ENGINEERING

PLANNING

SURVEYING

1997

**AVONDALE PHASE 2** - O'FALLON
BAX ROJECT NO. **96-7230D**
August 26, 1997

In addendum to the STORMWATER DETENTION ANALYSIS - AUG. 1997 the 2, 5 and 15 year 20 minute storm routings were calculated as follows.

**BASIN PEAK INFLOWS:**

2 year-20 minute storm

| | | |
|---|---|---|
| Q(onsite) | 32.2 x 1.61 = | 51.84 cfs |
| Q(offsite) | 28.8 x 1.61 = | 46.37 cfs |
| | Total | 98.21 cfs |

5 year-20 minute storm

| | | |
|---|---|---|
| Q(onsite) | 32.2 x 1.98 = | 63.76 cfs |
| Q(offsite) | 28.8 x 1.98 = | 57.02 cfs |
| | Total | 120.78 cfs |

15 year-20 minute storm

| | | |
|---|---|---|
| Q(onsite) | 32.2 x 2.64 = | 85.01 cfs |
| Q(offsite) | 28.8 x 2.64 = | 76.03 cfs |
| | Total | 161.04 cfs |


**STORM ROUTING CALCULATIONS AND RESULTS:**

A computer program was used in routing the design 25 and 100 year-20 minute storms through the basin. As found in the routing calculations, the results are as follows:

| 20 MIN STORM | CALCULATED RELEASE RATE | ATTENUATION PROVIDED | PEAK ELEVATION |
|---|---|---|---|
| 2 YEAR | 86.86 cfs | 11.38 cfs | 512.58 ft. |
| 5 YEAR | 108.18 cfs | 12.64 cfs | 512.98 ft. |
| 15 YEAR | 146.30 cfs | 14.79 cfs | 513.65 ft. |

BAX ENGINEERING CO., INC.
1052 South Cloverleaf Drive
St. Peters, MO 63376-6445
314-928-5552 FAX 928-1718

EXECUTED: 08-26-1997 10:07:00 20 MIN Return Freq: 2 years

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**********************************
*                                *
*       AVONDALE PHASE 2         *
*      DETENTION ANALYSIS        *
*   BAX ENGINEERING CO., INC.    *
*         AUGUST 1997            *
*                                *
**********************************
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Inflow Hydrograph: 7230-002.HYD
Rating Table file: 7230 .PND

----INITIAL CONDITIONS----
Elevation = 510.00 ft
Outflow = 0.00 cfs
Storage = 1.02 ac-ft

GIVEN POND DATA

| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (ac-ft) |
|---|---|---|
| 510.00 | 0.0 | 1.024 |
| 510.15 | 1.2 | 1.072 |
| 510.30 | 3.5 | 1.121 |
| 510.45 | 6.3 | 1.170 |
| 510.60 | 9.8 | 1.220 |
| 510.75 | 13.6 | 1.271 |
| 510.90 | 17.9 | 1.322 |
| 511.05 | 22.6 | 1.375 |
| 511.20 | 27.6 | 1.428 |
| 511.35 | 32.9 | 1.481 |
| 511.50 | 38.6 | 1.536 |
| 511.65 | 44.5 | 1.591 |
| 511.80 | 50.7 | 1.647 |
| 511.95 | 57.2 | 1.704 |
| 512.10 | 63.9 | 1.762 |
| 512.25 | 70.9 | 1.821 |
| 512.40 | 78.1 | 1.880 |
| 512.55 | 85.5 | 1.940 |
| 512.70 | 93.2 | 2.001 |
| 512.85 | 101.0 | 2.063 |
| 513.00 | 109.1 | 2.125 |
| 513.15 | 117.4 | 2.189 |
| 513.30 | 125.9 | 2.253 |
| 513.45 | 134.6 | 2.318 |
| 513.60 | 143.4 | 2.384 |
| 513.75 | 152.5 | 2.451 |
| 513.90 | 161.7 | 2.518 |
| 514.05 | 171.2 | 2.587 |
| 514.20 | 180.8 | 2.656 |
| 514.35 | 190.5 | 2.727 |
| 514.50 | 200.5 | 2.798 |

INTERMEDIATE ROUTING COMPUTATIONS

| 2S/t (cfs) | 2S/t + O (cfs) |
|---|---|
| 1487.5 | 1487.5 |
| 1556.9 | 1558.1 |
| 1627.4 | 1630.9 |
| 1698.9 | 1705.2 |
| 1771.5 | 1781.3 |
| 1845.2 | 1858.8 |
| 1920.0 | 1937.9 |
| 1995.9 | 2018.5 |
| 2072.9 | 2100.5 |
| 2151.0 | 2183.9 |
| 2230.2 | 2268.8 |
| 2310.6 | 2355.1 |
| 2392.1 | 2442.8 |
| 2474.7 | 2531.9 |
| 2558.5 | 2622.4 |
| 2643.5 | 2714.4 |
| 2729.7 | 2807.8 |
| 2816.9 | 2902.4 |
| 2905.4 | 2998.6 |
| 2995.1 | 3096.1 |
| 3086.0 | 3195.1 |
| 3178.1 | 3295.5 |
| 3271.3 | 3397.2 |
| 3365.9 | 3500.5 |
| 3461.6 | 3605.0 |
| 3558.6 | 3711.1 |
| 3656.8 | 3818.5 |
| 3756.3 | 3927.5 |
| 3857.0 | 4037.8 |
| 3959.0 | 4149.5 |
| 4062.3 | 4262.8 |

GIVEN POND DATA

| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (ac-ft) |
|---|---|---|
| 514.65 | 212.3 | 2.870 |
| 514.80 | 225.8 | 2.943 |
| 514.95 | 240.3 | 3.016 |
| 515.10 | 255.8 | 3.091 |
| 515.25 | 272.1 | 3.167 |
| 515.40 | 289.1 | 3.243 |
| 515.55 | 306.9 | 3.320 |
| 515.70 | 325.2 | 3.399 |
| 515.85 | 344.2 | 3.478 |
| 516.00 | 363.7 | 3.558 |

INTERMEDIATE ROUTING COMPUTATIONS

| 2S/t (cfs) | 2S/t + O (cfs) |
|---|---|
| 4166.8 | 4379.1 |
| 4272.6 | 4498.4 |
| 4379.7 | 4620.0 |
| 4488.1 | 4743.9 |
| 4597.9 | 4870.0 |
| 4708.9 | 4998.0 |
| 4821.3 | 5128.2 |
| 4935.0 | 5260.2 |
| 5050.0 | 5394.2 |
| 5166.4 | 5530.1 |

Time increment (t) = 1.0 min.

Pond File: 7230 .PND
Inflow Hydrograph: 7230-002.HYD
Outflow Hydrograph: 72300002.HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (min) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 0.0 | 0.00 | ----- | 1487.5 | 1487.5 | 0.00 | 510.00 |
| 1.0 | 8.94 | 8.9 | 1496.1 | 1496.4 | 0.15 | 510.02 |
| 2.0 | 17.84 | 26.8 | 1521.7 | 1522.9 | 0.60 | 510.08 |
| 3.0 | 26.78 | 44.6 | 1563.4 | 1566.3 | 1.46 | 510.17 |
| 4.0 | 35.73 | 62.5 | 1619.2 | 1625.9 | 3.34 | 510.29 |
| 5.0 | 44.67 | 80.4 | 1687.5 | 1699.6 | 6.09 | 510.44 |
| 6.0 | 53.57 | 98.2 | 1765.7 | 1785.7 | 10.01 | 510.61 |
| 7.0 | 62.51 | 116.1 | 1852.1 | 1881.7 | 14.85 | 510.79 |
| 8.0 | 71.46 | 134.0 | 1944.6 | 1986.0 | 20.71 | 510.99 |
| 9.0 | 80.35 | 151.8 | 2041.7 | 2096.4 | 27.35 | 511.19 |
| 10.0 | 89.30 | 169.7 | 2141.9 | 2211.4 | 34.74 | 511.40 |
| 11.0 | 98.24 | 187.5 | 2243.9 | 2329.4 | 42.74 | 511.61 |
| 12.0 | 98.21 | 196.5 | 2339.3 | 2440.4 | 50.53 | 511.80 |
| 13.0 | 98.21 | 196.4 | 2420.8 | 2535.7 | 57.48 | 511.96 |
| 14.0 | 98.21 | 196.4 | 2490.2 | 2617.2 | 63.51 | 512.09 |
| 15.0 | 98.21 | 196.4 | 2549.0 | 2686.6 | 68.78 | 512.20 |
| 16.0 | 98.21 | 196.4 | 2598.9 | 2745.4 | 73.29 | 512.30 |
| 17.0 | 98.21 | 196.4 | 2641.0 | 2795.3 | 77.14 | 512.38 |
| 18.0 | 98.21 | 196.4 | 2676.6 | 2837.4 | 80.42 | 512.45 |
| 19.0 | 98.21 | 196.4 | 2706.6 | 2873.0 | 83.20 | 512.50 |
| 20.0 | 98.21 | 196.4 | 2731.9 | 2903.0 | 85.55 | 512.55 |
| 21.0 | 89.31 | 187.5 | 2745.7 | 2919.5 | 86.86 | 512.58 |
| 22.0 | 80.41 | 169.7 | 2742.4 | 2915.5 | 86.54 | 512.57 |
| 23.0 | 71.46 | 151.9 | 2724.5 | 2894.2 | 84.86 | 512.54 |
| 24.0 | 62.57 | 134.0 | 2694.4 | 2858.6 | 82.07 | 512.48 |
| 25.0 | 53.62 | 116.2 | 2654.0 | 2810.6 | 78.32 | 512.40 |
| 26.0 | 44.68 | 98.3 | 2604.6 | 2752.3 | 73.82 | 512.31 |
| 27.0 | 35.79 | 80.5 | 2547.8 | 2685.1 | 68.67 | 512.20 |
| 28.0 | 26.84 | 62.6 | 2484.4 | 2610.4 | 63.01 | 512.08 |
| 29.0 | 17.89 | 44.7 | 2415.1 | 2529.1 | 56.99 | 511.95 |
| 30.0 | 9.00 | 26.9 | 2340.7 | 2442.0 | 50.65 | 511.80 |
| 31.0 | 0.05 | 9.1 | 2261.5 | 2349.8 | 44.14 | 511.64 |
| 32.0 | 0.00 | 0.1 | 2185.3 | 2261.5 | 38.11 | 511.49 |
| 33.0 | 0.00 | 0.0 | 2119.3 | 2185.3 | 33.00 | 511.35 |
| 34.0 | 0.00 | 0.0 | 2061.7 | 2119.3 | 28.80 | 511.23 |
| 35.0 | 0.00 | 0.0 | 2011.3 | 2061.7 | 25.24 | 511.13 |
| 36.0 | 0.00 | 0.0 | 1966.9 | 2011.3 | 22.18 | 511.04 |
| 37.0 | 0.00 | 0.0 | 1927.7 | 1966.9 | 19.59 | 510.95 |
| 38.0 | 0.00 | 0.0 | 1893.0 | 1927.7 | 17.35 | 510.88 |
| 39.0 | 0.00 | 0.0 | 1862.1 | 1893.0 | 15.46 | 510.81 |
| 40.0 | 0.00 | 0.0 | 1834.5 | 1862.1 | 13.78 | 510.76 |

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

Pond File: 7230 .PND
Inflow Hydrograph: 7230-002.HYD
Outflow Hydrograph: 72300002.HYD

Starting Pond W.S. Elevation = 510.00 ft

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

| | | |
|---|---|---|
| Peak Inflow | = | 98.24 cfs |
| Peak Outflow | = | 86.86 cfs |
| Peak Elevation | = | 512.58 ft |

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

| | | |
|---|---|---|
| Initial Storage | = | 1.02 ac-ft |
| Peak Storage From Storm | = | 0.93 ac-ft |
| Total Storage in Pond | = | 1.95 ac-ft |

20 MIN  Return Freq: 2 years

Pond File: 7230 .PND
Inflow Hydrograph: 7230-002.HYD
Outflow Hydrograph: 72300002.HYD

