



AARK Stream Restoration, LLC
NAU Capstone

Channel & Culvert Analysis

After determining the flows from watershed delineation and the slope of the channel using “Rosgen Level 2” which can be found in the final report, AARK Stream Restoration, LLC analyzed the 3 culverts in the stream the channel using Bentley CulvertMaster and Bentley FlowMaster. Here is the results:



FIGURE 1: ARIAL PHOTO FROM GOOGLE MAPS OF COYOTE SPRINGS ESTATE SHOWING THE CHANNELS AND CULVERTS ON THE REACH

- The document shows the important results. More in depth discussion of the results can be found in the report.



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1. Results of Culvert Analysis:

a. Culverts dimensions and status

Culverts dimensions & status					
Culvert	Length (ft)	Material	Diameter (in)	Inlet	Outlet
Culvert 1	90	Corrugated	24	Some vegetation	Sedimentation
Culvert 2	50	Corrugated	24	Pooling area	vegetation
Culvert 3	100	Corrugated	24	Some rocks	vegetation

b. Culvert control and clearance

Culvert	Control	Clearance (in)
Culvert 1	Outlet	2
Culvert 2	Outlet	12
Culvert 3	Outlet	23

Table above shows the culvert control and clearance. The results from CulvertMaster indicates that the culverts in the Coyote Springs have outlet control which means that water flowing into the culvert is faster than the water flowing out the culvert. It also means that the flow at the outlet is dissipated.

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2. Results of Channel Analysis:

a. Normal depth analysis:

Cross Section	Normal Depth(ft)	Discharge (ft ³ /s)	Velocity (ft/s)	Flow Type
1(Well House)	0.56	12.72	1.71	Subcritical
2	0.5	12.72	1.65	Subcritical
3	0.7	12.72	1.63	Subcritical
4	0.48	12.72	1.21	Subcritical
5	0.68	12.72	1.56	Subcritical
6	0.63	12.72	1.73	Subcritical
Culvert 1				
7	1.01	22.05	2.12	Subcritical
8	1.45	22.05	2.68	Subcritical
9	0.69	22.05	1.76	Subcritical
10(Pooling Area)	0.95	22.05	2.12	Subcritical
Culvert 2				
11	1.96	22.05	2.87	Subcritical
12	1.79	22.05	2.9	Subcritical
Culvert 3				

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b. Full flow analysis:

Cross Section	Discharge (ft ³ /s)	25-yr		100-yr	
		Discharge (ft ³ /s)	Pass?	Discharge (ft ³ /s)	Pass?
1(Well House)	5.98	12.72	NO	18.02	NO
2	53.39	12.72	YES	18.02	YES
3	16.25	12.72	YES	18.02	NO
4	29.24	12.72	YES	18.02	YES
5	314.37	12.72	YES	18.02	YES
6	198	12.72	YES	18.02	YES
Culvert 1					
7	25.83	22.05	YES	31.25	NO
8	75.23	22.05	YES	31.25	YES
9	13.34	22.05	NO	31.25	NO
10(Pooling Area)	44.98	22.05	YES	31.25	YES
Culvert 2					
11	33.93	22.05	YES	31.25	YES
12	16.23	22.05	NO	31.25	NO
Culvert 3					

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