# Aggregate Optimization Chart

Production Gradation Report

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

Contractor:

Sample Date: 7/27/20

Concrete Grade: **DM**

Dates Test Represents: 7/28/2020 through 8/3/2020

MDOT No.:

| Agg. Class | Pit # | Source | Weight (SSD) | ft³ | Specific Gravity | % Contribution |
|---|---|---|---|---|---|---|
| 6AA | 71-47 | Presque Isle | 1560 | 9.54 | 2.62 | 53.6 |
| 26A | 71-47 | Presque Isle | 200 | 1.22 | 2.62 | 6.9 |
| 2NS | 75-051 | Mid-Michigan | 1150 | 6.93 | 2.66 | 39.5 |
| | | **Total Wt** | **2910** | **17.69** | | 100.0 |

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

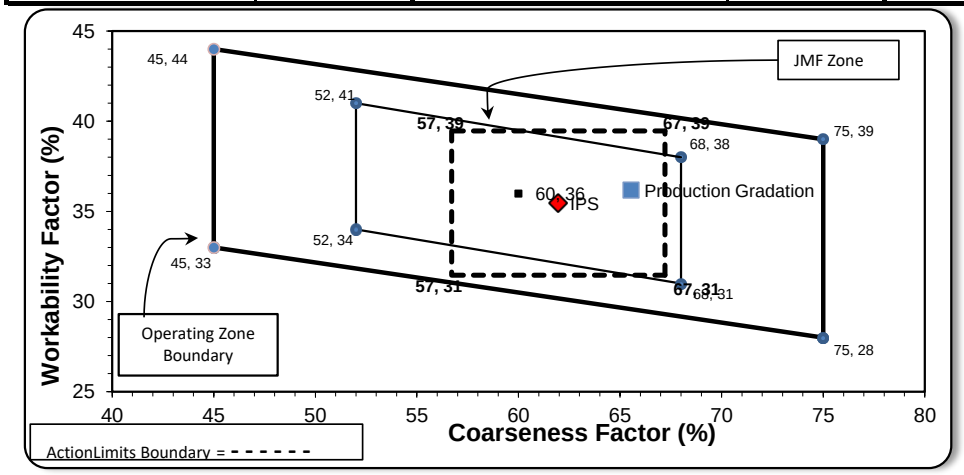
| Sieve | 6AA | 26A | 2NS | Cumulative % Passing | % Retained | Cumulative % Retained |
|---|---|---|---|---|---|---|
| 2" | 100.0 | 100.0 | 100.0 | 100.0 | 0.0 | 0.0 |
| 1.5" | 100.0 | 100.0 | 100.0 | 100.0 | 0.0 | 0.0 |
| 1" | 97.6 | 100.0 | 100.0 | 98.7 | 1.3 | 1.3 |
| 3/4" | 77.2 | 100.0 | 100.0 | 87.8 | 10.9 | 12.2 |
| 1/2" | 33.6 | 97.7 | 100.0 | 64.2 | 23.5 | 35.8 |
| 3/8" | 20.4 | 88.5 | 100.0 | 56.5 | 7.7 | 43.5 |
| #4 | 2.9 | 22.1 | 98.3 | 41.9 | 14.6 | 58.1 |
| #8 | 1.5 | 6.4 | 82.1 | 33.7 | 8.2 | 66.3 |
| #16 | 1.3 | 2.7 | 65.9 | 26.9 | 6.8 | 73.1 |
| #30 | 1.3 | 2.0 | 50.0 | 20.6 | 6.3 | 79.4 |
| #50 | 1.2 | 1.9 | 25.7 | 10.9 | 9.7 | 89.1 |
| #100 | 1.2 | 1.7 | 6.2 | 3.2 | 7.7 | 96.8 |
| LBW | 1.1 | 1.7 | 0.7 | 1.0 | 2.2 | 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 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.


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


Production Gradation ○ Batch Plant Gradations ◉ Aggregate Supplier Gradations

| Coarseness Factor: | 66 | Workability Factor: | 34 | Adjusted WF 36.2 |
|---|---|---|---|---|




Initial Production Sample (IPS)

| Coarseness Factor: | 62 |
|---|---|
| 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**

Contractor:

Sample Date: 7/27/20

Concrete Grade: **DM**

Dates Test Represents: 7/28/2020 through 8/3/2020

MDOT No.:

| Agg. Class | Pit # | Source | Weight (SSD) | ft³ | Specific Gravity | % Contribution |
|---|---|---|---|---|---|---|
| 6AA | 58-003 | Stoneco | 1500 | 8.94 | 2.69 | 50.8 |
| 26A | 58-003 | Stoneco | 305 | 1.82 | 2.69 | 10.3 |
| 2NS | 63-114 | Highland | 1150 | 6.95 | 2.65 | 38.9 |
| | | **Total Wt** | **2955** | **17.71** | | 100.0 |