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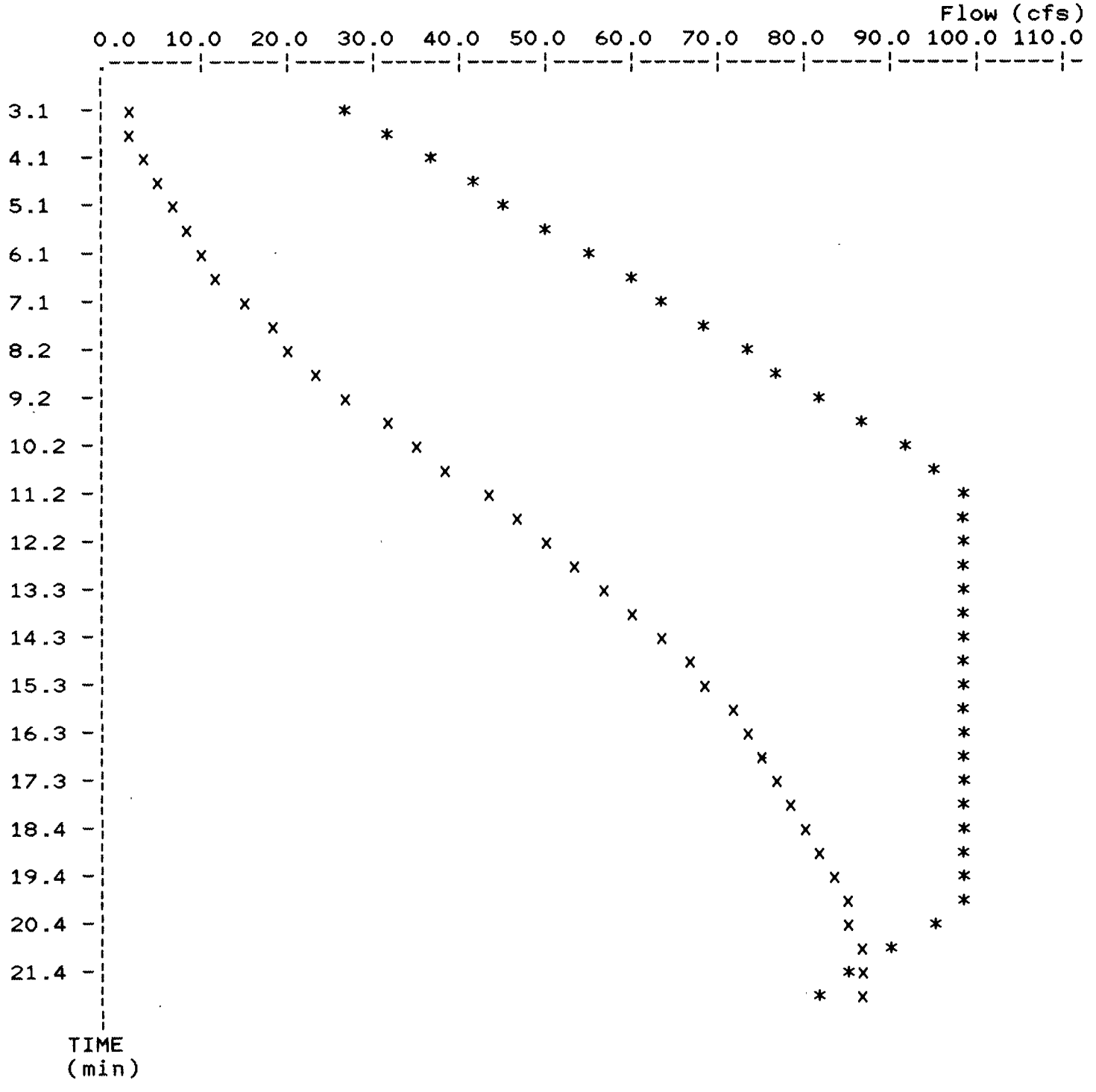
Peak Inflow = 98.24 cfs
Peak Outflow = 86.86 cfs
Peak Elevation = 512.58 ft




x File: 7230-002.HYD Qmax = 86.9 cfs
* File: 72300002.HYD Qmax = 98.2 cfs

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*
* AVONDALE PHASE 2 *
* DETENTION ANALYSIS *
* BAX ENGINEERING CO., INC. *
* AUGUST 1997 *
*
**********

Inflow Hydrograph: 7230-005.HYD
Rating Table file: 7230 .PND

----INITIAL CONDITIONS----
Elevation = 510.00 ft
Outflow = 0.00 cfs
Storage = 1.02 ac-ft

| GIVEN POND DATA | | | INTERMEDIATE ROUTING COMPUTATIONS | |
|---|---|---|---|---|
| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (ac-ft) | 2S/t (cfs) | 2S/t + O (cfs) |
| 510.00 | 0.0 | 1.024 | 1487.5 | 1487.5 |
| 510.15 | 1.2 | 1.072 | 1556.9 | 1558.1 |
| 510.30 | 3.5 | 1.121 | 1627.4 | 1630.9 |
| 510.45 | 6.3 | 1.170 | 1698.9 | 1705.2 |
| 510.60 | 9.8 | 1.220 | 1771.5 | 1781.3 |
| 510.75 | 13.6 | 1.271 | 1845.2 | 1858.8 |
| 510.90 | 17.9 | 1.322 | 1920.0 | 1937.9 |
| 511.05 | 22.6 | 1.375 | 1995.9 | 2018.5 |
| 511.20 | 27.6 | 1.428 | 2072.9 | 2100.5 |
| 511.35 | 32.9 | 1.481 | 2151.0 | 2183.9 |
| 511.50 | 38.6 | 1.536 | 2230.2 | 2268.8 |
| 511.65 | 44.5 | 1.591 | 2310.6 | 2355.1 |
| 511.80 | 50.7 | 1.647 | 2392.1 | 2442.8 |
| 511.95 | 57.2 | 1.704 | 2474.7 | 2531.9 |
| 512.10 | 63.9 | 1.762 | 2558.5 | 2622.4 |
| 512.25 | 70.9 | 1.821 | 2643.5 | 2714.4 |
| 512.40 | 78.1 | 1.880 | 2729.7 | 2807.8 |
| 512.55 | 85.5 | 1.940 | 2816.9 | 2902.4 |
| 512.70 | 93.2 | 2.001 | 2905.4 | 2998.6 |
| 512.85 | 101.0 | 2.063 | 2995.1 | 3096.1 |
| 513.00 | 109.1 | 2.125 | 3086.0 | 3195.1 |
| 513.15 | 117.4 | 2.189 | 3178.1 | 3295.5 |
| 513.30 | 125.9 | 2.253 | 3271.3 | 3397.2 |
| 513.45 | 134.6 | 2.318 | 3365.9 | 3500.5 |
| 513.60 | 143.4 | 2.384 | 3461.6 | 3605.0 |
| 513.75 | 152.5 | 2.451 | 3558.6 | 3711.1 |
| 513.90 | 161.7 | 2.518 | 3656.8 | 3818.5 |
| 514.05 | 171.2 | 2.587 | 3756.3 | 3927.5 |
| 514.20 | 180.8 | 2.656 | 3857.0 | 4037.8 |
| 514.35 | 190.5 | 2.727 | 3959.0 | 4149.5 |
| 514.50 | 200.5 | 2.798 | 4062.3 | 4262.8 |

GIVEN POND DATA

| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (ac-ft) |
|---|---|---|
| 514.65 | 212.3 | 2.870 |
| 514.80 | 225.8 | 2.943 |
| 514.95 | 240.3 | 3.016 |
| 515.10 | 255.8 | 3.091 |
| 515.25 | 272.1 | 3.167 |
| 515.40 | 289.1 | 3.243 |
| 515.55 | 306.9 | 3.320 |
| 515.70 | 325.2 | 3.399 |
| 515.85 | 344.2 | 3.478 |
| 516.00 | 363.7 | 3.558 |

INTERMEDIATE ROUTING COMPUTATIONS

| 2S/t (cfs) | 2S/t + O (cfs) |
|---|---|
| 4166.8 | 4379.1 |
| 4272.6 | 4498.4 |
| 4379.7 | 4620.0 |
| 4488.1 | 4743.9 |
| 4597.9 | 4870.0 |
| 4708.9 | 4998.0 |
| 4821.3 | 5128.2 |
| 4935.0 | 5260.2 |
| 5050.0 | 5394.2 |
| 5166.4 | 5530.1 |

Time increment (t) = 1.0 min.

Pond File: 7230 .PND
Inflow Hydrograph: 7230-005.HYD
Outflow Hydrograph: 72300005.HYD

INFLOW HYDROGRAPH

ROUTING COMPUTATIONS

| TIME (min) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
|---|---|---|---|---|---|---|
| 0.0 | 0.00 | ----- | 1487.5 | 1487.5 | 0.00 | 510.00 |
| 1.0 | 11.00 | 11.0 | 1498.1 | 1498.5 | 0.19 | 510.02 |
| 2.0 | 21.94 | 32.9 | 1529.6 | 1531.1 | 0.74 | 510.09 |
| 3.0 | 32.94 | 54.9 | 1580.4 | 1584.5 | 2.03 | 510.20 |
| 4.0 | 43.94 | 76.9 | 1648.3 | 1657.3 | 4.49 | 510.35 |
| 5.0 | 54.94 | 98.9 | 1730.7 | 1747.2 | 8.23 | 510.53 |
| 6.0 | 65.88 | 120.8 | 1825.0 | 1851.5 | 13.24 | 510.74 |
| 7.0 | 76.87 | 142.8 | 1928.5 | 1967.8 | 19.64 | 510.96 |
| 8.0 | 87.88 | 164.8 | 2038.9 | 2093.3 | 27.16 | 511.19 |
| 9.0 | 98.82 | 186.7 | 2154.2 | 2225.6 | 35.70 | 511.42 |
| 10.0 | 109.82 | 208.6 | 2272.8 | 2362.9 | 45.05 | 511.66 |
| 11.0 | 120.82 | 230.6 | 2393.2 | 2503.4 | 55.12 | 511.90 |
| 12.0 | 120.78 | 241.6 | 2505.1 | 2634.8 | 64.84 | 512.12 |
| 13.0 | 120.78 | 241.6 | 2599.9 | 2746.7 | 73.39 | 512.30 |
| 14.0 | 120.78 | 241.6 | 2680.0 | 2841.4 | 80.73 | 512.45 |
| 15.0 | 120.78 | 241.6 | 2747.5 | 2921.5 | 87.03 | 512.58 |
| 16.0 | 120.78 | 241.6 | 2804.2 | 2989.0 | 92.43 | 512.69 |
| 17.0 | 120.78 | 241.6 | 2851.8 | 3045.7 | 96.97 | 512.77 |
| 18.0 | 120.78 | 241.6 | 2891.8 | 3093.4 | 100.78 | 512.85 |
| 19.0 | 120.78 | 241.6 | 2925.3 | 3133.4 | 104.05 | 512.91 |
| 20.0 | 120.78 | 241.6 | 2953.2 | 3166.8 | 106.79 | 512.96 |
| 21.0 | 109.83 | 230.6 | 2967.5 | 3183.9 | 108.18 | 512.98 |
| 22.0 | 98.89 | 208.7 | 2961.1 | 3176.2 | 107.56 | 512.97 |
| 23.0 | 87.89 | 186.8 | 2937.4 | 3147.9 | 105.24 | 512.93 |
| 24.0 | 76.95 | 164.8 | 2899.2 | 3102.2 | 101.50 | 512.86 |
| 25.0 | 65.95 | 142.9 | 2848.8 | 3042.1 | 96.68 | 512.77 |
| 26.0 | 54.94 | 120.9 | 2787.9 | 2969.7 | 90.88 | 512.65 |
| 27.0 | 44.01 | 98.9 | 2718.3 | 2886.9 | 84.28 | 512.53 |
| 28.0 | 33.01 | 77.0 | 2641.0 | 2795.3 | 77.14 | 512.38 |
| 29.0 | 22.00 | 55.0 | 2557.0 | 2696.0 | 69.50 | 512.22 |
| 30.0 | 11.07 | 33.1 | 2467.1 | 2590.1 | 61.51 | 512.05 |
| 31.0 | 0.07 | 11.1 | 2371.7 | 2478.2 | 53.28 | 511.86 |
| 32.0 | 0.00 | 0.1 | 2280.4 | 2371.7 | 45.68 | 511.68 |
| 33.0 | 0.00 | 0.0 | 2201.6 | 2280.4 | 39.39 | 511.52 |
| 34.0 | 0.00 | 0.0 | 2133.4 | 2201.6 | 34.09 | 511.38 |
| 35.0 | 0.00 | 0.0 | 2074.0 | 2133.4 | 29.69 | 511.26 |
| 36.0 | 0.00 | 0.0 | 2022.1 | 2074.0 | 25.99 | 511.15 |
| 37.0 | 0.00 | 0.0 | 1976.4 | 2022.1 | 22.82 | 511.06 |
| 38.0 | 0.00 | 0.0 | 1936.1 | 1976.4 | 20.15 | 510.97 |
| 39.0 | 0.00 | 0.0 | 1900.5 | 1936.1 | 17.80 | 510.90 |
| 40.0 | 0.00 | 0.0 | 1868.8 | 1900.5 | 15.87 | 510.83 |

