

# Aggregate Optimization Chart

## Production Gradation Report

PLANT #: **12**

Contractor: \_\_\_\_\_

Sample Date: 10/30/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 10/31/2023 through 11/6/2023

MDOT No.: \_\_\_\_\_

| Agg. Class | Pit #  | Source       | Weight (ssd) | ft <sup>3</sup> | Specific Gravity | Contribution % |
|------------|--------|--------------|--------------|-----------------|------------------|----------------|
| CA         | 71-47  | Presque Isle | 1020         | 6.24            | 2.62             | 33.2           |
| IA         | 71-47  | Presque Isle | 850          | 5.20            | 2.62             | 27.7           |
| N2S        | 63-115 | Ray Rd       | 1200         | 7.26            | 2.65             | 39.1           |
| Total Wt   |        |              | <b>3070</b>  | <b>18.70</b>    |                  | <b>100.0</b>   |

<--- Verify this number is 100%

| Sieve | CA    | IA    | N2S   | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|-------|-------|-------|----------------------|------------|-----------------------|
| 2"    | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1.5"  | 98.5  | 100.0 | 100.0 | 99.5                 | 0.5        | 0.5                   |
| 1"    | 43.8  | 100.0 | 100.0 | 81.3                 | 18.2       | 18.7                  |
| 3/4"  | 12.2  | 97.0  | 100.0 | 70.0                 | 11.3       | 30.0                  |
| 1/2"  | 5.0   | 71.7  | 100.0 | 60.6                 | 9.4        | 39.4                  |
| 3/8"  | 3.9   | 48.0  | 100.0 | 53.6                 | 7.0        | 46.4                  |
| #4    | 2.9   | 10.4  | 96.5  | 41.6                 | 12.1       | 58.4                  |
| #8    | 2.6   | 4.7   | 79.3  | 33.2                 | 8.4        | 66.8                  |
| #16   | 2.5   | 3.9   | 62.2  | 26.2                 | 7.0        | 73.8                  |
| #30   | 2.4   | 3.6   | 47.4  | 20.3                 | 5.9        | 79.7                  |
| #50   | 2.3   | 3.2   | 23.2  | 10.7                 | 9.6        | 89.3                  |
| #100  | 2.0   | 2.9   | 5.1   | 3.5                  | 7.2        | 96.5                  |
| LBW   | 1.6   | 2.4   | 0.7   | 1.5                  | 2.0        | 98.5                  |

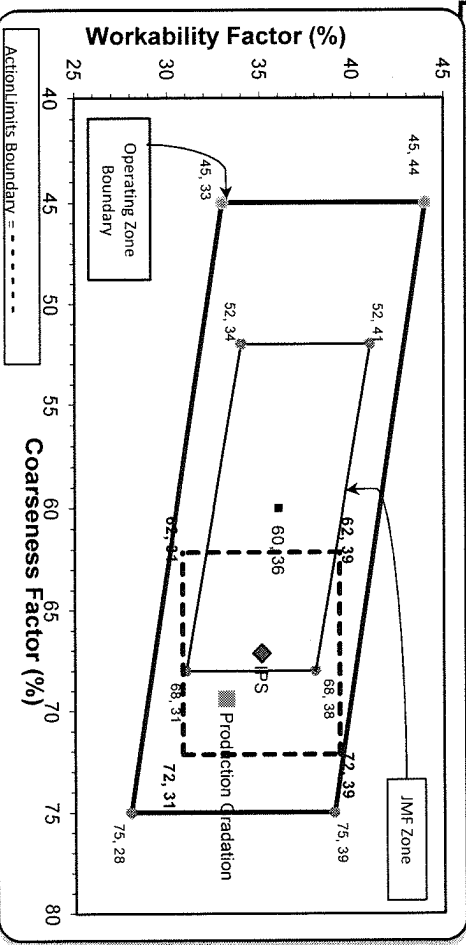
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max.  
 nom. max. #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max.  
 nom. max. #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when  
 a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Initial Production Sample (IPS)

