DETENTION CALCULATIONS

Osage Meadows

Total Site: 97.8 Acres

Developed Conditions: 97.8 Acres @ 2.4 cfs/Ac = 234.72 cfs

Undeveloped Conditions: 97.8 Acres @ 1.7 cfs/Ac = 166.26 cfs

Differential 68.46 cfs

Required Storage (30 minutes):

68.46 cfs x 1800 sec. = 123,228 Ft³

Storage Provided:

143,062 Ft³ @ Elev. 587.0

INDENTATIONS

Allowable Release Rate:

Undeveloped Conditions:

Flow at North Property Line: 286 Acres @ 1.7 cfs/Ac = 486.2 cfs

Developed Flow Not Tributary to Detention Basin:

14. Acres @ 2.4 = 33.6 cfs

Detention Basin Release Rate: 486.2 - 33.6 = 452.6 cfs

Detention Basin Outlet Structure:

Assume 2' High Orifices per drwg.

Flow thru orifice: $Q = Ca\sqrt{2gh}$

$Q = 452.6$ (max.)

$C = 0.6$

a = area of orifice opening

$g = 32.2\ ft/sec^2$

h = head on orifice (ft)

Assume $a = 38\ Ft^2$ (2' x 19'), $h = 6'$

$Q = 448.2$ cfs

INDENTATIONS →

Size Outlet Pipe:

Design Storm Flow To Detention Area:

(286-14) = 272 Acres @ 2.4 cfs/Ac = 652.8 cfs

Use 90" RCP @ 0.8% ; capacity = 687 cfs

Size Outlet Structure:

Total Flow Through Structure is combination of weir flow and orifice flow.

Weir Flow: $Q = CLH^{3/2}$ $C = 3.0$ $H = 2'$ $L = 23'$ $Q = 195$ cfs

Orifice Flow: $Q = Ca\sqrt{2gh}$ (h = pace) $C = 0.6$ $g = 32.2$ ft/sec^2 $a = 38$ ft^2 $h = 8'$ $Q = 517.5$ cfs

