Kumar & Associates, Inc.®
Geotechnical and Materials Engineers
and Environmental Scientists

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An Employee Owned Company

Office Locations: Denver (HQ), Parker, Colorado Springs, Fort Collins, Glenwood Springs, and Summit County, Colorado

April 9, 2025

Colorado Aggregate Recycling
Attn: Matt Bustamante
8900 Highway 93, Unit A
Golden, Colorado 80403

Subject: Laboratory Test Results, Class 6 Aggregate Base Course/Recycled Concrete, 2024 Colorado Aggregate Recycling, Golden Pit, Colorado

Project No. 25-1-266

Dear Mr. Bustamante:

Attached are the results of laboratory testing performed on a bulk sample of aggregate submitted to our Denver laboratory by a representative of Colorado Aggregate Recycling. The sample was assigned Kumar & Associates, Inc. (K+A) laboratory sample number 3936. We understand the sample was requested to be tested to evaluate the material's suitability to be classified as CDOT Class 6 aggregate base course (ABC). The sample originated from Colorado Aggregate Recycling's Golden Pit (North Yard). Laboratory testing was performed to determine the material classification parameters, including Atterberg Limits, gradation, and moisture-density relationships (modified Proctor). R-Value (Hveem-stabilometer) and Los Angles Abrasion testing were also performed. The results of the testing are summarized in the attached Table and figures. The testing was performed in accordance with the applicable ASTM standard test procedures.

Based on the testing results, the submitted sample meets the gradation and Atterberg limit specifications for Class 6 ABC presented on Table 703-2 in the Colorado Department of Transportation's (CDOT) 2023 *Standard Specifications for Road and Bridge Construction. The testing indicated* the material had an R-value of 81 at an exudation pressure of 300 psi and a 38% loss as evaluated by the Los Angles Abrasion test.

If you have questions or need further information, please call.

Sincerely,

KUMAR & ASSOCIATES, INC.

Justin Cupich, P.E.

JDC/db
Attachments
cc: file

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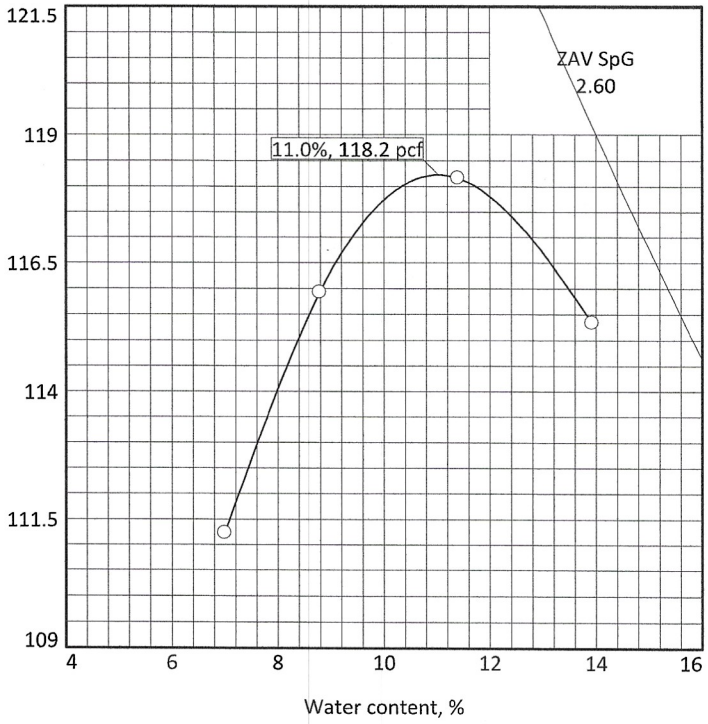
TABLE 1
SUMMARY OF LABORATORY TEST RESULTS
NORTH YARD (GOLDEN)

