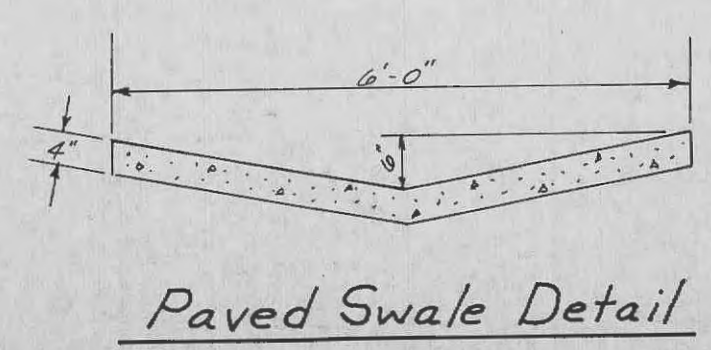
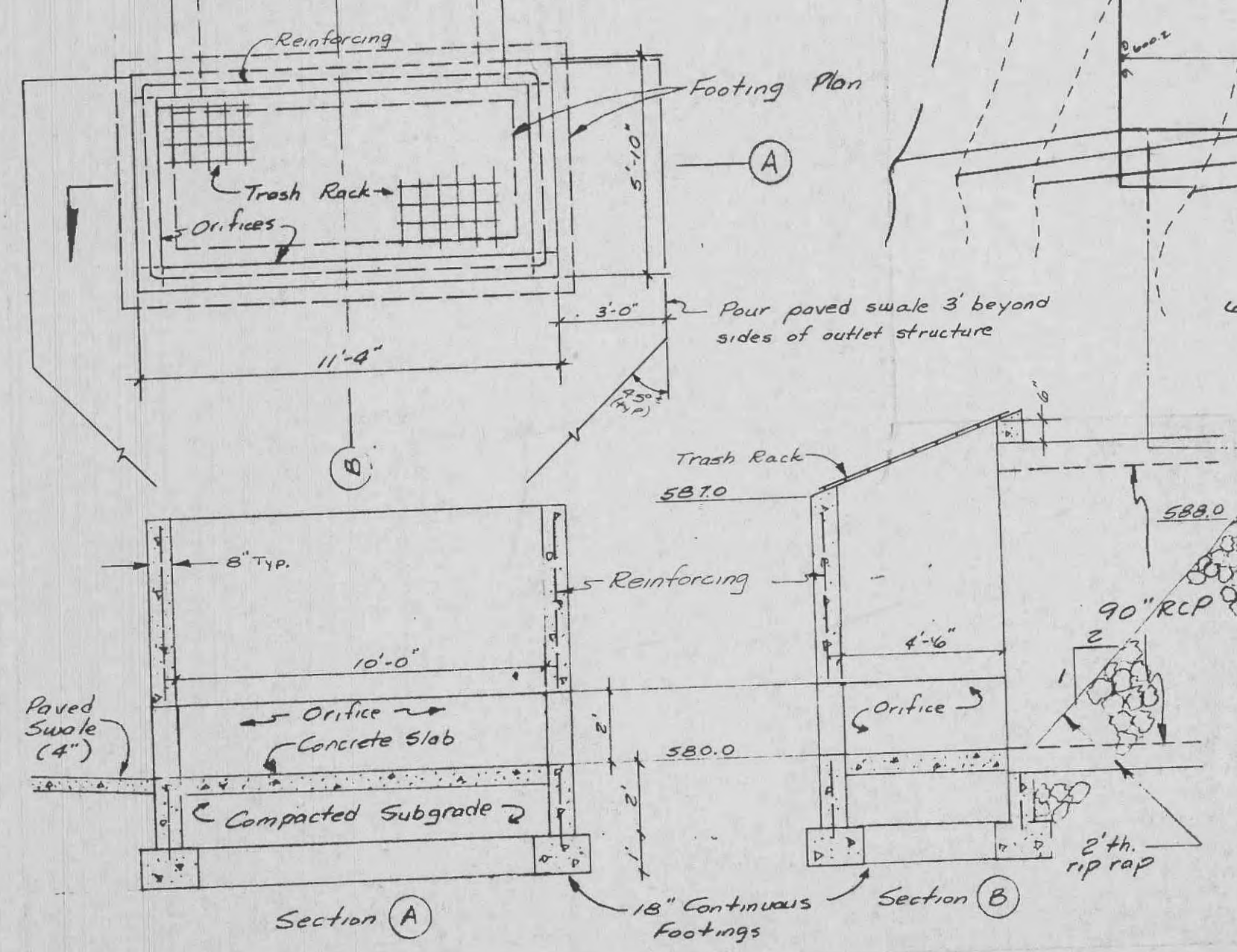
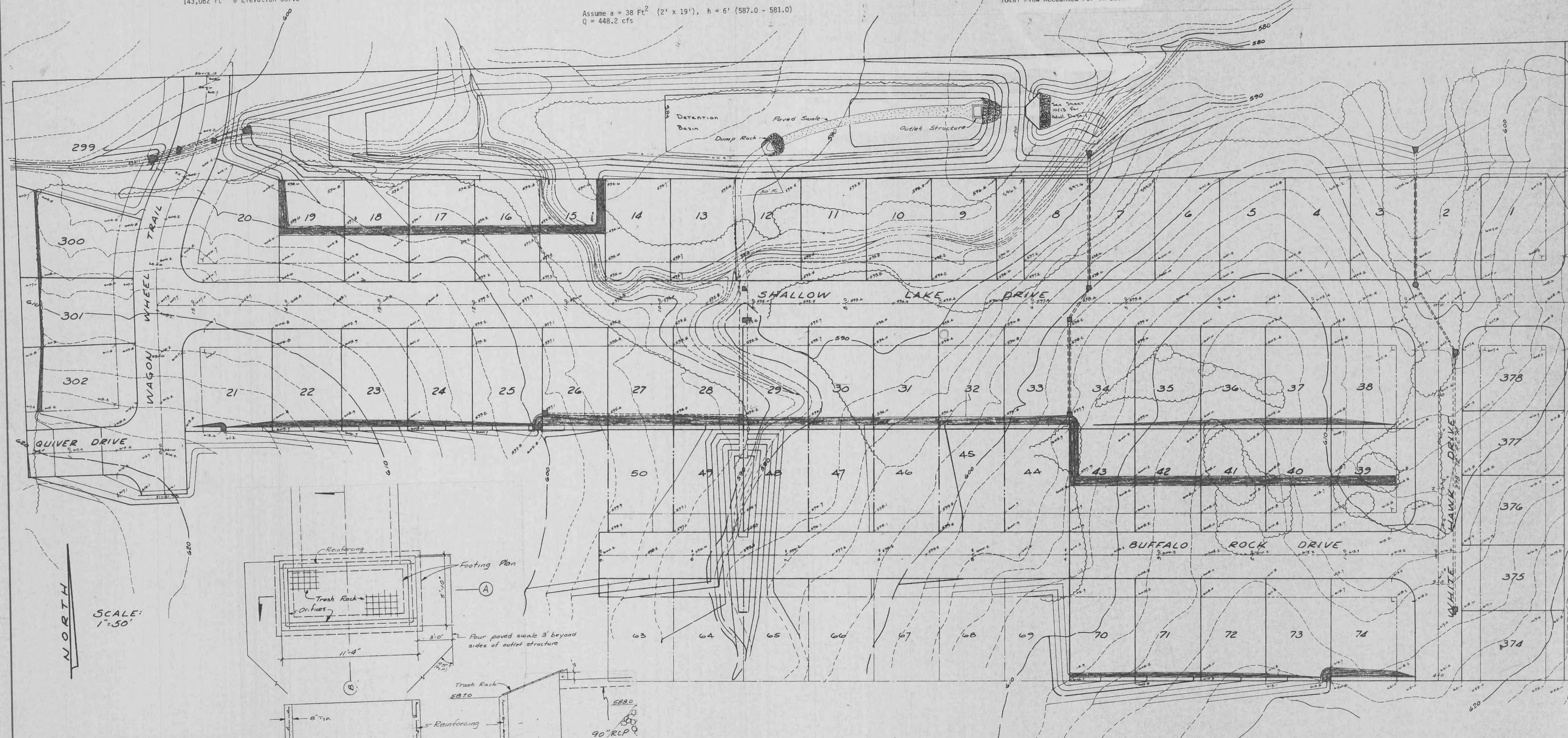


**DETENTION CALCULATIONS**  
Osage Meadows

Total Site: 97.8 Acres  
 Developed Conditions: 97.8 Acres @ 2.4 cfs/Acre = 234.72 cfs  
 Undeveloped Conditions: 97.8 Acres @ 1.7 cfs/Acre = 166.26 cfs  
 Differential = 68.46 cfs  
 Required Storage (30 minutes): 68.46 cfs x 1800 sec. = 123,228 ft.<sup>3</sup>  
 Storage Provided: 143,062 ft.<sup>3</sup> @ Elevation 587.0

**Allowable Release Rate:**  
 Undeveloped Conditions:  
 Flow at North Property Line: 286 Acres @ 1.7 cfs/Acre = 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 drawing  
 Flow through orifice:  
 $Q = Ca\sqrt{2gh}$   
 $Q = 452.6$  (max)  
 $c = 0.6$   
 $a =$  area of orifice opening  
 $g = 32.2$  ft/sec<sup>2</sup>  
 $h =$  head on orifice (ft)  
 Assume  $a = 38$  Ft<sup>2</sup> (2' x 19'),  $h = 6'$  (587.0 - 581.0)  
 $Q = 448.2$  cfs

**Size Outlet Pipe:**  
 Design Storm Flow to Detention Area:  
 (286 - 14) = 272 Acres @ 2.4 cfs/Acre = 652.8 cfs  
 Use 90" RCP @ 0.8%; capacity = 687 cfs  
**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:  $Q = Ca\sqrt{2gh}$   $C = 0.6$   $a = 38$  ft.<sup>2</sup>  $g = 32.2$  ft/sec<sup>2</sup>  
 $h = 8$  ft (589.0 - 581.0)  
 $Q = 517.5$  cfs  
 Total Flow Through Structure = 712 cfs  
 Stored Flow (Elevation 589.0) = 251,842 ft.<sup>3</sup> 1800 sec = 139.9 cfs  
 Total Flow Accounted For in Basin = 851.9 cfs (exceeds requirement)



Trash Rack: #4 bars welded together @ 6" o.c. secure to structure with clips and 1/2" anchor bolts @ 18" o.c. Fabricate in four equal sections  
 Concrete Sbb: 6" thick reinforced with 6x6 W29 x W29 w.w.f.  
 Reinforcing: Walls of Outlet Structure to be reinforced with #4 bars @ 6" o.c., centered in walls. Footing to be reinforced with two #5 bars, continuously

**OUTLET STRUCTURE**  
N.T.S.

BID YARDAGE: 66,500 cu. yds.  
 Revised 2-12-85: Bid Yardage  
 Revised 11-21-83: Bid Yardage