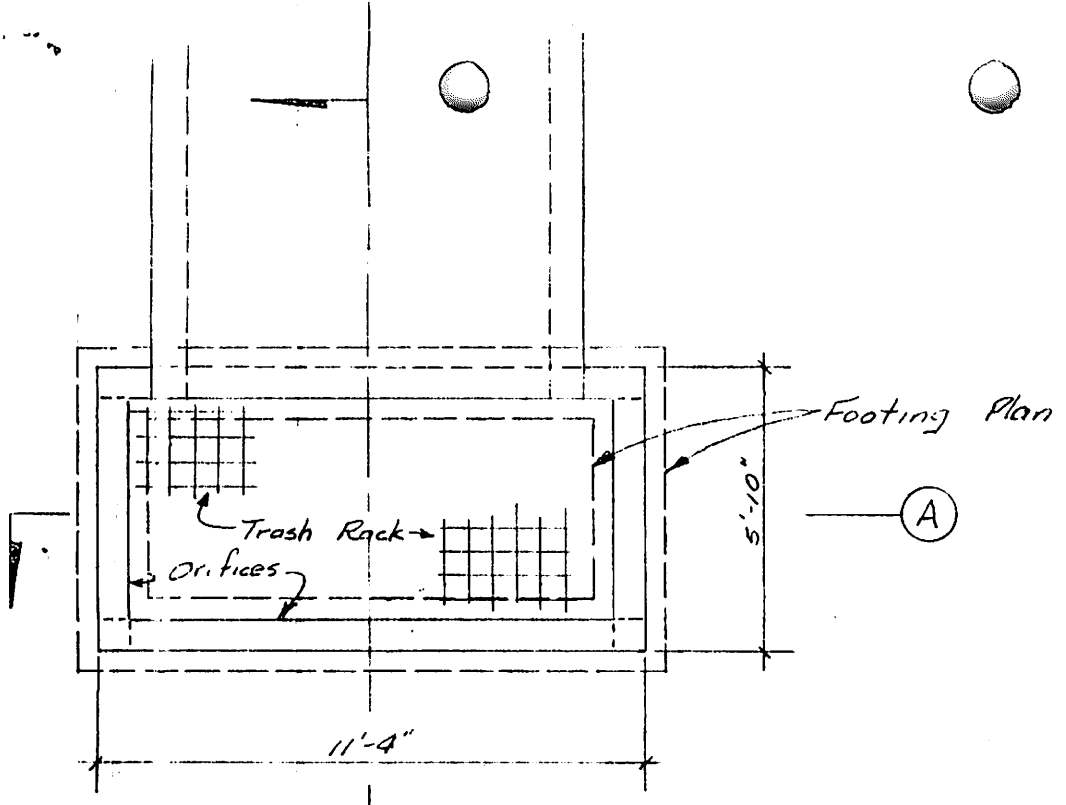
Total Flow Through Structure = 712 cfs

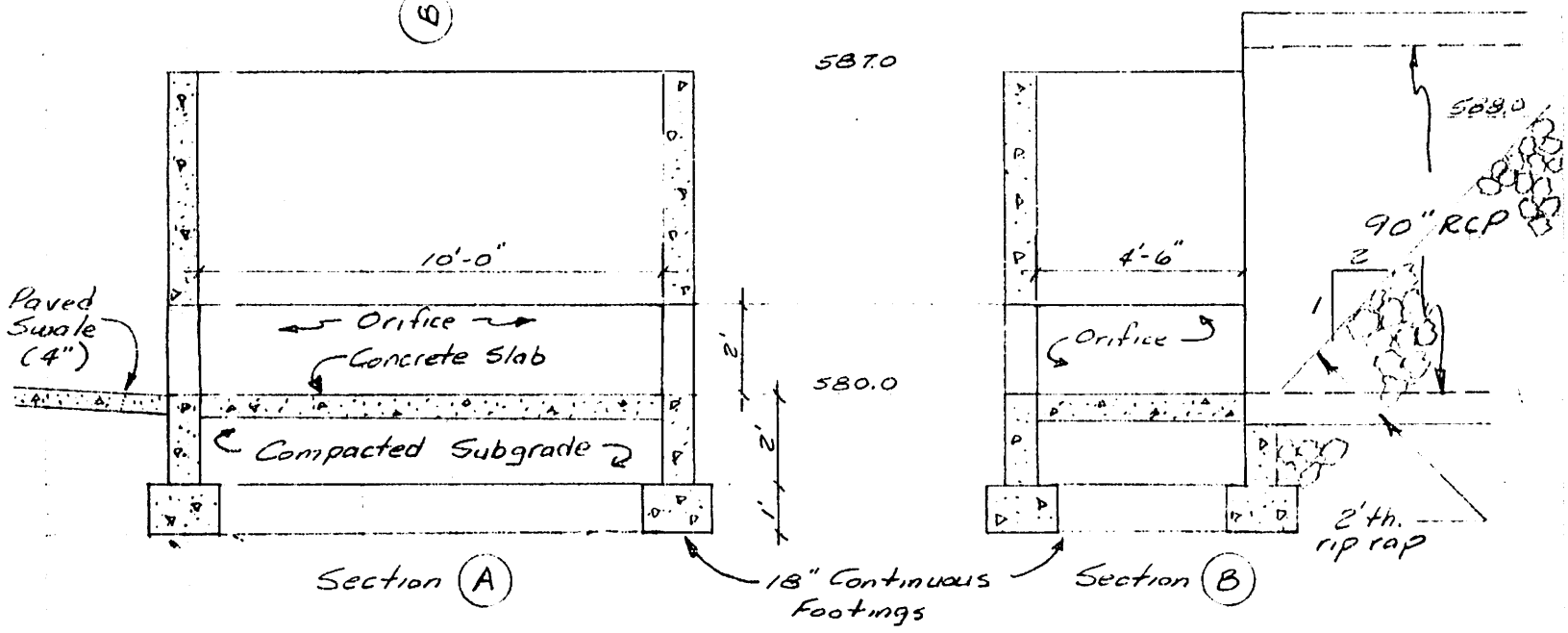
Stored Flow (Elev. 589.0) = 251 842 ft^3 ÷ 1800 sec = 139.9 cfs

Total Flow Accounted For in Basin = 851.9 cfs (exceeds required)

Osage Meadows
82-120

1" = 4'





Trash Rack: #4 bars welded together @ 6" o.c. secure to structure with clips and ½" anchor bolts @ 18" o.c. Fabricate in four equal sections

Concrete Slab: 6" thick reinforced with 6x6 W2.9 x W2.9 W.W.F.