## 2 YEARS

DETENTION NOTES:

DEVELOPED AREA OF TRACT: 4.9 Acres
MAX OUTFLOW AT T=20 MIN. (Q cfs) = 4.9(2.39-1.16) = 6.03 cfs
OUTFLOW AT T=20 MIN. (Q cfs) = 4.82 cfs

Elevation of Weir = 610.17 ft msl
Length of Weir = 11.67 ft — Weir Constant = 3.00
FL of Outlet = 607.00 ft msl — Entrance Type = 3
Diameter of Outlet = 12.00 in
Time Increment = 1.00 min

| Area sq ft | Storage cu ft | Elevation msl |
|---|---|---|
| 0 | 0 | 607.00 |
| 5945 | 2973 | 608.00 |
| 10434 | 19352 | 610.00 |
| 15191 | 44977 | 612.00 |
| ********** | ********** | 999.00 |

| Time min | Inflow cfs | Outflow cfs | Storage cu ft | Elev. msl |
|---|---|---|---|---|
| 0 | 11.71 | 0.00 | 0 | 607.00 |
| 1 | 11.71 | 0.31 | 884 | 607.23 |
| 2 | 11.71 | 0.62 | 1349 | 607.45 |
| 3 | 11.71 | 1.25 | 1977 | 607.67 |
| 4 | 11.71 | 1.93 | 2564 | 607.86 |
| 5 | 11.71 | 2.53 | 3115 | 608.02 |
| 6 | 11.71 | 2.76 | 3652 | 608.08 |
| 7 | 11.71 | 2.98 | 4177 | 608.15 |
| 8 | 11.71 | 3.15 | 4691 | 608.21 |
| 9 | 11.71 | 3.33 | 5193 | 608.27 |
| 10 | 11.71 | 3.51 | 5685 | 608.33 |
| 11 | 11.71 | 3.67 | 6167 | 608.39 |
| 12 | 11.71 | 3.81 | 6641 | 608.45 |
| 13 | 11.71 | 3.95 | 7106 | 608.50 |
| 14 | 11.71 | 4.09 | 7564 | 608.56 |
| 15 | 11.71 | 4.22 | 8013 | 608.62 |
| 16 | 11.71 | 4.35 | 8454 | 608.67 |
| 17 | 11.71 | 4.48 | 8888 | 608.72 |
| 18 | 11.71 | 4.60 | 9315 | 608.77 |
| 19 | 11.71 | 4.71 | 9735 | 608.83 |
| 20 | 11.71 | 4.82 | 10148 | 608.88 |
| 21 | 0.00 | 4.73 | 9698 | 608.81 |
| 22 | 0.00 | 4.63 | 9250 | 608.73 |

## 15 YEARS

DETENTION NOTES:

DEVELOPED AREA OF TRACT: 4.9 Acres
MAX OUTFLOW AT T=20 MIN. (Q cfs) = 4.9(3.85-1.87) = 9.70 cfs
OUTFLOW AT T=20 MIN. (Q cfs) = 6.39 cfs

Elevation of Weir = 610.17 ft msl
Length of Weir = 11.67 ft — Weir Constant = 3.00
FL of Outlet = 607.00 ft msl — Entrance Type = 3
Diameter of Outlet = 12.00 in
Time Increment = 1.00 min

| Area sq ft | Storage cu ft | Elevation msl |
|---|---|---|
| 0 | 0 | 607.00 |
| 5945 | 2973 | 608.00 |
| 10434 | 19352 | 610.00 |
| 15191 | 44977 | 612.00 |
| ********** | ********** | 999.00 |

| Time min | Inflow cfs | Outflow cfs | Storage cu ft | Elev. msl |
|---|---|---|---|---|
| 0 | 18.87 | 0.00 | 0 | 607.00 |
| 1 | 18.87 | 0.51 | 1102 | 607.37 |
| 2 | 18.87 | 1.44 | 2147 | 607.72 |
| 3 | 18.87 | 2.54 | 3127 | 608.02 |
| 4 | 18.87 | 2.93 | 4084 | 608.14 |
| 5 | 18.87 | 3.27 | 5020 | 608.25 |
| 6 | 18.87 | 3.60 | 5936 | 608.36 |
| 7 | 18.87 | 3.87 | 8836 | 608.47 |
| 8 | 18.87 | 4.13 | 7720 | 608.58 |
| 9 | 18.87 | 4.39 | 8589 | 608.69 |
| 10 | 18.87 | 4.63 | 9443 | 608.79 |
| 11 | 18.87 | 4.86 | 10284 | 608.89 |
| 12 | 18.87 | 5.08 | 11111 | 608.99 |
| 13 | 18.87 | 5.28 | 11927 | 609.09 |
| 14 | 18.87 | 5.46 | 12732 | 609.19 |
| 15 | 18.87 | 5.63 | 13526 | 609.29 |
| 16 | 18.87 | 5.80 | 14310 | 609.38 |
| 17 | 18.87 | 5.97 | 15084 | 609.48 |
| 18 | 18.87 | 6.13 | 15848 | 609.57 |
| 19 | 18.87 | 6.26 | 16605 | 609.66 |
| 20 | 18.87 | 6.39 | 17354 | 609.76 |
| 21 | 0.00 | 6.27 | 16570 | 609.63 |
| 22 | 0.00 | 6.16 | 15280 | 609.53 |

