# Stormwater Division

## MEMORANDUM

**DATE:** March 9, 2010

**TO:** Michael J. Gillis, Virginia Correctional Enterprises Document Management Services

**FROM:** Jo Anna Ripley, Stormwater

**PO:** 270712

**RE:** Files Approved for Scanning

---

**General File ID or BMP ID:** PC055

**PIN:** 3310100033D

**Subdivision, Tract, Business or Owner Name** (if known): Prime Outlets

**Property Description:** Regional Shopping Center

**Site Address:** 5711 Richmond Road

*(For internal use only)* **Box** 6 **Drawer:** 3

**Agreements:** (in file as of scan date) **N** **Book or Doc#:** **Page:**

Comments

| | | | | | |
|---|---|---|---|---|---|
| WATERSHED | PC | MAINTENANCE PLAN | No | CTRL STRUC DESC | RCP Pipe |
| BMP ID NO | 055 | SITE AREA acre | 7.84 | CTRL STRUC SIZE inches | 18 |
| PLAN NO | SP-107-94 | LAND USE | | OTLT BARRL DESC | RCP Pipe |
| TAX PARCEL | (33-01)(1-33D) | old BMP TYP | Dry Pond | OTLT BARRL SIZE inch | 18 |
| PIN NO | 3310100033D | JCC BMP CODE | | | |
| CONSTRUCTION DATE | | POINT VALUE | 4 | EMERG SPILLWAY | No |
| PROJECT NAME | Prime Outlets-Berkeley Common PH 1 | | | DESIGN HW ELEV | 100.3 |
| FACILITY LOCATION | 5711 Richmond Road | | | PERM POOL ELEV | na |
| CITY-STATE | Williamsburg, Va. 23185 | SVC DRAIN AREA acres | 8.25 | 2-YR OUTFLOW cfs | |
| CURRENT OWNER | Williamsburg Outlets LLC | | | 10-YR OUTFLOW cfs | |
| OWNER ADDRESS | 5211 International Drive | | | REC DRAWING | No |
| OWNER ADDRESS 2 | | SERVICE AREA DESCRI | Building, Parking & Offsite Roadway | | |
| CITY-STATE-ZIP CODE | Orlando, FL 32819 | IMPERV AREA acres | | CONSTR CERTIF | No |
| OWNER PHONE | | RECV STREAM | | | |
| MAINT AGREEMENT | Yes | EXT DET-WQ-CTRL | No | LAST INSP DATE | 9-10-24 |
| EMERG ACTION PLAN | No | WTR QUAL VOL acre-ft | 0 | INTERNAL RATING | 4 |
| | | CHAN PROT CTRL | No | MISC/COMMENTS | |
| | | CHAN PROT VOL acre-ft | 0 | Near Richmond Road. | |
| | | SW/FLOOD CONTROL | No | | |
| | | GEOTECH REPORT | No | | |

Get Last BMP No

Return to Menu

PC055

PC055

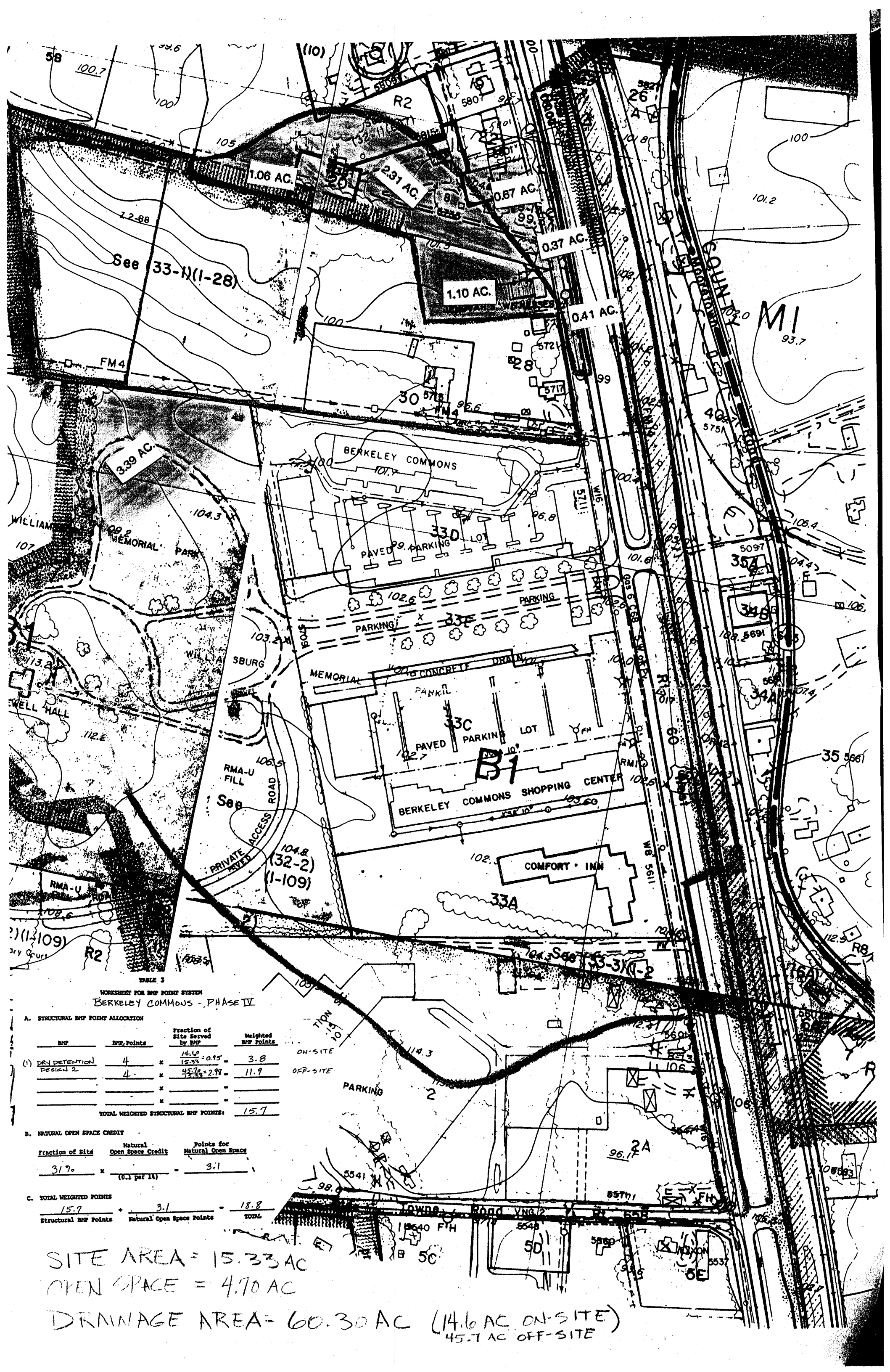



TABLE 3

WORKSHEET FOR BMP POINT SYSTEM

BERKELEY COMMONS - PHASE IV

A. STRUCTURAL BMP POINT ALLOCATION

| | BMP | BMP Points | | Fraction of Site Served by BMP | | Weighted BMP Points |
|---|---|---|---|---|---|---|
| (1) | DRY DETENTION DESIGN 2 | 4 | x | 14.6 / 15.33 = 0.95 | = | 3.8 |
| | | 4 | x | 45.7 / 15.33 = 2.98 | = | 11.9 |
| | | | x | | = | |
| | | | x | | = | |

TOTAL WEIGHTED STRUCTURAL BMP POINTS: 15.7

B. NATURAL OPEN SPACE CREDIT

| Fraction of Site | | Natural Open Space Credit (0.1 per 1%) | | Points for Natural Open Space |
|---|---|---|---|---|
| 31% | x | | = | 3.1 |

C. TOTAL WEIGHTED POINTS

| 15.7 | + | 3.1 | = | 18.8 |
|---|---|---|---|---|
| Structural BMP Points | | Natural Open Space Points | | TOTAL |

SITE AREA = 15.33 AC

OPEN SPACE = 4.70 AC

DRAINAGE AREA = 60.30 AC (14.6 AC ON-SITE, 45.7 AC OFF-SITE)

Langley and McDonald
A PROFESSIONAL CORPORATION
ENGINEERS · PLANNERS · SURVEYORS
VIRGINIA BEACH - WILLIAMSBURG, VIRGINIA

Subject: PC 066
SP-107-94

Computed By _____ Checked By _____

Project No. _____
Client _____
Date _____ Sheet No. _____

# Berkeley Commons Phase II - Drainage Calculations
## Table of Contents


| | | pg. |
|---|---|---|
| 1. | On site predevelopment runoff | 2 |
| 2. | " " postdevelopment runoff | 3 |
| 3. | Detention Basin Area & Volumes | 4 |
| 4. | Hydrograph (Basin 2 2yr storm, postdevelopment) | 5-6 |
| 5. | Hydrograph Routing | 7-10 |
| 6. | Hydrograph (Basin 2 10yr storm; post development) | 11-17 |
| 7. | Runoff Calculations - Entire Basin | 18 |
| 8. | Hydrograph (Entire Basin 10yr storm post-development) | 19 - 20 |
| | PG-5 capacity computations | |
| 9. | Drainage Area Map | 21 |
| 10. | Spread Calculations for turn lane | 22 |


21" Pipe -

$Q_{Basin}$ = 9.8 cfs

$Q_{Bypass}$ = 9.8 - 7 = 2.8

$Q_{BASIN}$ = 6.6 cfs  Max Depth = 98.1  0.2 ac/ft

$Q_{10}$ = 9.7  98.4  0.3 ac/ft

18" Pipe

Langley and McDonald
A PROFESSIONAL CORPORATION
ENGINEERS • PLANNERS • SURVEYORS
VIRGINIA BEACH - WILLIAMSBURG, VIRGINIA

Subject: Berkeley Commons Phase 2
Computed By: UCS Checked By:

Project No.
Client
Date Sheet No. 2

Pre-Development Runoff on site

A = 7.59
C = .6
CA = 4.55
$I_2$ = 4.0
$Q_2$ = 18.2 cfs

Time of Concentration

1. Overland Flow Time
   L = 230'
   C = .6
   S = 2.5%  $T_c$ = 10 min
2. Channel Time
   L = 600
   S = 1%  $T_c$ = 6.5 min
   16.5 min

Allowable discharge from basin = 18.2 - 7.02 = 11.2

runoff not draining to basin

Langley and McDonald
A PROFESSIONAL CORPORATION
ENGINEERS • PLANNERS • SURVEYORS
VIRGINIA BEACH - WILLIAMSBURG, VIRGINIA

Subject: Berkeley Commons Detention Basin Design
Computed By: WCS Checked By:

Project No.
Client
Date Sheet No. 3

Basin #1

1. Area on site not draining to detention basin:

A = 1.48 ac
C = .73
$I_{10}$ = 6.5 in/hr
$Q_{10}$ = 7.02 cfs

"C" computations

| | | | | |
|---|---|---|---|---|
| roof/pvmt. | 1.06 | x .9 | = | .950 |
| grass | .42 | x .3 | = | .126 |
| | | | | 1.080 = CA |
| | | | | .73 = C |

Time of Concentration

L = 360'
C = .9
S = 2%
$T_c$ = 7.5 min

Basin #2

2. Area on site draining to detention basin

A = 5.56
C = .77
CA = 4.278
$I_{10}$ = 5.5 inches/hour
$Q_{10}$ = 23.53 cfs

"C" computations

| | | | | |
|---|---|---|---|---|
| bldg/pvmt | 4.35 | x .9 | = | 3.915 |
| grass | 1.21 | x .3 | = | 0.363 |
| | | CA = | | 4.278 |
| | | C = | | |

Time of Concentration

1. Overland Flow Time
   L = 250'
   C = .9
   S = 0.86 %
   $T_c$ = 8 min
2. Channel Time
   L = 400'
   Ave. Velocity = 1.5 fps
   $T_c$ = 4 min
3. Total $T_c$ = 12 min

Langley and McDonald
A PROFESSIONAL CORPORATION
ENGINEERS • PLANNERS • SURVEYORS
VIRGINIA BEACH - WILLIAMSBURG, VIRGINIA

Subject _____

Computed By _____ Checked By _____

Project No. _____
Client _____
Date _____ Sheet No. 4

Detention Basin Area & Volumes

| Elev. (ft) | Area ($ft^2$) | Volume ($ft^3$) |
|---|---|---|
| 97.0 | 62 | |
| | | 2715.5 |
| 97.5 | 10,800 | |
| | | 5782.5 |
| 98.0 | 12,333 | |
| | | 6458.25 |
| 98.5 | 13500 | |
| | | 14,956.25 = Total Volume |

elev. vs. discharge

| Elev. | discharge | | | |
|---|---|---|---|---|
| | | | 21" | 24" |
| 97 | 0 | 0 | | |
| 97.5 | 2.5 | 3.0 | HW = .71 | HW/D = .40 |
| 98.0 | 5.5 | 8.0 | HW = 1.21 | HW/D = .69 |
| 98.5 | 10.0 | 14.0 | HW = 1.71 | HW/D = .98 |
| | 21" | 24" | | |

LANGLEY & McDONALD, P.C.
WILLIAMSBURG, VIRGINIA
1/10/88

# BERKELEY COMMONS
## HYDROLOGIC REPORT FOR
# DETENTION BASIN - PHASE II
## UNIVERSAL RATIONAL HYDROGRAPH

Q(PEAK) = C*I*A
2 YEAR STORM FREQUENCY

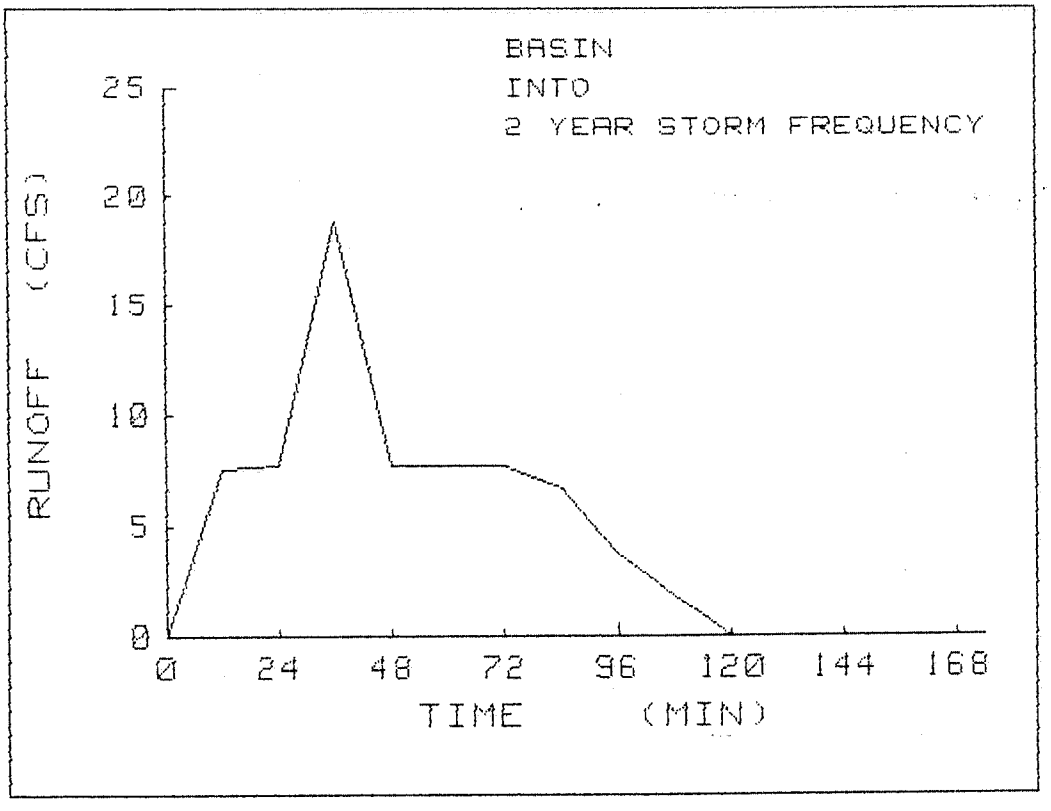
BASIN IDENTIFIER
DISCHARGES INTO PG-5 (VDOT EASEMENT)

BASIN AREA = 5.56 ACRES
RUNOFF COEFF. = .77
RAINFALL INT. = 4.40 IN/HR

| TIME (MIN) | RUNOFF (C.F.S.) |
|---|---|
| 0.0 | 0.0 |
| 6.0 | 3.8 |
| 12.0 | 7.5 |
| 18.0 | 7.6 |
| 24.0 | 7.7 |
| 30.0 | 13.3 |
| 36.0 | 18.8 |
| 42.0 | 13.3 |
| 48.0 | 7.7 |
| 54.0 | 7.7 |
| 60.0 | 7.7 |
| 66.0 | 7.7 |
| 72.0 | 7.7 |
| 78.0 | 7.2 |
| 84.0 | 6.7 |
| 90.0 | 5.2 |
| 96.0 | 3.7 |
| 102.0 | 2.7 |
| 108.0 | 1.8 |
| 114.0 | .9 |
| 120.0 | 0.0 |
| 126.0 | 0.0 |
| 132.0 | 0.0 |
| 138.0 | 0.0 |
| 144.0 | 0.0 |
| 150.0 | 0.0 |
| 156.0 | 0.0 |
| 162.0 | 0.0 |
| 168.0 | 0.0 |
| 174.0 | 0.0 |

LANGLEY & McDONALD, P.C.
WILLIAMSBURG, VIRGINIA
1/10/88

# HYDROLOGIC REPORT FOR



LANGLEY & McDONALD, P.C.
WILLIAMSBURG, VIRGINIA
1/10/88

# HYDROLOGIC REPORT FOR

## STAGE, STORAGE & DISCHARGE

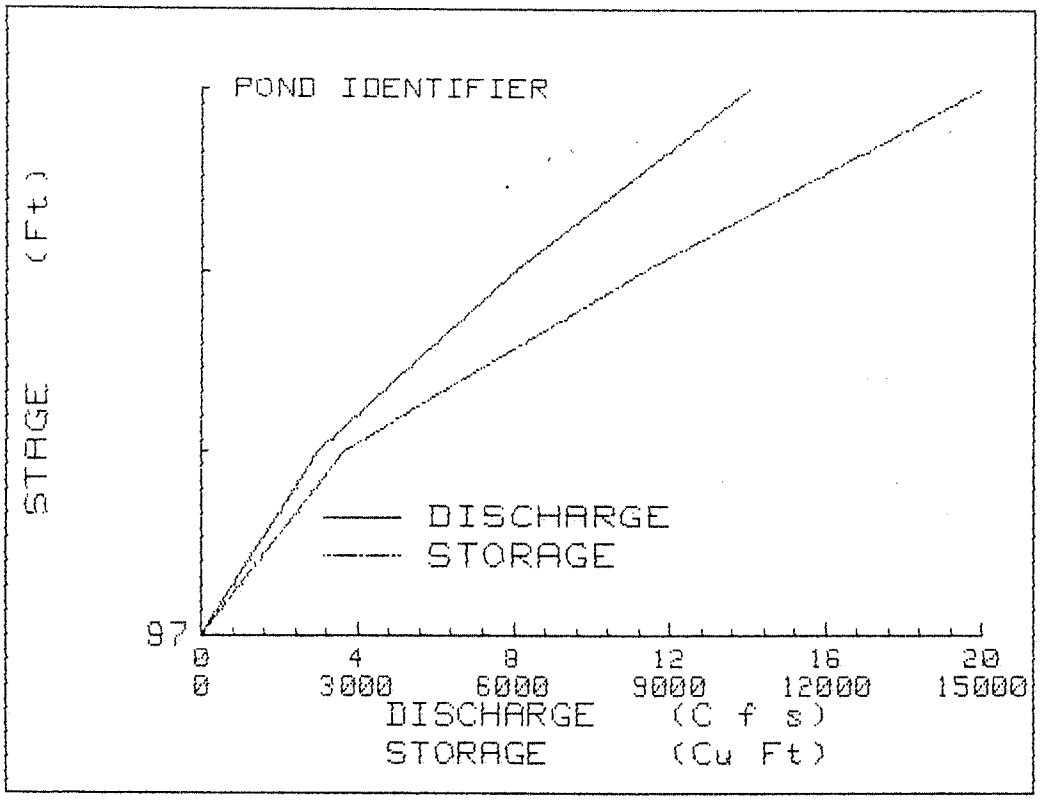
POND IDENTIFIER

24" RCP

| ELEV | STORAGE (CU.FT.) | OUTFLOW (CFS) | 2S/T+O (CFS) |
|---|---|---|---|
| 97.0 | 0.0 | 0.0 | 0.0 |
| 97.5 | 2715.5 | 3.0 | 18.1 |
| 98.0 | 8498.8 | 8.0 | 55.2 |
| 98.5 | 14957.0 | 14.0 | 97.1 |

LANGLEY & McDONALD, P.C.
WILLIAMSBURG, VIRGINIA
1/10/88

# HYDROLOGIC REPORT FOR



LANGLEY & McDONALD, P.C.
WILLIAMSBURG, VIRGINIA
1/10/88

# HYDROLOGIC REPORT FOR

# HYDROGRAPH RESERVOIR ROUTING

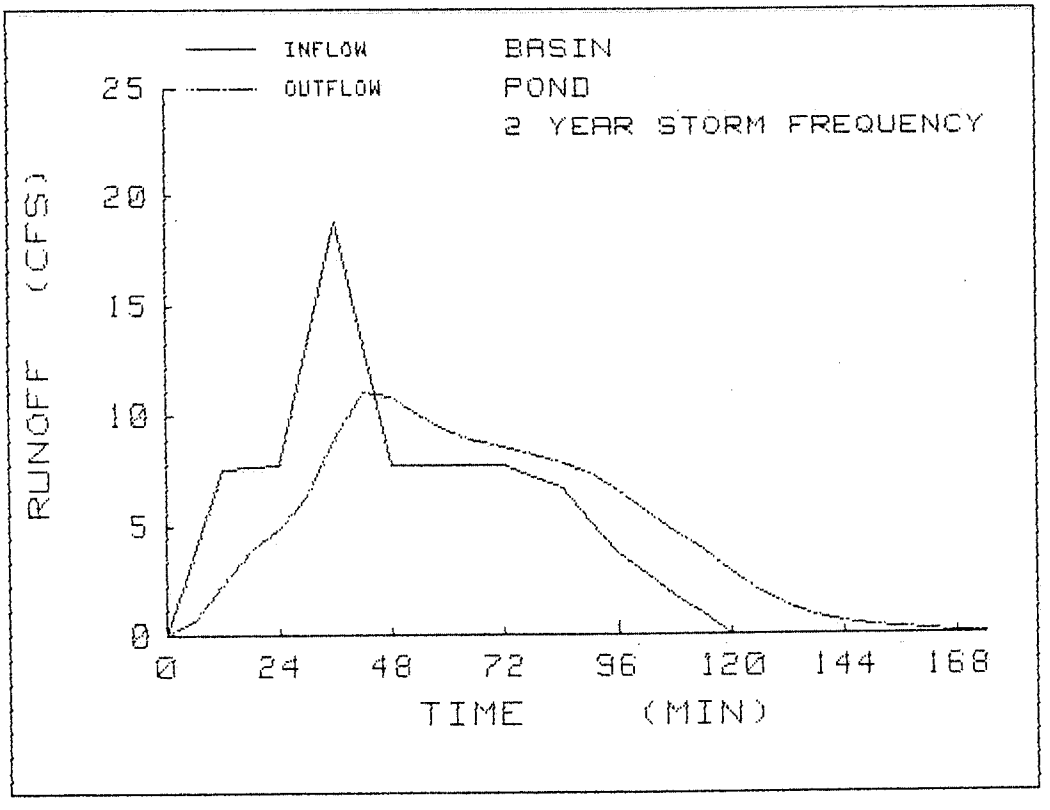
BASIN IDENTIFIER
POND IDENTIFIER
2 YEAR STORM FREQUENCY

| T | I1 | I2 | 2S1/T | O1 | 2S2/T +O2 | O2 | 2S2/T |
|---|---|---|---|---|---|---|---|
| 6.0 | 0.0 | 3.8 | 0.0 | 0.0 | 3.8 | .6 | 3.1 |
| 12.0 | 3.8 | 7.5 | 3.1 | .6 | 13.8 | 2.3 | 11.5 |
| 18.0 | 7.5 | 7.6 | 11.5 | 2.3 | 24.4 | 3.8 | 20.5 |
| 24.0 | 7.6 | 7.7 | 20.5 | 3.8 | 32.0 | 4.9 | 27.1 |
| 30.0 | 7.7 | 13.3 | 27.1 | 4.9 | 43.2 | 6.4 | 36.9 |
| 36.0 | 13.3 | 18.8 | 36.9 | 6.4 | 62.6 | 9.1 | 53.5 |
| 42.0 | 18.8 | 13.3 | 53.5 | 9.1 | 76.6 | 11.1 | 65.5 |
| 48.0 | 13.3 | 7.7 | 65.5 | 11.1 | 75.4 | 10.9 | 64.5 |
| 54.0 | 7.7 | 7.7 | 64.5 | 10.9 | 69.1 | 10.0 | 59.1 |
| 60.0 | 7.7 | 7.7 | 59.1 | 10.0 | 64.5 | 9.3 | 55.2 |
| 66.0 | 7.7 | 7.7 | 55.2 | 9.3 | 61.3 | 8.9 | 52.4 |
| 72.0 | 7.7 | 7.7 | 52.4 | 8.9 | 58.9 | 8.5 | 50.4 |
| 78.0 | 7.7 | 7.2 | 50.4 | 8.5 | 56.8 | 8.2 | 48.5 |
| 84.0 | 7.2 | 6.7 | 48.5 | 8.2 | 54.2 | 7.9 | 46.3 |
| 90.0 | 6.7 | 5.2 | 46.3 | 7.9 | 50.3 | 7.3 | 43.0 |
| 96.0 | 5.2 | 3.7 | 43.0 | 7.3 | 44.5 | 6.6 | 37.9 |
| 102.0 | 3.7 | 2.7 | 37.9 | 6.6 | 37.8 | 5.7 | 32.2 |
| 108.0 | 2.7 | 1.8 | 32.2 | 5.7 | 31.0 | 4.7 | 26.3 |
| 114.0 | 1.8 | .9 | 26.3 | 4.7 | 24.2 | 3.8 | 20.4 |
| 120.0 | .9 | 0.0 | 20.4 | 3.8 | 17.5 | 2.9 | 14.6 |
| 126.0 | 0.0 | 0.0 | 14.6 | 2.9 | 11.7 | 1.9 | 9.7 |
| 132.0 | 0.0 | 0.0 | 9.7 | 1.9 | 7.8 | 1.3 | 6.5 |
| 138.0 | 0.0 | 0.0 | 6.5 | 1.3 | 5.2 | .9 | 4.4 |
| 144.0 | 0.0 | 0.0 | 4.4 | .9 | 3.5 | .6 | 2.9 |
| 150.0 | 0.0 | 0.0 | 2.9 | .6 | 2.3 | .4 | 1.9 |
| 156.0 | 0.0 | 0.0 | 1.9 | .4 | 1.6 | .3 | 1.3 |
| 162.0 | 0.0 | 0.0 | 1.3 | .3 | 1.0 | .2 | .9 |
| 168.0 | 0.0 | 0.0 | .9 | .2 | .7 | .1 | .6 |
| 174.0 | 0.0 | 0.0 | .6 | .1 | .5 | .1 | .4 |

MAXIMUM ELEVATION = 98.3 FT
MAXIMUM STORAGE = 11793.0 CU FT
MAXIMUM DISCHARGE = 11.1 CFS

LANGLEY & McDONALD, P.C.
WILLIAMSBURG, VIRGINIA
1/10/88

# HYDROLOGIC REPORT FOR



LANGLEY & McDONALD, P.C.
WILLIAMSBURG, VIRGINIA
1/10/88

# BERKELEY COMMONS
HYDROLOGIC REPORT FOR

# DETENTION BASIN - PHASE II
UNIVERSAL RATIONAL HYDROGRAPH

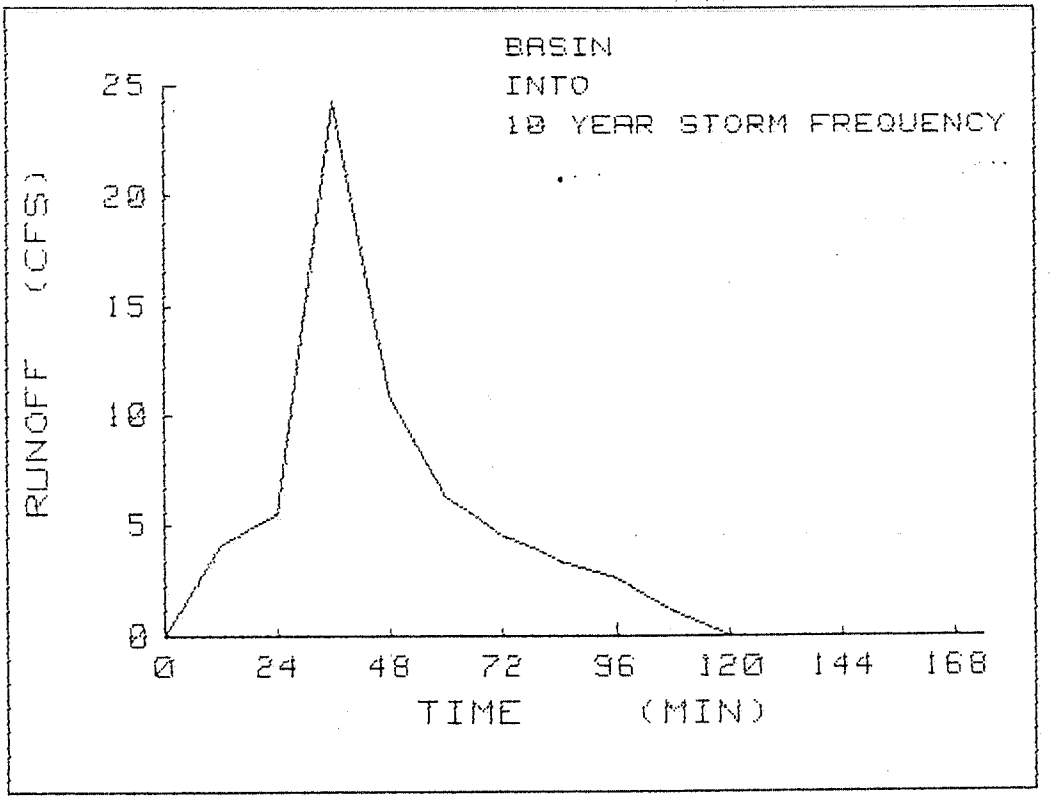
Q(PEAK) = C*I*A
10 YEAR STORM FREQUENCY

BASIN IDENTIFIER
DISCHARGES INTO PG-5 LVDOT EASEMENT

BASIN AREA = 5.56 ACRES
RUNOFF COEFF. = .77
RAINFALL INT. = 5.67 IN/HR

| TIME (MIN) | RUNOFF (C.F.S.) |
|---|---|
| 0.0 | 0.0 |
| 6.0 | 2.0 |
| 12.0 | 4.0 |
| 18.0 | 4.8 |
| 24.0 | 5.5 |
| 30.0 | 14.9 |
| 36.0 | 24.3 |
| 42.0 | 17.6 |
| 48.0 | 10.8 |
| 54.0 | 8.5 |
| 60.0 | 6.3 |
| 66.0 | 5.4 |
| 72.0 | 4.5 |
| 78.0 | 3.9 |
| 84.0 | 3.3 |
| 90.0 | 3.0 |
| 96.0 | 2.6 |
| 102.0 | 1.8 |
| 108.0 | 1.1 |
| 114.0 | .6 |
| 120.0 | 0.0 |
| 126.0 | 0.0 |
| 132.0 | 0.0 |
| 138.0 | 0.0 |
| 144.0 | 0.0 |
| 150.0 | 0.0 |
| 156.0 | 0.0 |
| 162.0 | 0.0 |
| 168.0 | 0.0 |
| 174.0 | 0.0 |

# HYDROLOGIC REPORT FOR



LANGLEY & McDONALD, P.C.
WILLIAMSBURG, VIRGINIA
1/10/88

# HYDROLOGIC REPORT FOR

## POND DEPTH VS STORAGE PROVIDED

POND IDENTIFIER

24" RCP

| ELEV feet | DEPTH feet | AREA sq.ft. | VOLUME cu.ft. | SUM VOL cu.ft. | OUTFLOW c.f.s. |
|---|---|---|---|---|---|
| 97.0 | | 62.0 | | 0.0 | 0.00 |
| | .5 | | 2715.5 | | |
| 97.5 | | 10800.0 | | 2715.5 | 3.00 |
| | .5 | | 5783.2 | | |
| 98.0 | | 12333.0 | | 8498.8 | 8.00 |
| | .5 | | 6458.2 | | |
| 98.5 | | 13500.0 | | 14957.0 | 14.00 |

LANGLEY & McDONALD, P.C.
WILLIAMSBURG, VIRGINIA
1/10/88

# HYDROLOGIC REPORT FOR

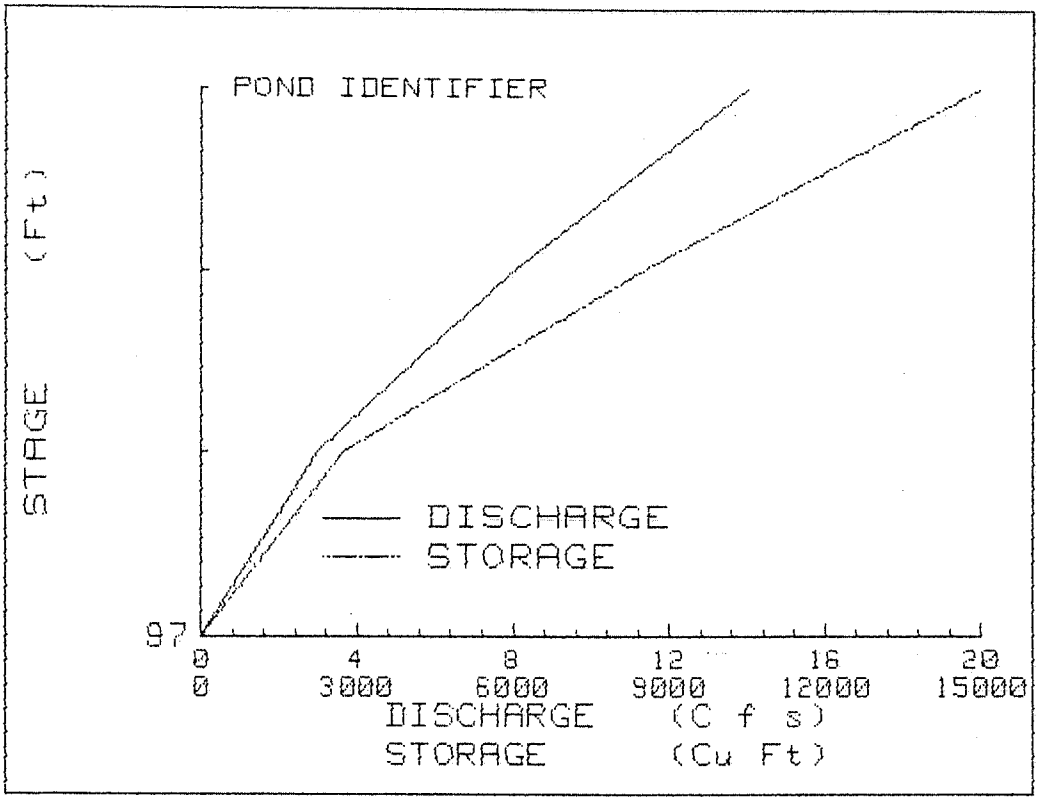
## STAGE, STORAGE & DISCHARGE

POND IDENTIFIER

| ELEV | STORAGE (CU.FT.) | OUTFLOW (CFS) | 2S/T+O (CFS) |
|---|---|---|---|
| 97.0 | 0.0 | 0.0 | 0.0 |
| 97.5 | 2715.5 | 3.0 | 18.1 |
| 98.0 | 8498.8 | 8.0 | 55.2 |
| 98.5 | 14957.0 | 14.0 | 97.1 |

LANGLEY & McDONALD, P.C.
WILLIAMSBURG, VIRGINIA
1/10/88

# HYDROLOGIC REPORT FOR



LANGLEY & McDONALD, P.C.
WILLIAMSBURG, VIRGINIA
1/10/88

# HYDROLOGIC REPORT FOR

# HYDROGRAPH RESERVOIR ROUTING

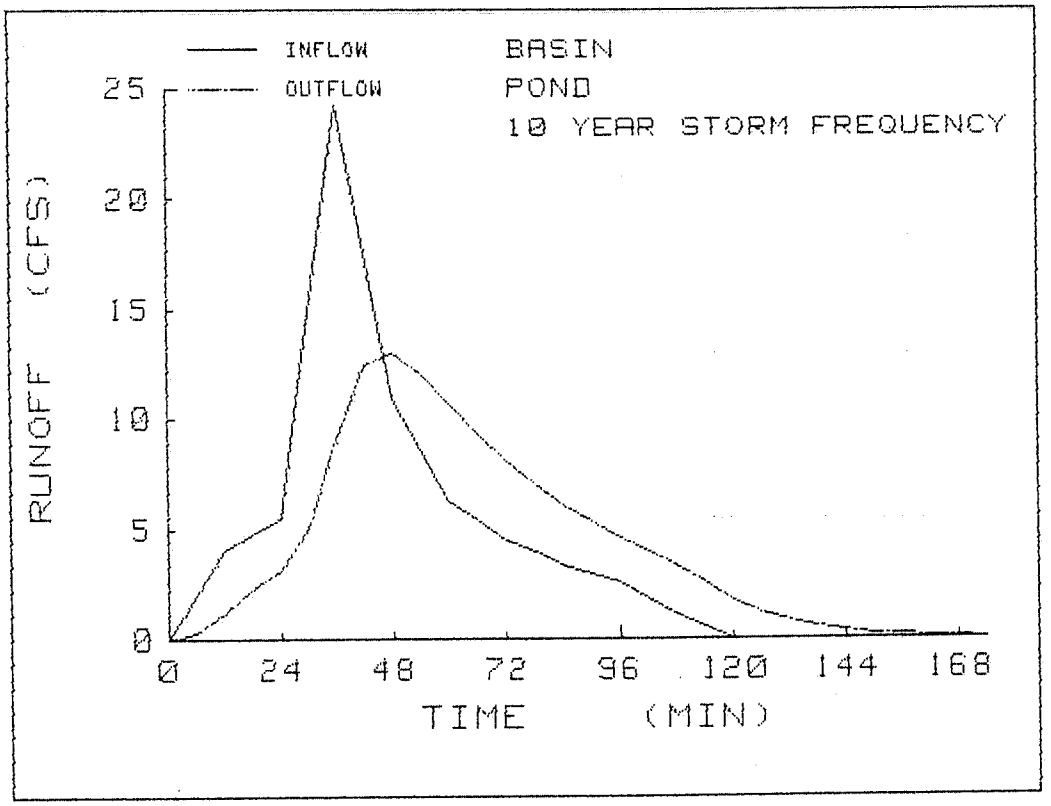
BASIN IDENTIFIER
POND IDENTIFIER
10 YEAR STORM FREQUENCY

| T | I1 | I2 | 2S1/T | O1 | 2S2/T +O2 | O2 | 2S2/T |
|---|---|---|---|---|---|---|---|
| 6.0 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | .3 | 1.7 |
| 12.0 | 2.0 | 4.0 | 1.7 | .3 | 7.4 | 1.2 | 6.2 |
| 18.0 | 4.0 | 4.8 | 6.2 | 1.2 | 13.7 | 2.3 | 11.4 |
| 24.0 | 4.8 | 5.5 | 11.4 | 2.3 | 19.4 | 3.2 | 16.2 |
| 30.0 | 5.5 | 14.9 | 16.2 | 3.2 | 33.4 | 5.1 | 28.3 |
| 36.0 | 14.9 | 24.3 | 28.3 | 5.1 | 62.4 | 9.0 | 53.4 |
| 42.0 | 24.3 | 17.6 | 53.4 | 9.0 | 86.2 | 12.4 | 73.7 |
| 48.0 | 17.6 | 10.8 | 73.7 | 12.4 | 89.7 | 12.9 | 76.8 |
| 54.0 | 10.8 | 8.5 | 76.8 | 12.9 | 83.2 | 12.0 | 71.2 |
| 60.0 | 8.5 | 6.3 | 71.2 | 12.0 | 74.0 | 10.7 | 63.3 |
| 66.0 | 6.3 | 5.4 | 63.3 | 10.7 | 64.2 | 9.3 | 54.9 |
| 72.0 | 5.4 | 4.5 | 54.9 | 9.3 | 55.6 | 8.1 | 47.5 |
| 78.0 | 4.5 | 3.9 | 47.5 | 8.1 | 48.0 | 7.0 | 40.9 |
| 84.0 | 3.9 | 3.3 | 40.9 | 7.0 | 41.2 | 6.1 | 35.1 |
| 90.0 | 3.3 | 3.0 | 35.1 | 6.1 | 35.3 | 5.3 | 29.9 |
| 96.0 | 3.0 | 2.6 | 29.9 | 5.3 | 30.2 | 4.6 | 25.5 |
| 102.0 | 2.6 | 1.8 | 25.5 | 4.6 | 25.3 | 4.0 | 21.3 |
| 108.0 | 1.8 | 1.1 | 21.3 | 4.0 | 20.3 | 3.3 | 17.0 |
| 114.0 | 1.1 | .6 | 17.0 | 3.3 | 15.4 | 2.6 | 12.8 |
| 120.0 | .6 | 0.0 | 12.8 | 2.6 | 10.8 | 1.8 | 9.0 |
| 126.0 | 0.0 | 0.0 | 9.0 | 1.8 | 7.2 | 1.2 | 6.0 |
| 132.0 | 0.0 | 0.0 | 6.0 | 1.2 | 4.8 | .8 | 4.0 |
| 138.0 | 0.0 | 0.0 | 4.0 | .8 | 3.2 | .5 | 2.7 |
| 144.0 | 0.0 | 0.0 | 2.7 | .5 | 2.2 | .4 | 1.8 |
| 150.0 | 0.0 | 0.0 | 1.8 | .4 | 1.4 | .2 | 1.2 |
| 156.0 | 0.0 | 0.0 | 1.2 | .2 | 1.0 | .2 | .8 |
| 162.0 | 0.0 | 0.0 | .8 | .2 | .6 | .1 | .5 |
| 168.0 | 0.0 | 0.0 | .5 | .1 | .4 | .1 | .4 |
| 174.0 | 0.0 | 0.0 | .4 | .1 | .3 | 0.0 | .2 |

MAXIMUM ELEVATION = 98.4 FT
MAXIMUM STORAGE = 13816.2 CU FT
MAXIMUM DISCHARGE = 12.9 CFS

LANGLEY & McDONALD, P.C.
WILLIAMSBURG, VIRGINIA
1/10/88

# HYDROLOGIC REPORT FOR



Langley and McDonald
A PROFESSIONAL CORPORATION
ENGINEERS • PLANNERS • SURVEYORS
VIRGINIA BEACH • WILLIAMSBURG, VIRGINIA

Subject: Berkeley Commons Phase 2
Computed By: WCS Checked By:

Project No.:
Client:
Date: Sheet No. 18

Total Basin Draining to PG-5:

A = 37.26
C = .43
$I_{10}$ = 2.54
$Q_{10}$ = 40.7 cfs

Time of Concentration

1. Overland Flow Time
   L = 200
   C = .25
   S = 1.0%
   $T_c$ = 23 min
2. Channel Time (Kirpich Chart)
   L = 1200'
   ΔEL = 1'
   $T_c$ = 27 min
4. Total $T_c$ = 50 min
5. Pipe Time = 2 min
6. Total $T_c$ = 52 min

LANGLEY & McDONALD, P.C.
WILLIAMSBURG, VIRGINIA
1/10/88

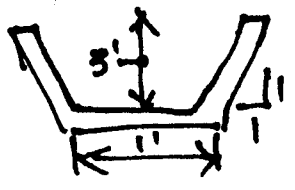
# BERKELEY COMMONS
HYDROLOGIC REPORT FOR
# PG-5 IN VDOT EASEMENT (North ℄)
UNIVERSAL RATIONAL HYDROGRAPH

Q(PEAK) = C*I*A
10 YEAR STORM FREQUENCY

BASIN IDENTIFIER
DISCHARGES INTO

BASIN AREA = 37.26 ACRES
RUNOFF COEFF. = .43
RAINFALL INT. = 2.54 IN/HR

| TIME (MIN) | RUNOFF (C.F.S.) |
|---|---|
| 0.0 | 0.0 |
| 26.0 | 1.7 |
| 52.0 | 3.5 |
| 78.0 | 3.9 |
| 104.0 | 4.3 |
| 130.0 | 22.5 |
| 156.0 | 40.7 |
| 182.0 | 26.9 |
| 208.0 | 13.0 |
| 234.0 | 8.7 |
| 260.0 | 4.4 |
| 286.0 | 4.3 |
| 312.0 | 4.2 |
| 338.0 | 3.2 |
| 364.0 | 2.2 |
| 390.0 | 2.1 |
| 416.0 | 2.0 |
| 442.0 | 1.0 |
| 468.0 | 0.0 |
| 494.0 | 0.0 |
| 520.0 | 0.0 |
| 546.0 | 0.0 |
| 572.0 | 0.0 |
| 598.0 | 0.0 |
| 624.0 | 0.0 |
| 650.0 | 0.0 |
| 676.0 | 0.0 |
| 702.0 | 0.0 |
| 728.0 | 0.0 |
| 754.0 | 0.0 |

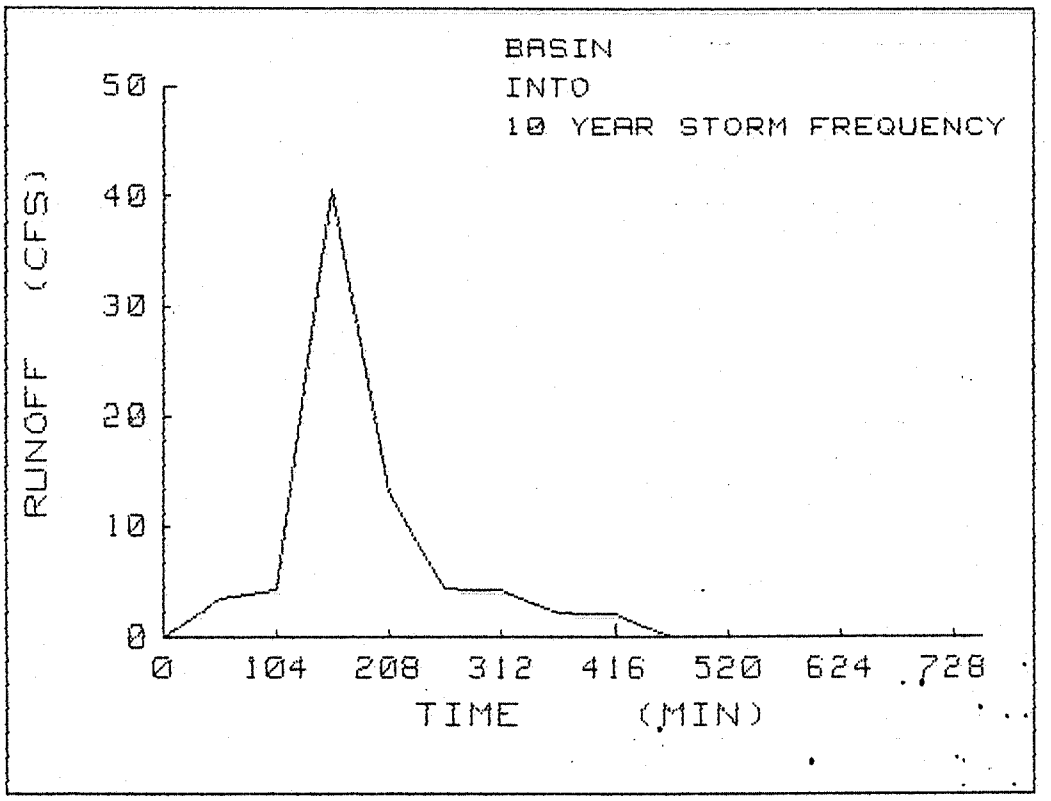



d = 3'
Q = 62.2 cfs
S = 0.2%
n = .015
V = 5.2 fps

d = 2.5
Q = 40.9
V = 4.7 fps

LANGLEY & McDONALD, P.C.
WILLIAMSBURG, VIRGINIA
1/10/88

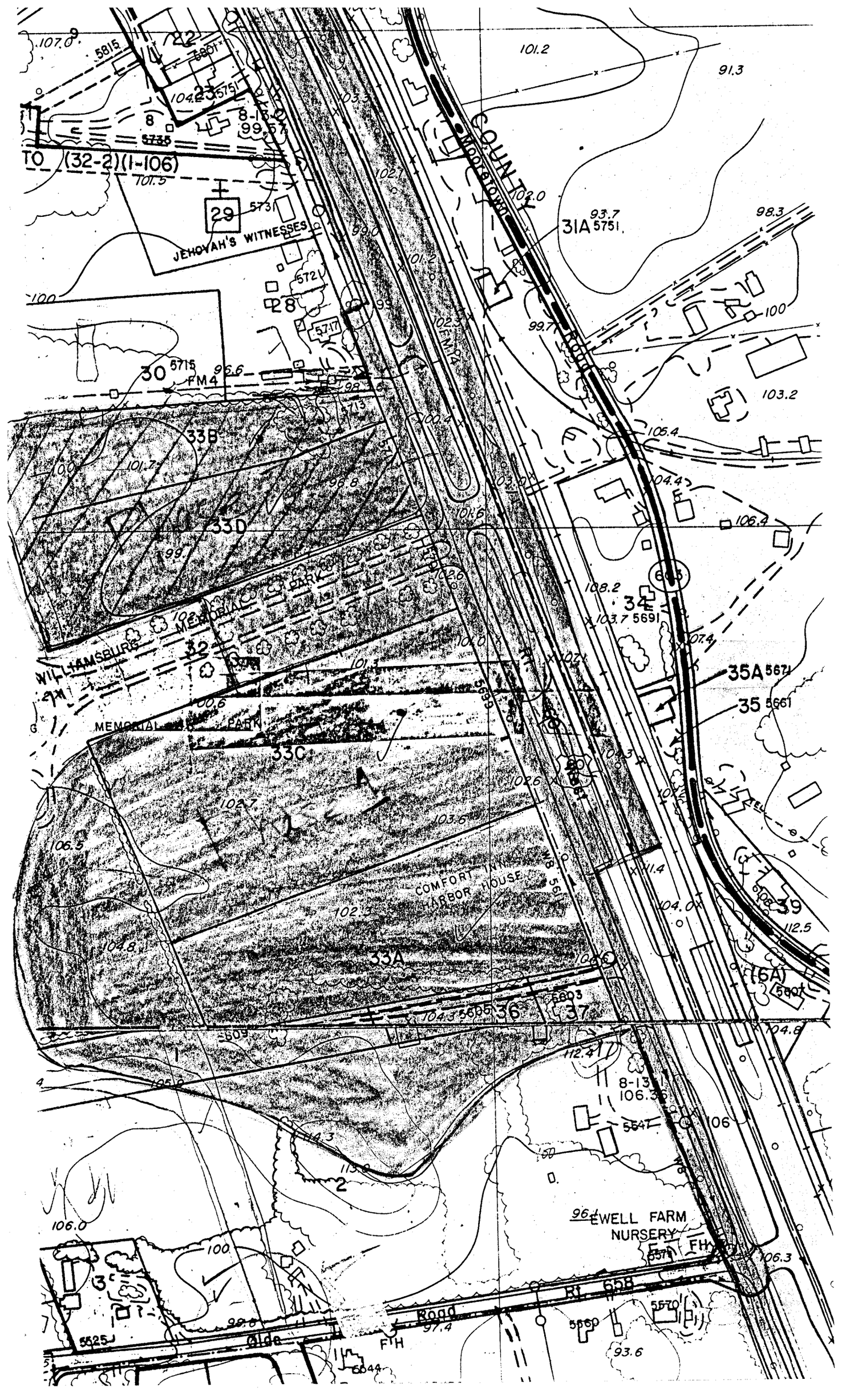
HYDROLOGIC REPORT FOR




RR · Design

- equivalent to a 36" pipe -

$F = \frac{V}{\sqrt{gD}} =$


COUNTY
Moorestown
Road
FM4
JEHOVAH'S WITNESSES
(32-2)(1-106)
31A
30
33B
33D
33C
33A
34
35A
35
39
(6A)
36
37
32
29
28
MEMORIAL PARK
COMFORT INN
HARBOR HOUSE
EWELL FARM
NURSERY
Olde
Road
FTH
RT 658

Langley and McDonald
A PROFESSIONAL CORPORATION
ENGINEERS • PLANNERS • SURVEYORS
VIRGINIA BEACH - WILLIAMSBURG, VIRGINIA

Subject: Drainage Calculations Berkeley Commons II
Computed By: WCS Checked By:

Project No. 87040-7
Client: Almac Ltd. Part.
Date: Sheet No. 22

Turn Lane Inlet - DI-7 - operates as 10' inlet on continuous grade.

A = 1.20 ac
C = .40
I = 3.5 in/hr
Q = 1.7 cfs

Given: Q = 1.4
n = .015
S = .0035 ft/ft
$S_x$ = .0208
CG-3

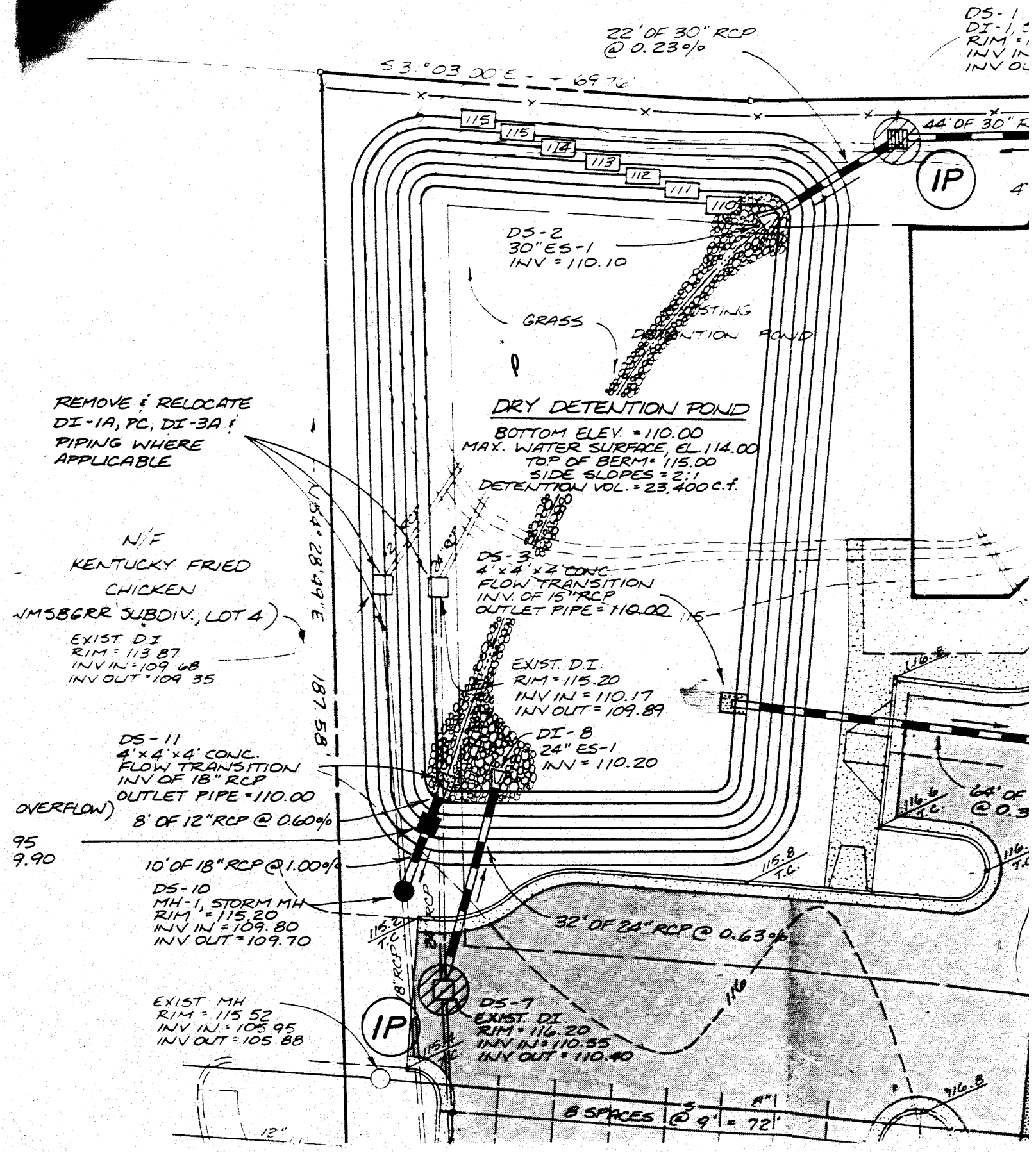
Find: L for 100% interception ($L_T$)
1. T = 10'
2. From Chart 15 $L_T$ = 16'

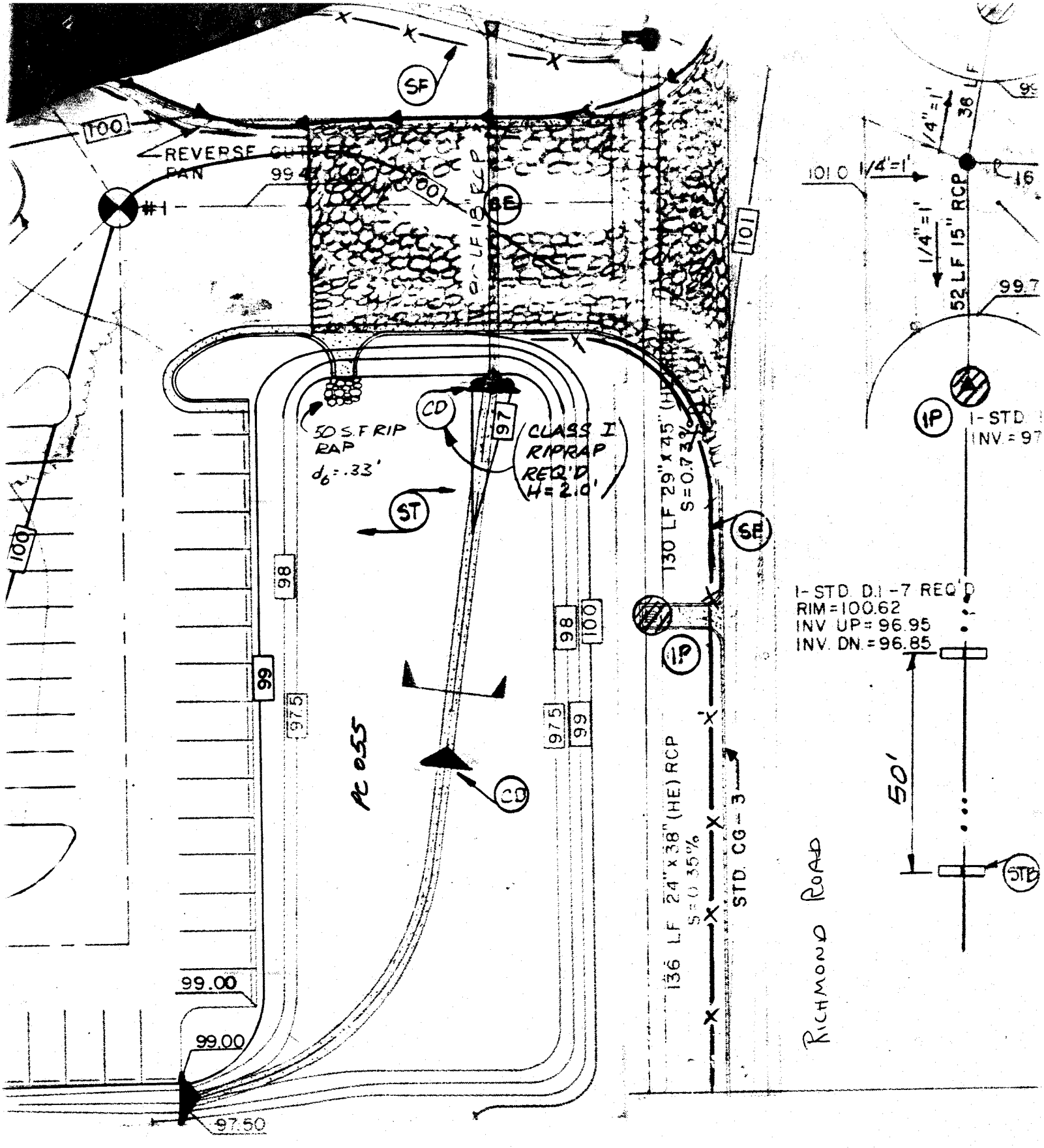
(Note: With no interception, spread does not encroach on main line roadway).

3m K.F.C.

LIGHTFOOT BOUTIQUES

RICHMOND RD - LIGHTFOOT






BERKELEY COMMONS
DETENTION BASIN PHASE 2

BERKELEY COMMONS
SHOPPING CENTER - PH I

YC 002

PC055

SURFACE STONE
MIN $d_{50}$: 0.67'

CORE STONE
VDOT #1

SEC 1-1
N.T.S.

24 L.F. 21" RCP
INV. UP: 100.26
INV. DN.: 100.20

INSTALL BASIN AS INITIAL ITEM TO FUNCTION AS SEDIMENT BASIN DURING CONSTRUCTION A CLEAN WHEN SEDIMENT BUILDS TO DEPTH OF

2' @ ROCK BARRIER @ OUTLET. REMOVE BARRIER AS LAST CONST. ITEM.

NO CURB THIS SIDE

4" CONC. SIDEWALK

Richmond Road

(East Bound Lanes)

Langley and McDonald
A PROFESSIONAL CORPORATION
ENGINEERS • PLANNERS • SURVEYORS
VIRGINIA BEACH – WILLIAMSBURG, VIRGINIA

Subject: ELEVATION – STORAGE & DISCHARGE
Computed By: DHM Checked By:

Project No. 87-40
Client: ALAN GLEN
Date: 5/11/87 Sheet No. 1

BERKELEY COMMONS SHOPPING CENTER, PH 1

# DETENTION BASIN

SEE SITE PLAN FOR BASIN CONFIGURATION

| STORAGE | | AREA | STORAGE | CUMULATIVE STORAGE |
|---|---|---|---|---|
| ELEVATION | 103.00 | 15930 S.F. | | |
| | | | 14940 cf | 31,455 |
| ELEVATION | 102.00 | 13950 SF | | |
| | | | 11745 cf | 16,515 |
| ELEVATION | 101.00 | 9540 SF | | |
| | | | 4770 cf | 4770 |
| ELEVATION | 100.48 | 0 | | |

1.5 51/67 1/AC
2.39 ac

## DISCHARGE FOR 21" ϕ OUTLET.

| | ELEV | HW/D | DISCHG. C.F.S. |
|---|---|---|---|
| 4 | 103 | 1.56 | 20 |
| 3 | 102 | 1.0 | 10 |
| 2 | 101 | 0.42 | 2.5 |
| 1 | 100.48 | 0.12 | 0 |

INV. OUT 100.2

Langley and McDonald
A PROFESSIONAL CORPORATION
ENGINEERS · PLANNERS · SURVEYORS
VIRGINIA BEACH · WILLIAMSBURG, VIRGINIA

Subject _____
Computed By _____ Checked By _____

Project No. _____
Client _____
Date _____ Sheet No. 2

TOTAL SITE AREA = 8.25 Ac.

PRE-DEV. CONDITIONS
HIGH PT. 106.7
LOW PT. 100.7
Δ = 6.0'

LENGTH = 820'
PRE-DEV. $T_c$ = 9 MIN. × 1.5 = 13.5 MIN.

FROM KIRPICH: A MULTIPLIER OF "2" IS USED FOR OVERLAND FLOW ON GRASS SURFACE, MULTIPLIER OF "1" IS USED FOR OVERLAND FLOW ON BARE EARTH, MULTIPLIER OF "1.5" IS USED FOR OVERLAND FLOW ON CROPLAND.

POST DEV. $T_c$
HIGH POINT PROPOSED 105.5
LOW POINT 103.0

POST DEV. $T_c$ = 7 MIN.

PRE DEV. PEAK $Q_2$

$Q_{10}$ = ACI
$Q_{10}$ = 8.25 (0.6)(4"/hr) 2.7 =
$Q_{10}$ = 19.8 cfs. 18 cfs
$T_c$ = 30 min.

From SCS model computer 12 + 20 — post $Q_2$ "$Q_2$"

POST DEV. PEAK $Q_2$

$Q_{10}$ = ACI
$Q_{10}$ = (8.25)(0.8)(7")
$Q_{10}$ = 46.2 cfs.

Post = 18 min = 23 cfs

Actual Pipe out flow = 10 cfs w/ 21" pipe

21" ϕ BASIN DISCHARGE HAS FLOW OF 19 cfs WITH $\frac{HW}{D}$ = 1.56 THIS IS CONDITION WITH BASIN FULL TO ELEV. 103 AND DISCHARGE PIPE @ ELEV. 100.26

Langley and McDonald
A PROFESSIONAL CORPORATION
ENGINEERS • PLANNERS • SURVEYORS
VIRGINIA BEACH - WILLIAMSBURG VIRGINIA

Subject

Computed By Checked By

Project No. 87-40
Client ALAN GLEN
Date 5/11/87 Sheet No. 3

CHECK OF DRAINAGE CHANNEL CAPACITY ALONG NORTHERN PROPERTY LINE

CALC BASED UPON MANNING FORMULA

$$Q = A \frac{1.486}{0.015} (R)^{2/3} (S)^{1/2}$$

ASSUME S = 0.0025 CONSTANT.

| DIST. FROM FRONT ℄ CORNER | DRAINAGE AREA | "C" | $I_{10}$ IN/HR. | INFLOW C.F.S. | CHANNEL DEPTH FT. | R | CAPACITY C.F.S. |
|---|---|---|---|---|---|---|---|
| 600' | 260' x 390' | 0.8 | 7 | 14.5 | 1 | 0.8 | 34 |
| 475' | 380' x 390' | 0.8 | 7 | 19.0 | 1.25 | 0.95 | 47.9 |
| 355' | 500' x 390' | 0.8 | 7 | 25 | 1.5 | 1.09 | 63.0 |
| 235' | 620' x 390' | 0.8 | 7 | 31.1 | 1.5 | 1.09 | 63.0 |
| 115 | 740' x 390' | 0.8 | 7 | 37.0 | 1.5 | 1.09 | 63.0 |

$Q = VA$ $V = Q/A = 34/8 = 4.25$ ft/sec

$V = \frac{1.486}{.015} \times \left(\frac{8 \times d}{8+2d}\right)^{2/3} \times .0025^{1/2}$ $Q = 11.5$

$= 2.9$ .05

## CONCLUSION

CHANNEL IS ADEQUATE. THE CAPACITY EXCEEDS INFLOW.

POST $T_c = \frac{1100 \text{ ft}}{3 \text{ ft/sec}} + 5 \text{ min} = 6 \text{ min} + 5 \text{ min} = 10 \text{ min}$

PRE $T_c = 22 \text{ min} + \frac{500'}{8 \text{ min}} = 30 \text{ min}$

W/S Slope = $\frac{0.107 - 100}{850} = 1\%$

HL = 850

IMP = 0%

RCN - 83

POST - 91

% IMP = 70%

HL = 1200 % Mod = 80%

LANGLEY & McDONALD, P.C.
WILLIAMSBURG, VIRGINIA
4/28/87

# HYDROLOGIC REPORT FOR
# U.S. ROUTE 60 SHOPPING CENTER
# UNIVERSAL RATIONAL HYDROGRAPH

Q(PEAK) = C*I*A
10 YEAR STORM FREQUENCY

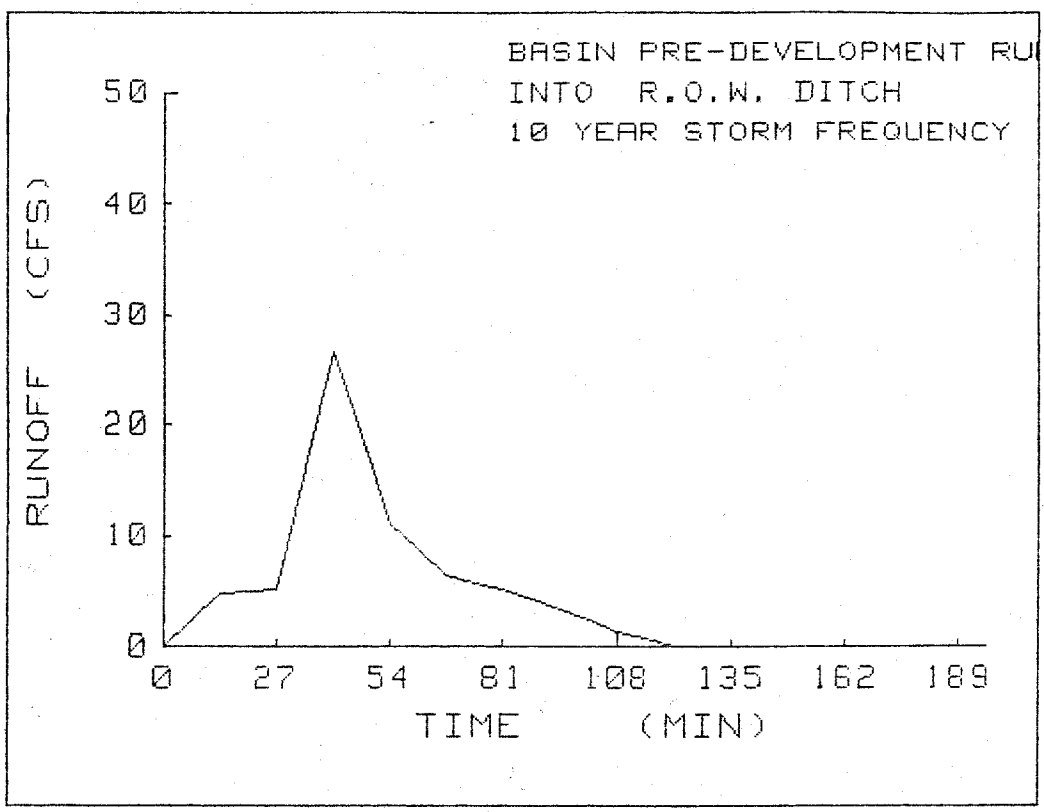
BASIN IDENTIFIER PRE-DEVELOPMENT RUNOFF
DISCHARGES INTO R.O.W. DITCH

BASIN AREA = 8.25 ACRES
RUNOFF COEFF. = .60
RAINFALL INT. = 5.40 IN/HR

| TIME (MIN) | RUNOFF (C.F.S.) |
|---|---|
| 0.0 | 0.0 |
| 6.8 | 2.4 |
| 13.5 | 4.9 |
| 20.3 | 5.0 |
| 27.0 | 5.2 |
| 33.8 | 16.0 |
| 40.5 | 26.7 |
| 47.3 | 18.9 |
| 54.0 | 11.1 |
| 60.8 | 8.8 |
| 67.5 | 6.4 |
| 74.3 | 5.8 |
| 81.0 | 5.2 |
| 87.8 | 4.2 |
| 94.5 | 3.3 |
| 101.3 | 2.3 |
| 108.0 | 1.4 |
| 114.8 | .7 |
| 121.5 | 0.0 |
| 128.3 | 0.0 |
| 135.0 | 0.0 |
| 141.8 | 0.0 |
| 148.5 | 0.0 |
| 155.2 | 0.0 |
| 162.0 | 0.0 |
| 168.8 | 0.0 |
| 175.5 | 0.0 |
| 182.2 | 0.0 |
| 189.0 | 0.0 |
| 195.8 | 0.0 |

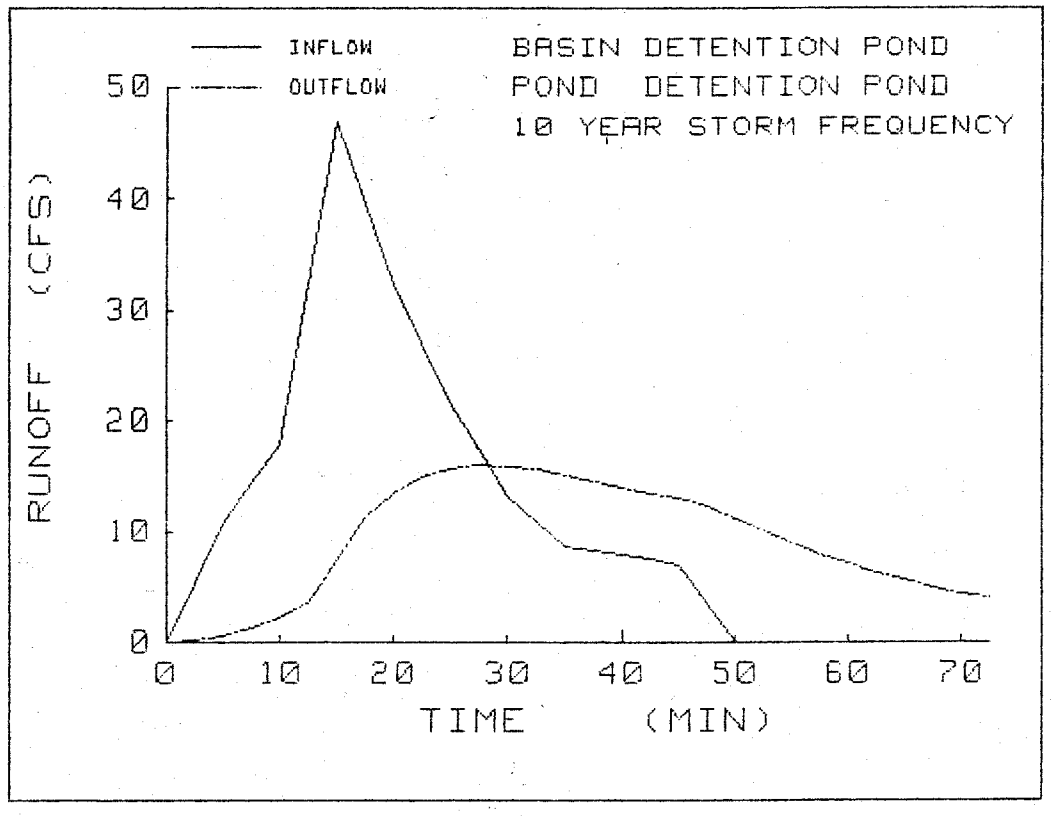
LANGLEY & McDONALD, P.C.
WILLIAMSBURG, VIRGINIA
4/28/87

# HYDROLOGIC REPORT FOR U.S. ROUTE 60 SHOPPING CENTER



LANGLEY & McDONALD, P.C.
WILLIAMSBURG, VIRGINIA
4/28/87

# HYDROLOGIC REPORT FOR U.S. ROUTE 60 SHOPPING CENTER



LANGLEY & McDONALD, P.C.
WILLIAMSBURG, VIRGINIA
4/28/87

# HYDROLOGIC REPORT FOR
# U.S. ROUTE 60 SHOPPING CENTER
# HYDROGRAPH RESERVOIR ROUTING

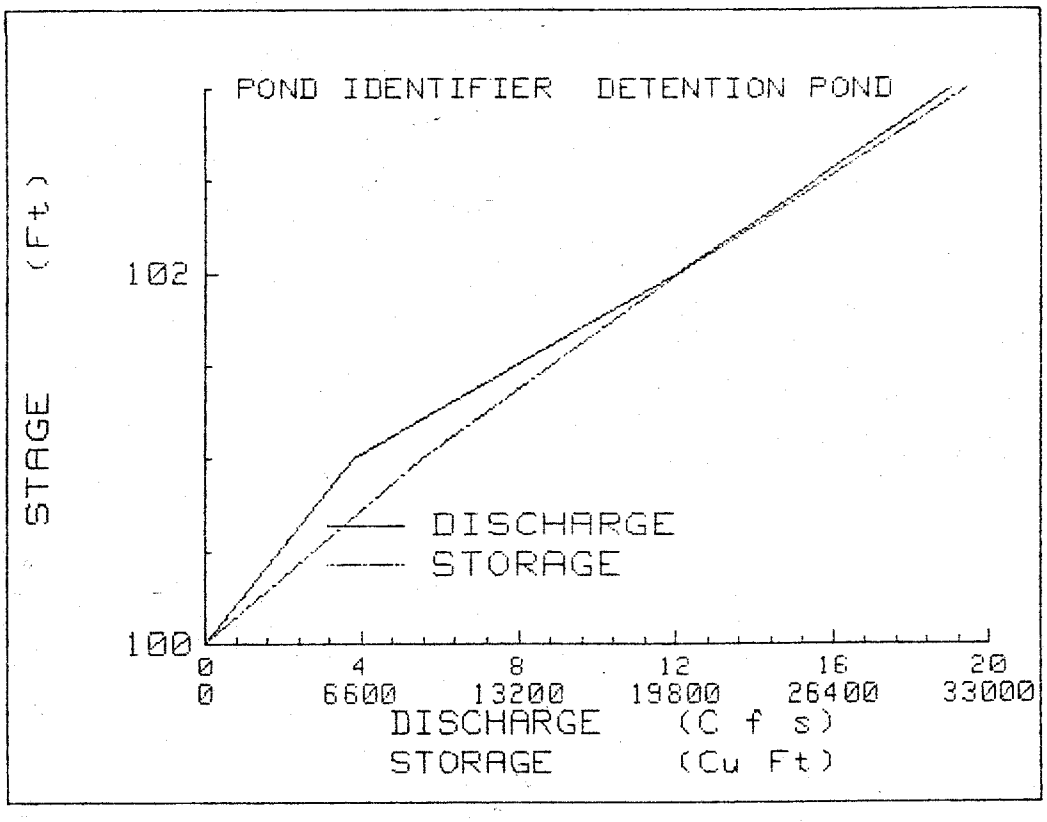
BASIN IDENTIFIER DETENTION POND
POND IDENTIFIER DETENTION POND
10 YEAR STORM FREQUENCY

| T | I1 | I2 | 2S1/T | O1 | 2S2/T +O2 | O2 | 2S2/T |
|---|---|---|---|---|---|---|---|
| 2.5 | 0.0 | 5.4 | 0.0 | 0.0 | 5.4 | .2 | 5.2 |
| 5.0 | 5.4 | 10.7 | 5.2 | .2 | 21.1 | .6 | 20.5 |
| 7.5 | 10.7 | 14.3 | 20.5 | .6 | 44.9 | 1.4 | 43.5 |
| 10.0 | 14.3 | 17.8 | 43.5 | 1.4 | 74.2 | 2.2 | 72.0 |
| 12.5 | 17.8 | 32.3 | 72.0 | 2.2 | 119.9 | 3.6 | 116.3 |
| 15.0 | 32.3 | 46.9 | 116.3 | 3.6 | 191.9 | 7.4 | 184.5 |
| 17.5 | 46.9 | 39.6 | 184.5 | 7.4 | 263.6 | 11.3 | 252.3 |
| 20.0 | 39.6 | 32.3 | 252.3 | 11.3 | 312.9 | 13.5 | 299.4 |
| 22.5 | 32.3 | 27.1 | 299.4 | 13.5 | 345.3 | 14.8 | 330.5 |
| 25.0 | 27.1 | 21.8 | 330.5 | 14.8 | 364.5 | 15.6 | 348.9 |
| 27.5 | 21.8 | 17.5 | 348.9 | 15.6 | 372.5 | 16.0 | 356.6 |
| 30.0 | 17.5 | 13.2 | 356.6 | 16.0 | 371.3 | 15.9 | 355.4 |
| 32.5 | 13.2 | 10.9 | 355.4 | 15.9 | 363.6 | 15.6 | 348.0 |
| 35.0 | 10.9 | 8.6 | 348.0 | 15.6 | 351.9 | 15.1 | 336.8 |
| 37.5 | 8.6 | 8.2 | 336.8 | 15.1 | 338.5 | 14.6 | 323.9 |
| 40.0 | 8.2 | 7.9 | 323.9 | 14.6 | 325.6 | 14.0 | 311.5 |
| 42.5 | 7.9 | 7.5 | 311.5 | 14.0 | 312.9 | 13.5 | 299.4 |
| 45.0 | 7.5 | 7.1 | 299.4 | 13.5 | 300.5 | 13.0 | 287.5 |
| 47.5 | 7.1 | 3.5 | 287.5 | 13.0 | 285.2 | 12.4 | 272.8 |
| 50.0 | 3.5 | 0.0 | 272.8 | 12.4 | 264.0 | 11.3 | 252.7 |
| 52.5 | 0.0 | 0.0 | 252.7 | 11.3 | 241.4 | 10.1 | 231.3 |
| 55.0 | 0.0 | 0.0 | 231.3 | 10.1 | 221.2 | 9.0 | 212.2 |
| 57.5 | 0.0 | 0.0 | 212.2 | 9.0 | 203.2 | 8.0 | 195.2 |
| 60.0 | 0.0 | 0.0 | 195.2 | 8.0 | 187.2 | 7.1 | 180.1 |
| 62.5 | 0.0 | 0.0 | 180.1 | 7.1 | 173.0 | 6.4 | 166.6 |
| 65.0 | 0.0 | 0.0 | 166.6 | 6.4 | 160.3 | 5.7 | 154.6 |
| 67.5 | 0.0 | 0.0 | 154.6 | 5.7 | 148.9 | 5.0 | 143.9 |
| 70.0 | 0.0 | 0.0 | 143.9 | 5.0 | 138.8 | 4.5 | 134.4 |
| 72.5 | 0.0 | 0.0 | 134.4 | 4.5 | 129.9 | 4.0 | 125.9 |

MAXIMUM ELEVATION = 102.6 FT
MAXIMUM STORAGE = 26742.2 CU FT
MAXIMUM DISCHARGE = 16.0 CFS

LANGLEY & McDONALD, P.C.
WILLIAMSBURG, VIRGINIA
4/28/87

# HYDROLOGIC REPORT FOR U.S. ROUTE 60 SHOPPING CENTER



LANGLEY & McDONALD, P.C.
WILLIAMSBURG, VIRGINIA
4/28/87

# HYDROLOGIC REPORT FOR U.S. ROUTE 60 SHOPPING CENTER

## STAGE, STORAGE & DISCHARGE

POND IDENTIFIER DETENTION POND

| ELEV | STORAGE (CU.FT.) | OUTFLOW (CFS) | 2S/T+O (CFS) |
|---|---|---|---|
| 100.0 | 0.0 | 0.0 | 0.0 |
| 101.0 | 9174.0 | 3.8 | 126.1 |
| 102.0 | 19836.0 | 12.0 | 276.5 |
| 103.0 | 32058.0 | 19.0 | 446.4 |

LANGLEY & McDONALD, P.C.
WILLIAMSBURG, VIRGINIA
4/28/87

# HYDROLOGIC REPORT FOR

# U.S. ROUTE 60 SHOPPING CENTER

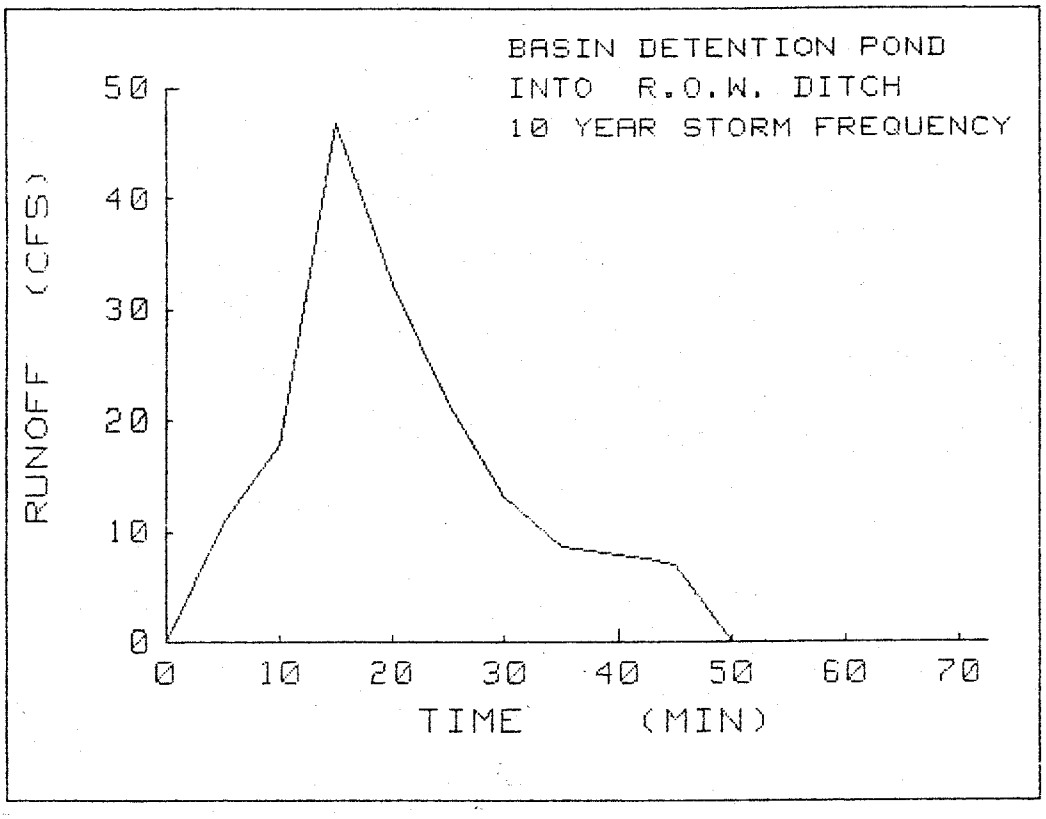
## POND DEPTH VS STORAGE PROVIDED

POND IDENTIFIER DETENTION POND

| ELEV feet | DEPTH feet | AREA sq.ft. | VOLUME cu.ft. | SUM VOL cu.ft. | OUTFLOW c.f.s. |
|---|---|---|---|---|---|
| 100.0 | | 8448.0 | | 0.0 | 0.00 |
| | 1.0 | | 9174.0 | | |
| 101.0 | | 9900.0 | | 9174.0 | 3.80 |
| | 1.0 | | 10662.0 | | |
| 102.0 | | 11424.0 | | 19836.0 | 12.00 |
| | 1.0 | | 12222.0 | | |
| 103.0 | | 13020.0 | | 32058.0 | 19.00 |

LANGLEY & McDONALD, P.C.
WILLIAMSBURG, VIRGINIA
4/28/87

# HYDROLOGIC REPORT FOR U.S. ROUTE 60 SHOPPING CENTER



LANGLEY & McDONALD, P.C.
WILLIAMSBURG, VIRGINIA
4/28/87

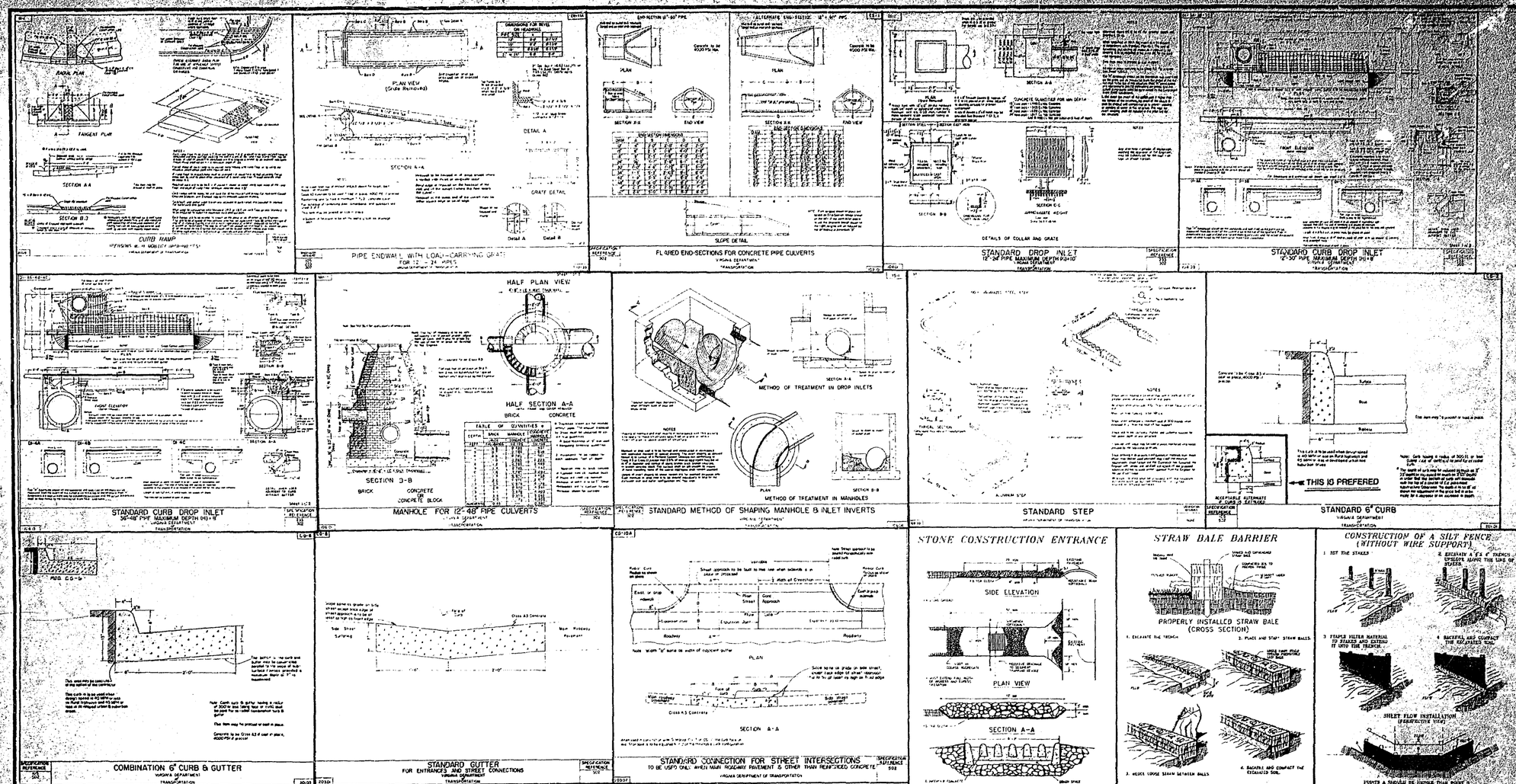
# HYDROLOGIC REPORT FOR
# U.S. ROUTE 60 SHOPPING CENTER
# UNIVERSAL RATIONAL HYDROGRAPH

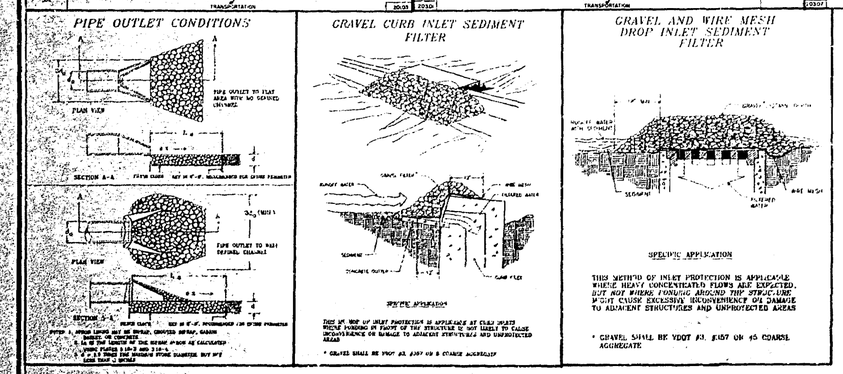
Q(PEAK) = C*I*A
10 YEAR STORM FREQUENCY

BASIN IDENTIFIER DETENTION POND
DISCHARGES INTO R.O.W. DITCH

BASIN AREA = 8.25 ACRES
RUNOFF COEFF. = .80
RAINFALL INT. = 7.10 IN/HR

| TIME (MIN) | RUNOFF (C.F.S.) |
|---|---|
| 0.0 | 0.0 |
| 2.5 | 5.4 |
| 5.0 | 10.7 |
| 7.5 | 14.3 |
| 10.0 | 17.8 |
| 12.5 | 32.3 |
| 15.0 | 46.9 |
| 17.5 | 39.6 |
| 20.0 | 32.3 |
| 22.5 | 27.1 |
| 25.0 | 21.8 |
| 27.5 | 17.5 |
| 30.0 | 13.2 |
| 32.5 | 10.9 |
| 35.0 | 8.6 |
| 37.5 | 8.2 |
| 40.0 | 7.9 |
| 42.5 | 7.5 |
| 45.0 | 7.1 |
| 47.5 | 3.5 |
| 50.0 | 0.0 |
| 52.5 | 0.0 |
| 55.0 | 0.0 |
| 57.5 | 0.0 |
| 60.0 | 0.0 |
| 62.5 | 0.0 |
| 65.0 | 0.0 |
| 67.5 | 0.0 |
| 70.0 | 0.0 |
| 72.5 | 0.0 |

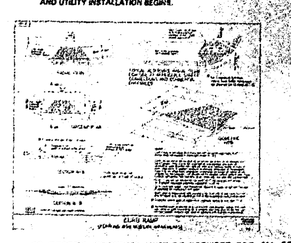



## EROSION AND SEDIMENT CONTROL NOTES

THE PURPOSE OF THE EROSION CONTROL MEASURES SHOWN ON THESE PLANS SHALL BE TO PRECLUDE THE TRANSPORT OF ALL WATERBORNE SEDIMENTS RESULTING FROM CONSTRUCTION ACTIVITIES FROM ENTERING ONTO ADJACENT PROPERTIES OR STATE WATERS. IF FIELD INSPECTION REVEALS THE INADEQUACY OF THE PLAN TO CONFINE SEDIMENT TO THE PROJECT SITE, APPROPRIATE MODIFICATIONS WILL BE MADE TO CORRECT ANY PLAN DEFICIENCIES. IN ADDITION TO THESE NOTES, ALL PROVISIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL REGULATIONS SHALL APPLY TO THIS PROJECT

1. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE "VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK", 3RD EDITION, 1992. THE CONTRACTOR SHALL BE THOROUGHLY FAMILIAR WITH ALL APPLICABLE MEASURES CONTAINED THEREIN WHICH MAY BE PERTINENT TO THIS PROJECT.
2. ALL POINTS OF CONSTRUCTION INGRESS AND EGRESS SHALL BE PROTECTED BY A TEMPORARY CONSTRUCTION ENTRANCE (STD. & SPEC. 3.02) TO PREVENT TRACKING OF MUD ONTO PUBLIC RIGHT-OF-WAYS. AN ENTRANCE PERMIT FROM VDOT IS REQUIRED PRIOR TO ANY CONSTRUCTION ACTIVITIES WITHIN STATE RIGHT-OF-WAYS.
3. SEDIMENT BASINS AND TRAPS, PERIMETER DIKES, SEDIMENT BARRIERS AND OTHER MEASURES INTENDED TO TRAP SEDIMENT ON SITE MUST BE CONSTRUCTED AS A FIRST STEP IN GRADING AND BE MADE FUNCTIONAL BEFORE UPSLOPE LAND DISTURBANCE TAKES PLACE. EARTHEN STRUCTURES SUCH AS DAMS, DIKES, AND DIVERSIONS MUST BE SEEDED AND MULCHED IMMEDIATELY AFTER INSTALLATION. AN ON-SITE PRE-CONSTRUCTION MEETING WILL BE HELD BETWEEN THE ENGINEER, THE OFFICE OF CODE COMPLIANCE AND THE CONTRACTOR TO IDENTIFY THOSE MEASURES TO BE INITIALLY INSTALLED.
4. MAINTENANCE OF ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL INCLUDE THE REPAIR OF MEASURES DAMAGED BY ANY SUBCONTRACTOR INCLUDING THOSE OF THE PUBLIC UTILITY COMPANIES. AT THE PRECONSTRUCTION MEETING, THE CONTRACTOR WILL SUPPLY CODE COMPLIANCE WITH THE NAME OF THE INDIVIDUAL WHO WILL BE RESPONSIBLE FOR ENSURING MAINTENANCE OF MEASURES ON A DAILY BASIS.
5. SURFACE FLOWS OVER CUT AND FILL SLOPES SHALL BE CONTROLLED BY EITHER REDIRECTING FLOWS FROM TRAVERSING THE SLOPES OR BY INSTALLING MECHANICAL DEVICES TO SAFELY LOWER WATER DOWNHILL WITHOUT CAUSING EROSION. A TEMPORARY FILL DIVERSION (STD. & SPEC. 3.10) SHALL BE INSTALLED PRIOR TO THE END OF EACH WORKING DAY.
6. SEDIMENT CONTROL MEASURES MAY REQUIRE MINOR FIELD ADJUSTMENTS AT TIME OF CONSTRUCTION TO INSURE THEIR INTENDED PURPOSE IS ACCOMPLISHED. OFFICE OF CODE COMPLIANCE APPROVAL WILL BE REQUIRED FOR OTHER DEVIATIONS FROM THE APPROVED PLANS.
7. THE CONTRACTOR SHALL PLACE SOIL STOCKPILES AT THE LOCATIONS SHOWN ON THIS PLAN OR AS DIRECTED BY THE ENGINEER. SOIL STOCKPILES SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING MEASURES.
8. THE CONTRACTOR SHALL COMPLETE DRAINAGE FACILITIES WITHIN 30 DAYS FOLLOWING COMPLETION OF ROUGH GRADING AT ANY POINT WITHIN THE PROJECT. THE INSTALLATION OF DRAINAGE FACILITIES SHALL TAKE PRECEDENCE OVER ALL UNDERGROUND UTILITIES. OUTFALL DITCHES FROM DRAINAGE STRUCTURES SHALL BE STABILIZED IMMEDIATELY AFTER CONSTRUCTION OF SAME. THIS INCLUDES INSTALLATION OF EROSION CONTROL STONE WHERE REQUIRED. ANY DRAINAGE OUTFALLS REQUIRED FOR A STREET MUST BE COMPLETED BEFORE STREET GRADING BEGINS.
9. PERMANENT OR TEMPORARY SOIL STABILIZATION MUST BE APPLIED TO ALL DENUDED AREAS WITHIN 7 DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. SOIL STABILIZATION MUST ALSO BE APPLIED TO DENUDED AREAS WHICH MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT (UNDISTURBED) FOR LONGER THAN 30 DAYS. SOIL STABILIZATION MEASURES INCLUDE VEGETATIVE ESTABLISHMENT, MULCHING AND THE EARLY APPLICATION OF GRAVEL BASE MATERIAL ON AREAS TO BE PAVED.
10. NO MORE THAN 300 FEET OF SANITARY SEWER, STORM SEWER, WATERLINES, OR UNDERGROUND UTILITY LINES ARE TO BE OPEN AT ONE TIME. FOLLOWING INSTALLATION OF ANY PORTION OF THESE ITEMS, ALL DISTURBED AREAS ARE TO BE IMMEDIATELY STABILIZED (I.E., THE SAME DAY).
11. IF DISTURBED AREA STABILIZATION IS TO BE ACCOMPLISHED DURING THE MONTHS OF DECEMBER, JANUARY, OR FEBRUARY, STABILIZATION SHALL CONSIST OF MULCHING IN ACCORDANCE WITH SPECIFICATION 3.35. SEEDING WILL THEN TAKE PLACE AS SOON AS THE SEASON PERMITS.
12. THE TERM SEEDING, FINAL VEGETATIVE COVER OR STABILIZATION, ON THIS PLAN SHALL MEAN THE SUCCESSFUL GERMINATION AND ESTABLISHMENT OF A STABLE GRASS COVER FROM A PROPERLY PREPARED SEEDBED CONTAINING THE SPECIFIED AMOUNTS OF SEED, LIME, AND FERTILIZER IN ACCORDANCE WITH SPECIFICATION 3.32, PERMANENT SEEDING. IRRIGATION SHALL BE REQUIRED AS NECESSARY TO ENSURE ESTABLISHMENT OF GRASS COVER.
13. ALL SLOPES STEEPER THAN 3:1 SHALL REQUIRE THE USE OF EROSION CONTROL BLANKETS SUCH AS EXCELSIOR BLANKETS TO AID IN THE ESTABLISHMENT OF A VEGETATIVE COVER. INSTALLATION SHALL BE IN ACCORDANCE WITH SPECIFICATION 3.36, MULCHING AND MANUFACTURER'S INSTRUCTIONS.
14. INLET PROTECTION IN ACCORDANCE WITH SPECIFICATION 3.07 SHALL BE PROVIDED FOR ALL STORM DRAIN INLETS AS SOON AS PRACTICAL FOLLOWING CONSTRUCTION OF SAME.
15. TEMPORARY LINERS, SUCH AS POLYETHYLENE SHEETS, SHALL BE PROVIDED FOR ALL PAVED DITCHES UNTIL THE PERMANENT CONCRETE LINER IS INSTALLED.
16. PAVED DITCHES SHALL BE REQUIRED WHEREVER EROSION IS EVIDENT. PARTICULAR ATTENTION SHALL BE PAID TO THOSE AREAS WHERE GRADES EXCEED 3 PERCENT.
17. TEMPORARY EROSION CONTROL MEASURES ARE NOT TO BE REMOVED UNTIL ALL DISTURBED AREAS ARE STABILIZED. AFTER STABILIZATION IS COMPLETE, ALL MEASURES SHALL BE REMOVED WITHIN 30 DAYS. TRAPPED SEDIMENT SHALL BE SPREAD AND SEEDED.
18. OFF-SITE WASTE OR BORROW AREAS SHALL BE APPROVED BY THE OFFICE OF CODE COMPLIANCE PRIOR TO THE IMPORT OF ANY BORROW OR EXPORT OF ANY WASTE TO OR FROM THE PROJECT SITE.
19. ALL PAVED AND/OR PIPED OUTFALLS WILL BE CONSTRUCTED BEFORE ROAD GRADING AND UTILITY INSTALLATION BEGINS.



20. RECORD DRAWINGS MUST BE PROVIDED FOR ALL DETENTION/AND FACILITIES. ALSO, UPON COMPLETION, THE CONSTRUCTION OF ALL DETENTION/SAND FACILITIES SHALL BE CERTIFIED BY A LICENSED PROFESSIONAL AND PERIODICALLY OBSERVED THE STRUCTURE DURING CONSTRUCTION. THE CERTIFICATION SHALL STATE THAT TO THE BEST OF HIS/HER KNOWLEDGE, JUDGEMENT, AND BELIEF THE STRUCTURE WAS CONSTRUCTED IN GENERAL COMPLIANCE WITH THE APPROVED PLANS AND SPECIFICATIONS.

9/14

Langley and McDonald P.C.
Engineers Surveyors Planners
Landscape Architects Environmental Consultants
VIRGINIA BEACH

| REV. | DATE |
|---|---|
| DSN. | |
| DR. | |
| CHK. | |
| DATE | AUGUST 31, 1994 |

BERKELEY COMMONS
PHASE II-A (ADDITION TO PHASE II) AND PHASE IV
NEG SHOPPING CENTER, LIMITED PARTNERSHIP
DETAIL SHEET

SHEET 2 OF 3
APP.
PROJ. MGR. JMW
DR. JMW

SP-107-94

# DEVELOPMENT MANAGEMENT

101-E MOUNTS BAY ROAD, P.O. BOX 8784, WILLIAMSBURG, VIRGINIA 23187-8784
(757) 253-6671 Fax: (757) 253-6850 E-MAIL: devtman@james-city.va.us

CODE COMPLIANCE
(757) 253-6626
codecomp@james-city.va.us

ENVIRONMENTAL DIVISION
(757) 253-6670
environ@james-city.va.us

PLANNING
(757) 253-6685
planning@james-city.va.us

COUNTY ENGINEER
(757) 253-6678

INTEGRATED PEST MANAGEMENT
(757) 253-2620


July 22, 1999

Mr. Steve Romeo
Langley and McDonald
4029 Ironbound Road
Williamsburg, VA 23188

RE: Prime Outlet Expansion

Dear Mr. Romeo:

As discussed in your letter of July 19, 1999, Prime Outlets is interested in acquiring a portion of the Comfort Inn property located at 5611 Richmond Road. This would require the subdivision of that parcel into two lots (or incorporation of a portion of the lot into the larger adjacent parcel). However, the proposal would result in a situation where the hotel property's impervious cover would then exceed 60% of the remaining parcel, which is not allowed under the Chesapeake Bay Preservation Ordinance.

To address this situation, you have proposed that the maximum impervious cover for the land area of the original parcel in aggregate would not exceed 60%. Your preliminary calculations show that the newly created parcel to be acquired by Prime Outlets would then be limited to a maximum impervious cover of approximately 55%. This is an acceptable arrangement provided that adequate safeguards and notations are incorporated into the shopping center's new site plan for this area to clearly show the limits on impervious cover. The hotel owners also need to be aware that they will not be able to expand the impervious cover of their site in the future as their remaining portion of the original parcel will already be at 63% impervious cover.

If you have any additional questions, please contact me at 253-6673.

Sincerely,

Darryl E. Cook

Darryl E. Cook, P.E.
Environmental Director

c: Paul Holt, Planning Division

Langley and McDonald

George E. Langley
Consultant
T. Joseph McDonald
1906-1982

July 19, 1999

Mr. Darryl Cook, P.E.
Code Compliance
James City County
P.O. Box 8784
Williamsburg, VA 23187-8784

Re: Prime Outlet Expansion

Dear Darryl:

A while back, 18 months or so, you reviewed a proposal by The Horizon Group (Prime Retail's predecessor) pertaining to the expansion of the shopping center. The proposal showed expansion of the shopping center behind the adjacent motel. I recall your position relative to this matter to be acceptable contingent upon the aggregate coverage of the parcels involved to not exceed 60% as set forth in the County's Chesapeake Bay Preservation Ordinance. Recently, I forwarded the concept plan and coverage summary to Paul Holt. I believe that Paul has passed the information on to you and ask that you contact me if you need additional information, have any questions or wish to further discuss the concept plan and coverage summary. Thank you for your attention to this matter.

Best regards,

LANGLEY AND McDONALD, INC.

Stephen A. Romeo, L.S.
Principal

SAR/nsa

*Engineers • Planners • Surveyors • Landscape Architects • Environmental Consultants*

4029 Ironbound Road • Williamsburg, VA 23188 • (757) 253-2975 • FAX: (757) 229-0049 • L&M@langleywb.com

Langley and McDonald, P.C.
ENGINEERS • SURVEYORS • PLANNERS
LANDSCAPE ARCHITECTS • ENVIRONMENTAL CONSULTANTS
VIRGINIA BEACH • WILLIAMSBURG, VIRGINIA

Subject: EXPANSION - COVERAGE & PARKING SUMMARIES
Computed By: SAK Checked By: _____

Project No. 1870040-302
Client: PRIME RETAIL
Date: 7/13/99 Sheet No. 1

EXIST. GROSS BUILDING AREA = 292,450 SF (ENTIRE CENTER)
ADDIT. " " " = + 70,350 SF
TOTAL " " " = 362,800 SF
× 0.8
TOTAL NET BUILDING AREA = 290,240 SF
÷ 200
REQUIRED PARKING SPACES 1451

EXISTING PARKING SPACES 1315
ADDIT. PARKING SPACES 203
PROVIDED PARKING SPACES 1518

EXISTING PARKING RATIO @ 1 PER 222 SF GROSS
1 PER 178 SF NET.

PROPOSED PARKING RATIO @ 1 PER 239 SF GROSS
1 PER 191 SF NET.

WEST SIDE OF CENTER (PHASE IV + CHURCH)
TOTAL AREA PHASE IV (15.55 AC) + CHURCH (1.3 AC) = 16.85 AC
EXISTING COVERAGE = 7.6 AC OR 45% OF TOTAL AREA
PROPOSED COVERAGE = 9.0 AC OR 53% OF TOTAL AREA

EAST SIDE OF CENTER (SUBDIVIDED PARCEL SOUTH OF MOTEL)
EXPANSION AREA = 1.64 AC
PROPOSED COVERAGE = 0.9 AC OR 55% OF EXPANSION AREA

MOTEL AREA = 3.36 AC
EXISTING COVERAGE = 2.1 AC OR 63%

AGGREGATED TOTAL AREA = 5.00 AC

Berk. Com Shop. Center

~~BCSC .DAT~~

BCSCP2.DAT

~~BCSC~~

BERKLEY COMMONS SHOPPING CENTRE PH 2

PRE & POST DEVELOPMENT RUNOFF

DETENTION BASIN SIZING

LANGLEY + McDONALD, ENGR.

| BLANK | AC | $T_c$ | RCN | BFLOW | |
|---|---|---|---|---|---|
| | | | 83 | | |
| 10 | 7.59 | .33 | | 0 | 1000 |
| 20 | 1.48 | .13 | 93 | 0 | 2000 |
| 910 | 5.56 | .2 | 91 | 0 | 9000 |
| 99999 | 0 | 0 | 0 | 0 | 0 |

ROUTE

ROUTING DATA BEGINS HERE

DETENTION BASIN

---

R␣␣0␣␣␣-1␣␣␣␣␣␣9000␣␣␣␣␣910

| | | | | |
|---|---|---|---|---|
| *5 | 0 | 5 | 0.5 | |
| 97.0 | 97.5 | 98.0 | 98.5 | 99.0 |
| 0 | .06 | 0.20 | 0.34 | 0.48 |
| 1 | 21 | 97.0 | 0.6 | 0␣0␣0␣0␣0 |

Results 2 y-6hr Pre - 9.8 cfs - 3.1 = 6.7 cfs  max 7.2 - 1.9 = 5.3

21" Pipe  Post - 11.3

Peak $Q_2$ = 6.6 cfs

Max Depth : 98.1  - 0.2 ac ft

$Q_{10}$ out = 8.7  Depth = 98.4  0.3 ac ft.

18" Pipe  Peak $Q_2$ = 5.9 cfs  Depth = 98.2  0.3

$Q_{10}$ = 8.3 cfs  98.5  0.4 ac ft.

FILE: BERKLEY1.MRG (ALT1.MRG)
Project: BERKELEY COMMONS-Phase 4
Location: James City Co. Virginia
Design: M. Gordon
Date: Aug. 23. 1994
Revision: Dec. 1. 1994
Yr. Storm: 10
N Value: 0.013 RCP
0.011 CPEP

LANGLEY and McDONALD, P.C.
201 Packets Court
Williamsburg, Virginia 23185

STORM SEWER DESIGN COMPUTATIONS

| FROM PT. | TO PT. | DRAIN. AREA | RUN-OFF COEFF. | C x A INCR. | C x A ACCUM. | INLET TIME | RAIN FALL | RUNOFF "Q" INCR. | RUNOFF "Q" ACCUM. | INVERT ELEV. UP | INVERT ELEV. LOW | LENGTH | SLOPE | PIPE DIAM. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | acres | "C" | | | min. | in/hr | cfs | cfs | | | ft. | ft./ft. | inches |
| | | [E] | [E] | | | [E] | | | | [E] | | [E] | | [E] |
| Rte. 60 | | | | | | | | | | | | | | |
| 35 | 34 | 0.67 | 0.50 | 0.34 | 0.34 | 15.00 | 5.17 | 1.73 | 1.73 | 94.95 | 94.48 | 134 | 0.0035 | 15 |
| 34 | 33 | 0.37 | 0.50 | 0.19 | 0.52 | 15.74 | 5.07 | 0.94 | 2.64 | 94.38 | 93.98 | 134 | 0.0030 | 15 |
| 33 | 37 | 0.41 | 0.80 | 0.33 | 0.85 | 16.45 | 4.98 | 1.63 | 4.22 | 93.88 | 93.25 | 146 | 0.0043 | 15 |
| 37 | 4 | MH-1 | 0.00 | 0.00 | 0.85 | 17.16 | 4.90 | 0.00 | 4.15 | 93.15 | 92.93 | 52 | 0.0042 | 15 |
| Onsite | | | | | | | | | | | | | | |
| 4 | 5 | 0.22 | 0.90 | 0.20 | 1.05 | 17.42 | 4.86 | 0.96 | 5.09 | 92.90 | 92.44 | 192 | 0.0024 | 18 |
| 5 | 6 | 0.73 | 0.90 | 0.66 | 1.70 | 18.36 | 4.76 | 3.12 | 8.10 | 92.19 | 91.83 | 135 | 0.0026 | 21 |
| 6 | 9 | 4.56 | 0.56 | 2.54 | 4.24 | 20.00 | 4.58 | 11.61 | 19.40 | 91.08 | 90.53 | 245 | 0.0022 | 30 |
| 8 | 9 | 1.44 | 0.90 | 1.30 | 1.30 | 10.00 | 5.93 | 7.68 | 7.68 | 92.31 | 92.00 | 130 | 0.0024 | 21 |
| 9 | 10 | 0.37 | 0.90 | 0.33 | 5.87 | 21.03 | 4.47 | 1.49 | 26.25 | 90.03 | 89.71 | 207 | 0.0016 | 36 |
| 10 | 7 | 1.72 | 0.84 | 1.44 | 7.31 | 21.96 | 4.38 | 6.31 | 32.02 | 89.61 | 89.42 | 113 | 0.0017 | 36 |
| 7 | 11 | 1.10 | 0.64 | 0.70 | 8.01 | 22.38 | 4.34 | 3.04 | 34.77 | 89.32 | 88.94 | 194 | 0.0019 | 36 |
| 11 | 12 | 0.61 | 0.64 | 0.39 | 8.40 | 23.04 | 4.28 | 1.68 | 35.97 | 88.84 | 88.74 | 52 | 0.0021 | 36 |
| 12 | 13 | 0.46 | 0.62 | 0.29 | 8.68 | 23.21 | 4.27 | 1.22 | 37.06 | 88.64 | 88.05 | 105 | 0.0022 | 36 |
| 13 | 14 | 0.73 | 0.90 | 0.66 | 9.34 | 23.54 | 4.24 | 2.78 | 39.58 | 87.95 | 87.89 | 24 | 0.0025 | 36 |
| 14 | 15 | 0.48 | 0.90 | 0.43 | 9.77 | 21.03 | 4.47 | 1.93 | 43.72 | 87.79 | 87.67 | 88 | 0.0014 | 42 |
| 2 | 1 | 0.30 | 0.90 | 0.27 | 0.27 | 10.00 | 5.93 | 1.60 | 1.60 | 96.76 | 96.63 | 37 | 0.0036 | 12 |
| 1 | 16 | 0.22 | 0.90 | 0.20 | 0.47 | 10.21 | 5.89 | 1.17 | 2.76 | 96.53 | 96.27 | 43 | 0.0060 | 12 |
| 16 | 17 | 37.27 | 0.43 | 16.03 | 16.49 | 52.00 | 2.65 | 42.44 | 43.68 | 95.28 | 94.64 | 150 | 0.0043 | 36 |
| 17 | 18 | 1.10 | 0.90 | 0.99 | 17.14 | 52.40 | 2.63 | 2.60 | 45.16 | 94.54 | 93.18 | 295 | 0.0046 | 36 |
| 18 | 19 | 0.52 | 0.90 | 0.47 | 17.36 | 53.17 | 2.61 | 1.22 | 45.26 | 93.08 | 92.37 | 153 | 0.0046 | 36 |
| 19 | 24 | 0.76 | 0.90 | 0.68 | 17.67 | 53.57 | 2.59 | 1.77 | 45.85 | 92.27 | 91.94 | 72 | 0.0046 | 36 |
| 22 | 23 | 0.17 | 0.90 | 0.15 | 0.15 | 10.00 | 5.93 | 0.91 | 0.91 | 94.10 | 93.80 | 52 | 0.0058 | 12 |
| 23 | 24 | 0.19 | 0.40 | 0.08 | 0.23 | 10.29 | 5.88 | 0.45 | 1.35 | 93.70 | 93.42 | 48 | 0.0058 | 12 |
| 24 | 25 | 0.19 | 0.90 | 0.17 | 18.07 | 53.73 | 2.59 | 0.45 | 46.79 | 91.39 | 90.92 | 96 | 0.0049 | 36 |
| 26 | 25 | 6.55 | 0.41 | 2.69 | 2.69 | 27.40 | 3.92 | 10.52 | 10.52 | 94.15 | 93.30 | 65 | 0.0131 | 24 |
| 25 | 27 | 0.13 | 0.40 | 0.05 | 20.81 | 53.98 | 2.58 | 0.13 | 53.72 | 90.42 | 90.25 | 60 | 0.0029 | 42 |
| 27 | 29 | 0.81 | 0.90 | 0.73 | 21.54 | 54.15 | 2.58 | 1.88 | 55.47 | 90.15 | 89.87 | 130 | 0.0022 | 42 |
| 29 | 30 | 1.80 | 0.45 | 0.81 | 22.35 | 54.53 | 2.56 | 2.08 | 57.28 | 89.77 | 89.47 | 126 | 0.0023 | 42 |
| 30 | 31 | 2.42 | 0.41 | 0.99 | 23.34 | 54.88 | 2.55 | 2.53 | 59.55 | 89.37 | 89.15 | 91 | 0.0025 | 42 |
| 31 | 15 | 0.84 | 0.55 | 0.46 | 23.80 | 55.13 | 2.54 | 1.18 | 60.54 | 88.65 | 88.40 | 189 | 0.0013 | 48 |
| 15 | 32 | MH-1 | 0.00 | 0.00 | 33.15 | 55.78 | 2.52 | 0.00 | 83.61 | 87.17 | 87.06 | 34 | 0.0034 | 48 |

FILE: BERKLEY1.MR6
Date: Aug. 23. 1994
Rev: Dec. 1. 1994



| FROM PT. | TO PT. | VELOCITY | CAPACITY | FLOW TIME | FLOW RATIO | VELOCITY RATIO | REMARKS |
|---|---|---|---|---|---|---|---|
| | | ft./sec. | cfs | min. | Qo/Qf | Vo/Vf | |
| 35 | 34 | 3.00 | 3.81 | 0.74 | 0.45 | 0.97 | |
| 34 | 33 | 3.15 | 3.50 | 0.71 | 0.75 | 1.11 | |
| 33 | 37 | 3.44 | 4.22 | 0.71 | 1.00 | 1.00 | |
| 37 | 4 | 3.38 | 4.15 | 0.26 | 1.00 | 1.00 | |
| 4 | 5 | 3.37 | 5.15 | 0.95 | 0.99 | 1.16 | |
| 5 | 6 | 3.37 | 8.10 | 0.67 | 1.00 | 1.00 | |
| 6 | 9 | 3.95 | 19.40 | 1.03 | 1.00 | 1.00 | Offsite-Jehova's Witness |
| 8 | 9 | 3.19 | 7.68 | 0.68 | 1.00 | 1.00 | |
| 9 | 10 | 3.71 | 26.25 | 0.93 | 1.00 | 1.00 | |
| 10 | 7 | 4.53 | 32.02 | 0.42 | 1.00 | 1.00 | |
| 7 | 11 | 4.92 | 34.77 | 0.66 | 1.00 | 1.00 | |
| 11 | 12 | 5.09 | 35.97 | 0.17 | 1.00 | 1.00 | |
| 12 | 13 | 5.24 | 37.06 | 0.33 | 1.00 | 1.00 | |
| 13 | 14 | 5.60 | 39.58 | 0.07 | 1.00 | 1.00 | |
| 14 | 15 | 4.54 | 43.72 | 0.32 | 1.00 | 1.00 | |
| 2 | 1 | 3.00 | 2.13 | 0.21 | 0.75 | 1.11 | |
| 1 | 16 | 3.51 | 2.76 | 0.20 | 1.00 | 1.00 | |
| 16 | 17 | 6.18 | 43.68 | 0.40 | 1.00 | 1.00 | |
| 17 | 18 | 6.39 | 45.16 | 0.77 | 1.00 | 1.00 | Adjusted CA per Ph.I-III |
| 18 | 19 | 6.40 | 45.26 | 0.40 | 1.00 | 1.00 | Adjusted CA per Ph.I-III |
| 19 | 24 | 7.42 | 45.26 | 0.16 | 1.01 | 1.16 | |
| 22 | 23 | 3.00 | 2.69 | 0.29 | 0.34 | 0.88 | |
| 23 | 24 | 3.43 | 2.69 | 0.23 | 0.50 | 1.00 | |
| 24 | 25 | 6.62 | 46.79 | 0.24 | 1.00 | 1.00 | |
| | | | | | | | Add pipe from Ph.I-III |
| 26 | 25 | 7.64 | 25.80 | 0.14 | 0.41 | 0.93 | |
| 25 | 27 | 5.58 | 53.72 | 0.18 | 1.00 | 1.00 | |
| 27 | 29 | 5.77 | 55.47 | 0.38 | 1.00 | 1.00 | |
| 29 | 30 | 5.95 | 57.28 | 0.35 | 1.00 | 1.00 | |
| 30 | 31 | 6.19 | 59.55 | 0.25 | 1.00 | 1.00 | |
| 31 | 15 | 4.82 | 60.54 | 0.65 | 1.00 | 1.00 | |
| 15 | 32 | 6.65 | 83.61 | 0.09 | 1.00 | 1.00 | Length includes ES-1 |

FILE: BERKLEY2.MRG (ALT2.MRG)
19-Dec-94



LANGLEY and McDONALD, P.C.
201 Packets Court
Williamsburg, Virginia 23185

Project: BERKELEY COMMONS - Phase II-A and Phase IV
Location: James City County, Virginia

HYDRAULIC GRADE LINE CALCULATIONS

1. Enter Tailwater Elevation 91.33

2. Enter "N" value for pipe? 0.013 RCP
0.011 CPEP

3. Enter the following data: [E]

| FROM PT. | TO PT. | Q OUT (cfs) | PIPE DIA. | L OUT (ft.) | FRICTION SLOPE | DNSTREAM INVERT | V OUT (FPS) | M.H. | INLET SHAPE | Q IN (cfs) | PIPE DIA. | ANGLE "K" | V IN (fps) | F.L.E. | H.G.E. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [E] | [E] | [E] | [E] | [E] | | [E] | | [E] | [E] | | | [E] | | [E] | |
| 35 | 34 | 1.73 | 15 | 134 | 0.0007 | 94.48 | 1.41 | N | Y | 0.00 | 0 | 0.00 | 0.00 | 98.55 | 97.80 |
| 34 | 33 | 2.64 | 15 | 134 | 0.0017 | 93.98 | 2.15 | N | Y | 1.73 | 15 | 0.00 | 1.41 | 99.02 | 97.70 |
| 33 | 37 | 4.22 | 15 | 146 | 0.0043 | 93.25 | 3.44 | N | Y | 2.64 | 15 | 0.00 | 2.15 | 99.39 | 97.45 |
| 37 | 4 | 4.15 | 15 | 52 | 0.0042 | 92.93 | 3.38 | Y | Y | 4.22 | 15 | 0.70 | 3.44 | 100.60 | 96.77 |
| 4 | 5 | 5.09 | 18 | 192 | 0.0024 | 92.44 | 2.88 | N | Y | 4.15 | 15 | 0.00 | 3.38 | 99.76 | 96.43 |
| 5 | 6 | 8.10 | 21 | 135 | 0.0026 | 91.83 | 3.37 | N | Y | 5.09 | 18 | 0.10 | 2.88 | 99.04 | 95.90 |
| 6 | 9 | 19.40 | 30 | 245 | 0.0022 | 90.53 | 3.95 | N | Y | 8.10 | 21 | 0.10 | 3.37 | 98.50 | 95.47 |
| 9 | 10 | 26.25 | 36 | 207 | 0.0016 | 89.71 | 3.71 | N | Y | 19.40 | 30 | 0.68 | 3.95 | 97.91 | 94.80 |
| 10 | 7 | 32.02 | 36 | 113 | 0.0017 | 89.42 | 4.53 | N | Y | 26.25 | 36 | 0.66 | 3.71 | 96.00 | 94.24 |
| 7 | 11 | 34.77 | 36 | 194 | 0.0019 | 88.94 | 4.92 | N | Y | 32.02 | 36 | 0.00 | 4.53 | 97.00 | 93.82 |
| 11 | 12 | 35.97 | 36 | 52 | 0.0021 | 88.74 | 5.09 | N | Y | 34.77 | 36 | 0.42 | 4.92 | 97.38 | 93.27 |
| 12 | 13 | 37.06 | 36 | 105 | 0.0022 | 88.05 | 5.24 | N | Y | 35.97 | 36 | 0.10 | 5.09 | 97.03 | 92.85 |
| 13 | 14 | 39.58 | 36 | 24 | 0.0025 | 87.89 | 5.60 | N | Y | 37.06 | 36 | 0.10 | 5.24 | 97.13 | 92.39 |
| 14 | 15 | 43.72 | 42 | 88 | 0.0014 | 87.67 | 4.54 | N | Y | 39.58 | 36 | 0.10 | 5.60 | 96.96 | 92.08 |
| 15 | 32 | 83.77 | 48 | 34 | 0.0034 | 87.33 | 6.67 | Y | Y | 83.77 | 42 | 0.70 | 4.82 | 98.00 | 91.72 |
| 16 | 17 | 43.68 | 36 | 150 | 0.0043 | 94.64 | 6.18 | Y | Y | 42.44 | 36 | 0.00 | 6.00 | 101.50 | 99.65 |
| 17 | 18 | 45.16 | 36 | 295 | 0.0046 | 93.18 | 6.39 | Y | Y | 43.68 | 36 | 0.00 | 6.18 | 100.57 | 98.83 |
| 18 | 19 | 45.26 | 36 | 153 | 0.0046 | 92.37 | 6.40 | Y | Y | 45.16 | 36 | 0.00 | 6.39 | 100.89 | 97.29 |
| 19 | 24 | 45.85 | 36 | 72 | 0.0047 | 91.94 | 6.49 | Y | Y | 45.26 | 36 | 0.22 | 6.40 | 100.43 | 96.40 |
| 24 | 25 | 46.79 | 36 | 96 | 0.0049 | 90.92 | 6.62 | N | Y | 45.85 | 36 | 0.38 | 6.49 | 100.23 | 95.79 |
| 25 | 27 | 53.72 | 42 | 60 | 0.0029 | 90.25 | 5.58 | N | Y | 46.79 | 36 | 0.35 | 6.62 | 97.30 | 94.80 |
| 27 | 29 | 55.47 | 42 | 130 | 0.0022 | 89.87 | 5.77 | Y | Y | 53.72 | 42 | 0.10 | 5.58 | 96.62 | 94.15 |
| 29 | 30 | 57.28 | 42 | 126 | 0.0023 | 89.47 | 5.95 | N | Y | 55.47 | 42 | 0.10 | 5.77 | 97.25 | 93.69 |
| 30 | 31 | 59.55 | 42 | 91 | 0.0025 | 89.15 | 6.19 | N | Y | 57.28 | 42 | 0.51 | 5.95 | 96.09 | 93.11 |
| 31 | 15 | 60.54 | 48 | 189 | 0.0013 | 88.40 | 4.82 | N | Y | 59.55 | 42 | 0.38 | 6.19 | 96.07 | 92.38 |
| 15 | 32 | 83.61 | 48 | 34 | 0.0034 | 87.06 | 6.65 | Y | Y | 60.54 | 48 | 0.70 | 4.82 | 98.00 | 91.72 |
| 8 | 9 | 7.68 | 21 | 130 | 0.0024 | 92.00 | 3.19 | N | Y | 0.00 | 0 | 0.00 | 0.00 | 95.40 | 95.14 |
| 2 | 1 | 1.60 | 12 | 37 | 0.0020 | 96.63 | 2.04 | N | Y | 0.00 | 0 | 0.00 | 0.00 | 99.80 | 100.05 |
| 1 | 16 | 2.76 | 12 | 43 | 0.0061 | 96.27 | 3.51 | N | Y | 1.60 | 12 | 0.00 | 2.04 | 99.80 | 99.96 |

90 deg K=0.70
80 deg K=0.66
70 deg K=0.61
60 deg K=0.55
50 deg K=0.47

40 deg K=0.38
30 deg K=0.28
25 deg K=0.22
20 deg K=0.16
15 deg K=0.10

| HF | HO | HI | HD | HT | .3HT | .5HT | H |
|---|---|---|---|---|---|---|---|
| 0.10 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.01 |
| 0.23 | 0.02 | 0.01 | 0.00 | 0.03 | 0.01 | 0.01 | 0.02 |
| 0.63 | 0.05 | 0.03 | 0.00 | 0.07 | 0.02 | 0.04 | 0.06 |
| 0.22 | 0.04 | 0.06 | 0.13 | 0.24 | 0.00 | 0.12 | 0.12 |
| 0.45 | 0.03 | 0.06 | 0.00 | 0.09 | 0.03 | 0.05 | 0.08 |
| 0.35 | 0.04 | 0.05 | 0.01 | 0.10 | 0.03 | 0.05 | 0.08 |
| 0.55 | 0.06 | 0.06 | 0.02 | 0.14 | 0.04 | 0.07 | 0.11 |
| 0.32 | 0.05 | 0.08 | 0.16 | 0.30 | 0.09 | 0.15 | 0.24 |
| 0.19 | 0.08 | 0.07 | 0.14 | 0.30 | 0.09 | 0.15 | 0.24 |
| 0.38 | 0.09 | 0.11 | 0.00 | 0.21 | 0.06 | 0.10 | 0.16 |
| 0.11 | 0.10 | 0.13 | 0.16 | 0.39 | 0.12 | 0.19 | 0.31 |
| 0.23 | 0.11 | 0.14 | 0.04 | 0.29 | 0.09 | 0.14 | 0.23 |
| 0.06 | 0.12 | 0.15 | 0.04 | 0.31 | 0.09 | 0.16 | 0.25 |
| 0.12 | 0.08 | 0.17 | 0.05 | 0.30 | 0.09 | 0.15 | 0.24 |
| 0.12 | 0.17 | 0.13 | 0.25 | 0.55 | 0.00 | 0.28 | 0.28 |
| | | | | | | | |
| 0.64 | 0.15 | 0.20 | 0.00 | 0.34 | 0.00 | 0.17 | 0.17 |
| 1.35 | 0.16 | 0.21 | 0.00 | 0.37 | 0.00 | 0.18 | 0.18 |
| 0.71 | 0.16 | 0.22 | 0.00 | 0.38 | 0.00 | 0.19 | 0.19 |
| 0.34 | 0.16 | 0.22 | 0.14 | 0.53 | 0.00 | 0.26 | 0.26 |
| 0.47 | 0.17 | 0.23 | 0.25 | 0.65 | 0.19 | 0.32 | 0.52 |
| 0.17 | 0.12 | 0.24 | 0.24 | 0.60 | 0.18 | 0.30 | 0.48 |
| 0.28 | 0.13 | 0.17 | 0.05 | 0.35 | 0.00 | 0.17 | 0.17 |
| 0.29 | 0.14 | 0.18 | 0.05 | 0.37 | 0.11 | 0.18 | 0.30 |
| 0.23 | 0.15 | 0.19 | 0.28 | 0.62 | 0.19 | 0.31 | 0.50 |
| 0.24 | 0.09 | 0.21 | 0.23 | 0.52 | 0.16 | 0.26 | 0.42 |
| 0.12 | 0.17 | 0.13 | 0.25 | 0.55 | 0.00 | 0.28 | 0.28 |
| | | | | | | | |
| 0.31 | 0.04 | 0.00 | 0.00 | 0.04 | 0.01 | 0.02 | 0.03 |
| | | | | | | | |
| 0.08 | 0.02 | 0.00 | 0.00 | 0.02 | 0.00 | 0.01 | 0.01 |
| 0.26 | 0.05 | 0.02 | 0.00 | 0.07 | 0.02 | 0.04 | 0.06 |

PROJECT 87040-65-8
HEC12 Version: V2.91 Run Date: 11-16-1994

==========

INLET NUMBER 35 LENGTH 6.0 STATION

DRAINAGE AREA = 0.670 ACRES C VALUE = .500 CA = 0.335
SUM CA= 0.335 INT= 3.50 CFS= 1.173 CO= 0.000 GUTTER FLOW= 1.173

GUTTER SLOPE = 0.0035 FT/FT PAVEMENT CROSS SLOPE = 0.0200 FT/FT

| SPREAD | W | W/T | SW | SW/SX | Eo | a | S'W | SE |
|---|---|---|---|---|---|---|---|---|
| 7.78 | 2.0 | 0.26 | 0.0833 | 4.2 | 0.70 | 3.5 | 0.147 | 0.122 |

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 5.2 EFFICIENCY= 1.00
CFS INTERCEPTED= 1.17 CFS CARRYOVER= 0.00

PROJECT 97040-65
HEC12 Version: V2.91 Run Date: 12-30-1994

==========

INLET NUMBER 34 LENGTH 4.0 STATION

DRAINAGE AREA = 0.370 ACRES C VALUE = .500 CA = 0.185
SUM CA= 0.185 INT= 3.50 CFS= 0.648 CO= 0.000 GUTTER FLOW= 0.648

GUTTER SLOPE = 0.0018 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

| SPREAD | W | W/T | SW | SW/SX | Eo | a | S'W | SE |
|---|---|---|---|---|---|---|---|---|
| 6.62 | 2.0 | 0.30 | 0.0833 | 4.0 | 0.77 | 3.5 | 0.146 | 0.133 |

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 3.1 EFFICIENCY= 1.00
CFS INTERCEPTED= 0.65 CFS CARRYOVER= 0.00

==========

INLET NUMBER 33 LENGTH 6.0 STATION

DRAINAGE AREA = 0.410 ACRES C VALUE = .800 CA = 0.328
SUM CA= 0.328 INT= 3.50 CFS= 1.148 CO= 0.000 GUTTER FLOW= 1.148

GUTTER SLOPE = 0.0060 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

| SPREAD | W | W/T | SW | SW/SX | Eo | a | S'W | SE |
|---|---|---|---|---|---|---|---|---|
| 6.51 | 2.0 | 0.31 | 0.0833 | 4.0 | 0.78 | 3.5 | 0.146 | 0.135 |

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 5.7 EFFICIENCY= 1.00
CFS INTERCEPTED= 1.15 CFS CARRYOVER= 0.00

PROJECT 78040-65-8
HEC12 Version: V2.91 Run Date: 11-15-1994

==========

INLET NUMBER 5 LENGTH 8.0 STATION

DRAINAGE AREA = 0.730 ACRES C VALUE = .900 CA = 0.657
SUM CA= 0.657 INT= 3.50 CFS= 2.299 CO= 0.000 GUTTER FLOW= 2.299

GUTTER SLOPE = 0.0033 FT/FT PAVEMENT CROSS SLOPE = 0.0132 FT/FT

| SPREAD | W | W/T | SW | SW/SX | Eo | a | S'W | SE |
|---|---|---|---|---|---|---|---|---|
| 14.03 | 2.0 | 0.14 | 0.0833 | 6.3 | 0.47 | 3.7 | 0.153 | 0.085 |

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 8.3 EFFICIENCY= 1.00
CFS INTERCEPTED= 2.29 CFS CARRYOVER= 0.01

==========

INLET NUMBER 6 LENGTH 14.0 STATION

DRAINAGE AREA = 0.390 ACRES C VALUE = .900 CA = 0.351
DRAINAGE AREA = 0.640 ACRES C VALUE = .900 CA = 0.576

FOR THE FIRST SIDE
SUM CA= 0.351 INT= 3.50 CFS= 1.228 CO= 0.000 GUTTER FLOW= 1.228
FOR THE OTHER SIDE
SUM CA= 0.576 INT= 3.50 CFS= 2.016 CO= 0.010 GUTTER FLOW= 2.026
AT THE INLET

SUM CA= 0.927 INT= 3.50 CFS= 3.244 CO= 0.010 GUTTER FLOW= 3.254

GUTTER SLOPE = 0.0048 FT/FT PAVEMENT CROSS SLOPE = 0.0200 FT/FT

SPREAD AT A SLOPE OF .005 (ft./ft.) AND 2.03 (cfs) IS 9.41 (ft.)

XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
P EFFEC. LENGTH (ft) = 17.60 H (ft) = 0.458
DEPTH OF WATER (ft) = 0.19 SPREAD (ft) = 9.31

```
==============================================================================
INLET NUMBER 10             LENGTH  16.0        STATION

DRAINAGE AREA =  0.160 ACRES       C VALUE = .900       CA =  0.144
DRAINAGE AREA =  1.380 ACRES       C VALUE = .900       CA =  1.242

FOR THE FIRST SIDE
SUM CA=   0.144 INT=  3.50  CFS=   0.504  CO=  0.000 GUTTER FLOW=   0.504
FOR THE OTHER SIDE
SUM CA=   1.242 INT=  3.50  CFS=   4.347  CO=  0.000 GUTTER FLOW=   4.347
AT THE INLET

SUM CA=   1.386 INT=  3.50  CFS=   4.851  CO=  0.000 GUTTER FLOW=   4.851

GUTTER SLOPE = 0.0200 FT/FT       PAVEMENT CROSS SLOPE =  0.0217 FT/FT


SPREAD AT A SLOPE OF .020 (ft./ft.) AND   4.35 (cfs) IS  9.17 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) = 19.60                H (ft) = 0.458
    DEPTH OF WATER (ft) =   0.23          SPREAD (ft)  = 10.42



==============================================================================
INLET NUMBER 7              LENGTH   6.0        STATION

DRAINAGE AREA =  1.050 ACRES       C VALUE = .630       CA =  0.661
DRAINAGE AREA =  1.060 ACRES       C VALUE = .630       CA =  0.668

FOR THE FIRST SIDE
SUM CA=   0.661 INT=  3.50  CFS=   2.315  CO=  0.000 GUTTER FLOW=   2.315
FOR THE OTHER SIDE
SUM CA=   0.668 INT=  3.50  CFS=   2.337  CO=  0.000 GUTTER FLOW=   2.337
AT THE INLET

SUM CA=   1.329 INT=  3.50  CFS=   4.653  CO=  0.000 GUTTER FLOW=   4.653

GUTTER SLOPE = 0.0030 FT/FT       PAVEMENT CROSS SLOPE =  0.0400 FT/FT


SPREAD AT A SLOPE OF .003 (ft./ft.) AND   2.34 (cfs) IS  7.40 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  9.60                H (ft) = 0.458
    DEPTH OF WATER (ft) =   0.35          SPREAD (ft)  =  8.85
```

Langley and McDonald
A PROFESSIONAL CORPORATION
ENGINEERS • PLANNERS • SURVEYORS
VIRGINIA BEACH - WILLIAMSBURG, VIRGINIA

Subject _____
Computed By _____ Checked By _____

Project No. _____
Client _____
Date 6/6/94 Sheet No. 3

PHASE IV

PREDEVELOPMENT

TO PG-5 37.26 AC
$C = 0.43$
$T_c = 52$ min
$Q_{10} = 40.7$ cfs @ $T_p = 156$ min.

Assume will be piped to Ph. IV Pond.

Remaining area to pond
$A = 23.25$
$C = 0.36$
$T_c =$

$i_2 =$ in/hr
$i_{10} =$ in/hr

pre-dev. C
3.69 x 0.3 Park
15.33 x 0.3 Undev.
4.75 x 0.6 Dev.

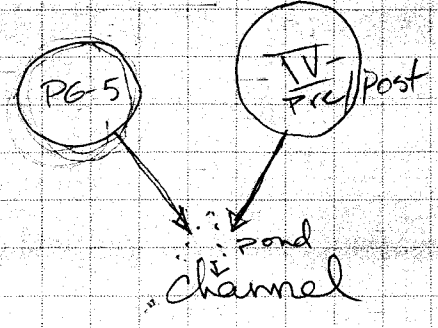
Kirpich - $T_c$
$H = 98.3 - 80.3 = 18'$
$L = 1500'$
$T_c = 12$ min. x 2 = 24 min
grassed surface

TR-55
200' overland flow
$n = .2$, $S = \frac{98.3-96.6}{200} = 0.007$
$t = \frac{.007(0.2 \times 200)^{0.8}}{\sqrt{3.5}\,(.007)^{0.4}} = 0.52$ hr
$= 31$ min.

1300' channel - 1.3% slope
$v \approx 2$ fps
$\frac{1300}{2 \times 60} = 10.8$ min

$T_c = 42$ min.

Total to Pond



Langley and McDonald
A PROFESSIONAL CORPORATION
ENGINEERS • PLANNERS • SURVEYORS
VIRGINIA BEACH - WILLIAMSBURG, VIRGINIA

Subject _____

Computed By _____ Checked By _____

Project No. _____
Client _____
Date _____ Sheet No. 4

POST - DEVELOPMENT

RUNOFF TO PG-5 SAME

REMAINING AREA TO POND

A = 23.~~95~~ 77
C = 0.55
$T_c$ =

3.69 x 0.3 park
15.33 x 0.6 Phase IV
4.75 x 0.6 Dev

$T_c$

50' overland

$$t = \frac{.007\,(.2 \times 50)^{0.8}}{\sqrt{3.5}\,(.007)^{0.4}} = 0.17 \text{ hr} = 10.3 \text{ min}$$

1450' pipe (24" @ 1% → v = 7 fps)
t = 3.5 min

$T_c$ = 14 min.

Soil Survey Sht. 13
29B | Slagee HSG C

$$CN_{post} = \frac{3.69(74) + 14.6(89) + 4.75(89)}{23.04} = 87$$

$$CN_{pre} = \frac{3.69(74) + 14.6(74) + 4.75(89)}{23.04} = 77$$

Langley and McDonald
A PROFESSIONAL CORPORATION
ENGINEERS • PLANNERS • SURVEYORS
VIRGINIA BEACH - WILLIAMSBURG, VIRGINIA

Subject: BERKELEY COMMONS - IV
Computed By: DBT Checked By:

Project No. 87-040-65-06
Client: McArthur Glen
Date: 6/9/94 Sheet No. 1

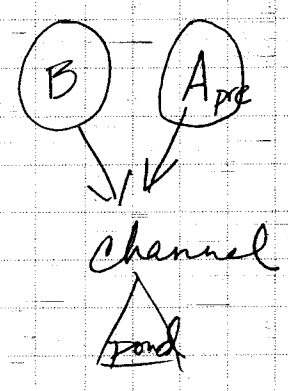
## PRE-DEVELOPMENT

SUBAREA B — TO PG-5 (from Ph. II work)

$A = 37.26$
$T_c = 52$ min
$C = 0.43$
$CN = 83$

SUBAREA A

$A = 23.04$
$C = 0.36$
$T_c = 42$ min
$CN = 77$




## POST-DEVELOPMENT

SUBAREA B - SAME AS PRE-DEV

SUBAREA A

$A = 23.04$
$C = 0.55$
$T_c = 14$ min
$CN = 87$

Langley and McDonald
A PROFESSIONAL CORPORATION
ENGINEERS • PLANNERS • SURVEYORS
VIRGINIA BEACH - WILLIAMSBURG, VIRGINIA

Subject _____

Computed By _____ Checked By _____

Project No. _____

Client _____

Date _____ Sheet No. _____

| | | | | Pts |
|---|---|---|---|---|
| Open Space | 4.7 AC (BACK) | 31% | | 3.1 |
| Pond Drainage Area | 60.3 AC | | | |
| 14.6 / 15.33 | Phase IV on-site | 0.95 | x 4 | 3.8 |
| 45.7 / 15.33 | offsite<br>19.03 I-III<br>18.23 PG-5<br>8.44 IV off-site | 2.98 | x 4 | 11.92 |

Dry Detention Design 2

0.5" / imp AC

$60.3(.49) \times \frac{0.5''}{12} = 1.23$ AC-FT $= 53{,}628$ cf

TR-55 10-YR DET VOL = 2.1 AC-FT
= 91,476 cf

$\frac{91476}{134 \times 27}$ = 25.3 AC SEDIMENT BASIN AREA

$\frac{53628 \text{ CF}}{12 \text{ HR} \times 60 \times 60} = 1.24$ CFS

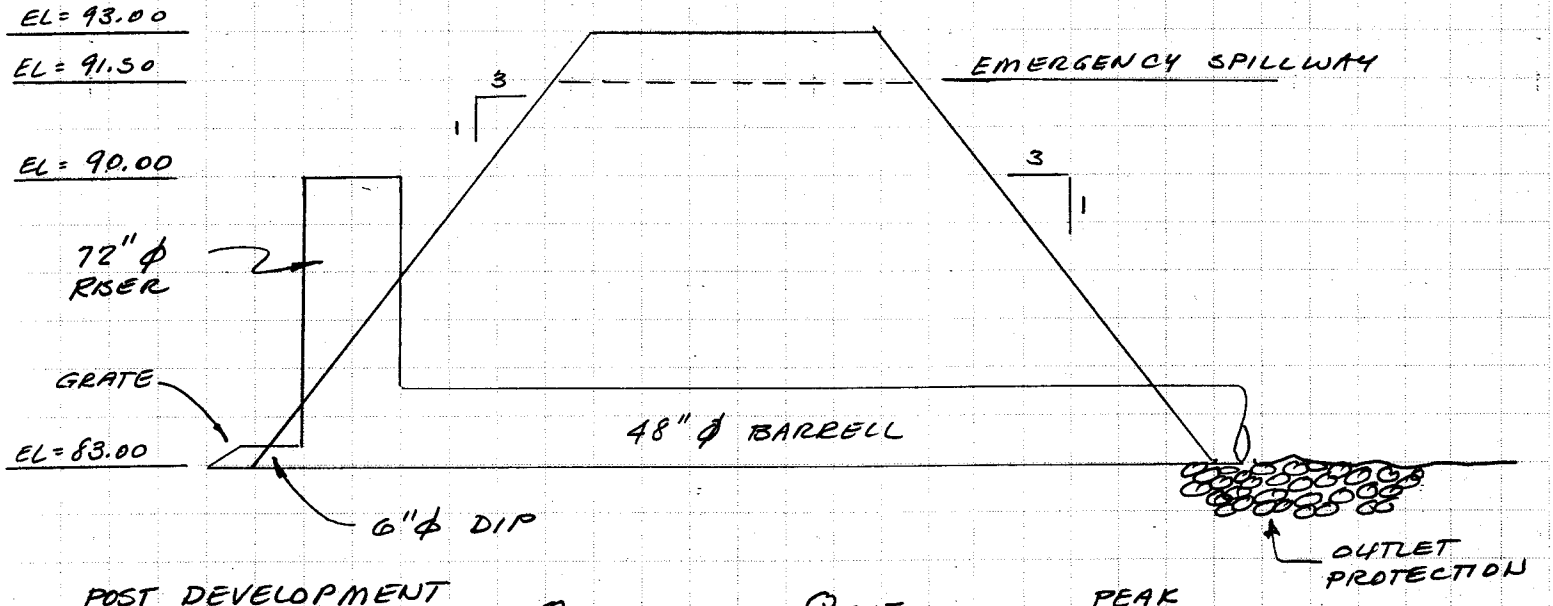
$Q = C_d A \sqrt{2gh} = 0.6 \frac{\pi D^2}{4} \sqrt{64.4 \times h} = 1.24$

$h = \frac{7}{2}$ $D = 0.42' = 5''$

Langley and McDonald
A PROFESSIONAL CORPORATION
ENGINEERS • PLANNERS • SURVEYORS
VIRGINIA BEACH - WILLIAMSBURG, VIRGINIA

Subject BERKELEY COMMONS
PHASE 4
Computed By MRG Checked By

Project No. 87040-65-08
Client
Date 9/27/94 Sheet No.

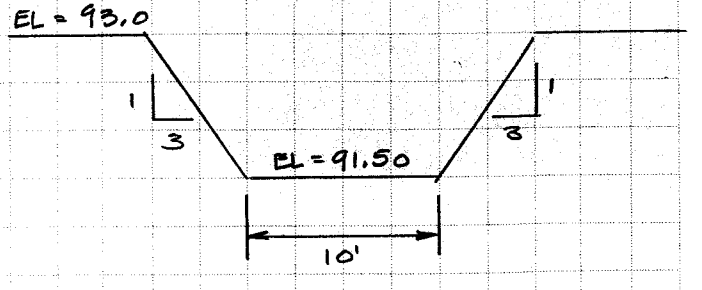



| POST DEVELOPMENT | $Q_{IN}$ | $Q_{OUT}$ | PEAK ELEV. |
|---|---|---|---|
| 2-YR | 72 cfs | 42.59 cfs | 90.73 |
| 10 YR | 145 cfs | 99.38 cfs | 91.33 |
| 25 YR | 159 cfs | 110.29 cfs | 91.43 |
| 100 YR | 206 cfs | 164.83 cfs | 91.83 |

PREDEVELOPMENT

2 YR ⟹ 59 cfs

10 YR ⟹ 136 cfs




EMERGENCY SPILLWAY RIP-RAP LINED CHANNEL

Langley and McDonald
A PROFESSIONAL CORPORATION
ENGINEERS • PLANNERS • SURVEYORS
VIRGINIA BEACH - WILLIAMSBURG, VIRGINIA

Subject BERKELEY COMMONS
Phase 4
Computed By MRG Checked By

Project No. 87040-65-8
Client
Date Sheet No.

## 6 PT. BMP WATER QUALITY VOLUME CALCULATIONS

% IMPERVIOUS = 49%

$R_v = 0.05 + (0.009 \times 49) = 0.4910$

$Vol. = [(R_m) * (R_v)/12](A)$

$= (1.0\ (0.49)/12)(2{,}689{,}830)$

$= 109{,}834.72$ C.F.

$R_m$ = vol of mean storm = 1.0 inch
$R_v$ = rainfall coefficient = 0.49
A = area of contributing watershed
= 61.75 Ac × 43560 = 2,689,830 SF.

DRAWDOWN

- TRY 6" ϕ ORFICE (VERTICAL)

$Q = C_d A \sqrt{2gh}$

$Q = 0.6 \left[\frac{(6/12)^2}{4}\right] \pi \sqrt{2gh}$

$Q = 0.6\ (0.0625)\ \pi\ (15.269)$

$Q = 1.798 \Rightarrow 1.80$ cfs

* 109,826 CF OF VOL. OCCURS @ ELEV. ~~90.25~~ 89.1

$h = \frac{90.25 - 83.0}{2} = 3.625$

riser lvl @ 90.0 _ok

Drawdown time = $\frac{\text{Vol. reqd}}{\text{flow rate}} = \frac{109{,}834.72}{1.80} = 61{,}056.44$ sec
= 16.96 hrs

- TRY 5" ϕ ORFICE

$Q = 0.6\ (0.0434)\ \pi\ (15.269)$
$= 1.249$ cfs $\Rightarrow 1.25$ cfs

Drawdown time = $\frac{109{,}834.72}{1.25} = 87{,}867.77$ sec $\Rightarrow$ 24.41 hrs

Langley and McDonald
A PROFESSIONAL CORPORATION
ENGINEERS • PLANNERS • SURVEYORS
VIRGINIA BEACH - WILLIAMSBURG, VIRGINIA

Subject BERKELEY COMMONS
PHASE 4
Computed By MRG Checked By

Project No. 88040-65-8
Client
Date 11/3/94 Sheet No.

FLOW THROUGH EMERGENCY SPILLWAY

$Q = CLH^{3/2}$
$= (2.62)(10)(0.33)^{3/2}$
$= 20.62(0.1896)$
$= 3.91$ cfs

$C = 2.62$
$L = 10.00'$
$H = 0.33'$

* PEAK OUTFLOW @ 100 YR. EVENT = 164.52 cfs

* MAX. FLOW THRU 48"ϕ PIPE THRU DAM = 164.52 − 3.91 = 160.61 cfs.

* FLOW IS LOW ENOUGH THAT THERE IS NO NEED FOR PROTECTING THE RAVINE SLOPE BEYOND POINT THAT EMERGENCY SPILLWAY MEETS EXIST GROUND.

POND-2 Version: 5.17
S/N: 1295130250

BERKELEY COMMONS -Phase 4
James City County, Virginia
L&M File No. 87040-65-8

CALCULATED 11-04-1994 15:03:15
DISK FILE: C:\PONDPACK\BERKLEY\ALT1 .VOL

Planimeter scale: 1 inch = 25 ft.

| Elevation (ft) | Planimeter (sq.in.) | Area (sq.ft) | A1+A2+sqr(A1*A2) (sq.ft) | * Volume (cubic-ft) | Volume Sum (cubic-ft) |
|---|---|---|---|---|---|
| 82.00 | 0.69 | 431 | 0 | 0 | 0 |
| 83.00 | 1.67 | 1.044 | 2.146 | 715 | 715 |
| 84.00 | 9.55 | 5.969 | 9.508 | 3.169 | 3.885 |
| 85.00 | 19.70 | 12.313 | 26.854 | 8.951 | 12.836 |
| 86.00 | 28.27 | 17.669 | 44.731 | 14.910 | 27.746 |
| 87.00 | 39.26 | 24.538 | 63.028 | 21.009 | 48.756 |
| 88.00 | 46.37 | 28.981 | 80.186 | 26.729 | 75.484 |
| 89.00 | 49.90 | 31.188 | 90.233 | 30.078 | 105.562 |
| 90.00 | 54.39 | 33.994 | 97.742 | 32.581 | 138.142 |
| 91.00 | 52.14 | 32.588 | 99.864 | 33.288 | 171.431 |
| 92.00 | 63.18 | 39.488 | 107.947 | 35.982 | 207.413 |
| 93.00 | 68.06 | 42.538 | 123.009 | 41.003 | 248.416 |

Elevations With Areas Interpolated From
The Closest Two Planimeter Readings

| | | | | | |
|---|---|---|---|---|---|
| 85.07 | ----- | 12.656 | 37.452 | 874 | 13.710 |
| 86.07 | ----- | 18.113 | 53.671 | 1.252 | 28.999 |
| 87.32 | ----- | 25.919 | 75.676 | 8.072 | 56.828 |
| 89.14 | ----- | 31.573 | 94.140 | 4.393 | 109.955 |

$$IA = (sq.rt(Area1) + ((Ei-E1)/(E2-E1))*(sq.rt(Area2)-sq.rt(Area1)))^2$$

where: E1, E2 = Closest two elevations with planimeter data
Ei = Elevation at which to interpolate area
Area1,Area2 = Areas computed for E1, E2, respectively
IA = Interpolated area for Ei

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

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

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

Return Frequency: 2 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 11-07-1994 09:08:59
Watershed file: --> C:\PONDPACK\BERKLEY\PH4PRE .MOP
Hydrograph file: --> C:\PONDPACK\BERKLEY\PRE-2.HYD

BERKELEY COMMONS PHASE IV
L&M JOB 87-040-65-06
PRE-DEVELOPMENT CONDITIONS

>>>> Input Parameters Used to Compute Hydrograph <<<<

| Subarea Description | AREA (acres) | CN | Tc (hrs) | * Tt (hrs) | Precip. (in) | Runoff (in) | Ia/P input/used | |
|---|---|---|---|---|---|---|---|---|
| A | 23.04 | 77.0 | ~~0.75~~ 0.7 | 0.00 | 3.50 | 1.43 | I.17 | .17 |
| B | 37.26 | 83.0 | ~~0.75~~ 0.87 | 0.20 | 3.50 | 1.86 | I.12 | .12 |

* Travel time from subarea outfall to composite watershed outfall point.
I -- Subarea where user specified interpolation between Ia/P tables.

Total area = 60.30 acres or 0.09422 sq.mi
Peak discharge = 59 cfs

>>>> Computer Modifications of Input Parameters <<<<<

| Subarea Description | Input Values Tc (hr) | Input Values * Tt (hr) | Rounded Values Tc (hr) | Rounded Values * Tt (hr) | Ia/P Interpolated (Yes/No) | Ia/P Messages |
|---|---|---|---|---|---|---|
| A | 0.70 | 0.00 | 0.75 | 0.00 | Yes | -- |
| B | 0.87 | 0.13 | 0.75 | 0.20 | Yes | -- |

* Travel time from subarea outfall to composite watershed outfall point.

Return Frequency: 2 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 11-07-1994 09:08:59
Watershed file: --> C:\PONDPACK\BERKLEY\PH4PRE .MOP
Hydrograph file: --> C:\PONDPACK\BERKLEY\PRE-2.HYD

BERKELEY COMMONS PHASE IV
L&M JOB 87-040-65-06
PRE-DEVELOPMENT CONDITIONS

>>>> Summary of Subarea Times to Peak <<<<

| Subarea | Peak Discharge at Composite Outfall (cfs) | Time to Peak at Composite Outfall (hrs) |
|---|---|---|
| A | 20 | 12.6 |
| B | 41 | 12.8 |
| Composite Watershed | 59 | 12.8 |

Return Frequency: 2 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 11-07-1994 09:08:59
Watershed file: --> C:\PONDPACK\BERKLEY\PH4PRE .MOP
Hydrograph file: --> C:\PONDPACK\BERKLEY\PRE-2.HYD

BERKELEY COMMONS PHASE IV
L&M JOB 87-040-65-06
PRE-DEVELOPMENT CONDITIONS

Composite Hydrograph Summary (cfs)

| Subarea Description | 11.0 hr | 11.3 hr | 11.6 hr | 11.9 hr | 12.0 hr | 12.1 hr | 12.2 hr | 12.3 hr | 12.4 hr |
|---|---|---|---|---|---|---|---|---|---|
| A | 0 | 1 | 1 | 1 | 2 | 2 | 4 | 8 | 13 |
| B | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 8 | 14 |
| Total (cfs) | 1 | 2 | 3 | 4 | 5 | 6 | 9 | 16 | 27 |

| Subarea Description | 12.5 hr | 12.6 hr | 12.7 hr | 12.8 hr | 13.0 hr | 13.2 hr | 13.4 hr | 13.6 hr | 13.8 hr |
|---|---|---|---|---|---|---|---|---|---|
| A | 18 | 20 | 20 | 18 | 13 | 9 | 7 | 5 | 4 |
| B | 22 | 31 | 38 | 41 | 38 | 28 | 19 | 14 | 10 |
| Total (cfs) | 40 | 51 | 58 | 59 | 51 | 37 | 26 | 19 | 14 |

| Subarea Description | 14.0 hr | 14.3 hr | 14.6 hr | 15.0 hr | 15.5 hr | 16.0 hr | 16.5 hr | 17.0 hr | 17.5 hr |
|---|---|---|---|---|---|---|---|---|---|
| A | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 1 |
| B | 8 | 6 | 5 | 4 | 4 | 3 | 3 | 3 | 2 |
| Total (cfs) | 11 | 9 | 7 | 6 | 6 | 5 | 4 | 4 | 3 |

| Subarea Description | 18.0 hr | 19.0 hr | 20.0 hr | 22.0 hr | 26.0 hr |
|---|---|---|---|---|---|
| A | 1 | 1 | 1 | 1 | 0 |
| B | 2 | 2 | 2 | 1 | 0 |
| Total (cfs) | 3 | 3 | 3 | 2 | 0 |

Return Frequency: 2 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 11-07-1994 09:08:59
Watershed file: --> C:\PONDPACK\BERKLEY\PH4PRE .MOP
Hydrograph file: --> C:\PONDPACK\BERKLEY\PRE-2.HYD

BERKELEY COMMONS PHASE IV
L&M JOB 87-040-65-06
PRE-DEVELOPMENT CONDITIONS

| Time (hrs) | Flow (cfs) | Time (hrs) | Flow (cfs) |
|---|---|---|---|
| 11.0 | 1 | 14.8 | 6 |
| 11.1 | 1 | 14.9 | 6 |
| 11.2 | 2 | 15.0 | 6 |
| 11.3 | 2 | 15.1 | 6 |
| 11.4 | 2 | 15.2 | 6 |
| 11.5 | 3 | 15.3 | 6 |
| 11.6 | 3 | 15.4 | 6 |
| 11.7 | 3 | 15.5 | 6 |
| 11.8 | 4 | 15.6 | 6 |
| 11.9 | 4 | 15.7 | 6 |
| 12.0 | 5 | 15.8 | 5 |
| 12.1 | 6 | 15.9 | 5 |
| 12.2 | 9 | 16.0 | 5 |
| 12.3 | 16 | 16.1 | 5 |
| 12.4 | 27 | 16.2 | 5 |
| 12.5 | 40 | 16.3 | 4 |
| 12.6 | 51 | 16.4 | 4 |
| 12.7 | 58 | 16.5 | 4 |
| 12.8 | 59 | 16.6 | 4 |
| 12.9 | 55 | 16.7 | 4 |
| 13.0 | 51 | 16.8 | 4 |
| 13.1 | 44 | 16.9 | 4 |
| 13.2 | 37 | 17.0 | 4 |
| 13.3 | 31 | 17.1 | 4 |
| 13.4 | 26 | 17.2 | 4 |
| 13.5 | 23 | 17.3 | 3 |
| 13.6 | 19 | 17.4 | 3 |
| 13.7 | 16 | 17.5 | 3 |
| 13.8 | 14 | 17.6 | 3 |
| 13.9 | 12 | 17.7 | 3 |
| 14.0 | 11 | 17.8 | 3 |
| 14.1 | 10 | 17.9 | 3 |
| 14.2 | 10 | 18.0 | 3 |
| 14.3 | 9 | 18.1 | 3 |
| 14.4 | 8 | 18.2 | 3 |
| 14.5 | 8 | 18.3 | 3 |
| 14.6 | 7 | 18.4 | 3 |
| 14.7 | 7 | 18.5 | 3 |

Return Frequency: 2 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 11-07-1994 09:08:59
Watershed file: --> C:\PONDPACK\BERKLEY\PH4PRE .MOP
Hydrograph file: --> C:\PONDPACK\BERKLEY\PRE-2.HYD

BERKELEY COMMONS PHASE IV
L&M JOB 87-040-65-06
PRE-DEVELOPMENT CONDITIONS

| Time (hrs) | Flow (cfs) | Time (hrs) | Flow (cfs) |
|---|---|---|---|
| 18.6 | 3 | 22.4 | 2 |
| 18.7 | 3 | 22.5 | 2 |
| 18.8 | 3 | 22.6 | 2 |
| 18.9 | 3 | 22.7 | 2 |
| 19.0 | 3 | 22.8 | 2 |
| 19.1 | 3 | 22.9 | 2 |
| 19.2 | 3 | 23.0 | 2 |
| 19.3 | 3 | 23.1 | 1 |
| 19.4 | 3 | 23.2 | 1 |
| 19.5 | 3 | 23.3 | 1 |
| 19.6 | 3 | 23.4 | 1 |
| 19.7 | 3 | 23.5 | 1 |
| 19.8 | 3 | 23.6 | 1 |
| 19.9 | 3 | 23.7 | 1 |
| 20.0 | 3 | 23.8 | 1 |
| 20.1 | 3 | 23.9 | 1 |
| 20.2 | 3 | 24.0 | 1 |
| 20.3 | 3 | 24.1 | 1 |
| 20.4 | 3 | 24.2 | 1 |
| 20.5 | 3 | 24.3 | 1 |
| 20.6 | 3 | 24.4 | 1 |
| 20.7 | 3 | 24.5 | 1 |
| 20.8 | 3 | 24.6 | 1 |
| 20.9 | 3 | 24.7 | 1 |
| 21.0 | 3 | 24.8 | 1 |
| 21.1 | 2 | 24.9 | 1 |
| 21.2 | 2 | 25.0 | 1 |
| 21.3 | 2 | 25.1 | 0 |
| 21.4 | 2 | 25.2 | 0 |
| 21.5 | 2 | 25.3 | 0 |
| 21.6 | 2 | 25.4 | 0 |
| 21.7 | 2 | 25.5 | 0 |
| 21.8 | 2 | 25.6 | 0 |
| 21.9 | 2 | 25.7 | 0 |
| 22.0 | 2 | 25.8 | 0 |
| 22.1 | 2 | 25.9 | 0 |
| 22.2 | 2 | | |
| 22.3 | 2 | | |

Return Frequency: 10 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 11-07-1994 09:08:59
Watershed file: --> C:\PONDPACK\BERKLEY\PH4PRE .MOP
Hydrograph file: --> C:\PONDPACK\BERKLEY\PRE-10.HYD

BERKELEY COMMONS PHASE IV
L&M JOB 87-040-65-06
PRE-DEVELOPMENT CONDITIONS

>>>> Input Parameters Used to Compute Hydrograph <<<<

| Subarea Description | AREA (acres) | CN | Tc (hrs) | * Tt (hrs) | Precip. (in) | Runoff (in) | Ia/p input/used | |
|---|---|---|---|---|---|---|---|---|
| A | 23.04 | 77.0 | 0.75 | 0.00 | 5.80 | 3.31 | I.1 | .10 |
| B | 37.26 | 83.0 | 0.75 | 0.20 | 5.80 | 3.91 | I.07 | .10 |

* Travel time from subarea outfall to composite watershed outfall point.
I -- Subarea where user specified interpolation between Ia/p tables.

Total area = 60.30 acres or 0.09422 sq.mi
Peak discharge = 133 cfs

>>>> Computer Modifications of Input Parameters <<<<<

| Subarea Description | Input Values Tc (hr) | Input Values * Tt (hr) | Rounded Values Tc (hr) | Rounded Values * Tt (hr) | Ia/p Interpolated (Yes/No) | Ia/p Messages |
|---|---|---|---|---|---|---|
| A | 0.70 | 0.00 | 0.75 | 0.00 | No | Computed Ia/p < .1 |
| B | 0.87 | 0.13 | 0.75 | 0.20 | No | Computed Ia/p < .1 |

* Travel time from subarea outfall to composite watershed outfall point.

Return Frequency: 10 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 11-07-1994 09:08:59
Watershed file: --> C:\PONDPACK\BERKLEY\PH4PRE .MOP
Hydrograph file: --> C:\PONDPACK\BERKLEY\PRE-10.HYD

BERKELEY COMMONS PHASE IV
L&M JOB 87-040-65-06
PRE-DEVELOPMENT CONDITIONS

>>>> Summary of Subarea Times to Peak <<<<

| Subarea | Peak Discharge at Composite Outfall (cfs) | Time to Peak at Composite Outfall (hrs) |
|---|---|---|
| A | 51 | 12.6 |
| B | 89 | 12.8 |
| Composite Watershed | 133 | 12.8 |

Return Frequency: 10 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 11-07-1994 09:08:59
Watershed file: --> C:\PONDPACK\BERKLEY\PH4PRE .MOP
Hydrograph file: --> C:\PONDPACK\BERKLEY\PRE-10.HYD

BERKELEY COMMONS PHASE IV
L&M JOB 87-040-65-06
PRE-DEVELOPMENT CONDITIONS

Composite Hydrograph Summary (cfs)

| Subarea Description | 11.0 hr | 11.3 hr | 11.6 hr | 11.9 hr | 12.0 hr | 12.1 hr | 12.2 hr | 12.3 hr | 12.4 hr |
|---|---|---|---|---|---|---|---|---|---|
| A | 2 | 2 | 3 | 4 | 5 | 8 | 14 | 23 | 35 |
| B | 3 | 3 | 5 | 6 | 7 | 9 | 12 | 19 | 31 |
| Total (cfs) | 5 | 5 | 8 | 10 | 12 | 17 | 26 | 42 | 66 |

| Subarea Description | 12.5 hr | 12.6 hr | 12.7 hr | 12.8 hr | 13.0 hr | 13.2 hr | 13.4 hr | 13.6 hr | 13.8 hr |
|---|---|---|---|---|---|---|---|---|---|
| A | 45 | 51 | 49 | 44 | 30 | 20 | 15 | 11 | 9 |
| B | 48 | 67 | 82 | 89 | 80 | 58 | 41 | 29 | 22 |
| Total (cfs) | 93 | 118 | 131 | 133 | 110 | 78 | 56 | 40 | 31 |

| Subarea Description | 14.0 hr | 14.3 hr | 14.6 hr | 15.0 hr | 15.5 hr | 16.0 hr | 16.5 hr | 17.0 hr | 17.5 hr |
|---|---|---|---|---|---|---|---|---|---|
| A | 7 | 6 | 5 | 4 | 4 | 3 | 3 | 3 | 2 |
| B | 17 | 13 | 10 | 9 | 7 | 7 | 6 | 5 | 5 |
| Total (cfs) | 24 | 19 | 15 | 13 | 11 | 10 | 9 | 8 | 7 |

| Subarea Description | 18.0 hr | 19.0 hr | 20.0 hr | 22.0 hr | 26.0 hr |
|---|---|---|---|---|---|
| A | 2 | 2 | 2 | 1 | 0 |
| B | 5 | 4 | 3 | 3 | 0 |
| Total (cfs) | 7 | 6 | 5 | 4 | 0 |

Return Frequency: 10 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 11-07-1994 09:08:59
Watershed file: --> C:\PONDPACK\BERKLEY\PH4PRE .MOP
Hydrograph file: --> C:\PONDPACK\BERKLEY\PRE-10.HYD

BERKELEY COMMONS PHASE IV
L&M JOB 87-040-65-06
PRE-DEVELOPMENT CONDITIONS

| Time (hrs) | Flow (cfs) | Time (hrs) | Flow (cfs) |
|---|---|---|---|
| 11.0 | 5 | 14.8 | 14 |
| 11.1 | 5 | 14.9 | 13 |
| 11.2 | 5 | 15.0 | 13 |
| 11.3 | 5 | 15.1 | 13 |
| 11.4 | 6 | 15.2 | 12 |
| 11.5 | 7 | 15.3 | 12 |
| 11.6 | 8 | 15.4 | 11 |
| 11.7 | 9 | 15.5 | 11 |
| 11.8 | 9 | 15.6 | 11 |
| 11.9 | 10 | 15.7 | 11 |
| 12.0 | 12 | 15.8 | 10 |
| 12.1 | 17 | 15.9 | 10 |
| 12.2 | 26 | 16.0 | 10 |
| 12.3 | 42 | 16.1 | 10 |
| 12.4 | 66 | 16.2 | 10 |
| 12.5 | 93 | 16.3 | 9 |
| 12.6 | 118 | 16.4 | 9 |
| 12.7 | 131 | 16.5 | 9 |
| 12.8 | 133 | 16.6 | 9 |
| 12.9 | 121 | 16.7 | 9 |
| 13.0 | 110 | 16.8 | 8 |
| 13.1 | 94 | 16.9 | 8 |
| 13.2 | 78 | 17.0 | 8 |
| 13.3 | 67 | 17.1 | 8 |
| 13.4 | 56 | 17.2 | 8 |
| 13.5 | 48 | 17.3 | 7 |
| 13.6 | 40 | 17.4 | 7 |
| 13.7 | 35 | 17.5 | 7 |
| 13.8 | 31 | 17.6 | 7 |
| 13.9 | 27 | 17.7 | 7 |
| 14.0 | 24 | 17.8 | 7 |
| 14.1 | 22 | 17.9 | 7 |
| 14.2 | 21 | 18.0 | 7 |
| 14.3 | 19 | 18.1 | 7 |
| 14.4 | 18 | 18.2 | 7 |
| 14.5 | 16 | 18.3 | 7 |
| 14.6 | 15 | 18.4 | 7 |
| 14.7 | 14 | 18.5 | 7 |

Return Frequency: 10 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 11-07-1994 09:08:59
Watershed file: --> C:\PONDPACK\BERKLEY\PH4PRE .MOP
Hydrograph file: --> C:\PONDPACK\BERKLEY\PRE-10.HYD

BERKELEY COMMONS PHASE IV
L&M JOB 87-040-65-06
PRE-DEVELOPMENT CONDITIONS

| Time (hrs) | Flow (cfs) | Time (hrs) | Flow (cfs) |
|---|---|---|---|
| 18.6 | 6 | 22.4 | 4 |
| 18.7 | 6 | 22.5 | 4 |
| 18.8 | 6 | 22.6 | 3 |
| 18.9 | 6 | 22.7 | 3 |
| 19.0 | 6 | 22.8 | 3 |
| 19.1 | 6 | 22.9 | 3 |
| 19.2 | 6 | 23.0 | 3 |
| 19.3 | 6 | 23.1 | 3 |
| 19.4 | 6 | 23.2 | 3 |
| 19.5 | 6 | 23.3 | 3 |
| 19.6 | 5 | 23.4 | 3 |
| 19.7 | 5 | 23.5 | 3 |
| 19.8 | 5 | 23.6 | 2 |
| 19.9 | 5 | 23.7 | 2 |
| 20.0 | 5 | 23.8 | 2 |
| 20.1 | 5 | 23.9 | 2 |
| 20.2 | 5 | 24.0 | 2 |
| 20.3 | 5 | 24.1 | 2 |
| 20.4 | 5 | 24.2 | 2 |
| 20.5 | 5 | 24.3 | 2 |
| 20.6 | 5 | 24.4 | 2 |
| 20.7 | 5 | 24.5 | 2 |
| 20.8 | 5 | 24.6 | 1 |
| 20.9 | 5 | 24.7 | 1 |
| 21.0 | 5 | 24.8 | 1 |
| 21.1 | 4 | 24.9 | 1 |
| 21.2 | 4 | 25.0 | 1 |
| 21.3 | 4 | 25.1 | 1 |
| 21.4 | 4 | 25.2 | 1 |
| 21.5 | 4 | 25.3 | 1 |
| 21.6 | 4 | 25.4 | 1 |
| 21.7 | 4 | 25.5 | 1 |
| 21.8 | 4 | 25.6 | 0 |
| 21.9 | 4 | 25.7 | 0 |
| 22.0 | 4 | 25.8 | 0 |
| 22.1 | 4 | 25.9 | 0 |
| 22.2 | 4 | | |
| 22.3 | 4 | | |

Return Frequency: 100 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 11-07-1994 09:08:59
Watershed file: --> C:\PONDPACK\BERKLEY\PH4PRE .MOP
Hydrograph file: --> C:\PONDPACK\BERKLEY\PRE-100.HYD

BERKELEY COMMONS PHASE IV
L&M JOB 87-040-65-06
PRE-DEVELOPMENT CONDITIONS

>>>> Input Parameters Used to Compute Hydrograph <<<<

| Subarea Description | AREA (acres) | CN | Tc (hrs) | * Tt (hrs) | Precip. (in) | Runoff (in) | Ia/p input/used | |
|---|---|---|---|---|---|---|---|---|
| A | 23.04 | 77.0 | 0.75 | 0.00 | 7.70 | 5.00 | I.08 | .10 |
| B | 37.26 | 83.0 | 0.75 | 0.20 | 7.70 | 5.69 | I.05 | .10 |

* Travel time from subarea outfall to composite watershed outfall point.
I -- Subarea where user specified interpolation between Ia/p tables.

Total area = 60.30 acres or 0.09422 sq.mi
Peak discharge = 196 cfs

>>>> Computer Modifications of Input Parameters <<<<<

| Subarea Description | Input Values Tc (hr) | Input Values * Tt (hr) | Rounded Values Tc (hr) | Rounded Values * Tt (hr) | Ia/p Interpolated (Yes/No) | Ia/p Messages |
|---|---|---|---|---|---|---|
| A | 0.70 | 0.00 | 0.75 | 0.00 | No | Computed Ia/p < .1 |
| B | 0.87 | 0.13 | 0.75 | 0.20 | No | Computed Ia/p < .1 |

* Travel time from subarea outfall to composite watershed outfall point.

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 11-07-1994 09:08:59
Watershed file: --> C:\PONDPACK\BERKLEY\PH4PRE .MOP
Hydrograph file: --> C:\PONDPACK\BERKLEY\PRE-100.HYD

BERKELEY COMMONS PHASE IV
L&M JOB 87-040-65-06
PRE-DEVELOPMENT CONDITIONS

>>>> Summary of Subarea Times to Peak <<<<

| Subarea | Peak Discharge at Composite Outfall (cfs) | Time to Peak at Composite Outfall (hrs) |
|---|---|---|
| A | 76 | 12.6 |
| B | 130 | 12.8 |
| Composite Watershed | 196 | 12.8 |

Return Frequency: 2 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 09-28-1994 14:13:01
Watershed file: --> C:\PONDPACK\BERKLEY\PH4POST .MOP
Hydrograph file: --> C:\PONDPACK\BERKLEY\POST-2.HYD

>>>> Input Parameters Used to Compute Hydrograph <<<<

| Subarea Description | AREA (acres) | CN | Tc (hrs) | * Tt (hrs) | Precip. (in) | Runoff (in) | Ia/p input | Ia/p used |
|---|---|---|---|---|---|---|---|---|
| A | 24.49 | 87.0 | 0.20 | 0.00 | 3.50 | 2.18 | I.09 | .10 |
| B | 37.26 | 83.0 | 0.75 | 0.20 | 3.50 | 1.86 | I.12 | .12 |

* Travel time from subarea outfall to composite watershed outfall point.
I -- Subarea where user specified interpolation between Ia/p tables.

Total area = 61.75 acres or 0.09648 sq.mi
Peak discharge = 72 cfs

>>>> Computer Modifications of Input Parameters <<<<<

| Subarea Description | Input Values Tc (hr) | Input Values * Tt (hr) | Rounded Values Tc (hr) | Rounded Values * Tt (hr) | Ia/p Interpolated (Yes/No) | Ia/p Messages |
|---|---|---|---|---|---|---|
| A | 0.23 | 0.00 | 0.20 | 0.00 | No | Computed Ia/p < .1 |
| B | 0.87 | 0.13 | 0.75 | 0.20 | Yes | -- |

* Travel time from subarea outfall to composite watershed outfall point.

Return Frequency: 2 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 09-28-1994 14:13:01
Watershed file: --> C:\PONDPACK\BERKLEY\PH4POST .MDP
Hydrograph file: --> C:\PONDPACK\BERKLEY\POST-2.HYD

>>>> Summary of Subarea Times to Peak <<<<

| Subarea | Peak Discharge at Composite Outfall (cfs) | Time to Peak at Composite Outfall (hrs) |
|---|---|---|
| A | 67 | 12.2 |
| B | 41 | 12.8 |
| Composite Watershed | 72 | 12.2 |

Return Frequency: 2 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 11-07-1994 09:23:00
Watershed file: --> C:\PONDPACK\BERKLEY\PH4POST .MOP
Hydrograph file: --> C:\PONDPACK\BERKLEY\POST-2.HYD

| Time (hrs) | Flow (cfs) | Time (hrs) | Flow (cfs) |
|---|---|---|---|
| 11.0 | 3 | 14.8 | 7 |
| 11.1 | 3 | 14.9 | 7 |
| 11.2 | 4 | 15.0 | 7 |
| 11.3 | 4 | 15.1 | 7 |
| 11.4 | 5 | 15.2 | 7 |
| 11.5 | 5 | 15.3 | 6 |
| 11.6 | 6 | 15.4 | 6 |
| 11.7 | 11 | 15.5 | 6 |
| 11.8 | 15 | 15.6 | 6 |
| 11.9 | 20 | 15.7 | 6 |
| 12.0 | 37 | 15.8 | 5 |
| 12.1 | 66 | 15.9 | 5 |
| 12.2 | 72 | 16.0 | 5 |
| 12.3 | 48 | 16.1 | 5 |
| 12.4 | 35 | 16.2 | 5 |
| 12.5 | 36 | 16.3 | 5 |
| 12.6 | 42 | 16.4 | 5 |
| 12.7 | 47 | 16.5 | 5 |
| 12.8 | 48 | 16.6 | 5 |
| 12.9 | 46 | 16.7 | 5 |
| 13.0 | 44 | 16.8 | 5 |
| 13.1 | 38 | 16.9 | 5 |
| 13.2 | 33 | 17.0 | 5 |
| 13.3 | 28 | 17.1 | 5 |
| 13.4 | 24 | 17.2 | 5 |
| 13.5 | 21 | 17.3 | 4 |
| 13.6 | 18 | 17.4 | 4 |
| 13.7 | 16 | 17.5 | 4 |
| 13.8 | 14 | 17.6 | 4 |
| 13.9 | 12 | 17.7 | 4 |
| 14.0 | 11 | 17.8 | 4 |
| 14.1 | 10 | 17.9 | 4 |
| 14.2 | 10 | 18.0 | 4 |
| 14.3 | 9 | 18.1 | 4 |
| 14.4 | 9 | 18.2 | 4 |
| 14.5 | 8 | 18.3 | 4 |
| 14.6 | 8 | 18.4 | 4 |
| 14.7 | 8 | 18.5 | 4 |

Return Frequency: 2 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 11-07-1994 09:23:00
Watershed file: --> C:\PONDPACK\BERKLEY\PH4POST .MOP
Hydrograph file: --> C:\PONDPACK\BERKLEY\POST-2.HYD

| Time (hrs) | Flow (cfs) | Time (hrs) | Flow (cfs) |
|---|---|---|---|
| 18.6 | 3 | 22.4 | 2 |
| 18.7 | 3 | 22.5 | 2 |
| 18.8 | 3 | 22.6 | 2 |
| 18.9 | 3 | 22.7 | 2 |
| 19.0 | 3 | 22.8 | 2 |
| 19.1 | 3 | 22.9 | 2 |
| 19.2 | 3 | 23.0 | 2 |
| 19.3 | 3 | 23.1 | 1 |
| 19.4 | 3 | 23.2 | 1 |
| 19.5 | 3 | 23.3 | 1 |
| 19.6 | 3 | 23.4 | 1 |
| 19.7 | 3 | 23.5 | 1 |
| 19.8 | 3 | 23.6 | 1 |
| 19.9 | 3 | 23.7 | 1 |
| 20.0 | 3 | 23.8 | 1 |
| 20.1 | 3 | 23.9 | 1 |
| 20.2 | 3 | 24.0 | 1 |
| 20.3 | 3 | 24.1 | 1 |
| 20.4 | 3 | 24.2 | 1 |
| 20.5 | 3 | 24.3 | 1 |
| 20.6 | 3 | 24.4 | 1 |
| 20.7 | 3 | 24.5 | 1 |
| 20.8 | 3 | 24.6 | 1 |
| 20.9 | 3 | 24.7 | 1 |
| 21.0 | 3 | 24.8 | 1 |
| 21.1 | 2 | 24.9 | 1 |
| 21.2 | 2 | 25.0 | 1 |
| 21.3 | 2 | 25.1 | 0 |
| 21.4 | 2 | 25.2 | 0 |
| 21.5 | 2 | 25.3 | 0 |
| 21.6 | 2 | 25.4 | 0 |
| 21.7 | 2 | 25.5 | 0 |
| 21.8 | 2 | 25.6 | 0 |
| 21.9 | 2 | 25.7 | 0 |
| 22.0 | 2 | 25.8 | 0 |
| 22.1 | 2 | 25.9 | 0 |
| 22.2 | 2 | | |
| 22.3 | 2 | | |

Return Frequency: 10 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 11-07-1994 09:23:00
Watershed file: --> C:\PONDPACK\BERKLEY\PH4POST .MOP
Hydrograph file: --> C:\PONDPACK\BERKLEY\POST-10.HYD

>>>> Input Parameters Used to Compute Hydrograph <<<<

| Subarea Description | AREA (acres) | CN | Tc (hrs) | * Tt (hrs) | Precip. (in) | Runoff (in) | Ia/p input/used | |
|---|---|---|---|---|---|---|---|---|
| A | 24.49 | 87.0 | 0.20 | 0.00 | 5.80 | 4.33 | I.05 | .10 |
| B | 37.26 | 83.0 | 0.75 | 0.20 | 5.80 | 3.91 | I.07 | .10 |

* Travel time from subarea outfall to composite watershed outfall point.
I -- Subarea where user specified interpolation between Ia/p tables.

Total area = 61.75 acres or 0.09648 sq.mi
Peak discharge = 145 cfs

>>>> Computer Modifications of Input Parameters <<<<<

| Subarea Description | Input Values Tc (hr) | Input Values * Tt (hr) | Rounded Values Tc (hr) | Rounded Values * Tt (hr) | Ia/p Interpolated (Yes/No) | Ia/p Messages |
|---|---|---|---|---|---|---|
| A | 0.23 | 0.00 | 0.20 | 0.00 | No | Computed Ia/p < .1 |
| B | 0.87 | 0.13 | 0.75 | 0.20 | No | Computed Ia/p < .1 |

* Travel time from subarea outfall to composite watershed outfall point.

Return Frequency: 10 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 11-07-1994 09:23:00
Watershed file: --> C:\PONDPACK\BERKLEY\PH4POST .MOP
Hydrograph file: --> C:\PONDPACK\BERKLEY\POST-10.HYD

>>>> Summary of Subarea Times to Peak <<<<

| Subarea | Peak Discharge at Composite Outfall (cfs) | Time to Peak at Composite Outfall (hrs) |
|---|---|---|
| A | 133 | 12.2 |
| B | 89 | 12.8 |
| Composite Watershed | 145 | 12.2 |

Return Frequency: 10 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 11-07-1994 09:23:00
Watershed file: --> C:\PONDPACK\BERKLEY\PH4POST .MOP
Hydrograph file: --> C:\PONDPACK\BERKLEY\POST-10.HYD

Composite Hydrograph Summary (cfs)

| Subarea Description | 11.0 hr | 11.3 hr | 11.6 hr | 11.9 hr | 12.0 hr | 12.1 hr | 12.2 hr | 12.3 hr | 12.4 hr |
|---|---|---|---|---|---|---|---|---|---|
| A | 4 | 5 | 8 | 35 | 67 | 122 | 133 | 80 | 41 |
| B | 3 | 3 | 5 | 6 | 7 | 9 | 12 | 19 | 31 |
| Total (cfs) | 7 | 8 | 13 | 41 | 74 | 131 | 145 | 99 | 72 |

| Subarea Description | 12.5 hr | 12.6 hr | 12.7 hr | 12.8 hr | 13.0 hr | 13.2 hr | 13.4 hr | 13.6 hr | 13.8 hr |
|---|---|---|---|---|---|---|---|---|---|
| A | 28 | 21 | 17 | 14 | 12 | 10 | 9 | 8 | 7 |
| B | 48 | 67 | 82 | 89 | 80 | 58 | 41 | 29 | 22 |
| Total (cfs) | 76 | 88 | 99 | 103 | 92 | 68 | 50 | 37 | 29 |

| Subarea Description | 14.0 hr | 14.3 hr | 14.6 hr | 15.0 hr | 15.5 hr | 16.0 hr | 16.5 hr | 17.0 hr | 17.5 hr |
|---|---|---|---|---|---|---|---|---|---|
| A | 7 | 6 | 5 | 5 | 4 | 4 | 3 | 3 | 3 |
| B | 17 | 13 | 10 | 9 | 7 | 7 | 6 | 5 | 5 |
| Total (cfs) | 24 | 19 | 15 | 14 | 11 | 11 | 9 | 8 | 8 |

| Subarea Description | 18.0 hr | 19.0 hr | 20.0 hr | 22.0 hr | 26.0 hr |
|---|---|---|---|---|---|
| A | 3 | 3 | 2 | 2 | 0 |
| B | 5 | 4 | 3 | 3 | 0 |
| Total (cfs) | 8 | 7 | 5 | 5 | 0 |

Return Frequency: 10 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 11-07-1994 09:23:00
Watershed file: --> C:\PONDPACK\BERKLEY\PH4POST .MOP
Hydrograph file: --> C:\PONDPACK\BERKLEY\POST-10.HYD

| Time (hrs) | Flow (cfs) | Time (hrs) | Flow (cfs) |
|---|---|---|---|
| 11.0 | 7 | 14.8 | 14 |
| 11.1 | 7 | 14.9 | 14 |
| 11.2 | 8 | 15.0 | 14 |
| 11.3 | 8 | 15.1 | 13 |
| 11.4 | 10 | 15.2 | 13 |
| 11.5 | 11 | 15.3 | 12 |
| 11.6 | 13 | 15.4 | 12 |
| 11.7 | 22 | 15.5 | 11 |
| 11.8 | 32 | 15.6 | 11 |
| 11.9 | 41 | 15.7 | 11 |
| 12.0 | 74 | 15.8 | 11 |
| 12.1 | 131 | 15.9 | 11 |
| 12.2 | 145 | 16.0 | 11 |
| 12.3 | 99 | 16.1 | 11 |
| 12.4 | 72 | 16.2 | 10 |
| 12.5 | 76 | 16.3 | 10 |
| 12.6 | 88 | 16.4 | 9 |
| 12.7 | 99 | 16.5 | 9 |
| 12.8 | 103 | 16.6 | 9 |
| 12.9 | 97 | 16.7 | 9 |
| 13.0 | 92 | 16.8 | 8 |
| 13.1 | 80 | 16.9 | 8 |
| 13.2 | 68 | 17.0 | 8 |
| 13.3 | 59 | 17.1 | 8 |
| 13.4 | 50 | 17.2 | 8 |
| 13.5 | 44 | 17.3 | 8 |
| 13.6 | 37 | 17.4 | 8 |
| 13.7 | 33 | 17.5 | 8 |
| 13.8 | 29 | 17.6 | 8 |
| 13.9 | 26 | 17.7 | 8 |
| 14.0 | 24 | 17.8 | 8 |
| 14.1 | 22 | 17.9 | 8 |
| 14.2 | 21 | 18.0 | 8 |
| 14.3 | 19 | 18.1 | 8 |
| 14.4 | 18 | 18.2 | 8 |
| 14.5 | 16 | 18.3 | 8 |
| 14.6 | 15 | 18.4 | 8 |
| 14.7 | 15 | 18.5 | 8 |

Return Frequency: 10 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 11-07-1994 09:23:00
Watershed file: --> C:\PONDPACK\BERKLEY\PH4POST .MOP
Hydrograph file: --> C:\PONDPACK\BERKLEY\POST-10.HYD

| Time (hrs) | Flow (cfs) | Time (hrs) | Flow (cfs) |
|---|---|---|---|
| 18.6 | 7 | 22.4 | 5 |
| 18.7 | 7 | 22.5 | 4 |
| 18.8 | 7 | 22.6 | 4 |
| 18.9 | 7 | 22.7 | 4 |
| 19.0 | 7 | 22.8 | 4 |
| 19.1 | 7 | 22.9 | 4 |
| 19.2 | 7 | 23.0 | 4 |
| 19.3 | 6 | 23.1 | 4 |
| 19.4 | 6 | 23.2 | 4 |
| 19.5 | 6 | 23.3 | 3 |
| 19.6 | 6 | 23.4 | 3 |
| 19.7 | 6 | 23.5 | 3 |
| 19.8 | 5 | 23.6 | 3 |
| 19.9 | 5 | 23.7 | 3 |
| 20.0 | 5 | 23.8 | 3 |
| 20.1 | 5 | 23.9 | 3 |
| 20.2 | 5 | 24.0 | 3 |
| 20.3 | 5 | 24.1 | 2 |
| 20.4 | 5 | 24.2 | 2 |
| 20.5 | 5 | 24.3 | 2 |
| 20.6 | 5 | 24.4 | 2 |
| 20.7 | 5 | 24.5 | 2 |
| 20.8 | 5 | 24.6 | 2 |
| 20.9 | 5 | 24.7 | 2 |
| 21.0 | 5 | 24.8 | 2 |
| 21.1 | 5 | 24.9 | 1 |
| 21.2 | 5 | 25.0 | 1 |
| 21.3 | 5 | 25.1 | 1 |
| 21.4 | 5 | 25.2 | 1 |
| 21.5 | 5 | 25.3 | 1 |
| 21.6 | 5 | 25.4 | 1 |
| 21.7 | 5 | 25.5 | 1 |
| 21.8 | 5 | 25.6 | 1 |
| 21.9 | 5 | 25.7 | 0 |
| 22.0 | 5 | 25.8 | 0 |
| 22.1 | 5 | 25.9 | 0 |
| 22.2 | 5 | | |
| 22.3 | 5 | | |

Return Frequency: 25 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 11-07-1994 09:23:00
Watershed file: --> C:\PONDPACK\BERKLEY\PH4POST .MOP
Hydrograph file: --> C:\PONDPACK\BERKLEY\POST-25.HYD

>>>> Input Parameters Used to Compute Hydrograph <<<<

| Subarea Description | AREA (acres) | CN | Tc (hrs) | * Tt (hrs) | Precip. (in) | Runoff (in) | Ia/p input/used | |
|---|---|---|---|---|---|---|---|---|
| A | 24.49 | 87.0 | 0.20 | 0.00 | 6.25 | 4.76 | I.05 | .10 |
| B | 37.26 | 83.0 | 0.75 | 0.20 | 6.25 | 4.32 | I.07 | .10 |

* Travel time from subarea outfall to composite watershed outfall point.
I -- Subarea where user specified interpolation between Ia/p tables.

Total area = 61.75 acres or 0.09648 sq.mi
Peak discharge = 159 cfs

>>>> Computer Modifications of Input Parameters <<<<<

| Subarea Description | Input Values Tc (hr) | Input Values * Tt (hr) | Rounded Values Tc (hr) | Rounded Values * Tt (hr) | Ia/p Interpolated (Yes/No) | Ia/p Messages |
|---|---|---|---|---|---|---|
| A | 0.23 | 0.00 | 0.20 | 0.00 | No | Computed Ia/p < .1 |
| B | 0.87 | 0.13 | 0.75 | 0.20 | No | Computed Ia/p < .1 |

* Travel time from subarea outfall to composite watershed outfall point.

Return Frequency: 25 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 11-07-1994 09:23:00
Watershed file: --> C:\PONDPACK\BERKLEY\PH4POST .MOP
Hydrograph file: --> C:\PONDPACK\BERKLEY\POST-25.HYD

>>>> Summary of Subarea Times to Peak <<<<

| Subarea | Peak Discharge at Composite Outfall (cfs) | Time to Peak at Composite Outfall (hrs) |
|---|---|---|
| A | 146 | 12.2 |
| B | 98 | 12.8 |
| Composite Watershed | 159 | 12.2 |

Return Frequency: 25 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 11-07-1994 09:23:00
Watershed file: --> C:\PONDPACK\BERKLEY\PH4POST .MOP
Hydrograph file: --> C:\PONDPACK\BERKLEY\POST-25.HYD

Composite Hydrograph Summary (cfs)

| Subarea Description | 11.0 hr | 11.3 hr | 11.6 hr | 11.9 hr | 12.0 hr | 12.1 hr | 12.2 hr | 12.3 hr | 12.4 hr |
|---|---|---|---|---|---|---|---|---|---|
| A | 4 | 6 | 9 | 38 | 73 | 135 | 146 | 88 | 46 |
| B | 3 | 4 | 5 | 7 | 8 | 10 | 13 | 21 | 34 |
| Total (cfs) | 7 | 10 | 14 | 45 | 81 | 145 | 159 | 109 | 80 |

| Subarea Description | 12.5 hr | 12.6 hr | 12.7 hr | 12.8 hr | 13.0 hr | 13.2 hr | 13.4 hr | 13.6 hr | 13.8 hr |
|---|---|---|---|---|---|---|---|---|---|
| A | 30 | 23 | 19 | 16 | 13 | 11 | 10 | 9 | 8 |
| B | 53 | 74 | 91 | 98 | 88 | 64 | 45 | 32 | 24 |
| Total (cfs) | 83 | 97 | 110 | 114 | 101 | 75 | 55 | 41 | 32 |

| Subarea Description | 14.0 hr | 14.3 hr | 14.6 hr | 15.0 hr | 15.5 hr | 16.0 hr | 16.5 hr | 17.0 hr | 17.5 hr |
|---|---|---|---|---|---|---|---|---|---|
| A | 7 | 6 | 6 | 5 | 5 | 4 | 4 | 4 | 3 |
| B | 19 | 14 | 12 | 10 | 8 | 7 | 7 | 6 | 5 |
| Total (cfs) | 26 | 20 | 18 | 15 | 13 | 11 | 11 | 10 | 8 |

| Subarea Description | 18.0 hr | 19.0 hr | 20.0 hr | 22.0 hr | 26.0 hr |
|---|---|---|---|---|---|
| A | 3 | 3 | 2 | 2 | 0 |
| B | 5 | 4 | 4 | 3 | 0 |
| Total (cfs) | 8 | 7 | 6 | 5 | 0 |

Return Frequency: 25 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 11-07-1994 09:23:00
Watershed file: --> C:\PONDPACK\BERKLEY\PH4POST .MOP
Hydrograph file: --> C:\PONDPACK\BERKLEY\POST-25.HYD

| Time (hrs) | Flow (cfs) | Time (hrs) | Flow (cfs) |
|---|---|---|---|
| 11.0 | 7 | 14.8 | 16 |
| 11.1 | 8 | 14.9 | 16 |
| 11.2 | 9 | 15.0 | 15 |
| 11.3 | 10 | 15.1 | 15 |
| 11.4 | 11 | 15.2 | 14 |
| 11.5 | 13 | 15.3 | 14 |
| 11.6 | 14 | 15.4 | 13 |
| 11.7 | 24 | 15.5 | 13 |
| 11.8 | 35 | 15.6 | 13 |
| 11.9 | 45 | 15.7 | 12 |
| 12.0 | 81 | 15.8 | 12 |
| 12.1 | 145 | 15.9 | 11 |
| 12.2 | 159 | 16.0 | 11 |
| 12.3 | 109 | 16.1 | 11 |
| 12.4 | 80 | 16.2 | 11 |
| 12.5 | 83 | 16.3 | 11 |
| 12.6 | 97 | 16.4 | 11 |
| 12.7 | 110 | 16.5 | 11 |
| 12.8 | 114 | 16.6 | 11 |
| 12.9 | 107 | 16.7 | 11 |
| 13.0 | 101 | 16.8 | 10 |
| 13.1 | 88 | 16.9 | 10 |
| 13.2 | 75 | 17.0 | 10 |
| 13.3 | 65 | 17.1 | 10 |
| 13.4 | 55 | 17.2 | 9 |
| 13.5 | 48 | 17.3 | 9 |
| 13.6 | 41 | 17.4 | 8 |
| 13.7 | 36 | 17.5 | 8 |
| 13.8 | 32 | 17.6 | 8 |
| 13.9 | 29 | 17.7 | 8 |
| 14.0 | 26 | 17.8 | 8 |
| 14.1 | 24 | 17.9 | 8 |
| 14.2 | 22 | 18.0 | 8 |
| 14.3 | 20 | 18.1 | 8 |
| 14.4 | 19 | 18.2 | 8 |
| 14.5 | 19 | 18.3 | 8 |
| 14.6 | 18 | 18.4 | 8 |
| 14.7 | 17 | 18.5 | 8 |

Return Frequency: 25 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 11-07-1994 09:23:00
Watershed file: --> C:\PONDPACK\BERKLEY\PH4POST .MOP
Hydrograph file: --> C:\PONDPACK\BERKLEY\POST-25.HYD

| Time (hrs) | Flow (cfs) | Time (hrs) | Flow (cfs) |
|---|---|---|---|
| 18.6 | 7 | 22.4 | 5 |
| 18.7 | 7 | 22.5 | 4 |
| 18.8 | 7 | 22.6 | 4 |
| 18.9 | 7 | 22.7 | 4 |
| 19.0 | 7 | 22.8 | 4 |
| 19.1 | 7 | 22.9 | 4 |
| 19.2 | 7 | 23.0 | 4 |
| 19.3 | 7 | 23.1 | 4 |
| 19.4 | 7 | 23.2 | 4 |
| 19.5 | 7 | 23.3 | 3 |
| 19.6 | 6 | 23.4 | 3 |
| 19.7 | 6 | 23.5 | 3 |
| 19.8 | 6 | 23.6 | 3 |
| 19.9 | 6 | 23.7 | 3 |
| 20.0 | 6 | 23.8 | 3 |
| 20.1 | 6 | 23.9 | 3 |
| 20.2 | 6 | 24.0 | 3 |
| 20.3 | 6 | 24.1 | 2 |
| 20.4 | 6 | 24.2 | 2 |
| 20.5 | 6 | 24.3 | 2 |
| 20.6 | 6 | 24.4 | 2 |
| 20.7 | 6 | 24.5 | 2 |
| 20.8 | 6 | 24.6 | 2 |
| 20.9 | 6 | 24.7 | 2 |
| 21.0 | 6 | 24.8 | 2 |
| 21.1 | 5 | 24.9 | 1 |
| 21.2 | 5 | 25.0 | 1 |
| 21.3 | 5 | 25.1 | 1 |
| 21.4 | 5 | 25.2 | 1 |
| 21.5 | 5 | 25.3 | 1 |
| 21.6 | 5 | 25.4 | 1 |
| 21.7 | 5 | 25.5 | 1 |
| 21.8 | 5 | 25.6 | 1 |
| 21.9 | 5 | 25.7 | 0 |
| 22.0 | 5 | 25.8 | 0 |
| 22.1 | 5 | 25.9 | 0 |
| 22.2 | 5 | | |
| 22.3 | 5 | | |

Return Frequency: 100 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 11-07-1994 09:23:00
Watershed file: --> C:\PONDPACK\BERKLEY\PH4POST .MOP
Hydrograph file: --> C:\PONDPACK\BERKLEY\POST-100.HYD

>>>> Input Parameters Used to Compute Hydrograph <<<<

| Subarea Description | AREA (acres) | CN | Tc (hrs) | * Tt (hrs) | Precip. (in) | Runoff (in) | Ia/p input/used | |
|---|---|---|---|---|---|---|---|---|
| A | 24.49 | 87.0 | 0.20 | 0.00 | 7.70 | 6.16 | I.04 | .10 |
| B | 37.26 | 83.0 | 0.75 | 0.20 | 7.70 | 5.69 | I.05 | .10 |

* Travel time from subarea outfall to composite watershed outfall point.
I -- Subarea where user specified interpolation between Ia/p tables.

Total area = 61.75 acres or 0.09648 sq.mi
Peak discharge = 206 cfs

>>>> Computer Modifications of Input Parameters <<<<<

| Subarea Description | Input Values Tc (hr) | Input Values * Tt (hr) | Rounded Values Tc (hr) | Rounded Values * Tt (hr) | Ia/p Interpolated (Yes/No) | Ia/p Messages |
|---|---|---|---|---|---|---|
| A | 0.23 | 0.00 | 0.20 | 0.00 | No | Computed Ia/p < .1 |
| B | 0.87 | 0.13 | 0.75 | 0.20 | No | Computed Ia/p < .1 |

* Travel time from subarea outfall to composite watershed outfall point.

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 11-07-1994 09:23:00
Watershed file: --> C:\PONDPACK\BERKLEY\PH4POST .MOP
Hydrograph file: --> C:\PONDPACK\BERKLEY\POST-100.HYD

>>>> Summary of Subarea Times to Peak <<<<

| Subarea | Peak Discharge at Composite Outfall (cfs) | Time to Peak at Composite Outfall (hrs) |
|---|---|---|
| A | 189 | 12.2 |
| B | 130 | 12.8 |
| Composite Watershed | 206 | 12.2 |

Return Frequency: 100 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 11-07-1994 09:23:00
Watershed file: --> C:\PONDPACK\BERKLEY\PH4POST .MOP
Hydrograph file: --> C:\PONDPACK\BERKLEY\POST-100.HYD

Composite Hydrograph Summary (cfs)

| Subarea Description | 11.0 hr | 11.3 hr | 11.6 hr | 11.9 hr | 12.0 hr | 12.1 hr | 12.2 hr | 12.3 hr | 12.4 hr |
|---|---|---|---|---|---|---|---|---|---|
| A | 5 | 7 | 11 | 49 | 95 | 174 | 189 | 113 | 59 |
| B | 4 | 5 | 7 | 9 | 11 | 13 | 17 | 27 | 45 |
| Total (cfs) | 9 | 12 | 18 | 58 | 106 | 187 | 206 | 140 | 104 |

| Subarea Description | 12.5 hr | 12.6 hr | 12.7 hr | 12.8 hr | 13.0 hr | 13.2 hr | 13.4 hr | 13.6 hr | 13.8 hr |
|---|---|---|---|---|---|---|---|---|---|
| A | 39 | 30 | 24 | 20 | 17 | 14 | 13 | 12 | 10 |
| B | 70 | 98 | 120 | 130 | 116 | 84 | 59 | 42 | 31 |
| Total (cfs) | 109 | 128 | 144 | 150 | 133 | 98 | 72 | 54 | 41 |

| Subarea Description | 14.0 hr | 14.3 hr | 14.6 hr | 15.0 hr | 15.5 hr | 16.0 hr | 16.5 hr | 17.0 hr | 17.5 hr |
|---|---|---|---|---|---|---|---|---|---|
| A | 9 | 8 | 8 | 7 | 6 | 6 | 5 | 5 | 4 |
| B | 25 | 19 | 15 | 13 | 11 | 10 | 9 | 8 | 7 |
| Total (cfs) | 34 | 27 | 23 | 20 | 17 | 16 | 14 | 13 | 11 |

| Subarea Description | 18.0 hr | 19.0 hr | 20.0 hr | 22.0 hr | 26.0 hr |
|---|---|---|---|---|---|
| A | 4 | 4 | 3 | 3 | 0 |
| B | 7 | 6 | 5 | 4 | 0 |
| Total (cfs) | 11 | 10 | 8 | 7 | 0 |

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 11-07-1994 09:23:00
Watershed file: --> C:\PONDPACK\BERKLEY\PH4POST .MOP
Hydrograph file: --> C:\PONDPACK\BERKLEY\POST-100.HYD

| Time (hrs) | Flow (cfs) | Time (hrs) | Flow (cfs) |
|---|---|---|---|
| 11.0 | 9 | 14.8 | 21 |
| 11.1 | 10 | 14.9 | 21 |
| 11.2 | 11 | 15.0 | 20 |
| 11.3 | 12 | 15.1 | 19 |
| 11.4 | 14 | 15.2 | 19 |
| 11.5 | 16 | 15.3 | 18 |
| 11.6 | 18 | 15.4 | 18 |
| 11.7 | 31 | 15.5 | 17 |
| 11.8 | 45 | 15.6 | 17 |
| 11.9 | 58 | 15.7 | 17 |
| 12.0 | 106 | 15.8 | 16 |
| 12.1 | 187 | 15.9 | 16 |
| 12.2 | 206 | 16.0 | 16 |
| 12.3 | 140 | 16.1 | 16 |
| 12.4 | 104 | 16.2 | 15 |
| 12.5 | 109 | 16.3 | 15 |
| 12.6 | 128 | 16.4 | 14 |
| 12.7 | 144 | 16.5 | 14 |
| 12.8 | 150 | 16.6 | 14 |
| 12.9 | 141 | 16.7 | 14 |
| 13.0 | 133 | 16.8 | 13 |
| 13.1 | 115 | 16.9 | 13 |
| 13.2 | 98 | 17.0 | 13 |
| 13.3 | 85 | 17.1 | 13 |
| 13.4 | 72 | 17.2 | 12 |
| 13.5 | 63 | 17.3 | 12 |
| 13.6 | 54 | 17.4 | 11 |
| 13.7 | 47 | 17.5 | 11 |
| 13.8 | 41 | 17.6 | 11 |
| 13.9 | 37 | 17.7 | 11 |
| 14.0 | 34 | 17.8 | 11 |
| 14.1 | 32 | 17.9 | 11 |
| 14.2 | 29 | 18.0 | 11 |
| 14.3 | 27 | 18.1 | 11 |
| 14.4 | 26 | 18.2 | 11 |
| 14.5 | 24 | 18.3 | 11 |
| 14.6 | 23 | 18.4 | 11 |
| 14.7 | 22 | 18.5 | 11 |

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 11-07-1994 09:23:00
Watershed file: --> C:\PONDPACK\BERKLEY\PH4POST .MOP
Hydrograph file: --> C:\PONDPACK\BERKLEY\POST-100.HYD

| Time (hrs) | Flow (cfs) | Time (hrs) | Flow (cfs) |
|---|---|---|---|
| 18.6 | 10 | 22.4 | 6 |
| 18.7 | 10 | 22.5 | 6 |
| 18.8 | 10 | 22.6 | 6 |
| 18.9 | 10 | 22.7 | 6 |
| 19.0 | 10 | 22.8 | 6 |
| 19.1 | 10 | 22.9 | 5 |
| 19.2 | 10 | 23.0 | 5 |
| 19.3 | 9 | 23.1 | 5 |
| 19.4 | 9 | 23.2 | 5 |
| 19.5 | 9 | 23.3 | 5 |
| 19.6 | 9 | 23.4 | 5 |
| 19.7 | 9 | 23.5 | 4 |
| 19.8 | 8 | 23.6 | 4 |
| 19.9 | 8 | 23.7 | 4 |
| 20.0 | 8 | 23.8 | 4 |
| 20.1 | 8 | 23.9 | 4 |
| 20.2 | 8 | 24.0 | 4 |
| 20.3 | 8 | 24.1 | 3 |
| 20.4 | 8 | 24.2 | 3 |
| 20.5 | 8 | 24.3 | 3 |
| 20.6 | 8 | 24.4 | 3 |
| 20.7 | 8 | 24.5 | 3 |
| 20.8 | 8 | 24.6 | 2 |
| 20.9 | 8 | 24.7 | 2 |
| 21.0 | 8 | 24.8 | 2 |
| 21.1 | 7 | 24.9 | 2 |
| 21.2 | 7 | 25.0 | 2 |
| 21.3 | 7 | 25.1 | 2 |
| 21.4 | 7 | 25.2 | 1 |
| 21.5 | 7 | 25.3 | 1 |
| 21.6 | 7 | 25.4 | 1 |
| 21.7 | 7 | 25.5 | 1 |
| 21.8 | 7 | 25.6 | 1 |
| 21.9 | 7 | 25.7 | 1 |
| 22.0 | 7 | 25.8 | 0 |
| 22.1 | 7 | 25.9 | 0 |
| 22.2 | 7 | | |
| 22.3 | 6 | | |

Quick TR-55 Version: 5.46 S/N: 1315430271

>>>>> GRAPHICAL PEAK DISCHARGE METHOD <<<<<

BERKELY COMMONS PHASE IV
L&M JOB 87-040-65-06
PREDEVELOPMENT

CALCULATED
DISK FILE: C:\PONDPACK\BERKLEY\PH4PRE .BPD

| | | | |
|---|---|---|---|
| Drainage Area | (acres) | 23.04 ---> | 0.0360 sq.mi. |
| Runoff Curve Number | (CN) | 77 | |
| Time of Concentration,Tc | (hrs) | 0.7 | |
| Rainfall Distribution | (Type) | II | |
| Pond and Swamp Areas | (%) | 0 ---> | 0.0 acres |

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency (years) | 2 | 10 | |
| Rainfall, P, 24-hr (in) | 3.5 | 5.9 | |
| Initial Abstraction, Ia (in) | 0.597 | 0.597 | 0.597 |
| Ia/p Ratio | 0.171 | 0.101 | 0.000 |
| Unit Discharge, * qu (csm/in) | 413 | 441 | 0 |
| Runoff, Q (in) | 1.43 | 3.39 | 0.00 |
| Pond & Swamp Adjustment Factor | 1.00 | 1.00 | 1.00 |
| PEAK DISCHARGE, qp (cfs) | 21 | 54 | 0 |

Summary of Computations for qu

| | | | | |
|---|---|---|---|---|
| Ia/p | #1 | 0.100 | 0.100 | 0.000 |
| C0 | #1 | 2.553 | 2.553 | 0.000 |
| C1 | #1 | -0.615 | -0.615 | 0.000 |
| C2 | #1 | -0.164 | -0.164 | 0.000 |
| qu (csm) | #1 | 441.141 | 441.141 | 0.000 |
| Ia/p | #2 | 0.300 | 0.300 | 0.000 |
| C0 | #2 | 2.465 | 2.465 | 0.000 |
| C1 | #2 | -0.623 | -0.623 | 0.000 |
| C2 | #2 | -0.117 | -0.117 | 0.000 |
| qu (csm) | #2 | 362.210 | 362.210 | 0.000 |
| * qu (csm) | | 413 | 441 | 0 |

* Interpolated for computed Ia/p ratio (between Ia/p #1 & Ia/p #2)
If computed Ia/p exceeds Ia/p limits, bounding limit for Ia/p is used.

$$\log(qu) = C0 + ( C1 * \log(Tc) ) + ( C2 * (\log(Tc))^2 )$$

qp (cfs) = qu(csm) * Area(sq.mi.) * Q(in.) * (Pond & Swamp Adj.)

Quick TR-55 Version: 5.46 S/N: 1315430271

>>>>> GRAPHICAL PEAK DISCHARGE METHOD <<<<<

BERKELY COMMONS PHASE IV
L&M JOB 87-040-65-06
POST-DEVELOPMENT

CALCULATED
DISK FILE: C:\PONDPACK\BERKLEY\PH4POST .GPD

| | | | |
|---|---|---|---|
| Drainage Area | (acres) | 24.49 ---> | 0.0383 sq.mi. |
| Runoff Curve Number | (CN) | 87 | |
| Time of Concentration,Tc | (hrs) | 0.23 | |
| Rainfall Distribution | (Type) | II | |
| Pond and Swamp Areas | (%) | 0 ---> | 0.0 acres |

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency (years) | 2 | 10 | |
| Rainfall, P, 24-hr (in) | 3.5 | 5.9 | |
| Initial Abstraction, Ia (in) | 0.299 | 0.299 | 0.299 |
| Ia/p Ratio | 0.085 | 0.051 | 0.000 |
| Unit Discharge, * qu (csm/in) | 757 | 757 | 0 |
| Runoff, Q (in) | 2.18 | 4.42 | 0.00 |
| Pond & Swamp Adjustment Factor | 1.00 | 1.00 | 1.00 |
| PEAK DISCHARGE, qp (cfs) | 63 | 128 | 0 |

Summary of Computations for qu

| | | | |
|---|---|---|---|
| Ia/p #1 | 0.100 | 0.100 | 0.000 |
| C0 #1 | 2.553 | 2.553 | 0.000 |
| C1 #1 | -0.615 | -0.615 | 0.000 |
| C2 #1 | -0.164 | -0.164 | 0.000 |
| qu (csm) #1 | 756.867 | 756.867 | 0.000 |
| Ia/p #2 | 0.100 | 0.100 | 0.000 |
| C0 #2 | 2.553 | 2.553 | 0.000 |
| C1 #2 | -0.615 | -0.615 | 0.000 |
| C2 #2 | -0.164 | -0.164 | 0.000 |
| qu (csm) #2 | 756.867 | 756.867 | 0.000 |
| * qu (csm) | 757 | 757 | 0 |

* Interpolated for computed Ia/p ratio (between Ia/p #1 & Ia/p #2)
If computed Ia/p exceeds Ia/p limits, bounding limit for Ia/p is used.

$$\log(qu) = C0 + ( C1 * \log(Tc) ) + ( C2 * (\log(Tc))^2 )$$

qp (cfs) = qu(csm) * Area(sq.mi.) * Q(in.) * (Pond & Swamp Adj.)

Quick TR-55 Version: 5.46 S/N: 1315430271

>>>>> DETENTION STORAGE ESTIMATE <<<<<

BERKELEY COMMONS - Phase 4
James City Co., Virginia

CALCULATED
DISK FILE: C:\PONDPACK\BERKLEY\PH4 .DET

Drainage Area (acres) 61.75 0.0965 sq.mi.
Rainfall Distribution (Type) II

| | Storm #1 | Storm #2 | Storm #3 |
|---|---|---|---|
| Frequency (years) | 2 | 10 | |
| Peak Inflow, qi (cfs) | 72 | 147 | |
| Inflow Runoff, Q (in) | 1.98 | 4.16 | |
| Peak Outflow, qo (cfs) | 63 | 128 | |
| qo/qi Ratio | 0.875 | 0.871 | 0.000 |
| * Vs/Vr Ratio | 0.148 | 0.149 | 0.000 |
| Inflow Volume, Vr (ac-ft) | 10.2 | 21.4 | 0.0 |
| STORAGE VOLUME, Vs (ac-ft) | 1.5 | 3.2 | 0.0 |

Summary of Volume Computations

| | | | |
|---|---|---|---|
| C0 | 0.682 | 0.682 | 0.682 |
| C1 | -1.430 | -1.430 | -1.430 |
| C2 | 1.640 | 1.640 | 1.640 |
| C3 | -0.804 | -0.804 | -0.804 |
| * Vs/Vr | 0.148 | 0.149 | 0.000 |

$$* \quad Vs/Vr = C0 + ( C1*(qo/qi) ) + ( C2*(qo/qi)^2 ) + ( C3*(qo/qi)^3 )$$

Outlet Structure File: ALT1 .STR

POND-2 Version: 5.17 S/N: 1295130250
Date Executed: Time Executed:

**********
BERKELEY COMMONS - Phase 4
James City County, Virginia

PROPOSED BMP
**********

***** COMPOSITE OUTFLOW SUMMARY ****

| Elevation (ft) | Q (cfs) | Contributing Structures |
|---|---|---|
| 83.00 | 0.0 | 1 |
| 83.25 | 0.2 | 1 |
| 83.50 | 0.4 | 2 |
| 83.75 | 0.5 | 2 |
| 84.00 | 0.6 | 2 |
| 84.25 | 0.7 | 2 |
| 84.50 | 0.8 | 2 |
| 84.75 | 0.8 | 2 |
| 85.00 | 0.9 | 2 |
| 85.25 | 1.0 | 2 |
| 85.50 | 1.0 | 2 |
| 85.75 | 1.1 | 2 |
| 86.00 | 1.1 | 2 |
| 86.25 | 1.2 | 2 |
| 86.50 | 1.2 | 2 |
| 86.75 | 1.3 | 2 |
| 87.00 | 1.3 | 2 |
| 87.25 | 1.3 | 2 |
| 87.50 | 1.5 | 2 +3 |
| 87.75 | 1.8 | 2 +3 |
| 88.00 | 2.1 | 2 +4 |
| 88.25 | 2.3 | 2 +4 |
| 88.50 | 2.4 | 2 +4 |
| 88.75 | 2.6 | 2 +4 |
| 89.00 | 2.7 | 2 +4 |
| 89.25 | 2.9 | 2 +4 |
| 89.50 | 3.0 | 2 +4 |
| 89.75 | 3.1 | 2 +4 |
| 90.00 | 3.2 | 2 +4 +5 |
| 90.25 | 11.1 | 2 +4 +5 |
| 90.50 | 25.4 | 2 +4 +5 |
| 90.75 | 43.9 | 2 +4 +5 |
| 91.00 | 65.8 | 2 +4 +5 |
| 91.25 | 90.6 | 2 +4 +5 |
| 91.50 | 118.1 | 2 +4 +5 |
| 91.75 | 151.7 | 2 +4 +5 +6 |
| 92.00 | 191.1 | 2 +4 +5 +6 |
| 92.25 | 229.9 | 2 +4 +5 +6 |
| 92.50 | 254.2 | 2 +4 +5 +6 |
| 92.75 | 280.7 | 2 +4 +5 +6 |
| 93.00 | 0.0 | |

Outlet Structure File: ALT1 .STR

POND-2 Version: 5.17 S/N: 1295130250
Date Executed: Time Executed:

**********
BERKELEY COMMONS - Phase 4
James City County, Virginia

PROPOSED BMP
**********

Outlet Structure File: C:\PONDPACK\BERKLEY\ALT1 .STR
Planimeter Input File: C:\PONDPACK\BERKLEY\ALT1 .VOL
Rating Table Output File: C:\PONDPACK\BERKLEY\ALT1 .PND

Min. Elev.(ft) = 83 Max. Elev.(ft) = 93 Incr.(ft) = .25

Additional elevations (ft) to be included in table:
* * * * * * * * * * * * * * * * * * * * * * * * * *

**********
SYSTEM CONNECTIVITY
**********

| Structure | No. | Q Table | | Q Table |
|---|---|---|---|---|
| TABLE | 1 | | -> | 1 |
| ORIFICE-VC | 2 | | -> | 2 |
| TABLE | 3 | | -> | 3 |
| ORIFICE-VC | 4 | | -> | 4 |
| STAND PIPE | 5 | | -> | 5 |
| WEIR-XY | 6 | | -> | 6 |

Outflow rating table summary was stored in file:
C:\PONDPACK\BERKLEY\ALT1 .PND

Outlet Structure File: ALT1 .STR

POND-2 Version: 5.17 S/N: 1295130250
Date Executed: Time Executed:

**********
BERKELEY COMMONS - Phase 4
James City County, Virginia

PROPOSED BMP
**********

>>>>>> Structure No. 1 <<<<<<
(Input Data)

TABLE
Input your own rating table.
E1 (ft) =83 E2 (ft) =83.40

Constant (ft) added to each elevation was:

| Elev. (ft) | Q (cfs) |
|---|---|
| 83 | 0 |
| 83.04000000000001 | |
| | .01 |
| 83.08 | .03 |
| 83.12 | .05 |
| 83.16 | .08 |
| 83.2 | .11 |
| 83.23999999999999 | |
| | .15 |
| 83.28 | .19 |
| 83.31999999999999 | |
| | .23 |
| 83.36 | .27 |
| 83.40000000000001 | |
| | .32 |

Outlet Structure File: ALT1 .STR

POND-2 Version: 5.17 S/N: 1295130250
Date Executed: Time Executed:

**********
BERKELEY COMMONS - Phase 4
James City County, Virginia

PROPOSED BMP
**********

>>>>>> Structure No. 2 <<<<<<
(Input Data)

ORIFICE-VC
Orifice - Vertical Circular

| | |
|---|---|
| E1 elev.(ft)? | 83.40 |
| E2 elev.(ft)? | 93.0 |
| Orifice coeff.? | .6 |
| Invert elev.(ft)? | 83 |
| Datum elev.(ft)? | 83.21 |
| Diameter (ft)? | .42 |

Outlet Structure File: ALT1 .STR

POND-2 Version: 5.17 S/N: 1295130250
Date Executed: Time Executed:

**********
BERKELEY COMMONS - Phase 4
James City County, Virginia

PROPOSED BMP
**********

>>>>>> Structure No. 3 <<<<<<
(Input Data)

TABLE
Input your own rating table.
E1 (ft) =87.32 E2 (ft) =87.82

Constant (ft) added to each elevation was:

| Elev. (ft) | Q (cfs) |
|---|---|
| 87.31999999999999 | 0 |
| 87.37 | .02 |
| 87.42 | .05 |
| 87.47 | .09 |
| 87.52 | .13 |
| 87.56999999999999 | .19 |
| 87.62 | .25 |
| 87.67 | .31 |
| 87.72 | .38 |
| 87.77 | .45 |
| 87.81999999999999 | .53 |

Outlet Structure File: ALT1 .STR

POND-2 Version: 5.17 S/N: 1295130250
Date Executed: Time Executed:

**********
BERKELEY COMMONS - Phase 4
James City County, Virginia

PROPOSED BMP
**********

>>>>>> Structure No. 4 <<<<<<
(Input Data)

ORIFICE-VC
Orifice - Vertical Circular

| | |
|---|---|
| E1 elev.(ft)? | 87.82 |
| E2 elev.(ft)? | 93.0 |
| Orifice coeff.? | .6 |
| Invert elev.(ft)? | 87.32 |
| Datum elev.(ft)? | 87.57 |
| Diameter (ft)? | .5 |

Outlet Structure File: ALT1 .STR

POND-2 Version: 5.17 S/N: 1295130250
Date Executed: Time Executed:

**********
BERKELEY COMMONS - Phase 4
James City County, Virginia

PROPOSED BMP
**********

>>>>>> Structure No. 5 <<<<<<
(Input Data)

STAND PIPE
Stand Pipe with weir or orifice flow

| | |
|---|---|
| E1 elev.(ft)? | 90.00 |
| E2 elev.(ft)? | 93.0 |
| Crest elev.(ft)? | 90.00 |
| Diameter (ft)? | 6 |
| Weir coefficient? | 3.3 |
| Orifice coefficient? | 0.6 |
| Start transition elev.(ft) @ ? | |
| Transition height (ft)? | |

Outlet Structure File: ALT1 .STR

POND-2 Version: 5.17 S/N: 1295130250
Date Executed: Time Executed:

**********
BERKELEY COMMONS - Phase 4
James City County, Virginia

PROPOSED BMP
**********

>>>>>> Structure No. 6 <<<<<<
(Input Data)

WEIR-XY
Weir - Defined by X, Y Coordinates
E1 (ft) =91.55 E2 (ft) =93.0

| X dist.(ft) | Y elev.(ft) |
|---|---|
| 0 | 93 |
| 4.5 | 91.5 |
| 14.5 | 91.5 |
| 19 | 93 |

Outlet Structure File: ALT1 .STR

POND-2 Version: 5.17 S/N: 1295130250
Date Executed: Time Executed:

**********
BERKELEY COMMONS - Phase 4
James City County, Virginia

PROPOSED BMP
**********

Outflow Rating Table for Structure #1
TABLE Input your own rating table.

| Elevation (ft) | Q (cfs) | Computation Messages |
|---|---|---|
| 83.00 | 0.0 | |
| 83.25 | 0.2 | Interpolated from input table |
| 83.50 | 0.0 | E = or > E2=83.40 |
| 83.75 | 0.0 | E = or > E2=83.40 |
| 84.00 | 0.0 | E = or > E2=83.40 |
| 84.25 | 0.0 | E = or > E2=83.40 |
| 84.50 | 0.0 | E = or > E2=83.40 |
| 84.75 | 0.0 | E = or > E2=83.40 |
| 85.00 | 0.0 | E = or > E2=83.40 |
| 85.25 | 0.0 | E = or > E2=83.40 |
| 85.50 | 0.0 | E = or > E2=83.40 |
| 85.75 | 0.0 | E = or > E2=83.40 |
| 86.00 | 0.0 | E = or > E2=83.40 |
| 86.25 | 0.0 | E = or > E2=83.40 |
| 86.50 | 0.0 | E = or > E2=83.40 |
| 86.75 | 0.0 | E = or > E2=83.40 |
| 87.00 | 0.0 | E = or > E2=83.40 |
| 87.25 | 0.0 | E = or > E2=83.40 |
| 87.50 | 0.0 | E = or > E2=83.40 |
| 87.75 | 0.0 | E = or > E2=83.40 |
| 88.00 | 0.0 | E = or > E2=83.40 |
| 88.25 | 0.0 | E = or > E2=83.40 |
| 88.50 | 0.0 | E = or > E2=83.40 |
| 88.75 | 0.0 | E = or > E2=83.40 |
| 89.00 | 0.0 | E = or > E2=83.40 |
| 89.25 | 0.0 | E = or > E2=83.40 |
| 89.50 | 0.0 | E = or > E2=83.40 |
| 89.75 | 0.0 | E = or > E2=83.40 |
| 90.00 | 0.0 | E = or > E2=83.40 |
| 90.25 | 0.0 | E = or > E2=83.40 |
| 90.50 | 0.0 | E = or > E2=83.40 |
| 90.75 | 0.0 | E = or > E2=83.40 |
| 91.00 | 0.0 | E = or > E2=83.40 |
| 91.25 | 0.0 | E = or > E2=83.40 |
| 91.50 | 0.0 | E = or > E2=83.40 |
| 91.75 | 0.0 | E = or > E2=83.40 |
| 92.00 | 0.0 | E = or > E2=83.40 |

Outlet Structure File: ALT1 .STR

POND-2 Version: 5.17 S/N: 1295130250
Date Executed: Time Executed:

>>>>> CONTINUED from previous page <<<<<

Outflow Rating Table for Structure #1
TABLE Input your own rating table.

| Elevation (ft) | Q (cfs) | Computation Messages |
|---|---|---|
| 92.25 | 0.0 | E = or > E2=83.40 |
| 92.50 | 0.0 | E = or > E2=83.40 |
| 92.75 | 0.0 | E = or > E2=83.40 |
| 93.00 | 0.0 | E = or > E2=83.40 |

Outlet Structure File: ALT1 .STR

POND-2 Version: 5.17 S/N: 1295130250
Date Executed: Time Executed:

**********
BERKELEY COMMONS - Phase 4
James City County, Virginia

PROPOSED BMP
**********

Outflow Rating Table for Structure #2
ORIFICE-VC Orifice - Vertical Circular

| Elevation (ft) | Q (cfs) | Computation Messages |
|---|---|---|
| 83.00 | 0.0 | E < E1=83.40 |
| 83.25 | 0.0 | E < E1=83.40 |
| 83.50 | 0.4 | H =.29 |
| 83.75 | 0.5 | H =.54 |
| 84.00 | 0.6 | H =.79 |
| 84.25 | 0.7 | H =1.04 |
| 84.50 | 0.8 | H =1.29 |
| 84.75 | 0.8 | H =1.54 |
| 85.00 | 0.9 | H =1.79 |
| 85.25 | 1.0 | H =2.04 |
| 85.50 | 1.0 | H =2.29 |
| 85.75 | 1.1 | H =2.54 |
| 86.00 | 1.1 | H =2.79 |
| 86.25 | 1.2 | H =3.04 |
| 86.50 | 1.2 | H =3.29 |
| 86.75 | 1.3 | H =3.54 |
| 87.00 | 1.3 | H =3.79 |
| 87.25 | 1.3 | H =4.04 |
| 87.50 | 1.4 | H =4.29 |
| 87.75 | 1.4 | H =4.54 |
| 88.00 | 1.5 | H =4.79 |
| 88.25 | 1.5 | H =5.04 |
| 88.50 | 1.5 | H =5.29 |
| 88.75 | 1.6 | H =5.54 |
| 89.00 | 1.6 | H =5.79 |
| 89.25 | 1.6 | H =6.04 |
| 89.50 | 1.7 | H =6.29 |
| 89.75 | 1.7 | H =6.54 |
| 90.00 | 1.7 | H =6.79 |
| 90.25 | 1.8 | H =7.04 |
| 90.50 | 1.8 | H =7.29 |
| 90.75 | 1.8 | H =7.54 |
| 91.00 | 1.9 | H =7.79 |
| 91.25 | 1.9 | H =8.04 |

Outlet Structure File: ALT1 .STR

POND-2 Version: 5.17 S/N: 1295130250
Date Executed: Time Executed:

>>>>> CONTINUED from previous page <<<<<

Outflow Rating Table for Structure #2
ORIFICE-VC Orifice - Vertical Circular

| Elevation (ft) | Q (cfs) | Computation Messages |
|---|---|---|
| 91.50 | 1.9 | H =8.29 |
| 91.75 | 1.9 | H =8.54 |
| 92.00 | 2.0 | H =8.79 |
| 92.25 | 2.0 | H =9.04 |
| 92.50 | 2.0 | H =9.290 |
| 92.75 | 2.1 | H =9.540 |
| 93.00 | 0.0 | E = or > E2=93.0 |

C = .6 A = .1385442 sq.ft.
H (ft) = Table elev. - Datum elev. ( 83.21 ft )
Q (cfs) = C * A * sqr(2g * H)

Outlet Structure File: ALT1 .STR

POND-2 Version: 5.17 S/N: 1295130250
Date Executed: Time Executed:

**********
BERKELEY COMMONS - Phase 4
James City County, Virginia

PROPOSED BMP
**********

Outflow Rating Table for Structure #3
TABLE Input your own rating table.

| Elevation (ft) | Q (cfs) | Computation Messages |
|---|---|---|
| 83.00 | 0.0 | E < E1=87.32 |
| 83.25 | 0.0 | E < E1=87.32 |
| 83.50 | 0.0 | E < E1=87.32 |
| 83.75 | 0.0 | E < E1=87.32 |
| 84.00 | 0.0 | E < E1=87.32 |
| 84.25 | 0.0 | E < E1=87.32 |
| 84.50 | 0.0 | E < E1=87.32 |
| 84.75 | 0.0 | E < E1=87.32 |
| 85.00 | 0.0 | E < E1=87.32 |
| 85.25 | 0.0 | E < E1=87.32 |
| 85.50 | 0.0 | E < E1=87.32 |
| 85.75 | 0.0 | E < E1=87.32 |
| 86.00 | 0.0 | E < E1=87.32 |
| 86.25 | 0.0 | E < E1=87.32 |
| 86.50 | 0.0 | E < E1=87.32 |
| 86.75 | 0.0 | E < E1=87.32 |
| 87.00 | 0.0 | E < E1=87.32 |
| 87.25 | 0.0 | E < E1=87.32 |
| 87.50 | 0.1 | Interpolated from input table |
| 87.75 | 0.4 | Interpolated from input table |
| 88.00 | 0.0 | E = or > E2=87.82 |
| 88.25 | 0.0 | E = or > E2=87.82 |
| 88.50 | 0.0 | E = or > E2=87.82 |
| 88.75 | 0.0 | E = or > E2=87.82 |
| 89.00 | 0.0 | E = or > E2=87.82 |
| 89.25 | 0.0 | E = or > E2=87.82 |
| 89.50 | 0.0 | E = or > E2=87.82 |
| 89.75 | 0.0 | E = or > E2=87.82 |
| 90.00 | 0.0 | E = or > E2=87.82 |
| 90.25 | 0.0 | E = or > E2=87.82 |
| 90.50 | 0.0 | E = or > E2=87.82 |
| 90.75 | 0.0 | E = or > E2=87.82 |
| 91.00 | 0.0 | E = or > E2=87.82 |
| 91.25 | 0.0 | E = or > E2=87.82 |
| 91.50 | 0.0 | E = or > E2=87.82 |
| 91.75 | 0.0 | E = or > E2=87.82 |
| 92.00 | 0.0 | E = or > E2=87.82 |

Outlet Structure File: ALT1 .STR

POND-2 Version: 5.17 S/N: 1295130250
Date Executed: Time Executed:

>>>>> CONTINUED from previous page <<<<<

Outflow Rating Table for Structure #3
TABLE Input your own rating table.

| Elevation (ft) | Q (cfs) | Computation Messages |
|---|---|---|
| 92.25 | 0.0 | E = or > E2=87.82 |
| 92.50 | 0.0 | E = or > E2=87.82 |
| 92.75 | 0.0 | E = or > E2=87.82 |
| 93.00 | 0.0 | E = or > E2=87.82 |

Outlet Structure File: ALT1 .STR

POND-2 Version: 5.17 S/N: 1295130250
Date Executed: Time Executed:

>>>>> CONTINUED from previous page <<<<<

Outflow Rating Table for Structure #4
ORIFICE-VC Orifice - Vertical Circular

| Elevation (ft) | Q (cfs) | Computation Messages |
|---|---|---|
| 91.50 | 1.9 | H =3.93 |
| 91.75 | 1.9 | H =4.18 |
| 92.00 | 2.0 | H =4.43 |
| 92.25 | 2.0 | H =4.68 |
| 92.50 | 2.1 | H =4.93 |
| 92.75 | 2.2 | H =5.18 |
| 93.00 | 0.0 | E = or > E2=93.0 |

C = .6 A = .1963496 sq.ft.
H (ft) = Table elev. - Datum elev. ( 87.57 ft )
Q (cfs) = C * A * sqr(2g * H)

Outlet Structure File: ALT1 .STR

POND-2 Version: 5.17 S/N: 1295130250
Date Executed: Time Executed:

**********
BERKELEY COMMONS - Phase 4
James City County, Virginia

PROPOSED BMP
**********

Outflow Rating Table for Structure #5
STAND PIPE Stand Pipe with weir or orifice flow

***** INLET CONTROL ASSUMED *****

| Elevation (ft) | Q (cfs) | Computation Messages |
|---|---|---|
| 83.00 | 0.0 | E < Inv.El.= 90 |
| 83.25 | 0.0 | E < El=90.00 |
| 83.50 | 0.0 | E < El=90.00 |
| 83.75 | 0.0 | E < El=90.00 |
| 84.00 | 0.0 | E < El=90.00 |
| 84.25 | 0.0 | E < El=90.00 |
| 84.50 | 0.0 | E < El=90.00 |
| 84.75 | 0.0 | E < El=90.00 |
| 85.00 | 0.0 | E < El=90.00 |
| 85.25 | 0.0 | E < El=90.00 |
| 85.50 | 0.0 | E < El=90.00 |
| 85.75 | 0.0 | E < El=90.00 |
| 86.00 | 0.0 | E < El=90.00 |
| 86.25 | 0.0 | E < El=90.00 |
| 86.50 | 0.0 | E < El=90.00 |
| 86.75 | 0.0 | E < El=90.00 |
| 87.00 | 0.0 | E < El=90.00 |
| 87.25 | 0.0 | E < El=90.00 |
| 87.50 | 0.0 | E < El=90.00 |
| 87.75 | 0.0 | E < El=90.00 |
| 88.00 | 0.0 | E < El=90.00 |
| 88.25 | 0.0 | E < El=90.00 |
| 88.50 | 0.0 | E < El=90.00 |
| 88.75 | 0.0 | E < El=90.00 |
| 89.00 | 0.0 | E < El=90.00 |
| 89.25 | 0.0 | E < El=90.00 |
| 89.50 | 0.0 | E < El=90.00 |
| 89.75 | 0.0 | E < El=90.00 |
| 90.00 | 0.0 | Weir: H =0.0 |
| 90.25 | 7.8 | Weir: H =.25 |
| 90.50 | 22.0 | Weir: H =.5 |
| 90.75 | 40.4 | Weir: H =.750 |

Outlet Structure File: ALT1 .STR

POND-2 Version: 5.17 S/N: 1295130250
Date Executed: Time Executed:

>>>>> CONTINUED from previous page <<<<<

Outflow Rating Table for Structure #5
STAND PIPE Stand Pipe with weir or orifice flow

***** INLET CONTROL ASSUMED *****

| Elevation (ft) | Q (cfs) | Computation | Messages |
|---|---|---|---|
| 91.00 | 62.2 | Weir: | H =1.0 |
| 91.25 | 86.9 | Weir: | H =1.25 |
| 91.50 | 114.3 | Weir: | H =1.5 |
| 91.75 | 144.0 | Weir: | H =1.75 |
| 92.00 | 175.9 | Weir: | H =2.0 |
| 92.25 | 204.2 | Orifice: | H =2.25 |
| 92.50 | 215.3 | Orifice: | H =2.5 |
| 92.75 | 225.8 | Orifice: | H =2.75 |
| 93.00 | 0.0 | E = or > E2=93.0 | |

Weir Cw = 3.3 Weir length = 18.84956 ft
Orifice Co = .6 Orifice area = 28.27434 sq.ft.
Q (cfs) = (Cw * L * H**1.5) or (Co * A * sqr(2*g*H))
No transition used, transition height = 0.0
Weir equation = Orifice equation @ elev.= 92.18863 ft

Outlet Structure File: ALT1 .STR

POND-2 Version: 5.17 S/N: 1295130250
Date Executed: Time Executed:

**********
BERKELEY COMMONS - Phase 4
James City County, Virginia

PROPOSED BMP
**********

Outflow Rating Table for Structure #6
WEIR-XY Weir - Defined by X, Y Coordinates

***** INLET CONTROL ASSUMED *****

| Elevation (ft) | Q (cfs) | Computation Messages | |
|---|---|---|---|
| 83.00 | 0.0 | E < Y min= 91.5 | |
| 83.25 | 0.0 | E < Y min= 91.5 | |
| 83.50 | 0.0 | E < Y min= 91.5 | |
| 83.75 | 0.0 | E < Y min= 91.5 | |
| 84.00 | 0.0 | E < Y min= 91.5 | |
| 84.25 | 0.0 | E < Y min= 91.5 | |
| 84.50 | 0.0 | E < Y min= 91.5 | |
| 84.75 | 0.0 | E < Y min= 91.5 | |
| 85.00 | 0.0 | E < Y min= 91.5 | |
| 85.25 | 0.0 | E < Y min= 91.5 | |
| 85.50 | 0.0 | E < Y min= 91.5 | |
| 85.75 | 0.0 | E < Y min= 91.5 | |
| 86.00 | 0.0 | E < Y min= 91.5 | |
| 86.25 | 0.0 | E < Y min= 91.5 | |
| 86.50 | 0.0 | E < Y min= 91.5 | |
| 86.75 | 0.0 | E < Y min= 91.5 | |
| 87.00 | 0.0 | E < Y min= 91.5 | |
| 87.25 | 0.0 | E < Y min= 91.5 | |
| 87.50 | 0.0 | E < Y min= 91.5 | |
| 87.75 | 0.0 | E < Y min= 91.5 | |
| 88.00 | 0.0 | E < Y min= 91.5 | |
| 88.25 | 0.0 | E < Y min= 91.5 | |
| 88.50 | 0.0 | E < Y min= 91.5 | |
| 88.75 | 0.0 | E < Y min= 91.5 | |
| 89.00 | 0.0 | E < Y min= 91.5 | |
| 89.25 | 0.0 | E < Y min= 91.5 | |
| 89.50 | 0.0 | E < Y min= 91.5 | |
| 89.75 | 0.0 | E < Y min= 91.5 | |
| 90.00 | 0.0 | E < E1=91.55 | |
| 90.25 | 0.0 | E < E1=91.55 | |
| 90.50 | 0.0 | E < E1=91.55 | |
| 90.75 | 0.0 | E < E1=91.55 | |
| 91.00 | 0.0 | E < E1=91.55 | |
| 91.25 | 0.0 | E < E1=91.55 | |
| 91.50 | 0.0 | E < E1=91.55 | |
| 91.75 | 3.8 | W(ft)=11.5 | Max. D(ft)=.25 |
| 92.00 | 11.2 | W(ft)=13.0 | Max. D(ft)=.5 |

Outlet Structure File: ALT1 .STR

POND-2 Version: 5.17 S/N: 1295130250
Date Executed: Time Executed:

>>>>> CONTINUED from previous page <<<<<

Outflow Rating Table for Structure #6
WEIR-XY Weir - Defined by X, Y Coordinates

***** INLET CONTROL ASSUMED *****

| Elevation (ft) | Q (cfs) | Computation Messages | |
|---|---|---|---|
| 92.25 | 21.6 | W(ft)=14.5 | Max. D(ft)=.750 |
| 92.50 | 34.8 | W(ft)=16.0 | Max. D(ft)=1.0 |
| 92.75 | 50.7 | W(ft)=17.5 | Max. D(ft)=1.25 |
| 93.00 | 0.0 | E = or > E2=93.0 | |

```
*********************************
*                               *
*   BERKELEY COMMONS PHASE IV   *
* James City County, Virginia   *
*                               *
*          PROPOSED BMP         *
*                               *
*********************************
```

Inflow Hydrograph: C:\PONDPACK\BERKLEY\POST-2 .HYD
Rating Table file: C:\PONDPACK\BERKLEY\ALT1 .PND

----INITIAL CONDITIONS----
Elevation = 83.00 ft
Outflow = 0.00 cfs
Storage = 715 cu-ft

| GIVEN POND DATA | | | INTERMEDIATE ROUTING COMPUTATIONS | |
|---|---|---|---|---|
| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (cu-ft) | 2S/t (cfs) | 2S/t + O (cfs) |
| 83.00 | 0.0 | 715 | 4.0 | 4.0 |
| 83.25 | 0.2 | 1.078 | 6.0 | 6.2 |
| 83.50 | 0.4 | 1.684 | 9.4 | 9.8 |
| 83.75 | 0.5 | 2.599 | 14.4 | 14.9 |
| 84.00 | 0.6 | 3.885 | 21.6 | 22.2 |
| 84.25 | 0.7 | 5.546 | 30.8 | 31.5 |
| 84.50 | 0.8 | 7.568 | 42.0 | 42.8 |
| 84.75 | 0.8 | 9.986 | 55.5 | 56.3 |
| 85.00 | 0.9 | 12.836 | 71.3 | 72.2 |
| 85.25 | 1.0 | 16.069 | 89.3 | 90.3 |
| 85.50 | 1.0 | 19.622 | 109.0 | 110.0 |
| 85.75 | 1.1 | 23.509 | 130.6 | 131.7 |
| 86.00 | 1.1 | 27.746 | 154.1 | 155.2 |
| 86.25 | 1.2 | 32.363 | 179.8 | 181.0 |
| 86.50 | 1.2 | 37.392 | 207.7 | 208.9 |
| 86.75 | 1.3 | 42.850 | 238.1 | 239.4 |
| 87.00 | 1.3 | 48.756 | 270.9 | 272.2 |
| 87.25 | 1.3 | 55.024 | 305.7 | 307.0 |
| 87.50 | 1.5 | 61.565 | 342.0 | 343.5 |
| 87.75 | 1.8 | 68.383 | 379.9 | 381.7 |
| 88.00 | 2.1 | 75.484 | 419.4 | 421.5 |
| 88.25 | 2.3 | 82.798 | 460.0 | 462.3 |
| 88.50 | 2.4 | 90.247 | 501.4 | 503.8 |
| 88.75 | 2.6 | 97.835 | 543.5 | 546.1 |
| 89.00 | 2.7 | 105.562 | 586.5 | 589.2 |
| 89.25 | 2.9 | 113.445 | 630.3 | 633.2 |
| 89.50 | 3.0 | 121.501 | 675.0 | 678.0 |
| 89.75 | 3.1 | 129.733 | 720.7 | 723.8 |
| 90.00 | 3.2 | 138.142 | 767.5 | 770.7 |
| 90.25 | 11.1 | 146.596 | 814.4 | 825.5 |
| 90.50 | 25.4 | 154.962 | 860.9 | 886.3 |

| GIVEN POND DATA | | | INTERMEDIATE ROUTING COMPUTATIONS | |
|---|---|---|---|---|
| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (cu-ft) | 2S/t (cfs) | 2S/t + O (cfs) |
| 90.75 | 43.9 | 163.240 | 906.9 | 950.8 |
| 91.00 | 65.8 | 171.430 | 952.4 | 1018.2 |
| 91.25 | 90.6 | 179.784 | 998.8 | 1089.4 |
| 91.50 | 118.1 | 188.559 | 1047.6 | 1165.7 |
| 91.75 | 151.7 | 197.765 | 1098.7 | 1250.4 |
| 92.00 | 191.1 | 207.413 | 1152.3 | 1343.4 |
| 92.25 | 229.9 | 217.379 | 1207.7 | 1437.6 |
| 92.50 | 254.2 | 227.533 | 1264.1 | 1518.3 |
| 92.75 | 280.7 | 237.879 | 1321.5 | 1602.2 |

Time increment (t) = 6.0 min.

Pond File: C:\PONDPACK\BERKLEY\ALT1 .PND
Inflow Hydrograph: C:\PONDPACK\BERKLEY\POST-2 .HYD
Outflow Hydrograph: C:\PONDPACK\BERKLEY\OUT-2 .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (min) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 660.0 | 3.00 | ----- | 4.0 | 4.0 | 0.00 | 83.00 |
| 666.0 | 3.00 | 6.0 | 9.2 | 10.0 | 0.40 | 83.51 |
| 672.0 | 4.00 | 7.0 | 15.1 | 16.2 | 0.52 | 83.79 |
| 678.0 | 4.00 | 8.0 | 21.9 | 23.1 | 0.61 | 84.03 |
| 684.0 | 5.00 | 9.0 | 29.5 | 30.9 | 0.69 | 84.23 |
| 690.0 | 5.00 | 10.0 | 38.0 | 39.5 | 0.77 | 84.43 |
| 696.0 | 6.00 | 11.0 | 47.4 | 49.0 | 0.80 | 84.61 |
| 702.0 | 11.00 | 17.0 | 62.7 | 64.4 | 0.85 | 84.88 |
| 708.0 | 15.00 | 26.0 | 86.7 | 88.7 | 0.99 | 85.23 |
| 714.0 | 20.00 | 35.0 | 119.6 | 121.7 | 1.05 | 85.63 |
| 720.0 | 37.00 | 57.0 | 174.2 | 176.6 | 1.18 | 86.21 |
| 726.0 | 66.00 | 103.0 | 274.6 | 277.2 | 1.30 | 87.04 |
| 732.0 | 72.00 | 138.0 | 408.6 | 412.6 | 2.03 | 87.94 |
| 738.0 | 48.00 | 120.0 | 523.5 | 528.6 | 2.52 | 88.65 |
| 744.0 | 35.00 | 83.0 | 601.0 | 606.5 | 2.78 | 89.10 |
| 750.0 | 36.00 | 71.0 | 666.0 | 672.0 | 2.99 | 89.47 |
| 756.0 | 42.00 | 78.0 | 737.7 | 744.0 | 3.14 | 89.86 |
| 762.0 | 47.00 | 89.0 | 804.0 | 826.7 | 11.38 | 90.25 |
| 768.0 | 48.00 | 95.0 | 840.9 | 899.0 | 29.03 | 90.55 |
| 774.0 | 46.00 | 94.0 | 856.2 | 934.9 | 39.34 | 90.69 |
| 780.0 | 44.00 | 90.0 | 861.0 | 946.2 | 42.59 | 90.73 |
| 786.0 | 38.00 | 82.0 | 859.7 | 943.0 | 41.68 | 90.72 |
| 792.0 | 33.00 | 71.0 | 854.4 | 930.7 | 38.13 | 90.67 |
| 798.0 | 28.00 | 61.0 | 847.9 | 915.4 | 33.75 | 90.61 |
| 804.0 | 24.00 | 52.0 | 841.3 | 899.9 | 29.31 | 90.55 |
| 810.0 | 21.00 | 45.0 | 835.5 | 886.3 | 25.40 | 90.50 |
| 816.0 | 18.00 | 39.0 | 829.3 | 874.5 | 22.62 | 90.45 |
| 822.0 | 16.00 | 34.0 | 823.3 | 863.3 | 19.98 | 90.41 |
| 828.0 | 14.00 | 30.0 | 818.0 | 853.3 | 17.64 | 90.36 |
| 834.0 | 12.00 | 26.0 | 813.1 | 844.0 | 15.45 | 90.33 |
| 840.0 | 11.00 | 23.0 | 808.9 | 836.1 | 13.59 | 90.29 |
| 846.0 | 10.00 | 21.0 | 805.7 | 829.9 | 12.14 | 90.27 |
| 852.0 | 10.00 | 20.0 | 803.4 | 825.7 | 11.13 | 90.25 |
| 858.0 | 9.00 | 19.0 | 801.1 | 822.4 | 10.65 | 90.24 |
| 864.0 | 9.00 | 18.0 | 798.7 | 819.1 | 10.17 | 90.22 |
| 870.0 | 8.00 | 17.0 | 796.4 | 815.7 | 9.69 | 90.21 |
| 876.0 | 8.00 | 16.0 | 794.0 | 812.4 | 9.20 | 90.19 |
| 882.0 | 8.00 | 16.0 | 792.2 | 810.0 | 8.86 | 90.18 |
| 888.0 | 8.00 | 16.0 | 791.0 | 808.2 | 8.61 | 90.17 |
| 894.0 | 7.00 | 15.0 | 789.4 | 806.0 | 8.29 | 90.16 |
| 900.0 | 7.00 | 14.0 | 787.6 | 803.4 | 7.92 | 90.15 |
| 906.0 | 7.00 | 14.0 | 786.3 | 801.6 | 7.65 | 90.14 |
| 912.0 | 7.00 | 14.0 | 785.4 | 800.3 | 7.47 | 90.14 |
| 918.0 | 6.00 | 13.0 | 784.0 | 798.4 | 7.19 | 90.13 |
| 924.0 | 6.00 | 12.0 | 782.3 | 796.0 | 6.85 | 90.12 |

Pond File: C:\PONDPACK\BERKLEY\ALT1 .PND
Inflow Hydrograph: C:\PONDPACK\BERKLEY\POST-2 .HYD
Outflow Hydrograph: C:\PONDPACK\BERKLEY\OUT-2 .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (min) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 930.0 | 6.00 | 12.0 | 781.1 | 794.3 | 6.60 | 90.11 |
| 936.0 | 6.00 | 12.0 | 780.2 | 793.1 | 6.43 | 90.10 |
| 942.0 | 6.00 | 12.0 | 779.6 | 792.2 | 6.31 | 90.10 |
| 948.0 | 5.00 | 11.0 | 778.5 | 790.6 | 6.07 | 90.09 |
| 954.0 | 5.00 | 10.0 | 776.9 | 788.5 | 5.76 | 90.08 |
| 960.0 | 5.00 | 10.0 | 775.8 | 786.9 | 5.54 | 90.07 |
| 966.0 | 5.00 | 10.0 | 775.1 | 785.8 | 5.39 | 90.07 |
| 972.0 | 5.00 | 10.0 | 774.5 | 785.1 | 5.28 | 90.07 |
| 978.0 | 5.00 | 10.0 | 774.1 | 784.5 | 5.20 | 90.06 |
| 984.0 | 5.00 | 10.0 | 773.9 | 784.1 | 5.14 | 90.06 |
| 990.0 | 5.00 | 10.0 | 773.7 | 783.9 | 5.10 | 90.06 |
| 996.0 | 5.00 | 10.0 | 773.5 | 783.7 | 5.07 | 90.06 |
| 1002.0 | 5.00 | 10.0 | 773.4 | 783.5 | 5.05 | 90.06 |
| 1008.0 | 5.00 | 10.0 | 773.3 | 783.4 | 5.04 | 90.06 |
| 1014.0 | 5.00 | 10.0 | 773.3 | 783.3 | 5.03 | 90.06 |
| 1020.0 | 5.00 | 10.0 | 773.2 | 783.3 | 5.02 | 90.06 |
| 1026.0 | 5.00 | 10.0 | 773.2 | 783.2 | 5.01 | 90.06 |
| 1032.0 | 5.00 | 10.0 | 773.2 | 783.2 | 5.01 | 90.06 |
| 1038.0 | 4.00 | 9.0 | 772.5 | 782.2 | 4.86 | 90.05 |
| 1044.0 | 4.00 | 8.0 | 771.3 | 780.5 | 4.61 | 90.04 |
| 1050.0 | 4.00 | 8.0 | 770.4 | 779.3 | 4.44 | 90.04 |
| 1056.0 | 4.00 | 8.0 | 769.8 | 778.4 | 4.31 | 90.04 |
| 1062.0 | 4.00 | 8.0 | 769.3 | 777.8 | 4.22 | 90.03 |
| 1068.0 | 4.00 | 8.0 | 769.0 | 777.3 | 4.16 | 90.03 |
| 1074.0 | 4.00 | 8.0 | 768.8 | 777.0 | 4.11 | 90.03 |
| 1080.0 | 4.00 | 8.0 | 768.6 | 776.8 | 4.08 | 90.03 |
| 1086.0 | 4.00 | 8.0 | 768.5 | 776.6 | 4.06 | 90.03 |
| 1092.0 | 4.00 | 8.0 | 768.4 | 776.5 | 4.04 | 90.03 |
| 1098.0 | 4.00 | 8.0 | 768.4 | 776.4 | 4.03 | 90.03 |
| 1104.0 | 4.00 | 8.0 | 768.3 | 776.4 | 4.02 | 90.03 |
| 1110.0 | 4.00 | 8.0 | 768.3 | 776.3 | 4.01 | 90.03 |
| 1116.0 | 3.00 | 7.0 | 767.6 | 775.3 | 3.87 | 90.02 |
| 1122.0 | 3.00 | 6.0 | 766.3 | 773.6 | 3.62 | 90.01 |
| 1128.0 | 3.00 | 6.0 | 765.4 | 772.3 | 3.44 | 90.01 |
| 1134.0 | 3.00 | 6.0 | 764.8 | 771.4 | 3.31 | 90.00 |
| 1140.0 | 3.00 | 6.0 | 764.4 | 770.8 | 3.22 | 90.00 |
| 1146.0 | 3.00 | 6.0 | 764.0 | 770.4 | 3.20 | 90.00 |
| 1152.0 | 3.00 | 6.0 | 763.6 | 770.0 | 3.20 | 90.00 |
| 1158.0 | 3.00 | 6.0 | 763.2 | 769.6 | 3.20 | 89.99 |
| 1164.0 | 3.00 | 6.0 | 762.8 | 769.2 | 3.20 | 89.99 |
| 1170.0 | 3.00 | 6.0 | 762.4 | 768.8 | 3.20 | 89.99 |
| 1176.0 | 3.00 | 6.0 | 762.0 | 768.4 | 3.20 | 89.99 |
| 1182.0 | 3.00 | 6.0 | 761.6 | 768.0 | 3.19 | 89.99 |
| 1188.0 | 3.00 | 6.0 | 761.2 | 767.6 | 3.19 | 89.98 |
| 1194.0 | 3.00 | 6.0 | 760.8 | 767.2 | 3.19 | 89.98 |
| 1200.0 | 3.00 | 6.0 | 760.5 | 766.8 | 3.19 | 89.98 |

Pond File: C:\PONDPACK\BERKLEY\ALT1 .PND
Inflow Hydrograph: C:\PONDPACK\BERKLEY\POST-2 .HYD
Outflow Hydrograph: C:\PONDPACK\BERKLEY\OUT-2 .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (min) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 1206.0 | 3.00 | 6.0 | 760.1 | 766.5 | 3.19 | 89.98 |
| 1212.0 | 3.00 | 6.0 | 759.7 | 766.1 | 3.19 | 89.98 |
| 1218.0 | 3.00 | 6.0 | 759.3 | 765.7 | 3.19 | 89.97 |
| 1224.0 | 3.00 | 6.0 | 758.9 | 765.3 | 3.19 | 89.97 |
| 1230.0 | 3.00 | 6.0 | 758.6 | 764.9 | 3.19 | 89.97 |
| 1236.0 | 3.00 | 6.0 | 758.2 | 764.6 | 3.19 | 89.97 |
| 1242.0 | 3.00 | 6.0 | 757.8 | 764.2 | 3.19 | 89.97 |
| 1248.0 | 3.00 | 6.0 | 757.4 | 763.8 | 3.19 | 89.96 |
| 1254.0 | 3.00 | 6.0 | 757.1 | 763.4 | 3.18 | 89.96 |
| 1260.0 | 2.00 | 5.0 | 755.7 | 762.1 | 3.18 | 89.95 |
| 1266.0 | 2.00 | 4.0 | 753.4 | 759.7 | 3.18 | 89.94 |
| 1272.0 | 2.00 | 4.0 | 751.0 | 757.4 | 3.17 | 89.93 |
| 1278.0 | 2.00 | 4.0 | 748.7 | 755.0 | 3.17 | 89.92 |
| 1284.0 | 2.00 | 4.0 | 746.4 | 752.7 | 3.16 | 89.90 |
| 1290.0 | 2.00 | 4.0 | 744.0 | 750.4 | 3.16 | 89.89 |
| 1296.0 | 2.00 | 4.0 | 741.7 | 748.0 | 3.15 | 89.88 |
| 1302.0 | 2.00 | 4.0 | 739.5 | 745.7 | 3.15 | 89.87 |
| 1308.0 | 2.00 | 4.0 | 737.2 | 743.5 | 3.14 | 89.85 |
| 1314.0 | 2.00 | 4.0 | 734.9 | 741.2 | 3.14 | 89.84 |
| 1320.0 | 2.00 | 4.0 | 732.6 | 738.9 | 3.13 | 89.83 |
| 1326.0 | 2.00 | 4.0 | 730.4 | 736.6 | 3.13 | 89.82 |
| 1332.0 | 2.00 | 4.0 | 728.1 | 734.4 | 3.12 | 89.81 |
| 1338.0 | 2.00 | 4.0 | 725.9 | 732.1 | 3.12 | 89.79 |
| 1344.0 | 2.00 | 4.0 | 723.7 | 729.9 | 3.11 | 89.78 |
| 1350.0 | 2.00 | 4.0 | 721.5 | 727.7 | 3.11 | 89.77 |
| 1356.0 | 2.00 | 4.0 | 719.2 | 725.5 | 3.10 | 89.76 |
| 1362.0 | 2.00 | 4.0 | 717.0 | 723.2 | 3.10 | 89.75 |
| 1368.0 | 2.00 | 4.0 | 714.9 | 721.0 | 3.09 | 89.73 |
| 1374.0 | 2.00 | 4.0 | 712.7 | 718.9 | 3.09 | 89.72 |
| 1380.0 | 2.00 | 4.0 | 710.5 | 716.7 | 3.08 | 89.71 |
| 1386.0 | 1.00 | 3.0 | 707.4 | 713.5 | 3.08 | 89.69 |
| 1392.0 | 1.00 | 2.0 | 703.2 | 709.4 | 3.07 | 89.67 |
| 1398.0 | 1.00 | 2.0 | 699.1 | 705.2 | 3.06 | 89.65 |
| 1404.0 | 1.00 | 2.0 | 695.0 | 701.1 | 3.05 | 89.63 |
| 1410.0 | 1.00 | 2.0 | 690.9 | 697.0 | 3.04 | 89.60 |
| 1416.0 | 1.00 | 2.0 | 686.9 | 692.9 | 3.03 | 89.58 |
| 1422.0 | 1.00 | 2.0 | 682.8 | 688.9 | 3.02 | 89.56 |
| 1428.0 | 1.00 | 2.0 | 678.8 | 684.8 | 3.01 | 89.54 |
| 1434.0 | 1.00 | 2.0 | 674.8 | 680.8 | 3.01 | 89.52 |
| 1440.0 | 1.00 | 2.0 | 670.8 | 676.8 | 3.00 | 89.49 |
| 1446.0 | 1.00 | 2.0 | 666.8 | 672.8 | 2.99 | 89.47 |
| 1452.0 | 1.00 | 2.0 | 662.8 | 668.8 | 2.98 | 89.45 |
| 1458.0 | 1.00 | 2.0 | 658.9 | 664.8 | 2.97 | 89.43 |
| 1464.0 | 1.00 | 2.0 | 655.0 | 660.9 | 2.96 | 89.40 |
| 1470.0 | 1.00 | 2.0 | 651.1 | 657.0 | 2.95 | 89.38 |
| 1476.0 | 1.00 | 2.0 | 647.2 | 653.1 | 2.94 | 89.36 |

Pond File: C:\PONDPACK\BERKLEY\ALT1 .PND
Inflow Hydrograph: C:\PONDPACK\BERKLEY\POST-2 .HYD
Outflow Hydrograph: C:\PONDPACK\BERKLEY\OUT-2 .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (min) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 1482.0 | 1.00 | 2.0 | 643.3 | 649.2 | 2.94 | 89.34 |
| 1488.0 | 1.00 | 2.0 | 639.4 | 645.3 | 2.93 | 89.32 |
| 1494.0 | 1.00 | 2.0 | 635.6 | 641.4 | 2.92 | 89.30 |
| 1500.0 | 0.00 | 1.0 | 630.8 | 636.6 | 2.91 | 89.27 |
| 1506.0 | 0.00 | 0.0 | 625.0 | 630.8 | 2.89 | 89.24 |
| 1512.0 | 0.00 | 0.0 | 619.3 | 625.0 | 2.86 | 89.20 |
| 1518.0 | 0.00 | 0.0 | 613.6 | 619.3 | 2.84 | 89.17 |
| 1524.0 | 0.00 | 0.0 | 608.0 | 613.6 | 2.81 | 89.14 |
| 1530.0 | 0.00 | 0.0 | 602.4 | 608.0 | 2.79 | 89.11 |
| 1536.0 | 0.00 | 0.0 | 596.9 | 602.4 | 2.76 | 89.08 |
| 1542.0 | 0.00 | 0.0 | 591.4 | 596.9 | 2.74 | 89.04 |
| 1548.0 | 0.00 | 0.0 | 586.0 | 591.4 | 2.71 | 89.01 |
| 1554.0 | 0.00 | 0.0 | 580.6 | 586.0 | 2.69 | 88.98 |

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: C:\PONDPACK\BERKLEY\ALT1 .PND
Inflow Hydrograph: C:\PONDPACK\BERKLEY\POST-2 .HYD
Outflow Hydrograph: C:\PONDPACK\BERKLEY\OUT-2 .HYD

Starting Pond W.S. Elevation = 83.00 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow = 72.00 cfs
Peak Outflow = 42.59 cfs
Peak Elevation = 90.73 ft

***** Summary of Approximate Peak Storage *****

Initial Storage = 715 cu-ft
Peak Storage From Storm = 161.938 cu-ft
---
Total Storage in Pond = 162.653 cu-ft

Warning: Inflow hydrograph truncated on left side.

```
*********************************
*                               *
*   BERKELEY COMMONS PHASE IV   *
* James City County, Virginia   *
*                               *
*          PROPOSED BMP         *
*                               *
*********************************
```

Inflow Hydrograph: C:\PONDPACK\BERKLEY\POST-10 .HYD
Rating Table file: C:\PONDPACK\BERKLEY\ALT1 .PND

----INITIAL CONDITIONS----
Elevation = 83.00 ft
Outflow = 0.00 cfs
Storage = 715 cu-ft

| GIVEN POND DATA | | | INTERMEDIATE ROUTING COMPUTATIONS | |
|---|---|---|---|---|
| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (cu-ft) | 2S/t (cfs) | 2S/t + O (cfs) |
| 83.00 | 0.0 | 715 | 4.0 | 4.0 |
| 83.25 | 0.2 | 1.078 | 6.0 | 6.2 |
| 83.50 | 0.4 | 1.684 | 9.4 | 9.8 |
| 83.75 | 0.5 | 2.599 | 14.4 | 14.9 |
| 84.00 | 0.6 | 3.885 | 21.6 | 22.2 |
| 84.25 | 0.7 | 5.546 | 30.8 | 31.5 |
| 84.50 | 0.8 | 7.568 | 42.0 | 42.8 |
| 84.75 | 0.8 | 9.986 | 55.5 | 56.3 |
| 85.00 | 0.9 | 12.836 | 71.3 | 72.2 |
| 85.25 | 1.0 | 16.069 | 89.3 | 90.3 |
| 85.50 | 1.0 | 19.622 | 109.0 | 110.0 |
| 85.75 | 1.1 | 23.509 | 130.6 | 131.7 |
| 86.00 | 1.1 | 27.746 | 154.1 | 155.2 |
| 86.25 | 1.2 | 32.363 | 179.8 | 181.0 |
| 86.50 | 1.2 | 37.392 | 207.7 | 208.9 |
| 86.75 | 1.3 | 42.850 | 238.1 | 239.4 |
| 87.00 | 1.3 | 48.756 | 270.9 | 272.2 |
| 87.25 | 1.3 | 55.024 | 305.7 | 307.0 |
| 87.50 | 1.5 | 61.565 | 342.0 | 343.5 |
| 87.75 | 1.8 | 68.383 | 379.9 | 381.7 |
| 88.00 | 2.1 | 75.484 | 419.4 | 421.5 |
| 88.25 | 2.3 | 82.798 | 460.0 | 462.3 |
| 88.50 | 2.4 | 90.247 | 501.4 | 503.8 |
| 88.75 | 2.6 | 97.835 | 543.5 | 546.1 |
| 89.00 | 2.7 | 105.562 | 586.5 | 589.2 |
| 89.25 | 2.9 | 113.445 | 630.3 | 633.2 |
| 89.50 | 3.0 | 121.501 | 675.0 | 678.0 |
| 89.75 | 3.1 | 129.733 | 720.7 | 723.8 |
| 90.00 | 3.2 | 138.142 | 767.5 | 770.7 |
| 90.25 | 11.1 | 146.596 | 814.4 | 825.5 |
| 90.50 | 25.4 | 154.962 | 860.9 | 886.3 |

| GIVEN POND DATA | | | INTERMEDIATE ROUTING COMPUTATIONS | |
|---|---|---|---|---|
| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (cu-ft) | 2S/t (cfs) | 2S/t + O (cfs) |
| 90.75 | 43.9 | 163.240 | 906.9 | 950.8 |
| 91.00 | 65.8 | 171.430 | 952.4 | 1018.2 |
| 91.25 | 90.6 | 179.784 | 998.8 | 1089.4 |
| 91.50 | 118.1 | 188.559 | 1047.6 | 1165.7 |
| 91.75 | 151.7 | 197.765 | 1098.7 | 1250.4 |
| 92.00 | 191.1 | 207.413 | 1152.3 | 1343.4 |
| 92.25 | 229.9 | 217.379 | 1207.7 | 1437.6 |
| 92.50 | 254.2 | 227.533 | 1264.1 | 1518.3 |
| 92.75 | 280.7 | 237.879 | 1321.5 | 1602.2 |

Time increment (t) = 6.0 min.

Pond File: C:\PONDPACK\BERKLEY\ALT1 .PND
Inflow Hydrograph: C:\PONDPACK\BERKLEY\POST-10 .HYD
Outflow Hydrograph: C:\PONDPACK\BERKLEY\OUT-10 .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (min) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 660.0 | 7.00 | ----- | 4.0 | 4.0 | 0.00 | 83.00 |
| 666.0 | 7.00 | 14.0 | 16.9 | 18.0 | 0.54 | 83.85 |
| 672.0 | 8.00 | 15.0 | 30.5 | 31.9 | 0.70 | 84.26 |
| 678.0 | 8.00 | 16.0 | 44.9 | 46.5 | 0.80 | 84.57 |
| 684.0 | 10.00 | 18.0 | 61.2 | 62.9 | 0.84 | 84.85 |
| 690.0 | 11.00 | 21.0 | 80.3 | 82.2 | 0.96 | 85.14 |
| 696.0 | 13.00 | 24.0 | 102.3 | 104.3 | 1.00 | 85.43 |
| 702.0 | 22.00 | 35.0 | 135.1 | 137.3 | 1.10 | 85.81 |
| 708.0 | 32.00 | 54.0 | 186.7 | 189.1 | 1.20 | 86.32 |
| 714.0 | 41.00 | 73.0 | 257.1 | 259.7 | 1.30 | 86.90 |
| 720.0 | 74.00 | 115.0 | 368.6 | 372.1 | 1.72 | 87.69 |
| 726.0 | 131.00 | 205.0 | 568.3 | 573.6 | 2.66 | 88.91 |
| 732.0 | 145.00 | 276.0 | 813.3 | 844.3 | 15.52 | 90.33 |
| 738.0 | 99.00 | 244.0 | 898.5 | 1057.3 | 79.41 | 91.14 |
| 744.0 | 72.00 | 171.0 | 902.1 | 1069.5 | 83.65 | 91.18 |
| 750.0 | 76.00 | 148.0 | 896.3 | 1050.1 | 76.93 | 91.11 |
| 756.0 | 88.00 | 164.0 | 899.4 | 1060.3 | 80.46 | 91.15 |
| 762.0 | 99.00 | 187.0 | 907.3 | 1086.4 | 89.54 | 91.24 |
| 768.0 | 103.00 | 202.0 | 913.7 | 1109.3 | 97.77 | 91.32 |
| 774.0 | 97.00 | 200.0 | 915.0 | 1113.7 | 99.38 | 91.33 |
| 780.0 | 92.00 | 189.0 | 912.3 | 1104.0 | 95.86 | 91.30 |
| 786.0 | 80.00 | 172.0 | 906.6 | 1084.3 | 88.81 | 91.23 |
| 792.0 | 68.00 | 148.0 | 897.7 | 1054.6 | 78.49 | 91.13 |
| 798.0 | 59.00 | 127.0 | 888.6 | 1024.7 | 68.05 | 91.02 |
| 804.0 | 50.00 | 109.0 | 879.4 | 997.6 | 59.09 | 90.92 |
| 810.0 | 44.00 | 94.0 | 870.9 | 973.4 | 51.23 | 90.83 |
| 816.0 | 37.00 | 81.0 | 863.4 | 951.9 | 44.26 | 90.75 |
| 822.0 | 33.00 | 70.0 | 855.6 | 933.4 | 38.90 | 90.68 |
| 828.0 | 29.00 | 62.0 | 848.8 | 917.6 | 34.37 | 90.62 |
| 834.0 | 26.00 | 55.0 | 843.0 | 903.8 | 30.43 | 90.57 |
| 840.0 | 24.00 | 50.0 | 838.3 | 893.0 | 27.31 | 90.53 |
| 846.0 | 22.00 | 46.0 | 834.5 | 884.3 | 24.94 | 90.49 |
| 852.0 | 21.00 | 43.0 | 830.8 | 877.5 | 23.32 | 90.46 |
| 858.0 | 19.00 | 40.0 | 827.3 | 870.8 | 21.76 | 90.44 |
| 864.0 | 18.00 | 37.0 | 823.9 | 864.3 | 20.22 | 90.41 |
| 870.0 | 16.00 | 34.0 | 820.4 | 857.9 | 18.71 | 90.38 |
| 876.0 | 15.00 | 31.0 | 817.0 | 851.4 | 17.20 | 90.36 |
| 882.0 | 15.00 | 30.0 | 814.7 | 847.0 | 16.16 | 90.34 |
| 888.0 | 14.00 | 29.0 | 813.0 | 843.7 | 15.38 | 90.32 |
| 894.0 | 14.00 | 28.0 | 811.5 | 841.0 | 14.73 | 90.31 |
| 900.0 | 14.00 | 28.0 | 810.7 | 839.5 | 14.39 | 90.31 |
| 906.0 | 13.00 | 27.0 | 809.8 | 837.7 | 13.97 | 90.30 |
| 912.0 | 13.00 | 26.0 | 808.8 | 835.8 | 13.51 | 90.29 |
| 918.0 | 12.00 | 25.0 | 807.7 | 833.8 | 13.04 | 90.28 |
| 924.0 | 12.00 | 24.0 | 806.6 | 831.7 | 12.55 | 90.28 |

Pond File: C:\PONDPACK\BERKLEY\ALT1 .PND
Inflow Hydrograph: C:\PONDPACK\BERKLEY\POST-10 .HYD
Outflow Hydrograph: C:\PONDPACK\BERKLEY\OUT-10 .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (min) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 930.0 | 11.00 | 23.0 | 805.5 | 829.6 | 12.06 | 90.27 |
| 936.0 | 11.00 | 22.0 | 804.4 | 827.5 | 11.56 | 90.26 |
| 942.0 | 11.00 | 22.0 | 803.8 | 826.4 | 11.30 | 90.25 |
| 948.0 | 11.00 | 22.0 | 803.5 | 825.8 | 11.16 | 90.25 |
| 954.0 | 11.00 | 22.0 | 803.3 | 825.5 | 11.09 | 90.25 |
| 960.0 | 11.00 | 22.0 | 803.1 | 825.3 | 11.06 | 90.25 |
| 966.0 | 11.00 | 22.0 | 803.1 | 825.1 | 11.05 | 90.25 |
| 972.0 | 10.00 | 21.0 | 802.3 | 824.1 | 10.89 | 90.24 |
| 978.0 | 10.00 | 20.0 | 801.0 | 822.3 | 10.63 | 90.24 |
| 984.0 | 9.00 | 19.0 | 799.4 | 820.0 | 10.31 | 90.22 |
| 990.0 | 9.00 | 18.0 | 797.5 | 817.4 | 9.93 | 90.21 |
| 996.0 | 9.00 | 18.0 | 796.2 | 815.5 | 9.66 | 90.20 |
| 1002.0 | 9.00 | 18.0 | 795.3 | 814.2 | 9.47 | 90.20 |
| 1008.0 | 8.00 | 17.0 | 793.9 | 812.3 | 9.19 | 90.19 |
| 1014.0 | 8.00 | 16.0 | 792.2 | 809.9 | 8.85 | 90.18 |
| 1020.0 | 8.00 | 16.0 | 791.0 | 808.2 | 8.60 | 90.17 |
| 1026.0 | 8.00 | 16.0 | 790.1 | 807.0 | 8.43 | 90.17 |
| 1032.0 | 8.00 | 16.0 | 789.5 | 806.1 | 8.31 | 90.16 |
| 1038.0 | 8.00 | 16.0 | 789.1 | 805.5 | 8.22 | 90.16 |
| 1044.0 | 8.00 | 16.0 | 788.8 | 805.1 | 8.16 | 90.16 |
| 1050.0 | 8.00 | 16.0 | 788.5 | 804.8 | 8.11 | 90.16 |
| 1056.0 | 8.00 | 16.0 | 788.4 | 804.5 | 8.08 | 90.15 |
| 1062.0 | 8.00 | 16.0 | 788.3 | 804.4 | 8.06 | 90.15 |
| 1068.0 | 8.00 | 16.0 | 788.2 | 804.3 | 8.04 | 90.15 |
| 1074.0 | 8.00 | 16.0 | 788.1 | 804.2 | 8.03 | 90.15 |
| 1080.0 | 8.00 | 16.0 | 788.1 | 804.1 | 8.02 | 90.15 |
| 1086.0 | 8.00 | 16.0 | 788.1 | 804.1 | 8.01 | 90.15 |
| 1092.0 | 8.00 | 16.0 | 788.0 | 804.1 | 8.01 | 90.15 |
| 1098.0 | 8.00 | 16.0 | 788.0 | 804.0 | 8.01 | 90.15 |
| 1104.0 | 8.00 | 16.0 | 788.0 | 804.0 | 8.01 | 90.15 |
| 1110.0 | 8.00 | 16.0 | 788.0 | 804.0 | 8.00 | 90.15 |
| 1116.0 | 7.00 | 15.0 | 787.3 | 803.0 | 7.86 | 90.15 |
| 1122.0 | 7.00 | 14.0 | 786.1 | 801.3 | 7.61 | 90.14 |
| 1128.0 | 7.00 | 14.0 | 785.2 | 800.1 | 7.44 | 90.13 |
| 1134.0 | 7.00 | 14.0 | 784.6 | 799.2 | 7.31 | 90.13 |
| 1140.0 | 7.00 | 14.0 | 784.1 | 798.6 | 7.22 | 90.13 |
| 1146.0 | 7.00 | 14.0 | 783.8 | 798.1 | 7.16 | 90.13 |
| 1152.0 | 7.00 | 14.0 | 783.6 | 797.8 | 7.11 | 90.12 |
| 1158.0 | 6.00 | 13.0 | 782.7 | 796.6 | 6.94 | 90.12 |
| 1164.0 | 6.00 | 12.0 | 781.4 | 794.7 | 6.67 | 90.11 |
| 1170.0 | 6.00 | 12.0 | 780.4 | 793.4 | 6.47 | 90.10 |
| 1176.0 | 6.00 | 12.0 | 779.8 | 792.4 | 6.34 | 90.10 |
| 1182.0 | 6.00 | 12.0 | 779.3 | 791.8 | 6.24 | 90.10 |
| 1188.0 | 5.00 | 11.0 | 778.2 | 790.3 | 6.03 | 90.09 |
| 1194.0 | 5.00 | 10.0 | 776.8 | 788.2 | 5.73 | 90.08 |
| 1200.0 | 5.00 | 10.0 | 775.7 | 786.8 | 5.52 | 90.07 |

Pond File: C:\PONDPACK\BERKLEY\ALT1 .PND
Inflow Hydrograph: C:\PONDPACK\BERKLEY\POST-10 .HYD
Outflow Hydrograph: C:\PONDPACK\BERKLEY\OUT-10 .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (min) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 1206.0 | 5.00 | 10.0 | 775.0 | 785.7 | 5.37 | 90.07 |
| 1212.0 | 5.00 | 10.0 | 774.5 | 785.0 | 5.26 | 90.07 |
| 1218.0 | 5.00 | 10.0 | 774.1 | 784.5 | 5.19 | 90.06 |
| 1224.0 | 5.00 | 10.0 | 773.8 | 784.1 | 5.13 | 90.06 |
| 1230.0 | 5.00 | 10.0 | 773.6 | 783.8 | 5.10 | 90.06 |
| 1236.0 | 5.00 | 10.0 | 773.5 | 783.6 | 5.07 | 90.06 |
| 1242.0 | 5.00 | 10.0 | 773.4 | 783.5 | 5.05 | 90.06 |
| 1248.0 | 5.00 | 10.0 | 773.3 | 783.4 | 5.03 | 90.06 |
| 1254.0 | 5.00 | 10.0 | 773.3 | 783.3 | 5.02 | 90.06 |
| 1260.0 | 5.00 | 10.0 | 773.2 | 783.3 | 5.02 | 90.06 |
| 1266.0 | 5.00 | 10.0 | 773.2 | 783.2 | 5.01 | 90.06 |
| 1272.0 | 5.00 | 10.0 | 773.2 | 783.2 | 5.01 | 90.06 |
| 1278.0 | 5.00 | 10.0 | 773.2 | 783.2 | 5.01 | 90.06 |
| 1284.0 | 5.00 | 10.0 | 773.2 | 783.2 | 5.00 | 90.06 |
| 1290.0 | 5.00 | 10.0 | 773.2 | 783.2 | 5.00 | 90.06 |
| 1296.0 | 5.00 | 10.0 | 773.2 | 783.2 | 5.00 | 90.06 |
| 1302.0 | 5.00 | 10.0 | 773.2 | 783.2 | 5.00 | 90.06 |
| 1308.0 | 5.00 | 10.0 | 773.2 | 783.2 | 5.00 | 90.06 |
| 1314.0 | 5.00 | 10.0 | 773.2 | 783.2 | 5.00 | 90.06 |
| 1320.0 | 5.00 | 10.0 | 773.2 | 783.2 | 5.00 | 90.06 |
| 1326.0 | 5.00 | 10.0 | 773.2 | 783.2 | 5.00 | 90.06 |
| 1332.0 | 5.00 | 10.0 | 773.2 | 783.2 | 5.00 | 90.06 |
| 1338.0 | 5.00 | 10.0 | 773.2 | 783.2 | 5.00 | 90.06 |
| 1344.0 | 4.00 | 9.0 | 772.4 | 782.2 | 4.86 | 90.05 |
| 1350.0 | 4.00 | 8.0 | 771.2 | 780.4 | 4.61 | 90.04 |
| 1356.0 | 4.00 | 8.0 | 770.4 | 779.2 | 4.43 | 90.04 |
| 1362.0 | 4.00 | 8.0 | 769.7 | 778.4 | 4.31 | 90.04 |
| 1368.0 | 4.00 | 8.0 | 769.3 | 777.7 | 4.22 | 90.03 |
| 1374.0 | 4.00 | 8.0 | 769.0 | 777.3 | 4.16 | 90.03 |
| 1380.0 | 4.00 | 8.0 | 768.8 | 777.0 | 4.11 | 90.03 |
| 1386.0 | 4.00 | 8.0 | 768.6 | 776.8 | 4.08 | 90.03 |
| 1392.0 | 4.00 | 8.0 | 768.5 | 776.6 | 4.06 | 90.03 |
| 1398.0 | 3.00 | 7.0 | 767.7 | 775.5 | 3.90 | 90.02 |
| 1404.0 | 3.00 | 6.0 | 766.4 | 773.7 | 3.64 | 90.01 |
| 1410.0 | 3.00 | 6.0 | 765.5 | 772.4 | 3.45 | 90.01 |
| 1416.0 | 3.00 | 6.0 | 764.9 | 771.5 | 3.32 | 90.00 |
| 1422.0 | 3.00 | 6.0 | 764.4 | 770.9 | 3.23 | 90.00 |
| 1428.0 | 3.00 | 6.0 | 764.0 | 770.4 | 3.20 | 90.00 |
| 1434.0 | 3.00 | 6.0 | 763.6 | 770.0 | 3.20 | 90.00 |
| 1440.0 | 2.00 | 5.0 | 762.2 | 768.6 | 3.20 | 89.99 |
| 1446.0 | 2.00 | 4.0 | 759.8 | 766.2 | 3.19 | 89.98 |
| 1452.0 | 2.00 | 4.0 | 757.5 | 763.8 | 3.19 | 89.96 |
| 1458.0 | 2.00 | 4.0 | 755.1 | 761.5 | 3.18 | 89.95 |
| 1464.0 | 2.00 | 4.0 | 752.8 | 759.1 | 3.18 | 89.94 |
| 1470.0 | 2.00 | 4.0 | 750.4 | 756.8 | 3.17 | 89.93 |
| 1476.0 | 2.00 | 4.0 | 748.1 | 754.4 | 3.17 | 89.91 |

Pond File: C:\PONDPACK\BERKLEY\ALT1 .PND
Inflow Hydrograph: C:\PONDPACK\BERKLEY\POST-10 .HYD
Outflow Hydrograph: C:\PONDPACK\BERKLEY\OUT-10 .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (min) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 1482.0 | 2.00 | 4.0 | 745.8 | 752.1 | 3.16 | 89.90 |
| 1488.0 | 2.00 | 4.0 | 743.5 | 749.8 | 3.16 | 89.89 |
| 1494.0 | 1.00 | 3.0 | 740.2 | 746.5 | 3.15 | 89.87 |
| 1500.0 | 1.00 | 2.0 | 735.9 | 742.2 | 3.14 | 89.85 |
| 1506.0 | 1.00 | 2.0 | 731.6 | 737.9 | 3.13 | 89.82 |
| 1512.0 | 1.00 | 2.0 | 727.4 | 733.6 | 3.12 | 89.80 |
| 1518.0 | 1.00 | 2.0 | 723.2 | 729.4 | 3.11 | 89.78 |
| 1524.0 | 1.00 | 2.0 | 718.9 | 725.2 | 3.10 | 89.76 |
| 1530.0 | 1.00 | 2.0 | 714.8 | 720.9 | 3.09 | 89.73 |
| 1536.0 | 0.00 | 1.0 | 709.6 | 715.8 | 3.08 | 89.71 |
| 1542.0 | 0.00 | 0.0 | 703.5 | 709.6 | 3.07 | 89.67 |
| 1548.0 | 0.00 | 0.0 | 697.3 | 703.5 | 3.06 | 89.64 |
| 1554.0 | 0.00 | 0.0 | 691.3 | 697.3 | 3.04 | 89.61 |

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: C:\PONDPACK\BERKLEY\ALT1 .PND
Inflow Hydrograph: C:\PONDPACK\BERKLEY\POST-10 .HYD
Outflow Hydrograph: C:\PONDPACK\BERKLEY\OUT-10 .HYD

Starting Pond W.S. Elevation = 83.00 ft

***** Summary of Peak Outflow and Peak Elevation *****

| | | | |
|---|---|---|---|
| Peak Inflow | = | 145.00 | cfs |
| Peak Outflow | = | 99.38 | cfs |
| Peak Elevation | = | 91.33 | ft |

***** Summary of Approximate Peak Storage *****

| | | | |
|---|---|---|---|
| Initial Storage | = | 715 | cu-ft |
| Peak Storage From Storm | = | 181.870 | cu-ft |
| Total Storage in Pond | = | 182.585 | cu-ft |

Warning: Inflow hydrograph truncated on left side.

```
*********************************
*                               *
*   BERKELEY COMMONS PHASE IV   *
* James City County, Virginia   *
*                               *
*          PROPOSED BMP         *
*                               *
*********************************
```

Inflow Hydrograph: C:\PONDPACK\BERKLEY\POST-25 .HYD
Rating Table file: C:\PONDPACK\BERKLEY\ALT1 .PND

----INITIAL CONDITIONS----
Elevation = 83.00 ft
Outflow = 0.00 cfs
Storage = 715 cu-ft

| GIVEN POND DATA | | | INTERMEDIATE ROUTING COMPUTATIONS | |
|---|---|---|---|---|
| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (cu-ft) | 2S/t (cfs) | 2S/t + O (cfs) |
| 83.00 | 0.0 | 715 | 4.0 | 4.0 |
| 83.25 | 0.2 | 1,078 | 6.0 | 6.2 |
| 83.50 | 0.4 | 1,684 | 9.4 | 9.8 |
| 83.75 | 0.5 | 2,599 | 14.4 | 14.9 |
| 84.00 | 0.6 | 3,885 | 21.6 | 22.2 |
| 84.25 | 0.7 | 5,546 | 30.8 | 31.5 |
| 84.50 | 0.8 | 7,568 | 42.0 | 42.8 |
| 84.75 | 0.8 | 9,986 | 55.5 | 56.3 |
| 85.00 | 0.9 | 12,836 | 71.3 | 72.2 |
| 85.25 | 1.0 | 16,069 | 89.3 | 90.3 |
| 85.50 | 1.0 | 19,622 | 109.0 | 110.0 |
| 85.75 | 1.1 | 23,509 | 130.6 | 131.7 |
| 86.00 | 1.1 | 27,746 | 154.1 | 155.2 |
| 86.25 | 1.2 | 32,363 | 179.8 | 181.0 |
| 86.50 | 1.2 | 37,392 | 207.7 | 208.9 |
| 86.75 | 1.3 | 42,850 | 238.1 | 239.4 |
| 87.00 | 1.3 | 48,756 | 270.9 | 272.2 |
| 87.25 | 1.3 | 55,024 | 305.7 | 307.0 |
| 87.50 | 1.5 | 61,565 | 342.0 | 343.5 |
| 87.75 | 1.8 | 68,383 | 379.9 | 381.7 |
| 88.00 | 2.1 | 75,484 | 419.4 | 421.5 |
| 88.25 | 2.3 | 82,798 | 460.0 | 462.3 |
| 88.50 | 2.4 | 90,247 | 501.4 | 503.8 |
| 88.75 | 2.6 | 97,835 | 543.5 | 546.1 |
| 89.00 | 2.7 | 105,562 | 586.5 | 589.2 |
| 89.25 | 2.9 | 113,445 | 630.3 | 633.2 |
| 89.50 | 3.0 | 121,501 | 675.0 | 678.0 |
| 89.75 | 3.1 | 129,733 | 720.7 | 723.8 |
| 90.00 | 3.2 | 138,142 | 767.5 | 770.7 |
| 90.25 | 11.1 | 146,596 | 814.4 | 825.5 |
| 90.50 | 25.4 | 154,962 | 860.9 | 886.3 |

| GIVEN POND DATA | | | INTERMEDIATE ROUTING COMPUTATIONS | |
|---|---|---|---|---|
| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (cu-ft) | 2S/t (cfs) | 2S/t + O (cfs) |
| 90.75 | 43.9 | 163.240 | 906.9 | 950.8 |
| 91.00 | 65.8 | 171.430 | 952.4 | 1018.2 |
| 91.25 | 90.6 | 179.784 | 998.8 | 1089.4 |
| 91.50 | 118.1 | 188.559 | 1047.6 | 1165.7 |
| 91.75 | 151.7 | 197.765 | 1098.7 | 1250.4 |
| 92.00 | 191.1 | 207.413 | 1152.3 | 1343.4 |
| 92.25 | 229.9 | 217.379 | 1207.7 | 1437.6 |
| 92.50 | 254.2 | 227.533 | 1264.1 | 1518.3 |
| 92.75 | 280.7 | 237.879 | 1321.5 | 1602.2 |

Time increment (t) = 6.0 min.

Pond File: C:\PONDPACK\BERKLEY\ALT1 .PND
Inflow Hydrograph: C:\PONDPACK\BERKLEY\POST-25 .HYD
Outflow Hydrograph: C:\PONDPACK\BERKLEY\OUT-25 .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (min) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 660.0 | 7.00 | ----- | 4.0 | 4.0 | 0.00 | 83.00 |
| 666.0 | 8.00 | 15.0 | 17.9 | 19.0 | 0.56 | 83.89 |
| 672.0 | 9.00 | 17.0 | 33.4 | 34.9 | 0.73 | 84.32 |
| 678.0 | 10.00 | 19.0 | 50.8 | 52.4 | 0.80 | 84.68 |
| 684.0 | 11.00 | 21.0 | 70.0 | 71.8 | 0.90 | 84.99 |
| 690.0 | 13.00 | 24.0 | 92.0 | 94.0 | 1.00 | 85.30 |
| 696.0 | 14.00 | 27.0 | 116.9 | 119.0 | 1.04 | 85.60 |
| 702.0 | 24.00 | 38.0 | 152.7 | 154.9 | 1.10 | 86.00 |
| 708.0 | 35.00 | 59.0 | 209.3 | 211.7 | 1.21 | 86.52 |
| 714.0 | 45.00 | 80.0 | 286.7 | 289.3 | 1.30 | 87.12 |
| 720.0 | 81.00 | 126.0 | 408.6 | 412.7 | 2.03 | 87.94 |
| 726.0 | 145.00 | 226.0 | 628.8 | 634.6 | 2.90 | 89.26 |
| 732.0 | 159.00 | 304.0 | 855.3 | 932.8 | 38.75 | 90.68 |
| 738.0 | 109.00 | 268.0 | 917.7 | 1123.3 | 102.84 | 91.36 |
| 744.0 | 80.00 | 189.0 | 913.0 | 1106.7 | 96.82 | 91.31 |
| 750.0 | 83.00 | 163.0 | 904.1 | 1076.0 | 85.94 | 91.20 |
| 756.0 | 97.00 | 180.0 | 906.6 | 1084.1 | 88.77 | 91.23 |
| 762.0 | 110.00 | 207.0 | 914.9 | 1113.6 | 99.33 | 91.33 |
| 768.0 | 114.00 | 224.0 | 922.0 | 1138.9 | 108.47 | 91.41 |
| 774.0 | 108.00 | 222.0 | 923.4 | 1144.0 | 110.29 | 91.43 |
| 780.0 | 101.00 | 209.0 | 920.2 | 1132.4 | 106.11 | 91.39 |
| 786.0 | 88.00 | 189.0 | 913.7 | 1109.2 | 97.74 | 91.31 |
| 792.0 | 75.00 | 163.0 | 904.4 | 1076.7 | 86.18 | 91.21 |
| 798.0 | 65.00 | 140.0 | 894.5 | 1044.4 | 74.91 | 91.09 |
| 804.0 | 55.00 | 120.0 | 885.3 | 1014.5 | 64.61 | 90.99 |
| 810.0 | 48.00 | 103.0 | 876.1 | 988.3 | 56.09 | 90.89 |
| 816.0 | 41.00 | 89.0 | 868.0 | 965.1 | 48.56 | 90.80 |
| 822.0 | 36.00 | 77.0 | 860.5 | 945.0 | 42.24 | 90.73 |
| 828.0 | 32.00 | 68.0 | 853.5 | 928.5 | 37.51 | 90.66 |
| 834.0 | 29.00 | 61.0 | 847.5 | 914.5 | 33.49 | 90.61 |
| 840.0 | 26.00 | 55.0 | 842.4 | 902.5 | 30.05 | 90.56 |
| 846.0 | 24.00 | 50.0 | 838.1 | 892.4 | 27.15 | 90.52 |
| 852.0 | 22.00 | 46.0 | 834.3 | 884.1 | 24.88 | 90.49 |
| 858.0 | 20.00 | 42.0 | 830.2 | 876.3 | 23.06 | 90.46 |
| 864.0 | 19.00 | 39.0 | 826.5 | 869.2 | 21.38 | 90.43 |
| 870.0 | 19.00 | 38.0 | 823.9 | 864.5 | 20.26 | 90.41 |
| 876.0 | 18.00 | 37.0 | 822.1 | 860.9 | 19.43 | 90.40 |
| 882.0 | 17.00 | 35.0 | 820.0 | 857.1 | 18.52 | 90.38 |
| 888.0 | 16.00 | 33.0 | 817.9 | 853.0 | 17.57 | 90.36 |
| 894.0 | 16.00 | 32.0 | 816.2 | 849.9 | 16.83 | 90.35 |
| 900.0 | 15.00 | 31.0 | 814.8 | 847.2 | 16.21 | 90.34 |
| 906.0 | 15.00 | 30.0 | 813.5 | 844.8 | 15.64 | 90.33 |
| 912.0 | 14.00 | 29.0 | 812.3 | 842.5 | 15.10 | 90.32 |
| 918.0 | 14.00 | 28.0 | 811.2 | 840.3 | 14.58 | 90.31 |
| 924.0 | 13.00 | 27.0 | 810.0 | 838.2 | 14.07 | 90.30 |

Pond File: C:\PONDPACK\BERKLEY\ALT1 .PND
Inflow Hydrograph: C:\PONDPACK\BERKLEY\POST-25 .HYD
Outflow Hydrograph: C:\PONDPACK\BERKLEY\OUT-25 .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (min) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 930.0 | 13.00 | 26.0 | 808.9 | 836.0 | 13.57 | 90.29 |
| 936.0 | 13.00 | 26.0 | 808.3 | 834.9 | 13.30 | 90.29 |
| 942.0 | 12.00 | 25.0 | 807.4 | 833.3 | 12.92 | 90.28 |
| 948.0 | 12.00 | 24.0 | 806.5 | 831.4 | 12.49 | 90.27 |
| 954.0 | 11.00 | 23.0 | 805.4 | 829.5 | 12.02 | 90.27 |
| 960.0 | 11.00 | 22.0 | 804.3 | 827.4 | 11.54 | 90.26 |
| 966.0 | 11.00 | 22.0 | 803.7 | 826.3 | 11.29 | 90.25 |
| 972.0 | 11.00 | 22.0 | 803.4 | 825.7 | 11.15 | 90.25 |
| 978.0 | 11.00 | 22.0 | 803.3 | 825.4 | 11.09 | 90.25 |
| 984.0 | 11.00 | 22.0 | 803.1 | 825.3 | 11.06 | 90.25 |
| 990.0 | 11.00 | 22.0 | 803.1 | 825.1 | 11.04 | 90.25 |
| 996.0 | 11.00 | 22.0 | 803.0 | 825.1 | 11.03 | 90.25 |
| 1002.0 | 11.00 | 22.0 | 802.9 | 825.0 | 11.02 | 90.25 |
| 1008.0 | 10.00 | 21.0 | 802.2 | 823.9 | 10.87 | 90.24 |
| 1014.0 | 10.00 | 20.0 | 801.0 | 822.2 | 10.62 | 90.23 |
| 1020.0 | 10.00 | 20.0 | 800.1 | 821.0 | 10.44 | 90.23 |
| 1026.0 | 10.00 | 20.0 | 799.4 | 820.1 | 10.31 | 90.23 |
| 1032.0 | 9.00 | 19.0 | 798.3 | 818.4 | 10.08 | 90.22 |
| 1038.0 | 9.00 | 18.0 | 796.7 | 816.3 | 9.77 | 90.21 |
| 1044.0 | 8.00 | 17.0 | 794.9 | 813.7 | 9.40 | 90.20 |
| 1050.0 | 8.00 | 16.0 | 792.9 | 810.9 | 9.00 | 90.18 |
| 1056.0 | 8.00 | 16.0 | 791.5 | 808.9 | 8.71 | 90.17 |
| 1062.0 | 8.00 | 16.0 | 790.5 | 807.5 | 8.51 | 90.17 |
| 1068.0 | 8.00 | 16.0 | 789.8 | 806.5 | 8.36 | 90.16 |
| 1074.0 | 8.00 | 16.0 | 789.3 | 805.8 | 8.26 | 90.16 |
| 1080.0 | 8.00 | 16.0 | 788.9 | 805.3 | 8.18 | 90.16 |
| 1086.0 | 8.00 | 16.0 | 788.6 | 804.9 | 8.13 | 90.16 |
| 1092.0 | 8.00 | 16.0 | 788.5 | 804.6 | 8.09 | 90.15 |
| 1098.0 | 8.00 | 16.0 | 788.3 | 804.5 | 8.07 | 90.15 |
| 1104.0 | 8.00 | 16.0 | 788.2 | 804.3 | 8.05 | 90.15 |
| 1110.0 | 8.00 | 16.0 | 788.2 | 804.2 | 8.03 | 90.15 |
| 1116.0 | 7.00 | 15.0 | 787.4 | 803.2 | 7.88 | 90.15 |
| 1122.0 | 7.00 | 14.0 | 786.1 | 801.4 | 7.63 | 90.14 |
| 1128.0 | 7.00 | 14.0 | 785.3 | 800.1 | 7.45 | 90.13 |
| 1134.0 | 7.00 | 14.0 | 784.6 | 799.3 | 7.32 | 90.13 |
| 1140.0 | 7.00 | 14.0 | 784.2 | 798.6 | 7.23 | 90.13 |
| 1146.0 | 7.00 | 14.0 | 783.8 | 798.2 | 7.16 | 90.13 |
| 1152.0 | 7.00 | 14.0 | 783.6 | 797.8 | 7.11 | 90.12 |
| 1158.0 | 7.00 | 14.0 | 783.5 | 797.6 | 7.08 | 90.12 |
| 1164.0 | 7.00 | 14.0 | 783.3 | 797.5 | 7.06 | 90.12 |
| 1170.0 | 6.00 | 13.0 | 782.5 | 796.3 | 6.90 | 90.12 |
| 1176.0 | 6.00 | 12.0 | 781.3 | 794.5 | 6.64 | 90.11 |
| 1182.0 | 6.00 | 12.0 | 780.4 | 793.3 | 6.45 | 90.10 |
| 1188.0 | 6.00 | 12.0 | 779.7 | 792.4 | 6.32 | 90.10 |
| 1194.0 | 6.00 | 12.0 | 779.2 | 791.7 | 6.23 | 90.10 |
| 1200.0 | 6.00 | 12.0 | 778.9 | 791.2 | 6.16 | 90.09 |

Pond File: C:\PONDPACK\BERKLEY\ALT1 .PND
Inflow Hydrograph: C:\PONDPACK\BERKLEY\POST-25 .HYD
Outflow Hydrograph: C:\PONDPACK\BERKLEY\OUT-25 .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (min) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 1206.0 | 6.00 | 12.0 | 778.7 | 790.9 | 6.12 | 90.09 |
| 1212.0 | 6.00 | 12.0 | 778.5 | 790.7 | 6.08 | 90.09 |
| 1218.0 | 6.00 | 12.0 | 778.4 | 790.5 | 6.06 | 90.09 |
| 1224.0 | 6.00 | 12.0 | 778.3 | 790.4 | 6.04 | 90.09 |
| 1230.0 | 6.00 | 12.0 | 778.3 | 790.3 | 6.03 | 90.09 |
| 1236.0 | 6.00 | 12.0 | 778.2 | 790.3 | 6.02 | 90.09 |
| 1242.0 | 6.00 | 12.0 | 778.2 | 790.2 | 6.02 | 90.09 |
| 1248.0 | 6.00 | 12.0 | 778.2 | 790.2 | 6.01 | 90.09 |
| 1254.0 | 6.00 | 12.0 | 778.1 | 790.2 | 6.01 | 90.09 |
| 1260.0 | 6.00 | 12.0 | 778.1 | 790.1 | 6.01 | 90.09 |
| 1266.0 | 5.00 | 11.0 | 777.4 | 789.1 | 5.86 | 90.08 |
| 1272.0 | 5.00 | 10.0 | 776.2 | 787.4 | 5.61 | 90.08 |
| 1278.0 | 5.00 | 10.0 | 775.3 | 786.2 | 5.44 | 90.07 |
| 1284.0 | 5.00 | 10.0 | 774.7 | 785.3 | 5.31 | 90.07 |
| 1290.0 | 5.00 | 10.0 | 774.3 | 784.7 | 5.22 | 90.06 |
| 1296.0 | 5.00 | 10.0 | 773.9 | 784.3 | 5.16 | 90.06 |
| 1302.0 | 5.00 | 10.0 | 773.7 | 783.9 | 5.11 | 90.06 |
| 1308.0 | 5.00 | 10.0 | 773.6 | 783.7 | 5.08 | 90.06 |
| 1314.0 | 5.00 | 10.0 | 773.4 | 783.6 | 5.06 | 90.06 |
| 1320.0 | 5.00 | 10.0 | 773.4 | 783.4 | 5.04 | 90.06 |
| 1326.0 | 5.00 | 10.0 | 773.3 | 783.4 | 5.03 | 90.06 |
| 1332.0 | 5.00 | 10.0 | 773.3 | 783.3 | 5.02 | 90.06 |
| 1338.0 | 5.00 | 10.0 | 773.2 | 783.3 | 5.01 | 90.06 |
| 1344.0 | 4.00 | 9.0 | 772.5 | 782.2 | 4.87 | 90.05 |
| 1350.0 | 4.00 | 8.0 | 771.3 | 780.5 | 4.62 | 90.04 |
| 1356.0 | 4.00 | 8.0 | 770.4 | 779.3 | 4.44 | 90.04 |
| 1362.0 | 4.00 | 8.0 | 769.8 | 778.4 | 4.31 | 90.04 |
| 1368.0 | 4.00 | 8.0 | 769.3 | 777.8 | 4.22 | 90.03 |
| 1374.0 | 4.00 | 8.0 | 769.0 | 777.3 | 4.16 | 90.03 |
| 1380.0 | 4.00 | 8.0 | 768.8 | 777.0 | 4.11 | 90.03 |
| 1386.0 | 4.00 | 8.0 | 768.6 | 776.8 | 4.08 | 90.03 |
| 1392.0 | 4.00 | 8.0 | 768.5 | 776.6 | 4.06 | 90.03 |
| 1398.0 | 3.00 | 7.0 | 767.7 | 775.5 | 3.90 | 90.02 |
| 1404.0 | 3.00 | 6.0 | 766.4 | 773.7 | 3.64 | 90.01 |
| 1410.0 | 3.00 | 6.0 | 765.5 | 772.4 | 3.45 | 90.01 |
| 1416.0 | 3.00 | 6.0 | 764.9 | 771.5 | 3.32 | 90.00 |
| 1422.0 | 3.00 | 6.0 | 764.4 | 770.9 | 3.23 | 90.00 |
| 1428.0 | 3.00 | 6.0 | 764.0 | 770.4 | 3.20 | 90.00 |
| 1434.0 | 3.00 | 6.0 | 763.6 | 770.0 | 3.20 | 90.00 |
| 1440.0 | 2.00 | 5.0 | 762.2 | 768.6 | 3.20 | 89.99 |
| 1446.0 | 2.00 | 4.0 | 759.8 | 766.2 | 3.19 | 89.98 |
| 1452.0 | 2.00 | 4.0 | 757.5 | 763.8 | 3.19 | 89.96 |
| 1458.0 | 2.00 | 4.0 | 755.1 | 761.5 | 3.18 | 89.95 |
| 1464.0 | 2.00 | 4.0 | 752.8 | 759.1 | 3.18 | 89.94 |
| 1470.0 | 2.00 | 4.0 | 750.4 | 756.8 | 3.17 | 89.93 |
| 1476.0 | 2.00 | 4.0 | 748.1 | 754.4 | 3.17 | 89.91 |

Pond File: C:\PONDPACK\BERKLEY\ALT1 .PND
Inflow Hydrograph: C:\PONDPACK\BERKLEY\POST-25 .HYD
Outflow Hydrograph: C:\PONDPACK\BERKLEY\OUT-25 .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (min) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 1482.0 | 2.00 | 4.0 | 745.8 | 752.1 | 3.16 | 89.90 |
| 1488.0 | 2.00 | 4.0 | 743.5 | 749.8 | 3.16 | 89.89 |
| 1494.0 | 1.00 | 3.0 | 740.2 | 746.5 | 3.15 | 89.87 |
| 1500.0 | 1.00 | 2.0 | 735.9 | 742.2 | 3.14 | 89.85 |
| 1506.0 | 1.00 | 2.0 | 731.6 | 737.9 | 3.13 | 89.82 |
| 1512.0 | 1.00 | 2.0 | 727.4 | 733.6 | 3.12 | 89.80 |
| 1518.0 | 1.00 | 2.0 | 723.2 | 729.4 | 3.11 | 89.78 |
| 1524.0 | 1.00 | 2.0 | 718.9 | 725.2 | 3.10 | 89.76 |
| 1530.0 | 1.00 | 2.0 | 714.8 | 720.9 | 3.09 | 89.73 |
| 1536.0 | 0.00 | 1.0 | 709.6 | 715.8 | 3.08 | 89.71 |
| 1542.0 | 0.00 | 0.0 | 703.5 | 709.6 | 3.07 | 89.67 |
| 1548.0 | 0.00 | 0.0 | 697.3 | 703.5 | 3.06 | 89.64 |
| 1554.0 | 0.00 | 0.0 | 691.3 | 697.3 | 3.04 | 89.61 |

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: C:\PONDPACK\BERKLEY\ALT1 .PND
Inflow Hydrograph: C:\PONDPACK\BERKLEY\POST-25 .HYD
Outflow Hydrograph: C:\PONDPACK\BERKLEY\OUT-25 .HYD

Starting Pond W.S. Elevation = 83.00 ft

***** Summary of Peak Outflow and Peak Elevation *****

| | | | |
|---|---|---|---|
| Peak Inflow | = | 159.00 | cfs |
| Peak Outflow | = | 110.29 | cfs |
| Peak Elevation | = | 91.43 | ft |

***** Summary of Approximate Peak Storage *****

| | | | |
|---|---|---|---|
| Initial Storage | = | 715 | cu-ft |
| Peak Storage From Storm | = | 185.353 | cu-ft |
| Total Storage in Pond | = | 186.068 | cu-ft |

Warning: Inflow hydrograph truncated on left side.

```
*********************************
*                               *
*   BERKELEY COMMONS PHASE IV   *
* James City County, Virginia   *
*                               *
*          PROPOSED BMP         *
*                               *
*********************************
```

Inflow Hydrograph: C:\PONDPACK\BERKLEY\POST-100.HYD
Rating Table file: C:\PONDPACK\BERKLEY\ALT1 .PND

----INITIAL CONDITIONS----
Elevation = 83.00 ft
Outflow = 0.00 cfs
Storage = 715 cu-ft

| GIVEN POND DATA | | | INTERMEDIATE ROUTING COMPUTATIONS | |
|---|---|---|---|---|
| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (cu-ft) | 2S/t (cfs) | 2S/t + O (cfs) |
| 83.00 | 0.0 | 715 | 4.0 | 4.0 |
| 83.25 | 0.2 | 1.078 | 6.0 | 6.2 |
| 83.50 | 0.4 | 1.684 | 9.4 | 9.8 |
| 83.75 | 0.5 | 2.599 | 14.4 | 14.9 |
| 84.00 | 0.6 | 3.885 | 21.6 | 22.2 |
| 84.25 | 0.7 | 5.546 | 30.8 | 31.5 |
| 84.50 | 0.8 | 7.568 | 42.0 | 42.8 |
| 84.75 | 0.8 | 9.986 | 55.5 | 56.3 |
| 85.00 | 0.9 | 12.836 | 71.3 | 72.2 |
| 85.25 | 1.0 | 16.069 | 89.3 | 90.3 |
| 85.50 | 1.0 | 19.622 | 109.0 | 110.0 |
| 85.75 | 1.1 | 23.509 | 130.6 | 131.7 |
| 86.00 | 1.1 | 27.746 | 154.1 | 155.2 |
| 86.25 | 1.2 | 32.363 | 179.8 | 181.0 |
| 86.50 | 1.2 | 37.392 | 207.7 | 208.9 |
| 86.75 | 1.3 | 42.850 | 238.1 | 239.4 |
| 87.00 | 1.3 | 48.756 | 270.9 | 272.2 |
| 87.25 | 1.3 | 55.024 | 305.7 | 307.0 |
| 87.50 | 1.5 | 61.565 | 342.0 | 343.5 |
| 87.75 | 1.8 | 68.383 | 379.9 | 381.7 |
| 88.00 | 2.1 | 75.484 | 419.4 | 421.5 |
| 88.25 | 2.3 | 82.798 | 460.0 | 462.3 |
| 88.50 | 2.4 | 90.247 | 501.4 | 503.8 |
| 88.75 | 2.6 | 97.835 | 543.5 | 546.1 |
| 89.00 | 2.7 | 105.562 | 586.5 | 589.2 |
| 89.25 | 2.9 | 113.445 | 630.3 | 633.2 |
| 89.50 | 3.0 | 121.501 | 675.0 | 678.0 |
| 89.75 | 3.1 | 129.733 | 720.7 | 723.8 |
| 90.00 | 3.2 | 138.142 | 767.5 | 770.7 |
| 90.25 | 11.1 | 146.596 | 814.4 | 825.5 |
| 90.50 | 25.4 | 154.962 | 860.9 | 886.3 |

| GIVEN POND DATA | | | INTERMEDIATE ROUTING COMPUTATIONS | |
|---|---|---|---|---|
| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (cu-ft) | 2S/t (cfs) | 2S/t + O (cfs) |
| 90.75 | 43.9 | 163.240 | 906.9 | 950.8 |
| 91.00 | 65.8 | 171.430 | 952.4 | 1018.2 |
| 91.25 | 90.6 | 179.784 | 998.8 | 1089.4 |
| 91.50 | 118.1 | 188.559 | 1047.6 | 1165.7 |
| 91.75 | 151.7 | 197.765 | 1098.7 | 1250.4 |
| 92.00 | 191.1 | 207.413 | 1152.3 | 1343.4 |
| 92.25 | 229.9 | 217.379 | 1207.7 | 1437.6 |
| 92.50 | 254.2 | 227.533 | 1264.1 | 1518.3 |
| 92.75 | 280.7 | 237.879 | 1321.5 | 1602.2 |

Time increment (t) = 6.0 min.

Pond File: C:\PONDPACK\BERKLEY\ALT1 .PND
Inflow Hydrograph: C:\PONDPACK\BERKLEY\POST-100.HYD
Outflow Hydrograph: C:\PONDPACK\BERKLEY\OUT-100 .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (min) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 660.0 | 9.00 | ----- | 4.0 | 4.0 | 0.00 | 83.00 |
| 666.0 | 10.00 | 19.0 | 21.8 | 23.0 | 0.61 | 84.02 |
| 672.0 | 11.00 | 21.0 | 41.2 | 42.8 | 0.80 | 84.50 |
| 678.0 | 12.00 | 23.0 | 62.5 | 64.2 | 0.85 | 84.87 |
| 684.0 | 14.00 | 26.0 | 86.5 | 88.5 | 0.99 | 85.22 |
| 690.0 | 16.00 | 30.0 | 114.4 | 116.5 | 1.03 | 85.57 |
| 696.0 | 18.00 | 34.0 | 146.2 | 148.4 | 1.10 | 85.93 |
| 702.0 | 31.00 | 49.0 | 192.8 | 195.2 | 1.20 | 86.38 |
| 708.0 | 45.00 | 76.0 | 266.2 | 268.8 | 1.30 | 86.97 |
| 714.0 | 58.00 | 103.0 | 365.8 | 369.2 | 1.70 | 87.67 |
| 720.0 | 106.00 | 164.0 | 524.8 | 529.8 | 2.52 | 88.65 |
| 726.0 | 187.00 | 293.0 | 797.8 | 817.8 | 9.98 | 90.21 |
| 732.0 | 206.00 | 393.0 | 934.7 | 1190.8 | 128.07 | 91.57 |
| 738.0 | 140.00 | 346.0 | 951.6 | 1280.7 | 164.52 | 91.83 |
| 744.0 | 104.00 | 244.0 | 935.7 | 1195.6 | 129.98 | 91.59 |
| 750.0 | 109.00 | 213.0 | 924.7 | 1148.7 | 111.97 | 91.44 |
| 756.0 | 128.00 | 237.0 | 928.4 | 1161.7 | 116.68 | 91.49 |
| 762.0 | 144.00 | 272.0 | 936.6 | 1200.4 | 131.86 | 91.60 |
| 768.0 | 150.00 | 294.0 | 942.9 | 1230.6 | 143.87 | 91.69 |
| 774.0 | 142.00 | 292.0 | 943.8 | 1234.9 | 145.56 | 91.70 |
| 780.0 | 133.00 | 275.0 | 940.5 | 1218.8 | 139.17 | 91.66 |
| 786.0 | 116.00 | 249.0 | 934.4 | 1189.5 | 127.54 | 91.57 |
| 792.0 | 98.00 | 214.0 | 924.6 | 1148.4 | 111.87 | 91.44 |
| 798.0 | 85.00 | 183.0 | 913.3 | 1107.6 | 97.18 | 91.31 |
| 804.0 | 72.00 | 157.0 | 902.4 | 1070.3 | 83.94 | 91.18 |
| 810.0 | 63.00 | 135.0 | 892.4 | 1037.4 | 72.49 | 91.07 |
| 816.0 | 54.00 | 117.0 | 883.5 | 1009.4 | 62.95 | 90.97 |
| 822.0 | 47.00 | 101.0 | 874.8 | 984.5 | 54.86 | 90.88 |
| 828.0 | 41.00 | 88.0 | 867.2 | 962.8 | 47.80 | 90.79 |
| 834.0 | 38.00 | 79.0 | 861.0 | 946.2 | 42.58 | 90.73 |
| 840.0 | 34.00 | 72.0 | 855.4 | 933.0 | 38.81 | 90.68 |
| 846.0 | 32.00 | 66.0 | 850.5 | 921.4 | 35.47 | 90.64 |
| 852.0 | 29.00 | 61.0 | 846.2 | 911.5 | 32.62 | 90.60 |
| 858.0 | 27.00 | 56.0 | 842.3 | 902.2 | 29.97 | 90.56 |
| 864.0 | 26.00 | 53.0 | 839.3 | 895.3 | 27.98 | 90.53 |
| 870.0 | 24.00 | 50.0 | 836.8 | 889.3 | 26.27 | 90.51 |
| 876.0 | 23.00 | 47.0 | 834.2 | 883.8 | 24.81 | 90.49 |
| 882.0 | 22.00 | 45.0 | 831.7 | 879.2 | 23.72 | 90.47 |
| 888.0 | 22.00 | 44.0 | 829.9 | 875.7 | 22.91 | 90.46 |
| 894.0 | 21.00 | 43.0 | 828.4 | 872.9 | 22.25 | 90.44 |
| 900.0 | 20.00 | 41.0 | 826.6 | 869.4 | 21.43 | 90.43 |
| 906.0 | 19.00 | 39.0 | 824.5 | 865.6 | 20.52 | 90.41 |
| 912.0 | 19.00 | 38.0 | 822.9 | 862.5 | 19.80 | 90.40 |
| 918.0 | 18.00 | 37.0 | 821.5 | 859.9 | 19.19 | 90.39 |
| 924.0 | 18.00 | 36.0 | 820.3 | 857.5 | 18.63 | 90.38 |

Pond File: C:\PONDPACK\BERKLEY\ALT1 .PND
Inflow Hydrograph: C:\PONDPACK\BERKLEY\POST-100.HYD
Outflow Hydrograph: C:\PONDPACK\BERKLEY\OUT-100 .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (min) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 930.0 | 17.00 | 35.0 | 819.1 | 855.3 | 18.10 | 90.37 |
| 936.0 | 17.00 | 34.0 | 817.9 | 853.1 | 17.58 | 90.36 |
| 942.0 | 17.00 | 34.0 | 817.3 | 851.9 | 17.31 | 90.36 |
| 948.0 | 16.00 | 33.0 | 816.4 | 850.3 | 16.93 | 90.35 |
| 954.0 | 16.00 | 32.0 | 815.5 | 848.4 | 16.49 | 90.34 |
| 960.0 | 16.00 | 32.0 | 814.9 | 847.5 | 16.26 | 90.34 |
| 966.0 | 16.00 | 32.0 | 814.7 | 846.9 | 16.14 | 90.34 |
| 972.0 | 15.00 | 31.0 | 814.0 | 845.7 | 15.84 | 90.33 |
| 978.0 | 15.00 | 30.0 | 813.1 | 844.0 | 15.44 | 90.33 |
| 984.0 | 14.00 | 29.0 | 812.1 | 842.1 | 15.00 | 90.32 |
| 990.0 | 14.00 | 28.0 | 811.0 | 840.1 | 14.53 | 90.31 |
| 996.0 | 14.00 | 28.0 | 810.5 | 839.0 | 14.28 | 90.31 |
| 1002.0 | 14.00 | 28.0 | 810.2 | 838.5 | 14.15 | 90.30 |
| 1008.0 | 13.00 | 27.0 | 809.5 | 837.2 | 13.84 | 90.30 |
| 1014.0 | 13.00 | 26.0 | 808.6 | 835.5 | 13.45 | 90.29 |
| 1020.0 | 13.00 | 26.0 | 808.1 | 834.6 | 13.24 | 90.29 |
| 1026.0 | 13.00 | 26.0 | 807.9 | 834.1 | 13.13 | 90.29 |
| 1032.0 | 12.00 | 25.0 | 807.2 | 832.9 | 12.83 | 90.28 |
| 1038.0 | 12.00 | 24.0 | 806.3 | 831.2 | 12.44 | 90.27 |
| 1044.0 | 11.00 | 23.0 | 805.3 | 829.3 | 12.00 | 90.27 |
| 1050.0 | 11.00 | 22.0 | 804.3 | 827.3 | 11.53 | 90.26 |
| 1056.0 | 11.00 | 22.0 | 803.7 | 826.3 | 11.28 | 90.25 |
| 1062.0 | 11.00 | 22.0 | 803.4 | 825.7 | 11.15 | 90.25 |
| 1068.0 | 11.00 | 22.0 | 803.3 | 825.4 | 11.09 | 90.25 |
| 1074.0 | 11.00 | 22.0 | 803.1 | 825.3 | 11.06 | 90.25 |
| 1080.0 | 11.00 | 22.0 | 803.0 | 825.1 | 11.04 | 90.25 |
| 1086.0 | 11.00 | 22.0 | 803.0 | 825.0 | 11.03 | 90.25 |
| 1092.0 | 11.00 | 22.0 | 802.9 | 825.0 | 11.02 | 90.25 |
| 1098.0 | 11.00 | 22.0 | 802.9 | 824.9 | 11.02 | 90.25 |
| 1104.0 | 11.00 | 22.0 | 802.9 | 824.9 | 11.01 | 90.25 |
| 1110.0 | 10.00 | 21.0 | 802.2 | 823.9 | 10.86 | 90.24 |
| 1116.0 | 10.00 | 20.0 | 800.9 | 822.2 | 10.62 | 90.23 |
| 1122.0 | 10.00 | 20.0 | 800.1 | 820.9 | 10.44 | 90.23 |
| 1128.0 | 10.00 | 20.0 | 799.4 | 820.1 | 10.31 | 90.23 |
| 1134.0 | 10.00 | 20.0 | 799.0 | 819.4 | 10.22 | 90.22 |
| 1140.0 | 10.00 | 20.0 | 798.7 | 819.0 | 10.16 | 90.22 |
| 1146.0 | 10.00 | 20.0 | 798.4 | 818.7 | 10.11 | 90.22 |
| 1152.0 | 10.00 | 20.0 | 798.3 | 818.4 | 10.08 | 90.22 |
| 1158.0 | 9.00 | 19.0 | 797.5 | 817.3 | 9.91 | 90.21 |
| 1164.0 | 9.00 | 18.0 | 796.2 | 815.5 | 9.65 | 90.20 |
| 1170.0 | 9.00 | 18.0 | 795.2 | 814.2 | 9.46 | 90.20 |
| 1176.0 | 9.00 | 18.0 | 794.6 | 813.2 | 9.33 | 90.19 |
| 1182.0 | 9.00 | 18.0 | 794.1 | 812.6 | 9.23 | 90.19 |
| 1188.0 | 8.00 | 17.0 | 793.1 | 811.1 | 9.02 | 90.18 |
| 1194.0 | 8.00 | 16.0 | 791.6 | 809.1 | 8.73 | 90.17 |
| 1200.0 | 8.00 | 16.0 | 790.6 | 807.6 | 8.52 | 90.17 |

Pond File: C:\PONDPACK\BERKLEY\ALT1 .PND
Inflow Hydrograph: C:\PONDPACK\BERKLEY\POST-100.HYD
Outflow Hydrograph: C:\PONDPACK\BERKLEY\OUT-100 .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (min) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 1206.0 | 8.00 | 16.0 | 789.8 | 806.6 | 8.37 | 90.16 |
| 1212.0 | 8.00 | 16.0 | 789.3 | 805.8 | 8.26 | 90.16 |
| 1218.0 | 8.00 | 16.0 | 788.9 | 805.3 | 8.19 | 90.16 |
| 1224.0 | 8.00 | 16.0 | 788.7 | 804.9 | 8.13 | 90.16 |
| 1230.0 | 8.00 | 16.0 | 788.5 | 804.7 | 8.09 | 90.15 |
| 1236.0 | 8.00 | 16.0 | 788.3 | 804.5 | 8.07 | 90.15 |
| 1242.0 | 8.00 | 16.0 | 788.2 | 804.3 | 8.05 | 90.15 |
| 1248.0 | 8.00 | 16.0 | 788.2 | 804.2 | 8.03 | 90.15 |
| 1254.0 | 8.00 | 16.0 | 788.1 | 804.2 | 8.02 | 90.15 |
| 1260.0 | 8.00 | 16.0 | 788.1 | 804.1 | 8.02 | 90.15 |
| 1266.0 | 7.00 | 15.0 | 787.3 | 803.1 | 7.87 | 90.15 |
| 1272.0 | 7.00 | 14.0 | 786.1 | 801.3 | 7.62 | 90.14 |
| 1278.0 | 7.00 | 14.0 | 785.2 | 800.1 | 7.44 | 90.13 |
| 1284.0 | 7.00 | 14.0 | 784.6 | 799.2 | 7.31 | 90.13 |
| 1290.0 | 7.00 | 14.0 | 784.2 | 798.6 | 7.22 | 90.13 |
| 1296.0 | 7.00 | 14.0 | 783.8 | 798.2 | 7.16 | 90.13 |
| 1302.0 | 7.00 | 14.0 | 783.6 | 797.8 | 7.11 | 90.12 |
| 1308.0 | 7.00 | 14.0 | 783.4 | 797.6 | 7.08 | 90.12 |
| 1314.0 | 7.00 | 14.0 | 783.3 | 797.4 | 7.06 | 90.12 |
| 1320.0 | 7.00 | 14.0 | 783.3 | 797.3 | 7.04 | 90.12 |
| 1326.0 | 7.00 | 14.0 | 783.2 | 797.3 | 7.03 | 90.12 |
| 1332.0 | 7.00 | 14.0 | 783.2 | 797.2 | 7.02 | 90.12 |
| 1338.0 | 6.00 | 13.0 | 782.4 | 796.2 | 6.87 | 90.12 |
| 1344.0 | 6.00 | 12.0 | 781.2 | 794.4 | 6.62 | 90.11 |
| 1350.0 | 6.00 | 12.0 | 780.3 | 793.2 | 6.44 | 90.10 |
| 1356.0 | 6.00 | 12.0 | 779.7 | 792.3 | 6.31 | 90.10 |
| 1362.0 | 6.00 | 12.0 | 779.2 | 791.7 | 6.22 | 90.10 |
| 1368.0 | 6.00 | 12.0 | 778.9 | 791.2 | 6.16 | 90.09 |
| 1374.0 | 5.00 | 11.0 | 778.0 | 789.9 | 5.97 | 90.09 |
| 1380.0 | 5.00 | 10.0 | 776.6 | 788.0 | 5.69 | 90.08 |
| 1386.0 | 5.00 | 10.0 | 775.6 | 786.6 | 5.49 | 90.07 |
| 1392.0 | 5.00 | 10.0 | 774.9 | 785.6 | 5.35 | 90.07 |
| 1398.0 | 5.00 | 10.0 | 774.4 | 784.9 | 5.25 | 90.06 |
| 1404.0 | 5.00 | 10.0 | 774.0 | 784.4 | 5.18 | 90.06 |
| 1410.0 | 4.00 | 9.0 | 773.1 | 783.0 | 4.98 | 90.06 |
| 1416.0 | 4.00 | 8.0 | 771.7 | 781.1 | 4.70 | 90.05 |
| 1422.0 | 4.00 | 8.0 | 770.7 | 779.7 | 4.50 | 90.04 |
| 1428.0 | 4.00 | 8.0 | 770.0 | 778.7 | 4.35 | 90.04 |
| 1434.0 | 4.00 | 8.0 | 769.5 | 778.0 | 4.25 | 90.03 |
| 1440.0 | 4.00 | 8.0 | 769.1 | 777.5 | 4.18 | 90.03 |
| 1446.0 | 3.00 | 7.0 | 768.1 | 776.1 | 3.98 | 90.02 |
| 1452.0 | 3.00 | 6.0 | 766.7 | 774.1 | 3.70 | 90.02 |
| 1458.0 | 3.00 | 6.0 | 765.7 | 772.7 | 3.50 | 90.01 |
| 1464.0 | 3.00 | 6.0 | 765.0 | 771.7 | 3.36 | 90.00 |
| 1470.0 | 3.00 | 6.0 | 764.5 | 771.0 | 3.25 | 90.00 |
| 1476.0 | 2.00 | 5.0 | 763.1 | 769.5 | 3.20 | 89.99 |

Pond File: C:\PONDPACK\BERKLEY\ALT1 .PND
Inflow Hydrograph: C:\PONDPACK\BERKLEY\POST-100.HYD
Outflow Hydrograph: C:\PONDPACK\BERKLEY\OUT-100 .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (min) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 1482.0 | 2.00 | 4.0 | 760.7 | 767.1 | 3.19 | 89.98 |
| 1488.0 | 2.00 | 4.0 | 758.4 | 764.7 | 3.19 | 89.97 |
| 1494.0 | 2.00 | 4.0 | 756.0 | 762.4 | 3.18 | 89.96 |
| 1500.0 | 2.00 | 4.0 | 753.6 | 760.0 | 3.18 | 89.94 |
| 1506.0 | 2.00 | 4.0 | 751.3 | 757.6 | 3.17 | 89.93 |
| 1512.0 | 1.00 | 3.0 | 748.0 | 754.3 | 3.17 | 89.91 |
| 1518.0 | 1.00 | 2.0 | 743.7 | 750.0 | 3.16 | 89.89 |
| 1524.0 | 1.00 | 2.0 | 739.4 | 745.7 | 3.15 | 89.87 |
| 1530.0 | 1.00 | 2.0 | 735.1 | 741.4 | 3.14 | 89.84 |
| 1536.0 | 1.00 | 2.0 | 730.8 | 737.1 | 3.13 | 89.82 |
| 1542.0 | 1.00 | 2.0 | 726.6 | 732.8 | 3.12 | 89.80 |
| 1548.0 | 0.00 | 1.0 | 721.4 | 727.6 | 3.11 | 89.77 |
| 1554.0 | 0.00 | 0.0 | 715.2 | 721.4 | 3.09 | 89.74 |

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: C:\PONDPACK\BERKLEY\ALT1 .PND
Inflow Hydrograph: C:\PONDPACK\BERKLEY\POST-100.HYD
Outflow Hydrograph: C:\PONDPACK\BERKLEY\OUT-100 .HYD

Starting Pond W.S. Elevation = 83.00 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow = 206.00 cfs
Peak Outflow = 164.52 cfs
Peak Elevation = 91.83 ft

***** Summary of Approximate Peak Storage *****

Initial Storage = 715 cu-ft
Peak Storage From Storm = 200.190 cu-ft
---
Total Storage in Pond = 200.905 cu-ft

Warning: Inflow hydrograph truncated on left side.

12/4/94



# TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

(with or without an emergency spillway)

Project BERKELEY COMMONS - Phases II-A & IV

Basin # _____ Location Rt. 60, James City Co., Va.

Total area draining to basin: 15.33 acres. (THIS SITE ONLY)
TOTAL BASIN AREA 60.40 AC.

Basin Volume Design

**Wet Storage:**

1. Minimum required volume = 67 cu. yds. x Total Drainage Area (acres).

   67 cu. yds. x 15.33 acres = 1028 cu. yds.

2. Available basin volume = 1074 cu. yds. at elevation 86.07. (From storage - elevation curve)

3. Excavate _____ cu. yds. to obtain required volume*.

   * Elevation corresponding to required volume = invert of the dewatering orifice.

4. Available volume before cleanout required.

   33 cu. yds. x 15.33 acres = 506 cu. yds.

5. Elevation corresponding to cleanout level = 85.07.

   (From Storage - Elevation Curve)

6. Distance from invert of the dewatering orifice to cleanout level = 1.0 ft. (Min. = 1.0 ft.)

**Dry Storage:**

7. Minimum required volume = 67 cu. yds. x Total Drainage Area (acres).

   67 cu. yds. x 15.33 acres = 1028 cu. yds.

8. Total available basin volume at crest of riser* = 5116 cu. yds. at elevation 90.00. (From Storage - Elevation Curve)

134 x 15.33 = 2054 CY (MIN)

* Minimum = 134 cu. yds./acre of total drainage area.

9. Diameter of dewatering orifice = 6 in.

10. Diameter of flexible tubing = 8 in. (diameter of dewatering orifice plus 2 inches).

Preliminary Design Elevations

11. Crest of Riser = 90.00

Top of Dam = 93.00

Design High Water = 90.82

Upstream Toe of Dam = 82.00

Basin Shape

12. Length of Flow / Effective Width — L / We = N/A

If > 2, baffles are not required N/A

If < 2, baffles are required N/A

Runoff

13. $Q_2$ = 42.6 cfs (From Chapter 5)

14. $Q_{25}$ = 110.3 cfs (From Chapter 5)

Principal Spillway Design

15. With emergency spillway, required spillway capacity $Q_p = Q_2 =$ 42.6 cfs. (riser and barrel)

Without emergency spillway, required spillway capacity $Q_p = Q_{25} =$ N/A cfs. (riser and barrel)

16. With emergency spillway:

Assumed available head (h) = 1.50 ft. (Using $Q_2$)

h = Crest of Emergency Spillway Elevation - Crest of Riser Elevation

Without emergency spillway:

Assumed available head (h) = N/A ft. (Using $Q_{25}$)

h = Design High Water Elevation - Crest of Riser Elevation

17. Riser diameter ($D_r$) = 72 in. Actual head (h) = 0.82 ft.

(From Plate 3.14-8.)

Note: Avoid orifice flow conditions.

18. Barrel length (l) = 42 ft.

Head (H) on barrel through embankment = 8.0 ft.

(From Plate 3.14-7).

19. Barrel diameter = 48 in.

(From Plate 3.14-B [concrete pipe] or Plate 3.14-A [corrugated pipe]).

20. Trash rack and anti-vortex device

Diameter = N/A inches.

Height = N/A inches.

(From Table 3.14-D).

Emergency Spillway Design

21. Required spillway capacity $Q_e = Q_{25} - Q_p =$ [illegible] cfs

22. Bottom width (b) = 10 ft.; the slope of the exit channel (s) = 0.010 ft./foot; and the minimum length of the exit channel (x) = 12 ft.
(From Table 3.14-C).

Anti-Seep Collar Design N/A (see Alt. Design on Sht 6 of 13)

23. Depth of water at principal spillway crest (Y) = N/A ft.

Slope of upstream face of embankment (Z) = N/A :1.

Slope of principal spillway barrel ($S_b$) = N/A %

Length of barrel in saturated zone ($L_s$) = N/A ft.

24. Number of collars required = N/A dimensions = N/A

(from Plate 3.14-12).

Final Design Elevations

25. Top of Dam = 93.00

Design High Water = 90.82

Emergency Spillway Crest = 91.50

Principal Spillway Crest = 90.00

Dewatering Orifice Invert = 86.07

Cleanout Elevation = 85.07

Elevation of Upstream Toe of Dam or Excavated Bottom of "Wet Storage Area" (if excavation was performed) = 82.00

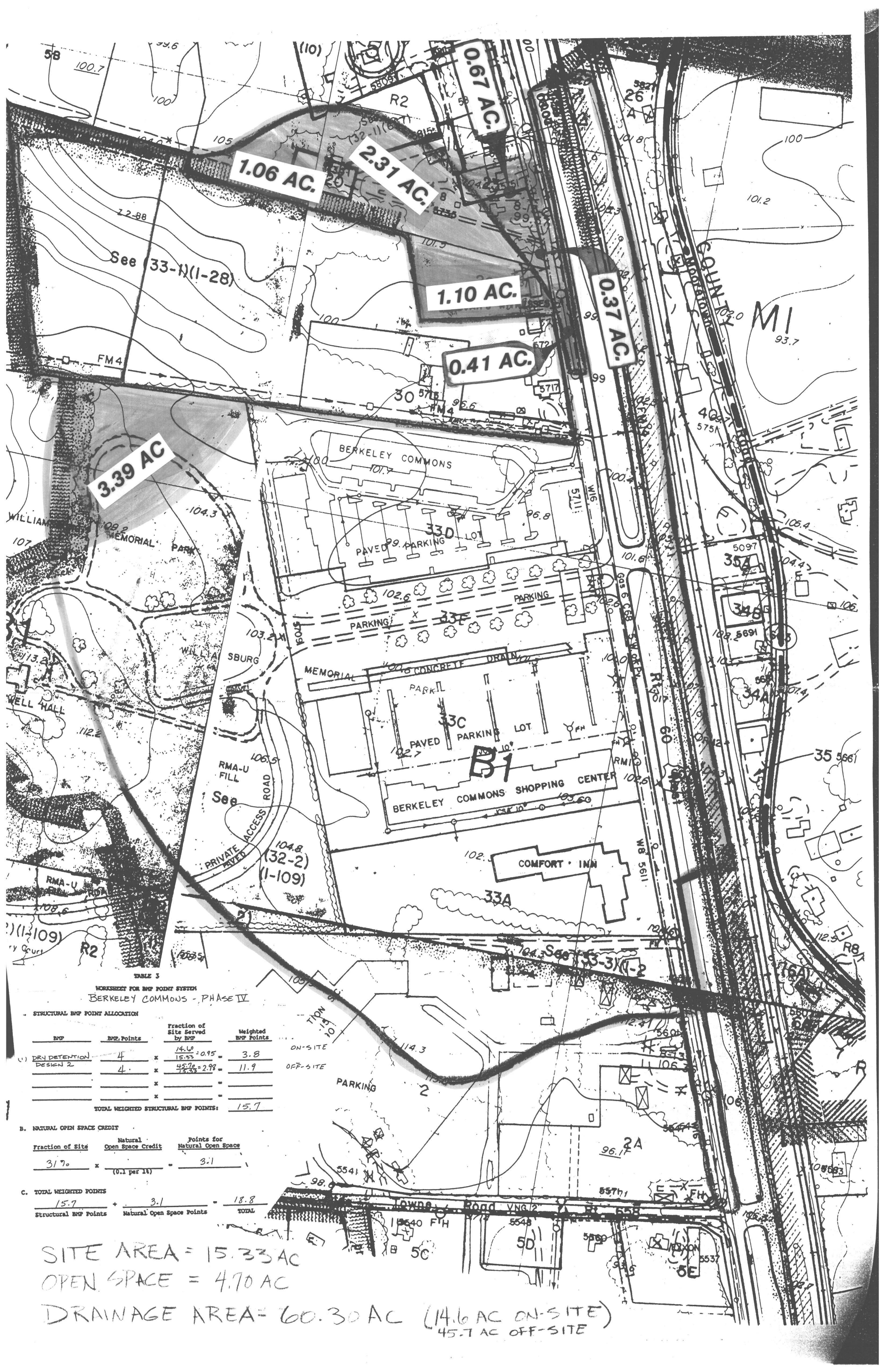



TABLE 3

WORKSHEET FOR BMP POINT SYSTEM

BERKELEY COMMONS - PHASE IV

A. STRUCTURAL BMP POINT ALLOCATION

| BMP | BMP Points | | Fraction of Site Served by BMP | | Weighted BMP Points | |
|---|---|---|---|---|---|---|
| (1) DRY DETENTION DESIGN 2 | 4 | x | 14.6 / 15.33 = 0.95 | = | 3.8 | ON-SITE |
| | 4 | x | 45.7 / 15.33 = 2.98 | = | 11.9 | OFF-SITE |
| | | x | | = | | |
| | | x | | = | | |
| TOTAL WEIGHTED STRUCTURAL BMP POINTS: | | | | | 15.7 | |

B. NATURAL OPEN SPACE CREDIT

| Fraction of Site | | Natural Open Space Credit | | Points for Natural Open Space |
|---|---|---|---|---|
| 31% | x | (0.1 per 1%) | = | 3.1 |

C. TOTAL WEIGHTED POINTS

| | | | | |
|---|---|---|---|---|
| 15.7 | + | 3.1 | = | 18.8 |
| Structural BMP Points | | Natural Open Space Points | | TOTAL |

SITE AREA = 15.33 AC

OPEN SPACE = 4.70 AC

DRAINAGE AREA = 60.30 AC (14.6 AC ON-SITE)
45.7 AC OFF-SITE

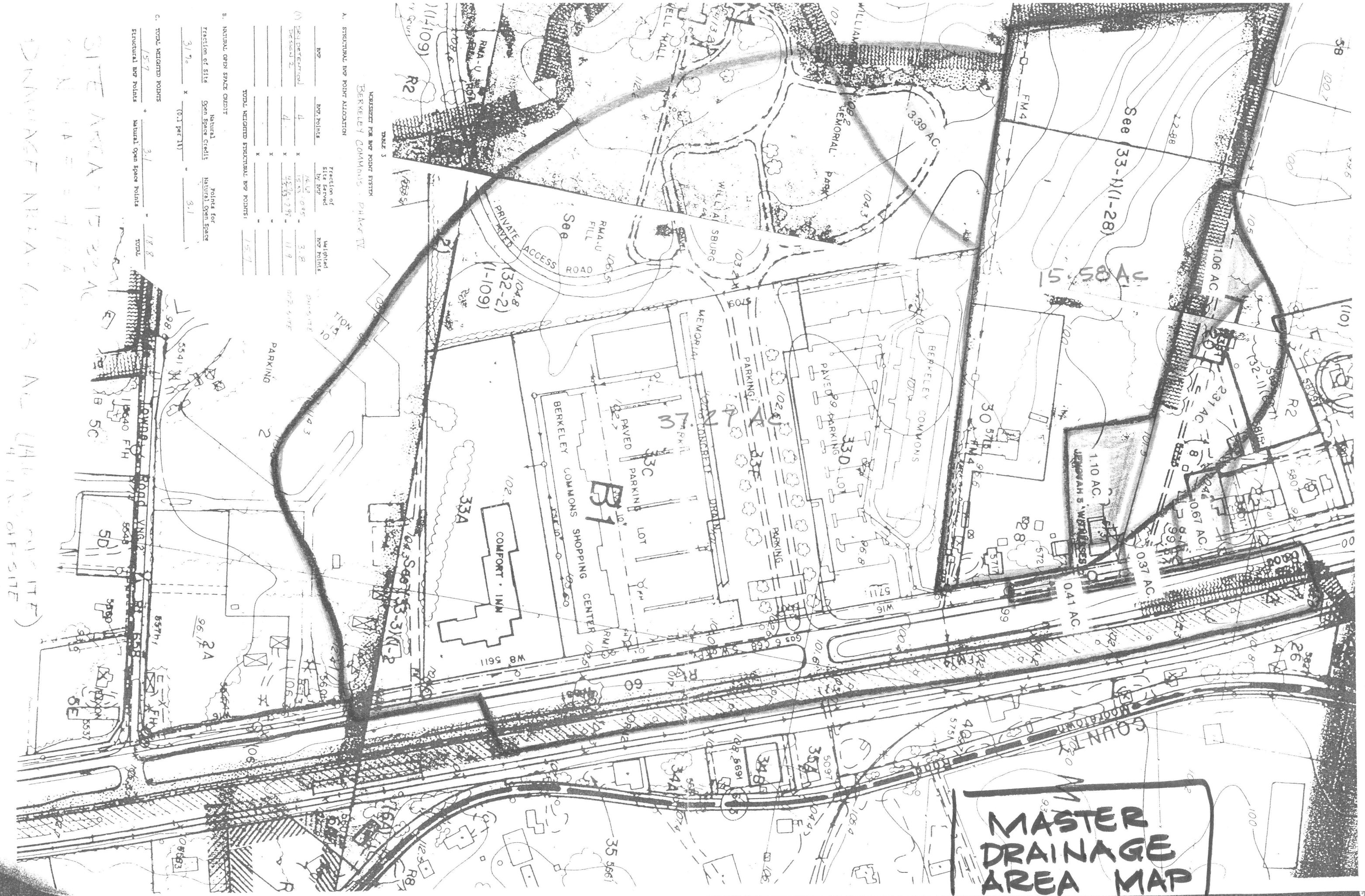



TABLE 3

WORKSHEET FOR BMP POINT SYSTEM

BERKELEY COMMONS - PHASE IV

A. STRUCTURAL BMP POINT ALLOCATION

| BMP | BMP Points | | Fraction of Site Served by BMP | | Weighted BMP Points |
|---|---|---|---|---|---|
| (1) POLLUTION DETENTION DESIGN 2 | 4 | x | 14.48 / 15.58 = 0.95 | = | 3.8 |
| | 4 | x | 44.27 / 15.58 = 2.84 | = | 11.4 |
| | | x | | = | |
| | | x | | = | |
| | | x | | = | |
| TOTAL WEIGHTED STRUCTURAL BMP POINTS: | | | | | 15.7 |

B. NATURAL OPEN SPACE CREDIT

| Fraction of Site | | Natural Open Space Credit | | Points for Natural Open Space |
|---|---|---|---|---|
| 31% | x | (0.1 per 1%) | = | 3.1 |

C. TOTAL WEIGHTED POINTS

| Structural BMP Points | + | Natural Open Space Points | = | TOTAL |
|---|---|---|---|---|
| 15.7 | + | 3.1 | = | 18.8 |

# MEMORANDUM

Langley and McDonald, P.C.
Engineers
Surveyors
Planners
Landscape Architects
Environmental Consultants

Main Office: 5544 Greenwich Road, Virginia Beach, VA 23462
(757) 473-2000 FAX#: (757) 497-7933
Williamsburg Office: 201 Packets Court, Wmbg, VA 23185
(757) 253–2975 FAX#: (757) 229–0049

**To:** Darryl Cook
Gary Pleskac

**From:** Deborah Lenceski DLenceski

**Date:** April 30, 1998

**Subject:** Berkeley Commons' Compliance with the Chesapeake Bay Preservation Ordinance
April 2, 1998 Comments

---

We would appreciate a reconsideration of your comments and further discussion so that we can proceed with development of a preliminary Stormwater Management Plan for the expansion. We have enclosed copies of the overall drainage area map for the pond built with Berkeley Commons Phase IV and the Ten Point calculations for the shopping center including the proposed development.

The April 2 comments make several assumptions about storm water management for this project that are leading to presumptive and erroneous responses. First the pond built with Berkeley Commons Phase VI currently treats stormwater from Ewell Station. It was sized using the county's topographic maps which show over 6 acres of Ewell Station draining to the pond. The proposed expansion is within this watershed. There is adequate fall between pond and Ewell Station to pipe this storm water to the pond. Whether this storm drain system "will be difficult" or not, is a question to be resolved between us, as the engineers and the developer. Code Compliance needs only to comment on whether or not the proposed solutions comply with county regulations.

These comments also raise several questions.

- Under what conditions will staff consider a waiver to more than 60% impervious cover as allowed in the ordinance? York County's Staff indicates that they expect 70% impervious cover on commercial sites.
- Can an owner of contiguous properties consider the area as a whole when analyzing Ches Bay compliance?
- Will the county offer any incentives towards providing needed infrastructure to a potential competitor such as the recommended coordination of stormwater management for Lot 2?

cc: Tom Rumptz

PROJECT NAME BERKLEY COMMONS
L&M JOB NO. 87040

TABLE 3

WORKSHEET FOR BMP POINT SYSTEM

| | | |
|---|---|---|
| Phase IV | 15.6 | |
| Phase II &IIa | 6.5 | |
| Expansion | 5.5 | behind hotel and Ewell station property |
| Hotel | 3.5 | |
| Phase I | 5.3 | |

SITE AREA = 36.5 ACRES (includes hotel)

A. STRUCTURAL BMP POINT ALLOCATION

| BMP | BMP POINTS | | FRACTION OF SITE SERVED BY BMP | | WEIGHTED BMP POINTS |
|---|---|---|---|---|---|
| Phase VI BMP | 6 | x | 60 / 36.5 | = | 9.9 |
| | | x | / | = | |
| | | x | / | = | |
| | | x | / | = | |

TOTAL WEIGHTED STRUCTURAL BMP POINTS: 9.9

B. NATURAL OPEN SPACE CREDIT

| FRACTION OR SITE | | NATURAL OPEN SPACE CREDIT | | POINTS FOR NATURAL OPEN SPACE |
|---|---|---|---|---|
| 4.7 / 36.5 | x | ( 0.1 per 1%) | = | 1.3 |

C. TOTAL WEIGHTED POINTS

| 9.9 | + | 1.3 | = | 11.2 |
|---|---|---|---|---|
| STRUCTURAL BMP POINTS | | NATURAL OPEN SPACE POINTS | | TOTAL |

Berkeley Commons Cover Statistics

| phase # | Area | gross floor area, ksf | open space (AC ) | open space (SF ) | precent open space | impervious area (AC) |
|---|---|---|---|---|---|---|
| existing as of 4-98 | | | | | | |
| 1,2,2A & 3 | 19.0 | 182.2 | 5.1 | | 27% | 13.9 |
| 4 | 15.6 | 110.25 | 7.0 | 304920 | 45% | 8.6 |
| subtotal | 34.6 | 292.45 | 12.1 | 304920 | 35% | 22.5 |
| proposed per 3-5-98 plans | | | | | | |
| changes to phase I | nc | 16.94 | -0.4 | -19188 | | 0.4 |
| phase 5 | 5.5 | 63.35 | 0.9 | 40318 | 17% | 4.6 |
| hotel residual | 3.5 | | 1.1 | 49800 | 33% | 2.4 |
| Result | 43.6 | 372.74 | 13.7 | 375850 | 32% | 29.9 |

Note: York County EO zoning does not specify cover requirments. The York County Ches Bay Ordinance requires "No more land shall be disturbed than is necessary to provide for the desired use or development." (Article III, Section 24.1-372(f)(6)a).

York County Landscaping Regulations usually result in 30% pervious area on commercial sites