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

Pond File: 7230 .PND
Inflow Hydrograph: 7230-005.HYD
Outflow Hydrograph: 72300005.HYD

Starting Pond W.S. Elevation = 510.00 ft

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

| | | |
|---|---|---|
| Peak Inflow | = | 120.82 cfs |
| Peak Outflow | = | 108.18 cfs |
| Peak Elevation | = | 512.98 ft |

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

| | | |
|---|---|---|
| Initial Storage | = | 1.02 ac-ft |
| Peak Storage From Storm | = | 1.09 ac-ft |
| Total Storage in Pond | = | 2.12 ac-ft |

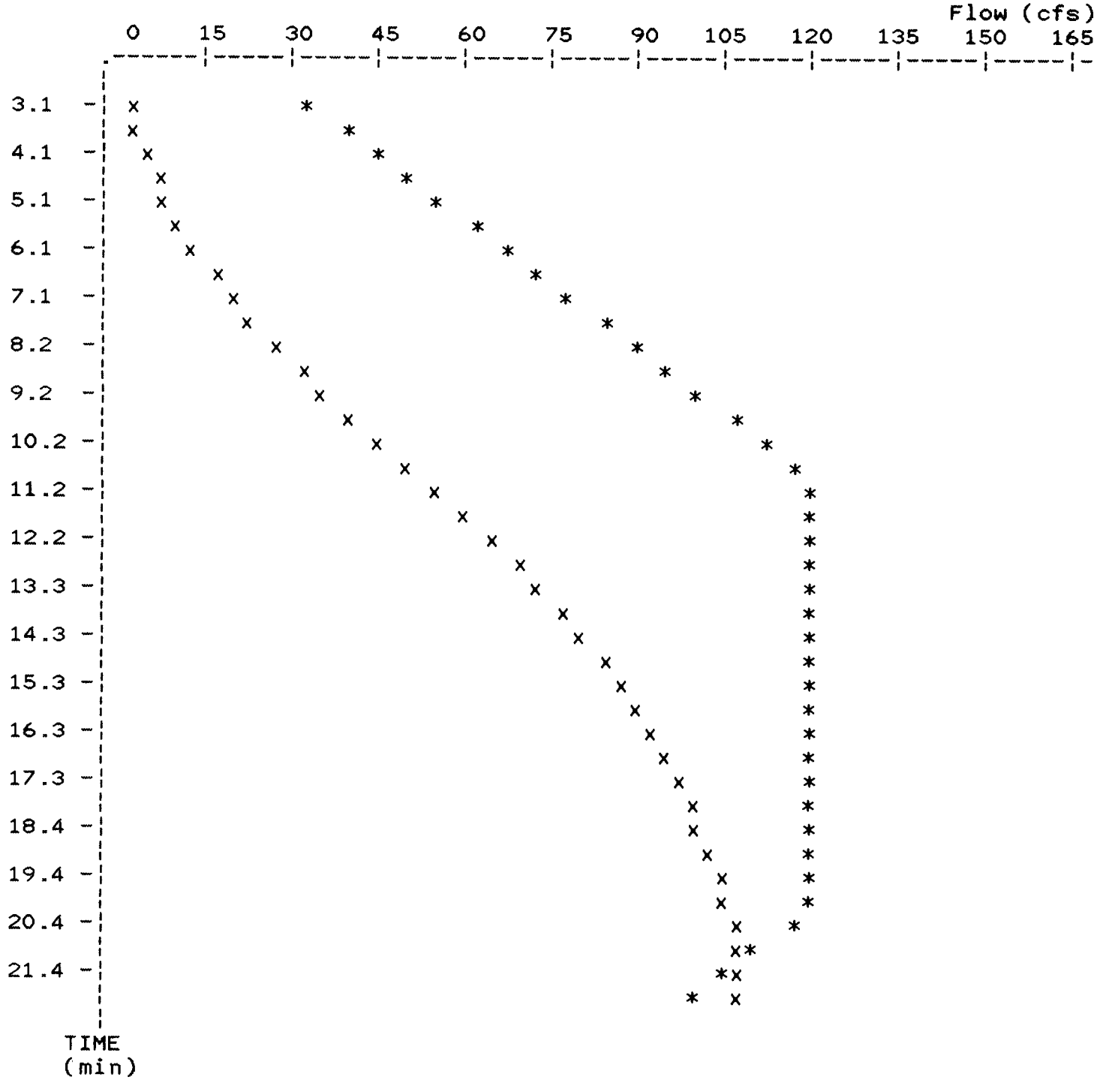
20 MIN

Return Freq: 5 years

Pond File: 7230 .PND
Inflow Hydrograph: 7230-005.HYD
Outflow Hydrograph: 72300005.HYD

EXECUTED: 08-26-1997
10:07:00

Peak Inflow = 120.82 cfs
Peak Outflow = 108.18 cfs
Peak Elevation = 512.98 ft




x File: 7230-005.HYD Qmax = 108.2 cfs
* File: 72300005.HYD Qmax = 120.8 cfs

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* *
* AVONDALE PHASE 2 *
* DETENTION ANALYSIS *
* BAX ENGINEERING CO., INC. *
* AUGUST 1997 *
* *
**********

Inflow Hydrograph: 7230-015.HYD
Rating Table file: 7230 .PND

----INITIAL CONDITIONS----
Elevation = 510.00 ft
Outflow = 0.00 cfs
Storage = 1.02 ac-ft

GIVEN POND DATA

| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (ac-ft) |
|---|---|---|
| 510.00 | 0.0 | 1.024 |
| 510.15 | 1.2 | 1.072 |
| 510.30 | 3.5 | 1.121 |
| 510.45 | 6.3 | 1.170 |
| 510.60 | 9.8 | 1.220 |
| 510.75 | 13.6 | 1.271 |
| 510.90 | 17.9 | 1.322 |
| 511.05 | 22.6 | 1.375 |
| 511.20 | 27.6 | 1.428 |
| 511.35 | 32.9 | 1.481 |
| 511.50 | 38.6 | 1.536 |
| 511.65 | 44.5 | 1.591 |
| 511.80 | 50.7 | 1.647 |
| 511.95 | 57.2 | 1.704 |
| 512.10 | 63.9 | 1.762 |
| 512.25 | 70.9 | 1.821 |
| 512.40 | 78.1 | 1.880 |
| 512.55 | 85.5 | 1.940 |
| 512.70 | 93.2 | 2.001 |
| 512.85 | 101.0 | 2.063 |
| 513.00 | 109.1 | 2.125 |
| 513.15 | 117.4 | 2.189 |
| 513.30 | 125.9 | 2.253 |
| 513.45 | 134.6 | 2.318 |
| 513.60 | 143.4 | 2.384 |
| 513.75 | 152.5 | 2.451 |
| 513.90 | 161.7 | 2.518 |
| 514.05 | 171.2 | 2.587 |
| 514.20 | 180.8 | 2.656 |
| 514.35 | 190.5 | 2.727 |
| 514.50 | 200.5 | 2.798 |

INTERMEDIATE ROUTING COMPUTATIONS

| 2S/t (cfs) | 2S/t + O (cfs) |
|---|---|
| 1487.5 | 1487.5 |
| 1556.9 | 1558.1 |
| 1627.4 | 1630.9 |
| 1698.9 | 1705.2 |
| 1771.5 | 1781.3 |
| 1845.2 | 1858.8 |
| 1920.0 | 1937.9 |
| 1995.9 | 2018.5 |
| 2072.9 | 2100.5 |
| 2151.0 | 2183.9 |
| 2230.2 | 2268.8 |
| 2310.6 | 2355.1 |
| 2392.1 | 2442.8 |
| 2474.7 | 2531.9 |
| 2558.5 | 2622.4 |
| 2643.5 | 2714.4 |
| 2729.7 | 2807.8 |
| 2816.9 | 2902.4 |
| 2905.4 | 2998.6 |
| 2995.1 | 3096.1 |
| 3086.0 | 3195.1 |
| 3178.1 | 3295.5 |
| 3271.3 | 3397.2 |
| 3365.9 | 3500.5 |
| 3461.6 | 3605.0 |
| 3558.6 | 3711.1 |
| 3656.8 | 3818.5 |
| 3756.3 | 3927.5 |
| 3857.0 | 4037.8 |
| 3959.0 | 4149.5 |
| 4062.3 | 4262.8 |

GIVEN POND DATA

| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (ac-ft) |
|---|---|---|
| 514.65 | 212.3 | 2.870 |
| 514.80 | 225.8 | 2.943 |
| 514.95 | 240.3 | 3.016 |
| 515.10 | 255.8 | 3.091 |
| 515.25 | 272.1 | 3.167 |
| 515.40 | 289.1 | 3.243 |
| 515.55 | 306.9 | 3.320 |
| 515.70 | 325.2 | 3.399 |
| 515.85 | 344.2 | 3.478 |
| 516.00 | 363.7 | 3.558 |

INTERMEDIATE ROUTING COMPUTATIONS

| 2S/t (cfs) | 2S/t + O (cfs) |
|---|---|
| 4166.8 | 4379.1 |
| 4272.6 | 4498.4 |
| 4379.7 | 4620.0 |
| 4488.1 | 4743.9 |
| 4597.9 | 4870.0 |
| 4708.9 | 4998.0 |
| 4821.3 | 5128.2 |
| 4935.0 | 5260.2 |
| 5050.0 | 5394.2 |
| 5166.4 | 5530.1 |

Time increment (t) = 1.0 min.

Pond File: 7230 .PND
Inflow Hydrograph: 7230-015.HYD
Outflow Hydrograph: 72300015.HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (min) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 0.0 | 0.00 | ----- | 1487.5 | 1487.5 | 0.00 | 510.00 |
| 1.0 | 14.67 | 14.7 | 1501.7 | 1502.2 | 0.25 | 510.03 |
| 2.0 | 29.25 | 43.9 | 1543.6 | 1545.6 | 0.99 | 510.12 |
| 3.0 | 43.92 | 73.2 | 1610.7 | 1616.8 | 3.05 | 510.27 |
| 4.0 | 58.59 | 102.5 | 1699.9 | 1713.2 | 6.67 | 510.47 |
| 5.0 | 73.25 | 131.8 | 1807.2 | 1831.7 | 12.27 | 510.70 |
| 6.0 | 87.84 | 161.1 | 1928.9 | 1968.2 | 19.67 | 510.96 |
| 7.0 | 102.50 | 190.3 | 2061.7 | 2119.2 | 28.79 | 511.23 |
| 8.0 | 117.17 | 219.7 | 2202.4 | 2281.3 | 39.46 | 511.52 |
| 9.0 | 131.76 | 248.9 | 2348.7 | 2451.3 | 51.32 | 511.81 |
| 10.0 | 146.43 | 278.2 | 2498.4 | 2626.9 | 64.24 | 512.11 |
| 11.0 | 161.09 | 307.5 | 2650.0 | 2805.9 | 77.96 | 512.40 |
| 12.0 | 161.04 | 322.1 | 2790.0 | 2972.1 | 91.08 | 512.66 |
| 13.0 | 161.04 | 322.1 | 2907.4 | 3112.1 | 102.31 | 512.87 |
| 14.0 | 161.04 | 322.1 | 3005.6 | 3229.5 | 111.95 | 513.05 |
| 15.0 | 161.04 | 322.1 | 3087.5 | 3327.7 | 120.09 | 513.20 |
| 16.0 | 161.04 | 322.1 | 3155.7 | 3409.6 | 126.94 | 513.32 |
| 17.0 | 161.04 | 322.1 | 3212.4 | 3477.8 | 132.69 | 513.42 |
| 18.0 | 161.04 | 322.1 | 3259.6 | 3534.5 | 137.47 | 513.50 |
| 19.0 | 161.04 | 322.1 | 3298.8 | 3581.6 | 141.44 | 513.57 |
| 20.0 | 161.04 | 322.1 | 3331.3 | 3620.9 | 144.76 | 513.62 |
| 21.0 | 146.44 | 307.5 | 3346.2 | 3638.8 | 146.30 | 513.65 |
| 22.0 | 131.85 | 278.3 | 3334.3 | 3624.5 | 145.07 | 513.63 |
| 23.0 | 117.18 | 249.0 | 3300.2 | 3583.4 | 141.58 | 513.57 |
| 24.0 | 102.59 | 219.8 | 3247.5 | 3520.0 | 136.24 | 513.48 |
| 25.0 | 87.93 | 190.5 | 3179.3 | 3438.0 | 129.34 | 513.36 |
| 26.0 | 73.26 | 161.2 | 3098.2 | 3340.5 | 121.16 | 513.22 |
| 27.0 | 58.68 | 131.9 | 3006.1 | 3230.1 | 112.00 | 513.05 |
| 28.0 | 44.01 | 102.7 | 2904.8 | 3108.8 | 102.04 | 512.87 |
| 29.0 | 29.34 | 73.3 | 2795.0 | 2978.1 | 91.56 | 512.67 |
| 30.0 | 14.75 | 44.1 | 2678.0 | 2839.1 | 80.55 | 512.45 |
| 31.0 | 0.09 | 14.8 | 2554.3 | 2692.8 | 69.26 | 512.21 |
| 32.0 | 0.00 | 0.1 | 2436.7 | 2554.4 | 58.86 | 511.99 |
| 33.0 | 0.00 | 0.0 | 2336.1 | 2436.7 | 50.27 | 511.79 |
| 34.0 | 0.00 | 0.0 | 2249.7 | 2336.1 | 43.20 | 511.62 |
| 35.0 | 0.00 | 0.0 | 2175.1 | 2249.7 | 37.32 | 511.47 |
| 36.0 | 0.00 | 0.0 | 2110.4 | 2175.1 | 32.34 | 511.33 |
| 37.0 | 0.00 | 0.0 | 2053.9 | 2110.4 | 28.23 | 511.22 |
| 38.0 | 0.00 | 0.0 | 2004.4 | 2053.9 | 24.76 | 511.11 |
| 39.0 | 0.00 | 0.0 | 1960.9 | 2004.4 | 21.78 | 511.02 |
| 40.0 | 0.00 | 0.0 | 1922.4 | 1960.9 | 19.24 | 510.94 |