## 25 YEARS

DETENTION NOTES:

DEVELOPED AREA OF TRACT: 4.9 Acres
MAX OUTFLOW AT T=20 MIN. (Q cfs) = 4.9(4.75-2.31) = 11.96 cfs
OUTFLOW AT T=20 MIN. (Q cfs) = 7.24 cfs

Elevation of Weir = 610.17 ft msl
Length of Weir = 11.67 ft — Weir Constant = 3.00
FL of Outlet = 607.00 ft msl — Entrance Type = 3
Diameter of Outlet = 12.00 in
Time Increment = 1.00 min

| Area sq ft | Storage cu ft | Elevation msl |
|---|---|---|
| 0 | 0 | 607.00 |
| 5945 | 2973 | 608.00 |
| 10434 | 19352 | 610.00 |
| 15191 | 44977 | 612.00 |
| ********** | ********** | 999.00 |

| Time min | Inflow cfs | Outflow cfs | Storage cu ft | Elev. msl |
|---|---|---|---|---|
| 0 | 23.28 | 0.00 | 0 | 607.00 |
| 1 | 23.28 | 0.63 | 1359 | 607.46 |
| 2 | 23.28 | 2.02 | 2635 | 607.89 |
| 3 | 23.28 | 2.84 | 3861 | 608.11 |
| 4 | 23.28 | 3.28 | 5061 | 608.25 |
| 5 | 23.28 | 3.69 | 6236 | 608.40 |
| 6 | 23.28 | 4.04 | 7390 | 608.54 |
| 7 | 23.28 | 4.37 | 8525 | 608.68 |
| 8 | 23.28 | 4.68 | 9641 | 608.81 |
| 9 | 23.28 | 4.98 | 10739 | 608.93 |
| 10 | 23.28 | 5.25 | 11820 | 609.08 |
| 11 | 23.28 | 5.49 | 12888 | 609.21 |
| 12 | 23.28 | 5.72 | 13941 | 609.34 |
| 13 | 23.28 | 5.95 | 14981 | 609.47 |
| 14 | 23.28 | 6.16 | 16008 | 609.59 |
| 15 | 23.28 | 6.33 | 17025 | 609.72 |
| 16 | 23.28 | 6.51 | 18031 | 609.84 |
| 17 | 23.28 | 6.68 | 19027 | 609.96 |
| 18 | 23.28 | 6.81 | 20016 | 610.05 |
| 19 | 23.28 | 6.82 | 20998 | 610.13 |
| 20 | 23.28 | 7.24 | 21960 | 610.20 |
| 21 | 0.00 | 6.94 | 20888 | 610.10 |
| 22 | 0.00 | 6.83 | 19880 | 610.01 |

SET SILL AT ELEVATION 610.20

## 100 YEARS

DETENTION NOTES:

DEVELOPED AREA OF TRACT: 4.9 Acres
100 YEAR (Q) TO BASIN = 4.9 x 6.08 = 29.79 CFS

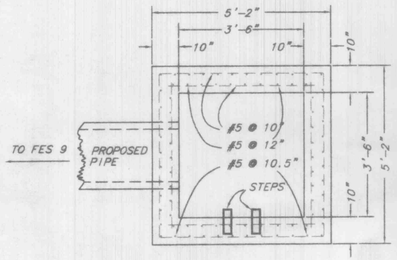
DESIGN HIGH WATER CALCULATIONS:
BLOCKED LOW FLOW CONDITION

