

Figure S1: C018 – Red Deer River Valley Slope Instability – GSI and Joint Set

Jn: 20 (Crushed rock, earthlike)







<p>GEOLOGICAL STRENGTH INDEX FOR JOINTED ROCKS (Hoek and Marinos, 2000)</p> <p>From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavourable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis.</p>		SURFACE CONDITIONS								
		VERY GOOD Very rough, fresh unweathered surfaces	GOOD Rough, slightly weathered, iron stained surfaces	FAIR Smooth, moderately weathered and altered surfaces	POOR Slickensided, highly weathered surfaces with compact coatings or fillings or angular fragments	VERY POOR Slickensided, highly weathered surfaces with soft clay coatings or fillings				
STRUCTURE		DECREASING SURFACE QUALITY →								
	INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities									
	BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets									
	VERY BLOCKY- interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets									
	BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity									
	DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces									
	LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes									
DECREASING INTERLOCKING OF ROCK PIECES ↓		90	80	70	60	50	40	30	20	10
		N/A								









Figure S3: S020 – Highwood House Rockfall Hazard – GSI and Joint Set

Jn: 12 (Three joint sets plus random joints)

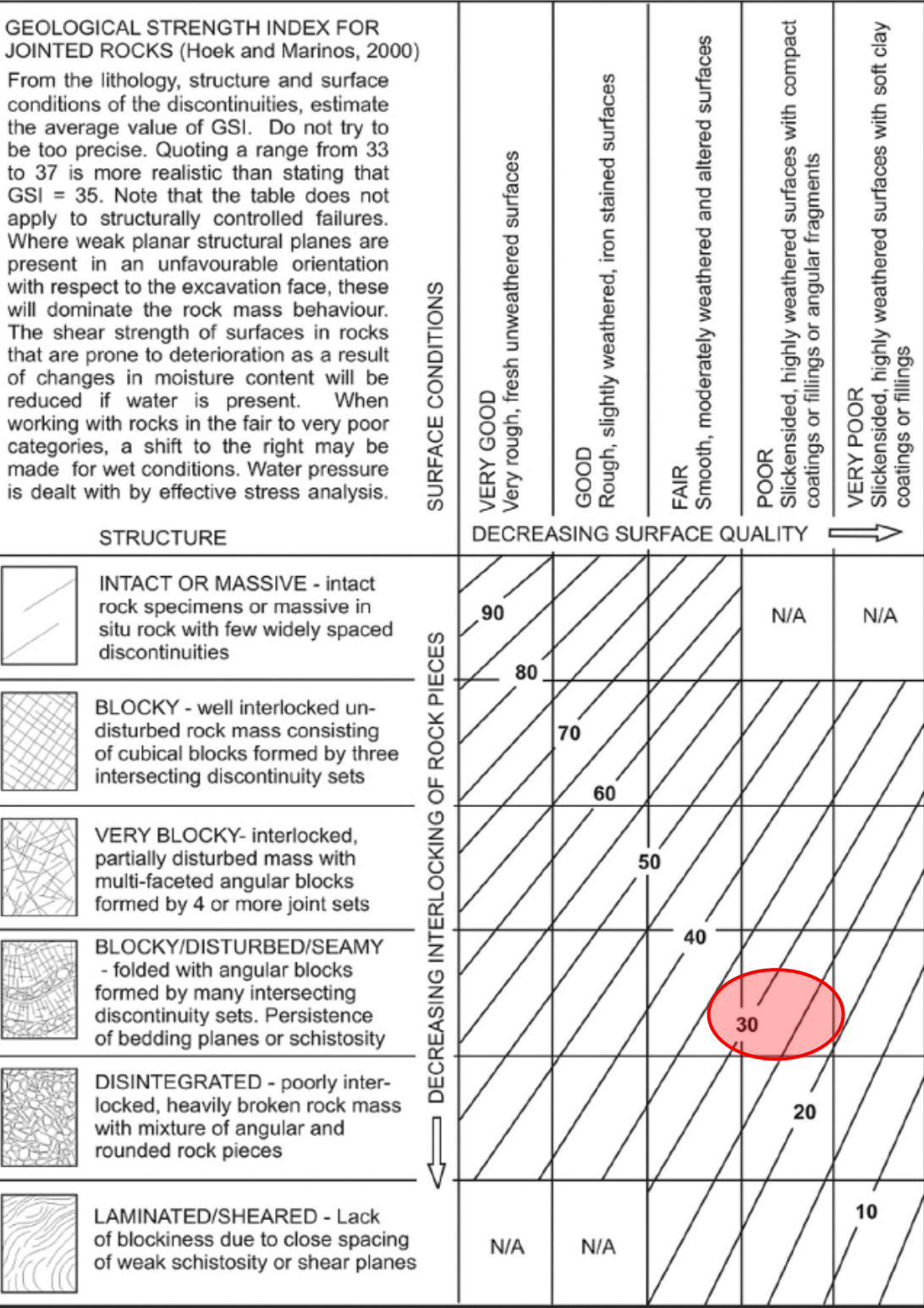




Figure S4: S042 – Spray Lakes Rockfall (North) – GSI and Joint Set Number

Jn: 9 (Three joint sets)







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		VERY GOOD Very rough, fresh unweathered surfaces	GOOD Rough, slightly weathered, iron stained surfaces	FAIR Smooth, moderately weathered and altered surfaces	POOR Slickensided, highly weathered surfaces with compact coatings or fillings or angular fragments	VERY POOR Slickensided, highly weathered surfaces with soft clay coatings or fillings
STRUCTURE		DECREASING SURFACE QUALITY ➡				
	INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities	90			N/A	N/A
	BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets	80	70			
	VERY BLOCKY- interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets		60	50		
	BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity			40	30	
	DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces				20	
	LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes					10
DECREASING INTERLOCKING OF ROCK PIECES ⬇						
		N/A	N/A			





Figure S5: S042 – Spray Lakes Rockfall (South) – GSI and Joint Set Number

Jn: 9 (Three joint sets)

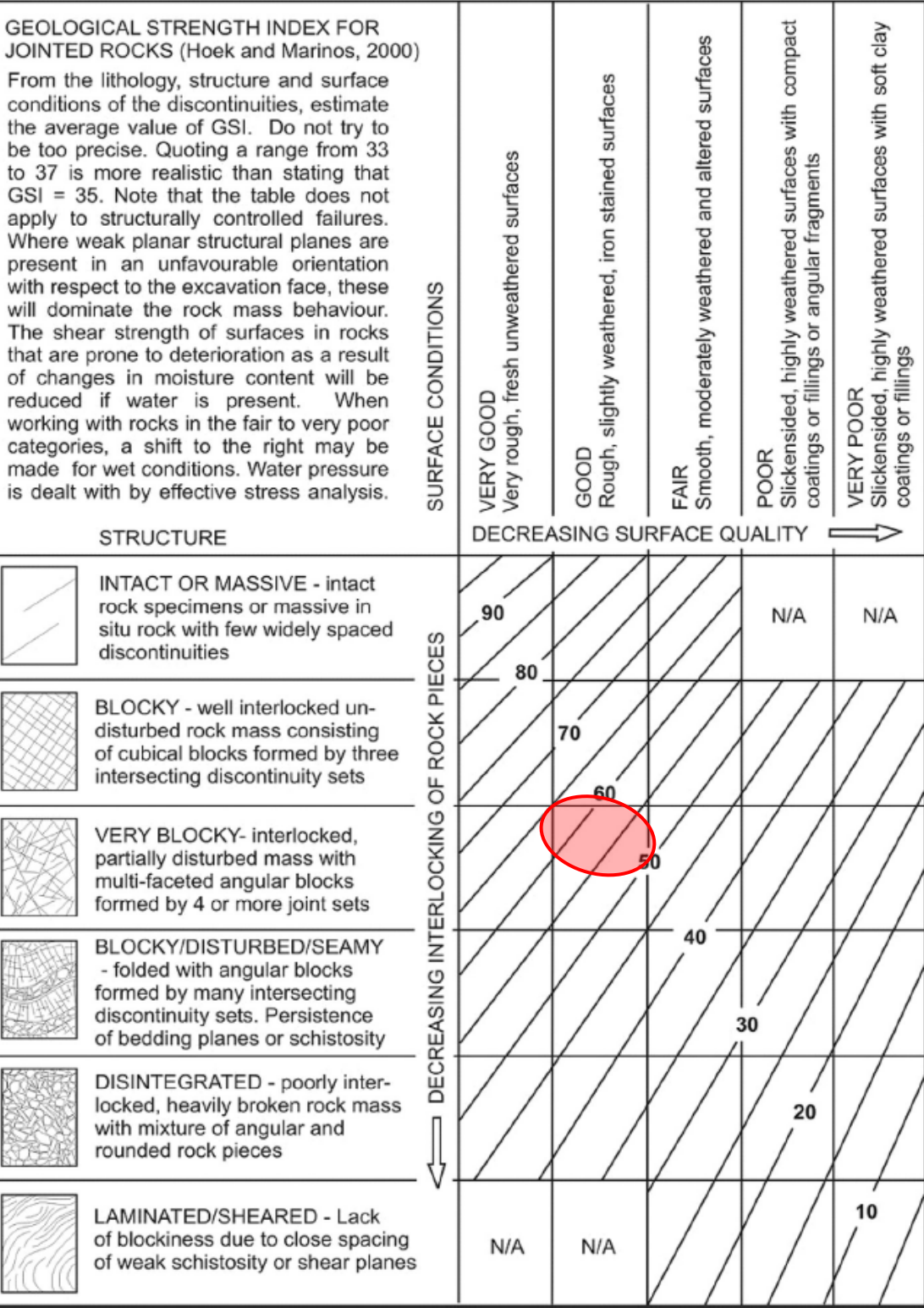




Figure S6: S057 – Hwy 1A, Exshaw, Site A – GSI and Joint Set Number Jn: 15 (Four or more joint sets, random, heavily jointed)