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

Pond File: 7230 .PND
Inflow Hydrograph: 7230-015.HYD
Outflow Hydrograph: 72300015.HYD

Starting Pond W.S. Elevation = 510.00 ft

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

| | | |
|---|---|---|
| Peak Inflow | = | 161.09 cfs |
| Peak Outflow | = | 146.30 cfs |
| Peak Elevation | = | 513.65 ft |

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

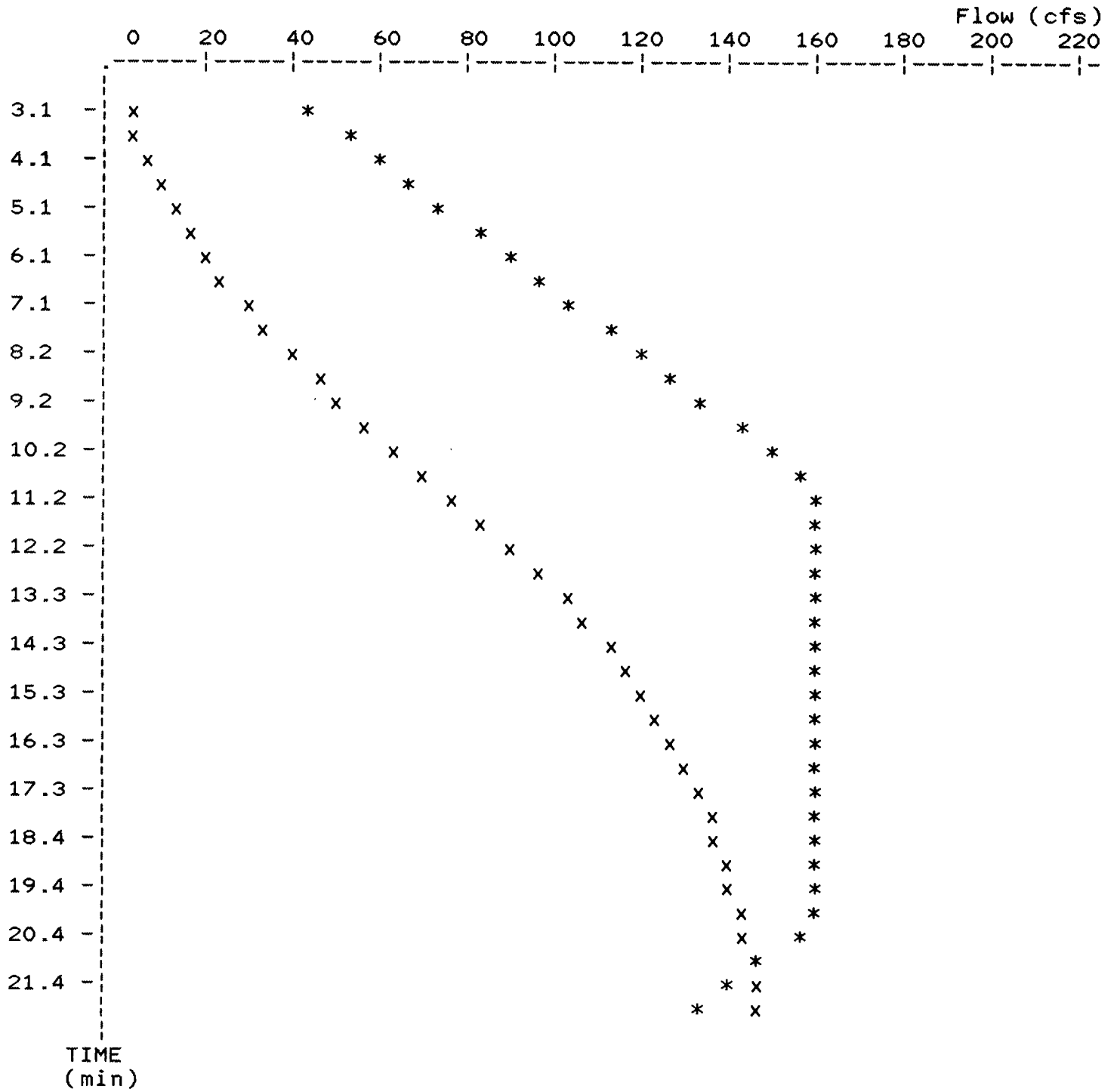
| | | |
|---|---|---|
| Initial Storage | = | 1.02 ac-ft |
| Peak Storage From Storm | = | 1.38 ac-ft |
| Total Storage in Pond | = | 2.41 ac-ft |

20 MIN
Return Freq: 15 years

Pond File: 7230 .PND
Inflow Hydrograph: 7230-015.HYD
Outflow Hydrograph: 72300015.HYD

EXECUTED: 08-26-1997
10:07:00

Peak Inflow = 161.09 cfs
Peak Outflow = 146.30 cfs
Peak Elevation = 513.65 ft




x File: 7230-015.HYD Qmax = 146.3 cfs
* File: 72300015.HYD Qmax = 161.1 cfs

ENGINEERING

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1997

STORMWATER DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
BAX PROJECT NO. 96-7230D
AVONDALE PHASE 2 - O'FALLON
AUGUST 1997

**INTRODUCTION:**

The tract of land is presently an undeveloped site located in the City of O'Fallon, Missouri. It is proposed that Phase-2, consisting of 22.73 acres, be developed into a single family residential subdivision. Detention requirements for the entire tract of 98.0 acres have been provided by the basin constructed with Phase-1. A stormwater detention basin shall be constructed near the southwest corner of Phase-2. This basin will provide additional detention for the tract. The basin shall be analyzed for the 25 and 100 year frequency - 20 minute duration design storms.

**GENERAL SITE DATA AND RUNOFF CALCULATIONS:**

Site area: Phase-2 - 22.7 acres

The P.I. factors to be used for the analysis are:

| | |
|---|---|
| 25 Year-20 minute storm (onsite residential): | 3.26 c.f.s./ac. |
| 25 Year-20 minute storm (offsite residential): | 3.26 c.f.s./ac. |
| 100 Year-20 minute storm (onsite residential): | 4.17 c.f.s./ac. |
| 100 Year-20 minute storm (offsite residential): | 4.17 c.f.s./ac. |

BAX ENGINEERING CO., INC.
1052 South Cloverleaf Drive
St. Peters, MO 63376-6445
314-928-5552 FAX 928-1718

**TIME OF CONCENTRATION:**

Of the inflows to the basin, the most remote point of origin lies to the northeast near Knaust Road and the entrance to The Borsheim Tract. Flows will travel approximately 400 feet overland to an area inlet then an additional 3,140 feet via onsite and offsite storm sewer to the detention basin. Time of concentration is estimated as follows:

A) T(overland) : L = 400 feet
Elevation difference = 600 - 594 = 6 feet
T(overland) = 4.0 minutes : See figure 1

B) T(sewer) : L = 3,140 feet
Estimated velocity of 7 ft./sec.
T(sewer) = 449 sec. = 7.47 minutes

Total 11.47 minutes - USE 11 minutes

**BASIN PEAK INFLOWS:**

Inflows to the basin have been estimated from the drainage area map of Phase-2 of the project. (see sheets 14 - 16 of construction plans)

Onsite areas (assumed 40% impervious - single family)
Total 32.2 acres

Offsite areas (assumed 40% impervious - single family)
Total 28.8 acres

25 year-20 minute storm

| | | |
|---|---|---|
| Q(onsite) | 32.2 x 3.26 = | 104.97 cfs |
| Q(offsite) | 28.8 x 3.26 = | 93.77 cfs |
| | Total | 198.74 cfs |

100 year-20 minute storm

| | | |
|---|---|---|
| Q(onsite) | 32.2 x 4.17 = | 134.27 cfs |
| Q(offsite) | 28.8 x 4.17 = | 119.94 cfs |
| | Total | 254.21 cfs |

ENGINEERING

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SURVEYING

**STORM ROUTING CALCULATIONS AND RESULTS:**

A computer program was used in routing the design 25 and 100 year-20 minute storms through the basin. As found in the routing calculations, the results are as follows:

| 20 MIN STORM | CALCULATED RELEASE RATE | ATTENUATION PROVIDED | PEAK ELEVATION |
|---|---|---|---|
| 25 YEAR | 182.01 cfs | 16.75 cfs | 514.22 ft. |
| 100 YEAR | 239.24 cfs | 15.05 cfs | 514.94 ft. |

**SUMMARY**

| | |
|---|---|
| Normal Pool (low flow elevation) | 510.00 ft. |
| 25 year-20min H.W. | 514.22 ft. |
| 100 year-20min H.W. | 514.94 ft. |
| TOP OF BERM | 516.00 ft. |

