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Date: December 31, 2016

Project: 16-3480L Laboratory Testing
 Aggregate Acceptance

Client: Mr. Fred Huppert
 Huppert Brothers Construction
 3509 54th Street West
 Billings, Montana 59106

Copies:

Source: Laurel South Quarry
Date Sampled: 11/29/16

Sample: Riprap #1
Sampled by: FH/HB

Test Method	Lab Result	FP-14 705.02 Riprap Specification
Sodium Sulfate Soundness loss, <i>average of 3 coarse size ranges</i> (ASTM C 88)	0.8% coarse	12% max
Sodium Sulfate Soundness loss, <i>average of 4 fine size ranges</i> (ASTM C 88)	2.7% fine	---
LA Abrasion loss, <i>crushed and sized to grading A</i> (ASTM C 535)	13% at 500 rev	50% max
Freeze-Thaw loss, <i>recommend weighted average of 4 rocks of varying geology, through 30 cycles</i> (ASTM D 5312)	< 0.5%	no FP-14 spec, but typ 10% max for those projects that specify
Specific Gravity, <i>recommend an average of 8 rocks of varying geology</i> (ASTM D 6473)	2.422 bulk Dry 2.485 bulk SSD 2.585 apparent 2.61% absorption	--- --- 2.40 min 4% max


 Joe B. DeBar, PE
 Materials Lab Manager