PROJECT NO.: 25-1-226
PROJECT NAME: 2025 COLORADO AGGREGATE RECYCLING LABORATORY TESTING
DATE RECEIVED: 3/3/2025

SAMPLE NO.	DATE TESTED	MAXIMUM DRY DENSITY (pcf)	OPTIMUM MOISTURE CONTENT (%)	GRADATION		PERCENT PASSING No. 200 SIEVE	ATTERBERG LIMITS		R-VALUE @ 300 PSI	LOS ANGELES ABRASION (ASTM C-131)		SOIL OR BEDROCK TYPE
				GRAVEL (%)	SAND (%)		LIQUID LIMIT (%)	PLASTICITY INDEX (%)		GRADING	PERCENT LOSS (%)	
3936	3/17/25	118.2	11.0	47	49	4	NV	NP	81	B	38	WELL-GRADED SAND WITH GRAVEL ABC CLASS 6 (RECYCLED CONCRETE)

COMPACTION TEST REPORT

Curve No. 3936



Preparation Method

Rammer: Wt. 10 lb. Drop 18 in.

Type Manual

Layers: No. five Blows per 56

Mold Size 0.075 cu. ft.

Test Performed on Material

Passing 3/4 in. Sieve

%>3/4 in. 0 %<No.200 3.6

Atterberg (D 4318): LL NV PI NP

NM (D 2216) Sp.G. (D 854) 2.6

USCS (D 2487) SW

AASHTO (M 145) A-1-a

Date: Sampled 3/3/25

Received 3/3/25

Tested 3/19/25

Tested By AS

COMPACTION TESTING DATA
ASTM D 1557-12 Method C Modified

	1	2	3	4	5	6
WM + WS	10528.0	10770.0	10958.0	10950.0		
WM	6474.0	6474.0	6474.0	6474.0		
WW + T #1	512.1	807.5	705.0	1134.1		
WD + T #1	488.6	766.7	655.4	1055.3		
TARE #1	152.6	302.6	220.2	489.5		
WW + T #2						
WD + T #2						
TARE #2						
MOIST.	7.0	8.8	11.4	13.9		
DRY DENS.	111.2	115.9	118.2	115.3		

SIEVE TEST RESULTS

Opening Size	% Passing	Specs.
1"	100	100
3/4"	100	95-100
1/2"	87	
3/8"	77	
#4	53	30-65
#8	40	25-55
#16	28	
#30	19	
#50	12	
#100	7	
#200	3.6	3-12

TEST RESULTS

Maximum dry density = 118.2 pcf

Optimum moisture = 11.0 %

Material Description

well-graded sand with gravel
ABC Class 6 (Recycled Concrete)

Remarks:

