

Appendix E

Culvert summary

Alignment Identifications Details		Alignment Cross Section Details		Inflows	Existing and Tailwater Conditions							Culvert Design						
Culvert ID	Rail Level (mAHD)	Min Formation Level (mAHD)	Peak Flow (m³/s)	Longitudinal Grade (1 on ...)	Exist Invert		V (m/s)	Exist WSL		Number of Cells (No.)	Culvert Flow (m³/s)	Height or Dia. (mm)	RCP, CMP, RCBC or SLBC?	Adjusted Height or Dia. (mm)	Invert Level		Barrel Length (m)	Slope (m/m)
					U/S (mAHD)	D/S (mAHD)		HWL (mAHD)	TWL (mAHD)						U/S (mAHD)	D/S (mAHD)		
CD0007	283.277	283.50	5.87	62	281.60	281.40	1.01	281.86	281.66	5	5.87	900	RCP	900.00	281.600	281.400	15.024	0.0133
CD0041	284.456	285.05	14.56	37	282.40	281.97	1.95	282.96	282.52	4	14.56	1650	RCP	1650.00	282.400	281.966	28.670	0.0151
CD0103	279.406	279.80	26.47	43	277.00	276.65	1.73	277.61	277.26	5	26.47	1800	RCP	1800.00	277.000	276.650	30.363	0.0115
CD0129	279.406	278.75	9.92	54	275.80	275.60	1.28	276.26	276.06	1	9.92	1950	RCP	1950.00	275.800	275.600	30.567	0.0065
CD0167	277.464	278.00	4.47	66	276.10	275.90	1.00	276.47	276.27	6	4.47	900	RCP	900.00	276.100	275.900	18.234	0.0110
CD0219	276.713	272.70	21.17	69	269.75	269.45	1.34	270.35	270.05	2	21.17	1950	RCP	1950.00	269.750	269.450	51.944	0.0058
CD0264	276.713	272.30	16.84	39	269.50	269.20	1.51	269.96	269.66	2	16.84	1800	RCP	1800.00	269.500	269.200	55.037	0.0055
CD0317	277.713	278.00	5.62	219	276.10	276.00	0.64	276.57	276.47	6	5.62	900	RCP	900.00	276.100	276.000	24.136	0.0041
CD0360	278.913	279.20	8.19	600	277.00	276.90	0.43	277.55	277.45	4	8.19	1200	RCP	1200.00	277.000	276.900	22.062	0.0045
CD0505	271.720	272.40	5.34	302	270.50	270.40	0.41	270.72	270.62	11	5.34	900	RCP	900.00	270.500	270.400	11.773	0.0085
CD0556	266.147	266.45	7.19	33	263.50	262.95	1.41	263.87	263.32	1	7.19	1950	RCP	1950.00	263.500	262.950	30.745	0.0179
CD0656	256.951	257.40	10.51	233	255.50	255.40	0.66	256.02	255.92	12	10.51	900	RCP	900.00	255.500	255.400	15.981	0.0063
CD0807	242.904	243.15	6.56	27	241.10	240.80	1.66	241.41	241.11	4	6.56	1050	RCP	1050.00	241.100	240.800	33.616	0.0089
CD0823	238.760	239.10	6.94	34	237.20	237.10	1.08	237.34	237.24	7	6.94	900	RCP	900.00	237.200	237.100	17.923	0.0056
CD0950	238.066	235.25	12.15	54	232.45	231.60	1.60	232.90	232.05	1	12.15	1800	RCP	1800.00	232.450	231.600	40.554	0.0210
CD1012	234.546	235.00	4.36	49	233.10	233.00	1.22	233.50	233.40	5	4.36	900	RCP	900.00	233.100	233.000	14.223	0.0070
CD1050	234.037	232.84	2.31	12	230.94	228.41	1.49	231.12	228.59	2	2.31	900	RCP	900.00	230.937	228.405	26.699	0.0948
CD1230	237.094	237.55	8.84	148	235.35	235.10	0.72	235.65	235.40	5	8.84	1200	RCP	1200.00	235.350	235.100	26.479	0.0094
CD1348	242.607	242.80	10.48	152	240.75	240.50	0.94	241.39	241.14	6	10.48	1050	RCP	1050.00	240.750	240.500	24.451	0.0102
CD1378	243.607	243.15	9.84	28	240.20	240.00	2.80	241.14	240.94	1	9.84	1950	RCP	1950.00	240.200	240.000	37.535	0.0053
CD1446	243.282	238.20	23.81	48	235.40	234.20	1.17	235.60	234.40	2	23.81	1800	RCP	1800.00	235.400	234.200	55.181	0.0217
CD2024	257.896	257.65	10.17	54	255.15	254.40	1.44	255.70	254.95	2	10.17	1500	RCP	1500.00	255.150	254.400	32.139	0.0233
CD2051	260.576	261.00	2.07	45	259.10	259.00	0.97	259.28	259.18	3	2.07	900	RCP	900.00	259.100	259.000	15.152	0.0066
CD2080	261.239	258.15	8.82	39	255.65	255.10	1.40	256.07	255.52	1	8.82	1500	RCP	1500.00	255.650	255.100	40.121	0.0137
CD2137	263.121	258.10	17.50	45	255.00	254.00	1.24	255.39	254.39	1	17.50	2100	RCP	2100.00	255.000	254.000	55.683	0.0180
CD2225	272.747	268.40	11.42	52	265.75	264.50	1.00	265.91	264.66	1	11.42	1650	RCP	1650.00	265.750	264.500	51.000	0.0245
CD2410	272.758	271.45	15.99	27	268.80	267.90	1.86	269.09	268.19	2	15.99	1650	RCP	1650.00	268.800	267.900	49.594	0.0181
CD2450	269.663	267.60	7.73	49	265.10	263.60	1.64	265.73	264.23	1	7.73	1500	RCP	1500.00	265.100	263.600	47.691	0.0315
CD2573	257.265	254.10	17.24	58	251.00	250.50	1.14	251.22	250.72	1	17.24	2100	RCP	2100.00	251.000	250.500	57.454	0.0087
CD2795	229.976	225.95	9.65	102	223.00	222.80	0.50	223.09	222.89	1	9.65	1950	RCP	1950.00	223.000	222.800	47.296	0.0042
CD2826	229.976	226.00	20.09	102	222.90	222.70	0.67	223.05	222.85	2	20.09	2100	RCP	2100.00	222.900	222.700	59.002	0.0034
CD2968	234.447	230.90	30.63	124	227.95	227.20	0.74	228.15	227.40	2	30.63	1950	RCP	1950.00	227.950	227.200	58.170	0.0129
CD2983N	234.447	232.10	48.33	116	229.00	228.00	0.90	229.25	228.25	3	48.33	2100	RCP	2100.00	229.000	228.000	100.506	0.0099
CD3050N	242.187	242.65	11.84	46	240.30	240.10	1.46	240.80	240.60	5	11.84	1350	RCP	1350.00	240.300	240.100	30.503	0.0066
CD3223N	247.882	248.03	6.23	23	245.68	245.35	1.85	245.94	245.61	2	6.23	1350	RCP	1350.00	245.680	245.350	29.879	0.0110
CD3299N	242.385	239.90	3.19	29	237.70	236.45	1.94	238.25	236.99	1	3.19	1200	RCP	1200.00	237.700	236.445	43.270	0.0290
CD3317N	238.66	235.70	3.70	37	233.80	232.60	1.87	234.43	233.23	1	3.70	900	RCP	900.00	233.800	232.600	44.500	0.0270
CD3709N	244.48	246.15	20.96	59	243.80	243.30	2.43	245.11	244.61	2	20.96	1350	RCP	1350.00	243.800	243.300	30.220	0.0165
CD3952N	238.53	233.30	8.63	40	231.10	229.60	2.25	231.98	230.48	1	8.63	1200	RCP	1200.00	231.100	229.600	60.680	0.0247
CD4048N	240.43	241.20	8.19	28	239.00	238.20	2.54	239.80	239.00	1	8.19	1200	RCP	1200.00	239.000	238.200	22.160	0.0361
CD2983S	238.77	231.35	47.21	101	229.00	228.00	2.44	230.97	229.97	3	47.21	1350	RCP	1350.00	229.000	228.000	100.506	0.0099
CD3050S	243.06	242.65	8.58	104	240.30	240.10	1.57	241.35	241.15	5	8.58	1350	RCP	1350.00	240.300	240.100	30.500	0.0066
CD3364S	240.93	229.95	45.39	366	227.60	227.40	1.49	230.07	229.87	3	45.39	1350	RCP	1350.00	227.600	227.400	73.340	0.0027
CD3609S	236.55	233.42	3.84	39	231.52	230.22	1.86	232.16	230.86	1	3.84	900	RCP	900.00	231.520	230.220	48.450	0.0268
CD3686S	236.55	237.85	9.68	100	235.95	234.55	1.64	237.04	235.64	1	9.68	900	RCP	900.00	235.950	234.550	52.900	0.0265

Normal Depth			Hydraulic Summary								Scour Protection			
Normal Depth (m)	solver	Q (m ³ /s)	Flow Control	HW level (mAHD)	HW depth (m)	HW depth (xD)	Afflux (m)	Freeboard to rail (m)	Freeboard level (mAHD)	Maximum HW depth to freeboard (m)	Outlet Velocity (m/s)	Allowable Velocity (m/s)	Equip rect flow depth (m)	Froud Number
0.48	0.00	5.87	Inlet	282.66	1.06	1.18	0.80	0.61	282.68	1.08	3.38	7.50	0.93	1.12
0.65	0.00	14.56	Inlet	283.83	1.43	0.87	0.87	0.63	283.86	1.46	4.68	7.50	1.25	1.34
0.82	0.00	26.47	Inlet	278.74	1.74	0.97	1.13	0.67	278.81	1.81	4.66	7.50	1.68	1.15
1.40	0.00	9.92	Inlet	278.53	2.73	1.40	2.27	0.88	278.81	3.01	4.34	7.50	1.07	1.34
0.39	0.00	4.47	Inlet	276.85	0.75	0.84	0.39	0.61	276.86	0.76	2.80	7.50	0.89	0.95
1.56	0.00	21.17	Inlet	272.69	2.94	1.51	2.35	4.02	276.11	6.36	4.13	7.50	1.60	1.04
1.46	0.00	16.84	Inlet	272.19	2.69	1.50	2.23	4.52	276.11	6.61	3.84	7.50	1.48	1.01
0.61	0.00	5.62	Inlet	276.98	0.88	0.98	0.41	0.73	277.11	1.01	2.18	7.50	1.13	0.66
0.80	0.00	8.19	Inlet	278.22	1.22	1.01	0.67	0.70	278.31	1.31	2.59	7.50	1.26	0.74
0.33	0.00	5.34	Inlet	271.11	0.61	0.68	0.39	0.61	271.12	0.62	2.27	7.50	1.08	0.70
0.83	0.00	7.19	Inlet	265.50	2.00	1.02	1.63	0.65	265.55	2.05	5.93	7.50	0.78	2.15
0.51	0.00	10.51	Inlet	256.34	0.84	0.93	0.32	0.61	256.35	0.85	2.36	7.50	1.49	0.62
0.61	0.00	6.56	Inlet	242.27	1.17	1.11	0.86	0.64	242.30	1.20	3.16	7.50	1.02	1.00
0.57	0.00	6.94	Inlet	238.12	0.92	1.02	0.78	0.64	238.16	0.96	2.32	7.50	1.22	0.67
1.14	0.00	12.15	Inlet	236.78	4.33	2.41	3.88	1.29	237.47	5.02	7.14	7.50	0.92	2.37
0.49	0.00	4.36	Inlet	233.94	0.84	0.93	0.44	0.61	233.95	0.85	2.47	7.50	0.94	0.81
0.28	0.00	2.31	Inlet	231.98	1.05	1.16	0.86	2.05	233.44	2.50	6.91	7.50	0.41	3.45
0.58	0.00	8.84	Inlet	236.45	1.10	0.92	0.80	0.64	236.49	1.14	3.29	7.50	1.16	0.98
0.61	0.00	10.48	Inlet	241.98	1.23	1.17	0.60	0.62	242.01	1.26	3.37	7.50	1.25	0.97
1.51	0.00	9.84	Inlet	242.90	2.70	1.39	1.77	0.70	243.01	2.81	3.96	7.50	1.12	1.20
1.11	0.00	23.81	Inlet	239.61	4.21	2.34	4.00	3.68	242.68	7.28	7.21	7.50	1.28	2.03
0.72	0.00	10.17	Inlet	257.25	2.10	1.40	1.55	0.64	257.30	2.15	6.02	7.50	0.92	2.01
0.43	0.00	2.07	Inlet	259.82	0.72	0.80	0.55	0.75	259.98	0.88	2.28	7.50	0.67	0.89
1.35	0.00	8.82	Inlet	260.01	4.36	2.91	3.94	1.23	260.64	4.99	5.27	7.50	0.92	1.76
1.36	0.00	17.50	Inlet	259.66	4.66	2.22	4.27	3.46	262.52	7.52	7.37	7.50	1.09	2.25
1.12	0.00	11.42	Inlet	270.68	4.93	2.99	4.77	2.07	272.15	6.40	7.42	7.50	0.88	2.53
0.97	0.00	15.99	Inlet	271.78	2.98	1.81	2.69	0.98	272.16	3.36	6.12	7.50	1.14	1.83
0.85	0.00	7.73	Inlet	268.68	3.58	2.38	2.95	0.99	269.06	3.96	7.46	7.50	0.72	2.81
1.89	0.00	17.24	Inlet	255.57	4.57	2.17	4.35	1.70	256.67	5.66	5.25	7.50	1.28	1.48
1.69	0.00	9.65	Inlet	225.65	2.65	1.36	2.55	4.33	229.38	6.38	3.86	7.50	1.12	1.17
1.71	0.00	20.09	Outlet	225.35	2.45	1.17	2.31	4.62	229.38	6.48	3.73	7.50	1.64	0.93
1.51	0.00	30.63	Inlet	232.80	4.85	2.49	4.65	1.65	233.85	5.90	6.16	7.50	1.58	1.57
1.60	0.00	48.33	Inlet	233.17	4.17	1.99	3.92	1.28	233.85	4.85	5.67	7.50	2.06	1.26
0.71	0.00	11.84	Inlet	241.53	1.23	0.91	0.74	0.66	241.59	1.29	3.09	7.50	1.38	0.84
0.72	0.00	6.23	Inlet	247.18	1.50	1.11	1.24	0.70	247.28	1.60	4.02	7.50	0.88	1.37
0.59	0.00	3.19	Inlet	239.53	1.83	1.53	1.29	2.85	241.79	4.09	5.81	7.50	0.52	2.57
0.87	-0.54	3.16	Inlet	238.56	4.76	5.28	4.13	0.10	238.06	4.26	5.87		0.56	2.50
1.29	-6.24	14.72	Inlet	251.72	7.92	5.86	6.60	-7.24	243.88	0.08	7.43		1.19	2.18
1.16	-2.08	6.55	Inlet	239.14	8.04	6.70	7.16	-0.61	237.93	6.83	7.71		0.75	2.85
1.13	-0.23	7.97	Inlet	246.34	7.34	6.12	6.54	-5.91	239.83	0.83	7.42		0.74	2.75
351843720889.61	#NUM!	#NUM!	Outlet	247.96	18.96	14.04	16.99	-9.19	238.17	9.17	10.99		1.47	2.90
0.59	0.00	8.58	Inlet	241.35	1.05	0.78	0.01	1.71	242.46	2.16	2.85		1.23	0.82
351843720889.61	#NUM!	#NUM!	Outlet	244.31	16.71	12.38	14.24	-3.38	240.33	12.73	10.57		1.47	2.79
1514018362114.11	#NUM!	#NUM!	Inlet	236.57	5.05	5.61	4.41	-0.02	235.95	4.43	6.04		0.56	2.57
0.89	-6.61	3.07	Outlet	268.50	32.55	36.16	31.46	-31.95	235.95		15.22		0.56	6.47

