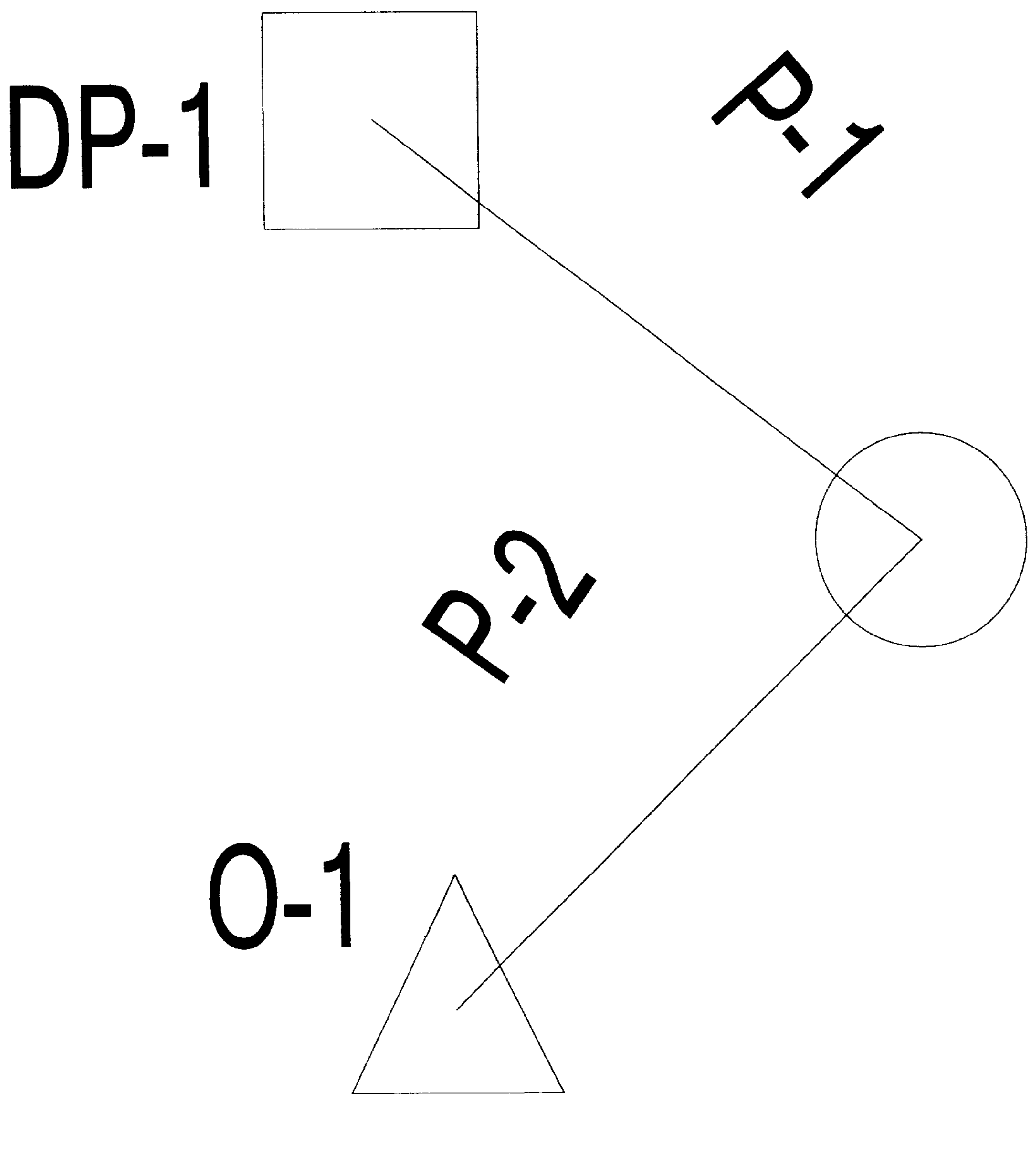
**Scenario: 100-year**

# Profile: Sump Inlet Right

Scenario: 100-year



## Scenario: 100-year



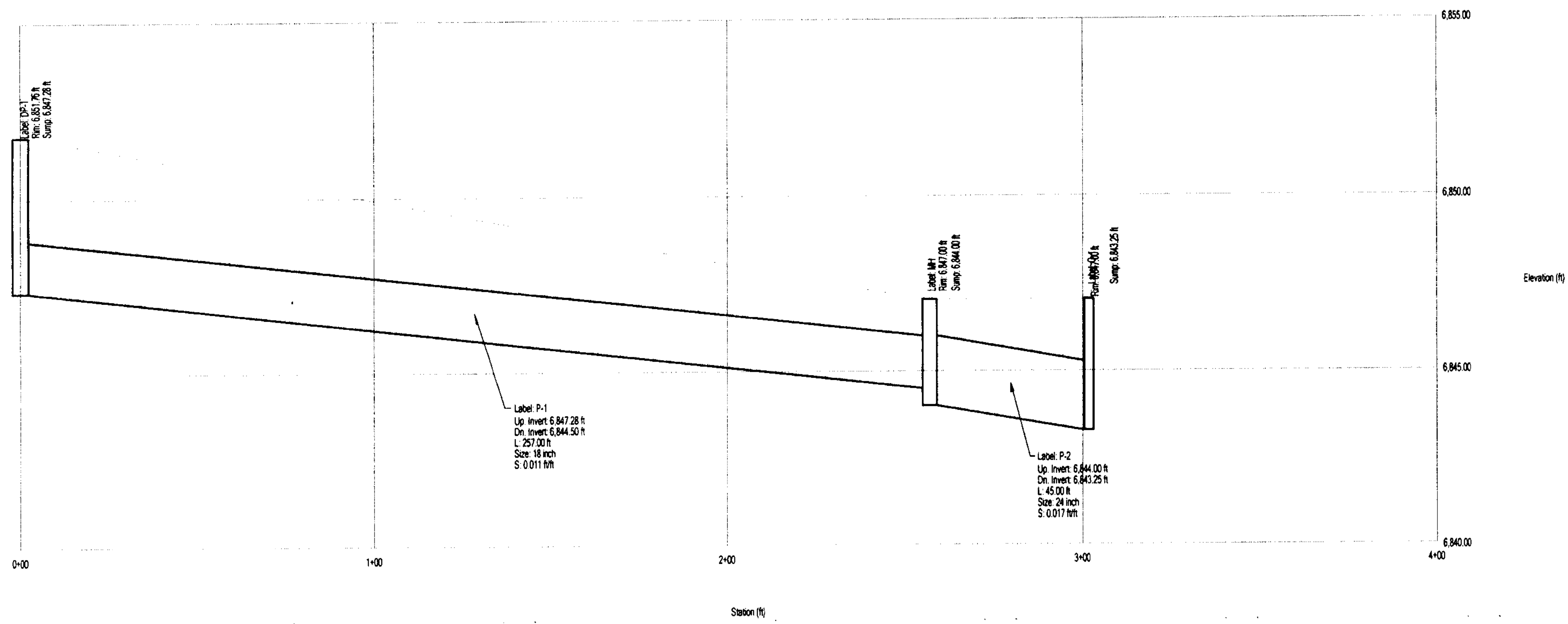
# Analysis Results
## Scenario: 100-year

| Outlet: O-1 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Label | Hydraulic Grade Line In (ft) | Hydraulic Grade Line Out (ft) | Gravity Element Headloss (ft) | System Additional Flow (cfs) | System Known Flow (cfs) | System Rational Flow (cfs) | System Intensity (in/hr) | System Flow Time (min) | System CA (acres) |
| O-1 | 6,843.25 | 6,843.25 | 0.00 | 0.00 | 0.00 | 7.35 | 8.28 | 7.22 | 0.88 |

| Pipe elements for network with outlet: O-1 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Label | Section Shape | Section Size | Length (ft) | Number of Sections | Constructed Slope (ft/ft) | Energy Slope (ft/ft) | Total System Flow (cfs) | Average Velocity (ft/s) | Upstream Invert Elevation (ft) | Downstream Invert Elevation (ft) | Hydraulic Grade Line In (ft) | Hydraulic Grade Line Out (ft) |
| P-1 | Circular | 18 inch | 57.00 | 1 | 0.011 | 0.011 | 7.61 | 6.16 | 6,847.28 | 6,844.50 | 6,848.35 | 6,845.42 |
| P-2 | Circular | 24 inch | 45.00 | 1 | 0.017 | 0.012 | 7.39 | 6.17 | 6,844.00 | 6,843.25 | 6,844.97 | 6,843.96 |

# Profile
## Scenario: 100-year

### Profile: Ultimate Design
Scenario: 100-year



# Existing Channel along Highway 24 ROW

Channel Calculator

Given Input Data:

| | |
|---|---|
| Shape .......................... | Trapezoidal |
| Solving for .................... | Depth of Flow |
| Flowrate ....................... | 65.1000 cfs |
| Slope .......................... | 0.0090 ft/ft |
| Manning's n .................... | 0.0350 |
| Height ......................... | 36.0000 in |
| Bottom width ................... | 480.0000 in |
| Left slope ..................... | 0.2500 ft/ft (V/H) |
| Right slope .................... | 0.2500 ft/ft (V/H) |

Computed Results:

| | |
|---|---|
| Depth .......................... | 6.8903 in |
| Velocity ....................... | 2.6805 fps |
| Full Flowrate .................. | 1129.3728 cfs |
| Flow area ...................... | 24.2864 ft2 |
| Flow perimeter ................. | 536.8189 in |
| Hydraulic radius ............... | 6.5148 in |
| Top width ...................... | 535.1224 in |
| Area ........................... | 156.0000 ft2 |
| Perimeter ...................... | 776.8636 in |
| Percent full ................... | 19.1397 % |

Critical Information

| | |
|---|---|
| Critical depth ................. | 5.1448 in |
| Critical slope ................. | 0.0241 ft/ft |
| Critical velocity .............. | 3.6400 fps |
| Critical area .................. | 17.8847 ft2 |
| Critical perimeter ............. | 522.4254 in |
| Critical hydraulic radius ...... | 4.9297 in |
| Critical top width ............. | 521.1587 in |
| Specific energy ................ | 0.6859 ft |
| Minimum energy ................. | 0.6431 ft |
| Froude number .................. | 0.6404 |
| Flow condition ................. | Subcritical |

## Existing Temporary Channel along Meridian Road (DP-E)

Channel Calculator

Given Input Data:

| | |
|---|---|
| Shape | Trapezoidal |
| Solving for | Depth of Flow |
| Flowrate | 88.2000 cfs |
| Slope | 0.0200 ft/ft |
| Manning's n | 0.0350 |
| Height | 36.0000 in |
| Bottom width | 0.0000 in |
| Left slope | 0.2500 ft/ft (V/H) |
| Right slope | 0.1667 ft/ft (V/H) |

Computed Results:

| | |
|---|---|
| Depth | 21.4874 in |
| Velocity | 5.5023 fps |
| Full Flowrate | 349.2362 cfs |
| Flow area | 16.0296 ft2 |
| Flow perimeter | 219.2720 in |
| Hydraulic radius | 10.5269 in |
| Top width | 214.8480 in |
| Area | 44.9946 ft2 |
| Perimeter | 367.3687 in |
| Percent full | 59.6872 % |

Critical Information

| | |
|---|---|
| Critical depth | 21.7023 in |
| Critical slope | 0.0190 ft/ft |
| Critical velocity | 5.3939 fps |
| Critical area | 16.3519 ft2 |
| Critical perimeter | 221.4655 in |
| Critical hydraulic radius | 10.6322 in |
| Critical top width | 216.9973 in |
| Specific energy | 2.2611 ft |
| Minimum energy | 2.7128 ft |
| Froude number | 1.0252 |
| Flow condition | Supercritical |

# Proposed Temporary Channel from Old Meridian Road (DP-Z)

Channel Calculator

Given Input Data:

| | |
|---|---|
| Shape .......................... | Trapezoidal |
| Solving for .................... | Depth of Flow |
| Flowrate ....................... | 73.3000 cfs |
| Slope .......................... | 0.0050 ft/ft |
| Manning's n .................... | 0.0350 |
| Height ......................... | 36.0000 in |
| Bottom width ................... | 60.0000 in |
| Left slope ..................... | 0.2500 ft/ft (V/H) |
| Right slope .................... | 0.2500 ft/ft (V/H) |

Computed Results:

| | |
|---|---|
| Depth .......................... | 21.9888 in |
| Velocity ....................... | 3.2444 fps |
| Full Flowrate .................. | 219.3674 cfs |
| Flow area ...................... | 22.5927 ft2 |
| Flow perimeter ................. | 241.3242 in |
| Hydraulic radius ............... | 13.4813 in |
| Top width ...................... | 235.9103 in |
| Area ........................... | 51.0000 ft2 |
| Perimeter ...................... | 356.8636 in |
| Percent full ................... | 61.0800 % |

Critical Information

| | |
|---|---|
| Critical depth ................. | 16.0014 in |
| Critical slope ................. | 0.0192 ft/ft |
| Critical velocity .............. | 5.3195 fps |
| Critical area .................. | 13.7795 ft2 |
| Critical perimeter ............. | 191.9505 in |
| Critical hydraulic radius ....... | 10.3373 in |
| Critical top width ............. | 188.0108 in |
| Specific energy ................ | 1.9960 ft |
| Minimum energy ................. | 2.0002 ft |
| Froude number .................. | 0.5336 |
| Flow condition ................. | Subcritical |

# Culvert Designer/Analyzer Report
## Highway 24 - DP WU

| Analysis Component | | | |
|---|---|---|---|
| Storm Event | Check | Discharge | 1,241.00 cfs |

| Peak Discharge Method: User-Specified | | | |
|---|---|---|---|
| Design Discharge | 1,241.00 cfs | Check Discharge | 1,241.00 cfs |

Tailwater properties: Trapezoidal Channel

| Tailwater conditions for Check Storm. | | | |
|---|---|---|---|
| Discharge | 1,241.00 cfs | Bottom Elevation | 6,813.00 ft |
| Depth | 3.82 ft | Velocity | 7.78 ft/s |

| Name | Description | Discharge | HW Elev. | Velocity |
|---|---|---|---|---|
| Culvert-1 | 3-12 x 6 ft Box | 1,240.93 cfs | 6,818.87 ft | 8.71 ft/s |
| Weir | Roadway (Constant Elevation) | 0.00 cfs | 6,818.87 ft | N/A |
| Total | --------------- | 1,240.93 cfs | 6,818.87 ft | N/A |

# Culvert Designer/Analyzer Report
# Highway 24 - DP WU

Component:Culvert-1

| Culvert Summary | | | |
|---|---|---|---|
| Computed Headwater Elev: | 6,818.87 ft | Discharge | 1,240.93 cfs |
| Inlet Control HW Elev. | 6,818.37 ft | Tailwater Elevation | 6,816.82 ft |
| Outlet Control HW Elev. | 6,818.87 ft | Control Type | Outlet Control |
| Headwater Depth/Height | 0.96 | | |

| Grades | | | |
|---|---|---|---|
| Upstream Invert | 6,813.10 ft | Downstream Invert | 6,812.87 ft |
| Length | 47.00 ft | Constructed Slope | 0.005000 ft/ft |

| Hydraulic Profile | | | |
|---|---|---|---|
| Profile | S1 | Depth, Downstream | 3.96 ft |
| Slope Type | Steep | Normal Depth | 2.78 ft |
| Flow Regime | Subcritical | Critical Depth | 3.33 ft |
| Velocity Downstream | 8.71 ft/s | Critical Slope | 0.002971 ft/ft |

| Section | | | |
|---|---|---|---|
| Section Shape | Box | Mannings Coefficient | 0.013 |
| Section Material | Concrete | Span | 12.00 ft |
| Section Size | 12 x 6 ft | Rise | 6.00 ft |
| Number Sections | 3 | | |

| Outlet Control Properties | | | |
|---|---|---|---|
| Outlet Control HW Elev. | 6,818.87 ft | Upstream Velocity Head | 1.54 ft |
| Ke | 0.50 | Entrance Loss | 0.77 ft |

| Inlet Control Properties | | | |
|---|---|---|---|
| Inlet Control HW Elev. | 6,818.37 ft | Flow Control | N/A |
| Inlet Type | 45° wingwall flares - offset | Area Full | 216.0 ft2 |
| K | 0.49700 | HDS 5 Chart | 13 |
| M | 0.66700 | HDS 5 Scale | 1 |
| C | 0.03020 | Equation Form | 2 |
| Y | 0.83500 | | |

