

# Aggregate Optimization Chart

**PLANT #:** **P-103**

Sample Date: 12/14/20

Concrete Grade: **DM**

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

Dates Test Represents: 12/15/2020 through 12/21/2020

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

| Agg. Class      | Pit #  | Source   | Weight (SSD) | ft <sup>3</sup> | Specific Gravity | % Contribution |
|-----------------|--------|----------|--------------|-----------------|------------------|----------------|
| 6AA             | 58-003 | Stoneco  | 1550         | 9.23            | 2.69             | 52.5           |
| 26A             | 58-003 | Stoneco  | 255          | 1.52            | 2.69             | 8.6            |
| 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%



**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"    | 99.2  | 100.0 | 100.0 | 99.6                 | 0.4        | 0.4                   |
| 3/4"  | 78.4  | 100.0 | 100.0 | 88.7                 | 10.9       | 11.3                  |
| 1/2"  | 37.1  | 99.5  | 100.0 | 67.0                 | 21.7       | 33.0                  |
| 3/8"  | 16.1  | 89.8  | 100.0 | 55.1                 | 11.9       | 44.9                  |
| #4    | 2.6   | 11.1  | 98.7  | 40.7                 | 14.4       | 59.3                  |
| #8    | 1.1   | 2.7   | 81.5  | 32.5                 | 8.2        | 67.5                  |
| #16   | 0.9   | 1.6   | 63.5  | 25.3                 | 7.2        | 74.7                  |
| #30   | 0.8   | 1.6   | 45.7  | 18.3                 | 7.0        | 81.7                  |
| #50   | 0.6   | 1.2   | 20.6  | 8.4                  | 9.9        | 91.6                  |
| #100  | 0.6   | 1.1   | 3.6   | 1.8                  | 6.6        | 98.2                  |
| LBW   | 0.5   | 0.8   | 0.3   | 0.4                  | 1.4        | 99.6                  |

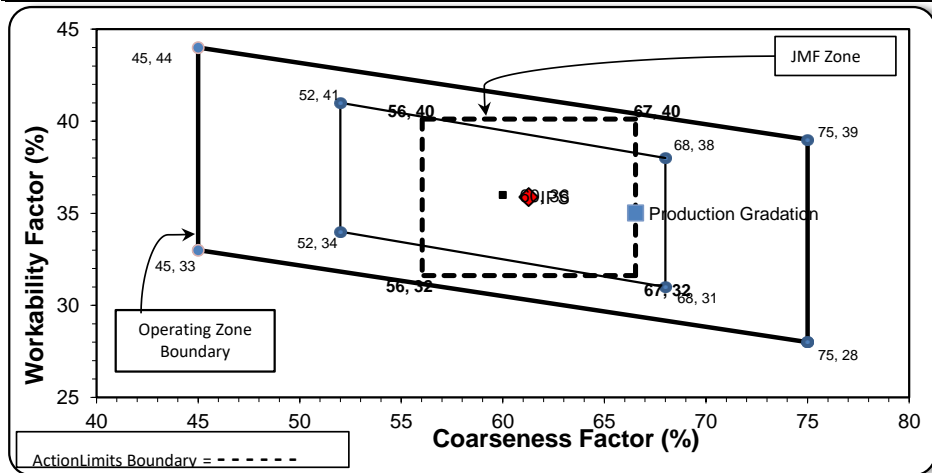
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2" 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>67</b> | <b>Workability Factor:</b> | <b>33</b> | <b>Adjusted WF</b> | <b>35.0</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: 12/14/20 Concrete Grade: **DM**  
 Dates Test Represents: 12/15/2020 through 12/21/2020

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

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 | 200          | 1.22            | 2.62             | 6.9            |
| 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%



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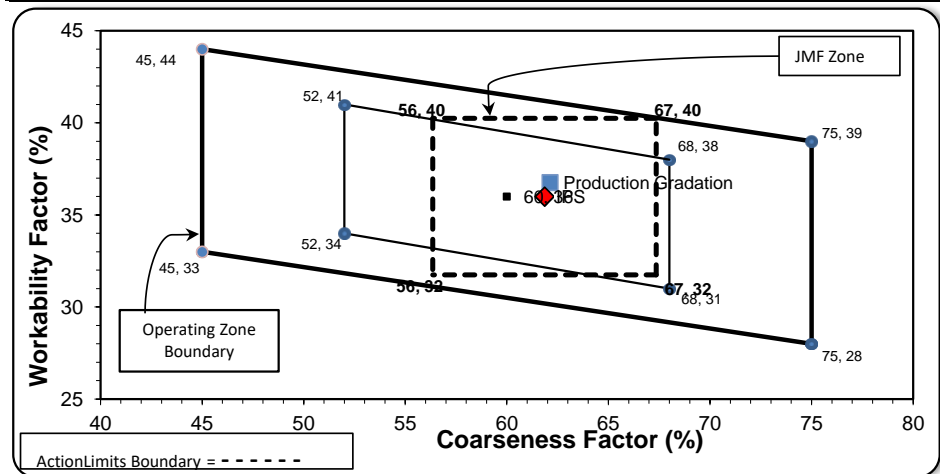
| Sieve | 6AA   | 26A   | 2NS   | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|-------|-------|-------|----------------------|------------|-----------------------|
| 2"    | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1.5"  | 100.0 | 100.0 | 100.0 | 100.0                | 0.0        | 0.0                   |
| 1"    | 99.5  | 100.0 | 100.0 | 99.7                 | 0.3        | 0.3                   |
| 3/4"  | 82.7  | 100.0 | 100.0 | 90.7                 | 9.0        | 9.3                   |
| 1/2"  | 43.6  | 96.4  | 100.0 | 69.6                 | 21.2       | 30.4                  |
| 3/8"  | 25.8  | 83.7  | 100.0 | 59.2                 | 10.4       | 40.8                  |
| #4    | 4.5   | 14.8  | 95.8  | 41.4                 | 17.8       | 58.6                  |
| #8    | 2.2   | 3.9   | 82.9  | 34.3                 | 7.1        | 65.7                  |
| #16   | 1.9   | 2.2   | 66.8  | 27.6                 | 6.7        | 72.4                  |
| #30   | 1.8   | 1.9   | 46.6  | 19.5                 | 8.1        | 80.5                  |
| #50   | 1.6   | 1.9   | 27.4  | 11.8                 | 7.7        | 88.2                  |
| #100  | 1.6   | 1.9   | 9.5   | 4.7                  | 7.1        | 95.3                  |
| LBW   | 1.2   | 1.5   | 1.2   | 1.2                  | 3.5        | 98.8                  |

\*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>62</b> | <b>Workability Factor:</b> | <b>34</b> | <b>Adjusted WF</b> | <b>36.8</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-36**

Sample Date: 12/14/20

Concrete Grade: **DM**

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

Dates Test Represents: 12/15/2020 through 12/21/2020

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             | 53.4           |
| 26A             | 71-47 | Presque Isle | 255          | 1.56            | 2.62             | 8.8            |
| 2NS             | 63-92 | Grange Hall  | 1100         | 6.65            | 2.65             | 37.8           |
| <b>Total Wt</b> |       |              | <b>2910</b>  | <b>17.72</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"    | 96.9  | 100.0 | 100.0 | 98.3                 | 1.7        | 1.7                   |
| 3/4"  | 88.5  | 100.0 | 100.0 | 93.9                 | 4.5        | 6.1                   |
| 1/2"  | 55.8  | 96.4  | 100.0 | 76.1                 | 17.8       | 23.9                  |
| 3/8"  | 25.4  | 83.7  | 100.0 | 58.7                 | 17.4       | 41.3                  |
| #4    | 7.5   | 14.8  | 97.5  | 42.2                 | 16.5       | 57.8                  |
| #8    | 3.8   | 3.9   | 85.5  | 34.7                 | 7.5        | 65.3                  |
| #16   | 2.6   | 2.2   | 70.5  | 28.2                 | 6.5        | 71.8                  |
| #30   | 2.3   | 1.9   | 45.8  | 18.7                 | 9.5        | 81.3                  |
| #50   | 2.1   | 1.9   | 13.5  | 6.4                  | 12.3       | 93.6                  |
| #100  | 1.9   | 1.9   | 1.8   | 1.9                  | 4.5        | 98.1                  |
| LBW   | 1.6   | 1.5   | 0.3   | 1.1                  | 0.8        | 98.9                  |

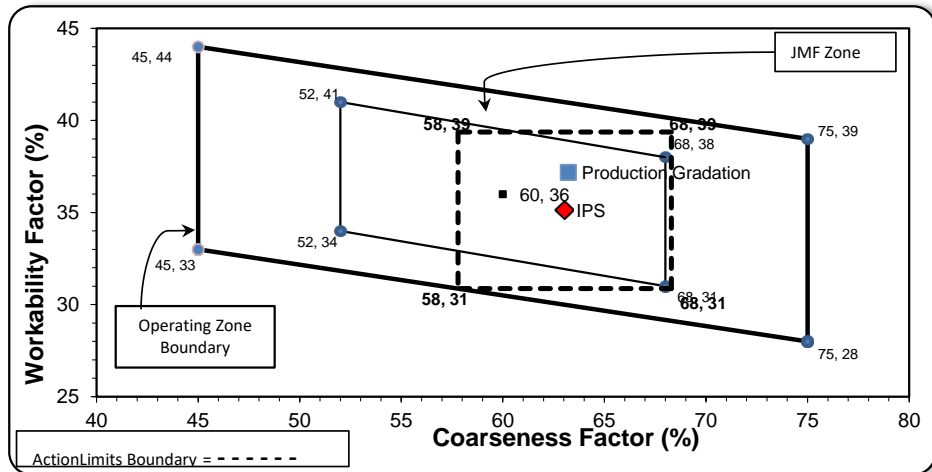
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2" 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>35</b> | <b>Adjusted WF</b> | <b>37.2</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-02**

Sample Date: 12/14/20 Concrete Grade: DM  
 Dates Test Represents: 12/15/2020 through 12/21/2020

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

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 | 200          | 1.22            | 2.62             | 6.9            |
| 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"    | 96.9  | 100.0 | 100.0 | 98.3                 | 1.7        | 1.7                   |
| 3/4"  | 88.5  | 100.0 | 100.0 | 93.8                 | 4.5        | 6.2                   |
| 1/2"  | 55.8  | 96.4  | 100.0 | 76.1                 | 17.8       | 23.9                  |
| 3/8"  | 25.4  | 83.7  | 100.0 | 58.9                 | 17.1       | 41.1                  |
| #4    | 7.5   | 14.8  | 95.7  | 42.9                 | 16.0       | 57.1                  |
| #8    | 3.8   | 3.9   | 77.6  | 33.0                 | 9.9        | 67.0                  |
| #16   | 2.6   | 2.2   | 61.3  | 25.8                 | 7.2        | 74.2                  |
| #30   | 2.3   | 1.9   | 46.4  | 19.7                 | 6.1        | 80.3                  |
| #50   | 2.1   | 1.9   | 22.8  | 10.3                 | 9.4        | 89.7                  |
| #100  | 1.9   | 1.9   | 4.3   | 2.9                  | 7.4        | 97.1                  |
| LBW   | 1.6   | 1.5   | 0.5   | 1.2                  | 1.7        | 98.8                  |

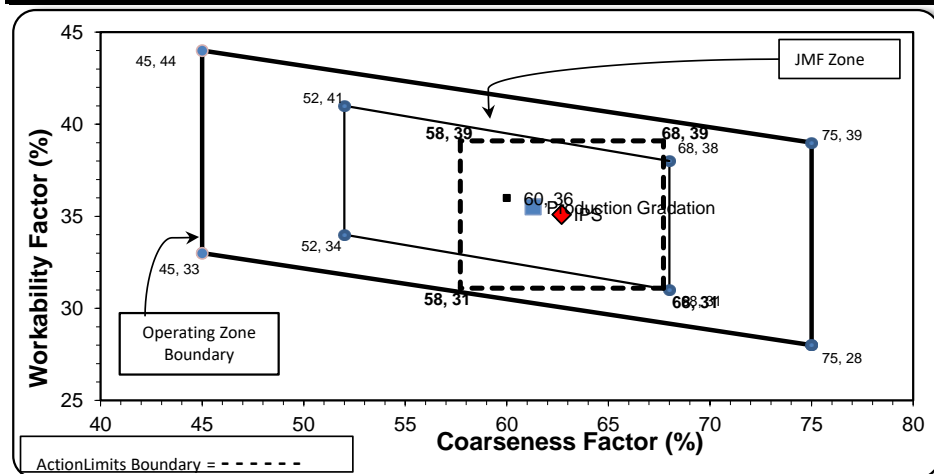
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 8% for the 1" sieve when a 2" 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>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: