



**Existing Drainage Areas and CN Values**

Area ID	Area (Ac)	CN Value (Existing)
E-1	3.42	74

**Proposed Drainage Areas and CN Values**

Area ID	Area (Ac)	CN Value (Proposed)
P-1	3.42	88

**Allowable Discharge**

	100-Year
P-1 (Ac)	3.42
Allowable Discharge per acre (cfs)	1.8
Allowable Discharge (cfs)	6.16

**Proposed Flow Values and Pond Results**

	2-Year	10-Year	100-Year	100-Year*
P-1 POI (Detention Pond Discharge) (cfs)	3.89	4.98	6.04	20.18
Detention Pond WSE	921.98	922.77	923.67	925.06
<b>Freeboard</b>	<b>9.02</b>	<b>8.23</b>	<b>7.33</b>	<b>5.94</b>

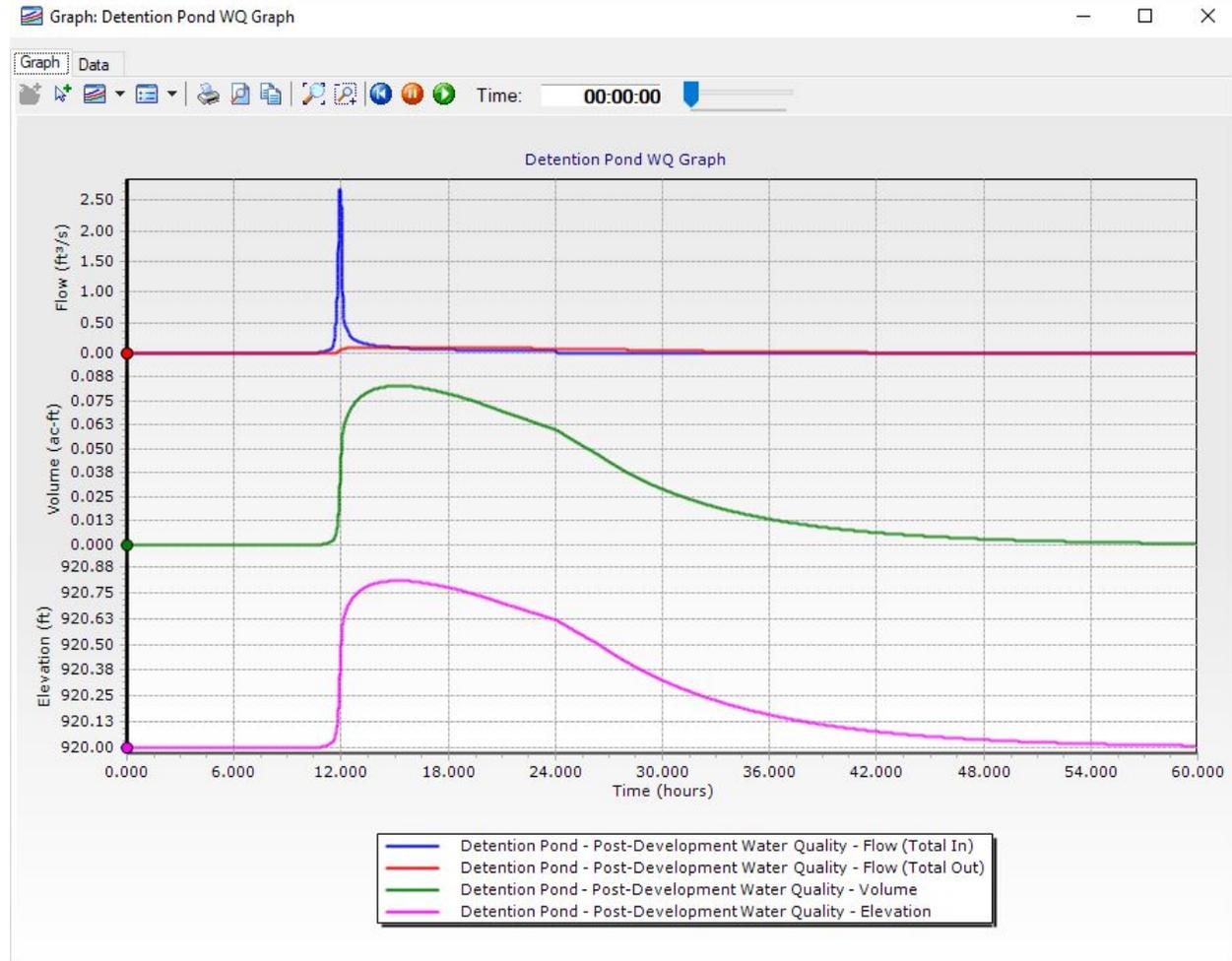
\*Assumes zero flow through primary outlet with subsequent 1% storm event

**Detention Pond Input Data/Outlet Structure Design**

	ELEV
18" Culvert (Upstream Invert)	919.90
(1) 2" Dia. Orifice (WQ)	920.00
(1) 0.4' x 2.0' Orifice (100yr)	920.90
4'x4' Outlet Structure Top (100-Year*)	924.20
Top of Pond	931.00

\*Assumes zero flow through primary outlet with subsequent 1% storm event

### Water Quality Hydrograph

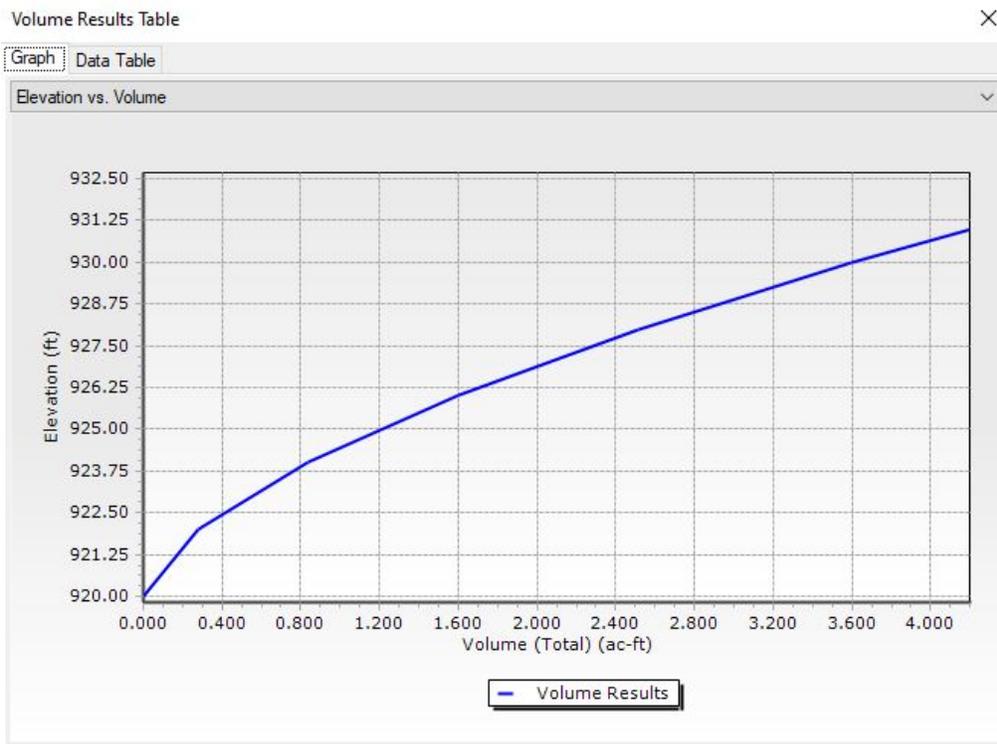


### Detention Pond Volume Table

Volume Results Table

Graph	Data Table					
	Elevation (ft)	Planimeter (ft <sup>2</sup> )	Area (acres)	A1+A2+sqr (A1*A2) (acres)	Volume (ac-ft)	Volume (Total) (ac-ft)
1	920.00	0.00	0.08	0.00	0.000	0.000
2	922.00	0.00	0.21	0.42	0.282	0.282
3	924.00	0.00	0.35	0.83	0.552	0.834
4	926.00	0.00	0.42	1.15	0.764	1.598
5	928.00	0.00	0.50	1.37	0.916	2.514
6	930.00	0.00	0.58	1.62	1.078	3.592
7	931.00	0.00	0.65	1.84	0.613	4.205

**Detention Pond Volume Graph**



**Conclusion**

The proposed development will provide control for all developed areas via a detention pond that discharges to the north, matching the existing topography. A riprap area will help dissipate the minimal amount of flow leaving the detention pond before it is discharged. The subsequent 100-Year storm event will flow through the top of the outlet structure (4'x4' riser).

As mentioned previously in this report, a 1.8 cfs per site-acre release rate was applied to the proposed drainage area, per City of Independence Detention Basin Requirements. The proposed detention does release the WQ event (1.37" of rainfall) over a 40-hour duration. See Water Quality Hydrograph for more information.

The top of the outlet structure will act as the emergency spillway in the subsequent 100-year event if the primary outlet is clogged. The elevation of said spillway is greater than 0.5 feet above the 100-year WSE, meeting APWA criteria. There is also more than 1 foot of freeboard from the design stage to the top of dam per APWA criteria. See attached PondPack calculations for additional information.