# Culvert Designer/Analyzer Report
# McLaughlin Bridge

Component:Culvert-1

| Culvert Summary | | | |
|---|---|---|---|
| Computed Headwater Eleva | 104.17 ft | Discharge | 623.40 cfs |
| Inlet Control HW Elev. | 104.17 ft | Tailwater Elevation | N/A ft |
| Outlet Control HW Elev. | 103.98 ft | Control Type | Inlet Control |
| Headwater Depth/Height | 1.39 | | |

| Grades | | | |
|---|---|---|---|
| Upstream Invert | 100.00 ft | Downstream Invert | 100.00 ft |
| Length | 50.00 ft | Constructed Slope | 0.010000 ft/ft |

| Hydraulic Profile | | | |
|---|---|---|---|
| Profile | S2 | Depth, Downstream | 1.99 ft |
| Slope Type | Steep | Normal Depth | 1.76 ft |
| Flow Regime | Supercritical | Critical Depth | 2.49 ft |
| Velocity Downstream | 11.21 ft/s | Critical Slope | 0.003719 ft/ft |

| Section | | | |
|---|---|---|---|
| Section Shape | Box | Mannings Coefficient | 0.013 |
| Section Material | Concrete | Span | 7.00 ft |
| Section Size | 7 x 3 ft | Rise | 3.00 ft |
| Number Sections | 4 | | |

| Outlet Control Properties | | | |
|---|---|---|---|
| Outlet Control HW Elev. | 103.98 ft | Upstream Velocity Head | 1.24 ft |
| Ke | 0.20 | Entrance Loss | 0.25 ft |

| Inlet Control Properties | | | |
|---|---|---|---|
| Inlet Control HW Elev. | 104.17 ft | Flow Control | N/A |
| Inlet Type | 90° headwall w 45° bevels | Area Full | 84.0 ft2 |
| K | 0.49500 | HDS 5 Chart | 10 |
| M | 0.66700 | HDS 5 Scale | 2 |
| C | 0.03140 | Equation Form | 2 |
| Y | 0.82000 | | |

# Culvert Designer/Analyzer Report
## Old Meridian Road - DP Y

| Analysis Component | | | |
|---|---|---|---|
| Storm Event | Check | Discharge | 65.10 cfs |

| Peak Discharge Method: User-Specified | | | |
|---|---|---|---|
| Design Discharge | 34.70 cfs | Check Discharge | 65.10 cfs |

Tailwater properties: Trapezoidal Channel

| Tailwater conditions for Check Storm. | | | |
|---|---|---|---|
| Discharge | 65.10 cfs | Bottom Elevation | 6,813.00 ft |
| Depth | 0.89 ft | Velocity | 3.45 ft/s |

| Name | Description | Discharge | HW Elev. | Velocity |
|---|---|---|---|---|
| Culvert-1 | 1-54 inch Circular | 65.11 cfs | 6,824.75 ft | 9.95 ft/s |
| Weir | Roadway (Constant Elevation) | 0.00 cfs | 6,824.75 ft | N/A |
| Total | -------------- | 65.11 cfs | 6,824.75 ft | N/A |

# Culvert Designer/Analyzer Report
## Old Meridian Road - DP Y

Component:Culvert-1

**Culvert Summary**

| | | | |
|---|---|---|---|
| Computed Headwater Elev: | 6,824.75 ft | Discharge | 65.11 cfs |
| Inlet Control HW Elev. | 6,824.43 ft | Tailwater Elevation | 6,813.89 ft |
| Outlet Control HW Elev. | 6,824.75 ft | Control Type | Entrance Control |
| Headwater Depth/Height | 0.83 | | |

**Grades**

| | | | |
|---|---|---|---|
| Upstream Invert | 6,821.00 ft | Downstream Invert | 6,820.50 ft |
| Length | 50.00 ft | Constructed Slope | 0.010000 ft/ft |

**Hydraulic Profile**

| | | | |
|---|---|---|---|
| Profile | S2 | Depth, Downstream | 1.94 ft |
| Slope Type | Steep | Normal Depth | 1.78 ft |
| Flow Regime | Supercritical | Critical Depth | 2.35 ft |
| Velocity Downstream | 9.95 ft/s | Critical Slope | 0.003794 ft/ft |

**Section**

| | | | |
|---|---|---|---|
| Section Shape | Circular | Mannings Coefficient | 0.013 |
| Section Material | Concrete | Span | 4.50 ft |
| Section Size | 54 inch | Rise | 4.50 ft |
| Number Sections | 1 | | |

**Outlet Control Properties**

| | | | |
|---|---|---|---|
| Outlet Control HW Elev. | 6,824.75 ft | Upstream Velocity Head | 0.93 ft |
| Ke | 0.50 | Entrance Loss | 0.47 ft |

**Inlet Control Properties**

| | | | |
|---|---|---|---|
| Inlet Control HW Elev. | 6,824.43 ft | Flow Control | N/A |
| Inlet Type | Square edge w/headwall | Area Full | 15.9 ft2 |
| K | 0.00980 | HDS 5 Chart | 1 |
| M | 2.00000 | HDS 5 Scale | 1 |
| C | 0.03980 | Equation Form | 1 |
| Y | 0.67000 | | |

# Culvert Designer/Analyzer Report
# Old Meridian Road - DP Y

Component:Weir

| Hydraulic Component(s): Roadway (Constant Elevation) | | | | | |
|---|---|---|---|---|---|
| Discharge | 0.00 | cfs | Allowable HW Elevation | 6,824.75 | ft |
| Roadway Width | 44.00 | ft | Overtopping Coefficient | 2.90 | US |
| Length | 150.00 | ft | Crest Elevation | 6,825.35 | ft |
| Headwater Elevation | N/A | ft | Discharge Coefficient (Cr) | 2.90 | |
| Submergence Factor (Kt) | 1.00 | | | | |

| Sta (ft) | Elev. (ft) |
|---|---|
| 0.00 | 6,825.35 |
| 150.00 | 6,825.35 |

## Culvert Outlet Protection

Meridian Crossing - Final Drainage Report

| Culvert | Diameter | No of Barrels | Slope | Velocity | Riprap Width | Riprap Length | | Riprap Size |
|---|---|---|---|---|---|---|---|---|
| | (in) | | (%) | ft/s | ft | ft | | |
| DP-Y | 54 | 1 | 1.20% | 10.5 | 13.5 | 21.5 | 3.78 | L |
| DP-Z | 42 | 1 | 0.90% | 10.0 | 10.5 | 18.5 | 3.44 | L |

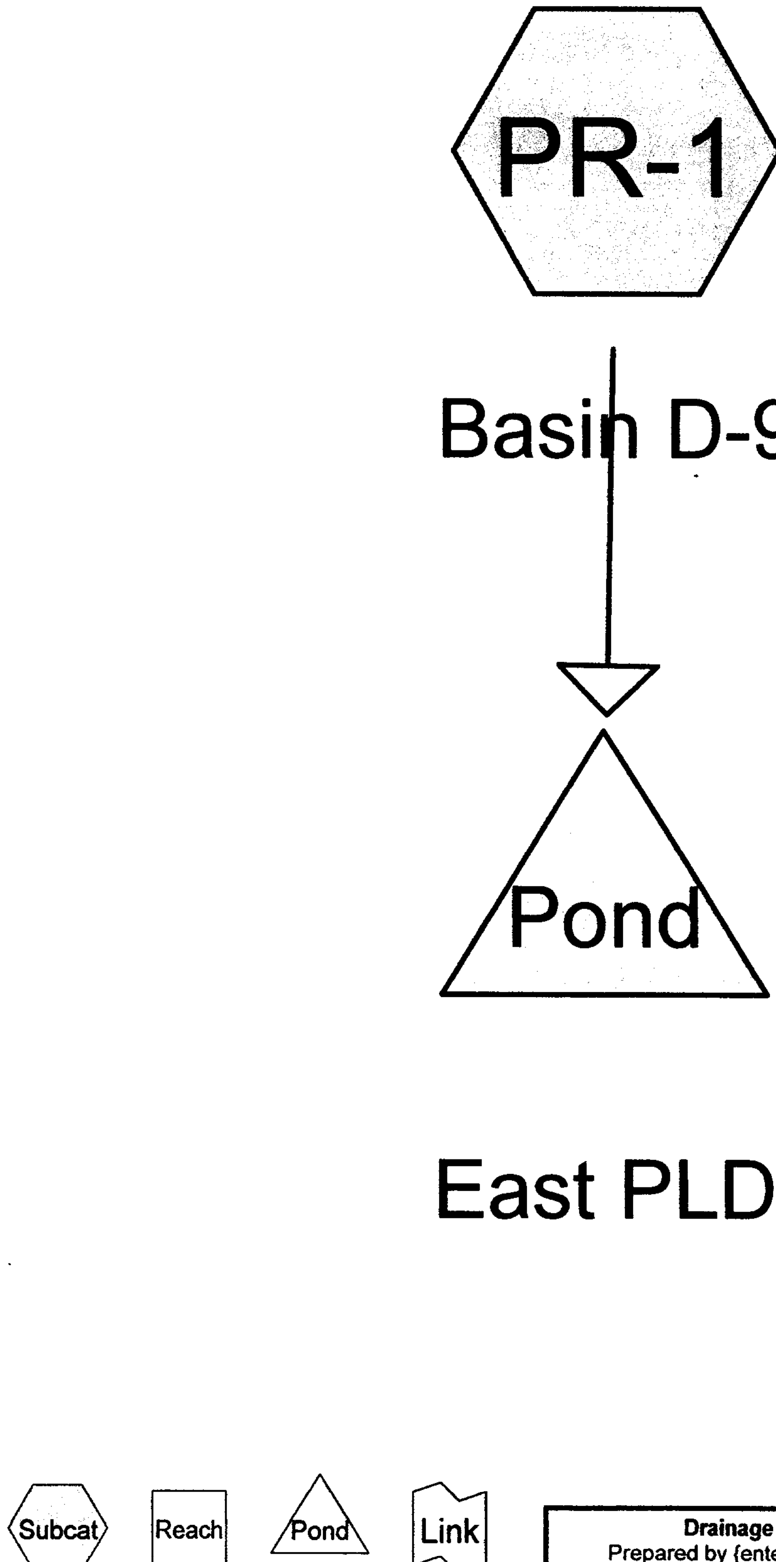
# Appendix G: Water Quality Pond Calculations

## Design Procedure Form: Porous Landscape Detention (PLD)

| | |
|---|---|
| **Designer:** | **Thomas Roberts** |
| **Company:** | **Springs Engineering** |
| **Date:** | **July 23, 2008** |
| **Project:** | **Merdian Crossing East Pond** |
| **Location:** | **Falcon, CO** |

| | |
|---|---|
| 1. Basin Storage Volume<br>( $I_a$ = 100% if all paved and roofed areas u/s of PLD)<br>A) Tributary Area's Imperviousness Ratio ($i = I_a / 100$ )<br><br>B) Contributing Watershed Area Including the PLD (Area)<br><br>C) Water Quality Capture Volume (WQCV)<br>($WQCV = 0.8 * (0.91 * I^3 - 1.19 * I^2 + 0.78 * I)$)<br>D) Design Volume: $Vol_{PLD}$ = (WQCV / 12) * Area | $I_a$ = 79.00 %<br>i = 0.79<br><br>Area = 167,616 square feet<br><br>WQCV = 0.26 watershed inches<br><br>Vol = 3,600 cubic feet |
| 2. PLD Surface Area ($A_{PLD}$) and Average Depth ($d_{av}$)<br>(from 3600.24 square feet to 7200.48 square feet)<br><br>($d_{av}$: = (Vol / $A_{PLD}$), Min=0.5', Max=1.0') | $A_{PLD}$ = 3,600 square feet<br><br>$d_{av}$ = 1.00 feet |
| 3. Draining of PLD (Check A, **or** B, **or** C, **answer** D)<br>Based on answers to 3A through 3D, check the appropriate method<br><br>A) Check box if subgrade is heavy or expansive clay [ ]<br>B) Check box if subgrade is silty or clayey sand [ ]<br>C) Check box if subgrade is well-draining soil [X]<br><br>D) Check box if underdrains are not desirable or if underdrains are not feasible at this site. [ ]<br><br>E) Does tributary catchment contain land uses that may have petroleum products, greases, or other chemicals present, such as gas station, hardware store, restaurant, etc.? yes [X] no [ ] | ____ Infiltration to Subgrade with Permeable Membrane: 3(C) checked and 3(E) = no<br><br>____ Underdrain with Impermeable Liner: 3(A) checked or 3(E) = yes<br><br>____ Underdrain with Non-Woven Geotextile Fabric: 3(B) checked and 3(E) = no<br><br>____ 16-Mil. Impermeable Membrane with No Underdrain: 3(D) checked - Evapotranspiration only<br><br>__x__ Other: Type D Inlet |
| 4. Sand/Peat Mix and Gravel Subbase (See Figure PLD-1)<br><br>A) Heavy or Expansive Clay (NRCS Group D Soils) Present; Perforated HDPE Underdrain Used.<br><br>B) Silty or Clayey Sand (NRCS Group C Soils) Present; Perforated HDPE Underdrain Used.<br><br>C) No Potential For Contamination And Well-Draining (NRCS Group A or B Soils) Are Present; Underdrains Elliminated.<br><br>D) Underdrains Are Not Desirable Or Are Not Feasible At This Site.<br><br>E) Other: | ____ 18" Minimum Depth Sand-Peat Mix with 8" Gravel Layer. 16-Mil. Impermeable Liner and a 3" to 4" Perforated HDPE Underdrain.<br><br>____ 18" Minimum Depth Sand-Peat Mix with 8" Gravel Layer and a 3" to 4" Perforated HDPE Underdrain w/ Non-Woven Pemeable Membrane.<br><br>____ 18" Minimum Depth Sand-Peat Mix with Non-Woven Pemeable Membrane and No Underdrain (Direct Infiltration).<br><br>____ 18" Minimum Depth Sand-Peat Mix with An Additional 18" Minimum Layer Sand-Peat Mix or Sand-Class 'A' Compost Bottom Layer (Total Sand-Peat Depth of 36"). 16-Mil. Impermeable Liner Used.<br><br>__x__ Other: See Detail on Sheet 8 |

Notes:




**Drainage Diagram for east pond-PLD Sizing**
Prepared by {enter your company name here} 7/23/2008
HydroCAD® 8.00 s/n 004515 © 2006 HydroCAD Software Solutions LLC

## Pond Pond: East PLD

| | | | | |
|---|---|---|---|---|
| Inflow Area = | 3.680 ac, | Inflow Depth = 0.56" | for 2-Year event | |
| Inflow = | 8.32 cfs @ | 0.09 hrs, Volume= | 0.172 af | |
| Outflow = | 6.50 cfs @ | 0.27 hrs, Volume= | 0.134 af, | Atten= 22%, Lag= 10.7 min |
| Primary = | 6.50 cfs @ | 0.27 hrs, Volume= | 0.134 af | |

Routing by Stor-Ind method, Time Span= 0.00-12.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 6,844.47' @ 0.27 hrs Surf.Area= 3,394 sf Storage= 4,371 cf