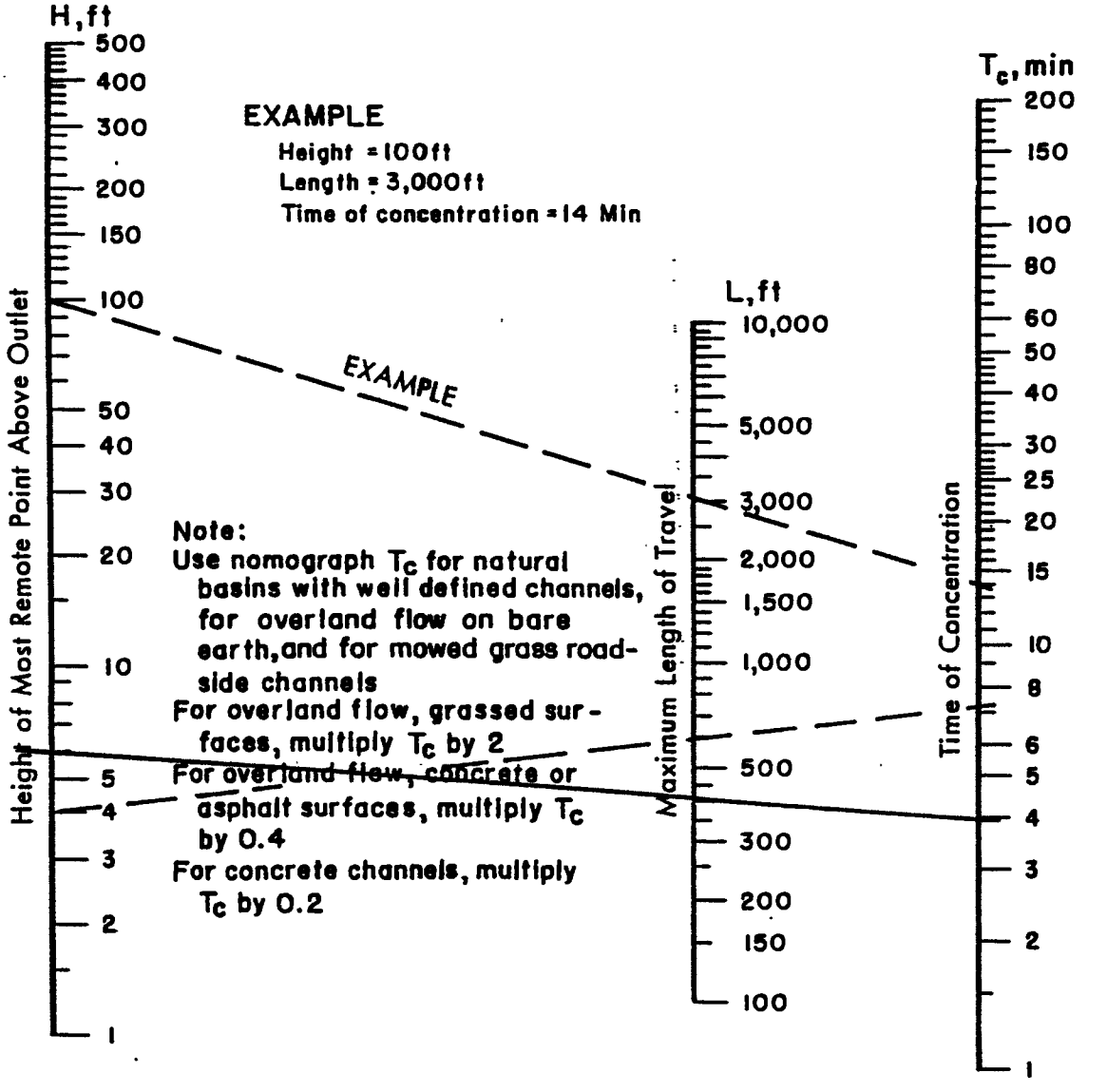
BAX ENGINEERING

SHEET ___ of ___

Project: ALONDALE DUARE 2

Date: 8-97 Project No: 96-7230

Designed: ADJ Checked: ___




Based on study by P. Z. Kirpich,
*Civil Engineering, Vol. 10, No. 6, June 1940, p. 362*

OVERLAND 4 min

PIPE FLOW 3.140 ÷ 7 ft/sec = 449 sec
= 7.47 min

TOTAL 11.47 min USE 11 min

052 South Cloverleaf Drive
t. Peters, MO 63376-6445
14-928-5552 FAX 928-1718

POND-2 Version: 5.17
S/N:

AVONDALE PHASE 2
DETENTION ANALYSIS
BAX ENGINEERING CO., INC.
AUGUST 1997

CALCULATED 08-12-1997 10:43:22
DISK FILE: 7230 .VOL

Planimeter scale: 1 inch = 1 ft.

| Elevation (ft) | Planimeter (sq.in.) | Area (acres) | A1+A2+sqr(A1*A2) (acres) | * Volume (acre-ft) | Volume Sum (acre-ft) |
|---|---|---|---|---|---|
| 506.00 | 8,727.46 | 0.20 | 0.00 | 0.00 | 0.00 |
| 508.00 | 11,108.91 | 0.26 | 0.68 | 0.45 | 0.45 |
| 510.00 | 13,775.56 | 0.32 | 0.86 | 0.57 | 1.02 |
| 512.00 | 16,723.28 | 0.38 | 1.05 | 0.70 | 1.72 |
| 514.00 | 19,936.63 | 0.46 | 1.26 | 0.84 | 2.56 |
| 516.00 | 23,414.12 | 0.54 | 1.49 | 0.99 | 3.56 |

* 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

POND-2 Version: 5.17 S/N:
EXECUTED: 08-12-1997 39:13 20 MIN Return Freq: 25 years

```
**********************************
*                                *
*       AVONDALE PHASE 2         *
*      DETENTION ANALYSIS        *
*   BAX ENGINEERING CO., INC.    *
*         AUGUST 1997            *
*                                *
**********************************
```

Inflow Hydrograph: 7230-025.HYD
Rating Table file: 7230 .PND

----INITIAL CONDITIONS----
Elevation = 510.00 ft
Outflow = 0.00 cfs
Storage = 1.02 ac-ft

GIVEN POND DATA

| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (ac-ft) |
|---|---|---|
| 510.00 | 0.0 | 1.024 |
| 510.15 | 1.2 | 1.072 |
| 510.30 | 3.5 | 1.121 |
| 510.45 | 6.3 | 1.170 |
| 510.60 | 9.8 | 1.220 |
| 510.75 | 13.6 | 1.271 |
| 510.90 | 17.9 | 1.322 |
| 511.05 | 22.6 | 1.375 |
| 511.20 | 27.6 | 1.428 |
| 511.35 | 32.9 | 1.481 |
| 511.50 | 38.6 | 1.536 |
| 511.65 | 44.5 | 1.591 |
| 511.80 | 50.7 | 1.647 |
| 511.95 | 57.2 | 1.704 |
| 512.10 | 63.9 | 1.762 |
| 512.25 | 70.9 | 1.821 |
| 512.40 | 78.1 | 1.880 |
| 512.55 | 85.5 | 1.940 |
| 512.70 | 93.2 | 2.001 |
| 512.85 | 101.0 | 2.063 |
| 513.00 | 109.1 | 2.125 |
| 513.15 | 117.4 | 2.189 |
| 513.30 | 125.9 | 2.253 |
| 513.45 | 134.6 | 2.318 |
| 513.60 | 143.4 | 2.384 |
| 513.75 | 152.5 | 2.451 |
| 513.90 | 161.7 | 2.518 |
| 514.05 | 171.2 | 2.587 |
| 514.20 | 180.8 | 2.656 |
| 514.35 | 190.5 | 2.727 |
| 514.50 | 200.5 | 2.798 |

INTERMEDIATE ROUTING COMPUTATIONS

| 2S/t (cfs) | 2S/t + O (cfs) |
|---|---|
| 1487.5 | 1487.5 |
| 1556.9 | 1558.1 |
| 1627.4 | 1630.9 |
| 1698.9 | 1705.2 |
| 1771.5 | 1781.3 |
| 1845.2 | 1858.8 |
| 1920.0 | 1937.9 |
| 1995.9 | 2018.5 |
| 2072.9 | 2100.5 |
| 2151.0 | 2183.9 |
| 2230.2 | 2268.8 |
| 2310.6 | 2355.1 |
| 2392.1 | 2442.8 |
| 2474.7 | 2531.9 |
| 2558.5 | 2622.4 |
| 2643.5 | 2714.4 |
| 2729.7 | 2807.8 |
| 2816.9 | 2902.4 |
| 2905.4 | 2998.6 |
| 2995.1 | 3096.1 |
| 3086.0 | 3195.1 |
| 3178.1 | 3295.5 |
| 3271.3 | 3397.2 |
| 3365.9 | 3500.5 |
| 3461.6 | 3605.0 |
| 3558.6 | 3711.1 |
| 3656.8 | 3818.5 |
| 3756.3 | 3927.5 |
| 3857.0 | 4037.8 |
| 3959.0 | 4149.5 |
| 4062.3 | 4262.8 |

GIVEN POND DATA

| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (ac-ft) |
|---|---|---|
| 514.65 | 212.3 | 2.870 |
| 514.80 | 225.8 | 2.943 |
| 514.95 | 240.3 | 3.016 |
| 515.10 | 255.8 | 3.091 |
| 515.25 | 272.1 | 3.167 |
| 515.40 | 289.1 | 3.243 |
| 515.55 | 306.9 | 3.320 |
| 515.70 | 325.2 | 3.399 |
| 515.85 | 344.2 | 3.478 |
| 516.00 | 363.7 | 3.558 |

INTERMEDIATE ROUTING COMPUTATIONS

| 2S/t (cfs) | 2S/t + O (cfs) |
|---|---|
| 4166.8 | 4379.1 |
| 4272.6 | 4498.4 |
| 4379.7 | 4620.0 |
| 4488.1 | 4743.9 |
| 4597.9 | 4870.0 |
| 4708.9 | 4998.0 |
| 4821.3 | 5128.2 |
| 4935.0 | 5260.2 |
| 5050.0 | 5394.2 |
| 5166.4 | 5530.1 |

Time increment (t) = 1.0 min.

Pond File: 7230 .PND
Inflow Hydrograph: 7230-025.HYD
Outflow Hydrograph: 72300025.HYD

INFLOW HYDROGRAPH

| TIME (min) | INFLOW (cfs) |
|---|---|
| 0.0 | 0.00 |
| 1.0 | 18.10 |
| 2.0 | 36.09 |
| 3.0 | 54.19 |
| 4.0 | 72.29 |
| 5.0 | 90.38 |
| 6.0 | 108.38 |
| 7.0 | 126.47 |
| 8.0 | 144.57 |
| 9.0 | 162.57 |
| 10.0 | 180.66 |
| 11.0 | 198.76 |
| 12.0 | 198.70 |
| 13.0 | 198.70 |
| 14.0 | 198.70 |
| 15.0 | 198.70 |
| 16.0 | 198.70 |
| 17.0 | 198.70 |
| 18.0 | 198.70 |
| 19.0 | 198.70 |
| 20.0 | 198.70 |
| 21.0 | 180.68 |
| 22.0 | 162.68 |
| 23.0 | 144.58 |
| 24.0 | 126.59 |
| 25.0 | 108.49 |
| 26.0 | 90.39 |
| 27.0 | 72.40 |
| 28.0 | 54.30 |
| 29.0 | 36.20 |
| 30.0 | 18.21 |
| 31.0 | 0.11 |
| 32.0 | 0.00 |
| 33.0 | 0.00 |
| 34.0 | 0.00 |
| 35.0 | 0.00 |
| 36.0 | 0.00 |
| 37.0 | 0.00 |
| 38.0 | 0.00 |
| 39.0 | 0.00 |
| 40.0 | 0.00 |

ROUTING COMPUTATIONS

| I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
|---|---|---|---|---|
| ----- | 1487.5 | 1487.5 | 0.00 | 510.00 |
| 18.1 | 1505.0 | 1505.6 | 0.31 | 510.04 |
| 54.2 | 1556.7 | 1559.2 | 1.23 | 510.15 |
| 90.3 | 1638.8 | 1647.0 | 4.11 | 510.33 |
| 126.5 | 1747.1 | 1765.3 | 9.06 | 510.57 |
| 162.7 | 1877.1 | 1909.8 | 16.37 | 510.85 |
| 198.8 | 2023.6 | 2075.8 | 26.10 | 511.15 |
| 234.9 | 2182.7 | 2258.5 | 37.91 | 511.48 |
| 271.0 | 2350.7 | 2453.7 | 51.50 | 511.82 |
| 307.1 | 2524.7 | 2657.8 | 66.60 | 512.16 |
| 343.2 | 2702.3 | 2867.9 | 82.80 | 512.50 |
| 379.4 | 2882.0 | 3081.7 | 99.85 | 512.83 |
| 397.5 | 3047.3 | 3279.5 | 116.08 | 513.13 |
| 397.4 | 3184.9 | 3444.7 | 129.90 | 513.37 |
| 397.4 | 3299.3 | 3582.3 | 141.49 | 513.57 |
| 397.4 | 3394.2 | 3696.7 | 151.27 | 513.73 |
| 397.4 | 3472.8 | 3791.6 | 159.39 | 513.86 |
| 397.4 | 3537.8 | 3870.2 | 166.21 | 513.97 |
| 397.4 | 3591.4 | 3935.2 | 171.87 | 514.06 |
| 397.4 | 3635.8 | 3988.8 | 176.54 | 514.13 |
| 397.4 | 3672.4 | 4033.2 | 180.40 | 514.19 |
| 379.4 | 3687.7 | 4051.8 | 182.01 | 514.22 |
| 343.4 | 3670.7 | 4031.1 | 180.22 | 514.19 |
| 307.3 | 3626.7 | 3977.9 | 175.59 | 514.12 |
| 271.2 | 3560.7 | 3897.9 | 168.62 | 514.01 |
| 235.1 | 3476.2 | 3795.7 | 159.75 | 513.87 |
| 198.9 | 3376.3 | 3675.1 | 149.42 | 513.70 |
| 162.8 | 3263.4 | 3539.1 | 137.85 | 513.51 |
| 126.7 | 3139.5 | 3390.1 | 125.30 | 513.29 |
| 90.5 | 3006.0 | 3230.0 | 111.98 | 513.05 |
| 54.4 | 2864.1 | 3060.4 | 98.14 | 512.80 |
| 18.3 | 2714.6 | 2882.4 | 83.94 | 512.52 |
| 0.1 | 2572.8 | 2714.7 | 70.92 | 512.25 |
| 0.0 | 2452.4 | 2572.8 | 60.23 | 512.02 |
| 0.0 | 2349.6 | 2452.4 | 51.40 | 511.82 |
| 0.0 | 2261.3 | 2349.6 | 44.12 | 511.64 |
| 0.0 | 2185.1 | 2261.3 | 38.10 | 511.49 |
| 0.0 | 2119.2 | 2185.1 | 32.98 | 511.35 |
| 0.0 | 2061.6 | 2119.2 | 28.79 | 511.23 |
| 0.0 | 2011.1 | 2061.6 | 25.23 | 511.13 |
| 0.0 | 1966.8 | 2011.1 | 22.17 | 511.04 |

