

# Aggregate Optimization Chart

## Production Gradation Report

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

Sample Date: 2/21/22

Concrete Grade: **DM, 4500HP**

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

Dates Test Represents: 2/22/2022 through 2/28/2022

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

| Agg. Class      | Pit #  | Source       | Weight (SSD) | ft <sup>3</sup> | Specific Gravity | % Contribution |
|-----------------|--------|--------------|--------------|-----------------|------------------|----------------|
| 6AA             | 71-47  | Presque Isle | 1500         | 9.17            | 2.62             | 51.5           |
| 26A             | 71-47  | Presque Isle | 260          | 1.59            | 2.62             | 8.9            |
| 2NS             | 75-051 | Mid-Michigan | 1150         | 6.93            | 2.66             | 39.5           |
| <b>Total Wt</b> |        |              | <b>2910</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"    | 96.7  | 100.0 | 100.0 | 98.3                 | 1.7        | 1.7                   |
| 3/4"  | 81.6  | 100.0 | 100.0 | 90.5                 | 7.8        | 9.5                   |
| 1/2"  | 38.4  | 96.1  | 100.0 | 67.9                 | 22.6       | 32.1                  |
| 3/8"  | 17.5  | 83.4  | 100.0 | 56.0                 | 11.9       | 44.0                  |
| #4    | 2.1   | 14.7  | 98.5  | 41.3                 | 14.7       | 58.7                  |
| #8    | 1.4   | 3.7   | 83.3  | 34.0                 | 7.4        | 66.0                  |
| #16   | 1.2   | 1.8   | 68.3  | 27.8                 | 6.2        | 72.2                  |
| #30   | 1.2   | 1.4   | 53.3  | 21.8                 | 6.0        | 78.2                  |
| #50   | 1.1   | 1.3   | 29.2  | 12.2                 | 9.6        | 87.8                  |
| #100  | 1.1   | 1.2   | 7.3   | 3.6                  | 8.7        | 96.4                  |
| LBW   | 1.0   | 1.1   | 0.6   | 0.9                  | 2.7        | 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 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.

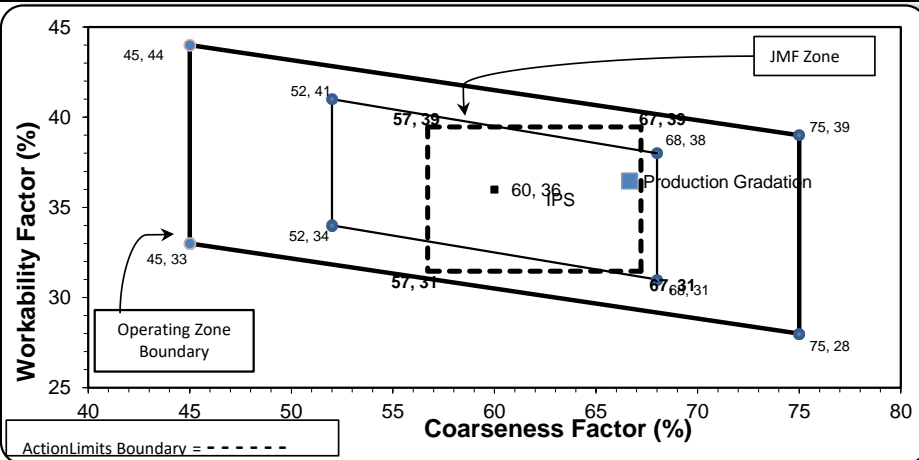
Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

|                           |           |                            |           |             |
|---------------------------|-----------|----------------------------|-----------|-------------|
| <b>Coarseness Factor:</b> | <b>67</b> | <b>Workability Factor:</b> | <b>34</b> | <b>36.5</b> |
|---------------------------|-----------|----------------------------|-----------|-------------|

|                            |           |
|----------------------------|-----------|
| <b>Coarseness Factor:</b>  | <b>62</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"  | 95.0                 | 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

**PLANT #:** **P-102**

Sample Date: 2/21/22

Concrete Grade: **DM, 4500HP**

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

Dates Test Represents: 2/22/2022 through 2/28/2022

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

| Agg. Class      | Pit #  | Source   | Weight (SSD) | ft <sup>3</sup> | Specific Gravity | % Contribution |
|-----------------|--------|----------|--------------|-----------------|------------------|----------------|
| 6AA             | 58-003 | Stoneco  | 1400         | 8.34            | 2.69             | 47.4           |
| 26A             | 58-003 | Stoneco  | 405          | 2.41            | 2.69             | 13.7           |
| 2NS             | 63-114 | Highland | 1150         | 6.95            | 2.65             | 38.9           |
| <b>Total Wt</b> |        |          | <b>2955</b>  | <b>17.71</b>    |                  | <b>100.0</b>   |

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



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 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"    | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 3/4"  | 81.4  | 100.0 | 100.0 | 91.2                 | 8.8        | 8.8                   |
| 1/2"  | 44.3  | 98.9  | 100.0 | 73.5                 | 17.7       | 26.5                  |
| 3/8"  | 19.2  | 70.9  | 100.0 | 57.7                 | 15.7       | 42.3                  |
| #4    | 1.8   | 9.3   | 99.7  | 40.9                 | 16.8       | 59.1                  |
| #8    | 1.0   | 3.4   | 88.0  | 35.2                 | 5.7        | 64.8                  |
| #16   | 0.8   | 2.1   | 71.3  | 28.4                 | 6.8        | 71.6                  |
| #30   | 0.6   | 1.8   | 49.1  | 19.6                 | 8.8        | 80.4                  |
| #50   | 0.5   | 1.7   | 20.6  | 8.5                  | 11.2       | 91.5                  |
| #100  | 0.4   | 1.5   | 3.1   | 1.6                  | 6.9        | 98.4                  |
| LBW   | 0.3   | 1.4   | 0.3   | 0.5                  | 1.2        | 99.5                  |

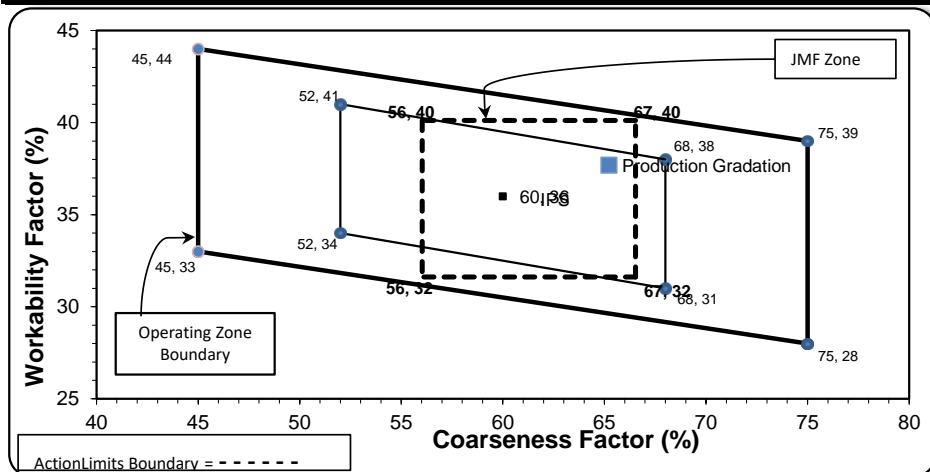
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2"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

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

|                           |           |                            |           |             |                           |           |
|---------------------------|-----------|----------------------------|-----------|-------------|---------------------------|-----------|
| <b>Coarseness Factor:</b> | <b>65</b> | <b>Workability Factor:</b> | <b>35</b> | <b>37.7</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 #:** **P-32**

Sample Date: 2/21/22

Concrete Grade: **DM, 4500HP**

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

Dates Test Represents: 2/22/2022 through 2/28/2022

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"    | 95.8  | 100.0 | 100.0 | 97.9                 | 2.1        | 2.1                   |
| 3/4"  | 79.7  | 100.0 | 100.0 | 89.8                 | 8.1        | 10.2                  |
| 1/2"  | 34.1  | 97.9  | 100.0 | 66.8                 | 23.1       | 33.2                  |
| 3/8"  | 16.9  | 89.3  | 100.0 | 57.3                 | 9.5        | 42.7                  |
| #4    | 4.0   | 28.8  | 96.3  | 43.1                 | 14.2       | 56.9                  |
| #8    | 3.0   | 10.7  | 83.1  | 35.5                 | 7.6        | 64.5                  |
| #16   | 2.5   | 4.1   | 67.4  | 28.4                 | 7.1        | 71.6                  |
| #30   | 2.1   | 3.7   | 48.7  | 20.7                 | 7.6        | 79.3                  |
| #50   | 1.7   | 3.4   | 24.5  | 10.9                 | 9.8        | 89.1                  |
| #100  | 1.3   | 3.0   | 7.4   | 3.9                  | 7.0        | 96.1                  |
| LBW   | 0.9   | 2.4   | 1.4   | 1.3                  | 2.6        | 98.7                  |

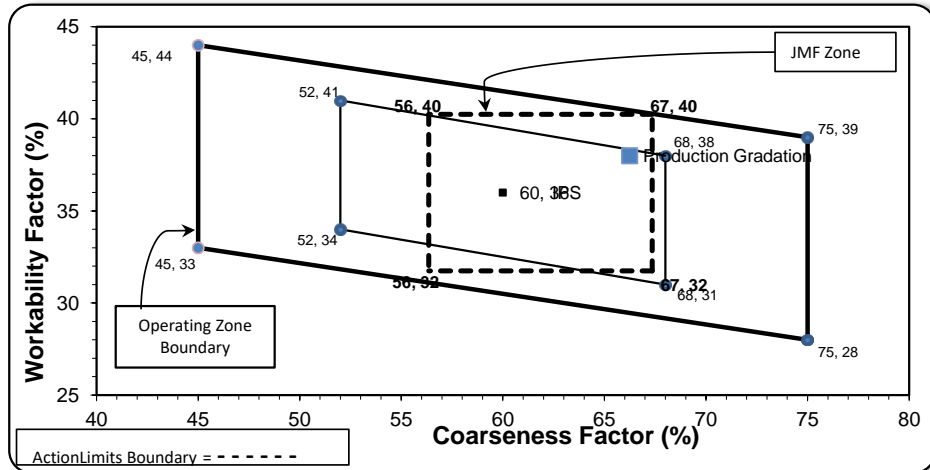
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2"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

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

|                           |           |                            |           |                    |             |
|---------------------------|-----------|----------------------------|-----------|--------------------|-------------|
| <b>Coarseness Factor:</b> | <b>66</b> | <b>Workability Factor:</b> | <b>36</b> | <b>Adjusted WF</b> | <b>38.0</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

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

Sample Date: 2/21/22

Concrete Grade: **DM, 4500HP**

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

Dates Test Represents: 2/22/2022 through 2/28/2022

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

| Agg. Class      | Pit #  | Source        | Weight (SSD) | ft <sup>3</sup> | Specific Gravity | % Contribution |
|-----------------|--------|---------------|--------------|-----------------|------------------|----------------|
| 6AA             | 58-003 | Stoneco       | 1450         | 8.64            | 2.69             | 49.1           |
| 26A             | 58-003 | Stoneco       | 405          | 2.41            | 2.69             | 13.7           |
| 2NS             | 81-019 | Pleasant Lake | 1100         | 6.65            | 2.65             | 37.2           |
| <b>Total Wt</b> |        |               | <b>2955</b>  | <b>17.70</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"    | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 3/4"  | 81.4  | 100.0 | 100.0 | 90.9                 | 9.1        | 9.1                   |
| 1/2"  | 44.3  | 98.9  | 100.0 | 72.5                 | 18.4       | 27.5                  |
| 3/8"  | 19.2  | 70.9  | 100.0 | 56.4                 | 16.2       | 43.6                  |
| #4    | 1.8   | 9.3   | 97.7  | 38.5                 | 17.8       | 61.5                  |
| #8    | 1.0   | 3.4   | 86.0  | 33.0                 | 5.6        | 67.0                  |
| #16   | 0.8   | 2.1   | 70.7  | 27.0                 | 6.0        | 73.0                  |
| #30   | 0.6   | 1.8   | 52.4  | 20.0                 | 7.0        | 80.0                  |
| #50   | 0.5   | 1.7   | 22.0  | 8.7                  | 11.4       | 91.3                  |
| #100  | 0.4   | 1.5   | 4.5   | 2.1                  | 6.6        | 97.9                  |
| LBW   | 0.3   | 1.4   | 1.7   | 1.0                  | 1.1        | 99.0                  |

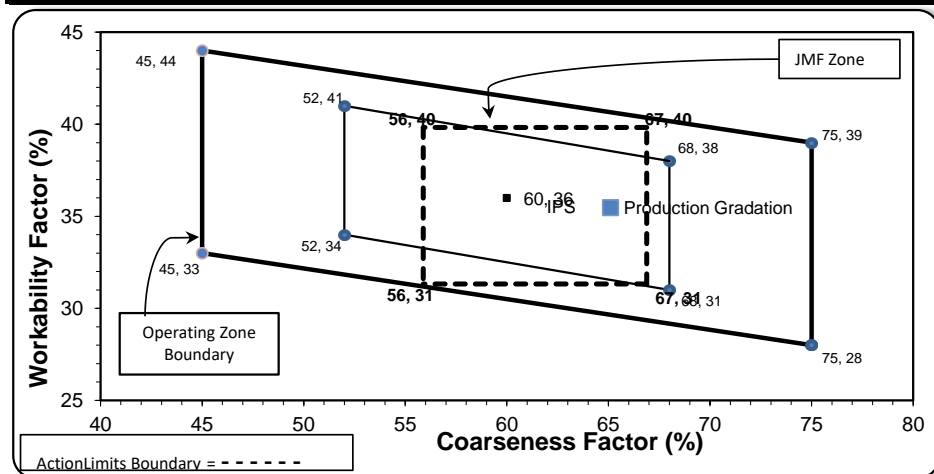
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2"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

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

|                           |           |                            |           |                    |             |
|---------------------------|-----------|----------------------------|-----------|--------------------|-------------|
| <b>Coarseness Factor:</b> | <b>65</b> | <b>Workability Factor:</b> | <b>33</b> | <b>Adjusted WF</b> | <b>35.5</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"  | 89.1                 | 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

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

Sample Date: 2/21/22

Concrete Grade: **DM, 4500HP**

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

Dates Test Represents: 2/22/2022 through 2/28/2022

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 | 350          | 2.14            | 2.62             | 12.0           |
| 2NS             | 63-92 | Grange Hall  | 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%



**Superior Materials, LLC**  
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 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"    | 98.6  | 100.0 | 100.0 | 99.3                 | 0.7        | 0.7                   |
| 3/4"  | 85.6  | 100.0 | 100.0 | 92.8                 | 6.5        | 7.2                   |
| 1/2"  | 45.0  | 97.9  | 100.0 | 72.2                 | 20.6       | 27.8                  |
| 3/8"  | 23.0  | 89.3  | 100.0 | 60.1                 | 12.1       | 39.9                  |
| #4    | 5.1   | 28.8  | 98.1  | 43.2                 | 17.0       | 56.8                  |
| #8    | 3.0   | 10.7  | 82.8  | 34.1                 | 9.0        | 65.9                  |
| #16   | 2.5   | 4.1   | 67.7  | 27.4                 | 6.8        | 72.6                  |
| #30   | 2.3   | 3.7   | 49.2  | 20.2                 | 7.2        | 79.8                  |
| #50   | 2.2   | 3.4   | 22.5  | 10.0                 | 10.2       | 90.0                  |
| #100  | 2.1   | 3.0   | 3.8   | 2.9                  | 7.2        | 97.1                  |
| LBW   | 1.5   | 2.4   | 0.6   | 1.3                  | 1.6        | 98.7                  |

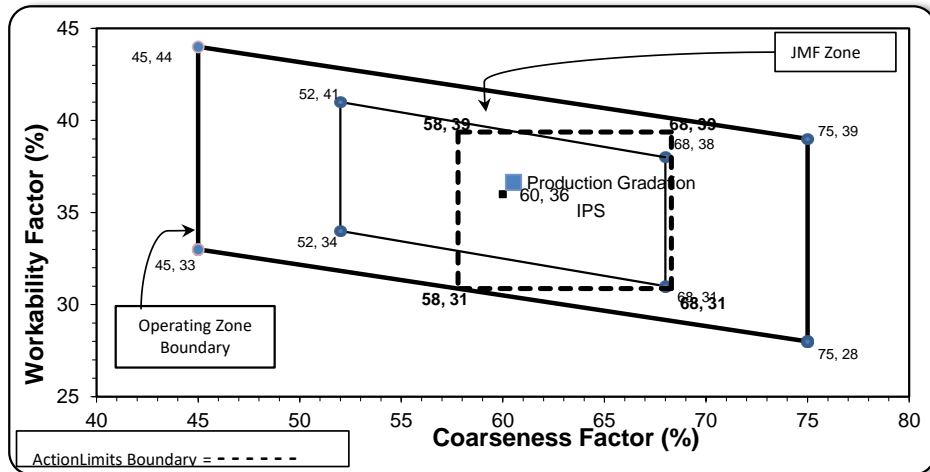
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2"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

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

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>36.6</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

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

Sample Date: 2/21/22

Concrete Grade: **DM, 4500HP**

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

Dates Test Represents: 2/22/2022 through 2/28/2022

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             | 63-92 | Grange Hall  | 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"    | 96.7  | 100.0 | 100.0 | 98.3                 | 1.7        | 1.7                   |
| 3/4"  | 81.6  | 100.0 | 100.0 | 90.5                 | 7.8        | 9.5                   |
| 1/2"  | 38.4  | 96.1  | 100.0 | 67.7                 | 22.8       | 32.3                  |
| 3/8"  | 17.5  | 83.4  | 100.0 | 55.5                 | 12.1       | 44.5                  |
| #4    | 2.1   | 14.7  | 98.1  | 39.8                 | 15.8       | 60.2                  |
| #8    | 1.4   | 3.7   | 82.8  | 32.5                 | 7.3        | 67.5                  |
| #16   | 1.2   | 1.8   | 67.7  | 26.4                 | 6.0        | 73.6                  |
| #30   | 1.2   | 1.4   | 49.2  | 19.4                 | 7.0        | 80.6                  |
| #50   | 1.1   | 1.3   | 22.5  | 9.2                  | 10.2       | 90.8                  |
| #100  | 1.1   | 1.2   | 3.8   | 2.1                  | 7.1        | 97.9                  |
| LBW   | 1.0   | 1.1   | 0.6   | 0.9                  | 1.3        | 99.1                  |

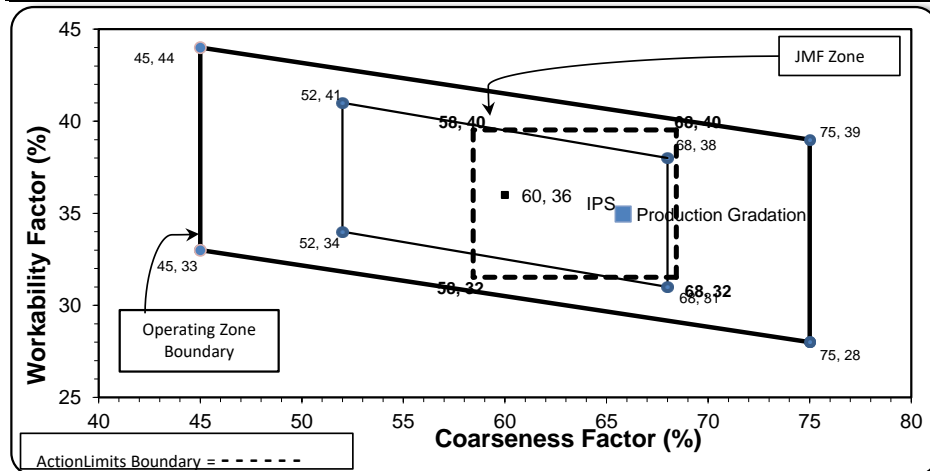
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2"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

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

|                           |           |                            |           |             |                           |           |
|---------------------------|-----------|----------------------------|-----------|-------------|---------------------------|-----------|
| <b>Coarseness Factor:</b> | <b>66</b> | <b>Workability Factor:</b> | <b>32</b> | <b>35.0</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

**PLANT #:** **P-02**

Sample Date: 2/21/22

Concrete Grade: **DM, 4500HP**

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

Dates Test Represents: 2/22/2022 through 2/28/2022

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

| Agg. Class      | Pit #  | Source       | Weight (SSD) | ft <sup>3</sup> | Specific Gravity | % Contribution |
|-----------------|--------|--------------|--------------|-----------------|------------------|----------------|
| 6AA             | 71-47  | Presque Isle | 1555         | 9.51            | 2.62             | 53.5           |
| 26A             | 71-47  | Presque Isle | 250          | 1.53            | 2.62             | 8.6            |
| 2NS             | 63-115 | Ray 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"    | 98.6  | 100.0 | 100.0 | 99.3                 | 0.7        | 0.7                   |
| 3/4"  | 85.6  | 100.0 | 100.0 | 92.3                 | 7.0        | 7.7                   |
| 1/2"  | 45.0  | 97.9  | 100.0 | 70.4                 | 21.9       | 29.6                  |
| 3/8"  | 23.0  | 89.3  | 100.0 | 57.9                 | 12.5       | 42.1                  |
| #4    | 5.1   | 28.8  | 96.5  | 41.7                 | 16.1       | 58.3                  |
| #8    | 3.0   | 10.7  | 80.6  | 33.0                 | 8.7        | 67.0                  |
| #16   | 2.5   | 4.1   | 67.6  | 27.3                 | 5.8        | 72.7                  |
| #30   | 2.3   | 3.7   | 48.2  | 19.8                 | 7.5        | 80.2                  |
| #50   | 2.2   | 3.4   | 27.0  | 11.7                 | 8.1        | 88.3                  |
| #100  | 2.1   | 3.0   | 5.2   | 3.4                  | 8.3        | 96.6                  |
| LBW   | 1.5   | 2.4   | 0.9   | 1.4                  | 2.0        | 98.6                  |

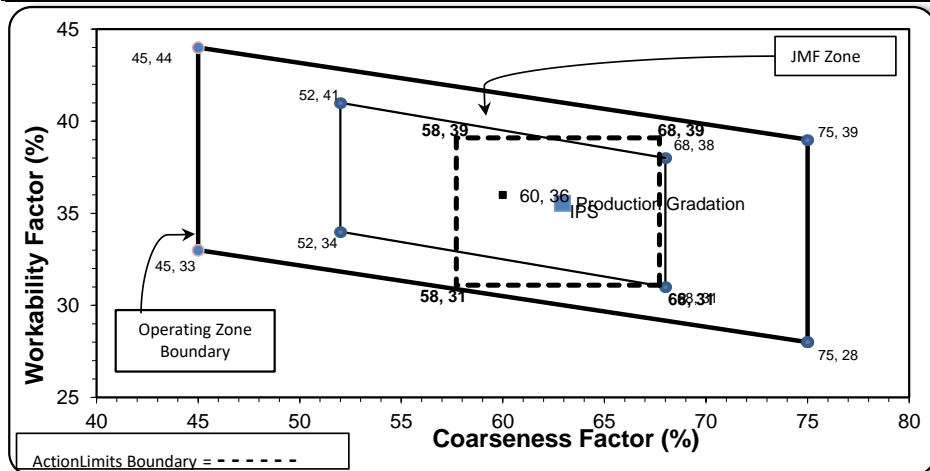
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2"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

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

|                           |           |                            |           |                    |             |
|---------------------------|-----------|----------------------------|-----------|--------------------|-------------|
| <b>Coarseness Factor:</b> | <b>63</b> | <b>Workability Factor:</b> | <b>33</b> | <b>Adjusted WF</b> | <b>35.5</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: