

# GROUND ENGINEERING

March 17, 2017

Subject: Laboratory Testing,  
Delivered Class 6 Recycled  
Concrete Sample

Job No. 17-1044

Mr. Gary Hansen  
Allied Recycled Aggregates  
P.O. Box 566  
Commerce City, Colorado 80037-0566

Dear Mr. Hansen,


As requested, analytical testing was completed on one sample of class 6 recycled concrete delivered to our laboratory by your representative. The following testing was completed in general accordance with the respective standards; Modified Proctor (ASTM D 1557), Sieve Analysis (ASTM C 136), Atterberg Limits (ASTM D 4318), R-Value (ASTM D 2844) and Los Angeles Abrasion (ASTM C 131). The sample location was identified as 4082. This sample meets CDOT Class 6 Grading requirements. This sample also meets the City of Aurora Type 2 Base Grading requirements.


The results of the testing have been attached.

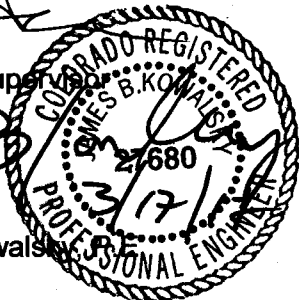
If you have any questions regarding this data, please do not hesitate to contact our office.

**GROUND ENGINEERING CONSULTANTS, INC.**

Sincerely,

  
Nick Andrade  
Laboratory Supervisor

  
Reviewed by  
James B. Kowalski



Ground Engineering's ID Number: 3560  
 Sample location: 4082  
 Date Sampled: 3/16/2017  
 Sample Identification: Class 6 Recycled Concrete

Table I. Sieve Analysis Results, (ASTM C 136)

| Sieve Size | % Passing | CDOT Class 6 Specs. | City of Aurora Type 2 Base Specs. |
|------------|-----------|---------------------|-----------------------------------|
| 1"         | 100       | 100                 | 100                               |
| 3/4"       | 100       | 100                 | --                                |
| 1/2"       | 84        | --                  | --                                |
| 3/8"       | 73        | --                  | 50-85                             |
| No.4       | 55        | 30-65               | 35-65                             |
| No. 8      | 42        | 25-55               | --                                |
| No. 10     | 39        | --                  | 25-50                             |
| No. 16     | 30        | --                  | --                                |
| No. 30     | 21        | --                  | --                                |
| No. 40     | 18        | --                  | 15-30                             |
| No. 50     | 15        | --                  | --                                |
| No. 100    | 10        | --                  | --                                |
| No. 200    | 7.1       | 3-12                | 3-15                              |

Table II. Additional Test Results: Atterberg Limits, (ASTM D 4318), Los Angeles Abrasion, (ASTM C 131, Grading B), R-Value (ASTM D 2844), Modified Proctor (ASTM D 1557)

| Test Method                          | Result | CDOT Class 6 Specs. | City of Aurora Type 2 Base Specs. |
|--------------------------------------|--------|---------------------|-----------------------------------|
| <b>Atterberg Limits</b>              |        |                     |                                   |
| <i>Liquid Limit</i>                  | N/V    | 30 Maximum          | 25 Maximum                        |
| <i>Plasticity Index</i>              | N/P    | 6 Maximum           | 15 Maximum                        |
| <b>Modified Proctor</b>              |        |                     |                                   |
| <i>Maximum Dry Density (pcf)</i>     | 115.7  | --                  | --                                |
| <i>Optimum Moisture Content (%)</i>  | 12.7   | --                  | --                                |
| L. A. Abrasion (% loss)<br>Grading B | 43     | 50 Maximum          | 45 Maximum                        |
| R-Value                              | 81     | --                  | 78 Minimum                        |

Ground Engineering Consultants, Inc.