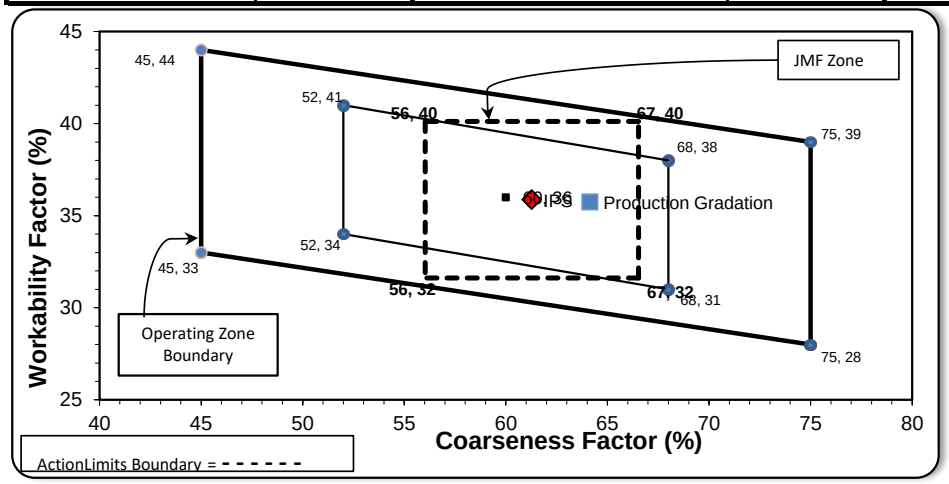
<----- Verify this number is 100%

| 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" | 86.1 | 100.0 | 100.0 | 92.9 | 7.1 | 7.1 |
| 1/2" | 41.4 | 99.1 | 100.0 | 70.2 | 22.8 | 29.8 |
| 3/8" | 18.7 | 85.0 | 100.0 | 57.2 | 13.0 | 42.8 |
| #4 | 2.5 | 13.0 | 99.3 | 41.3 | 15.9 | 58.7 |
| #8 | 1.2 | 4.0 | 82.8 | 33.2 | 8.0 | 66.8 |
| #16 | 0.9 | 2.3 | 63.6 | 25.4 | 7.8 | 74.6 |
| #30 | 0.8 | 2.0 | 45.4 | 18.3 | 7.2 | 81.7 |
| #50 | 0.7 | 1.8 | 18.8 | 7.9 | 10.4 | 92.1 |
| #100 | 0.6 | 1.7 | 4.0 | 2.0 | 5.8 | 98.0 |
| LBW | 0.6 | 1.3 | 0.3 | 0.6 | 1.5 | 99.4 |

*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 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation ○ Batch Plant Gradations ◉ Aggregate Supplier Gradations

| Coarseness Factor: | 64 | Workability Factor: | 33 | Adjusted WF 35.7 |
|---|---|---|---|---|




Intial Production Sample (IPS)

| Coarseness Factor: | 61 |
|---|---|
| Workability Factor: | 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" | 89.2 | 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 |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PREPARED BY:
SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

Production Gradation Report

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

Contractor:

Sample Date: 7/27/20

Concrete Grade: **DM**

Dates Test Represents: 7/28/2020 through 8/3/2020

MDOT No.:

| Agg. Class | Pit # | Source | Weight (SSD) | ft³ | Specific Gravity | % Contribution |
|---|---|---|---|---|---|---|
| 6AA | 58-003 | Stoneco | 1500 | 8.94 | 2.69 | 50.8 |
| 26A | 58-003 | Stoneco | 305 | 1.82 | 2.69 | 10.3 |
| 2NS | 63-114 | Highland | 1150 | 6.95 | 2.65 | 38.9 |
| | | **Total Wt** | **2955** | **17.71** | | 100.0 |

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

| 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" | 86.1 | 100.0 | 100.0 | 92.9 | 7.1 | 7.1 |
| 1/2" | 41.4 | 99.1 | 100.0 | 70.2 | 22.8 | 29.8 |
| 3/8" | 18.7 | 85.0 | 100.0 | 57.2 | 13.0 | 42.8 |
| #4 | 2.5 | 13.0 | 99.3 | 41.3 | 15.9 | 58.7 |
| #8 | 1.2 | 4.0 | 82.8 | 33.2 | 8.0 | 66.8 |
| #16 | 0.9 | 2.3 | 63.6 | 25.4 | 7.8 | 74.6 |
| #30 | 0.8 | 2.0 | 45.4 | 18.3 | 7.2 | 81.7 |
| #50 | 0.7 | 1.8 | 18.8 | 7.9 | 10.4 | 92.1 |
| #100 | 0.6 | 1.7 | 4.0 | 2.0 | 5.8 | 98.0 |
| LBW | 0.6 | 1.3 | 0.3 | 0.6 | 1.5 | 99.4 |