Coarseness Factor: **69** Workability Factor: **33**

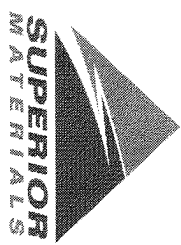
Coarseness Factor: **67** Workability Factor: **35**



| Sieve | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|----------------------|------------|-----------------------|
| 2"    | 100.0                | 0.0        | 0.0                   |
| 1.5"  | 99.6                 | 0.4        | 0.4                   |
| 1"    | 83.9                 | 15.7       | 16.1                  |
| 3/4"  | 74.0                 | 9.8        | 26.0                  |
| 1/2"  | 63.7                 | 10.3       | 36.3                  |
| 3/8"  | 56.4                 | 7.3        | 43.6                  |
| #4    | 43.0                 | 13.4       | 57.0                  |
| #8    | 35.1                 | 7.9        | 64.9                  |
| #16   | 29.0                 | 6.1        | 71.0                  |
| #30   | 20.9                 | 8.0        | 79.1                  |
| #50   | 8.1                  | 12.8       | 91.9                  |
| #100  | 1.6                  | 6.5        | 98.4                  |
| LBW   | 0.9                  | 0.8        | 99.1                  |

PREPARED BY:  
SM, LLC Technical Service

Approved By: \_\_\_\_\_



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## Mechanical Analysis Report

| Material                         | Location            | Sample Type         | Sample Method | Sampled by     | Sample Date | Time       |
|----------------------------------|---------------------|---------------------|---------------|----------------|-------------|------------|
| Coarse Agg LS                    | Onsite Southfield   | QA                  | Bucket Blend  | Douglas Storey | 11/3/23     | 12:00 PM   |
| <b>Sample Weights</b>            |                     |                     |               |                |             |            |
| Sieve                            | Retained Fractional | Percents Cumulative | Specification |                |             |            |
|                                  | Weight              | Percent             | Retained      | Passing        | Low Limit   | High Limit |
| 2"                               | 0                   | 0.00                | 0.00          | <b>100.00</b>  |             |            |
| 1 1/2"                           | 82                  | 1.52                | 1.52          | <b>98.48</b>   |             |            |
| 1"                               | 2954                | 54.66               | 56.18         | <b>43.82</b>   |             |            |
| 3/4"                             | 1707                | 31.59               | 87.77         | <b>12.23</b>   |             |            |
| x 5/8"                           |                     | 0.00                | 87.77         |                |             |            |
| 1/2"                             | 391                 | 7.24                | 95.00         | <b>5.00</b>    |             |            |
| 3/8"                             | 62                  | 1.15                | 96.15         | <b>3.85</b>    |             |            |
| x 1/4"                           |                     | 0.00                | 96.15         |                |             |            |
| No. 4                            | 53                  | 0.98                | 97.13         | <b>2.87</b>    |             |            |
| No. 8                            | 14                  | 0.26                | 97.39         | <b>2.61</b>    |             |            |
| No. 16                           | 6                   | 0.11                | 97.50         | <b>2.50</b>    |             |            |
| No. 30                           | 5                   | 0.09                | 97.59         | <b>2.41</b>    |             |            |
| No. 50                           | 7                   | 0.13                | 97.72         | <b>2.28</b>    |             |            |
| No. 100                          | 13                  | 0.24                | 97.96         | <b>2.04</b>    |             |            |
| No. 200                          | 15                  | 0.28                | 98.24         | <b>1.76</b>    |             |            |
| Pan                              | 10                  | 0.19                | 98.43         | <b>0.00</b>    |             |            |
| LBW                              | 85                  | 1.57                |               |                | Max Sieve   | 1"         |
| Total                            | 5404                | 100.00              |               |                |             |            |
| <b>Remarks:</b>                  |                     |                     |               |                |             |            |
| <b>Sample Weights</b>            |                     |                     |               |                |             |            |
| <i>Initial Weight:</i>           |                     |                     | 5448 gm       |                |             |            |
| <i>Dry Weight:</i>               |                     |                     | 5404 gm       |                |             |            |
| <i>Washed Weight:</i>            |                     |                     | 5319 gm       |                |             |            |
| Crushed Material                 |                     |                     |               |                |             |            |
| <i>Retained Sieve:</i>           |                     |                     | No. 4         | Weight:        | 5249 gm     |            |
| <i>Crushed Material:</i>         |                     |                     | gm %          |                |             |            |
| <b>Deleterious Pick</b>          |                     |                     |               |                |             |            |
| <i>Retained Sieve:</i>           |                     |                     | No. 4         | Weight:        | 5249 gm     |            |
| <i>Soft Particles:</i>           |                     |                     | gm %          |                |             |            |
| <i>Clay-Ironstone:</i>           |                     |                     | gm %          |                |             |            |
| <i>Chert:</i>                    |                     |                     | gm %          |                |             |            |
| <i>Soft + Clay-Iron:</i>         |                     |                     | 0 gm 0.0 %    |                |             |            |
| <i>Total Deleterious:</i>        |                     |                     | 0 gm 0.0 %    |                |             |            |
| <b>Other Test Results</b>        |                     |                     |               |                |             |            |
| <i>Fineness Modulus:</i>         |                     |                     | 7.71          |                |             |            |
| <i>Moisture Content:</i>         |                     |                     | 44 gm 0.8 %   |                |             |            |
| <i>Loss by Wash:</i>             |                     |                     | 85 gm 1.6 %   |                |             |            |
| <i>Tested by:</i> Douglas Storey |                     |                     |               |                |             |            |
| <i>Date:</i>                     |                     | 11/3/23             |               | <i>Time:</i>   |             | 12:00 PM   |

