

# Aggregate Optimization Chart

## Production Gradation Report

**PLANT #:** **P-101**

Sample Date: 11/6/23

Concrete Grade: DM, 4500HP

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

Dates Test Represents: 11/7/2023 through 11/13/2023

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

| Agg. Class      | Pit #  | Source       | Weight (SSD) | ft <sup>3</sup> | Specific Gravity | % Contribution |
|-----------------|--------|--------------|--------------|-----------------|------------------|----------------|
| 6AA             | 71-47  | Presque Isle | 1450         | 8.87            | 2.62             | 50.0           |
| 26A             | 71-47  | Presque Isle | 300          | 1.83            | 2.62             | 10.3           |
| 2NS             | 75-051 | Mid Michigan | 1150         | 6.93            | 2.66             | 39.7           |
| <b>Total Wt</b> |        |              | <b>2900</b>  | <b>17.63</b>    |                  | <b>100.0</b>   |

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



**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

| Sieve | 6AA   | 26A   | 2NS   | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|-------|-------|-------|----------------------|------------|-----------------------|
| 2"    | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1.5"  | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1"    | 99.3  | 100.0 | 100.0 | 99.7                 | 0.3        | 0.3                   |
| 3/4"  | 85.9  | 100.0 | 100.0 | 93.0                 | 6.7        | 7.1                   |
| 1/2"  | 43.7  | 97.0  | 100.0 | 71.5                 | 21.4       | 28.5                  |
| 3/8"  | 25.5  | 88.7  | 100.0 | 61.6                 | 10.0       | 38.4                  |
| #4    | 4.3   | 22.6  | 96.3  | 42.7                 | 18.9       | 57.3                  |
| #8    | 2.5   | 4.9   | 82.1  | 34.3                 | 8.4        | 65.7                  |
| #16   | 2.3   | 2.2   | 67.2  | 28.0                 | 6.3        | 72.0                  |
| #30   | 2.2   | 1.8   | 51.4  | 21.7                 | 6.4        | 78.3                  |
| #50   | 2.1   | 1.6   | 27.5  | 12.1                 | 9.5        | 87.9                  |
| #100  | 2.0   | 1.5   | 7.3   | 4.1                  | 8.1        | 96.0                  |
| LBW   | 1.7   | 1.4   | 0.8   | 1.3                  | 2.7        | 98.7                  |

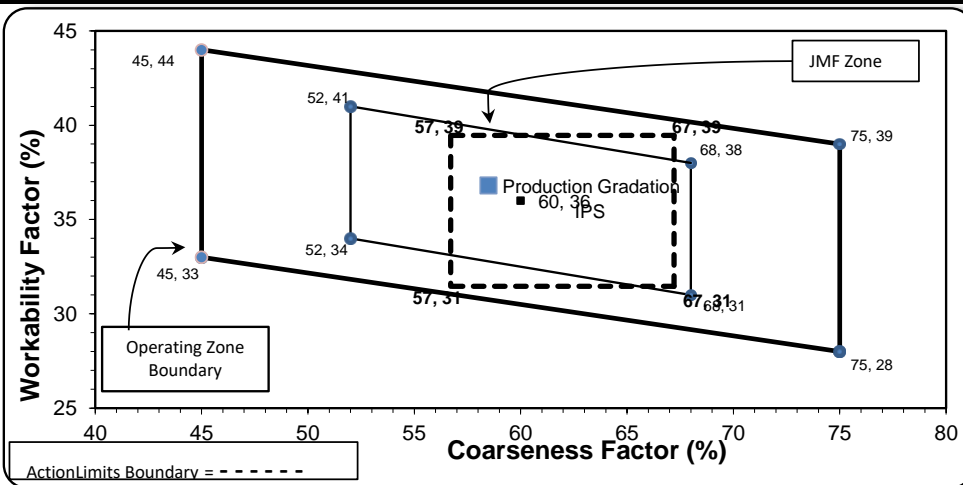
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for the 3/4" sieve when a 1.5" max. size (nom. Max. 1.0") aggregate is used.

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

|                           |           |                            |           |                    |             |                           |           |
|---------------------------|-----------|----------------------------|-----------|--------------------|-------------|---------------------------|-----------|
| <b>Coarseness Factor:</b> | <b>58</b> | <b>Workability Factor:</b> | <b>34</b> | <b>Adjusted WF</b> | <b>36.8</b> | <b>Coarseness Factor:</b> | <b>62</b> |
|---------------------------|-----------|----------------------------|-----------|--------------------|-------------|---------------------------|-----------|

**Workability Factor:** **35**



| Sieve | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|----------------------|------------|-----------------------|
| 2"    | 100.0                | 0.0        | 0.0                   |
| 1.5"  | 100.0                | 0.0        | 0.0                   |
| 1"    | 100.0                | 0.0        | 0.0                   |
| 3/4"  | 95.0                 | 5.0        | 5.0                   |
| 1/2"  | 70.5                 | 24.5       | 29.5                  |
| 3/8"  | 60.0                 | 10.5       | 40.0                  |
| #4    | 44.4                 | 15.6       | 55.6                  |
| #8    | 35.5                 | 9.0        | 64.5                  |
| #16   | 28.5                 | 7.0        | 71.5                  |
| #30   | 21.5                 | 7.0        | 78.5                  |
| #50   | 10.2                 | 11.3       | 89.8                  |
| #100  | 3.1                  | 7.1        | 96.9                  |
| LBW   | 1.3                  | 1.8        | 98.7                  |

PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

# Production Gradation Report

**PLANT #:** P-102

Sample Date: 11/6/23

Concrete Grade: DM, 4500HP

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

Dates Test Represents: 11/7/2023 through 11/13/2023

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

| Agg. Class      | Pit #  | Source        | Weight (SSD) | ft <sup>3</sup> | Specific Gravity | % Contribution |
|-----------------|--------|---------------|--------------|-----------------|------------------|----------------|
| 6AA             | 58-003 | Stoneco       | 1375         | 8.19            | 2.69             | 46.6           |
| 26A             | 58-003 | Stoneco       | 425          | 2.53            | 2.69             | 14.4           |
| 2NS             | 81-019 | Pleasant Lake | 1150         | 6.95            | 2.65             | 39.0           |
| <b>Total Wt</b> |        |               | <b>2950</b>  | <b>17.68</b>    |                  | <b>100.0</b>   |