Plug-Flow detention time= 12.8 min calculated for 0.134 af (78% of inflow)
Center-of-Mass det. time= 10.8 min ( 20.9 - 10.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 6,843.00' | 9,728 cf | **Custom Stage Data (Pyramidal)** Listed below |

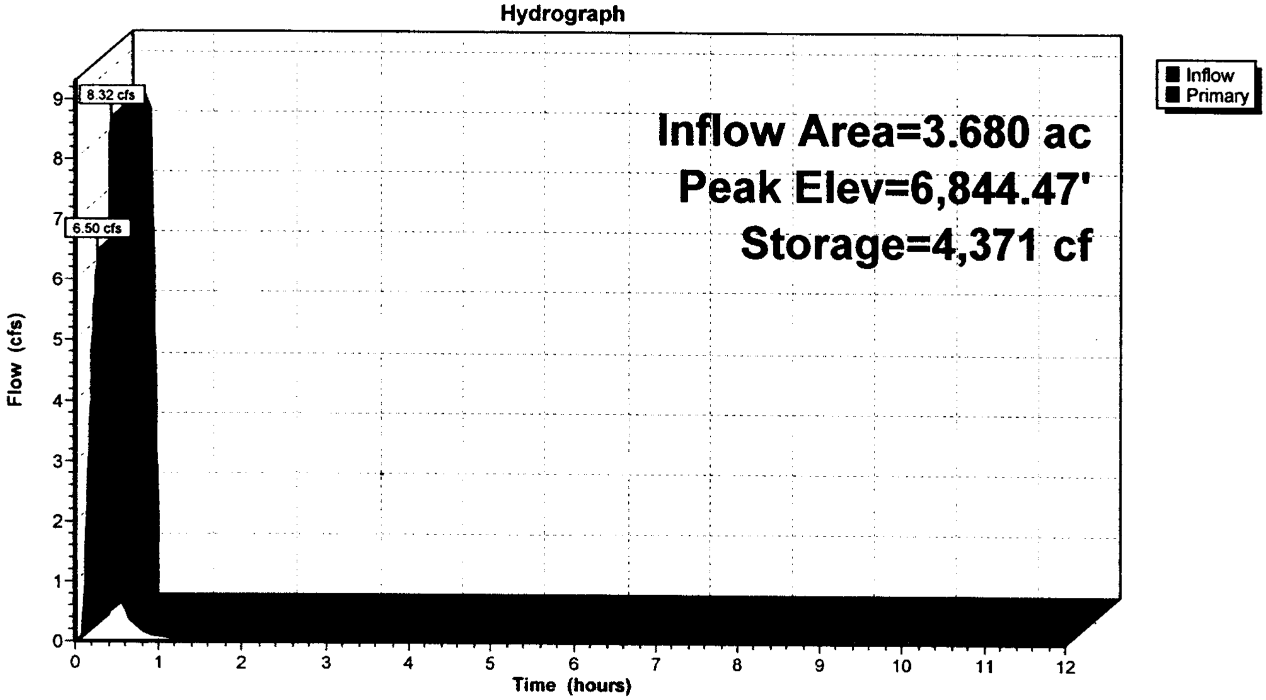
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|
| 6,843.00 | 2,200 | 0 | 0 | 2,200 |
| 6,844.00 | 3,300 | 2,731 | 2,731 | 3,320 |
| 6,846.00 | 3,700 | 6,996 | 9,728 | 3,939 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 6,845.50' | **3.00' x 3.00' Horiz. Orifice/Grate** Limited to weir flow C= 1.000 |
| #2 | Primary | 6,843.60' | **2.50' W x 1.25' H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=6.49 cfs @ 0.27 hrs HW=6,844.47' (Free Discharge)
├─**1=Orifice/Grate** ( Controls 0.00 cfs)
└─**2=Orifice/Grate** (Orifice Controls 6.49 cfs @ 2.99 fps)

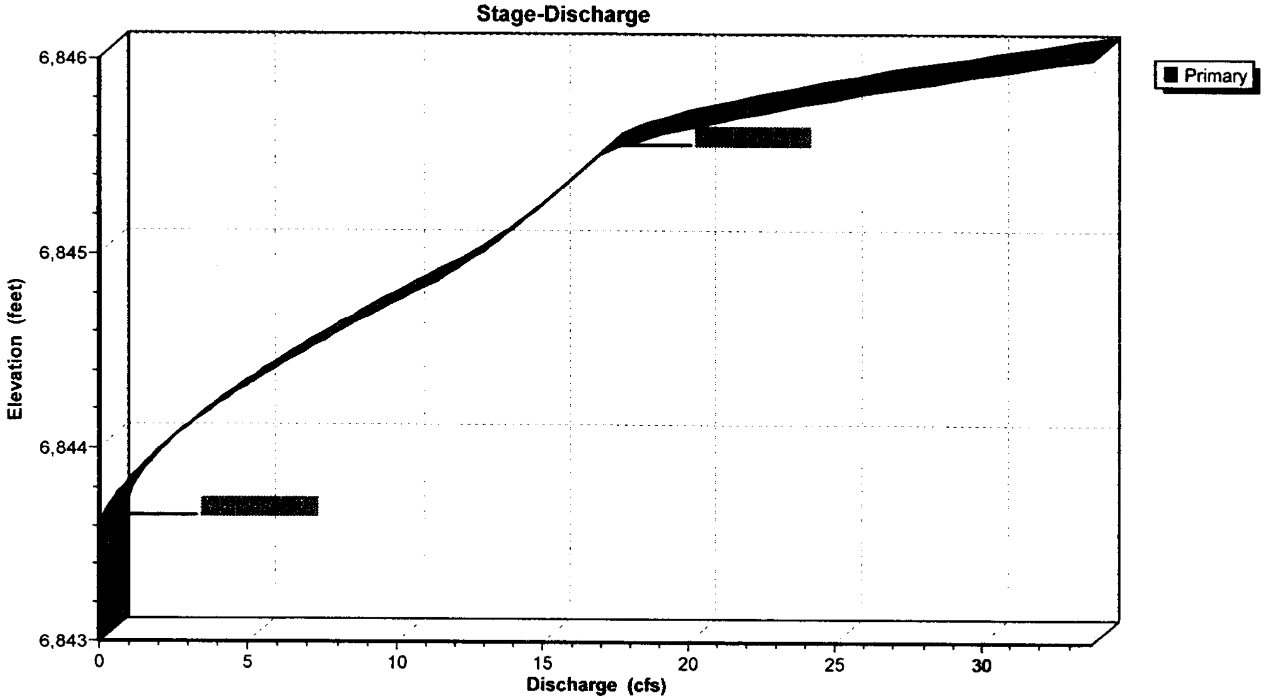
## Pond Pond: East PLD

Hydrograph




## Pond Pond: East PLD

Stage-Discharge



## Pond Pond: East PLD

Inflow Area = 3.680 ac, Inflow Depth = 0.77" for 5-Year event
Inflow = 11.42 cfs @ 0.09 hrs, Volume= 0.236 af
Outflow = 9.65 cfs @ 0.26 hrs, Volume= 0.198 af, Atten= 16%, Lag= 10.4 min
Primary = 9.65 cfs @ 0.26 hrs, Volume= 0.198 af

Routing by Stor-Ind method, Time Span= 0.00-12.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 6,844.73' @ 0.26 hrs Surf.Area= 3,446 sf Storage= 5,288 cf

Plug-Flow detention time= 10.5 min calculated for 0.198 af (84% of inflow)
Center-of-Mass det. time= 9.4 min ( 19.4 - 10.0 )

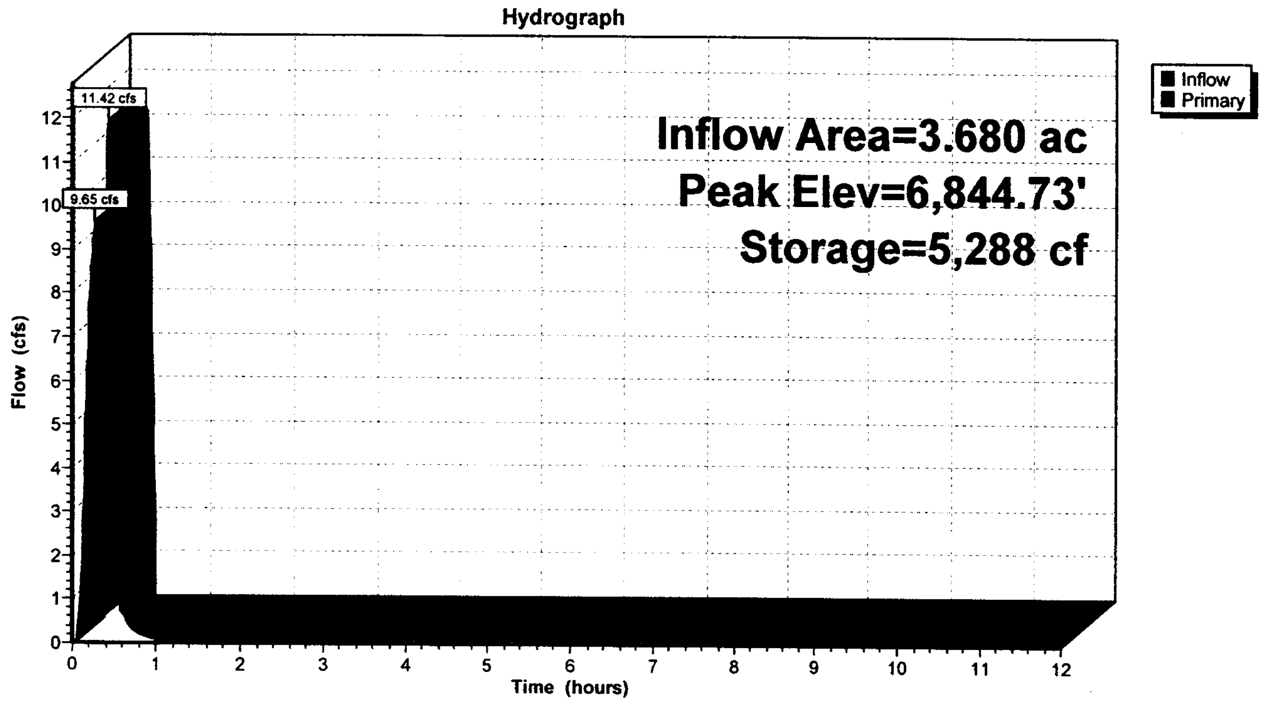
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 6,843.00' | 9,728 cf | **Custom Stage Data (Pyramidal)** Listed below |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|
| 6,843.00 | 2,200 | 0 | 0 | 2,200 |
| 6,844.00 | 3,300 | 2,731 | 2,731 | 3,320 |
| 6,846.00 | 3,700 | 6,996 | 9,728 | 3,939 |

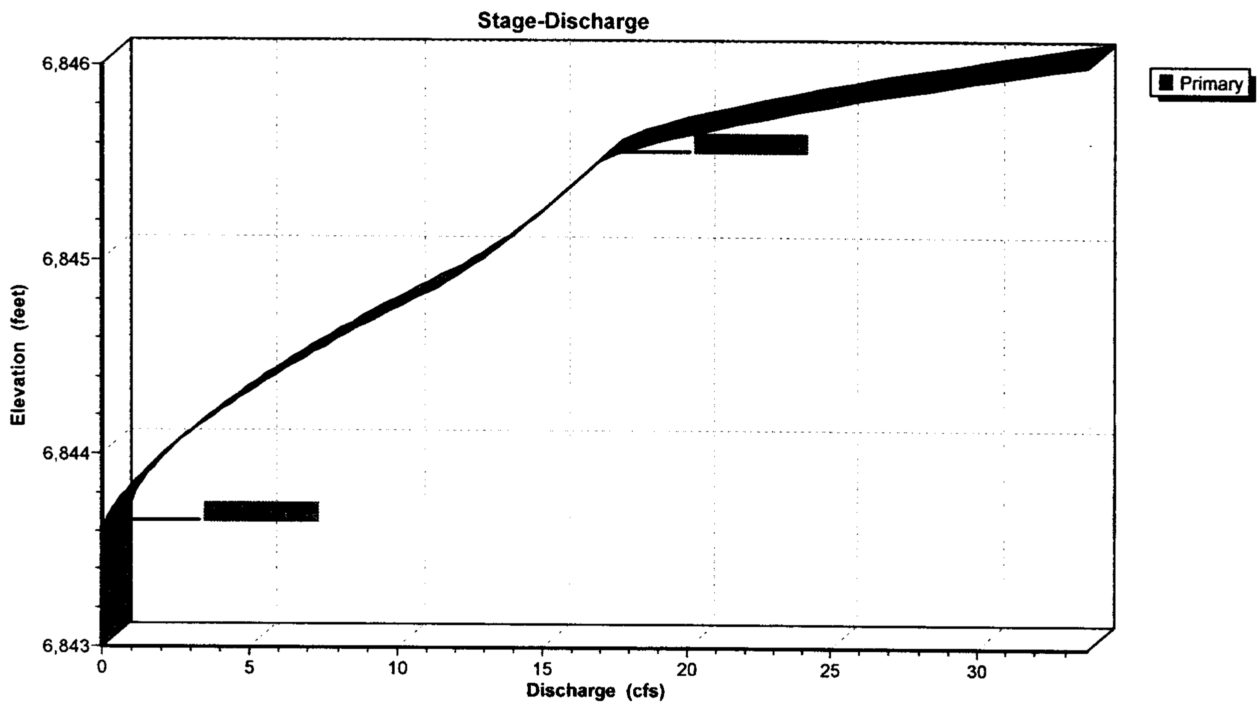
| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 6,845.50' | **3.00' x 3.00' Horiz. Orifice/Grate** Limited to weir flow C= 1.000 |
| #2 | Primary | 6,843.60' | **2.50' W x 1.25' H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=9.63 cfs @ 0.26 hrs HW=6,844.73' (Free Discharge)
├—**1=Orifice/Grate** ( Controls 0.00 cfs)
└—**2=Orifice/Grate** (Orifice Controls 9.63 cfs @ 3.41 fps)

