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LA GRANDE ALLIANCE

CREE DEVELOPMENT CORPORATION
Respect · Collaboration · Strength

VOLUME 6 - APPENDIX

SECTION 6.7 – RAILWAY HYDROLOGY AND DRAINAGE

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Vision Eeyou Istchee
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with subconsultant KPMG

BILLY DIAMOND ALIGNMENT CATCHMENTS CHARACTERISTIC AND PROPOSED CULVERT

Catchment	Area (ha)	Type of Water Crossing	NRCS Hydrologic Soil Group	Overland Flow Slope S_i (%)	Tc (min)	Design Flow (m^3/s)		Structure Type	Culvert Dimension (mm)
						25-yr	100-yr		
BV1010	22.34	Intermittent	B	1.943	77.79	0.40	0.57	CSP	900
BV1015	21.34	Intermittent	B	1.496	70.10	0.41	0.59	CSP	900
BV1020	86.72	Intermittent	B	1.504	101.14	1.30	1.84	CSP	1200
BV1035	10.46	Intermittent	B	3.868	72.17	0.34	0.49	CSP	600
BV1036	2.19	Intermittent	B	3.614	60.06	0.08	0.12	CSP	600
BV1037	6.04	Intermittent	B	6.290	61.38	0.22	0.31	CSP	600
BV1045	7.81	Intermittent	B	4.194	65.10	0.28	0.39	CSP	900
BV1050	13.18	Intermittent	B	5.793	57.21	0.51	0.72	CSP	900
BV1052	13.18	Intermittent	B	2.810	55.74	0.30	0.42	CSP	900
BV1055	56.61	Intermittent	B	0.990	136.12	0.69	0.98	CSP	1200
BV1060	33.88	Intermittent	B	1.465	98.34	0.52	0.73	CSP	900
BV1065	41.76	Intermittent	B	1.629	101.18	0.63	0.89	CSP	1200
BV1075	458.53	Permanent Watercourse (±7.0m Width)	B	0.894	152.04	7.42	10.50	SCA-3	7510 x 3755
BV1080A	29.47	Intermittent	B	12.575	107.22	0.74	1.04	CSP	600
BV1080B									900
BV1085	66.88	Intermittent	B	13.585	127.37	1.49	2.10	CSP	1400
BV1086	33.48	Intermittent	B	19.353	94.22	0.92	1.30	CSP	1200
BV1090	48.94	Intermittent	B	14.901	113.50	1.18	1.67	CSP	1200
BV1095	15.69	Intermittent	B	25.025	69.15	0.53	0.75	CSP	900
BV1105	111.63	Intermittent	B	7.372	164.32	2.08	2.94	CSP	1600
BV1106	3.39	Intermittent	B	9.967	58.72	0.13	0.18	CSP	600
BV1110A	27.68	Intermittent	B	14.585	101.17	0.72	1.02	CSP	600
BV1110B								CSP	900
BV1115	13.52	Intermittent	B	17.906	90.22	0.38	0.54	CSP	900
BV1120	9.41	Intermittent	B	19.212	88.85	0.27	0.38	CSP	900
BV1125	15.39	Intermittent	B	20.715	84.89	0.45	0.64	CSP	900
BV1126	9.00	Intermittent	B	18.666	75.59	0.29	0.41	CSP	900
BV1130	12.02	Intermittent	B	20.959	76.68	0.38	0.54	CSP	900
BV1135	14.23	Intermittent	B	21.078	76.46	0.45	0.64	CSP	900
BV1140	51.91	Intermittent	B	7.441	105.58	1.31	1.86	CSP	1200
BV1145	11.45	Intermittent	B	10.456	86.48	0.33	0.47	CSP	900
BV1150	13.81	Intermittent	B	11.691	83.62	0.41	0.58	CSP	900
BV1155	48.23	Intermittent	B	6.627	132.37	1.04	1.48	CSP	1200
BV1160	31.41	Intermittent	B	4.209	93.41	0.86	1.22	CSP	1200
BV1165	25.78	Lake Crossing (±5.0m Width)	B	4.258	94.37	0.70	1.00	BAP-30A2	5180 x 2180
BV1170A	20.83	Intermittent	B	4.628	71.56	0.69	0.98	CSP	600
BV1170B								CSP	600
BV1170C								CSP	600

Catchment	Area (ha)	Type of Water Crossing	NRCS Hydrologic Soil Group	Overland Flow Slope S_i (%)	Tc (min)	Design Flow (m^3/s)		Structure Type	Culvert Dimension (mm)
						25-yr	100-yr		
BV1175	14.85	Intermittent	B	11.300	64.76	0.53	0.75	CSP	900
BV1180	13.47	Intermittent	B	8.716	68.98	0.46	0.65	CSP	900
BV1185	9.17	Intermittent	B	8.451	52.95	0.37	0.52	CSP	900
BV1190A	13.90	Intermittent	B	6.069	76.53	0.44	0.62	CSP	600
BV1190B								CSP	600
BV1195	9.08	Intermittent	B	3.829	72.53	0.30	0.42	CSP	900
BV1200	30.47	Intermittent	B	2.500	67.89	0.60	0.85	CSP	900
BV1205	8.03	Intermittent	B	10.342	76.44	0.25	0.36	CSP	900
BV1210	14.36	Intermittent	B	10.551	70.29	0.48	0.68	CSP	900
BV1215	27.64	Intermittent	B	3.628	95.63	0.75	1.06	CSP	1200
BV1220	20.35	Intermittent	B	3.208	76.87	0.64	0.91	CSP	1200
BV1225	39.78	Intermittent	B	1.683	75.23	0.73	1.04	CSP	1200
BV1230	8.82	Intermittent	B	3.693	80.10	0.27	0.38	CSP	900
BV1235	19.42	Intermittent	B	3.632	80.77	0.59	0.84	CSP	900
BV1240	4.15	Intermittent	B	1.668	40.51	0.11	0.16	CSP	600
BV1245	14.24	Intermittent	B	2.921	47.60	0.35	0.50	CSP	900
BV1250	185.93	Permanent Watercourse (±5.0m Width)	B	0.294	210.11	2.04	2.88	BAP-30A2	5180 x 2180
BV1255	1625.40	Permanent Watercourse (±18.0m Width)	B	0.294	372.40	12.70	17.98	SCA-66	18110 x 9068
BV1265	109.82	Intermittent	B	0.811	137.83	1.33	1.89	CSP	1200
BV1270	106.19	Intermittent	B	0.834	113.91	1.47	2.08	CSP	1400
BV1275	152.06	Intermittent	B	1.544	129.55	1.93	2.72	CSP	1600
BV1280	14.59	Intermittent	B	1.092	70.54	0.28	0.40	CSP	900
BV1290	44.17	Intermittent	B	0.591	117.39	0.60	0.85	CSP	1200
BV1295	18.22	Intermittent	B	1.196	65.38	0.37	0.52	CSP	900
BV1305	20.47	Intermittent	B	1.629	65.32	0.42	0.59	CSP	900
BV1310	38.66	Intermittent	B	2.895	49.63	0.94	1.33	CSP	1200
BV1315	7.28	Intermittent	B	5.119	68.04	0.25	0.35	CSP	900
BV1320	11.77	Intermittent	B	6.099	83.63	0.35	0.49	CSP	900
BV1350	91.19	Permanent Watercourse (±6.0m Width)	B	3.800	119.76	2.11	2.99	SCA-1	6990 x 3495
BV1351	18.92	Intermittent	B	5.176	77.15	0.59	0.84	CSP	1200
BV2005	29.99	Intermittent	B	4.597	84.95	0.88	1.25	CSP	1200
BV2007	10.32	Intermittent	B	3.906	73.90	0.33	0.47	CSP	900
BV2010	15.00	Intermittent	B	0.740	79.50	0.27	0.38	CSP	900
BV2012	20.16	Intermittent	B	2.243	54.86	0.46	0.65	CSP	900
BV2014	21.64	Intermittent	B	0.590	96.04	0.34	0.48	CSP	900

Catchment	Area (ha)	Type of Water Crossing	NRCS Hydrologic Soil Group	Overland Flow Slope S_i (%)	Tc (min)	Design Flow (m^3/s)		Structure Type	Culvert Dimension (mm)
						25-yr	100-yr		
BV2030	184.03	Permanent Watercourse (±6.5m Width)	B	1.173	124.30	2.40	3.39	SCA-1	6990 x 3495
BV2035	86.60	Intermittent	B	1.188	120.05	1.16	1.64	CSP	1400
BV2040	61.03	Intermittent	B	1.275	116.01	0.83	1.18	CSP	1200
BV2045	32.90	Intermittent	B	1.343	105.71	0.48	0.68	CSP	900
BV2046	24.13	Intermittent	B	1.485	97.24	0.37	0.53	CSP	900
BV2050	37.62	Intermittent	B	1.263	119.71	0.50	0.71	CSP	900
BV2070	126.09	Intermittent	B	1.155	106.46	1.83	2.59	CSP	1400
BV2095	293.82	Permanent Watercourse	B	1.258	135.41	6.48	9.18	BAP-30A2	5180 x 2180
BV2100	143.87	Intermittent	B	6.371	148.14	2.88	4.07	CSP	1800
BV2120A	138.28	Intermittent	B	2.183	84.19	2.36	3.34	CSP	900
BV2120B								CSP	900
BV2120C								CSP	900
BV2125	286.87	Intermittent	B	1.655	157.90	3.17	4.48	CSP	1800
BV2135	59.40	Intermittent	B	0.926	99.04	0.91	1.28	CSP	1200
BV2140	10.19	Intermittent	B	5.193	67.55	0.35	0.50	CSP	900
BV2145	9.57	Intermittent	B	3.397	89.57	0.27	0.38	CSP	900
BV2155	1368.08	Permanent Watercourse	B	1.181	250.12	16.39	23.20	SCA-1	6990 x 3495
BV2160	44.33	Permanent Watercourse	B	0.223	215.24	10.52	14.89	SCA-1	6990 x 3495
BV2165	6.68	Intermittent	B	1.088	70.74	0.13	0.18	CSP	600
BV2170	15.96	Intermittent	B	0.730	98.47	0.24	0.35	CSP	900
BV2175	623.34	Potential Watercourse	B	0.880	212.23	9.23	13.07	SCA-49	2 X (15010 x 7505)
BV2180	39.57	Intermittent	B	1.004	123.49	0.52	0.73	CSP	900
BV2185	65.07	Intermittent	B	0.895	131.53	3.88	5.49	CSP	2000
BV2190	253.27	Intermittent	B	2.466	138.13	3.07	4.34	CSP	1800
BV2200	75.32	Intermittent	B	5.681	128.36	1.66	2.35	CSP	1400
BV2210	91.38	Lake Crossing	B	5.329	133.37	2.71	3.84	SCA-29	11910 x 5955
BV2220	27.63	Intermittent	B	5.408	95.93	0.75	1.06	CSP	1200
BV2221	19.99	Intermittent	B	3.211	118.41	0.47	0.66	CSP	900
BV2225	7.26	Intermittent	B	11.915	61.47	0.27	0.38	CSP	900
BV2230	54.67	Intermittent	B	4.977	127.23	1.21	1.72	CSP	1200
BV2235	1773.67	Permanent Watercourse	B	0.659	321.76	11.96	16.92	SCA-20	10100 x 5045
BV2240A	96.72	Intermittent	B	0.625	144.66	1.13	1.61	CSP	900
BV2240B									900
BV2245A	15.78	Intermittent	B	2.497	55.17	0.36	0.51	CSP	600
BV2245B									600
BV2250	16.93	Intermittent	B	1.057	72.47	0.32	0.45	CSP	900

Catchment	Area (ha)	Type of Water Crossing	NRCS Hydrologic Soil Group	Overland Flow Slope S_i (%)	Tc (min)	Design Flow (m^3/s)		Structure Type	Culvert Dimension (mm)
						25-yr	100-yr		
BV2255	39.46	Intermittent	B	5.979	103.92	1.01	1.43	CSP	1200
BV2260	16.20	Intermittent	B	8.479	90.80	0.45	0.64	CSP	900
BV2065A	25.47	Intermittent	B	6.490	105.97	0.64	0.91	CSP	900
BV2065B								CSP	900
BV2266	9.32	Intermittent	B	0.179	91.25	0.15	0.21	CSP	600
BV2267	18.92	Intermittent	B	0.081	164.80	0.20	0.29	CSP	600
BV2268	7.10	Intermittent	B	3.145	72.64	0.23	0.33	CSP	900
BV2270	16.99	Intermittent	B	2.910	65.08	0.35	0.49	CSP	900
BV2275	4.55	Intermittent	B	2.526	32.09	0.14	0.20	CSP	600
BV2280	11073.20	Permanent Watercourse	B	0.190	757.65	41.23	58.35	SCA-66	18110 x 9068
BV2285	17.97	Intermittent	B	5.164	82.97	0.54	0.76	CSP	900
BV2290	163.17	Permanent Watercourse	B	1.458	124.04	2.13	3.01	BAP-30A2	5180 x 2180
BV3000	44.98	Intermittent	B	2.237	85.48	0.76	1.08	CSP	900
BV3005								CSP	900
BV3010	165.70	Intermittent	B	1.876	117.66	2.53	3.58	CSP	1600
BV3014	3.71	Intermittent	B	10.732	69.70	0.13	0.18	CSP	600
BV3015	5.06	Intermittent	B	6.667	77.74	0.16	0.22	CSP	600
BV3020	10.42	Intermittent	B	3.766	70.95	0.35	0.49	CSP	900
BV3025	77.32	Intermittent	B	3.028	104.68	1.97	2.78	CSP	1400
BV3030	77.32	Intermittent	B	2.225	88.77	1.27	1.80	CSP	900
BV3035	54.80	Intermittent	B	0.677	113.25	0.76	1.08	CSP	900
BV3036	42.37	Intermittent	B	0.712	100.54	0.64	0.91	CSP	900
BV3040	6560.07	Permanent Watercourse	B	0.107	1008.64	20.03	28.35	SCA-39	13460 x 6730
BV3045	25.84	Intermittent	B	0.969	89.92	0.42	0.60	CSP	900
BV3050	56.57	Intermittent	B	0.742	131.58	0.71	1.00	CSP	900
BV3057	146.67	Intermittent	B	1.595	115.15	2.02	2.85	CSP	1400
BV3060	2617.57	Permanent Watercourse	B	0.692	351.72	16.59	23.48	SCA-82	22250 x 11125
BV3062	63.46	Intermittent	B	2.171	65.09	1.29	1.83	CSP	1200
BV3063A	140.91	Potential Watercourse	B	1.837	98.95	2.15	3.04	CSP	1600
BV3063B		Potential Watercourse						CSP	1600
BV3063C		Potential Watercourse						CSP	1600
BV3063D		Potential Watercourse						CSP	1600
BV3063E		Potential Watercourse						CSP	1600
BV3065A	82.73	Potential Watercourse	B	2.620	76.27	1.51	2.14	CSP	1400

Catchment	Area (ha)	Type of Water Crossing	NRCS Hydrologic Soil Group	Overland Flow Slope S_i (%)	Tc (min)	Design Flow (m^3/s)		Structure Type	Culvert Dimension (mm)
						25-yr	100-yr		
BV3065B		Potential Watercourse						CSP	1400
BV3067	26.47	Intermittent	B	1.284	87.20	0.44	0.62	CSP	900
BV3080	162.56	Potential Watercourse	B	0.977	137.67	1.97	2.79	CSP	1800
BV3095	7.48	Intermittent	B	2.925	47.55	0.19	0.26	CSP	600
BV3097	43.33	Intermittent	B	2.983	66.16	0.87	1.24	CSP	1200
BV3098	14.76	Intermittent	B	1.775	74.49	0.27	0.39	CSP	900
BV3100	32.60	Intermittent	B	1.790	71.48	0.62	0.88	CSP	900
BV3105	5.05	Intermittent	B	1.958	66.35	0.10	0.14	CSP	600
BV3110	21.65	Intermittent	B	3.609	83.03	0.65	0.92	CSP	900
BV3115	13.60	Intermittent	B	2.259	52.22	0.32	0.45	CSP	900
BV3116	2.29	Intermittent	B	4.069	41.80	0.11	0.15	CSP	600
BV3125	164.83	Intermittent	B	2.255	117.99	2.23	3.15	CSP	1400
BV3130	49.61	Intermittent	B	1.613	83.30	0.85	1.21	CSP	1200
BV3140	61.76	Intermittent	B	0.764	109.55	0.88	1.24	CSP	1200
BV3142	7273.38	Permanent Watercourse (±15.0m Width)	B	0.231	626.57	33.95	48.05	SCA-51	15530 x 7765
BV3144	6.11	Intermittent	B	2.000	46.09	0.15	0.22	CSP	600
BV3145	135.58	Permanent Watercourse (±12.0m Width)	B	1.170	115.34	3.06	4.33	SCA-49	15010 x 7505
BV3150	103.04	Intermittent	B	0.541	145.91	1.20	1.70	CSP	1200
BV3152	14.35	Intermittent	B	0.851	70.85	0.28	0.39	CSP	900
BV3154	20.85	Intermittent	B	0.674	85.91	0.35	0.50	CSP	900
BV3160	8.86	Intermittent	B	0.284	88.09	0.15	0.21	CSP	600
BV3165	5.75	Intermittent	B	1.088	64.56	0.12	0.17	CSP	600
BV3170	48.83	Intermittent	B	0.830	108.41	0.70	0.99	CSP	900
BV4005	33.49	Intermittent	B	1.036	85.06	0.57	0.80	CSP	900
BV4010	10.03	Permanent Watercourse (±10.0m Width)	B	1.532	68.73	0.20	0.28	SCA-20	10100 x 5045
BV4015	129.85	Permanent Watercourse (±10.0m Width)	B	0.567	140.22	1.56	2.20	SCA-20	10100 x 5045
BV4020	17.77	Intermittent	B	1.237	73.40	0.33	0.47	CSP	900
BV4025	51.67	Intermittent	B	1.135	88.19	0.85	1.21	CSP	1200
BV4030	67.22	Intermittent	B	0.660	138.18	0.81	1.15	CSP	1200
BV4035	43.44	Intermittent	B	1.301	99.60	0.66	0.93	CSP	900
BV4040	77.23	Intermittent	B	1.094	128.53	0.98	1.39	CSP	1200
BV4045	8.81	Intermittent	B	2.896	36.24	0.26	0.37	CSP	900
BV4050	65.32	Intermittent	B	0.821	115.40	0.90	1.27	CSP	1200

Catchment	Area (ha)	Type of Water Crossing	NRCS Hydrologic Soil Group	Overland Flow Slope S_i (%)	Tc (min)	Design Flow (m^3/s)		Structure Type	Culvert Dimension (mm)
						25-yr	100-yr		
BV4055	62.94	Intermittent	B	0.663	106.69	0.91	1.29	CSP	1200
BV4056	2.90	Intermittent	B	8.348	41.27	0.14	0.19	CSP	600
BV4057A	1.74	Intermittent	B	9.952	40.83	0.08	0.12	CSP	600
BV4057B	3.21	Intermittent	B	4.840	54.20	0.13	0.18	CSP	600
BV4058	8.04	Intermittent	B	5.541	54.72	0.32	0.45	CSP	900
BV4059A	11.10	Intermittent	B	5.281	70.26	0.37	0.53	CSP	900
BV4059B	2.90	Intermittent	B	4.333	40.50	0.14	0.20	CSP	600
BV4060	34.96	Intermittent	B	2.126	70.26	0.68	0.96	CSP	900
BV4065	11.76	Intermittent	B	4.840	76.65	0.37	0.53	CSP	900
BV4070	6.58	Intermittent	B	7.885	67.14	0.23	0.32	CSP	900
BV4075	11.24	Intermittent	B	8.334	73.50	0.37	0.52	CSP	900
BV4080	18.70	Intermittent	B	3.788	75.04	0.60	0.85	CSP	900
BV4085	19.99	Intermittent	B	5.080	74.82	0.64	0.91	CSP	900
BV4090	22.90	Intermittent	B	4.402	86.82	0.66	0.94	CSP	900
BV4095	13.05	Intermittent	B	8.411	69.21	0.44	0.63	CSP	900
BV4100	23.74	Intermittent	B	4.860	98.76	0.63	0.89	CSP	900
BV4105	58.09	Intermittent	B	4.417	106.15	1.46	2.07	CSP	1200
BV4110	41.64	Intermittent	B	2.302	72.72	0.79	1.11	CSP	900
BV4115	24.73	Intermittent	B	0.839	87.75	0.41	0.58	CSP	900
BV4125	11.60	Intermittent	B	0.967	78.01	0.21	0.30	CSP	900
BV4130	26.50	Intermittent	B	2.321	65.32	0.54	0.76	CSP	900
BV4135	28.89	Intermittent	B	2.500	76.59	0.53	0.75	CSP	900
BV4137	13.52	Intermittent	B	0.925	80.92	0.24	0.34	CSP	900
BV4140	44.60	Intermittent	B	1.568	90.44	0.72	1.03	CSP	900
BV4144	23.55	Intermittent	B	1.557	60.66	0.50	0.71	CSP	900
BV4145	180.62	Intermittent	B	1.037	170.01	1.89	2.68	CSP	1400
BV4150	209.53	Intermittent	B	1.086	147.49	2.42	3.43	CSP	1600
BV4155	711.98	Intermittent	B	0.723	249.89	5.72	8.09	CSP	2200
BV4160	31.73	Intermittent	B	1.467	100.76	0.48	0.68	CSP	900
BV4165	389.42	Intermittent	B	0.802	203.81	3.60	5.10	CSP	2000
BV4170	17.61	Intermittent	B	0.755	95.82	0.27	0.39	CSP	900
BV4175	74.37	Intermittent	B	1.276	107.31	1.07	1.52	CSP	1200
BV4180	88.79	Intermittent	B	0.950	144.57	1.04	1.47	CSP	1200
BV4185	45.12	Intermittent	B	1.476	95.09	0.71	1.00	CSP	1200
BV4190A	23.71	Intermittent	B	2.153	51.83	0.56	0.79	CSP	600
BV4190B								CSP	600
BV4200	13.75	Intermittent	B	0.782	92.99	0.22	0.31	CSP	900
BV4202	20.67	Intermittent	B	1.690	63.36	0.43	0.61	CSP	900
BV4205	31.17	Intermittent	B	0.842	87.52	0.52	0.73	CSP	900
BV4210	23.04	Intermittent	B	0.583	96.89	0.36	0.50	CSP	900
BV4215	13.58	Intermittent	B	1.870	45.13	0.35	0.49	CSP	900
BV4220	5.13	Intermittent	B	1.703	48.76	0.13	0.18	CSP	600

Catchment	Area (ha)	Type of Water Crossing	NRCS Hydrologic Soil Group	Overland Flow Slope S_i (%)	Tc (min)	Design Flow (m^3/s)		Structure Type	Culvert Dimension (mm)
						25-yr	100-yr		
BV4225	361.41	Permanent Watercourse (±5.0m Width)	B	0.628	203.79	3.34	4.73	SCA-2	7250 x 3625
BV4230	40.64	Intermittent	B	1.074	101.08	0.61	0.86	CSP	900
BV4235	13.68	Intermittent	B	1.167	77.04	0.25	0.35	CSP	900
BV4237	60.64	Intermittent	B	0.943	112.68	0.85	1.20	CSP	1200
BV4240	806.25	Permanent Watercourse (±10.0m Width)	B	0.370	331.42	6.86	9.71	SCA-20	10100 x 5045
BV4255	96.36	Intermittent	B	0.931	92.92	1.54	2.17	CSP	1600
BV4275	6.49	Intermittent	B	0.406	65.46	0.13	0.19	CSP	600
BV4277	12.74	Intermittent	B	0.237	102.15	0.19	0.27	CSP	600
BV4280	1163.65	Permanent Watercourse (±10.0m Width)	B	0.059	543.56	5.78	8.17	SCA-20	10100 x 5045
BV4285	210.17	Intermittent	B	0.312	230.55	1.78	2.53	CSP	1400
BV5005	18.47	Intermittent	B	0.944	79.56	0.33	0.46	CSP	900
BV5010	9.13	Intermittent	B	1.593	47.05	0.23	0.32	CSP	900
BV5015	2065.96	Permanent Watercourse (±8.0m Width)	B	0.230	503.73	10.21	14.45	SCA-20	10100 x 5045
BV5018	16.10	Intermittent	B	0.860	70.18	0.31	0.44	CSP	900
BV5025	971.29	Permanent Watercourse (±12.0m Width)	B	0.402	302.55	6.83	9.67	SCA-49	15010 x 7505
BV5030	43.49	Intermittent	B	1.303	89.65	0.71	1.01	CSP	1200
BV5035	95.43	Intermittent	B	0.867	130.41	1.20	1.70	CSP	1200
BV5040	6.01	Intermittent	B	0.298	84.65	0.10	0.14	CSP	600
BV5045	279.40	Permanent Watercourse (±12.0m Width)	B	0.662	179.86	2.82	3.99	SCA-49	15010 x 7505
BV5050	305.90	Intermittent	B	0.404	301.01	2.16	3.06	CSP	1600
BV5055	285.21	Intermittent	B	0.810	198.67	2.69	3.80	CSP	1600
BV5060	85.43	Intermittent	B	0.756	179.05	0.86	1.22	CSP	1200
BV5065	3561.03	Permanent Watercourse (±8.0m Width)	B	0.211	712.64	13.83	19.58	SCA-20	10100 x 5045
BV5070	1223.96	Permanent Watercourse (±12.0m Width)	B	0.277	492.73	6.14	8.69	SCA-49	15010 x 7505
BV5075A	63.77	Intermittent	B	0.599	134.06	0.79	1.12	CSP	900
BV5075B								CSP	900

Catchment	Area (ha)	Type of Water Crossing	NRCS Hydrologic Soil Group	Overland Flow Slope S_i (%)	Tc (min)	Design Flow (m^3/s)		Structure Type	Culvert Dimension (mm)
						25-yr	100-yr		
BV5080	15.92	Intermittent	B	0.112	134.41	0.20	0.28	CSP	600
BV5085A	1896.07	Permanent Watercourse (±20.0m Width)	B	0.343	435.80	10.36	14.66	SCA-74	20190 x 10083
BV5085B		Permanent Watercourse (±5.0m Width)						BAP-30A2	5180 x 2180
BV5085C		Permanent Watercourse (±15.0m Width)						SCA-51	15530 x 7765
BV5090	20.48	Intermittent	B	2.897	49.60	0.50	0.70	CSP	900
BV5105	77.49	Intermittent	B	1.008	110.89	1.09	1.55	CSP	1200
BV5110	534.53	Permanent Watercourse (±16.0m Width)	B	0.456	284.82	3.92	5.55	SCA-63	17600 x 8800
BV5115	245.87	Permanent Watercourse (±8.0m Width)	B	0.539	225.38	2.12	3.00	SCA-16	9840 x 4920
BV5120	222.82	Permanent Watercourse (±6.0m Width)	B	0.314	229.23	7.94	11.24	SCA-49	7640 x 3820
BV5125	56.85	Permanent Watercourse (±5.0m Width)	B	2.087	78.87	1.02	1.44	SCA-2	7250 x 3625
BV5135	33.74	Intermittent	B	1.454	78.64	0.60	0.85	CSP	900
BV5140	51.21	Intermittent	B	1.930	82.24	0.89	1.26	CSP	1200
BV5150	63.79	Intermittent	B	1.819	90.39	1.04	1.47	CSP	1200
BV5155	65.68	Permanent Watercourse (±8.0m Width)	B	1.506	88.18	1.09	1.54	SCA-16	9840 x 4920
BV5165	40.63	Intermittent	B	0.603	115.41	0.56	0.79	CSP	900
BV5170	16.93	Intermittent	B	1.223	74.14	0.32	0.45	CSP	900
BV5175	24.89	Intermittent	B	1.675	80.75	0.44	0.62	CSP	900
BV5180	87.86	Intermittent	B	1.110	120.50	1.17	1.66	CSP	1200
BV5185	80.55	Intermittent	B	0.966	121.39	1.07	1.51	CSP	1200
BV5190	93.17	Permanent Watercourse (±5.0m Width)	B	2.085	80.71	1.64	2.32	BAP-30A2	5180 x 2180
BV5195	54.56	Permanent Watercourse (±5.0m Width)	B	0.447	148.00	0.63	0.89	BAP-30A2	5180 x 2180

Catchment	Area (ha)	Type of Water Crossing	NRCS Hydrologic Soil Group	Overland Flow Slope S_i (%)	Tc (min)	Design Flow (m^3/s)		Structure Type	Culvert Dimension (mm)
						25-yr	100-yr		
BV5200	16.69	Intermittent	B	0.604	81.56	0.29	0.41	CSP	900
BV5205	56.83	Intermittent	B	0.301	145.30	0.66	0.94	CSP	900
BV5215	40.64	Intermittent	B	0.492	88.24	0.67	0.95	CSP	900
BV5222	94.63	Intermittent	B	1.190	110.54	1.34	1.89	CSP	1200
BV5225	60.04	Intermittent	B	0.822	103.05	0.89	1.26	CSP	1200
BV5230	28.91	Intermittent	B	0.548	114.10	0.40	0.57	CSP	900
BV5235	108.09	Intermittent	B	1.669	87.08	1.80	2.55	CSP	1400
BV5240	16.72	Intermittent	B	1.730	73.52	0.31	0.44	CSP	900
BV5245	11.85	Intermittent	B	2.557	53.16	0.28	0.39	CSP	900
BV5255	8.85	Intermittent	B	3.228	71.69	0.29	0.41	CSP	900
BV5260	32.64	Intermittent	B	1.516	83.51	0.56	0.79	CSP	1200
BV5265	150.89	Permanent Watercourse (±5.0m Width)	B	1.761	100.63	2.28	3.22	BAP-30A2	5180 x 2180
BV5270	21.21	Intermittent	B	1.703	71.79	0.40	0.57	CSP	900
BV5275	330.85	Intermittent	B	0.797	179.34	3.34	4.73	CSP	2000
BV5280	21.64	Intermittent	B	3.390	81.49	0.65	0.93	CSP	900
BV5285	1394.98	Permanent Watercourse (±15.5m Width)	B	0.437	369.48	14.39	20.36	SCA-55	16050 x 8025
BV5290A	2272.58	Permanent Watercourse (±5.0m Width)	B	0.506	449.65	12.15	17.19	BAP-30A2	5180 x 2180
BV5290B		Permanent Watercourse (±5.0m Width)						BAP-30A2	5180 x 2180
BV5290C		Permanent Watercourse (±15.0m Width)						SCA-51	15530 x 7765
BV5295	23.15	Intermittent	B	1.727	76.22	0.42	0.60	CSP	900
BV5296	19.37	Intermittent	B	1.736	78.39	0.35	0.49	CSP	900
BV5300	154.14	Intermittent	B	1.605	125.49	2.00	2.82	CSP	1400
BV5305	96.25	Intermittent	B	3.676	122.42	2.20	3.11	CSP	1400
BV5330	3030.76	Permanent Watercourse (±9.5m Width)	B	0.651	375.26	18.36	25.99	SCA-20	10100 x 5045
BV5335	162.12	Intermittent	B	2.143	109.13	2.31	3.27	CSP	1600
BV5350	145.05	Intermittent	B	2.561	96.23	2.26	3.19	CSP	1400

GREVET-CHAPAIS ALIGNMENT CATCHMENTS CHARACTERISTICS AND PROPOSED CULVERTS

Catchment	Area (ha)	Type of Water Crossing	NRCS Hydrologic Soil Group	Overland Flow Slope S_i (%)	Tc (min)	Design Flow (m^3/s)		Structure Type	Culvert Dimension (mm)
						25-yr	100-yr		
BV060	133.35	Intermittent	B	0.646	208.86	1.22	1.69	CSP	1200
BV065	1399.01	Permanent Watercourse	B	0.646	208.86	12.80	17.70	SCA-12	9060 x 4530
BV070	435.80	Permanent Watercourse	B	0.646	208.86	3.99	5.51	SCA-29	2 X (11910 x 5955)
BV075	14.23	Intermittent	B	3.463	82.73	0.43	0.59	CSP	900
BV080	342.63	Intermittent	B	0.911	163.92	3.71	5.13	CSP	1800
BV085	178.59	Intermittent	B	1.826	109.55	2.55	3.53	CSP	1600
BV090	57.17	Intermittent	B	4.021	105.82	1.45	2.01	CSP	1200
BV094	48.42	Intermittent	B	5.867	100.48	2.73	3.77	CSP	1600
BV100	35.29	Intermittent	B	9.415	77.72	3.84	5.31	CSP	1200
BV105	110.18	Permanent Watercourse	B	4.364	151.02	7.48	10.34	SCA-30	12000 x 4259
BV110	57.10	Intermittent	B	8.413	107.46	1.43	1.98	CSP	1200
BV115	73.66	Intermittent	B	5.457	125.03	1.67	2.30	CSP	1200
BV120	232.11	Permanent Watercourse	B	2.896	104.08	14.02	19.39	2 x SCA-30	2 X (12000 x 4259)
BV125	31.94	Intermittent	B	7.035	91.77	0.90	1.24	CSP	1200
BV130	15.35	Intermittent	B	4.055	101.12	0.40	0.56	CSP	900
BV135	4.69	Intermittent	B	2.903	49.53	0.11	0.16	CSP	600
BV140	6.40	Intermittent	B	7.456	69.05	0.22	0.30	CSP	600
BV145	48.01	Intermittent	B	2.966	74.32	0.90	1.24	CSP	1200
BV150	85.34	Intermittent	B	2.762	84.28	1.46	2.02	CSP	1200
BV155	84.34	Intermittent	B	1.763	96.74	1.31	1.82	CSP	1200
BV160	31.67	Intermittent	B	1.016	97.14	0.49	0.68	CSP	900
BV165	6.77	Intermittent	B	2.124	46.87	0.17	0.24	CSP	600
BV170	951.90	Intermittent	B	1.275	177.21	11.02	15.24	CSP	2 X 2000
BV175	19.83	Intermittent	B	2.395	61.85	0.42	0.58	CSP	900
BV180	34.12	Intermittent	B	3.286	110.32	0.84	1.16	CSP	1200
BV185	17.71	Intermittent	B	5.970	85.35	0.52	0.72	CSP	900
BV190	277.00	Intermittent	B	1.957	127.92	3.56	4.92	CSP	1600
BV195	471.75	Intermittent	B	2.800	103.02	11.12	15.38	CSP	2 X 2000
BV200	231.52	Intermittent	B	1.645	147.73	2.69	3.72	CSP	1400
BV205	353.60	Intermittent	B	1.447	162.08	3.86	5.33	CSP	1800
BV210	30.72	Intermittent	B	3.470	90.85	0.87	1.20	CSP	1200
BV215	25.12	Intermittent	B	4.413	88.74	0.72	1.00	CSP	900
BV220	200.62	Intermittent	B	2.248	94.85	3.17	4.39	CSP	1600
BV225	24.39	Intermittent	B	2.681	63.98	0.51	0.70	CSP	900
BV230	74.43	Intermittent	B	1.915	95.67	1.17	1.62	CSP	1200
BV235	7.26	Intermittent	B	3.222	66.49	0.25	0.35	CSP	900
BV240	24.60	Intermittent	B	2.552	58.26	0.54	0.75	CSP	900
BV245	93.27	Intermittent	B	1.829	102.91	1.39	1.93	CSP	1200
BV250	64.54	Intermittent	B	1.507	108.32	0.93	1.29	CSP	1200
BV255	14.03	Intermittent	B	1.464	79.54	0.25	0.35	CSP	900

Catchment	Area (ha)	Type of Water Crossing	NRCS Hydrologic Soil Group	Overland Flow Slope S_i (%)	Tc (min)	Design Flow (m^3/s)		Structure Type	Culvert Dimension (mm)
						25-yr	100-yr		
BV265	149.93	Intermittent	B	0.635	189.39	1.47	2.03	CSP	1200
BV270A	164.68	Intermittent	B	0.859	158.22	1.83	2.53	CSP	1600
BV275	276.84	Intermittent	B	1.523	138.15	3.37	4.66	CSP	1600
BV285	909.43	Intermittent	B	1.184	205.03	8.43	11.65	CSP	2200
BV290	113.52	Intermittent	B	3.192	104.99	2.90	4.01	CSP	1600
BV295	23.64	Intermittent	B	2.466	68.74	0.47	0.65	CSP	900
BV300	69.74	Intermittent	B	2.125	77.79	1.26	1.75	CSP	1200
BV305	715.55	Intermittent	B	1.942	135.82	8.82	12.20	CSP	2200
BV310	28.04	Intermittent	B	7.874	88.90	0.80	1.11	CSP	1200
BV315	20.30	Intermittent	B	5.378	107.05	0.51	0.71	CSP	900
BV320	35.87	Intermittent	B	5.504	106.19	0.91	1.26	CSP	1200
BV325	985.93	Permanent Watercourse	B	1.844	176.83	12.59	17.42	SCA-12	9060 x 4530
BV330	19.44	Intermittent	B	1.732	77.14	0.35	0.49	CSP	900
BV335	154.51	Intermittent	B	1.643	116.51	2.12	2.93	CSP	1400
BV340	101.03	Intermittent	B	1.839	105.50	1.48	2.05	CSP	1200
BV345	5.51	Intermittent	B	2.502	45.75	0.14	0.20	CSP	600
BV350	480.42	Intermittent	B	2.304	146.56	5.62	7.77	CSP	2000
BV355	13.51	Intermittent	B	4.332	81.41	0.41	0.57	CSP	900
BV360	592.35	Permanent Watercourse	B	1.054	172.92	9.96	13.78	SCA-12	9060 x 4530
BV365	269.27	Permanent Watercourse	B	1.270	130.70	3.79	5.24	SCA-2	7250 x 3625
BV370	18.52	Intermittent	B	2.546	65.16	0.38	0.53	CSP	900
BV380	29.35	Intermittent	B	3.166	77.20	0.93	1.28	CSP	1200
BV385	19.31	Intermittent	B	1.046	80.50	0.34	0.47	CSP	900
BV390	29.28	Intermittent	B	1.962	64.07	0.61	0.84	CSP	900
BV395	12.70	Intermittent	B	1.050	72.76	0.24	0.33	CSP	900
BV400	99.01	Intermittent	B	1.252	124.56	1.30	1.79	CSP	1200
BV405	69.92	Intermittent	B	1.698	85.01	1.19	1.65	CSP	1200
BV410	606.59	Intermittent	B	0.958	217.96	10.55	14.59	CSP	2 X 2000
BV415	287.20	Intermittent	B	1.352	159.97	3.16	4.37	CSP	1600
BV420	114.31	Intermittent	B	2.619	81.74	2.00	2.77	CSP	1400
BV425	153.03	Intermittent	B	2.117	102.97	2.29	3.16	CSP	1400
BV430	125.69	Intermittent	B	1.854	111.79	1.77	2.45	CSP	1400
BV435	8.06	Intermittent	B	4.271	81.73	0.24	0.34	CSP	900
BV440	39.77	Intermittent	B	2.910	64.19	0.82	1.14	CSP	1200
BV445	375.44	Intermittent	B	1.435	146.06	4.40	6.09	CSP	1800
BV450	71.38	Intermittent	B	2.243	83.86	1.23	1.70	CSP	1200
BV455	35.86	Intermittent	B	2.035	68.69	0.71	0.98	CSP	1200
BV460	25.93	Intermittent	B	2.362	49.91	0.63	0.87	CSP	900
BV465	36.63	Intermittent	B	1.231	85.23	0.62	0.86	CSP	900
BV470	40.08	Intermittent	B	2.011	74.32	0.75	1.04	CSP	900
BV475	433.71	Intermittent	B	0.965	196.79	4.13	5.72	CSP	1800
BV480	23.56	Intermittent	B	2.515	60.45	1.98	2.73	CSP	1400
BV485	26.37	Intermittent	B	0.711	100.71	1.47	2.03	CSP	1400

Catchment	Area (ha)	Type of Water Crossing	NRCS Hydrologic Soil Group	Overland Flow Slope S_i (%)	Tc (min)	Design Flow (m^3/s)		Structure Type	Culvert Dimension (mm)
						25-yr	100-yr		
BV490	67.06	Intermittent	B	2.138	93.73	1.07	1.48	CSP	1200
BV495	10.28	Intermittent	B	2.438	53.29	0.24	0.33	CSP	900
BV500	26.95	Intermittent	B	2.507	60.13	0.82	1.14	CSP	1200
BV505	309.44	Intermittent	B	1.195	166.72	4.13	5.72	CSP	1800
BV510	28.29	Intermittent	B	1.641	77.80	0.51	0.71	CSP	900
BV515	4416.75	Permanent Watercourse	B	0.108	693.71	19.22	26.58	SCA-30	12000 x 4259
BV520	108.85	Intermittent	B	1.761	101.94	1.64	2.26	CSP	1200
BV525	9.10	Intermittent	B	2.851	37.77	0.26	0.36	CSP	900
BV530	49.85	Intermittent	B	0.602	96.60	0.78	1.08	CSP	1200
BV535	49.08	Intermittent	B	2.554	56.62	1.10	1.53	CSP	1200
BV540	74.02	Intermittent	B	1.339	88.40	1.23	1.70	CSP	1200
BV550	60.46	Intermittent	B	1.058	86.54	1.02	1.41	CSP	1200
BV555	141.65	Intermittent	B	0.842	142.14	1.69	2.34	CSP	1400
BV560	1403.96	Intermittent	B	1.043	236.18	11.79	16.31	CSP	2 X 2000
BV565	22.89	Intermittent	B	2.258	57.13	0.51	0.71	CSP	900
BV570	35.07	Intermittent	B	1.957	66.38	0.71	0.98	CSP	1200
BV575	278.49	Intermittent	B	1.838	144.73	3.28	4.54	CSP	1800
BV580	171.00	Intermittent	B	1.668	123.24	2.25	3.12	CSP	1600
BV585	549.38	Permanent Watercourse	B	1.611	114.16	12.54	17.35	SCA-10	9000 x 3760
BV590	211.14	Intermittent	B	1.346	132.04	2.65	3.67	CSP	1600
BV595	38.73	Permanent Watercourse	B	1.502	82.69	13.22	18.28	SCA-90	24000 x 12040
BV600	17.39	Permanent Watercourse	B	4.873	75.68	13.78	19.05	SCA-39	13460 x 6730
BV605	269.36	Permanent Watercourse	B	1.348	131.21	3.40	4.70	SCA-66	18110 x 9068
BV610	216.98	Intermittent	B	2.119	92.80	3.48	4.82	CSP	1800
BV615	13.32	Intermittent	B	1.365	78.87	0.24	0.33	CSP	900
BV620	62.26	Intermittent	B	1.136	109.75	0.89	1.23	CSP	1200
BV625	260.54	Intermittent	B	0.984	172.08	3.85	5.33	CSP	2000
BV630	54.83	Intermittent	B	3.404	120.91	1.27	1.76	CSP	1200
BV635	212.41	Intermittent	B	0.481	184.76	2.12	2.93	CSP	1600
BV640	151.31	Intermittent	B	0.406	207.99	1.39	1.92	CSP	1400
BV645	22.88	Intermittent	B	0.965	68.96	0.45	0.62	CSP	900
BV650	322.13	Intermittent	B	0.782	170.01	3.40	4.70	CSP	1800
BV655	226.87	Intermittent	B	0.669	212.41	2.05	2.84	CSP	1400
BV660	27.02	Intermittent	B	3.115	75.82	0.86	1.20	CSP	1200
BV665	72.96	Intermittent	B	1.585	92.11	1.18	1.63	CSP	1200
BV670	47.95	Intermittent	B	2.018	78.57	0.86	1.19	CSP	1200
BV675	60.01	Intermittent	B	1.364	107.50	0.87	1.20	CSP	1200
BV680	63.48	Intermittent	B	1.552	91.36	1.03	1.42	CSP	1200
BV685	51.56	Intermittent	B	1.373	89.18	0.85	1.18	CSP	1200
BV690	161.22	Intermittent	B	1.437	105.14	2.37	3.28	CSP	1600

Catchment	Area (ha)	Type of Water Crossing	NRCS Hydrologic Soil Group	Overland Flow Slope S_i (%)	Tc (min)	Design Flow (m^3/s)		Structure Type	Culvert Dimension (mm)
						25-yr	100-yr		
BV695	760.83	Permanent Watercourse	B	0.937	184.90	9.94	13.75	SCA-41	2 X (13980 x 6985)
BV700	13.21	Intermittent	B	2.355	53.29	0.31	0.43	CSP	900
BV705	30.87	Intermittent	B	1.408	87.64	0.52	0.71	CSP	900
BV710	55.89	Intermittent	B	3.522	96.19	1.52	2.10	CSP	1400
BV715	49.82	Intermittent	B	2.681	84.33	0.85	1.18	CSP	1200
BV720	264.47	Intermittent	B	1.736	132.65	3.31	4.58	CSP	1800
BV725	51.35	Intermittent	B	1.949	95.84	0.81	1.11	CSP	1200
BV730	864.32	Intermittent	B	1.222	179.76	8.77	12.13	CSP	2 X 2000
BV735	67.92	Intermittent	B	2.372	82.93	1.18	1.63	CSP	1200
BV740	67.75	Intermittent	B	1.296	93.46	1.08	1.50	CSP	1200
BV745	71.61	Intermittent	B	2.611	73.88	1.35	1.86	CSP	1400
BV750	85.20	Intermittent	B	2.084	82.14	1.49	2.06	CSP	1400
BV755	45.20	Intermittent	B	1.008	91.54	0.73	1.01	CSP	1200
BV760	24.42	Intermittent	B	1.364	75.77	0.45	0.62	CSP	900
BV765	1241.78	Intermittent	B	1.996	198.47	11.77	16.27	CSP	3 X 2000
BV770	9.19	Intermittent	B	3.082	63.63	0.33	0.46	CSP	900
BV775	99.27	Intermittent	B	1.460	103.66	1.48	2.04	CSP	1400