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



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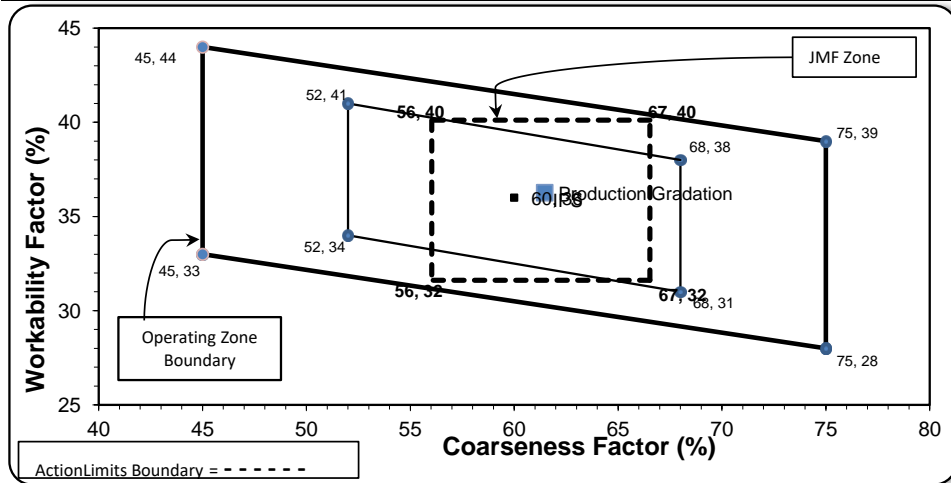
| Sieve | 6AA   | 26A   | 2NS   | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|-------|-------|-------|----------------------|------------|-----------------------|
| 2"    | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1.5"  | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1"    | 99.9  | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 3/4"  | 83.5  | 100.0 | 100.0 | 92.3                 | 7.6        | 7.7                   |
| 1/2"  | 39.0  | 99.9  | 100.0 | 71.6                 | 20.8       | 28.4                  |
| 3/8"  | 15.9  | 89.5  | 100.0 | 59.3                 | 12.3       | 40.7                  |
| #4    | 3.1   | 12.4  | 97.9  | 41.4                 | 17.9       | 58.6                  |
| #8    | 2.0   | 3.3   | 83.0  | 33.8                 | 7.6        | 66.2                  |
| #16   | 1.7   | 2.9   | 66.4  | 27.1                 | 6.7        | 72.9                  |
| #30   | 1.6   | 2.7   | 47.2  | 19.5                 | 7.6        | 80.5                  |
| #50   | 1.4   | 2.6   | 23.2  | 10.1                 | 9.5        | 89.9                  |
| #100  | 1.2   | 2.5   | 4.4   | 2.6                  | 7.4        | 97.4                  |
| LBW   | 1.1   | 2.4   | 0.4   | 1.0                  | 1.6        | 99.0                  |

\*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 4% for the 3/4" sieve when a 1.5" max. size (nom. Max. 1.0") aggregate is used.

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations  Adjusted WF Initial Production Sample (IPS)

|                                     |                                      |                                |
|-------------------------------------|--------------------------------------|--------------------------------|
| <b>Coarseness Factor:</b> <b>61</b> | <b>Workability Factor:</b> <b>34</b> | <b>Adjusted WF</b> <b>36.3</b> |
|-------------------------------------|--------------------------------------|--------------------------------|

| <b>Coarseness Factor:</b> <b>61</b> | <b>Workability Factor:</b> <b>36</b> |            |                       |
|-------------------------------------|--------------------------------------|------------|-----------------------|
| Sieve                               | Cumulative % Passing                 | % Retained | Cumulative % Retained |
| 2"                                  | 100.0                                | 0.0        | 0.0                   |
| 1.5"                                | 100.0                                | 0.0        | 0.0                   |
| 1"                                  | 99.3                                 | 0.7        | 0.7                   |
| 3/4"                                | 89.2                                 | 10.1       | 10.8                  |
| 1/2"                                | 70.7                                 | 18.5       | 29.3                  |
| 3/8"                                | 60.7                                 | 10.0       | 39.3                  |
| #4                                  | 44.4                                 | 16.3       | 55.6                  |
| #8                                  | 35.9                                 | 8.5        | 64.1                  |
| #16                                 | 27.3                                 | 8.6        | 72.7                  |
| #30                                 | 19.1                                 | 8.2        | 80.9                  |
| #50                                 | 7.4                                  | 11.7       | 92.6                  |
| #100                                | 1.9                                  | 5.6        | 98.1                  |
| LBW                                 | 0.7                                  | 1.2        | 99.3                  |



PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

**PLANT #:** 12

Sample Date: 11/6/23

Concrete Grade: DM, 4500HP

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

Dates Test Represents: 11/7/2023 through 11/13/2023

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

| Agg. Class      | Pit #  | Source       | Weight (SSD) | ft <sup>3</sup> | Specific Gravity | % Contribution |
|-----------------|--------|--------------|--------------|-----------------|------------------|----------------|
| 6AA             | 71-47  | Presque Isle | 1450         | 8.87            | 2.62             | 49.9           |
| 26A             | 71-47  | Presque Isle | 305          | 1.87            | 2.62             | 10.5           |
| 2NS             | 63-115 | Ray Rd       | 1150         | 6.95            | 2.65             | 39.6           |
| <b>Total Wt</b> |        |              | <b>2905</b>  | <b>17.69</b>    |                  | <b>100.0</b>   |

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



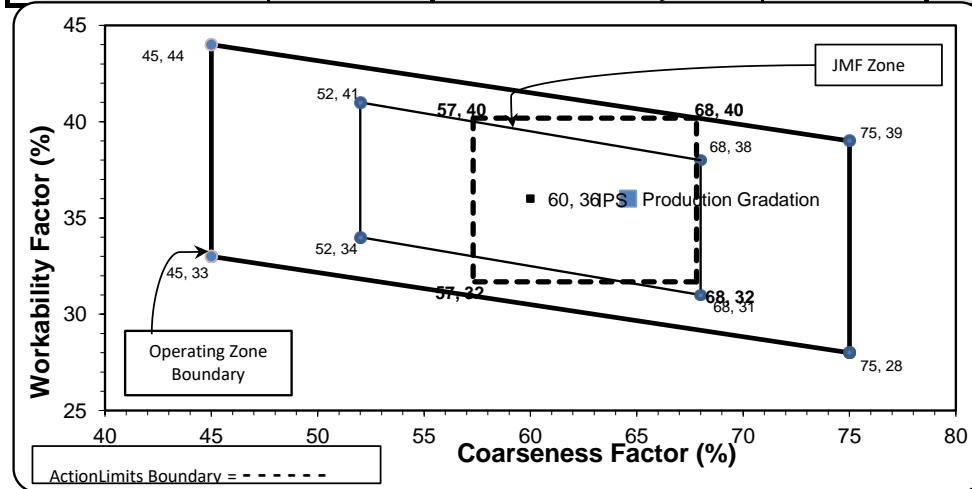
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

| Sieve | 6AA   | 26A   | 2NS   | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|-------|-------|-------|----------------------|------------|-----------------------|
| 2"    | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1.5"  | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1"    | 96.5  | 100.0 | 100.0 | 98.3                 | 1.7        | 1.7                   |
| 3/4"  | 75.9  | 100.0 | 100.0 | 88.0                 | 10.3       | 12.0                  |
| 1/2"  | 34.7  | 94.3  | 100.0 | 66.8                 | 21.2       | 33.2                  |
| 3/8"  | 16.9  | 86.0  | 100.0 | 57.1                 | 9.8        | 42.9                  |
| #4    | 2.9   | 27.9  | 96.0  | 42.4                 | 14.7       | 57.6                  |
| #8    | 1.6   | 6.5   | 80.9  | 33.5                 | 8.9        | 66.5                  |
| #16   | 1.4   | 3.2   | 65.9  | 27.1                 | 6.4        | 72.9                  |
| #30   | 1.4   | 2.6   | 49.5  | 20.6                 | 6.6        | 79.4                  |
| #50   | 1.3   | 2.4   | 25.5  | 11.0                 | 9.6        | 89.0                  |
| #100  | 1.3   | 2.3   | 5.4   | 3.0                  | 8.0        | 97.0                  |
| LBW   | 1.0   | 2.0   | 0.6   | 0.9                  | 2.1        | 99.1                  |

\*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 4% for the 3/4" sieve when a 1.5" max. size (nom. Max. 1.0") aggregate is used.

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations  Adjusted WF Initial Production Sample (IPS)

|                           |           |                            |           |                    |             |                           |           |
|---------------------------|-----------|----------------------------|-----------|--------------------|-------------|---------------------------|-----------|
| <b>Coarseness Factor:</b> | <b>65</b> | <b>Workability Factor:</b> | <b>34</b> | <b>Adjusted WF</b> | <b>36.0</b> | <b>Coarseness Factor:</b> | <b>63</b> |
|---------------------------|-----------|----------------------------|-----------|--------------------|-------------|---------------------------|-----------|



| Sieve | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|----------------------|------------|-----------------------|
| 2"    | 100.0                | 0.0        | 0.0                   |
| 1.5"  | 100.0                | 0.0        | 0.0                   |
| 1"    | 99.3                 | 0.7        | 0.7                   |
| 3/4"  | 89.0                 | 10.3       | 11.0                  |
| 1/2"  | 70.3                 | 18.7       | 29.7                  |
| 3/8"  | 59.9                 | 10.4       | 40.1                  |
| #4    | 41.9                 | 18.0       | 58.1                  |
| #8    | 35.9                 | 6.0        | 64.1                  |
| #16   | 27.8                 | 8.2        | 72.2                  |
| #30   | 18.9                 | 8.8        | 81.1                  |
| #50   | 6.3                  | 12.6       | 93.7                  |
| #100  | 1.7                  | 4.6        | 98.3                  |
| LBW   | 1.0                  | 0.7        | 99.0                  |

PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

**PLANT #:** p11

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

Sample Date: 11/6/23

Concrete Grade: DM, 4500HP

Dates Test Represents: 11/7/2023 through 11/13/2023

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

| Agg. Class      | Pit #  | Source       | Weight (SSD) | ft <sup>3</sup> | Specific Gravity | % Contribution |
|-----------------|--------|--------------|--------------|-----------------|------------------|----------------|
| 6AA             | 71-47  | Presque Isle | 1455         | 8.90            | 2.62             | 50.1           |
| 26A             | 71-47  | Presque Isle | 300          | 1.83            | 2.62             | 10.3           |
| 2NS             | 95-013 | Smelter Bay  | 1150         | 6.95            | 2.65             | 39.6           |
| <b>Total Wt</b> |        |              | <b>2905</b>  | <b>17.69</b>    |                  | <b>100.0</b>   |