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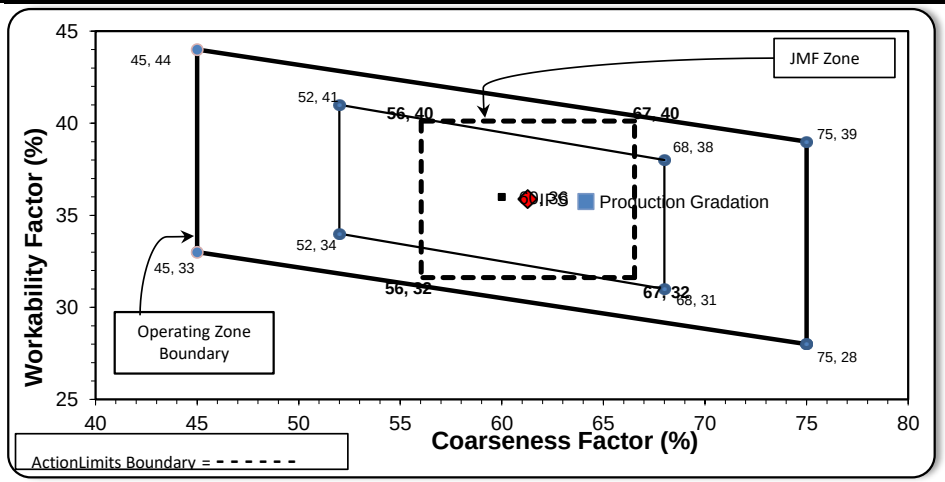
*Maximum % Retained must be above the 3/8" sieve.
*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
*% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom.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

Production Gradation ○ Batch Plant Gradations ◉ Aggregate Supplier Gradations

| Coarseness Factor: | 64 | Workability Factor: | 33 | Adjusted WF 35.7 |
|---|---|---|---|---|




Intial Production Sample (IPS)

| Coarseness Factor: | 61 |
|---|---|
| Workability Factor: | 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" | 89.2 | 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

Production Gradation Report

**PLANT #:** **P-12**

Contractor:

Sample Date: 7/27/20

Concrete Grade: **DM**

Dates Test Represents: 7/28/2020 through 8/3/2020

MDOT No.:

| Agg. Class | Pit # | Source | Weight (SSD) | ft³ | Specific Gravity | % Contribution |
|---|---|---|---|---|---|---|
| 6AA | 71-47 | Presque Isle | 1505 | 9.21 | 2.62 | 51.8 |
| 26A | 71-47 | Presque Isle | 250 | 1.53 | 2.62 | 8.6 |
| 2NS | 63-115 | Ray Rd | 1150 | 6.95 | 2.65 | 39.6 |
| | | **Total Wt** | **2905** | **17.69** | | 100.0 |

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

| 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" | 97.2 | 100.0 | 100.0 | 98.5 | 1.5 | 1.5 |
| 3/4" | 72.4 | 100.0 | 100.0 | 85.7 | 12.8 | 14.3 |
| 1/2" | 31.6 | 98.2 | 100.0 | 64.4 | 21.3 | 35.6 |
| 3/8" | 18.3 | 80.1 | 100.0 | 56.0 | 8.4 | 44.0 |
| #4 | 4.5 | 19.5 | 98.3 | 42.9 | 13.0 | 57.1 |
| #8 | 2.4 | 7.3 | 80.7 | 33.8 | 9.1 | 66.2 |
| #16 | 2.1 | 4.0 | 63.3 | 26.5 | 7.3 | 73.5 |
| #30 | 2.0 | 3.4 | 47.3 | 20.1 | 6.4 | 79.9 |
| #50 | 1.9 | 3.1 | 24.8 | 11.1 | 9.0 | 88.9 |
| #100 | 1.7 | 2.9 | 4.7 | 3.0 | 8.1 | 97.0 |
| LBW | 1.3 | 2.6 | 0.3 | 1.0 | 2.0 | 99.0 |


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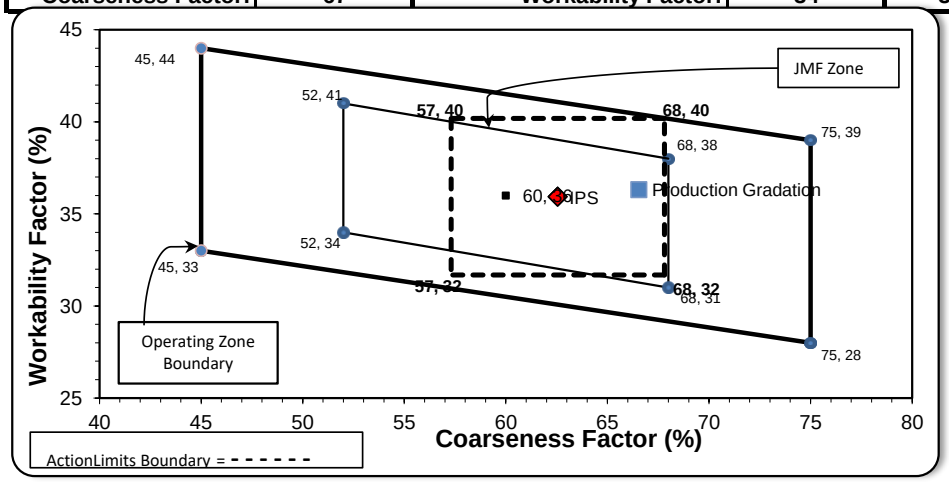
*Maximum % Retained must be above the 3/8" sieve.
*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
*% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom.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