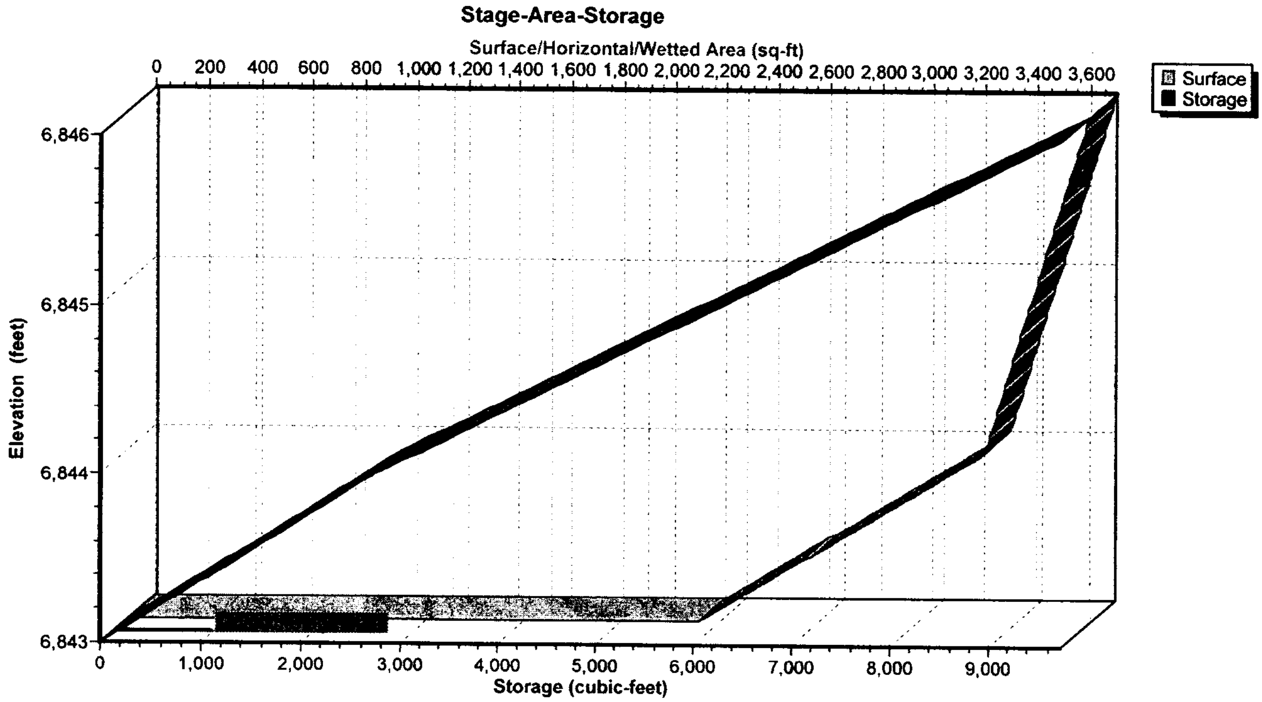
## Pond Pond: East PLD




## Pond Pond: East PLD



## Pond Pond: East PLD



## Pond Pond: East PLD

Inflow Area = 3.680 ac, Inflow Depth = 1.37" for 100-Year event
Inflow = 20.30 cfs @ 0.09 hrs, Volume= 0.420 af
Outflow = 16.97 cfs @ 0.26 hrs, Volume= 0.382 af, Atten= 16%, Lag= 10.4 min
Primary = 16.97 cfs @ 0.26 hrs, Volume= 0.382 af

Routing by Stor-Ind method, Time Span= 0.00-12.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 6,845.51' @ 0.26 hrs Surf.Area= 3,603 sf Storage= 8,024 cf

Plug-Flow detention time= 8.7 min calculated for 0.382 af (91% of inflow)
Center-of-Mass det. time= 7.8 min ( 17.8 - 10.0 )

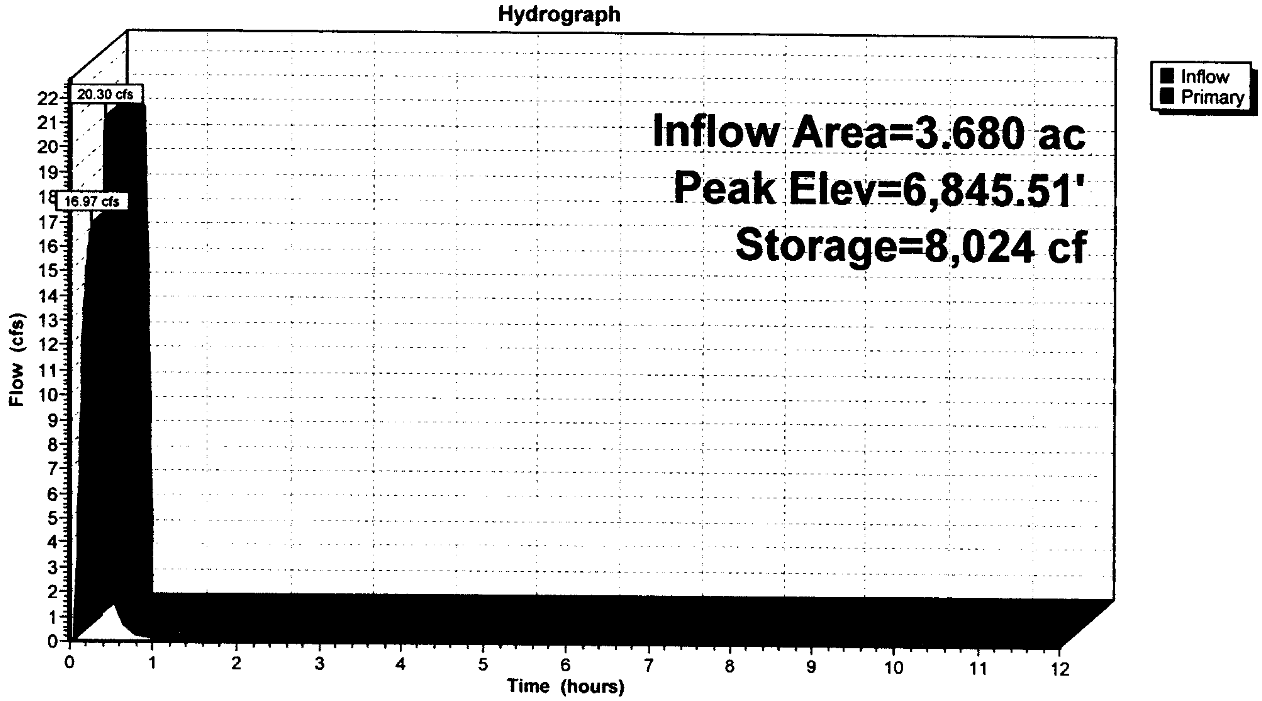
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 6,843.00' | 9,728 cf | **Custom Stage Data (Pyramidal)** Listed below |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) | Wet.Area (sq-ft) |
|---|---|---|---|---|
| 6,843.00 | 2,200 | 0 | 0 | 2,200 |
| 6,844.00 | 3,300 | 2,731 | 2,731 | 3,320 |
| 6,846.00 | 3,700 | 6,996 | 9,728 | 3,939 |

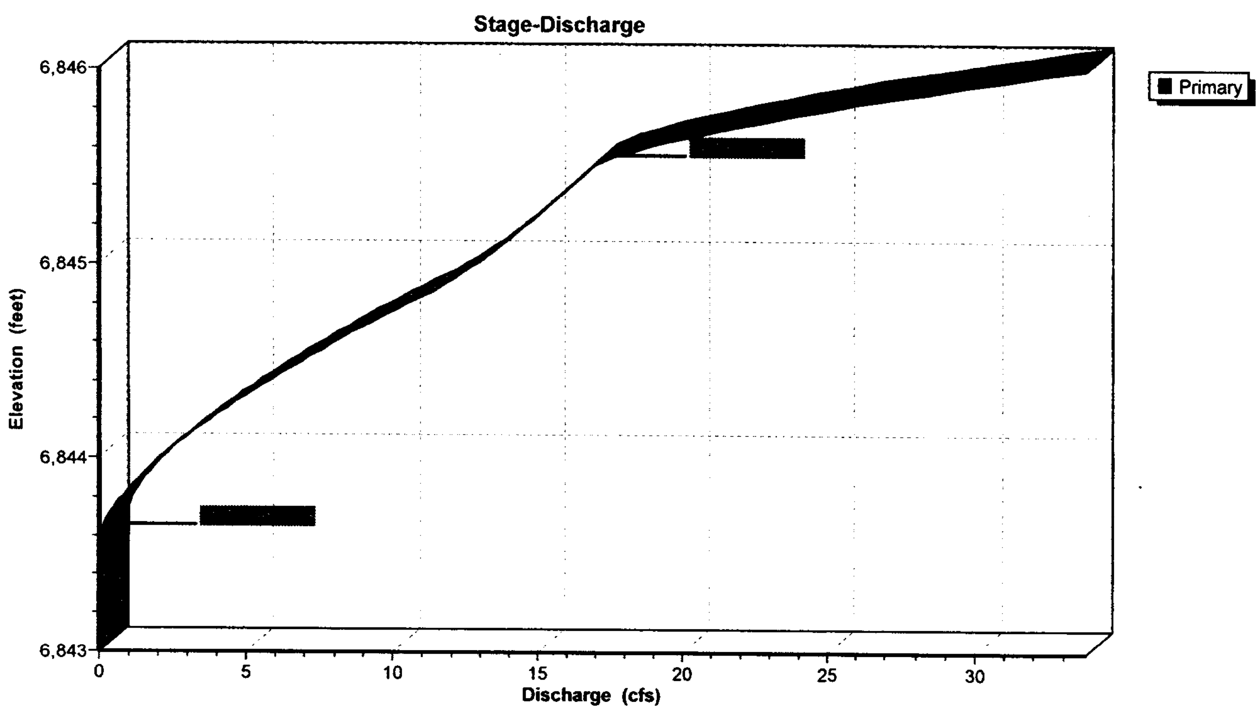
| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 6,845.50' | **3.00' x 3.00' Horiz. Orifice/Grate** Limited to weir flow C= 1.000 |
| #2 | Primary | 6,843.60' | **2.50' W x 1.25' H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=16.92 cfs @ 0.26 hrs HW=6,845.51' (Free Discharge)
├—**1=Orifice/Grate** (Weir Controls 0.04 cfs @ 0.33 fps)
└—**2=Orifice/Grate** (Orifice Controls 16.88 cfs @ 5.40 fps)

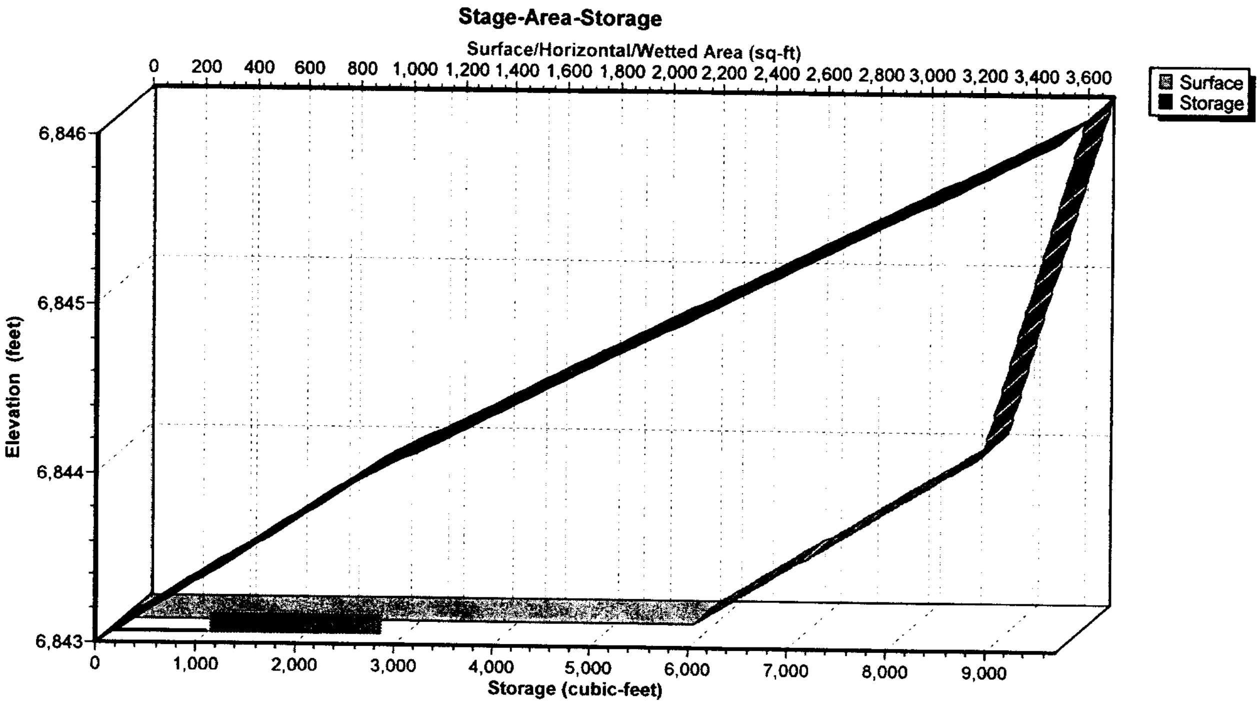
## Pond Pond: East PLD




## Pond Pond: East PLD



## Pond Pond: East PLD

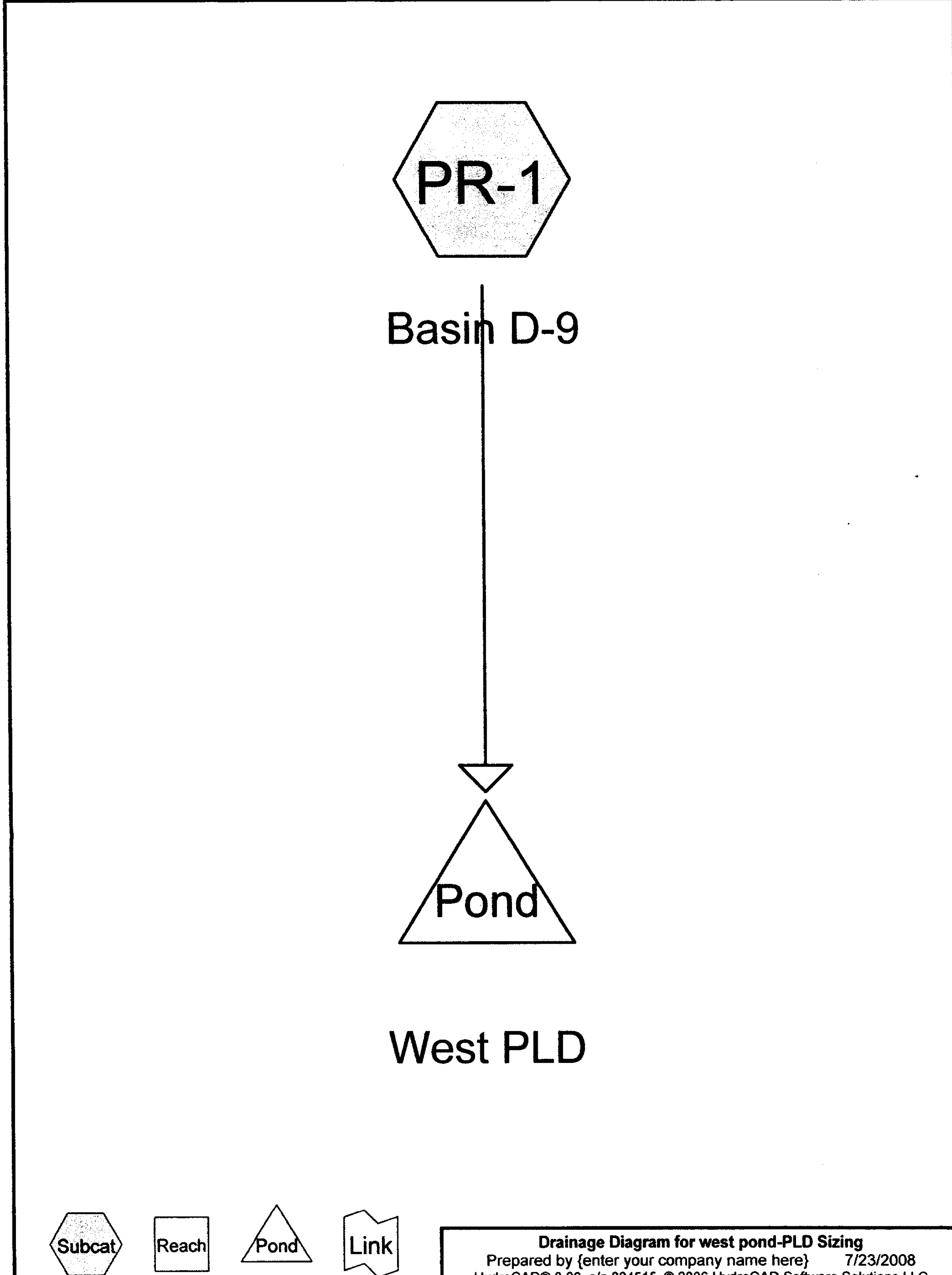


# Design Procedure Form: Porous Landscape Detention (PLD)

Designer: Thomas Roberts
Company: Springs Engineering
Date: July 23, 2008
Project: Meridian Crossing West Pond
Location: Falcon, CO

| | |
|---|---|
| 1. Basin Storage Volume<br>( $I_a$ = 100% if all paved and roofed areas u/s of PLD)<br>A) Tributary Area's Imperviousness Ratio ($i = I_a / 100$ ) | $I_a$ = 82.00 %<br>i = 0.82 |
| B) Contributing Watershed Area Including the PLD (Area) | Area = 200,821 square feet |
| C) Water Quality Capture Volume (WQCV)<br>($WQCV = 0.8 * (0.91 * I^3 - 1.19 * I^2 + 0.78 * I)$) | WQCV = 0.27 watershed inches |
| D) Design Volume: $Vol_{PLD}$ = (WQCV / 12) * Area | Vol = 4,568 cubic feet |
| 2. PLD Surface Area ($A_{PLD}$) and Average Depth ($d_{av}$)<br>(from 4567.86 square feet to 9135.72 square feet) | $A_{PLD}$ = 4,600 square feet |
| ($d_{av}$: = (Vol / $A_{PLD}$), Min=0.5', Max=1.0') | $d_{av}$ = 0.99 feet |
| 3. Draining of PLD (Check A, **or** B, **or** C, **answer** D)<br>Based on answers to 3A through 3D, check the appropriate method | ____ Infiltration to Subgrade with Permeable Membrane: 3(C) checked and 3(E) = no |
| A) Check box if subgrade is heavy or expansive clay [ ]<br>B) Check box if subgrade is silty or clayey sand [ ]<br>C) Check box if subgrade is well-draining soil [x] | ____ Underdrain with Impermeable Liner: 3(A) checked or 3(E) = yes |
| D) Check box if underdrains are not desirable or if underdrains are not feasible at this site. [ ] | ____ Underdrain with Non-Woven Geotextile Fabric: 3(B) checked and 3(E) = no |
| E) Does tributary catchment contain land uses that may have petroleum products, greases, or other chemicals present, such as gas station, hardware store, restaurant, etc.? yes [x] no [ ] | ____ 16-Mil. Impermeable Membrane with No Underdrain: 3(D) checked - Evapotranspiration only<br>x Other: Type D Inlet |
| 4. Sand/Peat Mix and Gravel Subbase (See Figure PLD-1) | |
| A) Heavy or Expansive Clay (NRCS Group D Soils) Present; Perforated HDPE Underdrain Used. | ____ 18" Minimum Depth Sand-Peat Mix with 8" Gravel Layer. 16-Mil. Impermeable Liner and a 3" to 4" Perforated HDPE Underdrain. |
| B) Silty or Clayey Sand (NRCS Group C Soils) Present; Perforated HDPE Underdrain Used. | ____ 18" Minimum Depth Sand-Peat Mix with 8" Gravel Layer and a 3" to 4" Perforated HDPE Underdrain w/ Non-Woven Pemeable Membrane. |
| C) No Potential For Contamination And Well-Draining (NRCS Group A or B Soils) Are Present; Underdrains Elliminated. | ____ 18" Minimum Depth Sand-Peat Mix with Non-Woven Pemeable Membrane and No Underdrain (Direct Infiltration). |
| D) Underdrains Are Not Desirable Or Are Not Feasible At This Site. | ____ 18" Minimum Depth Sand-Peat Mix with An Additional 18" Minimum Layer Sand-Peat Mix or Sand-Class 'A' Compost Bottom Layer (Total Sand-Peat Depth of 36"). 16-Mil. Impermeable Liner Used. |
| E) Other: | x Other: See Detail on Sheet 8 |

Notes:




**Drainage Diagram for west pond-PLD Sizing**
Prepared by {enter your company name here} 7/23/2008
HydroCAD® 8.00 s/n 004515 © 2006 HydroCAD Software Solutions LLC

## Pond Pond: West PLD

| | | | | |
|---|---|---|---|---|
| Inflow Area = | 3.680 ac, | Inflow Depth = 0.32" | for 2-Year event | |
| Inflow = | 11.93 cfs @ | 0.10 hrs, Volume= | 0.098 af | |
| Outflow = | 11.81 cfs @ | 0.10 hrs, Volume= | 0.098 af, | Atten= 1%, Lag= 0.2 min |
| Primary = | 11.81 cfs @ | 0.10 hrs, Volume= | 0.098 af | |

Routing by Stor-Ind method, Time Span= 0.00-12.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 6,841.48' @ 0.10 hrs Surf.Area= 148 sf Storage= 133 cf

Plug-Flow detention time= 0.2 min calculated for 0.098 af (100% of inflow)
Center-of-Mass det. time= 0.2 min ( 5.7 - 5.5 )

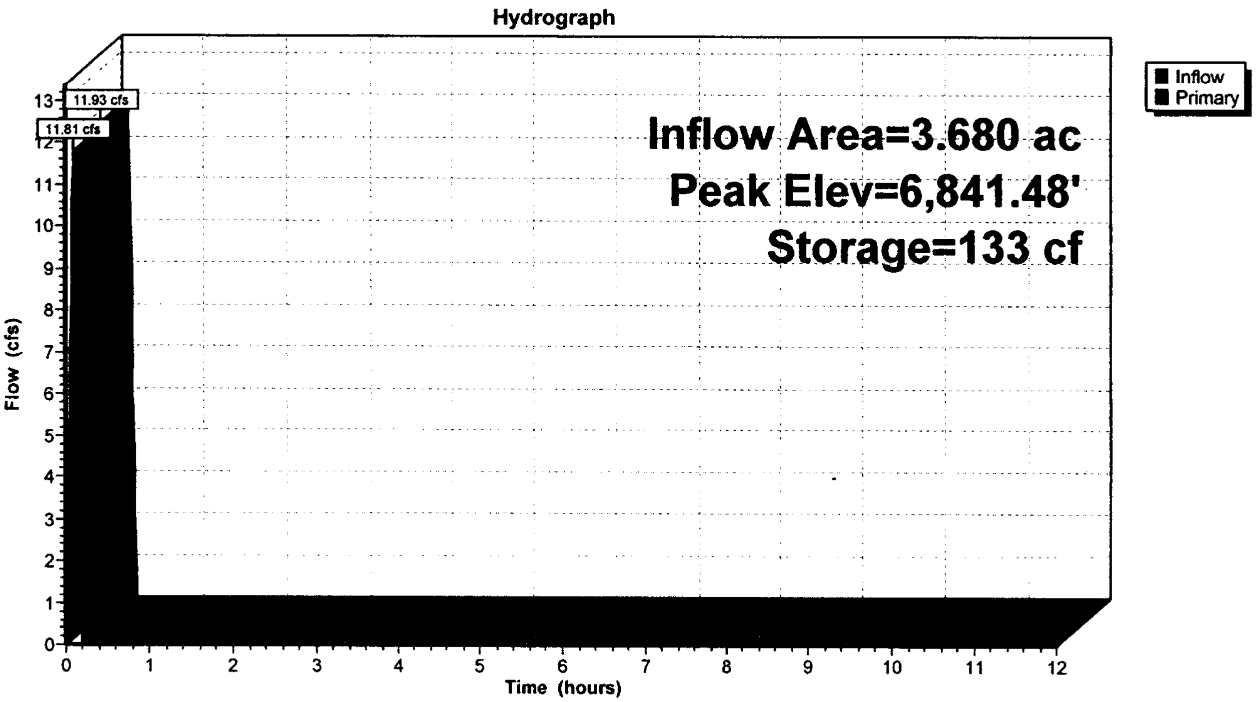
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 6,840.00' | 6,085 cf | **Custom Stage Data (Prismatic)** Listed below |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 6,840.00 | 20 | 0 | 0 |
| 6,841.00 | 100 | 60 | 60 |
| 6,842.00 | 200 | 150 | 210 |
| 6,843.00 | 1,500 | 850 | 1,060 |
| 6,844.50 | 5,200 | 5,025 | 6,085 |

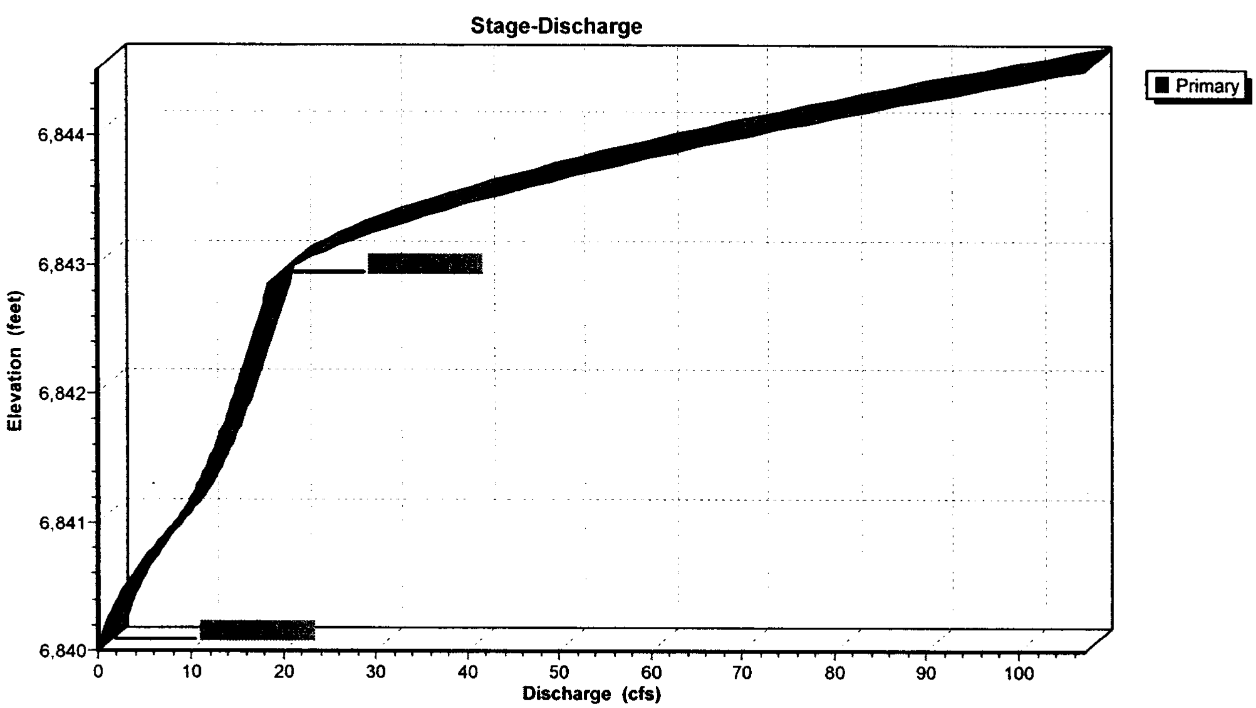
| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 6,842.85' | **3.00' x 3.00' Horiz. Orifice/Grate** Limited to weir flow C= 1.000 |
| #2 | Primary | 6,840.00' | **2.50' W x 1.00' H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=11.74 cfs @ 0.10 hrs HW=6,841.47' (Free Discharge)
**1=Orifice/Grate** ( Controls 0.00 cfs)
**2=Orifice/Grate** (Orifice Controls 11.74 cfs @ 4.70 fps)

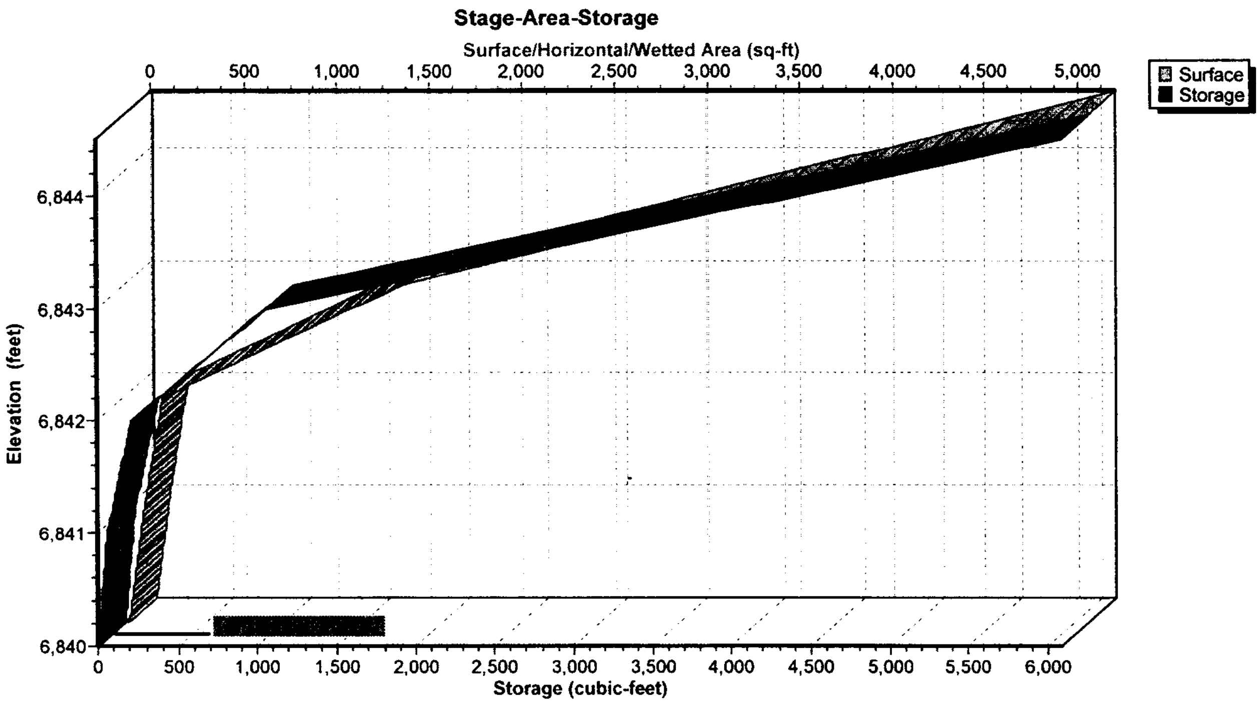
## Pond Pond: West PLD




## Pond Pond: West PLD



## Pond Pond: West PLD



## Pond Pond: West PLD

Inflow Area = 3.680 ac, Inflow Depth = 0.44" for 5-Year event
Inflow = 16.39 cfs @ 0.09 hrs, Volume= 0.135 af
Outflow = 15.20 cfs @ 0.11 hrs, Volume= 0.135 af, Atten= 7%, Lag= 0.6 min
Primary = 15.20 cfs @ 0.11 hrs, Volume= 0.135 af

Routing by Stor-Ind method, Time Span= 0.00-12.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 6,842.11' @ 0.11 hrs Surf.Area= 340 sf Storage= 302 cf

Plug-Flow detention time= 0.2 min calculated for 0.134 af (100% of inflow)
Center-of-Mass det. time= 0.2 min ( 5.7 - 5.5 )