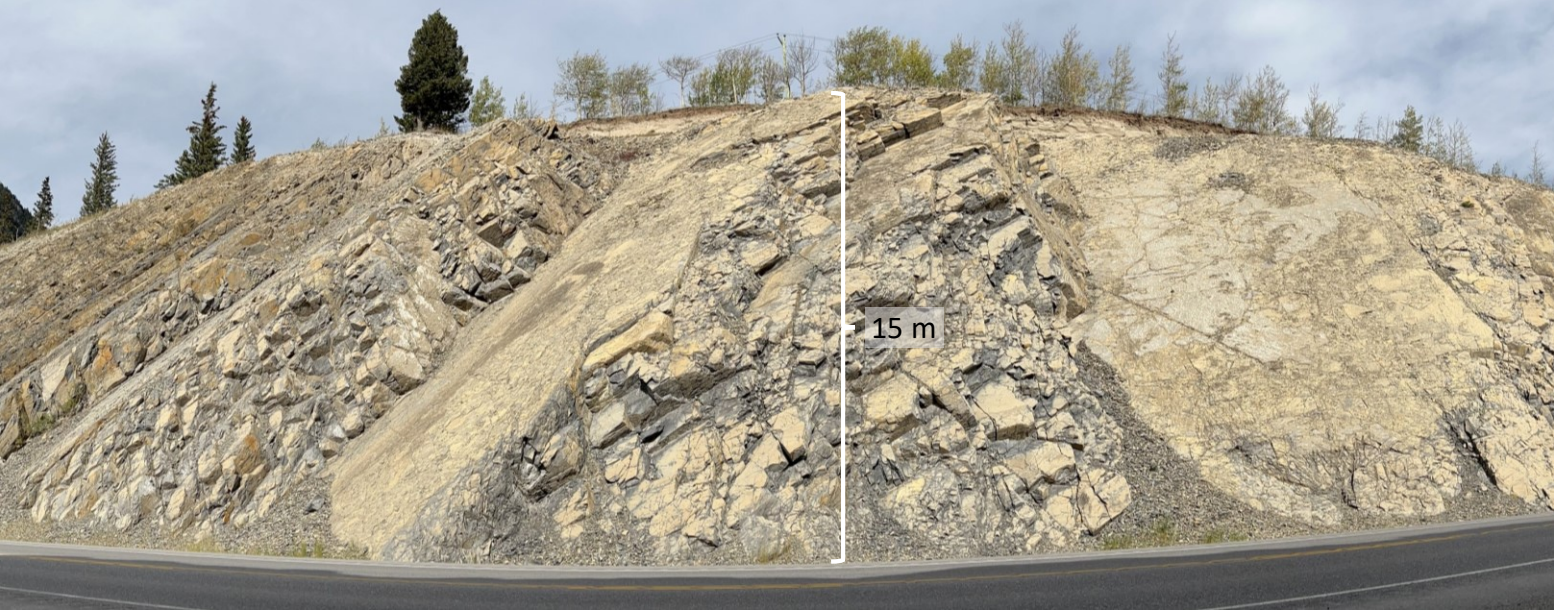
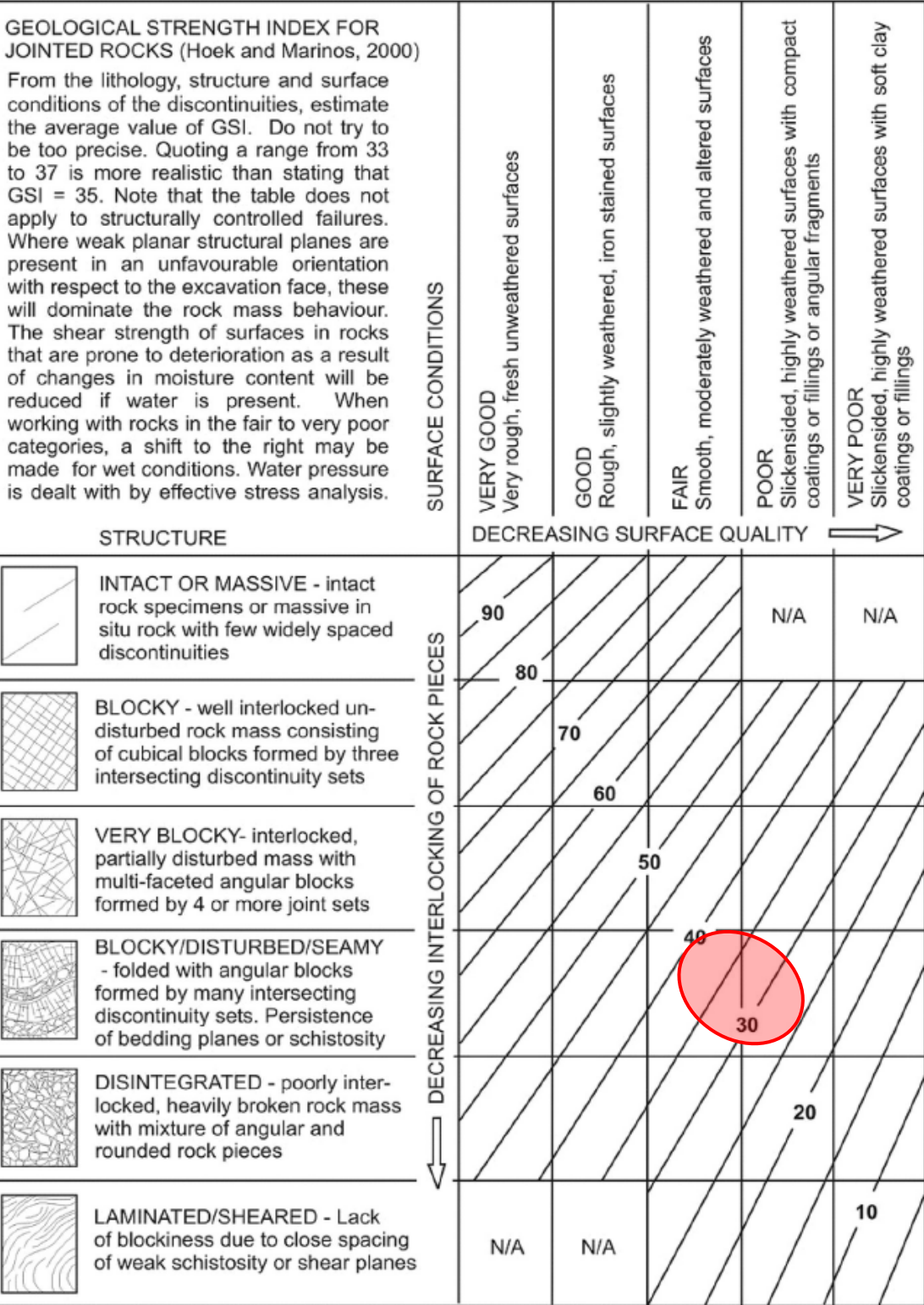




Figure S7: S057 – Hwy 1A, Exshaw, Site B – GSI and Joint Set Number

Jn: 12 (Three joint sets plus random joints)

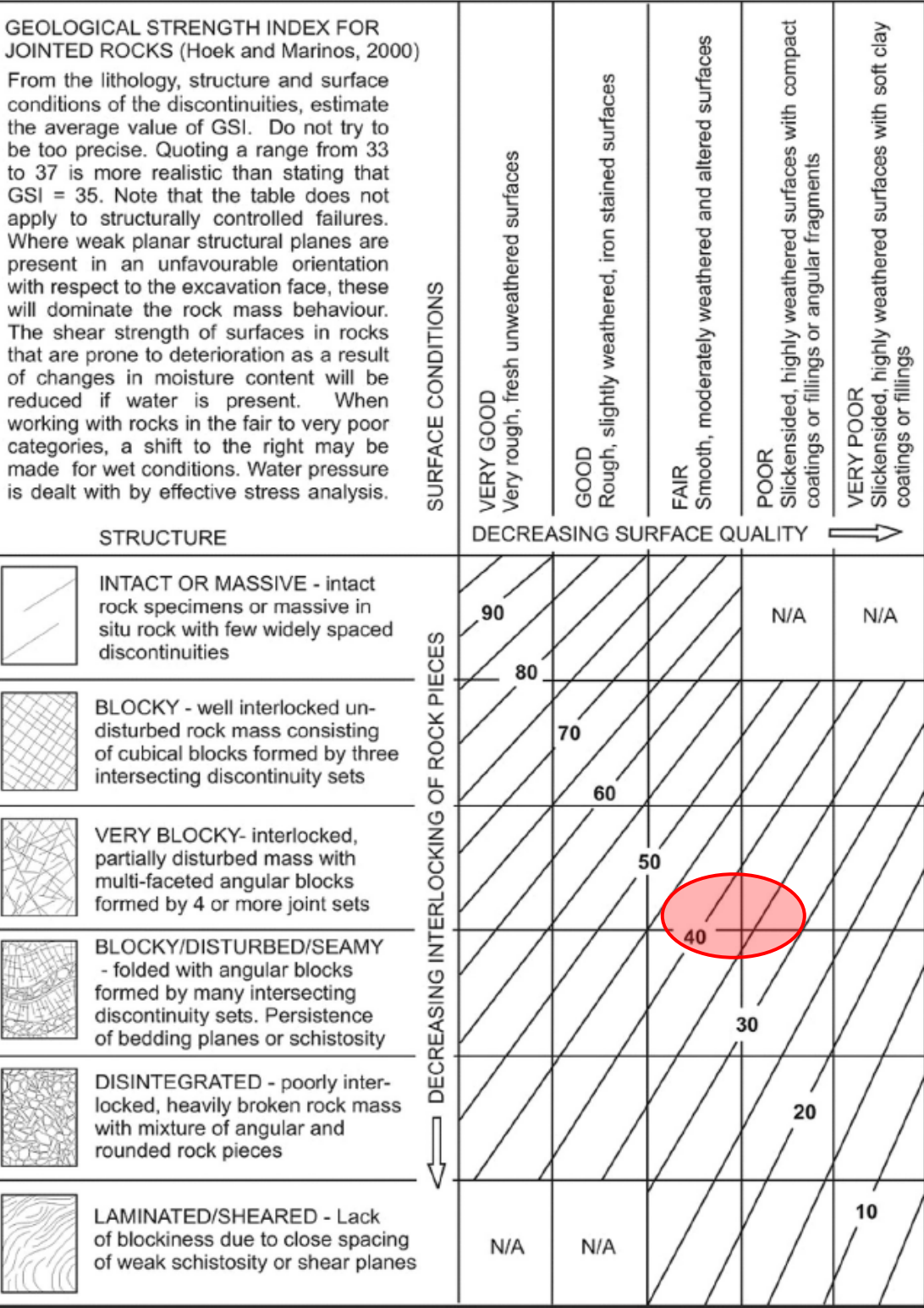




Figure S8: S070 – East of Fir Creek Rock Cut – GSI and Joint Set Number

Jn: 12 (One joint set plus random joints)

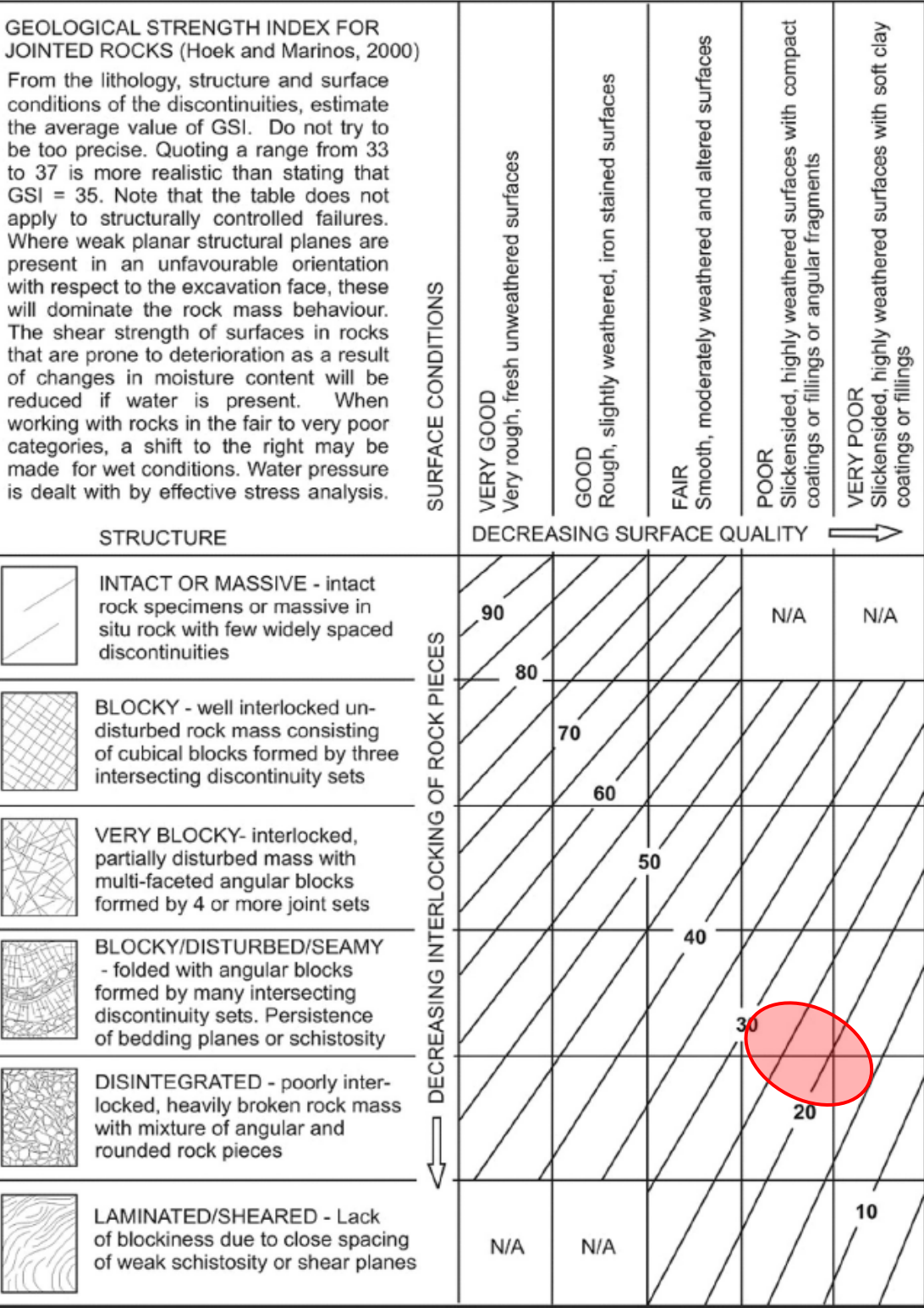










Figure S9: S074 – Lipsett Ridge Rock Cut – GSI and Joint Set Number

Jn: 12 (One joint set plus random joints)

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STRUCTURE		DECREASING SURFACE QUALITY →								
	INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities									
	BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets									
	VERY BLOCKY- interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets									
	BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity									
	DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces									
	LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes									
DECREASING INTERLOCKING OF ROCK PIECES ↓		90	80	70	60	50	40	30	20	10
							N/A		N/A	