Production Gradation ○ Batch Plant Gradations ◉ Aggregate Supplier Gradations

| Coarseness Factor: | 67 | Workability Factor: | 34 | Adjusted WF 36.3 |
|---|---|---|---|---|




Intial Production Sample (IPS)

| Coarseness Factor: | 63 |
|---|---|
| Workability Factor: | 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" | 89.0 | 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

Production Gradation Report

**PLANT #:** **P-20**

Contractor:

Sample Date: 7/27/20

Concrete Grade: **DM**

Dates Test Represents: 7/28/2020 through 8/3/2020

MDOT No.:

| Agg. Class | Pit # | Source | Weight (SSD) | ft³ | Specific Gravity | % Contribution |
|---|---|---|---|---|---|---|
| 6AA | 71-47 | Presque Isle | 1605 | 9.82 | 2.62 | 55.2 |
| 26A | 71-47 | Presque Isle | 200 | 1.22 | 2.62 | 6.9 |
| 2NS | 63-92 | Grange Hall | 1100 | 6.65 | 2.65 | 37.9 |
| | | **Total Wt** | **2905** | **17.69** | | 100.0 |

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

| 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" | 98.4 | 100.0 | 100.0 | 99.1 | 0.9 | 0.9 |
| 3/4" | 84.5 | 100.0 | 100.0 | 91.4 | 7.7 | 8.6 |
| 1/2" | 42.5 | 97.3 | 100.0 | 68.0 | 23.4 | 32.0 |
| 3/8" | 21.6 | 89.1 | 100.0 | 55.9 | 12.1 | 44.1 |
| #4 | 2.5 | 23.1 | 97.4 | 39.9 | 16.1 | 60.1 |
| #8 | 1.6 | 3.8 | 86.0 | 33.7 | 6.1 | 66.3 |
| #16 | 1.5 | 2.0 | 72.3 | 28.3 | 5.4 | 71.7 |
| #30 | 1.5 | 1.8 | 51.0 | 20.3 | 8.1 | 79.7 |
| #50 | 1.4 | 1.6 | 18.3 | 7.8 | 12.5 | 92.2 |
| #100 | 1.4 | 1.6 | 1.9 | 1.6 | 6.2 | 98.4 |
| LBW | 1.3 | 1.4 | 0.4 | 1.0 | 0.6 | 99.0 |


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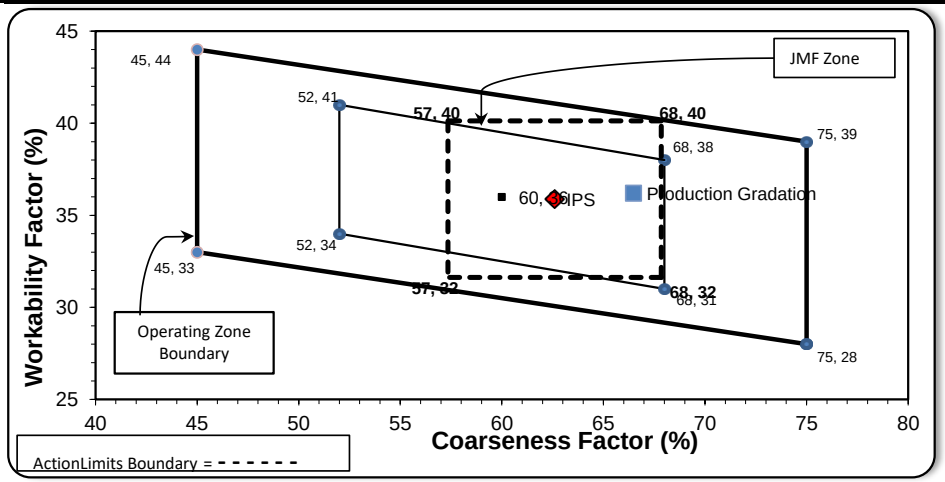
*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
*% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation ○ Batch Plant Gradations ◉ Aggregate Supplier Gradations

| Coarseness Factor: | 66 | Workability Factor: | 34 | Adjusted WF 36.2 |
|---|---|---|---|---|