# **GROUND**

## **ENGINEERING**

### **GRADATION PROPERTIES**

Project: **Allied Recycled Aggregates Lab Testing 2017**

Job Number: **17-1044**

Date: **3/17/2017**

Reported to: **Allied Recycled Aggregates**  
P.O. Box 566  
Commerce City, CO 80037-0566

Attn: **Gary Hansen**

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#### **Sample Information**

Sample Number: **3560**

Sample Location: **4082**

Aggregate Identification: **CDOT Class 6 / Aurora Type 2 Recycled Concrete Base**

Date Sampled: **3/16/2017**

Sampled By: **Allied Recycled Aggregates Representative**

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#### **Gradation Analysis**

| <b>Sieve Size<br/>(opening)</b> | <b>Passing<br/>(%)</b> |
|---------------------------------|------------------------|
| 2"                              | 100                    |
| 1 1/2"                          | 100                    |
| 1"                              | 100                    |
| 3/4"                            | 100                    |
| 1/2"                            | 84                     |
| 3/8"                            | 73                     |
| #4                              | 55                     |
| #8                              | 42                     |
| #10                             | 39                     |
| #16                             | 30                     |
| #30                             | 21                     |
| #40                             | 18                     |
| #50                             | 15                     |
| #100                            | 10                     |
| #200                            | 7.1                    |

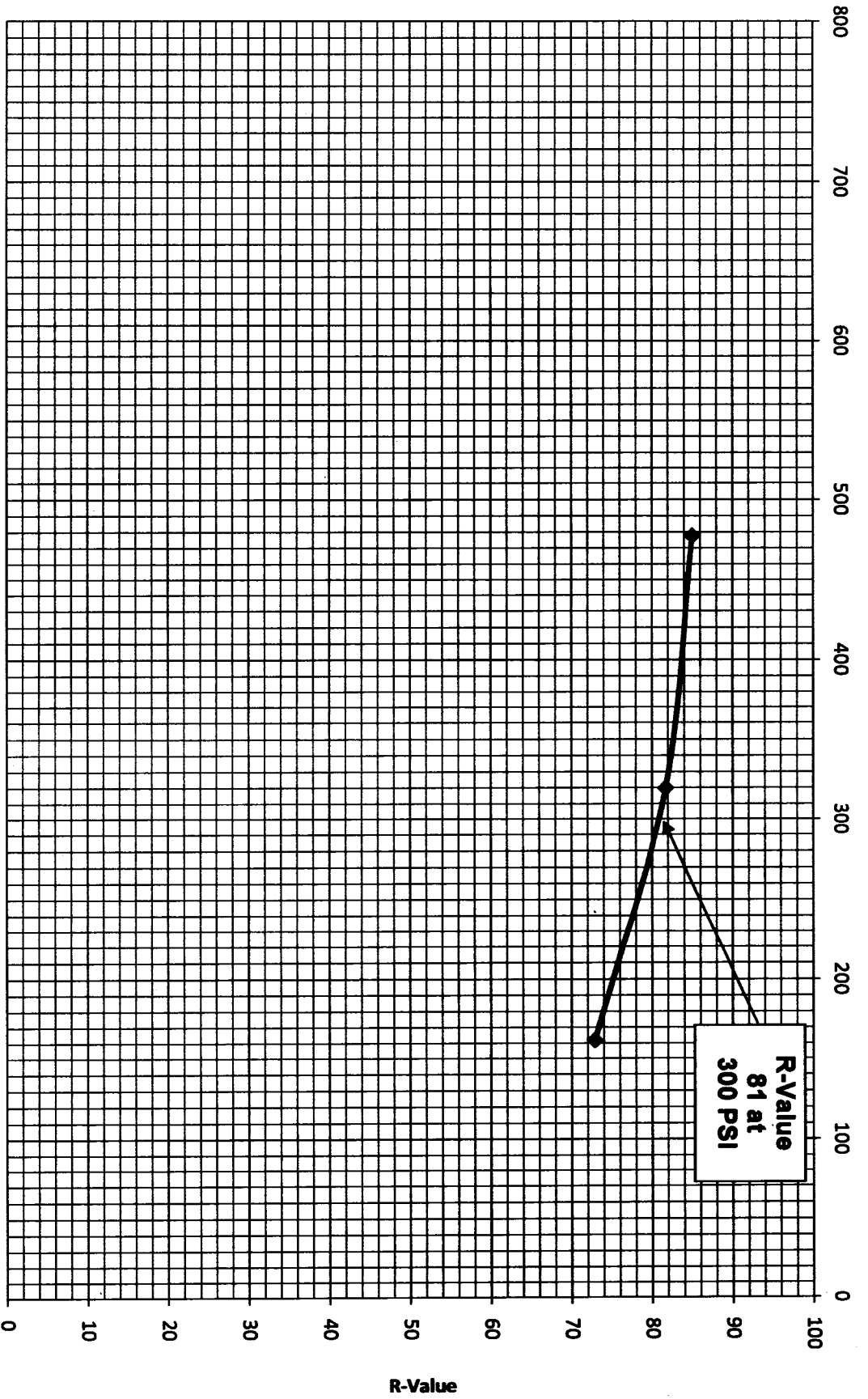
Liquid Limit: **NV**

Plasticity Index: **NP**

L.A. Abrasion (% Loss)

ASTM C131, Grading B **43**

Exudation Pressure (PSI)



Location: 4082

| Test Specimen      | 1   | 2    | 3    |
|--------------------|-----|------|------|
| Moisture (%)       | 9.9 | 11.7 | 15.0 |
| R-Value            | 85  | 82   | 73   |
| Exudation Pressure | 478 | 320  | 162  |

Sample ID No. 3560

Job No. 17-1044

GROUND

ENGINEERING CONSULTANTS

R-VALUE TEST RESULT

ASTM D2844/D2844M - 13

Soil Type: CDOT Class 6/Aurora Type 2 Recycled Concrete

\*\*\*\*Material will be considered "unstable" if optimum moisture is greater than 300 psi exudation moisture and the decrease in R-value from 400 psi to 300 psi exudation pressure is 10 or greater

# COMPACTION TEST REPORT

Curve No.: 3560

Date: 3-16-2017

Project No.: 17-1044

Project: Allied Recycled Aggregates 2017 Lab Testing

Client: Allied Recycled Aggregates

Location: 4082

Sample Number: 3560

Remarks:

## MATERIAL DESCRIPTION

Description: Class 6 Recycled Concrete

Classifications -

USCS:

AASHTO:

Nat. Moist. =

Sp.G. =

Liquid Limit = NV

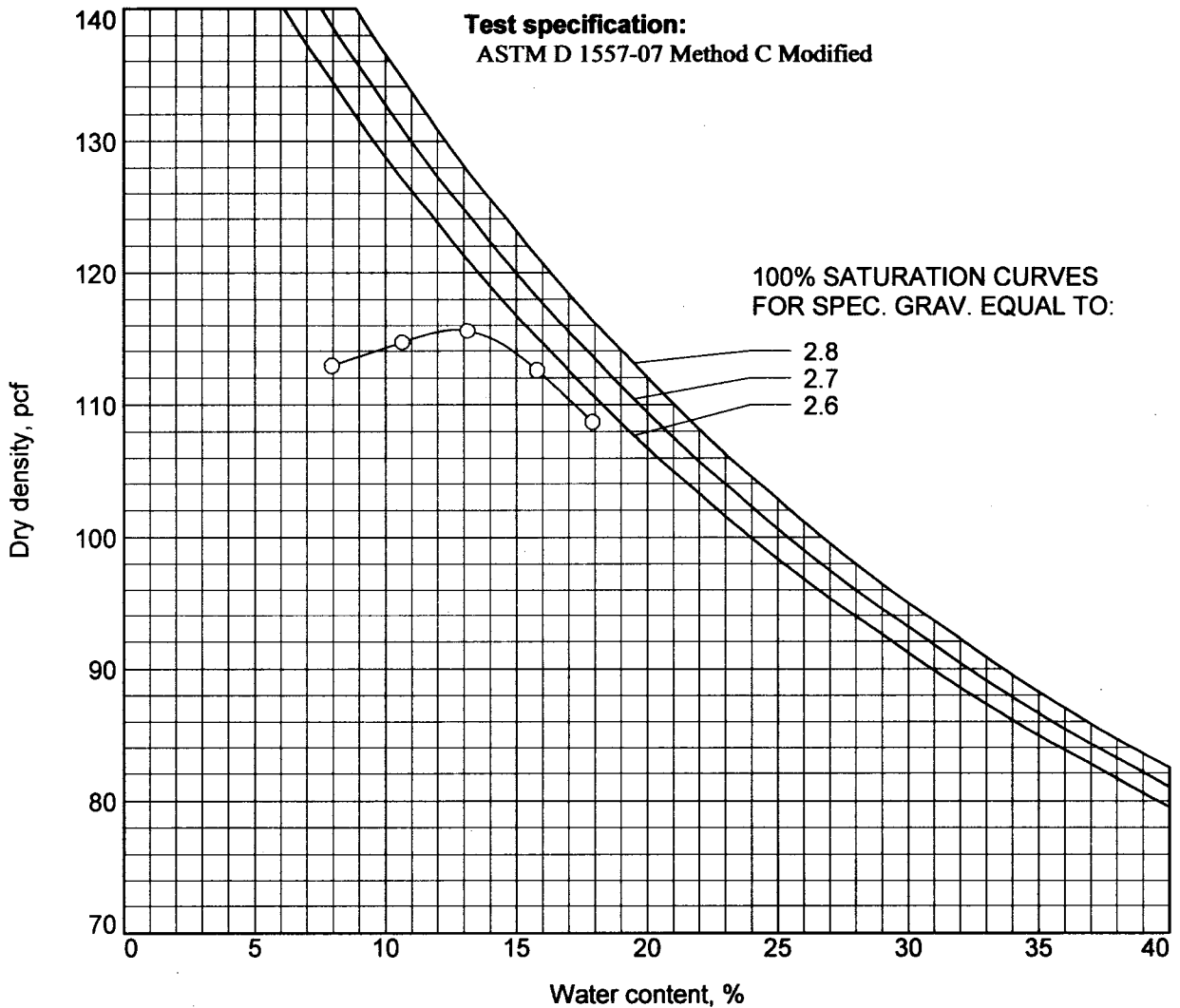
Plasticity Index = NP

% < No.200 = 7.1 %

## TEST RESULTS

Maximum dry density = 115.7 pcf

Optimum moisture = 12.7 %



Figure



"Quality Through Cooperation"

**MATERIALS TESTING LABORATORY**

15700 East 32nd Avenue

Aurora, CO 80011

(303) 326-8270/FAX (303) 326-8271

**MATERIAL PRE-QUALIFICATION  
TYPE 2 BASE COURSE**

(please type in all information)

**APPROVED**

**MAR 24 2017**

**MATERIALS LAB**

For use until June 1, 2018

Remarks for City Use

|  |   |              |                              |
|--|---|--------------|------------------------------|
| <b>Company Name:</b>                   | Allied Recycled Aggregates                      |              |                              |
| <b>Contact Person:/ Email Address:</b> | Russel Hawkins / russ.hawkins@alliedrecycle.com |              |                              |
| <b>Mailing Address:</b>                | P. O. Box 566                                   |              |                              |
| <b>City, State, Zip:</b>               | Commerce City, Colorado 80037                   |              |                              |
| <b>Telephone No.:</b>                  | 303-289-3366                                    | <b>Cell:</b> | <b>Fax No.:</b> 303-289-3543 |
| <b>Plant or Pit Name:</b>              | Pit 1   |              |                              |
| <b>Plant or Pit Location:</b>          | 7901 US Highway 85, Commerce City, CO, 80022    |              |                              |
| <b>Product Identification Code:</b>    | #4 Class6 / Type 2                              |              |                              |
| <i>(As Found on Delivery Ticket)</i>   |   |              |                              |

**ANALYSIS SUMMARY**

| SIEVE                             | % PASSING | SPECIFICATION |
|-----------------------------------|-----------|---------------|
| 1"                                | 100       | 100           |
| 3/4"                              | 100       |               |
| 1/2"                              | 84        |               |
| 3/8"                              | 73        | 50 - 85       |
| No. 4                             | 55        | 35 - 65       |
| No. 8                             | 42        |               |
| No. 10                            | 39        | 25 - 50       |
| No. 16                            | 30        |               |
| No. 30                            | 21        |               |
| No. 40                            | 18        | 15 - 30       |
| No. 100                           | 10        |               |
| No. 200 (Washed ASTM C 117)       | 7.1       | 3 - 15        |
| Liquid Limit                      | N/V       | 25 Maximum    |
| Plasticity Index                  | N/P       | 15 Maximum    |
| Maximum Dry Density (ASTM D 1557) | 115.7 pcf |               |
| Optimum Moisture Content          | 12.7 %    |               |
| L. A. Abrasion                    | 43 %      | 45% Maximum   |
| Hveem "R" Value                   | 81 %      | 78% Minimum   |

Note: The fraction passing the No. 200 sieve shall not be greater than 2/3 of the fraction passing the No. 40 sieve