## Mechanical Analysis Report

| Material                  | Location            | Sample Type      | Sample Method      | Sampled by     | Sample Date | Time                                  |
|---------------------------|---------------------|------------------|--------------------|----------------|-------------|---------------------------------------|
| Inter Agg LS              | Onsite Southfield   | QA               | Bucket Blend       | Douglas Storey | 11/3/23     | 12:00 PM                              |
| <b>Sample Weights</b>     |                     |                  |                    |                |             |                                       |
| Sieve                     | Retained Fractional | Percent Retained | Percent Cumulative | Low Limit      | High Limit  |                                       |
|                           | Weight              | Percent          | Passing            |                |             |                                       |
| 2"                        | 0                   | 0.00             | 100.00             |                |             | Initial Weight: 2646 gm               |
| 1 1/2"                    | 0                   | 0.00             | 100.00             |                |             | Dry Weight: 2589 gm                   |
| 1"                        | 0                   | 0.00             | 100.00             |                |             | Washed Weight: 2528 gm                |
| 3/4"                      | 77                  | 2.97             | 97.03              |                |             | Crushed Material                      |
| x 5/8"                    |                     | 0.00             |                    |                |             |                                       |
| 1/2"                      | 655                 | 25.30            | 71.73              |                |             |                                       |
| 3/8"                      | 615                 | 23.75            | 47.97              |                |             |                                       |
| x 1/4"                    |                     | 0.00             |                    |                |             |                                       |
| No. 4                     | 972                 | 37.54            | 10.43              |                |             | Retained Sieve: No. 4 Weight: 2319 gm |
| No. 8                     | 148                 | 5.72             | 4.71               |                |             | Soft Particles: gm %                  |
| No. 16                    | 21                  | 0.81             | 3.90               |                |             | Clay-Ironstone: gm %                  |
| No. 30                    | 7                   | 0.27             | 3.63               |                |             | Chert: gm %                           |
| No. 50                    | 9                   | 0.35             | 3.28               |                |             | Soft + Clay-Iron: 0 gm 0.0 %          |
| No. 100                   | 10                  | 0.39             | 2.90               |                |             | Total Deleterious: 0 gm 0.0 %         |
| No. 200                   | 9                   | 0.35             | 2.55               |                |             | <b>Other Test Results</b>             |
| Pan                       | 5                   | 0.19             | 0.00               |                |             |                                       |
| LBW                       | 61                  | 2.36             |                    | Max Sieve      | No. 4       |                                       |
| Total                     | 2589                | 100.00           |                    |                |             | Moisture Content: 57 gm 2.2 %         |
| <b>Remarks:</b>           |                     |                  |                    |                |             |                                       |
| Loss by Wash: 61 gm 2.4 % |                     |                  |                    |                |             |                                       |
| Tested by: Douglas Storey |                     |                  |                    |                |             |                                       |
| Date: 11/3/23             |                     | Time: 12:00 PM   |                    |                |             |                                       |

## Mechanical Analysis Report

| Material                         | Location            | Sample Type         | Sample Method | Sampled by     | Sample Date    | Time       |
|----------------------------------|---------------------|---------------------|---------------|----------------|----------------|------------|
| ZNS                              | Onsite Southfield   | QA                  | Bucket Blend  | Douglas Storey | 10/31/23       | 12:00 PM   |
| <b>Sample Weights</b>            |                     |                     |               |                |                |            |
| Sieve                            | Retained Fractional | Percents Cumulative | Specification |                |                |            |
|                                  | Weight              | Percent             | Retained      | Passing        | Low Limit      | High Limit |
| 2"                               | 0                   | 0.00                | 0.00          | 100.00         |                |            |
| 1 1/2"                           | 0                   | 0.00                | 0.00          | 100.00         |                |            |
| 1"                               | 0                   | 0.00                | 0.00          | 100.00         |                |            |
| 3/4"                             | 0                   | 0.00                | 0.00          | 100.00         |                |            |
| x 5/8"                           |                     | 0.00                | 0.00          |                |                |            |
| 1/2"                             | 0                   | 0.00                | 0.00          | 100.00         |                |            |
| 3/8"                             | 0                   | 0.00                | 0.00          | 100.00         |                |            |
| x 1/4"                           |                     | 0.00                | 0.00          |                |                |            |
| No. 4                            | 19                  | 3.47                | 3.47          | 96.53          |                |            |
| No. 8                            | 94                  | 17.18               | 20.66         | 79.34          |                |            |
| No. 16                           | 94                  | 17.18               | 37.84         | 62.16          |                |            |
| No. 30                           | 81                  | 14.81               | 52.65         | 47.35          |                |            |
| No. 50                           | 132                 | 24.13               | 76.78         | 23.22          |                |            |
| No. 100                          | 99                  | 18.10               | 94.88         | 5.12           |                |            |
| No. 200                          | 22                  | 4.02                | 98.90         | 1.10           |                |            |
| Pan                              | 2                   | 0.37                | 99.27         | 0.00           |                |            |
| LBW                              | 4                   | 0.73                |               |                | Max Sieve      | No. 50     |
| Total                            | 547                 | 100.00              |               |                |                |            |
| <b>Remarks:</b>                  |                     |                     |               |                |                |            |
| <b>Sample Weights</b>            |                     |                     |               |                |                |            |
| Initial Weight:                  |                     |                     | 568 gm        |                |                |            |
| Dry Weight:                      |                     |                     | 547 gm        |                |                |            |
| Washed Weight:                   |                     |                     | 543 gm        |                |                |            |
| Crushed Material                 |                     |                     |               |                |                |            |
| Retained Sieve:                  |                     |                     | No. 4         | Weight:        | 19 gm          |            |
| Crushed Material:                |                     |                     | gm %          |                |                |            |
| <b>Deleterious Pick</b>          |                     |                     |               |                |                |            |
| Retained Sieve:                  |                     |                     | No. 4         | Weight:        | 19 gm          |            |
| Soft Particles:                  |                     |                     | gm %          |                |                |            |
| Clay-Ironstone:                  |                     |                     | gm %          |                |                |            |
| Chert:                           |                     |                     | gm %          |                |                |            |
| Soft + Clay-Iron:                |                     |                     | 0 gm 0.0 %    |                |                |            |
| Total Deleterious:               |                     |                     | 0 gm 0.0 %    |                |                |            |
| <b>Other Test Results</b>        |                     |                     |               |                |                |            |
| Fineness Modulus:                |                     |                     | 2.86          |                |                |            |
| Moisture Content:                |                     |                     | 21 gm 3.8 %   |                |                |            |
| Loss by Wash:                    |                     |                     | 4 gm 0.7 %    |                |                |            |
| <b>Tested by:</b> Douglas Storey |                     |                     |               |                |                |            |
| Date:                            |                     |                     | 11/1/23       |                | Time: 12:00 PM |            |

# Aggregate Optimization Chart

## Production Gradation Report

PLANT #: **P-101**

Sample Date: **10/30/23**

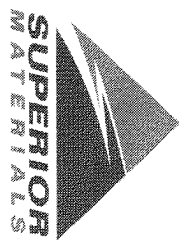
Dates Test Represents: **10/31/2023**

through **11/6/2023**

Concrete Grade: **P1M, 3500HP**

Contractor: \_\_\_\_\_

MDOT No.: \_\_\_\_\_



Superior Materials, LLC  
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Suite 500  
Farmington Hills, MI 48336

| Agg. Class | Pit #  | Source          | Weight (ssd) | ft <sup>3</sup> | Specific Gravity | Contribution % |
|------------|--------|-----------------|--------------|-----------------|------------------|----------------|
| CA         | 71-47  | Presque Isle    | 1070         | 6.54            | 2.62             | 34.9           |
| IA         | 71-47  | Presque Isle    | 800          | 4.89            | 2.62             | 26.1           |
| 2NS        | 75-051 | Mid Michigan    | 1200         | 7.23            | 2.66             | 39.1           |
|            |        | <b>Total Wt</b> | <b>3070</b>  |                 |                  | <b>100.0</b>   |

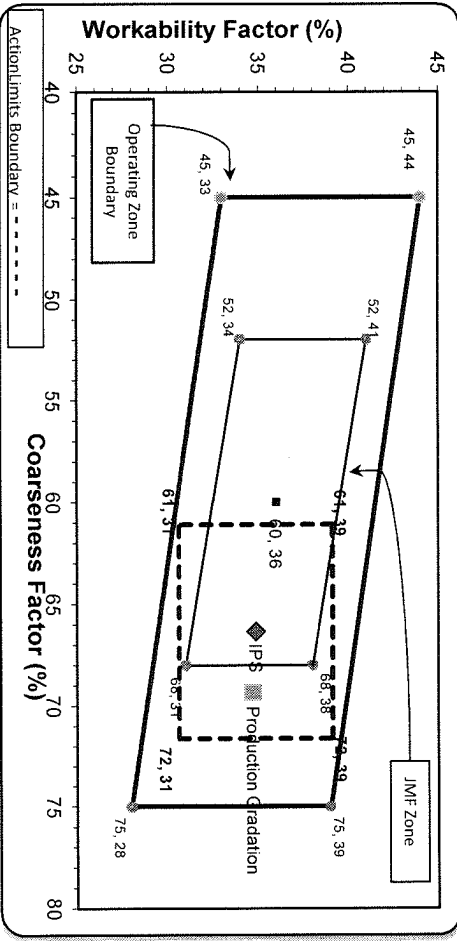
| Sieve | CA    | IA    | 2NS   | Cumulative % Passing |
|-------|-------|-------|-------|----------------------|
| 2"    | 100.0 | 100.0 | 100.0 | 100.0                |
| 1.5"  | 94.7  | 100.0 | 100.0 | 98.2                 |
| 1"    | 41.1  | 100.0 | 100.0 | 79.5                 |
| 3/4"  | 13.9  | 98.1  | 100.0 | 69.5                 |
| 1/2"  | 5.3   | 78.7  | 100.0 | 61.4                 |
| 3/8"  | 4.4   | 54.1  | 100.0 | 54.7                 |
| #4    | 3.4   | 13.8  | 96.1  | 42.3                 |
| #8    | 3.1   | 5.4   | 82.4  | 34.7                 |
| #16   | 2.9   | 3.9   | 68.6  | 28.8                 |
| #30   | 2.8   | 3.5   | 54.3  | 23.1                 |
| #50   | 2.7   | 3.1   | 30.6  | 13.7                 |
| #100  | 2.4   | 2.6   | 9.2   | 5.1                  |
| LBW   | 2.0   | 2.0   | 1.5   | 1.8                  |

<----- Verify this number is 100%

\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max.  
 nom. max. #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max.  
 nom. max. #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when  
 a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Coarseness Factor: **69** Workability Factor: **35**



Initial Production Sample (IPS)

Coarseness Factor: **66**  
Workability Factor: **35**

| Sieve | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|----------------------|------------|-----------------------|
| 2"    | 100.0                | 0.0        | 0.0                   |
| 1.5"  | 99.6                 | 0.4        | 0.4                   |
| 1"    | 84.3                 | 15.3       | 15.7                  |
| 3/4"  | 74.8                 | 9.6        | 25.2                  |
| 1/2"  | 64.3                 | 10.4       | 35.7                  |
| 3/8"  | 56.8                 | 7.5        | 43.2                  |
| #4    | 43.0                 | 13.8       | 57.0                  |
| #8    | 34.9                 | 8.1        | 65.1                  |
| #16   | 26.4                 | 8.5        | 73.6                  |
| #30   | 19.9                 | 6.5        | 80.1                  |
| #50   | 10.4                 | 9.5        | 89.6                  |
| #100  | 3.4                  | 7.0        | 96.6                  |
| LBW   | 1.2                  | 2.2        | 98.8                  |

PREPARED BY:  
SM, LLC Technical Service

Approved By: \_\_\_\_\_

## Mechanical Analysis Report

| Material                         | Location                   | Sample Type    | Sample Method                 | Sampled by     | Sample Date          | Time              |
|----------------------------------|----------------------------|----------------|-------------------------------|----------------|----------------------|-------------------|
| Coarse Agg LS                    | Mt Clemens                 | QA             | Bucket Blend                  | Douglas Storey | 10/31/23             | 12:00 PM          |
| <b>Sieve</b>                     | <b>Retained Fractional</b> |                | <b>Percentages Cumulative</b> |                | <b>Specification</b> |                   |
|                                  | <b>Weight</b>              | <b>Percent</b> | <b>Retained</b>               | <b>Passing</b> | <b>Low Limit</b>     | <b>High Limit</b> |
| 2"                               | 0                          | 0.00           | 0.00                          | <b>100.00</b>  |                      |                   |
| 1 1/2"                           | 276                        | 5.26           | 5.26                          | <b>94.74</b>   |                      |                   |
| 1"                               | 2818                       | 53.68          | 58.93                         | <b>41.07</b>   |                      |                   |
| 3/4"                             | 1425                       | 27.14          | 86.08                         | <b>13.92</b>   |                      |                   |
| X 5/8"                           |                            | 0.00           | 86.08                         |                |                      |                   |
| 1/2"                             | 455                        | 8.67           | 94.74                         | <b>5.26</b>    |                      |                   |
| 3/8"                             | 45                         | 0.86           | 95.60                         | <b>4.40</b>    |                      |                   |
| X 1/4"                           |                            | 0.00           | 95.60                         |                |                      |                   |
| No. 4                            | 51                         | 0.97           | 96.57                         | <b>3.43</b>    |                      |                   |
| No. 8                            | 18                         | 0.34           | 96.91                         | <b>3.09</b>    |                      |                   |
| No. 16                           | 8                          | 0.15           | 97.07                         | <b>2.93</b>    |                      |                   |
| No. 30                           | 6                          | 0.11           | 97.18                         | <b>2.82</b>    |                      |                   |
| No. 50                           | 8                          | 0.15           | 97.33                         | <b>2.67</b>    |                      |                   |
| No. 100                          | 13                         | 0.25           | 97.58                         | <b>2.42</b>    |                      |                   |
| No. 200                          | 16                         | 0.30           | 97.89                         | <b>2.11</b>    |                      |                   |
| Pan                              | 8                          | 0.15           | 98.04                         | <b>0.00</b>    |                      |                   |
| LBW                              | 103                        | 1.96           |                               |                | Max Sieve            | 1"                |
| Total                            | 5250                       | 100.00         |                               |                |                      |                   |
| <b>Remarks:</b>                  |                            |                |                               |                |                      |                   |
| <b>Sample Weights</b>            |                            |                |                               |                |                      |                   |
| <i>Initial Weight:</i>           |                            |                | 5348 gm                       |                |                      |                   |
| <i>Dry Weight:</i>               |                            |                | 5250 gm                       |                |                      |                   |
| <i>Washed Weight:</i>            |                            |                | 5147 gm                       |                |                      |                   |
| Crushed Material                 |                            |                |                               |                |                      |                   |
| <i>Retained Sieve:</i>           |                            |                | No. 4                         | Weight:        | 5070 gm              |                   |
| <i>Crushed Material:</i>         |                            |                | gm %                          |                |                      |                   |
| <b>Deleterious Pick</b>          |                            |                |                               |                |                      |                   |
| <i>Retained Sieve:</i>           |                            |                | No. 4                         | Weight:        | 5070 gm              |                   |
| <i>Soft Particles:</i>           |                            |                | gm %                          |                |                      |                   |
| <i>Clay-Ironstone:</i>           |                            |                | gm %                          |                |                      |                   |
| <i>Chert:</i>                    |                            |                | gm %                          |                |                      |                   |
| <i>Soft + Clay-Iron:</i>         |                            |                | 0 gm 0.0 %                    |                |                      |                   |
| <i>Total Deleterious:</i>        |                            |                | 0 gm 0.0 %                    |                |                      |                   |
| <b>Other Test Results</b>        |                            |                |                               |                |                      |                   |
| <i>Fineness Modulus:</i>         |                            |                | 7.70                          |                |                      |                   |
| <i>Moisture Content:</i>         |                            |                | 98 gm 1.9 %                   |                |                      |                   |
| <i>Loss by Wash:</i>             |                            |                | 103 gm 2.0 %                  |                |                      |                   |
| <b>Tested by:</b> Douglas Storey |                            |                |                               |                |                      |                   |
| <i>Date:</i>                     |                            | 11/1/23        |                               | <i>Time:</i>   |                      | 12:00 PM          |

## Mechanical Analysis Report

| Material                  | Location   | Sample Type | Sample Method                 | Sampled by     | Sample Date    | Time     |
|---------------------------|------------|-------------|-------------------------------|----------------|----------------|----------|
| Inter Agg LS              | Mt Clemens | QA          | Bucket Blend                  | Douglas Storey | 10/31/23       | 12:00 PM |
| <b>Sample Weights</b>     |            |             |                               |                |                |          |
| Sieve                     |            |             | Initial Weight:               | 2716 gm        |                |          |
| 2"                        |            |             | Dry Weight:                   | 2629 gm        |                |          |
| 1 1/2"                    |            |             | Washed Weight:                | 2576 gm        |                |          |
| 1"                        |            |             | Crushed Material              |                |                |          |
| 3/4"                      |            |             |                               |                |                |          |
| x 5/8"                    |            |             |                               |                |                |          |
| 1/2"                      |            |             | Retained Sieve:               | No. 4 ▼        | Weight:        | 2267 gm  |
| 3/8"                      |            |             | Crushed Material:             |                |                |          |
| x 1/4"                    |            |             |                               |                |                |          |
| <b>Deleterious Pick</b>   |            |             |                               |                |                |          |
| No. 4                     |            |             | Retained Sieve:               | No. 4 ▼        | Weight:        | 2267 gm  |
| No. 8                     |            |             | Soft Particles: gm %          |                |                |          |
| No. 16                    |            |             | Clay-Ironstone: gm %          |                |                |          |
| No. 30                    |            |             | Chert: gm %                   |                |                |          |
| No. 50                    |            |             | Soft + Clay-Iron: 0 gm 0.0 %  |                |                |          |
| No. 100                   |            |             | Total Deleterious: 0 gm 0.0 % |                |                |          |
| <b>Other Test Results</b> |            |             |                               |                |                |          |
| Pan                       |            |             | Fineness Modulus: 6.16        |                |                |          |
| LBW                       |            |             | Moisture Content: 87 gm 3.3 % |                |                |          |
| Total                     |            |             | Loss by Wash: 53 gm 2.0 %     |                |                |          |
| <b>Remarks:</b>           |            |             |                               |                |                |          |
|                           |            |             |                               |                |                |          |
| Date:                     |            |             | 11/1/23                       |                | Time: 12:00 PM |          |
| Tested by:                |            |             | Douglas Storey                |                |                |          |

# Mechanical Analysis Report

| Material                  | Location        | Sample Type        | Sample Method     | Sampled by         | Sample Date | Time       |
|---------------------------|-----------------|--------------------|-------------------|--------------------|-------------|------------|
| ZNS                       | Mt Clemens      | QA                 | Bucket Blend      | Douglas Storey     | 10/31/23    | 12:00 PM   |
| <b>Sample Weights</b>     |                 |                    |                   |                    |             |            |
| Sieve                     | Retained Weight | Fractional Percent | Percents Retained | Cumulative Passing | Low Limit   | High Limit |
| 2"                        | 0               | 0.00               | 0.00              | 100.00             |             |            |
| 1 1/2"                    | 0               | 0.00               | 0.00              | 100.00             |             |            |
| 1"                        | 0               | 0.00               | 0.00              | 100.00             |             |            |
| 3/4"                      | 0               | 0.00               | 0.00              | 100.00             |             |            |
| x 5/8"                    |                 | 0.00               | 0.00              |                    |             |            |
| 1/2"                      | 0               | 0.00               | 0.00              | 100.00             |             |            |
| 3/8"                      | 0               | 0.00               | 0.00              | 100.00             |             |            |
| x 1/4"                    |                 | 0.00               | 0.00              |                    |             |            |
| No. 4                     | 23              | 3.92               | 3.92              | 96.08              |             |            |
| No. 8                     | 80              | 13.65              | 17.58             | 82.42              |             |            |
| No. 16                    | 81              | 13.82              | 31.40             | 68.60              |             |            |
| No. 30                    | 84              | 14.33              | 45.73             | 54.27              |             |            |
| No. 50                    | 139             | 23.72              | 69.45             | 30.55              |             |            |
| No. 100                   | 125             | 21.33              | 90.78             | 9.22               |             |            |
| No. 200                   | 43              | 7.34               | 98.12             | 1.88               |             |            |
| Pan                       | 2               | 0.34               | 98.46             | 0.00               |             |            |
| LBW                       | 9               | 1.54               |                   |                    | Max Sieve   | No. 50     |
| Total                     | 586             | 100.00             |                   |                    |             |            |
| <b>Remarks:</b>           |                 |                    |                   |                    |             |            |
| <b>Sample Weights</b>     |                 |                    |                   |                    |             |            |
| Initial Weight:           |                 |                    | 613 gm            |                    |             |            |
| Dry Weight:               |                 |                    | 586 gm            |                    |             |            |
| Washed Weight:            |                 |                    | 577 gm            |                    |             |            |
| Crushed Material          |                 |                    |                   |                    |             |            |
| Retained Sieve:           |                 | No. 4              | Weight:           | 23 gm              |             |            |
| Crushed Material:         |                 | gm                 |                   |                    |             |            |
| <b>Deleterious Pick</b>   |                 |                    |                   |                    |             |            |
| Retained Sieve:           |                 | No. 4              | Weight:           | 23 gm              |             |            |
| Soft Particles:           |                 | gm %               |                   |                    |             |            |
| Clay-Ironstone:           |                 | gm %               |                   |                    |             |            |
| Chert:                    |                 | gm %               |                   |                    |             |            |
| Soft + Clay-Iron:         |                 | 0 gm 0.0 %         |                   |                    |             |            |
| Total Deleterious:        |                 | 0 gm 0.0 %         |                   |                    |             |            |
| <b>Other Test Results</b> |                 |                    |                   |                    |             |            |
| Fineness Modulus:         |                 | 2.59               |                   |                    |             |            |
| Moisture Content:         |                 | 27 gm 4.6 %        |                   |                    |             |            |
| Loss by Wash:             |                 | 9 gm 1.5 %         |                   |                    |             |            |
| Tested by:                |                 |                    | Douglas Storey    |                    |             |            |
| Date:                     |                 | 11/1/23            |                   | Time:              |             | 12:00 PM   |