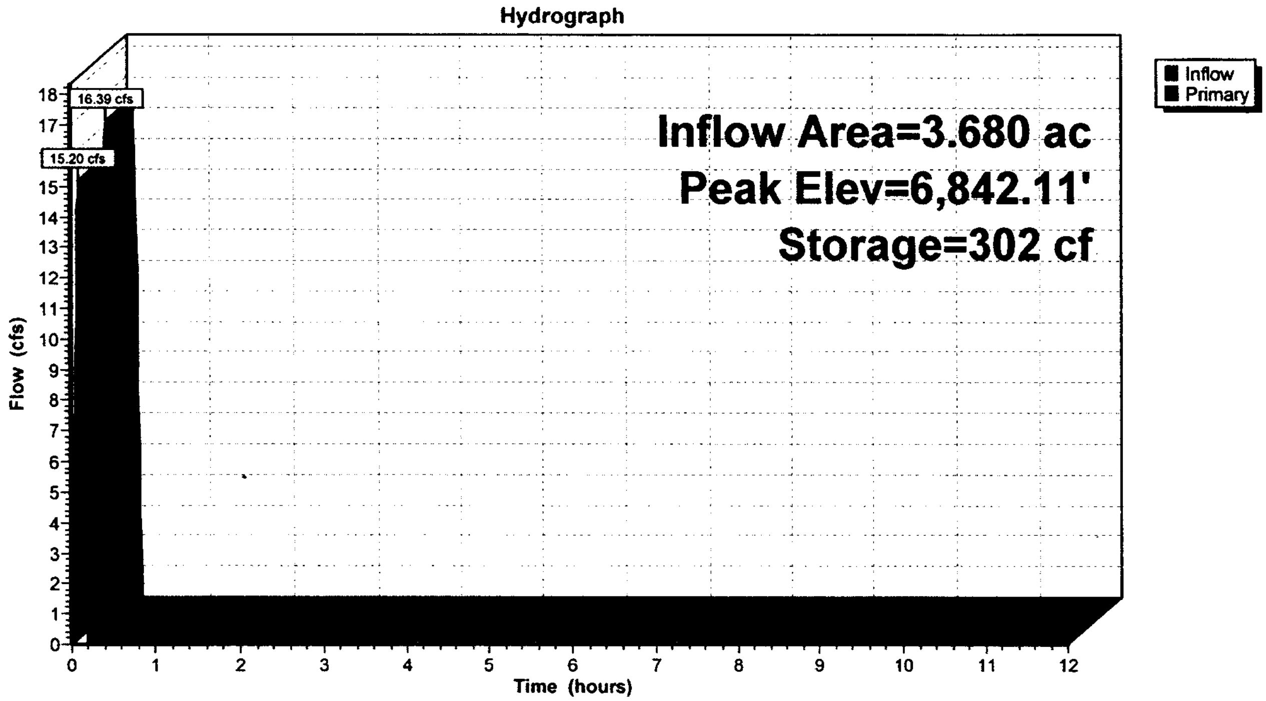
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 6,840.00' | 6,085 cf | **Custom Stage Data (Prismatic)** Listed below |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 6,840.00 | 20 | 0 | 0 |
| 6,841.00 | 100 | 60 | 60 |
| 6,842.00 | 200 | 150 | 210 |
| 6,843.00 | 1,500 | 850 | 1,060 |
| 6,844.50 | 5,200 | 5,025 | 6,085 |

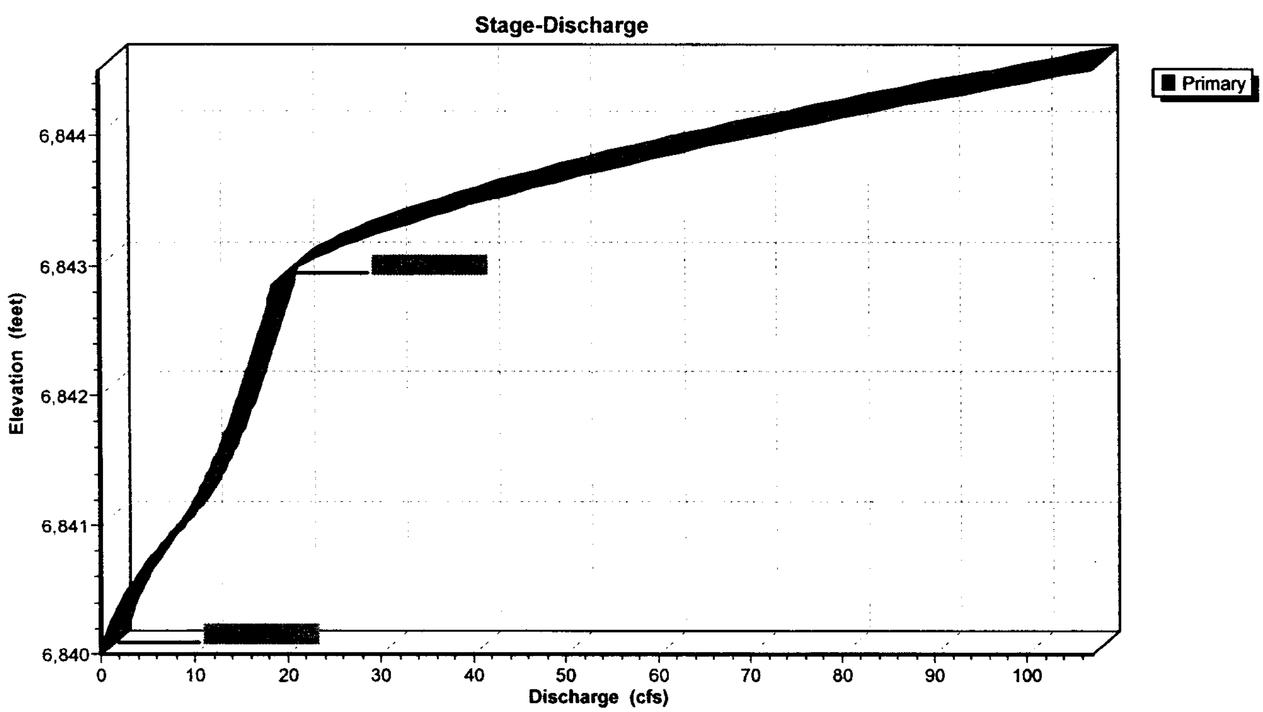
| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 6,842.85' | **3.00' x 3.00' Horiz. Orifice/Grate** Limited to weir flow C= 1.000 |
| #2 | Primary | 6,840.00' | **2.50' W x 1.00' H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=15.16 cfs @ 0.11 hrs HW=6,842.10' (Free Discharge)
↑—**1=Orifice/Grate** ( Controls 0.00 cfs)
└—**2=Orifice/Grate** (Orifice Controls 15.16 cfs @ 6.06 fps)

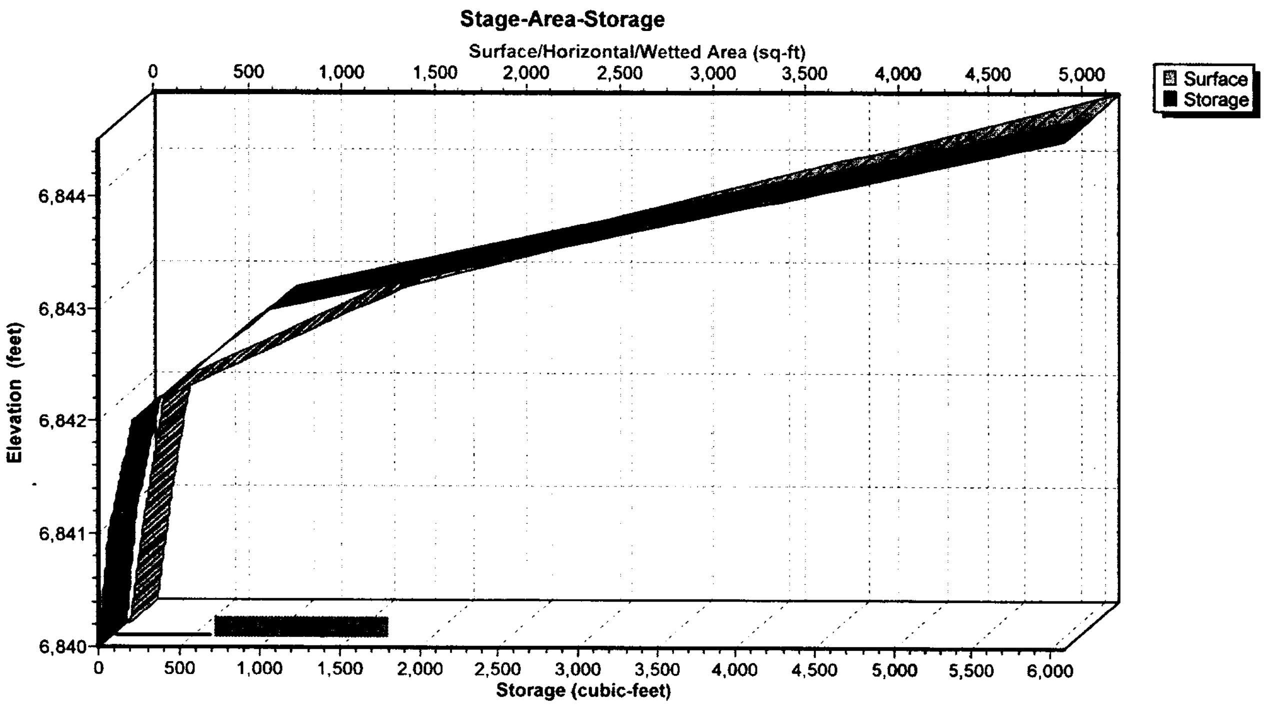
## Pond Pond: West PLD




## Pond Pond: West PLD



## Pond Pond: West PLD



## Pond Pond: West PLD

| | | | | |
|---|---|---|---|---|
| Inflow Area = | 3.680 ac, | Inflow Depth = 0.78" | for 100-Year event | |
| Inflow = | 29.14 cfs @ | 0.09 hrs, Volume= | 0.240 af | |
| Outflow = | 25.15 cfs @ | 0.11 hrs, Volume= | 0.239 af, | Atten= 14%, Lag= 1.0 min |
| Primary = | 25.15 cfs @ | 0.11 hrs, Volume= | 0.239 af | |

Routing by Stor-Ind method, Time Span= 0.00-12.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 6,843.13' @ 0.11 hrs Surf.Area= 1,809 sf Storage= 1,479 cf

Plug-Flow detention time= 0.7 min calculated for 0.239 af (100% of inflow)
Center-of-Mass det. time= 0.7 min ( 6.2 - 5.5 )

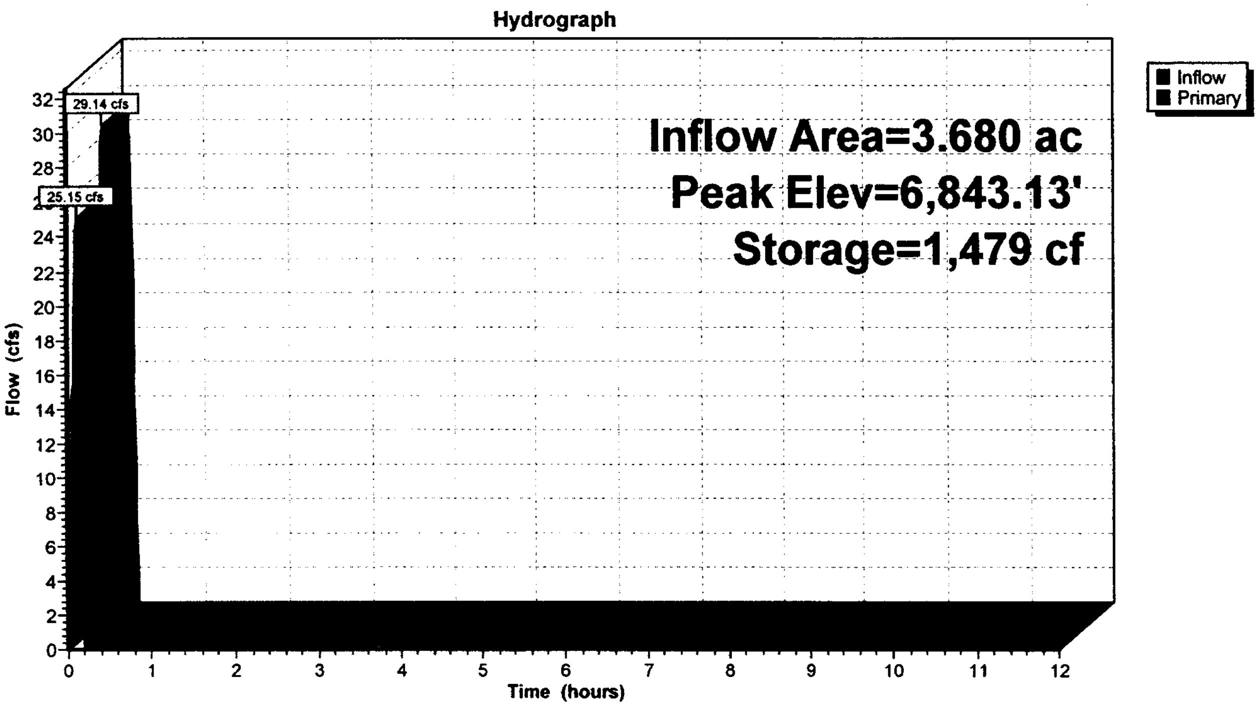
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 6,840.00' | 6,085 cf | **Custom Stage Data (Prismatic)** Listed below |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 6,840.00 | 20 | 0 | 0 |
| 6,841.00 | 100 | 60 | 60 |
| 6,842.00 | 200 | 150 | 210 |
| 6,843.00 | 1,500 | 850 | 1,060 |
| 6,844.50 | 5,200 | 5,025 | 6,085 |

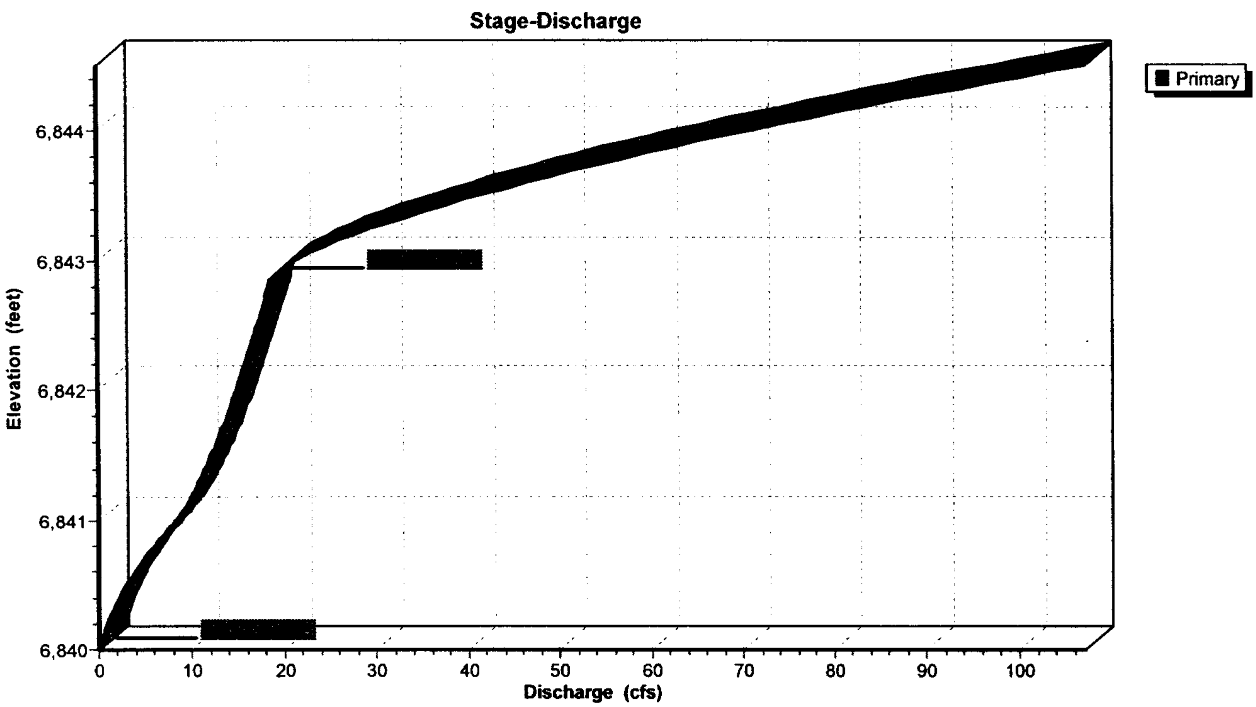
| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 6,842.85' | **3.00' x 3.00' Horiz. Orifice/Grate** Limited to weir flow C= 1.000 |
| #2 | Primary | 6,840.00' | **2.50' W x 1.00' H Vert. Orifice/Grate** C= 0.600 |

**Primary OutFlow** Max=25.05 cfs @ 0.11 hrs HW=6,843.12' (Free Discharge)
├─**1=Orifice/Grate** (Weir Controls 5.58 cfs @ 1.71 fps)
└─**2=Orifice/Grate** (Orifice Controls 19.46 cfs @ 7.79 fps)

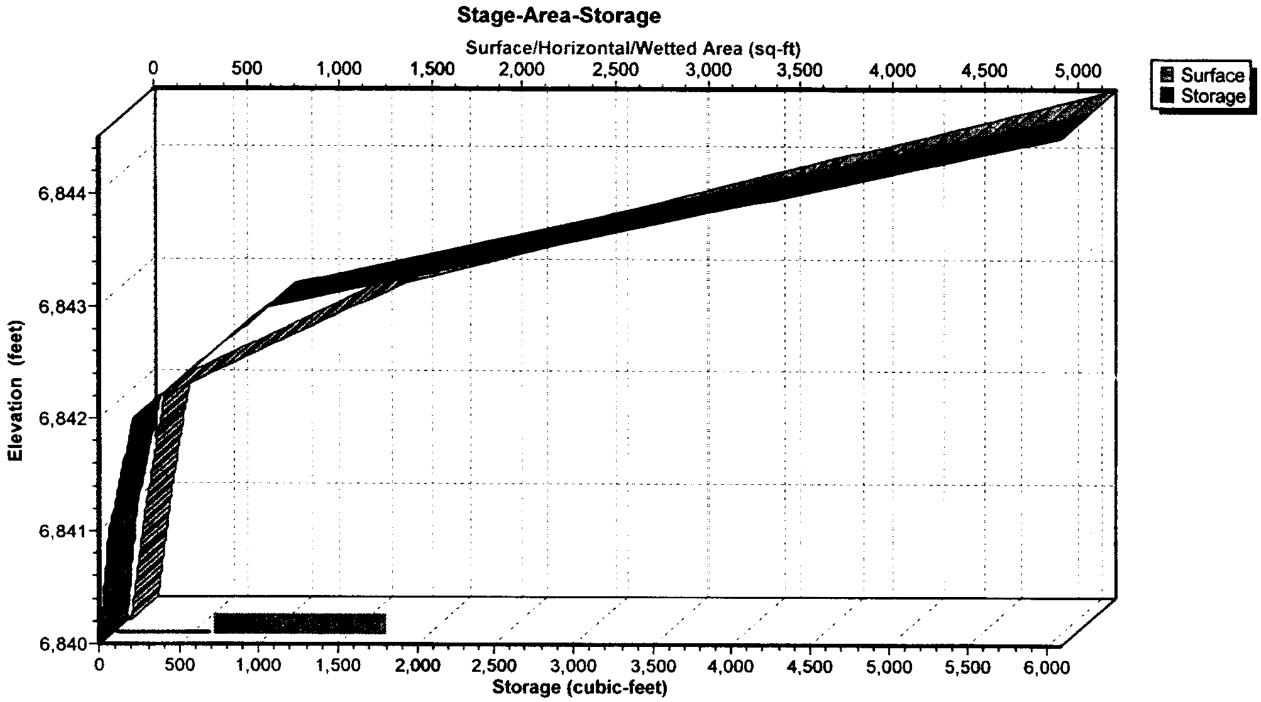
## Pond Pond: West PLD




## Pond Pond: West PLD



## Pond Pond: West PLD



## Appendix H: Operations and Maintenance Manual

# OPERATION AND MAINTENANCE MANUAL
# MERIDIAN CROSSING
# PARK PLACE ENTERPRISES
# EL PASO COUNTY, COLORADO

**May 2008**

PREPARED FOR:

**Park Place Enterprises**
15 Miranda Road
Colorado Springs, CO 80906

PREPARED BY:

*Springs Engineering*
31 N. Tejon Street
Suite 315
Colorado Springs, CO 80903

PROJECT NO. 07-057-0032

# Table of Contents

## Introduction

This Operation and Maintenance Plan is being submitted on behalf of Park Place Enterprises for a development known as Meridian Crossing in Falcon, Colorado. The purpose of this Operation and Maintenance Manual (O&M) is to identify facilities which are to be maintained by the Meridian Crossing Properties Owners Association (POA) and the frequency with which these items are to be maintained.

## General Location and Description

Meridian Crossing is currently zoned CR and the proposed development includes 6 commercial lots, proposed water quality facilities, streets, and utilities.

Meridian Crossing is approximately 9.5 acres and is located north of the intersection of Meridian Road and Old Meridian Road in Falcon, Colorado, Section 12, Township 13 South, Range 65 West of the 6$^{th}$ Principal Meridian.

### *Description of Construction*

Construction will consist of site grading, utility installation, and road paving. Approximately 9.5 acres of the site will be graded for construction of the proposed commercial units. Erosion control will be provided prior to construction.

## Facilities

Water quality facilities will be owned and maintained by the POA. Water and sanitary sewer will be maintained by the Falcon Highlands Metropolitan District. All other utilities are to be maintained by their respective owners.

## Inspection and Maintenance

A thorough inspection of the permanent structures shall be performed every 30 days as well as after any significant rain or snowmelt event. Inspectors are to look for any significant deterioration of the facilities including:

- Erosion of channels and side slopes.
- Accumulated trash or debris.

Repairs and removal of debris shall occur as soon as practical.

## Porous Landscape Detention Facility

Lawn mowing and vegetative care shall be performed routinely, as aesthetic requirements demand. This shall limit unwanted vegetation. Irrigated turf grass shall be between 2 and 4 inches in height and non irrigated native turf grasses shall be 4 to 6 inches in height. Debris and litter removal shall be performed routinely, as aesthetic requirements demand. Removal of debris and litter from any detention area minimizes clogging of the sand media. Landscaping removal and replacement shall be done every 5 to 10 years depending on infiltration rates needed to drain the area in 12 hours or less. Over time the sandy loam sandy loam turf will clog. The layer will need to be replaced, along with all turf and other vegetation growing on the surface, to rehabilitate infiltration rates. Bin-annual inspections of the hydraulic performance of the area will need to be performed. This will determine if the sand media is allowing acceptable infiltration.

An Operation and Maintenance Log follows.

## Operation & Maintenance Log

THE SHOPPES AT FALCON
OPERATION AND MAINTENANCE LOG

(Record inspections, items found maintenance and corrective actions taken. Also record any training received by Contractor personnel with regard to erosion control, materials handling and any inspections by outside agencies)

| DATE | ITEM | SIGNATURE OF PERSON MAKING ENTRY |
|---|---|---|
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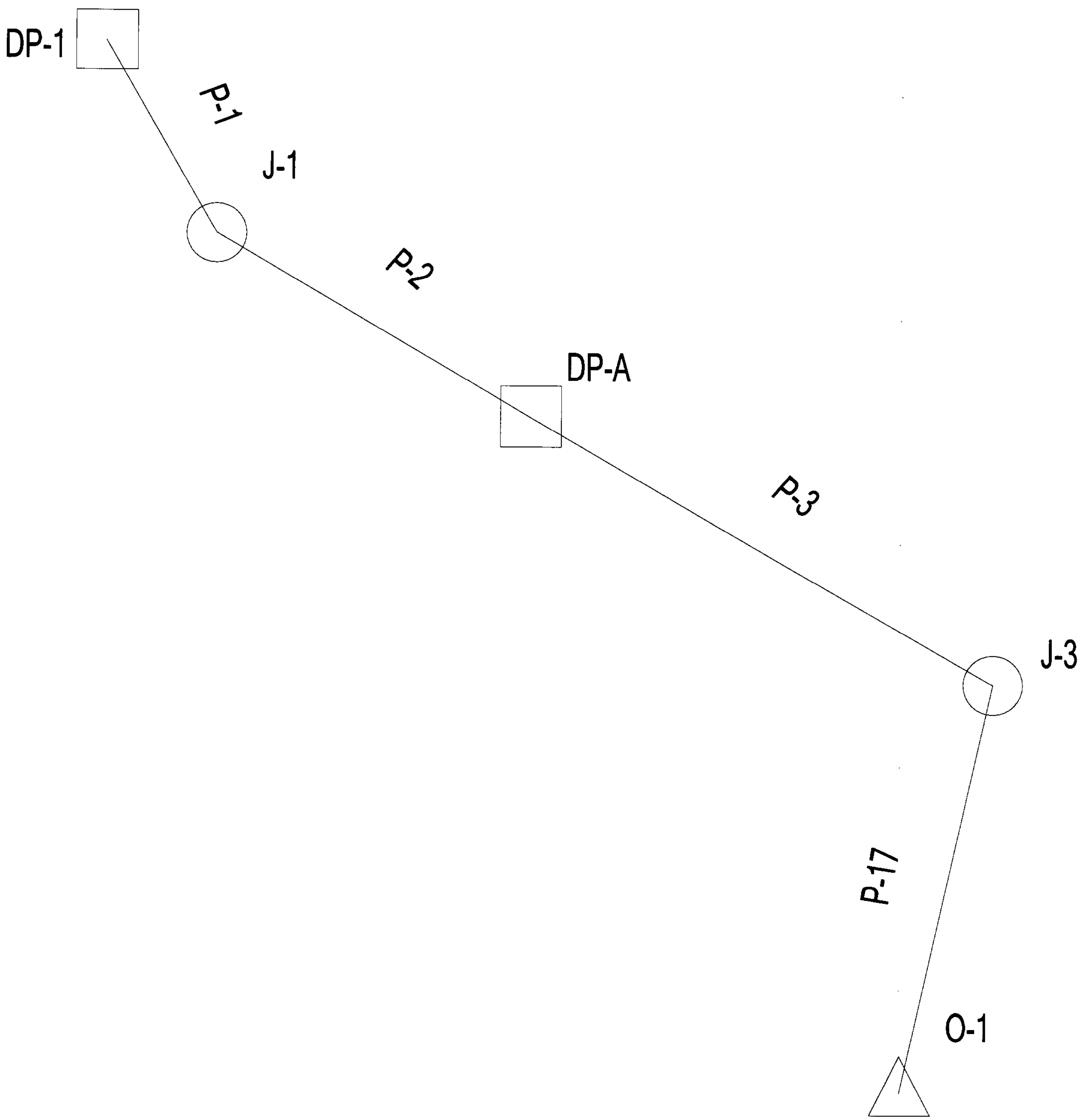
## Appendix I: Ultimate Design StormCAD Calculations

# Scenario: 100-year



# Analysis Results
## Scenario: 100-year

Note:
The input data may have been modified since the last calculation was performed.
The calculated results may be outdated.

| | |
|---|---|
| Title: | Old Meridian Road |
| Project Engineer: | Charlene Sammons |
| Project Date: | 11/14/07 |
| Comments: | Storm in Old Meridian Road for Meridian Crossing Storm Sewer |

Scenario Summary

| | |
|---|---|
| Scenario | 100-year |
| Physical Properties Alternat | Base-Physical Properties |
| Catchments Alternative | Catchments-100-year |
| System Flows Alternative | Base-System Flows |
| Structure Headlosses Alterr | Base-Structure Headlosses |
| Boundary Conditions Altern | Base-Boundary Conditions |
| Design Constraints Alternat | Base-Design Constraints |
| Capital Cost Alternative | Base-Cost |
| User Data Alternative | Base-User Data |

Network Inventory

| | | | |
|---|---|---|---|
| Number of Pipes | 4 | Number of Inlets | 2 |
| - Circular Pipes: | 4 | - Grate Inlets: | 0 |
| - Box Pipes: | 0 | - Curb Inlets: | 2 |
| - Arch Pipes: | 0 | - Combination Inlets: | 0 |
| - Vertical Elliptical Pipes: | 0 | - Slot Inlets: | 0 |
| - Horizontal Elliptical Pipes: | 0 | - Grate Inlets in Ditch: | 0 |
| Number of Junctions | 2 | - Generic Inlets: | 0 |
| Number of Outlets | 1 | | |

Circular Pipes Inventory

| | | | |
|---|---|---|---|
| 18 inch | 274.57 ft | 24 inch | 55.00 ft |
| Total Length | 329.57 ft | | |

Curb Inlet Inventory

| | |
|---|---|
| Type R 10' | 2 |

**Inlet elements for network with outlet: O-1**

| Label | Inlet | Total System Flow (cfs) | Total Intercepted Flow (cfs) | Total Bypassed Flow (cfs) | Bypass Target | Capture Efficiency (%) | Hydraulic Grade Line In (ft) | Hydraulic Grade Line Out (ft) | Gravity Element Headloss (ft) | Headloss Method |
|---|---|---|---|---|---|---|---|---|---|---|
| DP-1 | Curb Type R | 7.61 | 7.61 | 10.28 | DP-A | 42.5 | 5,848.83 | 5,848.83 | 0.00 | Absolut |
| DP-A | Curb Type R | 9.39 | 2.10 | 14.37 | <Automati | 12.8 | 5,846.39 | 5,846.08 | 0.31 | Standa |

**Junction elements for network with outlet: O-1**

| Label | Hydraulic Grade Line In (ft) | Hydraulic Grade Line Out (ft) | Gravity Element Headloss (ft) | Headloss Method | System Additional Flow (cfs) | System Known Flow (cfs) | System Rational Flow (cfs) | System Intensity (in/hr) | System Flow Time (min) | System CA (acres) |
|---|---|---|---|---|---|---|---|---|---|---|
| J-1 | 5,847.76 | 5,847.46 | 0.30 | Standa | 0.00 | 0.00 | 7.55 | 8.50 | 6.59 | 0.88 |
| J-3 | 5,844.91 | 5,844.91 | 0.00 | Absolut | 0.00 | 0.00 | 9.30 | 8.13 | 7.63 | 1.13 |

# Analysis Results
## Scenario: 100-year

**Outlet: O-1**

| Label | Hydraulic Grade Line In (ft) | Hydraulic Grade Line Out (ft) | Gravity Element Headloss (ft) | System Additional Flow (cfs) | System Known Flow (cfs) | System Rational Flow (cfs) | System Intensity (in/hr) | System Flow Time (min) | System CA (acres) |
|---|---|---|---|---|---|---|---|---|---|
| O-1 | 6,843.10 | 6,843.10 | 0.00 | 0.00 | 0.00 | 9.22 | 8.06 | 7.83 | 1.13 |

**Pipe elements for network with outlet: O-1**

| Label | Section Shape | Section Size | Length (ft) | Number of Sections | Constructed Slope (ft/ft) | Energy Slope (ft/ft) | Total System Flow (cfs) | Average Velocity (ft/s) | Upstream Invert Elevation (ft) | Downstream Invert Elevation (ft) | Hydraulic Grade Line In (ft) | Hydraulic Grade Line Out (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P-1 | Circular | 18 inch | 71.21 | 1 | 0.012 | 0.011 | 7.61 | 6.31 | 6,847.76 | 6,846.90 | 6,848.83 | 6,847.79 |
| P-2 | Circular | 18 inch | 17.16 | 1 | 0.009 | 0.009 | 7.55 | 5.53 | 6,846.40 | 6,845.29 | 6,847.46 | 6,846.39 |
| P-3 | Circular | 18 inch | 86.20 | 1 | 0.009 | 0.009 | 9.39 | 6.33 | 6,844.90 | 6,844.13 | 6,846.08 | 6,845.29 |
| P-17 | Circular | 24 inch | 55.00 | 1 | 0.007 | 0.010 | 9.30 | 4.62 | 6,843.50 | 6,843.10 | 6,844.91 | 6,844.19 |

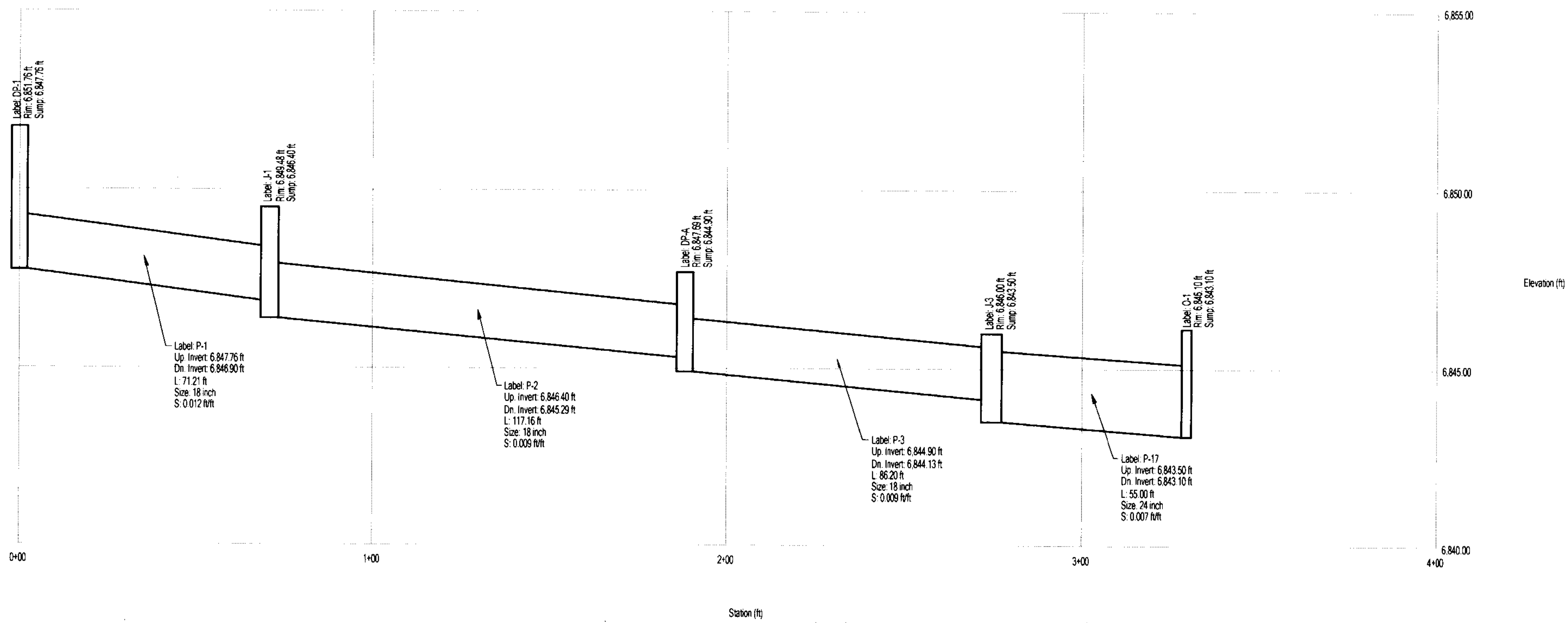
# Scenario: 100-year

## Combined Pipe\Node Report

| Label | Up. Node | Dn. Node | L (ft) | Up. Inlet Area (acres) | Up. Inlet Rat. Coef. | Up. Inlet Area (acres) | Up. Calc. Sys. CA (acres) | Up.Inlet Rat. Q (cfs) | Size | Q Full (cfs) | Avg. v (ft/s) | Up. Gr Elev. (ft) | HGL In (ft) | Up. Invert (ft) | Dn. Gr. Elev. (ft) | HGL Out (ft) | Dn. Invert (ft) | S (ft/ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P-1 | DP-1 | J-1 | 71.21 | 2.07 | 1.00 | 2.07 | 0.88 | 17.89 | 18 inch | 11.54 | 6.31 | 6,851.76 | 6,848.83 | 6,847.76 | 6,849.48 | 6,847.79 | 6,846.90 | 0.012 |
| P-2 | J-1 | DP-A | 117.16 | N/A | N/A | N/A | 0.88 | N/A | 18 inch | 10.22 | 5.53 | 6,849.48 | 6,847.46 | 6,846.40 | 6,847.69 | 6,846.39 | 6,845.29 | 0.009 |
| P-3 | DP-A | J-3 | 86.20 | 0.80 | 1.00 | 0.80 | 1.13 | 6.63 | 18 inch | 9.93 | 6.33 | 6,847.69 | 6,846.08 | 6,844.90 | 6,846.00 | 6,845.29 | 6,844.13 | 0.009 |
| P-17 | J-3 | O-1 | 55.00 | N/A | N/A | N/A | 1.13 | N/A | 24 inch | 10.45 | 4.62 | 6,846.00 | 6,844.91 | 6,843.50 | 6,846.10 | 6,844.19 | 6,843.10 | 0.007 |

# Profile
## Scenario: 100-year

Profile: Ultimate
Scenario: 100-year




Title: Old Meridian Road
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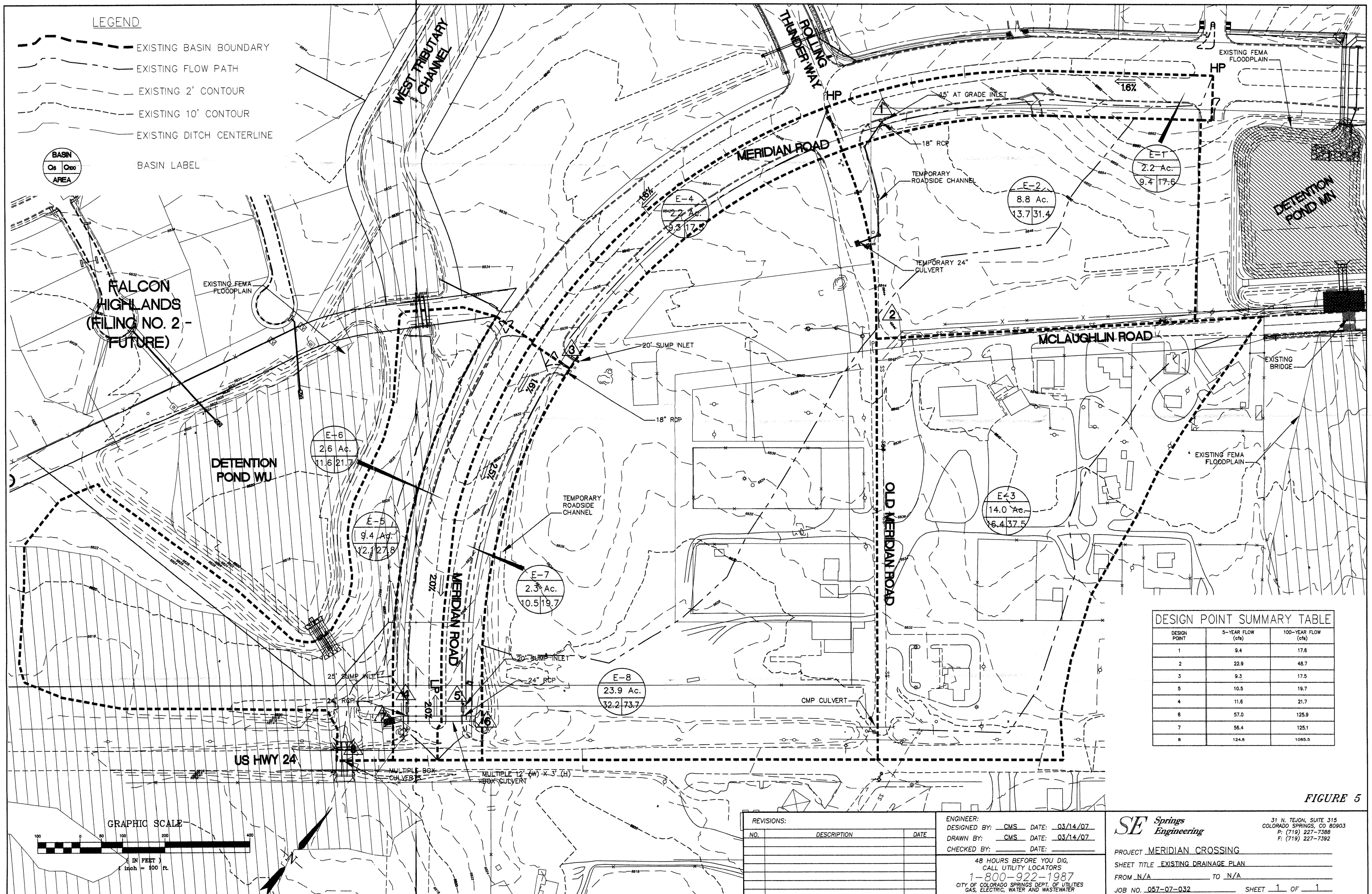
07/24/08 03:05:24 PM



Project Engineer: Charlene Sammons
StormCAD v5.6 [05.06.012.00]




## DESIGN POINT SUMMARY TABLE

| DESIGN POINT | 5-YEAR FLOW (cfs) | 100-YEAR FLOW (cfs) |
|---|---|---|
| 1 | 9.4 | 17.6 |
| 2 | 22.9 | 48.7 |
| 3 | 9.3 | 17.5 |
| 5 | 10.5 | 19.7 |
| 4 | 11.6 | 21.7 |
| 6 | 57.0 | 125.9 |
| 7 | 56.4 | 125.1 |
| 8 | 124.6 | 1085.5 |

*FIGURE 5*

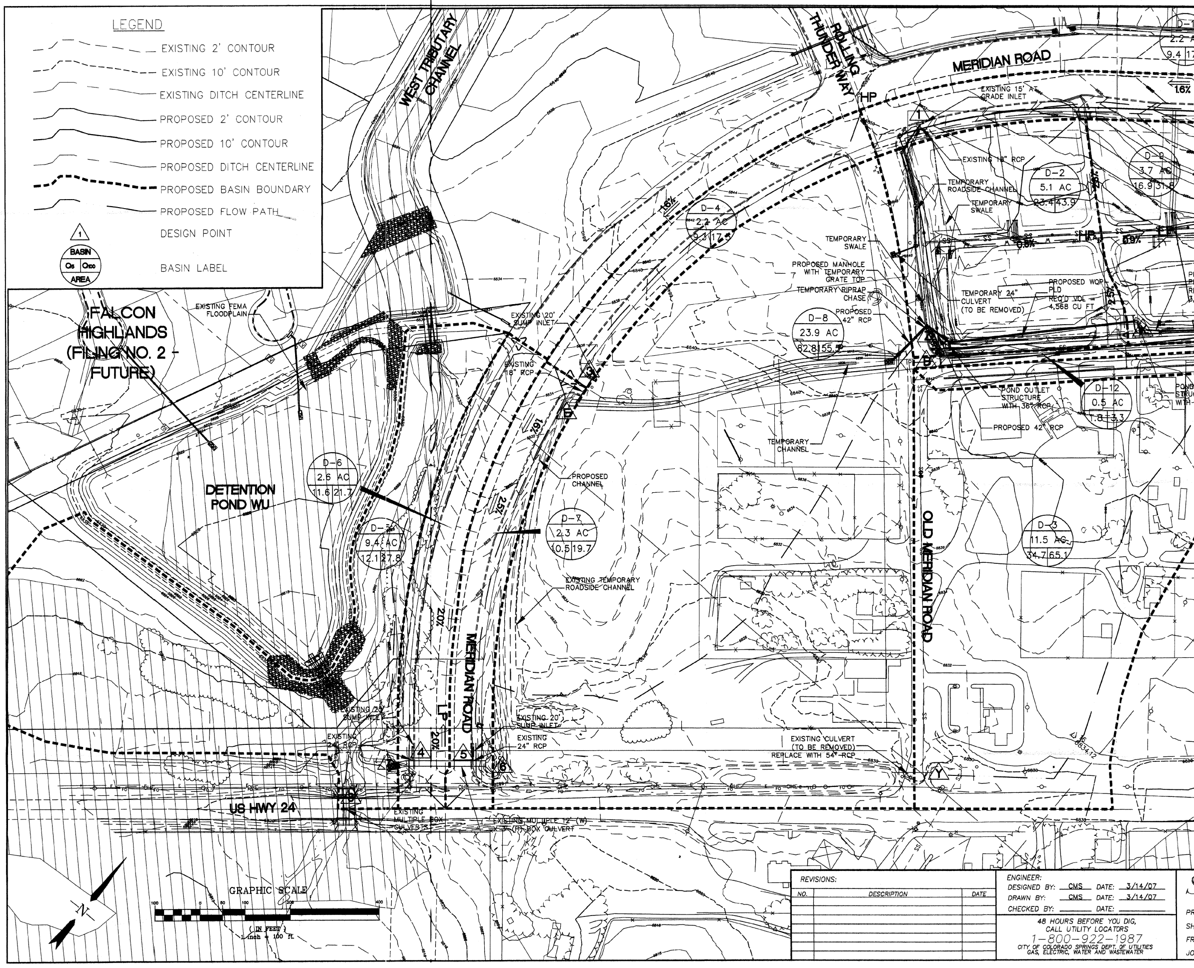
| REVISIONS: | | |
|---|---|---|
| NO. | DESCRIPTION | DATE |
| | | |

ENGINEER:
DESIGNED BY: CMS DATE: 03/14/07
DRAWN BY: CMS DATE: 03/14/07
CHECKED BY: ______ DATE: ______

48 HOURS BEFORE YOU DIG, CALL UTILITY LOCATORS
1-800-922-1987
CITY OF COLORADO SPRINGS DEPT. OF UTILITIES GAS, ELECTRIC, WATER AND WASTEWATER

SE Springs Engineering
31 N. TEJON, SUITE 315
COLORADO SPRINGS, CO 80903
P: (719) 227-7388
F: (719) 227-7392

PROJECT MERIDIAN CROSSING
SHEET TITLE EXISTING DRAINAGE PLAN
FROM N/A TO N/A
JOB NO. 057-07-032 SHEET 1 OF 1




## DESIGN POINT SUMMARY TABLE

| DESIGN POINT | 5-YEAR FLOW (cfs) | 100-YEAR FLOW (cfs) |
|---|---|---|
| 1 | 9.4 | 17.6 |
| J | 3.7 | 7.0 |
| B | 4.7 | 8.9 |
| X | 16.9 | 31.8 |
| Z | 44.6 | 83.8 |
| Y | 34.7 | 65.1 |
| 3 | 9.3 | 17.5 |
| E | 46.9 | 88.2 |
| 5 | 10.5 | 19.7 |
| 4 | 11.6 | 21.7 |
| 6 | 127.7 | 239.9 |
| 7 | 140.2 | 264.8 |
| 8 | 209.4 | 1243.5 |

FIGURE 6

| REVISIONS: | | |
|---|---|---|
| NO. | DESCRIPTION | DATE |

ENGINEER:
DESIGNED BY: CMS DATE: 3/14/07
DRAWN BY: CMS DATE: 3/14/07
CHECKED BY: DATE:

48 HOURS BEFORE YOU DIG, CALL UTILITY LOCATORS
1-800-922-1987
CITY OF COLORADO SPRINGS DEPT. OF UTILITIES GAS, ELECTRIC, WATER AND WASTEWATER

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COLORADO SPRINGS, CO 80903
P: (719) 227-7388
F: (719) 227-7392

PROJECT MERIDIAN CROSSING FILING NO.1
SHEET TITLE PROPOSED DRAINAGE PLAN
FROM N/A TO N/A
JOB NO. 057-07-032 SHEET 1 OF 1

Cushing Terrell

# APPENDIX F: PLD SITE PHOTOS