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

Pond File: 7230 .PND
Inflow Hydrograph: 7230-025.HYD
Outflow Hydrograph: 72300025.HYD

Starting Pond W.S. Elevation = 510.00 ft

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

| | | |
|---|---|---|
| Peak Inflow | = | 198.76 cfs |
| Peak Outflow | = | 182.01 cfs |
| Peak Elevation | = | 514.22 ft |

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

| | | |
|---|---|---|
| Initial Storage | = | 1.02 ac-ft |
| Peak Storage From Storm | = | 1.64 ac-ft |
| Total Storage in Pond | = | 2.67 ac-ft |

POND-2 Version: 5.17 S/N:

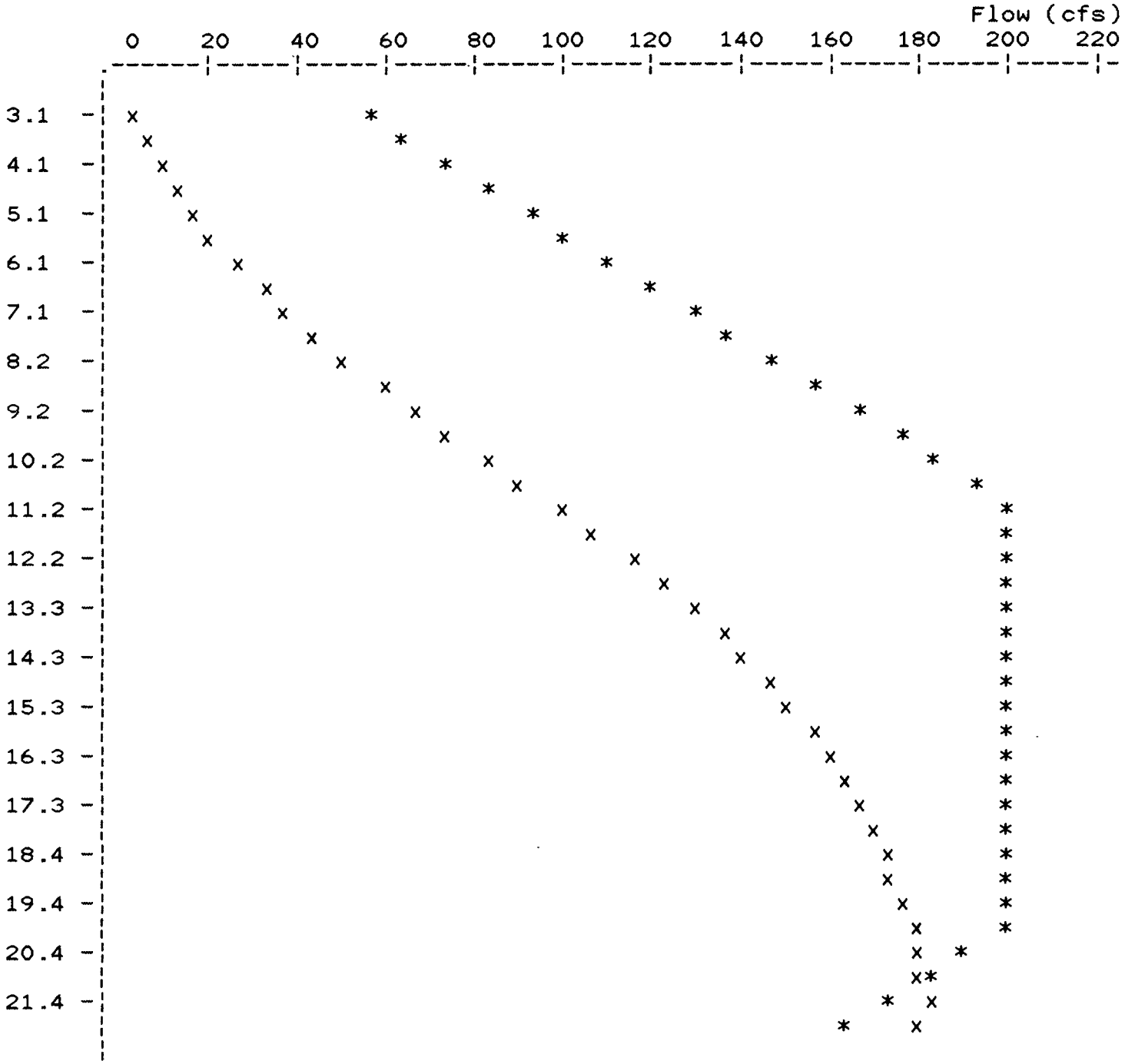
20 MIN

Return Freq: 25 years

Pond File: 7230 .PND
Inflow Hydrograph: 7230-025.HYD
Outflow Hydrograph: 72300025.HYD

EXECUTED: 08-12-1997
10:39:13

Peak Inflow = 198.76 cfs
Peak Outflow = 182.01 cfs
Peak Elevation = 514.22 ft




x File: 7230-025.HYD Qmax = 182.0 cfs
* File: 72300025.HYD Qmax = 198.8 cfs

POND-2 Version: 5.17 S/[redacted]
EXECUTED: 08-12-1997 [redacted]:39:13 20 MIN [redacted] Return Freq: 100 years

```
**********************************
*                                *
*       AVONDALE PHASE 2         *
*      DETENTION ANALYSIS        *
*   BAX ENGINEERING CO., INC.    *
*         AUGUST 1997            *
*                                *
**********************************
```

Inflow Hydrograph: 7230-100.HYD
Rating Table file: 7230 .PND

----INITIAL CONDITIONS----
Elevation = 510.00 ft
Outflow = 0.00 cfs
Storage = 1.02 ac-ft

GIVEN POND DATA

| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (ac-ft) |
|---|---|---|
| 510.00 | 0.0 | 1.024 |
| 510.15 | 1.2 | 1.072 |
| 510.30 | 3.5 | 1.121 |
| 510.45 | 6.3 | 1.170 |
| 510.60 | 9.8 | 1.220 |
| 510.75 | 13.6 | 1.271 |
| 510.90 | 17.9 | 1.322 |
| 511.05 | 22.6 | 1.375 |
| 511.20 | 27.6 | 1.428 |
| 511.35 | 32.9 | 1.481 |
| 511.50 | 38.6 | 1.536 |
| 511.65 | 44.5 | 1.591 |
| 511.80 | 50.7 | 1.647 |
| 511.95 | 57.2 | 1.704 |
| 512.10 | 63.9 | 1.762 |
| 512.25 | 70.9 | 1.821 |
| 512.40 | 78.1 | 1.880 |
| 512.55 | 85.5 | 1.940 |
| 512.70 | 93.2 | 2.001 |
| 512.85 | 101.0 | 2.063 |
| 513.00 | 109.1 | 2.125 |
| 513.15 | 117.4 | 2.189 |
| 513.30 | 125.9 | 2.253 |
| 513.45 | 134.6 | 2.318 |
| 513.60 | 143.4 | 2.384 |
| 513.75 | 152.5 | 2.451 |
| 513.90 | 161.7 | 2.518 |
| 514.05 | 171.2 | 2.587 |
| 514.20 | 180.8 | 2.656 |
| 514.35 | 190.5 | 2.727 |
| 514.50 | 200.5 | 2.798 |

INTERMEDIATE ROUTING COMPUTATIONS

| 2S/t (cfs) | 2S/t + O (cfs) |
|---|---|
| 1487.5 | 1487.5 |
| 1556.9 | 1558.1 |
| 1627.4 | 1630.9 |
| 1698.9 | 1705.2 |
| 1771.5 | 1781.3 |
| 1845.2 | 1858.8 |
| 1920.0 | 1937.9 |
| 1995.9 | 2018.5 |
| 2072.9 | 2100.5 |
| 2151.0 | 2183.9 |
| 2230.2 | 2268.8 |
| 2310.6 | 2355.1 |
| 2392.1 | 2442.8 |
| 2474.7 | 2531.9 |
| 2558.5 | 2622.4 |
| 2643.5 | 2714.4 |
| 2729.7 | 2807.8 |
| 2816.9 | 2902.4 |
| 2905.4 | 2998.6 |
| 2995.1 | 3096.1 |
| 3086.0 | 3195.1 |
| 3178.1 | 3295.5 |
| 3271.3 | 3397.2 |
| 3365.9 | 3500.5 |
| 3461.6 | 3605.0 |
| 3558.6 | 3711.1 |
| 3656.8 | 3818.5 |
| 3756.3 | 3927.5 |
| 3857.0 | 4037.8 |
| 3959.0 | 4149.5 |
| 4062.3 | 4262.8 |

GIVEN POND DATA

| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (ac-ft) |
|---|---|---|
| 514.65 | 212.3 | 2.870 |
| 514.80 | 225.8 | 2.943 |
| 514.95 | 240.3 | 3.016 |
| 515.10 | 255.8 | 3.091 |
| 515.25 | 272.1 | 3.167 |
| 515.40 | 289.1 | 3.243 |
| 515.55 | 306.9 | 3.320 |
| 515.70 | 325.2 | 3.399 |
| 515.85 | 344.2 | 3.478 |
| 516.00 | 363.7 | 3.558 |

INTERMEDIATE ROUTING COMPUTATIONS

| 2S/t (cfs) | 2S/t + O (cfs) |
|---|---|
| 4166.8 | 4379.1 |
| 4272.6 | 4498.4 |
| 4379.7 | 4620.0 |
| 4488.1 | 4743.9 |
| 4597.9 | 4870.0 |
| 4708.9 | 4998.0 |
| 4821.3 | 5128.2 |
| 4935.0 | 5260.2 |
| 5050.0 | 5394.2 |
| 5166.4 | 5530.1 |

Time increment (t) = 1.0 min.

POND-2 Version: 5.17 S/[redacted]
EXECUTED: 08-12-1997 [redacted]:39:13 20 MIN [redacted] Return Freq: 100 years

Pond File: 7230 .PND
Inflow Hydrograph: 7230-100.HYD
Outflow Hydrograph: 72300100.HYD

INFLOW HYDROGRAPH

| TIME (min) | INFLOW (cfs) |
|---|---|
| 0.0 | 0.00 |
| 1.0 | 23.15 |
| 2.0 | 46.17 |
| 3.0 | 69.33 |
| 4.0 | 92.49 |
| 5.0 | 115.63 |
| 6.0 | 138.66 |
| 7.0 | 161.80 |
| 8.0 | 184.96 |
| 9.0 | 207.99 |
| 10.0 | 231.14 |
| 11.0 | 254.29 |
| 12.0 | 254.21 |
| 13.0 | 254.21 |
| 14.0 | 254.21 |
| 15.0 | 254.21 |
| 16.0 | 254.21 |
| 17.0 | 254.21 |
| 18.0 | 254.21 |
| 19.0 | 254.21 |
| 20.0 | 254.21 |
| 21.0 | 231.16 |
| 22.0 | 208.13 |
| 23.0 | 184.98 |
| 24.0 | 161.95 |
| 25.0 | 138.80 |
| 26.0 | 115.64 |
| 27.0 | 92.63 |
| 28.0 | 69.47 |
| 29.0 | 46.31 |
| 30.0 | 23.29 |
| 31.0 | 0.14 |
| 32.0 | 0.00 |
| 33.0 | 0.00 |
| 34.0 | 0.00 |
| 35.0 | 0.00 |
| 36.0 | 0.00 |
| 37.0 | 0.00 |
| 38.0 | 0.00 |
| 39.0 | 0.00 |
| 40.0 | 0.00 |

ROUTING COMPUTATIONS

| I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
|---|---|---|---|---|
| ----- | 1487.5 | 1487.5 | 0.00 | 510.00 |
| 23.2 | 1509.9 | 1510.6 | 0.39 | 510.05 |
| 69.3 | 1575.4 | 1579.2 | 1.87 | 510.19 |
| 115.5 | 1679.4 | 1690.9 | 5.76 | 510.42 |
| 161.8 | 1815.8 | 1841.2 | 12.74 | 510.72 |
| 208.1 | 1978.0 | 2023.9 | 22.93 | 511.06 |
| 254.3 | 2160.0 | 2232.3 | 36.15 | 511.44 |
| 300.5 | 2356.5 | 2460.5 | 51.99 | 511.83 |
| 346.8 | 2563.2 | 2703.3 | 70.05 | 512.23 |
| 393.0 | 2776.5 | 2956.1 | 89.79 | 512.63 |
| 439.1 | 2994.0 | 3215.6 | 110.80 | 513.03 |
| 485.4 | 3213.8 | 3479.5 | 132.83 | 513.42 |
| 508.5 | 3415.4 | 3722.3 | 153.46 | 513.77 |
| 508.4 | 3582.0 | 3923.8 | 170.88 | 514.04 |
| 508.4 | 3719.7 | 4090.5 | 185.37 | 514.27 |
| 508.4 | 3833.2 | 4228.1 | 197.44 | 514.45 |
| 508.4 | 3924.7 | 4341.7 | 208.50 | 514.60 |
| 508.4 | 3996.3 | 4433.1 | 218.41 | 514.72 |
| 508.4 | 4051.6 | 4504.7 | 226.55 | 514.81 |
| 508.4 | 4093.7 | 4560.0 | 233.14 | 514.88 |
| 508.4 | 4125.8 | 4602.1 | 238.17 | 514.93 |
| 485.4 | 4132.7 | 4611.2 | 239.24 | 514.94 |
| 439.3 | 4102.8 | 4572.0 | 234.57 | 514.89 |
| 393.1 | 4044.9 | 4496.0 | 225.52 | 514.80 |
| 346.9 | 3964.4 | 4391.8 | 213.74 | 514.67 |
| 300.8 | 3863.6 | 4265.1 | 200.74 | 514.50 |
| 254.4 | 3742.5 | 4118.1 | 187.77 | 514.31 |
| 208.3 | 3604.3 | 3950.8 | 173.23 | 514.08 |
| 162.1 | 3452.0 | 3766.4 | 157.24 | 513.83 |
| 115.8 | 3287.2 | 3567.7 | 140.26 | 513.55 |
| 69.6 | 3111.8 | 3356.8 | 122.52 | 513.24 |
| 23.4 | 2926.8 | 3135.2 | 104.20 | 512.91 |
| 0.1 | 2752.0 | 2926.9 | 87.46 | 512.59 |
| 0.0 | 2604.4 | 2752.0 | 73.80 | 512.31 |
| 0.0 | 2479.3 | 2604.4 | 62.57 | 512.07 |
| 0.0 | 2372.6 | 2479.3 | 53.36 | 511.86 |
| 0.0 | 2281.1 | 2372.6 | 45.74 | 511.68 |
| 0.0 | 2202.2 | 2281.1 | 39.44 | 511.52 |
| 0.0 | 2133.9 | 2202.2 | 34.13 | 511.38 |
| 0.0 | 2074.5 | 2133.9 | 29.73 | 511.26 |
| 0.0 | 2022.5 | 2074.5 | 26.02 | 511.15 |

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

Pond File: 7230 .PND
Inflow Hydrograph: 7230-100.HYD
Outflow Hydrograph: 72300100.HYD

Starting Pond W.S. Elevation = 510.00 ft

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

| | | |
|---|---|---|
| Peak Inflow | = | 254.29 cfs |
| Peak Outflow | = | 239.24 cfs |
| Peak Elevation | = | 514.94 ft |

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

| | | |
|---|---|---|
| Initial Storage | = | 1.02 ac-ft |
| Peak Storage From Storm | = | 1.99 ac-ft |
| Total Storage in Pond | = | 3.01 ac-ft |

POND-2 Version: 5.17 S/N:

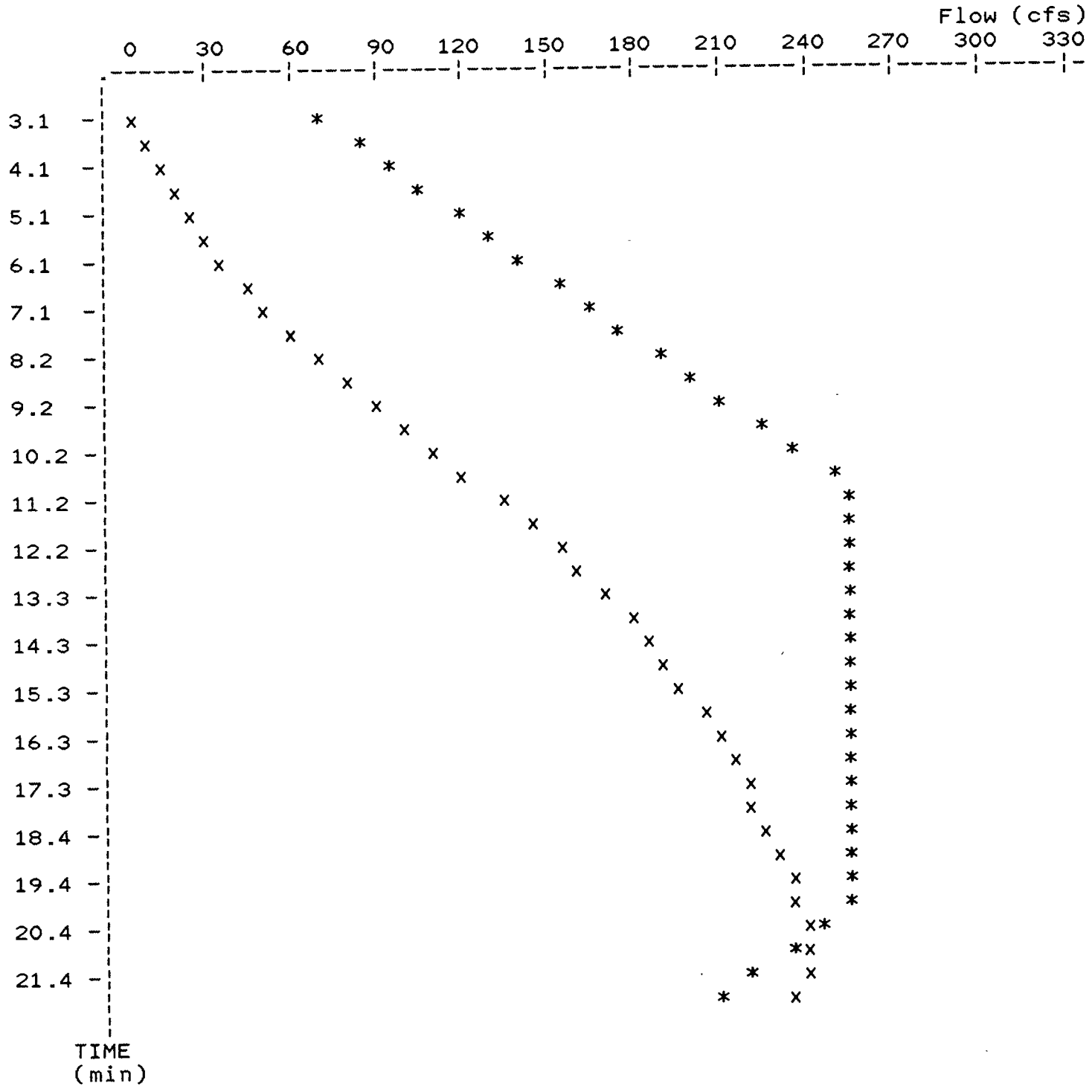
20 MIN

Return Freq: 100 years

Pond File: 7230 .PND
Inflow Hydrograph: 7230-100.HYD
Outflow Hydrograph: 72300100.HYD

EXECUTED: 08-12-1997
10:39:13

Peak Inflow = 254.29 cfs
Peak Outflow = 239.24 cfs
Peak Elevation = 514.94 ft




x File: 7230-100.HYD Qmax = 239.2 cfs
* File: 72300100.HYD Qmax = 254.3 cfs

Outlet Structure File: 7230 .STR

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

**********
AVONDALE PHASE 2
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
AUGUST 1997
**********

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

| Elevation (ft) | Q (cfs) | Contributing Structures |
|---|---|---|
| 510.00 | 0.0 | 1 |
| 510.15 | 1.2 | 1 |
| 510.30 | 3.5 | 1 |
| 510.45 | 6.3 | 1 |
| 510.60 | 9.8 | 1 |
| 510.75 | 13.6 | 1 |
| 510.90 | 17.9 | 1 |
| 511.05 | 22.6 | 1 |
| 511.20 | 27.6 | 1 |
| 511.35 | 32.9 | 1 |
| 511.50 | 38.6 | 1 |
| 511.65 | 44.5 | 1 |
| 511.80 | 50.7 | 1 |
| 511.95 | 57.2 | 1 |
| 512.10 | 63.9 | 1 |
| 512.25 | 70.9 | 1 |
| 512.40 | 78.1 | 1 |
| 512.55 | 85.5 | 1 |
| 512.70 | 93.2 | 1 |
| 512.85 | 101.0 | 1 |
| 513.00 | 109.1 | 1 |
| 513.15 | 117.4 | 1 |
| 513.30 | 125.9 | 1 |
| 513.45 | 134.6 | 1 |
| 513.60 | 143.4 | 1 |
| 513.75 | 152.5 | 1 |
| 513.90 | 161.7 | 1 |
| 514.05 | 171.2 | 1 |
| 514.20 | 180.8 | 1 |
| 514.35 | 190.5 | 1 |
| 514.50 | 200.5 | 3 +1 |
| 514.65 | 212.3 | 3 +1 |
| 514.80 | 225.8 | 3 +1 |
| 514.95 | 240.3 | 3 +1 |
| 515.10 | 255.8 | 3 +1 |
| 515.25 | 272.1 | 3 +1 |
| 515.40 | 289.1 | 3 +1 |
| 515.55 | 306.9 | 3 +1 |
| 515.70 | 325.2 | 3 +1 |
| 515.85 | 344.2 | 3 +1 |
| 516.00 | 363.7 | 3 +1 |

Outlet Structure File: 7230 .STR

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

**********
AVONDALE PHASE 2
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
AUGUST 1997
**********

Outlet Structure File: 7230 .STR
Planimeter Input File: 7230 .VOL
Rating Table Output File: 7230 .PND

Min. Elev.(ft) = 510 Max. Elev.(ft) = 516 Incr.(ft) = .15

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

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

| Structure | No. | Q Table | | Q Table |
|---|---|---|---|---|
| WEIR-VR | 3 | | -> | 3 |
| WEIR-VR | 1 | | -> | 1 |

Outflow rating table summary was stored in file:
7230 .PND

Outlet Structure File: 7230 .STR

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

**********
AVONDALE PHASE 2
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
AUGUST 1997
**********

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

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)? 514.5
E2 elev.(ft)? 516.001
Weir coefficient? 3
Weir elev.(ft)? 514.500
Length (ft)? 10
Contracted/Suppressed (C/S)? S

Outlet Structure File: 7230 .STR

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

**********
AVONDALE PHASE 2
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
AUGUST 1997
**********

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

WEIR-VR
Weir - Vertical Rectangular

| | |
|---|---|
| E1 elev.(ft)? | 510 |
| E2 elev.(ft)? | 516.001 |
| Weir coefficient? | 3 |
| Weir elev.(ft)? | 510.00 |
| Length (ft)? | 7.00000 |
| Contracted/Suppressed (C/S)? | S |

Outlet Structure File: 7230 .STR

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

**********
AVONDALE PHASE 2
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
AUGUST 1997
**********

Outflow Rating Table for Structure #3
WEIR-VR Weir - Vertical Rectangular

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

| Elevation (ft) | Q (cfs) | Computation Messages |
|---|---|---|
| 510.00 | 0.0 | E < Inv.El.= 514.5 |
| 510.15 | 0.0 | E < Inv.El.= 514.5 |
| 510.30 | 0.0 | E < Inv.El.= 514.5 |
| 510.45 | 0.0 | E < Inv.El.= 514.5 |
| 510.60 | 0.0 | E < Inv.El.= 514.5 |
| 510.75 | 0.0 | E < Inv.El.= 514.5 |
| 510.90 | 0.0 | E < Inv.El.= 514.5 |
| 511.05 | 0.0 | E < Inv.El.= 514.5 |
| 511.20 | 0.0 | E < Inv.El.= 514.5 |
| 511.35 | 0.0 | E < Inv.El.= 514.5 |
| 511.50 | 0.0 | E < Inv.El.= 514.5 |
| 511.65 | 0.0 | E < Inv.El.= 514.5 |
| 511.80 | 0.0 | E < Inv.El.= 514.5 |
| 511.95 | 0.0 | E < Inv.El.= 514.5 |
| 512.10 | 0.0 | E < Inv.El.= 514.5 |
| 512.25 | 0.0 | E < Inv.El.= 514.5 |
| 512.40 | 0.0 | E < Inv.El.= 514.5 |
| 512.55 | 0.0 | E < Inv.El.= 514.5 |
| 512.70 | 0.0 | E < Inv.El.= 514.5 |
| 512.85 | 0.0 | E < Inv.El.= 514.5 |
| 513.00 | 0.0 | E < Inv.El.= 514.5 |
| 513.15 | 0.0 | E < Inv.El.= 514.5 |
| 513.30 | 0.0 | E < Inv.El.= 514.5 |
| 513.45 | 0.0 | E < Inv.El.= 514.5 |
| 513.60 | 0.0 | E < Inv.El.= 514.5 |
| 513.75 | 0.0 | E < Inv.El.= 514.5 |
| 513.90 | 0.0 | E < Inv.El.= 514.5 |
| 514.05 | 0.0 | E < Inv.El.= 514.5 |
| 514.20 | 0.0 | E < Inv.El.= 514.5 |
| 514.35 | 0.0 | E < Inv.El.= 514.5 |
| 514.50 | 0.0 | H =0.0 |
| 514.65 | 1.7 | H =.15 |
| 514.80 | 4.9 | H =.3 |
| 514.95 | 9.1 | H =.45 |

Outlet Structure File: 7230 .STR

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

›››› CONTINUED from previous page ‹‹‹‹

Outflow Rating Table for Structure #3
WEIR-VR Weir - Vertical Rectangular

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

| Elevation (ft) | Q (cfs) | Computation Messages |
|---|---|---|
| 515.10 | 13.9 | H =.6 |
| 515.25 | 19.5 | H =.750 |
| 515.40 | 25.6 | H =.9 |
| 515.55 | 32.3 | H =1.05 |
| 515.70 | 39.4 | H =1.2 |
| 515.85 | 47.1 | H =1.35 |
| 516.00 | 55.1 | H =1.5 |

C = 3 L (ft) = 10
H (ft) = Table elev. - Invert elev. ( 514.5 ft )
Q (cfs) = C * L * (H**1.5) -- Suppressed Weir

Outlet Structure File: 7230 .STR

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

**********
AVONDALE PHASE 2
DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING CO., INC.
AUGUST 1997
**********

Outflow Rating Table for Structure #1
WEIR-VR Weir - Vertical Rectangular

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

| Elevation (ft) | Q (cfs) | Computation Messages |
|---|---|---|
| 510.00 | 0.0 | H =0.0 |
| 510.15 | 1.2 | H =.15 |
| 510.30 | 3.5 | H =.3 |
| 510.45 | 6.3 | H =.45 |
| 510.60 | 9.8 | H =.6 |
| 510.75 | 13.6 | H =.750 |
| 510.90 | 17.9 | H =.9 |
| 511.05 | 22.6 | H =1.05 |
| 511.20 | 27.6 | H =1.2 |
| 511.35 | 32.9 | H =1.35 |
| 511.50 | 38.6 | H =1.5 |
| 511.65 | 44.5 | H =1.65 |
| 511.80 | 50.7 | H =1.8 |
| 511.95 | 57.2 | H =1.95 |
| 512.10 | 63.9 | H =2.1 |
| 512.25 | 70.9 | H =2.25 |
| 512.40 | 78.1 | H =2.4 |
| 512.55 | 85.5 | H =2.55 |
| 512.70 | 93.2 | H =2.7 |
| 512.85 | 101.0 | H =2.85 |
| 513.00 | 109.1 | H =3.0 |
| 513.15 | 117.4 | H =3.15 |
| 513.30 | 125.9 | H =3.3 |
| 513.45 | 134.6 | H =3.45 |
| 513.60 | 143.4 | H =3.6 |
| 513.75 | 152.5 | H =3.75 |
| 513.90 | 161.7 | H =3.9 |
| 514.05 | 171.2 | H =4.05 |
| 514.20 | 180.8 | H =4.2 |
| 514.35 | 190.5 | H =4.35 |
| 514.50 | 200.5 | H =4.5 |
| 514.65 | 210.6 | H =4.65 |
| 514.80 | 220.8 | H =4.8 |
| 514.95 | 231.3 | H =4.95 |

Outlet Structure File: 7230 .STR

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

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

Outflow Rating Table for Structure #1
WEIR-VR Weir - Vertical Rectangular

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

| Elevation (ft) | Q (cfs) | Computation Messages |
|---|---|---|
| 515.10 | 241.9 | H =5.1 |
| 515.25 | 252.6 | H =5.25 |
| 515.40 | 263.5 | H =5.4 |
| 515.55 | 274.6 | H =5.55 |
| 515.70 | 285.8 | H =5.7 |
| 515.85 | 297.1 | H =5.85 |
| 516.00 | 308.6 | H =6.0 |

C = 3 L (ft) = 7
H (ft) = Table elev. - Invert elev. ( 510 ft )
Q (cfs) = C * L * (H**1.5) -- Suppressed Weir

1997

ENGINEERING

PLANNING

SURVEYING

AVONDALE PHASE 2 - O'FALLON
BAX ROJECT NO. 96-7230D
August 26, 1997

In addendum to the STORMWATER DETENTION ANALYSIS - AUG. 1997 the 2, 5 and 15 year 20 minute storm routings were calculated as follows.

BASIN PEAK INFLOWS:

2 year-20 minute storm

| | | |
|---|---|---|
| Q(onsite) | 32.2 x 1.61 = | 51.84 cfs |
| Q(offsite) | 28.8 x 1.61 = | 46.37 cfs |
| | Total | 98.21 cfs |

5 year-20 minute storm

| | | |
|---|---|---|
| Q(onsite) | 32.2 x 1.98 = | 63.76 cfs |
| Q(offsite) | 28.8 x 1.98 = | 57.02 cfs |
| | Total | 120.78 cfs |

15 year-20 minute storm

| | | |
|---|---|---|
| Q(onsite) | 32.2 x 2.64 = | 85.01 cfs |
| Q(offsite) | 28.8 x 2.64 = | 76.03 cfs |
| | Total | 161.04 cfs |

STORM ROUTING CALCULATIONS AND RESULTS:

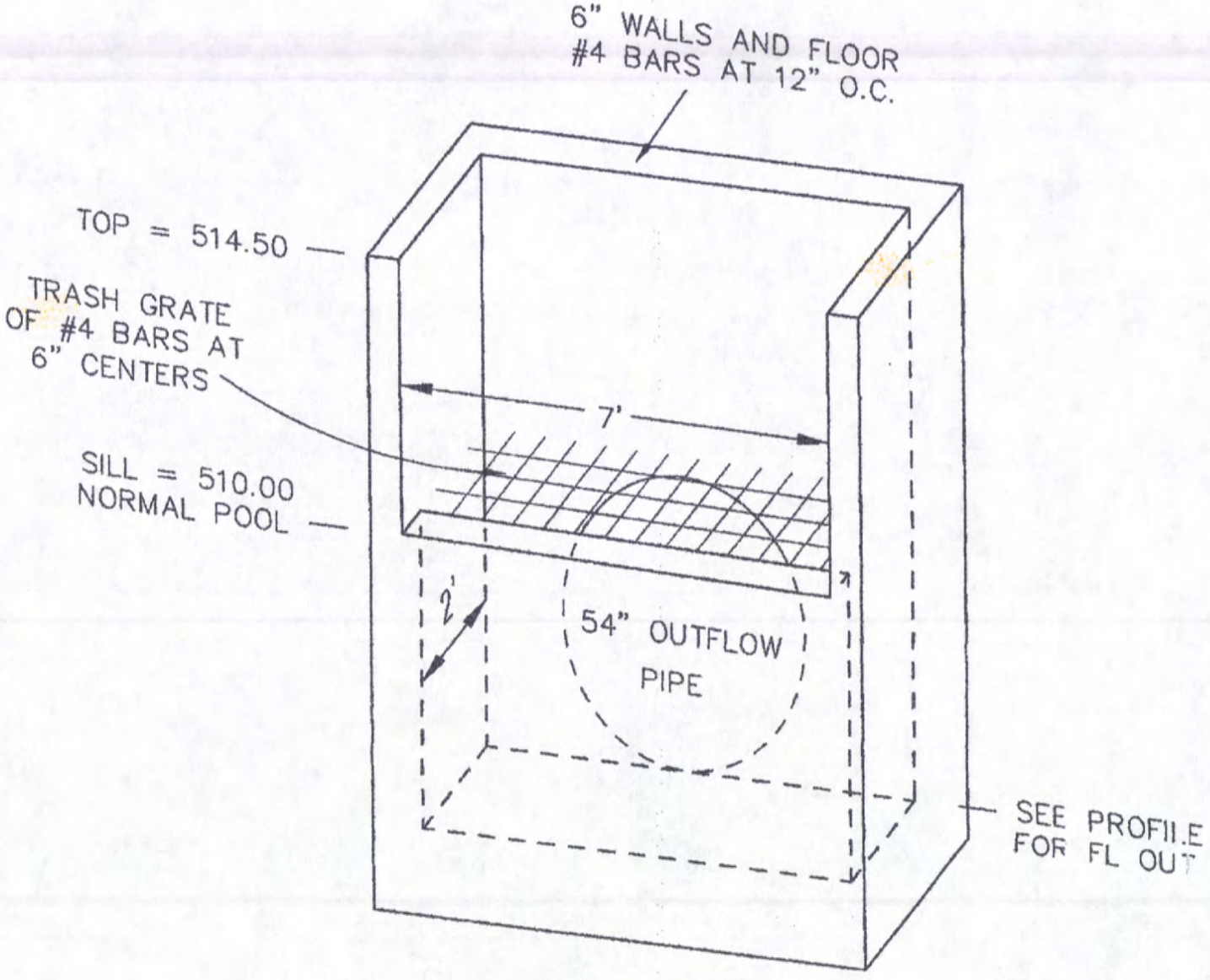
A computer program was used in routing the design 25 and 100 year-20 minute storms through the basin. As found in the routing calculations, the results are as follows:

| 20 MIN STORM | CALCULATED RELEASE RATE | ATTENUATION PROVIDED | PEAK ELEVATION |
|---|---|---|---|
| 2 YEAR | 86.86 cfs | 11.38 cfs | 512.58 ft. |
| 5 YEAR | 108.18 cfs | 12.64 cfs | 512.98 ft. |
| 15 YEAR | 146.30 cfs | 14.79 cfs | 513.65 ft. |

BAX ENGINEERING CO., INC.
1052 South Cloverleaf Drive
St. Peters, MO 63376-6445
314-928-5552 FAX 928-1718

**BAX ENGINEERING**
*Engineering - Planning - Surveying*
1052 South Cloverleaf Drive
St. Peters, MO 63376-6445
314-928-5552
FAX 928-1718

Project: AVONDALE Ph 2 SHEET ___ of ___
Date: _____ Project No: _____
Designed: _____ Checked: _____




OS 314

NOT TO SCALE