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



**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
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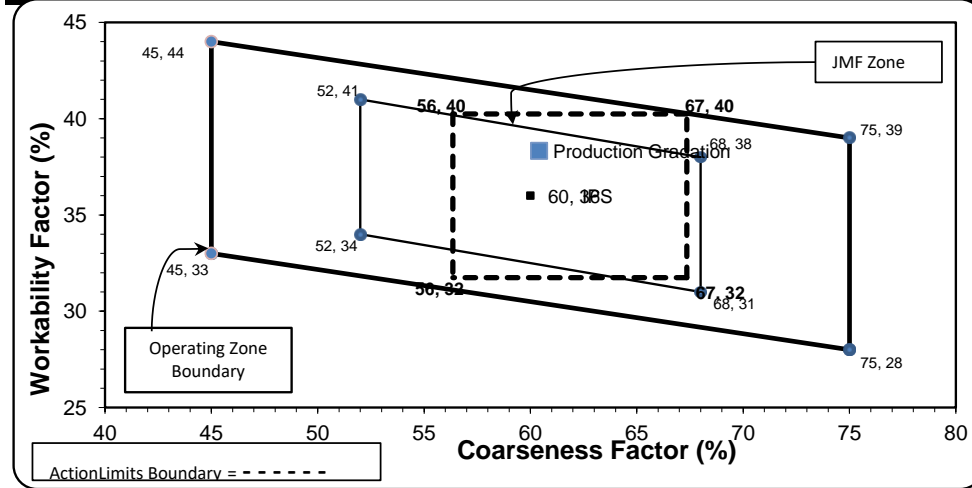
| Sieve | 6AA   | 26A   | 2NS   | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|-------|-------|-------|----------------------|------------|-----------------------|
| 2"    | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1.5"  | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1"    | 97.8  | 100.0 | 100.0 | 98.9                 | 1.1        | 1.1                   |
| 3/4"  | 79.6  | 100.0 | 100.0 | 89.8                 | 9.1        | 10.2                  |
| 1/2"  | 43.3  | 94.3  | 100.0 | 71.0                 | 18.8       | 29.0                  |
| 3/8"  | 25.5  | 86.0  | 100.0 | 61.2                 | 9.8        | 38.8                  |
| #4    | 5.2   | 27.9  | 97.2  | 44.0                 | 17.3       | 56.0                  |
| #8    | 2.7   | 6.5   | 85.4  | 35.8                 | 8.1        | 64.2                  |
| #16   | 2.2   | 3.2   | 69.9  | 29.1                 | 6.7        | 70.9                  |
| #30   | 2.1   | 2.6   | 50.3  | 21.2                 | 7.9        | 78.8                  |
| #50   | 2.0   | 2.4   | 24.6  | 11.0                 | 10.2       | 89.0                  |
| #100  | 1.9   | 2.3   | 7.2   | 4.0                  | 6.9        | 96.0                  |
| LBW   | 1.4   | 2.0   | 0.9   | 1.3                  | 2.8        | 98.7                  |

\*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 4% for the 3/4" sieve when a 1.5" max. size (nom. Max. 1.0") aggregate is used.

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

|                           |           |                            |           |                    |             |                           |           |
|---------------------------|-----------|----------------------------|-----------|--------------------|-------------|---------------------------|-----------|
| <b>Coarseness Factor:</b> | <b>60</b> | <b>Workability Factor:</b> | <b>36</b> | <b>Adjusted WF</b> | <b>38.3</b> | <b>Coarseness Factor:</b> | <b>62</b> |
|---------------------------|-----------|----------------------------|-----------|--------------------|-------------|---------------------------|-----------|



| Sieve | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|----------------------|------------|-----------------------|
| 2"    | 100.0                | 0.0        | 0.0                   |
| 1.5"  | 100.0                | 0.0        | 0.0                   |
| 1"    | 100.0                | 0.0        | 0.0                   |
| 3/4"  | 95.0                 | 5.0        | 5.0                   |
| 1/2"  | 72.3                 | 22.8       | 27.7                  |
| 3/8"  | 60.4                 | 11.8       | 39.6                  |
| #4    | 42.6                 | 17.8       | 57.4                  |
| #8    | 36.0                 | 6.6        | 64.0                  |
| #16   | 29.5                 | 6.5        | 70.5                  |
| #30   | 20.3                 | 9.2        | 79.7                  |
| #50   | 9.5                  | 10.8       | 90.5                  |
| #100  | 3.4                  | 6.1        | 96.6                  |
| LBW   | 1.3                  | 2.1        | 98.7                  |

PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

# Production Gradation Report

**PLANT #:** **P-32**

Sample Date: 11/6/23

Concrete Grade: DM, 4500HP

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

Dates Test Represents: 11/7/2023 through 11/13/2023

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

| Agg. Class      | Pit #  | Source       | Weight (SSD) | ft <sup>3</sup> | Specific Gravity | % Contribution |
|-----------------|--------|--------------|--------------|-----------------|------------------|----------------|
| 6AA             | 71-47  | Presque Isle | 1455         | 8.90            | 2.62             | 50.1           |
| 26A             | 71-47  | Presque Isle | 300          | 1.83            | 2.62             | 10.3           |
| 2NS             | 95-013 | Smelter Bay  | 1150         | 6.95            | 2.65             | 39.6           |
| <b>Total Wt</b> |        |              | <b>2905</b>  | <b>17.69</b>    |                  | <b>100.0</b>   |

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



**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

| Sieve | 6AA   | 26A   | 2NS   | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|-------|-------|-------|----------------------|------------|-----------------------|
| 2"    | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1.5"  | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1"    | 97.8  | 100.0 | 100.0 | 98.9                 | 1.1        | 1.1                   |
| 3/4"  | 79.6  | 100.0 | 100.0 | 89.8                 | 9.1        | 10.2                  |
| 1/2"  | 43.3  | 94.3  | 100.0 | 71.0                 | 18.8       | 29.0                  |
| 3/8"  | 25.5  | 86.0  | 100.0 | 61.2                 | 9.8        | 38.8                  |
| #4    | 5.2   | 27.9  | 97.2  | 44.0                 | 17.3       | 56.0                  |
| #8    | 2.7   | 6.5   | 85.4  | 35.8                 | 8.1        | 64.2                  |
| #16   | 2.2   | 3.2   | 69.9  | 29.1                 | 6.7        | 70.9                  |
| #30   | 2.1   | 2.6   | 50.3  | 21.2                 | 7.9        | 78.8                  |
| #50   | 2.0   | 2.4   | 24.6  | 11.0                 | 10.2       | 89.0                  |
| #100  | 1.9   | 2.3   | 7.2   | 4.0                  | 6.9        | 96.0                  |
| LBW   | 1.4   | 2.0   | 0.9   | 1.3                  | 2.8        | 98.7                  |

\*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 4% for the 3/4" sieve when

a 1.5" max. size (nom. Max. 1.0") aggregate is used.

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

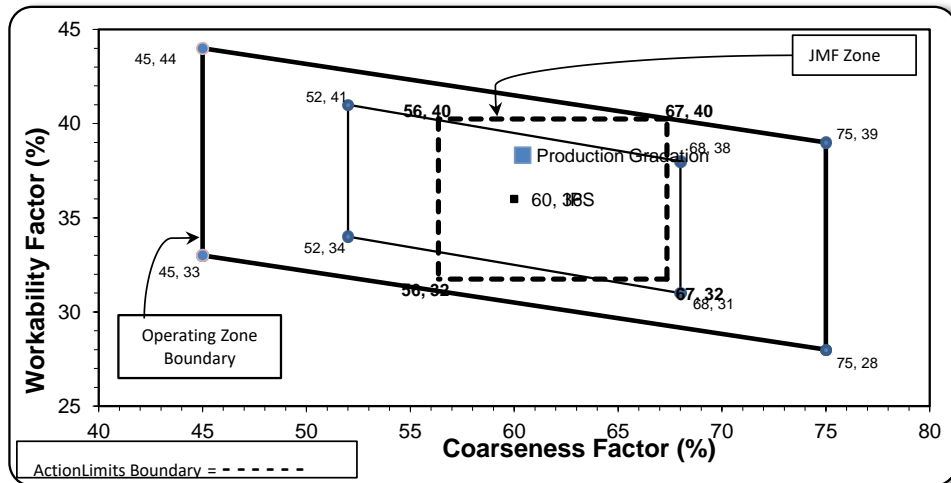
Adjusted WF Initial Production Sample (IPS)

|                           |           |                            |           |             |
|---------------------------|-----------|----------------------------|-----------|-------------|
| <b>Coarseness Factor:</b> | <b>60</b> | <b>Workability Factor:</b> | <b>36</b> | <b>38.3</b> |
|---------------------------|-----------|----------------------------|-----------|-------------|

|                           |           |
|---------------------------|-----------|
| <b>Coarseness Factor:</b> | <b>62</b> |
|---------------------------|-----------|

|                            |           |
|----------------------------|-----------|
| <b>Workability Factor:</b> | <b>36</b> |
|----------------------------|-----------|

| Sieve | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|----------------------|------------|-----------------------|
| 2"    | 100.0                | 0.0        | 0.0                   |
| 1.5"  | 100.0                | 0.0        | 0.0                   |
| 1"    | 100.0                | 0.0        | 0.0                   |
| 3/4"  | 95.0                 | 5.0        | 5.0                   |
| 1/2"  | 72.3                 | 22.8       | 27.7                  |
| 3/8"  | 60.4                 | 11.8       | 39.6                  |
| #4    | 42.6                 | 17.8       | 57.4                  |
| #8    | 36.0                 | 6.6        | 64.0                  |
| #16   | 29.5                 | 6.5        | 70.5                  |
| #30   | 20.3                 | 9.2        | 79.7                  |
| #50   | 9.5                  | 10.8       | 90.5                  |
| #100  | 3.4                  | 6.1        | 96.6                  |
| LBW   | 1.3                  | 2.1        | 98.7                  |



PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

# Production Gradation Report

**PLANT #:** **P-35**

Sample Date: 11/6/23

Concrete Grade: **DM, 4500HP**

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

Dates Test Represents: 11/7/2023 through 11/13/2023

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

| Agg. Class      | Pit #  | Source        | Weight (SSD) | ft <sup>3</sup> | Specific Gravity | % Contribution |
|-----------------|--------|---------------|--------------|-----------------|------------------|----------------|
| 6AA             | 58-003 | Stoneco       | 1375         | 8.19            | 2.69             | 46.6           |
| 26A             | 58-003 | Stoneco       | 425          | 2.53            | 2.69             | 14.4           |
| 2NS             | 81-019 | Pleasant Lake | 1150         | 6.95            | 2.65             | 39.0           |
| <b>Total Wt</b> |        |               | <b>2950</b>  | <b>17.68</b>    |                  | <b>100.0</b>   |

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



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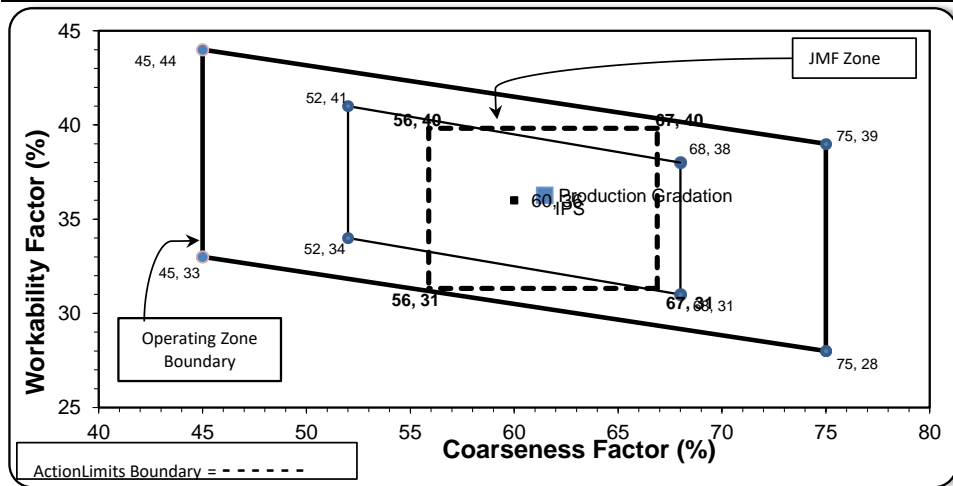
| Sieve | 6AA   | 26A   | 2NS   | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|-------|-------|-------|----------------------|------------|-----------------------|
| 2"    | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1.5"  | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1"    | 99.9  | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 3/4"  | 83.5  | 100.0 | 100.0 | 92.3                 | 7.6        | 7.7                   |
| 1/2"  | 39.0  | 99.9  | 100.0 | 71.6                 | 20.8       | 28.4                  |
| 3/8"  | 15.9  | 89.5  | 100.0 | 59.3                 | 12.3       | 40.7                  |
| #4    | 3.1   | 12.4  | 97.9  | 41.4                 | 17.9       | 58.6                  |
| #8    | 2.0   | 3.3   | 83.0  | 33.8                 | 7.6        | 66.2                  |
| #16   | 1.7   | 2.9   | 66.4  | 27.1                 | 6.7        | 72.9                  |
| #30   | 1.6   | 2.7   | 47.2  | 19.5                 | 7.6        | 80.5                  |
| #50   | 1.4   | 2.6   | 23.2  | 10.1                 | 9.5        | 89.9                  |
| #100  | 1.2   | 2.5   | 4.4   | 2.6                  | 7.4        | 97.4                  |
| LBW   | 1.1   | 2.4   | 0.4   | 1.0                  | 1.6        | 99.0                  |

\*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 4% for the 3/4" sieve when a 1.5" max. size (nom. Max. 1.0") aggregate is used.

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations  Adjusted WF Initial Production Sample (IPS)

|                              |                               |                          |
|------------------------------|-------------------------------|--------------------------|
| <b>Coarseness Factor:</b> 61 | <b>Workability Factor:</b> 34 | <b>Adjusted WF:</b> 36.3 |
|------------------------------|-------------------------------|--------------------------|

|                               |
|-------------------------------|
| <b>Coarseness Factor:</b> 61  |
| <b>Workability Factor:</b> 36 |



| Sieve | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|----------------------|------------|-----------------------|
| 2"    | 100.0                | 0.0        | 0.0                   |
| 1.5"  | 100.0                | 0.0        | 0.0                   |
| 1"    | 99.3                 | 0.7        | 0.7                   |
| 3/4"  | 89.1                 | 10.2       | 10.9                  |
| 1/2"  | 70.5                 | 18.6       | 29.5                  |
| 3/8"  | 60.5                 | 10.0       | 39.5                  |
| #4    | 44.1                 | 16.4       | 55.9                  |
| #8    | 35.6                 | 8.5        | 64.4                  |
| #16   | 27.7                 | 7.9        | 72.3                  |
| #30   | 20.6                 | 7.1        | 79.4                  |
| #50   | 8.7                  | 11.8       | 91.3                  |
| #100  | 1.6                  | 7.1        | 98.4                  |
| LBW   | 1.1                  | 0.6        | 98.9                  |

PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

# Production Gradation Report

**PLANT #:** **P-36**

Sample Date: 11/6/23

Concrete Grade: **DM, 4500HP**

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

Dates Test Represents: 11/7/2023 through 11/13/2023

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

| Agg. Class      | Pit # | Source       | Weight (SSD) | ft <sup>3</sup> | Specific Gravity | % Contribution |
|-----------------|-------|--------------|--------------|-----------------|------------------|----------------|
| 6AA             | 71-47 | Presque Isle | 1450         | 8.87            | 2.62             | 49.9           |
| 26A             | 71-47 | Presque Isle | 305          | 1.87            | 2.62             | 10.5           |
| 2NS             | 63-92 | Grange Hall  | 1150         | 6.95            | 2.65             | 39.6           |
| <b>Total Wt</b> |       |              | <b>2905</b>  | <b>17.69</b>    |                  | <b>100.0</b>   |

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



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| Sieve | 6AA   | 26A   | 2NS   | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|-------|-------|-------|----------------------|------------|-----------------------|
| 2"    | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1.5"  | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1"    | 96.5  | 100.0 | 100.0 | 98.3                 | 1.7        | 1.7                   |
| 3/4"  | 75.9  | 100.0 | 100.0 | 88.0                 | 10.3       | 12.0                  |
| 1/2"  | 34.7  | 94.3  | 100.0 | 66.8                 | 21.2       | 33.2                  |
| 3/8"  | 16.9  | 86.0  | 100.0 | 57.1                 | 9.8        | 42.9                  |
| #4    | 2.9   | 27.9  | 97.2  | 42.9                 | 14.2       | 57.1                  |
| #8    | 1.6   | 6.5   | 82.6  | 34.2                 | 8.7        | 65.8                  |
| #16   | 1.4   | 3.2   | 67.9  | 27.9                 | 6.3        | 72.1                  |
| #30   | 1.4   | 2.6   | 49.3  | 20.5                 | 7.4        | 79.5                  |
| #50   | 1.3   | 2.4   | 20.4  | 9.0                  | 11.5       | 91.0                  |
| #100  | 1.3   | 2.3   | 3.4   | 2.2                  | 6.7        | 97.8                  |
| LBW   | 1.0   | 2.0   | 0.8   | 1.0                  | 1.2        | 99.0                  |

\*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 4% for the 3/4" sieve when a 1.5" max. size (nom. Max. 1.0") aggregate is used.

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

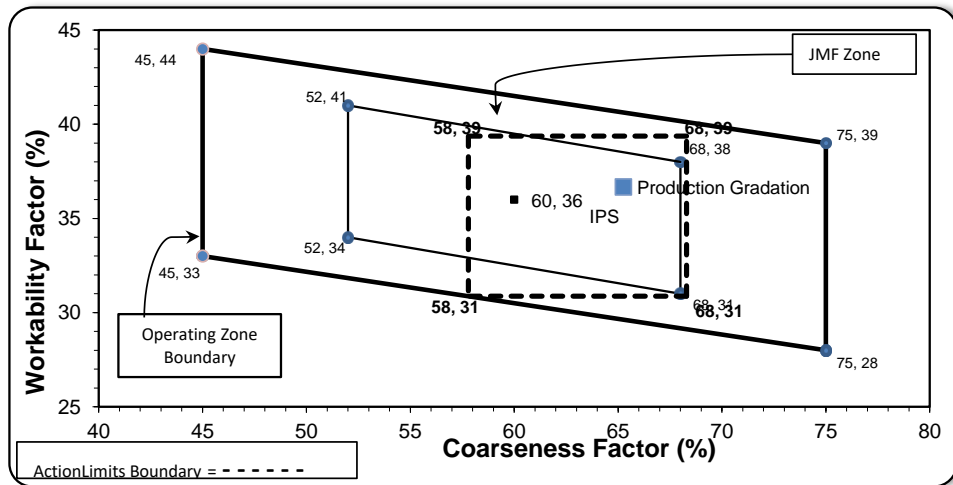
Adjusted WF Initial Production Sample (IPS)

|                           |           |                            |           |             |
|---------------------------|-----------|----------------------------|-----------|-------------|
| <b>Coarseness Factor:</b> | <b>65</b> | <b>Workability Factor:</b> | <b>34</b> | <b>36.7</b> |
|---------------------------|-----------|----------------------------|-----------|-------------|

|                           |           |
|---------------------------|-----------|
| <b>Coarseness Factor:</b> | <b>63</b> |
|---------------------------|-----------|

|                            |           |
|----------------------------|-----------|
| <b>Workability Factor:</b> | <b>35</b> |
|----------------------------|-----------|

| Sieve | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|----------------------|------------|-----------------------|
| 2"    | 100.0                | 0.0        | 0.0                   |
| 1.5"  | 100.0                | 0.0        | 0.0                   |
| 1"    | 99.1                 | 0.9        | 0.9                   |
| 3/4"  | 90.3                 | 8.8        | 9.7                   |
| 1/2"  | 69.2                 | 21.1       | 30.8                  |
| 3/8"  | 59.1                 | 10.1       | 40.9                  |
| #4    | 41.8                 | 17.3       | 58.2                  |
| #8    | 35.1                 | 6.6        | 64.9                  |
| #16   | 28.5                 | 6.6        | 71.5                  |
| #30   | 21.2                 | 7.3        | 78.8                  |
| #50   | 8.7                  | 12.5       | 91.3                  |
| #100  | 1.8                  | 7.0        | 98.2                  |
| LBW   | 0.7                  | 1.0        | 99.3                  |



PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

# Production Gradation Report

**PLANT #:** **P-39**

Sample Date: 11/6/23

Concrete Grade: **DM, 4500HP**

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

Dates Test Represents: 11/7/2023 through 11/13/2023

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

| Agg. Class      | Pit #  | Source          | Weight (SSD) | ft <sup>3</sup> | Specific Gravity | % Contribution |
|-----------------|--------|-----------------|--------------|-----------------|------------------|----------------|
| 6AA             | 71-47  | Presque Isle    | 1505         | 9.21            | 2.62             | 51.8           |
| 26A             | 71-47  | Presque Isle    | 300          | 1.83            | 2.62             | 10.3           |
| 2NS             | 44-051 | Krake Willis Rd | 1100         | 6.65            | 2.65             | 37.9           |
| <b>Total Wt</b> |        |                 | <b>2905</b>  | <b>17.69</b>    |                  | <b>100.0</b>   |

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



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| Sieve | 6AA   | 26A   | 2NS   | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|-------|-------|-------|----------------------|------------|-----------------------|
| 2"    | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1.5"  | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1"    | 99.3  | 100.0 | 100.0 | 99.6                 | 0.4        | 0.4                   |
| 3/4"  | 85.9  | 100.0 | 100.0 | 92.7                 | 6.9        | 7.3                   |
| 1/2"  | 43.7  | 97.0  | 100.0 | 70.5                 | 22.2       | 29.5                  |
| 3/8"  | 25.5  | 88.7  | 100.0 | 60.2                 | 10.3       | 39.8                  |
| #4    | 4.3   | 22.6  | 98.9  | 42.0                 | 18.2       | 58.0                  |
| #8    | 2.5   | 4.9   | 84.6  | 33.8                 | 8.2        | 66.2                  |
| #16   | 2.3   | 2.2   | 68.9  | 27.5                 | 6.3        | 72.5                  |
| #30   | 2.2   | 1.8   | 49.7  | 20.1                 | 7.4        | 79.9                  |
| #50   | 2.1   | 1.6   | 23.8  | 10.3                 | 9.9        | 89.7                  |
| #100  | 2.0   | 1.5   | 6.5   | 3.7                  | 6.6        | 96.3                  |
| LBW   | 1.7   | 1.4   | 1.6   | 1.6                  | 2.0        | 98.4                  |

\*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 4% for the 3/4" sieve when

a 1.5" max. size (nom. Max. 1.0") aggregate is used.

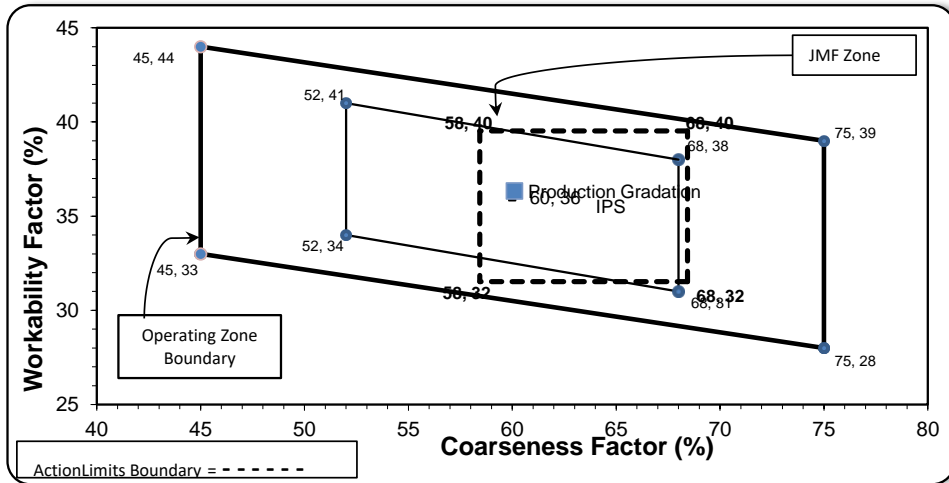
Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

|                           |           |                            |           |             |
|---------------------------|-----------|----------------------------|-----------|-------------|
| <b>Coarseness Factor:</b> | <b>60</b> | <b>Workability Factor:</b> | <b>34</b> | <b>36.3</b> |
|---------------------------|-----------|----------------------------|-----------|-------------|

|                           |           |
|---------------------------|-----------|
| <b>Coarseness Factor:</b> | <b>63</b> |
|---------------------------|-----------|

|                            |           |
|----------------------------|-----------|
| <b>Workability Factor:</b> | <b>36</b> |
|----------------------------|-----------|



| Sieve | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|----------------------|------------|-----------------------|
| 2"    | 100.0                | 0.0        | 0.0                   |
| 1.5"  | 100.0                | 0.0        | 0.0                   |
| 1"    | 100.0                | 0.0        | 0.0                   |
| 3/4"  | 89.7                 | 10.3       | 10.3                  |
| 1/2"  | 70.3                 | 19.4       | 29.7                  |
| 3/8"  | 59.1                 | 11.2       | 40.9                  |
| #4    | 42.8                 | 16.3       | 57.2                  |
| #8    | 35.5                 | 7.3        | 64.5                  |
| #16   | 29.0                 | 6.5        | 71.0                  |
| #30   | 21.2                 | 7.7        | 78.8                  |
| #50   | 9.8                  | 11.5       | 90.2                  |
| #100  | 3.7                  | 6.1        | 96.3                  |
| LBW   | 1.2                  | 2.5        | 98.8                  |