$H=(Q/CL)^{0.67}$

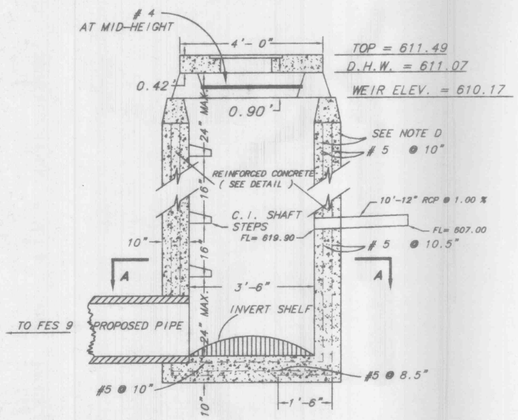
$H=(29.79/(3x11.67))^{0.67} = 0.90'$

D.H.W. = 610.20 + 0.90 = 611.10

# DETENTION BASIN CALCULATIONS

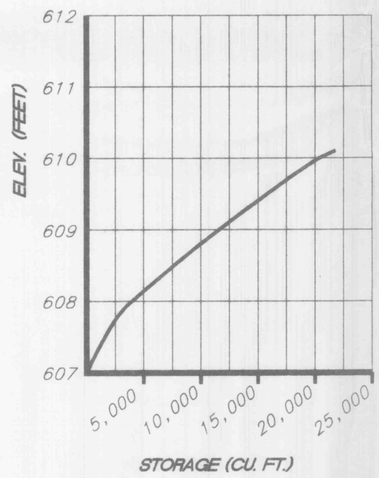



SECTION A-A

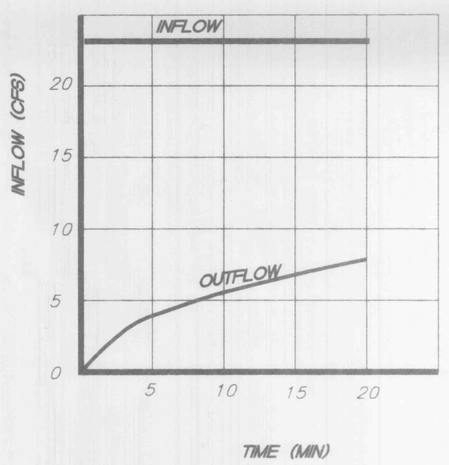



OVERFLOW STRUCTURE 10
OPEN ALL FOUR SIDES
CAST IN PLACE
(n.t.s.)

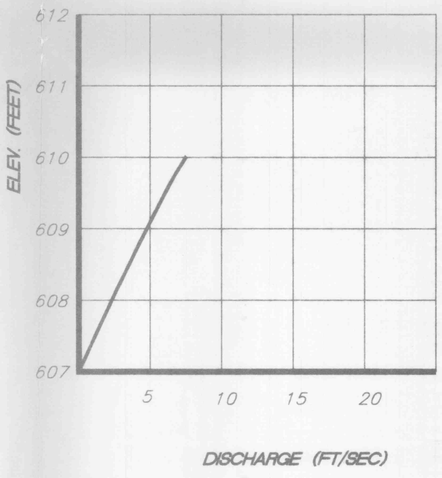
NOTE: A. ALL REINFORCING STEEL TO BE: ASTM A-615-75, GRADE 60
NOTE: B: ALL BAR LAPS SHALL BE A MINIMUM OF 24 BAR DIAMETERS.
NOTE: C REINFORCING STEEL SHALL HAVE A MINIMUM OF 2" CONCRETE COVER.
NOTE: D. REINFORSED INLETS OR MANHOLES CAN BE POURED CIRCULAR IF DESIRED WITH SAME REINFORCEMENT REQUIREMENTS.
NOTE: E. M.S.D. REQUIREMENT: REINFORCE TO TOP OF INCOMING PIPE.
NOTE: F. THE CONCRETE COVER FOR THE LOWER MAT OF STEEL IN THE BOTTOM SLAB SHALL BE 3.
NOTE: G. CONCRETE FOR THIS STRUCTURE SHALL BE CLASS b, fc=3'000 p.s.i.




ELEVATION VS. STORAGE
(25 YEAR EVENT)




INFLOW/OUTFLOW
(25 YEAR EVENT)




ELEVATION VS. DISCHARGE
(25 YEAR EVENT)

STATE OF MISSOURI
MARK A. DOERING
NUMBER E-23059
REGISTERED PROFESSIONAL ENGINEER

| REVISIONS | |
|---|---|
| DATE | COMMENTS |
| 12/10/97 | REV. CALC. FOR NEW SIZE |

MARSHALL FORD
DETENTION BASIN CALCS.


DOERING ENGINEERING INC.
7321 S. LINDBERGH BLVD.
SUITE 104
ST. LOUIS, MO. 63125
OFFICE: (314) 487-6913
FAX: (314) 487-2379
CIVIL ENGINEERING * PLANNING


DATE: 11/13/97 | JOB NO.96125det | CADD: 96125
DRAWN: MAD | CHK: MAD | SHEET: 5