Project No. 25-1-226 **Client:** Colorado Aggregate Recycling

Project: Colorado Aggregate Recycling - 2025 Various Laboratory Projects

○ **Location:** North Yard (Golden) **Sample Number:** 3936

Checked by: JJM

Title: Lab Manager

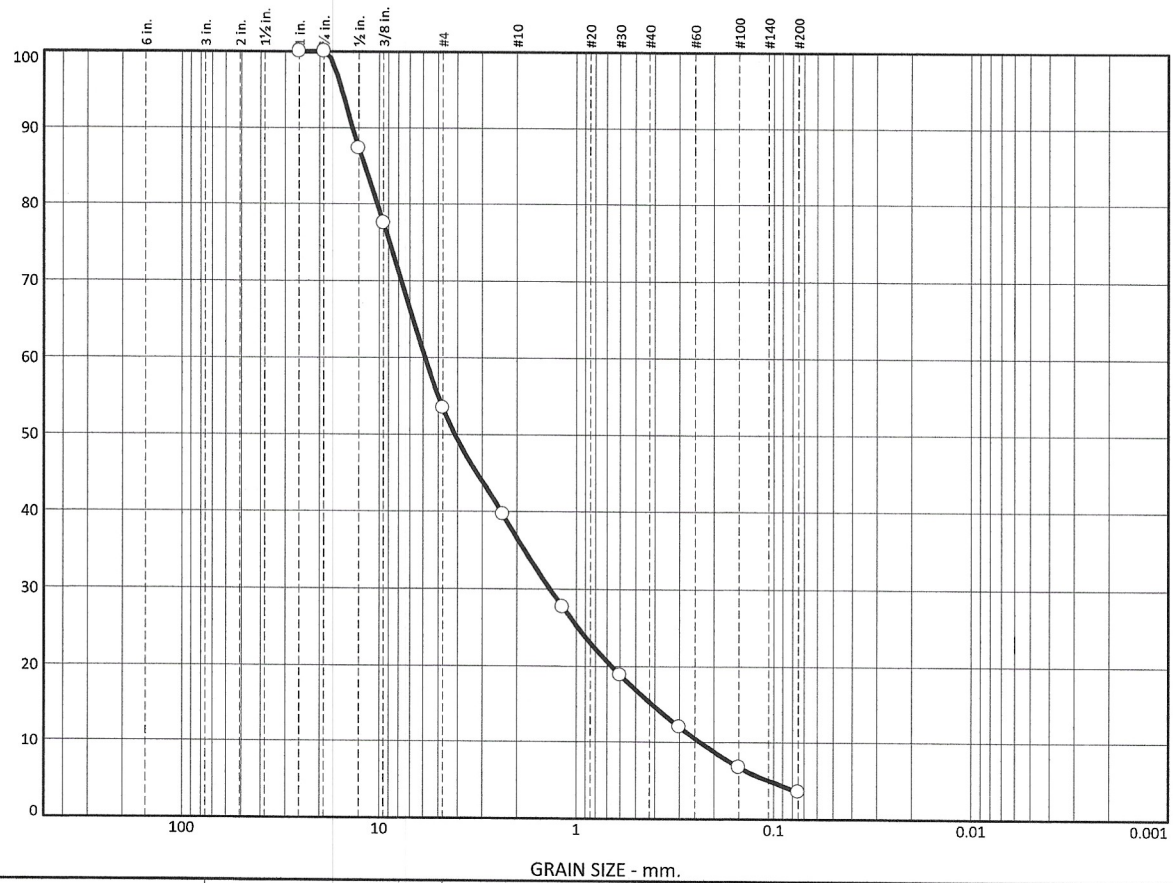
Kumar & Associates, Inc.

Denver, Colorado

Figure

Particle Size Distribution Report

ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	47	16	22	11	4	

Test Results (ASTM D422)

Sieve Size or Diam. (mm.)	Finer (%)	Spec.* (%)	Out of Spec. (%)	Pct. of Fines
1"	100	100		
3/4"	100	95-100		
1/2"	87			
3/8"	77			
#4	53	30-65		
#8	40	25-55		74
#16	28			52
#30	19			35
#50	12			23
#100	7			13
#200	3.6	3-12		6.8

* CDOT - ABC Class 6

Material Description

well-graded sand with gravel
ABC Class 6 (Recycled Concrete)

Atterberg Limits

PL= NP LL= NV PI= NP

Classification

USCS= SW AASHTO= A-1-a

Test Remarks

Location: North Yard (Golden)
Sample Number: 3936

Sample Date: 3/3/25

Kumar & Associates, Inc.

Denver, Colorado

Client: Colorado Aggregate Recycling

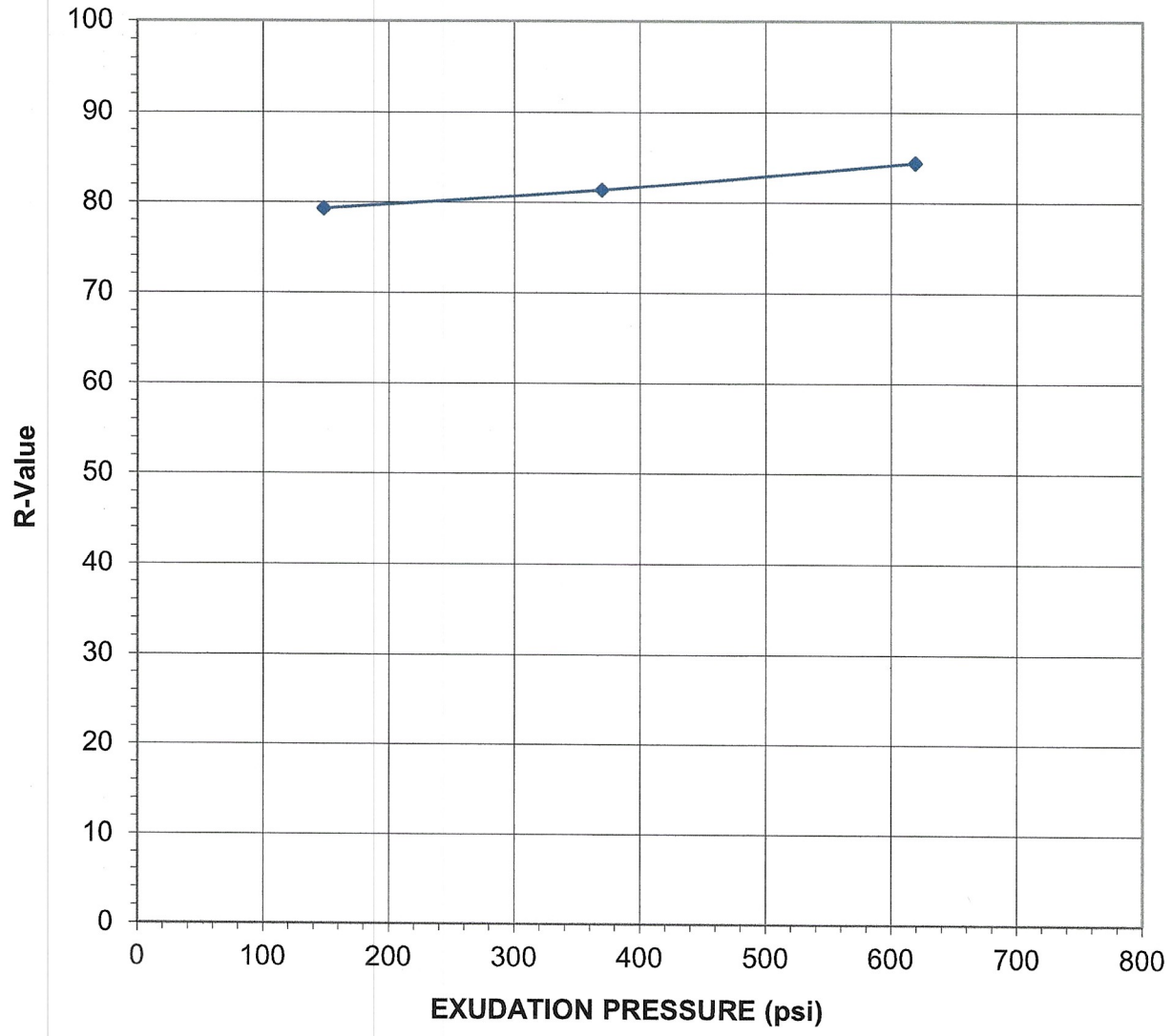
Project: Colorado Aggregate Recycling - 2025 Various Laboratory Projects

Project No: 25-1-226

Figure

R-VALUE

TEST SPECIMEN	1	2	3	4	R-VALUE (300 psi)
MOISTURE CONTENT (%)	13.5	14.4	15.3		
DENSITY (pcf)	111.9	112.9	111.2		
EXPANSION PRESSURE (psi)	0.000	0.000	0.000		
EXUDATION PRESSURE (psi)	619	370	148		
R-VALUE	84	81	79		**81**



SOIL TYPE: well-graded sand with gravel ABC Class 6 (Recycled Concrete)

LOCATION: North Yard (Golden)

DATE SAMPLED: 3/3/25 DATE RECEIVED: 3/3/25 DATE TESTED: 3/17/25

GRAVEL: 47 SAND: 49 SILT AND CLAY: 4

LIQUID LIMIT: NV PLASTICITY INDEX: NP

25-1-226	KUMAR & ASSOCIATES	HVEEM STABILOMETER TEST RESULTS	3936