Intial Production Sample (IPS)

| Coarseness Factor: | 63 |
|---|---|
| Workability Factor: | 36 |

| 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" | 89.2 | 10.8 | 10.8 |
| 1/2" | 68.4 | 20.8 | 31.6 |
| 3/8" | 59.9 | 8.6 | 40.1 |
| #4 | 43.0 | 16.9 | 57.0 |
| #8 | 35.9 | 7.1 | 64.1 |
| #16 | 29.0 | 6.8 | 71.0 |
| #30 | 21.3 | 7.7 | 78.7 |
| #50 | 9.9 | 11.4 | 90.1 |
| #100 | 2.4 | 7.5 | 97.6 |
| LBW | 1.2 | 1.2 | 98.8 |

PREPARED BY:
SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

Production Gradation Report

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

Contractor:

Sample Date: 7/27/20

Concrete Grade: **DM**

Dates Test Represents: 7/28/2020 through 8/3/2020

MDOT No.:

| Agg. Class | Pit # | Source | Weight (SSD) | ft³ | Specific Gravity | % Contribution |
|---|---|---|---|---|---|---|
| 6AA | 71-47 | Presque Isle | 1305 | 7.98 | 2.62 | 44.9 |
| 26A | 71-47 | Presque Isle | 450 | 2.75 | 2.62 | 15.5 |
| 2NS | 95-013 | Smelter Bay | 1150 | 6.95 | 2.65 | 39.6 |
| | | **Total Wt** | **2905** | **17.69** | | 100.0 |

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

| 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" | 97.6 | 100.0 | 100.0 | 98.9 | 1.1 | 1.1 |
| 3/4" | 76.0 | 100.0 | 100.0 | 89.2 | 9.7 | 10.8 |
| 1/2" | 31.0 | 98.2 | 100.0 | 68.7 | 20.5 | 31.3 |
| 3/8" | 12.4 | 80.1 | 100.0 | 57.6 | 11.2 | 42.4 |
| #4 | 1.9 | 19.5 | 96.6 | 42.1 | 15.5 | 57.9 |
| #8 | 1.5 | 7.3 | 81.9 | 34.2 | 7.9 | 65.8 |
| #16 | 1.4 | 4.0 | 65.5 | 27.2 | 7.0 | 72.8 |
| #30 | 1.4 | 3.4 | 45.0 | 19.0 | 8.2 | 81.0 |
| #50 | 1.3 | 3.1 | 19.1 | 8.6 | 10.3 | 91.4 |
| #100 | 1.2 | 2.9 | 3.8 | 2.5 | 6.1 | 97.5 |
| LBW | 0.9 | 2.6 | 0.4 | 1.0 | 1.5 | 99.0 |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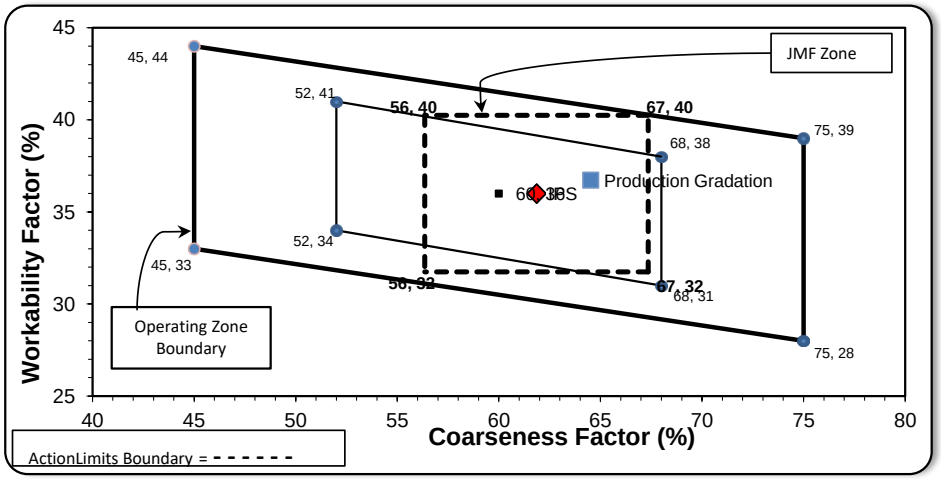
*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
*% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation ○ Batch Plant Gradations ◉ Aggregate Supplier Gradations

| Coarseness Factor: | 65 | Workability Factor: | 34 | Adjusted WF 36.7 |
|---|---|---|---|---|




Intial Production Sample (IPS)

| Coarseness Factor: | 62 |
|---|---|
| Workability Factor: | 36 |

| 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**

Contractor:

Sample Date: 7/27/20

Concrete Grade: **DM**

Dates Test Represents: 7/28/2020 through 8/3/2020

MDOT No.:

| Agg. Class | Pit # | Source | Weight (SSD) | ft³ | Specific Gravity | % Contribution |
|---|---|---|---|---|---|---|
| 6AA | 58-003 | Stoneco | 1500 | 8.94 | 2.69 | 50.8 |
| 26A | 58-003 | Stoneco | 355 | 2.11 | 2.69 | 12.0 |
| 2NS | 81-093 | Burmeister | 1100 | 6.65 | 2.65 | 37.2 |
| | | **Total Wt** | **2955** | **17.70** | | 100.0 |

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

| 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" | 86.1 | 100.0 | 100.0 | 92.9 | 7.1 | 7.1 |
| 1/2" | 41.4 | 99.1 | 100.0 | 70.1 | 22.8 | 29.9 |
| 3/8" | 18.7 | 85.0 | 100.0 | 56.9 | 13.2 | 43.1 |
| #4 | 2.5 | 13.0 | 98.0 | 39.3 | 17.6 | 60.7 |
| #8 | 1.2 | 4.0 | 89.4 | 34.4 | 4.9 | 65.6 |
| #16 | 0.9 | 2.3 | 63.2 | 24.3 | 10.1 | 75.7 |
| #30 | 0.8 | 2.0 | 41.6 | 16.1 | 8.1 | 83.9 |
| #50 | 0.7 | 1.8 | 14.7 | 6.0 | 10.1 | 94.0 |
| #100 | 0.6 | 1.7 | 2.5 | 1.4 | 4.6 | 98.6 |
| LBW | 0.6 | 1.3 | 0.7 | 0.7 | 0.7 | 99.3 |


**Superior Materials, LLC**
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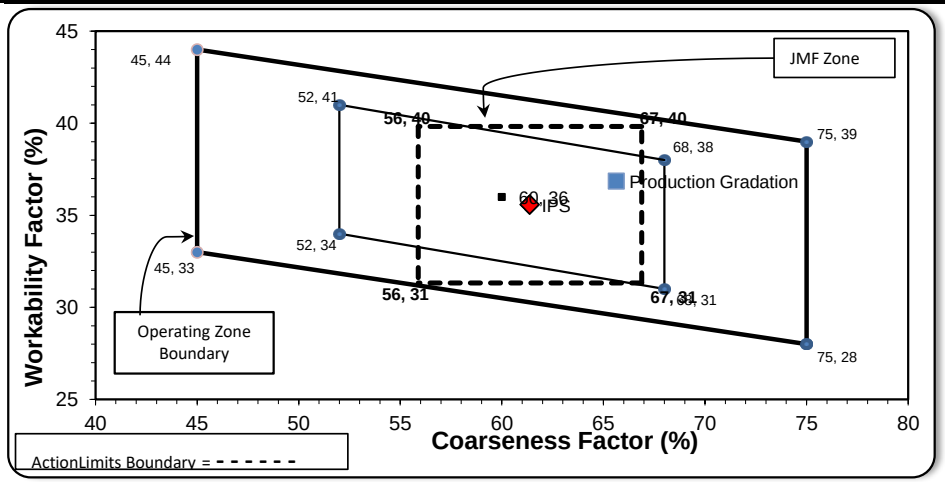
Farmington Hills, MI 48336


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

Production Gradation ○ Batch Plant Gradations ◉ Aggregate Supplier Gradations

| Coarseness Factor: | 66 | Workability Factor: | 34 | Adjusted WF 36.9 |
|---|---|---|---|---|




Intial Production Sample (IPS)

| Coarseness Factor: | 61 |
|---|---|
| Workability Factor: | 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**

Contractor:

Sample Date: 7/27/20

Concrete Grade: **DM**

Dates Test Represents: 7/28/2020 through 8/3/2020

MDOT No.:

| Agg. Class | Pit # | Source | Weight (SSD) | ft³ | 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 |
| | | **Total Wt** | **2905** | **17.69** | | 100.0 |

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

| 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" | 97.2 | 100.0 | 100.0 | 98.5 | 1.5 | 1.5 |
| 3/4" | 72.4 | 100.0 | 100.0 | 85.7 | 12.8 | 14.3 |
| 1/2" | 31.6 | 98.2 | 100.0 | 64.4 | 21.3 | 35.6 |
| 3/8" | 18.3 | 80.1 | 100.0 | 55.6 | 8.8 | 44.4 |
| #4 | 4.5 | 19.5 | 97.4 | 41.2 | 14.4 | 58.8 |
| #8 | 2.4 | 7.3 | 86.0 | 34.6 | 6.7 | 65.4 |
| #16 | 2.1 | 4.0 | 72.3 | 28.9 | 5.7 | 71.1 |
| #30 | 2.0 | 3.4 | 51.0 | 20.7 | 8.2 | 79.3 |
| #50 | 1.9 | 3.1 | 18.3 | 8.2 | 12.5 | 91.8 |
| #100 | 1.7 | 2.9 | 1.9 | 1.9 | 6.3 | 98.1 |
| LBW | 1.3 | 2.6 | 0.4 | 1.1 | 0.8 | 98.9 |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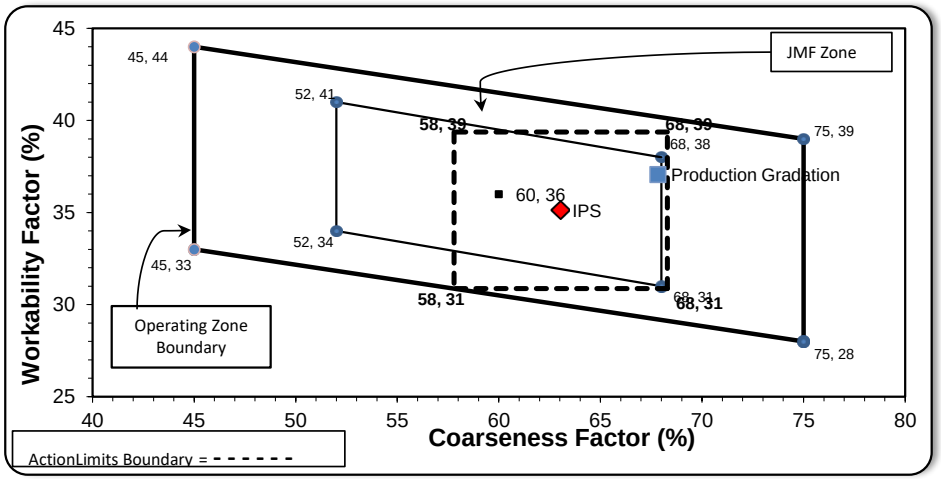
*Maximum % Retained must be above the 3/8" sieve.
*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
*% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation ○ Batch Plant Gradations ◉ Aggregate Supplier Gradations

| Coarseness Factor: | 68 | Workability Factor: | 35 | Adjusted WF 37.1 |
|---|---|---|---|---|




Intial Production Sample (IPS)

| Coarseness Factor: | 63 |
|---|---|
| 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" | 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 |

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SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

Production Gradation Report

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

Contractor:

Sample Date: 7/27/20

Concrete Grade: **DM**

Dates Test Represents: 7/28/2020 through 8/3/2020

MDOT No.:

| Agg. Class | Pit # | Source | Weight (SSD) | ft³ | Specific Gravity | % Contribution |
|---|---|---|---|---|---|---|
| 6AA | 71-47 | Presque Isle | 1605 | 9.82 | 2.62 | 55.2 |
| 26A | 71-47 | Presque Isle | 150 | 0.92 | 2.62 | 5.2 |
| 2NS | 44-051 | Krake Willis Rd | 1150 | 6.95 | 2.65 | 39.6 |
| | | **Total Wt** | **2905** | **17.69** | | 100.0 |

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

| 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" | 97.6 | 100.0 | 100.0 | 98.7 | 1.3 | 1.3 |
| 3/4" | 77.2 | 100.0 | 100.0 | 87.4 | 11.3 | 12.6 |
| 1/2" | 33.6 | 97.7 | 100.0 | 63.2 | 24.2 | 36.8 |
| 3/8" | 20.4 | 88.5 | 100.0 | 55.4 | 7.8 | 44.6 |
| #4 | 2.9 | 22.1 | 95.8 | 40.7 | 14.8 | 59.3 |
| #8 | 1.5 | 6.4 | 81.6 | 33.5 | 7.2 | 66.5 |
| #16 | 1.3 | 2.7 | 65.8 | 26.9 | 6.6 | 73.1 |
| #30 | 1.3 | 2.0 | 51.0 | 21.0 | 5.9 | 79.0 |
| #50 | 1.2 | 1.9 | 26.2 | 11.1 | 9.9 | 88.9 |
| #100 | 1.2 | 1.7 | 7.6 | 3.8 | 7.4 | 96.2 |
| LBW | 1.1 | 1.7 | 1.2 | 1.2 | 2.6 | 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.


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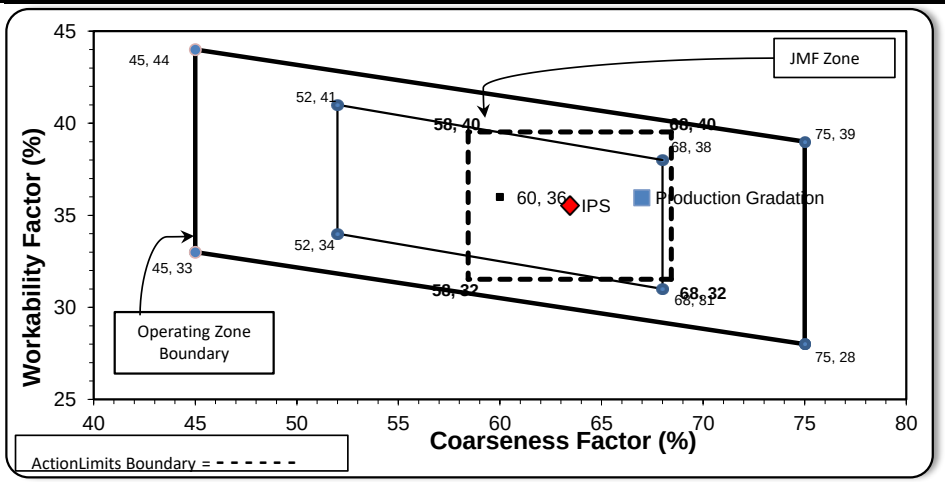
Production Gradation ○ Batch Plant Gradations ◉ Aggregate Supplier Gradations

| Coarseness Factor: | 67 | Workability Factor: | 33 | Adjusted WF 36.0 |
|---|---|---|---|---|




Intial Production Sample (IPS)

| Coarseness Factor: | 63 |
|---|---|
| Workability Factor: | 36 |

| 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 |

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SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

Production Gradation Report

**PLANT #:** **P-O2**

Contractor: _____

Sample Date: 7/27/20

Concrete Grade: **DM**

Dates Test Represents: 7/28/2020 through 8/3/2020

MDOT No.: _____

| Agg. Class | Pit # | Source | Weight (SSD) | ft³ | Specific Gravity | % Contribution |
|---|---|---|---|---|---|---|
| 6AA | 71-47 | Presque Isle | 1505 | 9.21 | 2.62 | 51.8 |
| 26A | 71-47 | Presque Isle | 250 | 1.53 | 2.62 | 8.6 |
| 2NS | 63-115 | Ray Rd | 1150 | 6.95 | 2.65 | 39.6 |
| | | **Total Wt** | **2905** | **17.69** | | 100.0 |

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

| 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" | 97.2 | 100.0 | 100.0 | 98.5 | 1.5 | 1.5 |
| 3/4" | 72.4 | 100.0 | 100.0 | 85.7 | 12.8 | 14.3 |
| 1/2" | 31.6 | 98.2 | 100.0 | 64.4 | 21.3 | 35.6 |
| 3/8" | 18.3 | 80.1 | 100.0 | 56.0 | 8.4 | 44.0 |
| #4 | 4.5 | 19.5 | 98.3 | 42.9 | 13.0 | 57.1 |
| #8 | 2.4 | 7.3 | 80.7 | 33.8 | 9.1 | 66.2 |
| #16 | 2.1 | 4.0 | 63.3 | 26.5 | 7.3 | 73.5 |
| #30 | 2.0 | 3.4 | 47.3 | 20.1 | 6.4 | 79.9 |
| #50 | 1.9 | 3.1 | 24.8 | 11.1 | 9.0 | 88.9 |
| #100 | 1.7 | 2.9 | 4.7 | 3.0 | 8.1 | 97.0 |
| LBW | 1.3 | 2.6 | 0.3 | 1.0 | 2.0 | 99.0 |


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*% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.

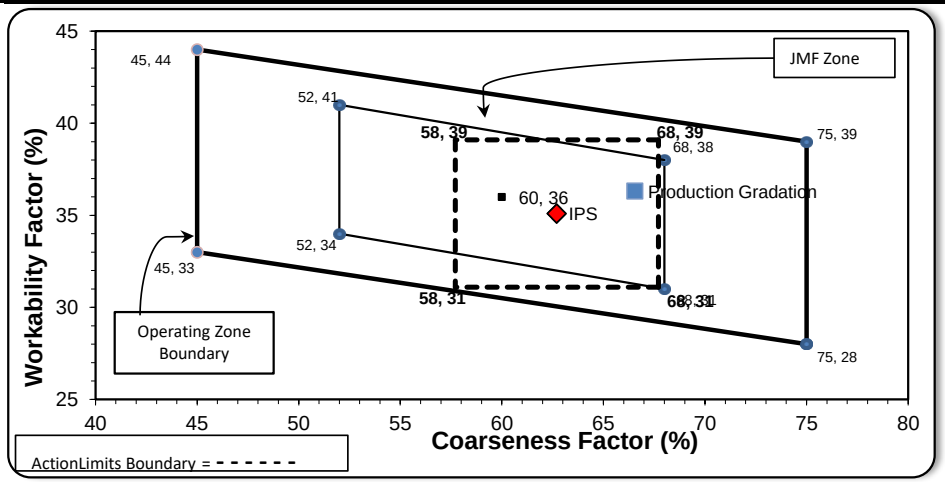
Production Gradation ○ Batch Plant Gradations ◉ Aggregate SupplierGradations

| Coarseness Factor: | 67 | Workability Factor: | 34 | Adjusted WF 36.3 |
|---|---|---|---|---|

Intial Production Sample (IPS)

| Coarseness Factor: | 63 |
|---|---|
| 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" | 95.1 | 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: