

## **Appendix B. Surface Discontinuity Data**

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Discontinuity data collected during the field mapping effort was compiled using the program DIPS (Rocscience, 2012). The purpose was to analyze the general distribution of rock mass discontinuities as visualized by their poles and establish major discontinuity trends and relationships throughout the project area. Equal area stereonet are used to visualize the distribution of poles and their orientations, to determine significant discontinuity sets as well as a general sense of the degree of fracturing throughout the rock mass. Wide spread discontinuities are indicative of highly fractured rock masses without a consistent fabric. Using a Fisher concentration plot, pole densities can be observed for different discontinuity types and major discontinuity sets determined. These discontinuity sets can then be visualized in an equal angle stereonet to determine any problematic kinematic relationships.

A total of 123 data points were collected during the preliminary and Phase 2 and 3 mapping efforts, representing discontinuity attitudes observed at the ground surface across the Axis 2, north and south borrow and quarry project areas. Of these data points, 4 represent regional shear surface, 23 represent rock mass bedding or bedding parallel joint attitudes and 96 represent rock mass joint attitudes. Figures 4-3a and 4-3b are equal angle stereonet of the bedding and joint data from left and right abutment slopes (respectively) with fisher concentrations to determine the major discontinuity sets. A total of 1 bedding and 2 joint sets were determined from this analysis (Table 4-1). The locations and orientations of bedding and bedding parallel discontinuity features are plotted on Figure 4-1. All of the surface bedding and discontinuity data from the Axis 2 area, borrow areas and Teichert quarry are presented in Table B-1 below. Shears were considered as individual and unique discontinuities due to insufficient data for determination of shear sets.

Table B-1: Surface Discontinuity Data

Number	Strike			Dip		Type	Latitude	Longitude	Location
1	S	10	W	51	W	Discontinuity	39.03952	-121.02501	Axis 2
2	S	20	W	85	W	Discontinuity	39.03931	-121.02497	Axis 2
3	N	60	W	85	N	Discontinuity	39.03931	-121.02497	Axis 2
4	N	81	W	78	N	Discontinuity	39.03948	-121.02445	Axis 2
5	N	10	E	84	E	Discontinuity	39.03948	-121.02444	Axis 2
16	N	18	W	65	SW	Discontinuity	39.04096	-121.02342	Axis 2
17	N	3	E	30	SE	Discontinuity	39.04095	-121.02342	Axis 2
18	N	70	W	85	S	Discontinuity	39.04064	-121.02327	Axis 2
19	N	75	W	12	S	Discontinuity	39.04058	-121.02328	Axis 2
20	N	75	E	20	S	Discontinuity	39.04012	-121.02309	Axis 2
21	N	27	E	84	SE	Discontinuity	39.03939	-121.02261	Axis 2
22	N	60	W	87	N	Discontinuity	39.03940	-121.02261	Axis 2
23	N	25	W	75	N	Discontinuity	39.03940	-121.02257	Axis 2
24	N	20	E	87	S	Discontinuity	39.03991	-121.02196	Axis 2
25	N	60	W	20	SW	Discontinuity	39.03991	-121.02194	Axis 2
26	N	10	E	60	S	Discontinuity	39.04001	-121.02215	Axis 2
27	N	85	E	75	S	Discontinuity	39.03998	-121.02218	Axis 2
48	N	30	E	77	E	Discontinuity	39.03890	-121.02247	Axis 2
49	N	55	W	65	W	Discontinuity	39.03892	-121.02243	Axis 2
50	N	0	E	8	E	Bedding	39.03891	-121.02243	Axis 2
51	N	90	E	8	S	Bedding	39.03892	-121.02244	Axis 2
52	N	90	E	20	S	Bedding	39.03894	-121.02248	Axis 2
53	N	70	E	90	S	Discontinuity	39.03898	-121.02216	Axis 2
54	N	30	E	70	E	Discontinuity	39.03898	-121.02216	Axis 2
55	N	50	W	18	S	Bedding	39.03898	-121.02216	Axis 2
56	N	90	E	77	S	Discontinuity	39.03900	-121.02198	Axis 2
57	N	28	E	68	E	Discontinuity	39.03900	-121.02198	Axis 2
58	N	50	W	11	S	Bedding	39.03900	-121.02198	Axis 2
59	S	40	E	68	S	Discontinuity	39.03897	-121.02182	Axis 2
60	N	85	E	57	N	Discontinuity	39.03897	-121.02182	Axis 2
61	N	80	E	80	S	Discontinuity	39.03888	-121.02155	Axis 2
65	N	37	E	90	S	Discontinuity	39.03837	-121.02193	Axis 2
66	N	45	W	75	N	Discontinuity	39.03849	-121.02187	Axis 2
67	N	30	E	83	S	Discontinuity	39.03848	-121.02188	Axis 2
68	N	60	W	10	S	Bedding	39.03851	-121.02185	Axis 2
69	N	5	E	78	W	Discontinuity	39.03856	-121.02193	Axis 2
70	N	78	E	68	N	Discontinuity	39.03855	-121.02193	Axis 2
71	N	2	E	75	E	Discontinuity	39.03816	-121.02253	Axis 2
72	N	90	W	86	N	Discontinuity	39.03817	-121.02254	Axis 2
73	N	72	E	90	S	Discontinuity	39.03817	-121.02281	Axis 2
74	N	26	E	9	S	Bedding	39.03817	-121.02281	Axis 2
75	N	6	W	60	W	Discontinuity	39.03817	-121.02281	Axis 2
76	N	20	W	70	E	Discontinuity	39.03839	-121.02288	Axis 2
77	N	20	E	80	E	Discontinuity	39.03840	-121.02288	Axis 2

Number	Strike			Dip		Type	Latitude	Longitude	Location
78	N	80	W	68	N	Discontinuity	39.03840	-121.02288	Axis 2
79	N	68	W	27	S	Bedding	39.03840	-121.02288	Axis 2
80	N	58	W	88	N	Discontinuity	39.03848	-121.02296	Axis 2
81	N	15	E	15	W	Bedding	39.03848	-121.02296	Axis 2
82	N	35	E	75	S	Discontinuity	39.03848	-121.02296	Axis 2
83	N	75	W	25	S	Bedding	39.03848	-121.02314	Axis 2
84	N	24	E	80	S	Discontinuity	39.03848	-121.02314	Axis 2
85	N	73	W	68	N	Discontinuity	39.03848	-121.02314	Axis 2
86	N	32	E	70	S	Discontinuity	39.03836	-121.02309	Axis 2
87	N	90	E	6	S	Bedding	39.03835	-121.02310	Axis 2
88	N	60	W	71	N	Discontinuity	39.03833	-121.02307	Axis 2
89	N	10	E	72	E	Discontinuity	39.03805	-121.02459	Axis 2
90	N	30	E	77	S	Discontinuity	39.03805	-121.02459	Axis 2
91	N	90	E	90	S	Discontinuity	39.03805	-121.02459	Axis 2
92	N	25	W	20	S	Bedding	39.03840	-121.02551	Axis 2
93	N	65	W	83	N	Discontinuity	39.03840	-121.02547	Axis 2
94	N	5	W	88	E	Discontinuity	39.03840	-121.02542	Axis 2
95	N	65	W	80	N	Discontinuity	39.03847	-121.02505	Axis 2
96	N	12	E	80	3	Discontinuity	39.03848	-121.02505	Axis 2
97	N	45	W	27	S	Bedding	39.03848	-121.02505	Axis 2
98	N	90	E	9	S	Bedding	39.03855	-121.02508	Axis 2
99	N	85	W	85	S	Discontinuity	39.03653	-121.02650	Axis 2
100	N	5	E	75	E	Discontinuity	39.03652	-121.02652	Axis 2
BR04	N	60	W	68	N	Discontinuity	39.03925	-121.02485	Axis 2
BR05	N	5	W	90	N	Discontinuity	39.03910	-121.02463	Axis 2
BR06	N	80	W	70	N	Discontinuity	39.03816	-121.02354	Axis 2
BR07	N	5	E	83	E	Discontinuity	39.03832	-121.02384	Axis 2
BR08	N	15	E	20	W	Discontinuity	39.03844	-121.02387	Axis 2
BR08	N	90	E	75	S	Discontinuity	39.03844	-121.02387	Axis 2
BR08	N	25	E	80	E	Discontinuity	39.03844	-121.02387	Axis 2
BR09	N	75	W	67	N	Discontinuity	39.03845	-121.02409	Axis 2
BR09	S	20	E	18	S	Discontinuity	39.03845	-121.02409	Axis 2
BR09	N	80	E	85	N	Discontinuity	39.03845	-121.02409	Axis 2
BR10	N	70	W	80	N	Discontinuity	39.03855	-121.02418	Axis 2
BR10	N	10	E	90	N	Discontinuity	39.03855	-121.02418	Axis 2
BR11	N	15	W	80	E	Discontinuity	39.03899	-121.02451	Axis 2
BR12	N	20	E	85	E	Discontinuity	39.03846	-121.02477	Axis 2
BR13	N	58	W	70	S	Discontinuity	39.03837	-121.02486	Axis 2
BR13	N	35	E	80	E	Discontinuity	39.03837	-121.02486	Axis 2
BR13	N	60	E	34	N	Discontinuity	39.03837	-121.02486	Axis 2
BR14	N	70	E	21	S	Discontinuity	39.03768	-121.02505	Axis 2
BR20	N	5	E	90	N	Discontinuity	39.03697	-121.02665	Axis 2
BR20	N	85	E	72	S	Discontinuity	39.03697	-121.02665	Axis 2
BR20	N	0	W	0	N	Bedding	39.03697	-121.02665	Axis 2
BR21	N	60	E	86	S	Discontinuity	39.03712	-121.02671	Axis 2

Number	Strike			Dip		Type	Latitude	Longitude	Location
BR21	N	65	E	90		Discontinuity	39.03712	-121.02671	Axis 2
BR21	N	15	E	72	E	Discontinuity	39.03712	-121.02671	Axis 2
BR21	N	20	E	72	E	Discontinuity	39.03712	-121.02671	Axis 2
BR21	S	72	E	7	S	Bedding	39.03865	-121.02442	Axis 2
BR22	N	63	E	83	S	Discontinuity	39.03864	-121.02467	Axis 2
BR22	S	0	E	30	W	Bedding	39.03864	-121.02467	Axis 2
BR22	N	70	W	85	S	Discontinuity	39.03864	-121.02467	Axis 2
BR22	N	60	W	87	N	Discontinuity	39.03864	-121.02467	Axis 2
BR23	S	0	E	15	W	Bedding	39.03865	-121.02419	Axis 2
BR23	N	27	E	69	E	Discontinuity	39.03865	-121.02371	Axis 2
BR23	N	25	E	80	E	Discontinuity	39.03865	-121.02323	Axis 2
BR23	N	65	E	30	N	Discontinuity	39.03866	-121.02275	Axis 2
BR24	S	10	E	12	W	Bedding	39.03914	-121.02441	Axis 2
BR25	S	42	E	28	W	Bedding	39.03915	-121.02436	Axis 2
BR26	N	90	E	6	S	Bedding	39.03948	-121.02444	Axis 2
BR27	N	90	E	4	N	Bedding	39.03949	-121.02445	Axis 2
BR28	N	83	W	20	S	Bedding	39.03940	-121.02260	Axis 2
BR01	N	62	W	30	S	Discontinuity	39.05581	-121.01295	North Borrow Area
BR02	N	87	E	77	N	Discontinuity	39.05429	-121.01217	North Borrow Area
BR03	N	77	W	82	S	Discontinuity	39.04989	-121.02135	South Borrow Area
6	N	75	E	85	SE	Discontinuity	39.03041	-121.02462	Teichert quarry
7	N	27	W	90	N	Discontinuity	39.03044	-121.02460	Teichert quarry
8	N	15	E	12	NW	Discontinuity	39.03074	-121.02467	Teichert quarry
9	N	60	W	85	NE	Discontinuity	39.03074	-121.02467	Teichert quarry
10	N	20	E	85	SE	Discontinuity	39.03075	-121.02467	Teichert quarry
11	N	80	E	50	SE	Discontinuity	39.03074	-121.02467	Teichert quarry
12	N	15	E	72	E	Discontinuity	39.03095	-121.02443	Teichert quarry
13	N	70	E	15	NW	Discontinuity	39.03103	-121.02434	Teichert quarry
14	N	20	W	60	SW	Discontinuity	39.03019	-121.02225	Teichert quarry
15	N	85	E	80	S	Discontinuity	39.03017	-121.02228	Teichert quarry
	N	12	W	85	NE	Fault	39.03107	-121.02345	Teichert quarry
	N	10	E	85	E	Fault	39.03129	-121.02336	Teichert quarry
	N	11	E	85	E	Fault	39.02910	-121.02373	Teichert quarry
	N	55	E	90	N	Fault	39.02969	-121.02440	Teichert quarry