PREPARED BY:  
 SM, LLC Technical Service

Approved By:



# Aggregate Optimization Chart

# Production Gradation Report

**PLANT #:** P-02

Sample Date: 11/6/23

Concrete Grade: **DM, 4500HP**

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

Dates Test Represents: 11/7/2023 through 11/13/2023

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

| Agg. Class      | Pit #  | Source       | Weight (SSD) | ft <sup>3</sup> | Specific Gravity | % Contribution |
|-----------------|--------|--------------|--------------|-----------------|------------------|----------------|
| 6AA             | 71-47  | Presque Isle | 1450         | 8.87            | 2.62             | 49.9           |
| 26A             | 71-47  | Presque Isle | 305          | 1.87            | 2.62             | 10.5           |
| 2NS             | 63-115 | Ray Rd       | 1150         | 6.95            | 2.65             | 39.6           |
| <b>Total Wt</b> |        |              | <b>2905</b>  | <b>17.69</b>    |                  | <b>100.0</b>   |

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



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| Sieve | 6AA   | 26A   | 2NS   | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|-------|-------|-------|----------------------|------------|-----------------------|
| 2"    | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1.5"  | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1"    | 96.5  | 100.0 | 100.0 | 98.3                 | 1.7        | 1.7                   |
| 3/4"  | 75.9  | 100.0 | 100.0 | 88.0                 | 10.3       | 12.0                  |
| 1/2"  | 34.7  | 94.3  | 100.0 | 66.8                 | 21.2       | 33.2                  |
| 3/8"  | 16.9  | 86.0  | 100.0 | 57.1                 | 9.8        | 42.9                  |
| #4    | 2.9   | 27.9  | 96.0  | 42.4                 | 14.7       | 57.6                  |
| #8    | 1.6   | 6.5   | 80.9  | 33.5                 | 8.9        | 66.5                  |
| #16   | 1.4   | 3.2   | 65.9  | 27.1                 | 6.4        | 72.9                  |
| #30   | 1.4   | 2.6   | 49.5  | 20.6                 | 6.6        | 79.4                  |
| #50   | 1.3   | 2.4   | 25.5  | 11.0                 | 9.6        | 89.0                  |
| #100  | 1.3   | 2.3   | 5.4   | 3.0                  | 8.0        | 97.0                  |
| LBW   | 1.0   | 2.0   | 0.6   | 0.9                  | 2.1        | 99.1                  |

\*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 4% for the 3/4" sieve when a 1.5" max. size (nom. Max. 1.0") aggregate is used.

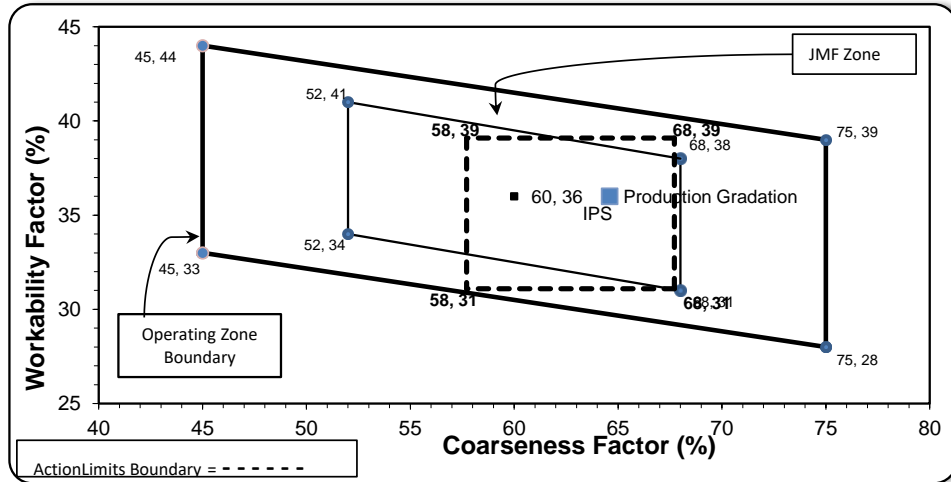
Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations  Adjusted WF Initial Production Sample (IPS)

|                           |           |                            |           |             |
|---------------------------|-----------|----------------------------|-----------|-------------|
| <b>Coarseness Factor:</b> | <b>65</b> | <b>Workability Factor:</b> | <b>34</b> | <b>36.0</b> |
|---------------------------|-----------|----------------------------|-----------|-------------|

|                           |           |
|---------------------------|-----------|
| <b>Coarseness Factor:</b> | <b>63</b> |
|---------------------------|-----------|

|                            |           |
|----------------------------|-----------|
| <b>Workability Factor:</b> | <b>35</b> |
|----------------------------|-----------|

| Sieve | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|----------------------|------------|-----------------------|
| 2"    | 100.0                | 0.0        | 0.0                   |
| 1.5"  | 100.0                | 0.0        | 0.0                   |
| 1"    | 100.0                | 0.0        | 0.0                   |
| 3/4"  | 95.1                 | 4.9        | 4.9                   |
| 1/2"  | 74.6                 | 20.5       | 25.4                  |
| 3/8"  | 59.3                 | 15.3       | 40.7                  |
| #4    | 42.1                 | 17.2       | 57.9                  |
| #8    | 35.1                 | 7.1        | 64.9                  |
| #16   | 29.2                 | 5.9        | 70.8                  |
| #30   | 21.9                 | 7.3        | 78.1                  |
| #50   | 9.6                  | 12.4       | 90.4                  |
| #100  | 2.4                  | 7.2        | 97.6                  |
| LBW   | 0.9                  | 1.5        | 99.1                  |



PREPARED BY:  
 SM, LLC Technical Service

Approved By: