

Aggregate Optimization Chart

PLANT #: **P-101**

Sample Date: 1/18/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 1/19/2021 through 1/25/2021

MDOT No.: _____

| Agg. Class | Pit # | Source | Weight (SSD) | ft ³ | Specific Gravity | % Contribution |
|-----------------|--------|--------------|--------------|-----------------|------------------|----------------|
| CA | 71-47 | Presque Isle | 970 | 5.93 | 2.62 | 31.6 |
| IA | 71-47 | Presque Isle | 900 | 5.50 | 2.62 | 29.3 |
| 2NS | 75-051 | Mid-Michigan | 1200 | 7.23 | 2.66 | 39.1 |
| Total Wt | | | 3070 | 18.67 | | 100.0 |

<---- Verify this number is 100%



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

| Sieve | CA | IA | 2NS | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|-------|-------|-------|----------------------|------------|-----------------------|
| 2" | 100.0 | 100.0 | 100.0 | 100.0 | 0.0 | 0.0 |
| 1.5" | 98.7 | 100.0 | 100.0 | 99.6 | 0.4 | 0.4 |
| 1" | 44.6 | 100.0 | 100.0 | 82.5 | 17.1 | 17.5 |
| 3/4" | 13.6 | 99.3 | 100.0 | 72.5 | 10.0 | 27.5 |
| 1/2" | 2.9 | 84.1 | 100.0 | 64.7 | 7.8 | 35.3 |
| 3/8" | 2.0 | 60.8 | 100.0 | 57.5 | 7.1 | 42.5 |
| #4 | 1.6 | 11.6 | 98.0 | 42.2 | 15.3 | 57.8 |
| #8 | 1.4 | 3.7 | 81.9 | 33.5 | 8.7 | 66.5 |
| #16 | 1.4 | 2.4 | 65.8 | 26.9 | 6.7 | 73.1 |
| #30 | 1.3 | 2.2 | 47.0 | 19.4 | 7.4 | 80.6 |
| #50 | 1.2 | 2.1 | 20.6 | 9.0 | 10.4 | 91.0 |
| #100 | 1.1 | 2.0 | 2.9 | 2.1 | 7.0 | 97.9 |
| LBW | 1.0 | 1.8 | 0.4 | 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

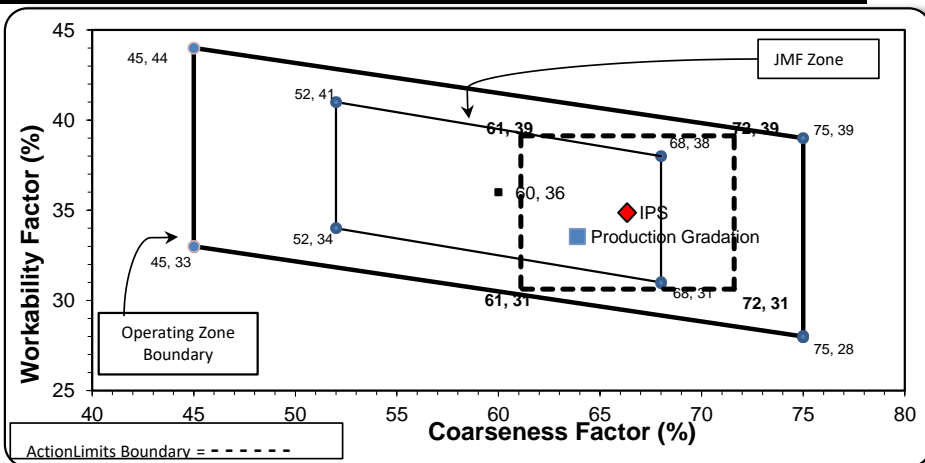
| | | | |
|---------------------------|-----------|----------------------------|-----------|
| Coarseness Factor: | 64 | Workability Factor: | 34 |
|---------------------------|-----------|----------------------------|-----------|

Initial Production Sample (IPS)

| | |
|---------------------------|-----------|
| Coarseness Factor: | 66 |
|---------------------------|-----------|

| | |
|----------------------------|-----------|
| Workability Factor: | 35 |
|----------------------------|-----------|

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



PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-32**

Sample Date: 1/18/21 Concrete Grade: **P1M**
 Dates Test Represents: 1/19/2021 through 1/25/2021

Contractor: _____

MDOT No.: _____

| Agg. Class | Pit # | Source | Weight (SSD) | ft ³ | Specific Gravity | % Contribution |
|-----------------|--------|--------------|--------------|-----------------|------------------|----------------|
| CA | 71-47 | Presque Isle | 1000 | 6.12 | 2.62 | 32.6 |
| IA | 71-47 | Presque Isle | 820 | 5.02 | 2.62 | 26.7 |
| 2NS | 95-013 | Smelter Bay | 1250 | 7.56 | 2.65 | 40.7 |
| Total Wt | | | 3070 | 18.69 | | 100.0 |

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



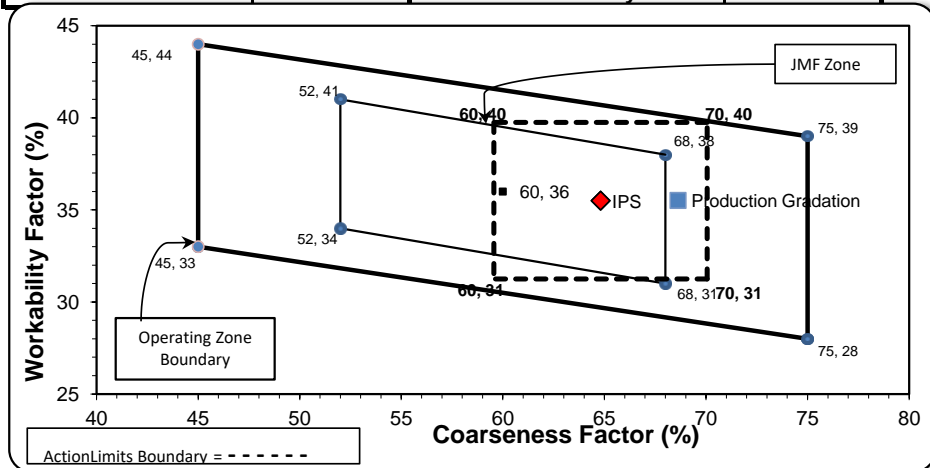
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

| Sieve | CA | IA | 2NS | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|-------|-------|-------|----------------------|------------|-----------------------|
| 2" | 100.0 | 100.0 | 100.0 | 100.0 | 0.0 | 0.0 |
| 1.5" | 95.8 | 100.0 | 100.0 | 98.6 | 1.4 | 1.4 |
| 1" | 35.1 | 100.0 | 100.0 | 78.9 | 19.8 | 21.1 |
| 3/4" | 12.9 | 97.5 | 100.0 | 71.0 | 7.9 | 29.0 |
| 1/2" | 4.4 | 74.0 | 100.0 | 61.9 | 9.0 | 38.1 |
| 3/8" | 3.1 | 52.5 | 100.0 | 55.7 | 6.2 | 44.3 |
| #4 | 2.2 | 11.4 | 96.3 | 43.0 | 12.8 | 57.0 |
| #8 | 2.1 | 4.5 | 82.6 | 35.5 | 7.5 | 64.5 |
| #16 | 2.0 | 3.3 | 66.4 | 28.6 | 6.9 | 71.4 |
| #30 | 1.9 | 3.0 | 43.2 | 19.0 | 9.6 | 81.0 |
| #50 | 1.8 | 2.9 | 18.1 | 8.7 | 10.3 | 91.3 |
| #100 | 1.7 | 2.7 | 4.3 | 3.0 | 5.7 | 97.0 |
| LBW | 1.3 | 2.2 | 1.5 | 1.6 | 1.4 | 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 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Coarseness Factor: **69** **Workability Factor:** **36**



Initial Production Sample (IPS)

| Coarseness Factor: | | 65 | |
|---------------------|----------------------|------------|-----------------------|
| Workability Factor: | | 36 | |
| Sieve | Cumulative % Passing | % Retained | Cumulative % Retained |
| 2" | 100.0 | 0.0 | 0.0 |
| 1.5" | 99.0 | 0.6 | 0.6 |
| 1" | 84.0 | 15.3 | 16.0 |
| 3/4" | 73.5 | 10.5 | 26.5 |
| 1/2" | 65.2 | 8.2 | 34.8 |
| 3/8" | 58.2 | 7.1 | 41.8 |
| #4 | 44.1 | 14.1 | 55.9 |
| #8 | 35.5 | 8.6 | 64.5 |
| #16 | 29.1 | 6.4 | 70.9 |
| #30 | 21.9 | 7.3 | 78.1 |
| #50 | 9.6 | 12.2 | 90.4 |
| #100 | 2.6 | 7.1 | 97.4 |
| LBW | 1.0 | 1.6 | 99.0 |

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-36**

Sample Date: 1/18/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 1/19/2021 through 1/25/2021

MDOT No.: _____

| Agg. Class | Pit # | Source | Weight (SSD) | ft ³ | Specific Gravity | % Contribution |
|-----------------|-------|--------------|--------------|-----------------|------------------|----------------|
| CA | 71-47 | Presque Isle | 1070 | 6.54 | 2.62 | 34.9 |
| IA | 71-47 | Presque Isle | 800 | 4.89 | 2.62 | 26.1 |
| 2NS | 63-92 | Grange Hall | 1200 | 7.26 | 2.65 | 39.1 |
| Total Wt | | | 3070 | 18.70 | | 100.0 |

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



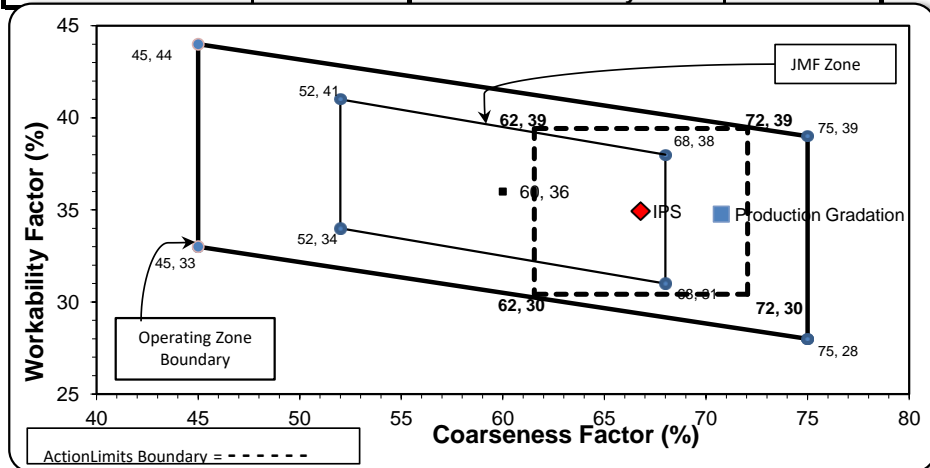
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

| Sieve | CA | IA | 2NS | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|-------|-------|-------|----------------------|------------|-----------------------|
| 2" | 100.0 | 100.0 | 100.0 | 100.0 | 0.0 | 0.0 |
| 1.5" | 95.8 | 100.0 | 100.0 | 98.5 | 1.5 | 1.5 |
| 1" | 35.1 | 100.0 | 100.0 | 77.4 | 21.2 | 22.6 |
| 3/4" | 12.9 | 97.5 | 100.0 | 69.0 | 8.4 | 31.0 |
| 1/2" | 4.4 | 74.0 | 100.0 | 59.9 | 9.1 | 40.1 |
| 3/8" | 3.1 | 52.5 | 100.0 | 53.8 | 6.1 | 46.2 |
| #4 | 2.2 | 11.4 | 97.3 | 41.8 | 12.1 | 58.2 |
| #8 | 2.1 | 4.5 | 84.1 | 34.8 | 7.0 | 65.2 |
| #16 | 2.0 | 3.3 | 69.2 | 28.6 | 6.2 | 71.4 |
| #30 | 1.9 | 3.0 | 48.6 | 20.4 | 8.2 | 79.6 |
| #50 | 1.8 | 2.9 | 19.5 | 9.0 | 11.4 | 91.0 |
| #100 | 1.7 | 2.7 | 2.4 | 2.2 | 6.8 | 97.8 |
| LBW | 1.3 | 2.2 | 0.4 | 1.2 | 1.1 | 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

| | | | |
|---------------------------|-----------|----------------------------|-----------|
| Coarseness Factor: | 71 | Workability Factor: | 35 |
|---------------------------|-----------|----------------------------|-----------|



Initial Production Sample (IPS)

| Coarseness Factor: | 67 | | |
|----------------------------|----------------------|------------|-----------------------|
| 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" | 85.0 | 15.0 | 15.0 |
| 3/4" | 72.1 | 12.9 | 27.9 |
| 1/2" | 64.5 | 7.6 | 35.5 |
| 3/8" | 56.5 | 8.0 | 43.5 |
| #4 | 42.7 | 13.8 | 57.3 |
| #8 | 34.9 | 7.8 | 65.1 |
| #16 | 29.0 | 5.9 | 71.0 |
| #30 | 21.0 | 8.0 | 79.0 |
| #50 | 8.2 | 12.8 | 91.8 |
| #100 | 1.6 | 6.5 | 98.4 |
| LBW | 0.7 | 0.9 | 99.3 |

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-39**

Sample Date: 1/18/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 1/19/2021 through 1/25/2021

MDOT No.: _____

| Agg. Class | Pit # | Source | Weight (SSD) | ft ³ | Specific Gravity | % Contribution |
|-----------------|-------|--------------|--------------|-----------------|------------------|----------------|
| CA | 71-47 | Presque Isle | 970 | 5.93 | 2.62 | 31.6 |
| IA | 71-47 | Presque Isle | 900 | 5.50 | 2.62 | 29.3 |
| 2NS | 63-92 | Grange Hall | 1200 | 7.26 | 2.65 | 39.1 |
| Total Wt | | | 3070 | 18.70 | | 100.0 |

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



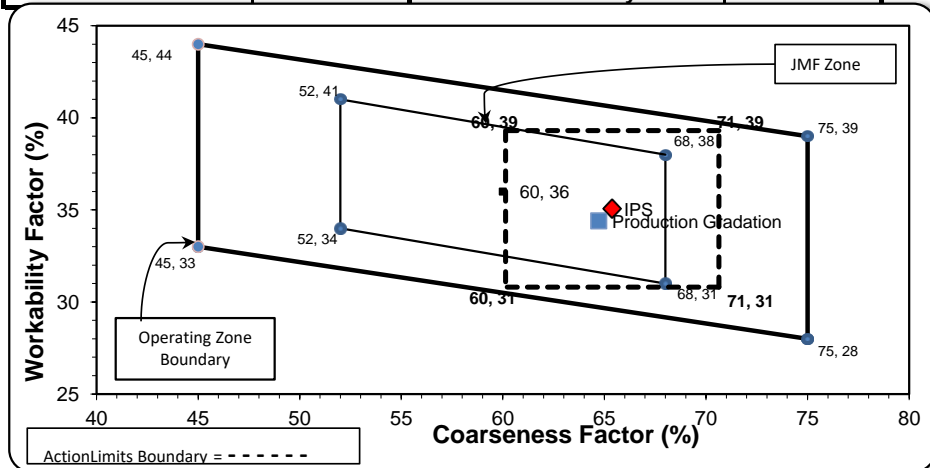
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

| Sieve | CA | IA | 2NS | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|-------|-------|-------|----------------------|------------|-----------------------|
| 2" | 100.0 | 100.0 | 100.0 | 100.0 | 0.0 | 0.0 |
| 1.5" | 98.7 | 100.0 | 100.0 | 99.6 | 0.4 | 0.4 |
| 1" | 44.6 | 100.0 | 100.0 | 82.5 | 17.1 | 17.5 |
| 3/4" | 13.6 | 99.3 | 100.0 | 72.5 | 10.0 | 27.5 |
| 1/2" | 2.9 | 84.1 | 100.0 | 64.7 | 7.8 | 35.3 |
| 3/8" | 2.0 | 60.8 | 100.0 | 57.5 | 7.1 | 42.5 |
| #4 | 1.6 | 11.6 | 97.3 | 41.9 | 15.6 | 58.1 |
| #8 | 1.4 | 3.7 | 84.1 | 34.4 | 7.5 | 65.6 |
| #16 | 1.4 | 2.4 | 69.2 | 28.2 | 6.2 | 71.8 |
| #30 | 1.3 | 2.2 | 48.6 | 20.1 | 8.1 | 79.9 |
| #50 | 1.2 | 2.1 | 19.5 | 8.6 | 11.4 | 91.4 |
| #100 | 1.1 | 2.0 | 2.4 | 1.9 | 6.7 | 98.1 |
| LBW | 1.0 | 1.8 | 0.4 | 1.0 | 0.9 | 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

| | | | |
|---------------------------|-----------|----------------------------|-----------|
| Coarseness Factor: | 65 | Workability Factor: | 34 |
|---------------------------|-----------|----------------------------|-----------|



Initial Production Sample (IPS)

| Coarseness Factor: | 65 | | |
|----------------------------|----------------------|------------|-----------------------|
| Workability Factor: | 35 | | |
| Sieve | Cumulative % Passing | % Retained | Cumulative % Retained |
| 2" | 100.0 | 0.0 | 0.0 |
| 1.5" | 99.6 | 0.4 | 0.4 |
| 1" | 83.9 | 15.7 | 16.1 |
| 3/4" | 74.1 | 9.8 | 25.9 |
| 1/2" | 64.3 | 9.7 | 35.7 |
| 3/8" | 57.5 | 6.8 | 42.5 |
| #4 | 44.5 | 13.1 | 55.5 |
| #8 | 35.1 | 9.4 | 64.9 |
| #16 | 27.9 | 7.2 | 72.1 |
| #30 | 21.7 | 6.2 | 78.3 |
| #50 | 12.6 | 9.1 | 87.4 |
| #100 | 3.5 | 9.1 | 96.5 |
| LBW | 1.2 | 2.4 | 98.8 |

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-02**

Sample Date: 1/18/21 Concrete Grade: **P1M**
 Dates Test Represents: 1/19/2021 through 1/25/2021

Contractor: _____

MDOT No.: _____

| Agg. Class | Pit # | Source | Weight (SSD) | ft ³ | Specific Gravity | % Contribution |
|-----------------|--------|--------------|--------------|-----------------|------------------|----------------|
| CA | 71-47 | Presque Isle | 1000 | 6.12 | 2.62 | 32.6 |
| IA | 71-47 | Presque Isle | 820 | 5.02 | 2.62 | 26.7 |
| 2NS | 63-115 | Ray Rd | 1250 | 7.56 | 2.65 | 40.7 |
| Total Wt | | | 3070 | 18.69 | | 100.0 |

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



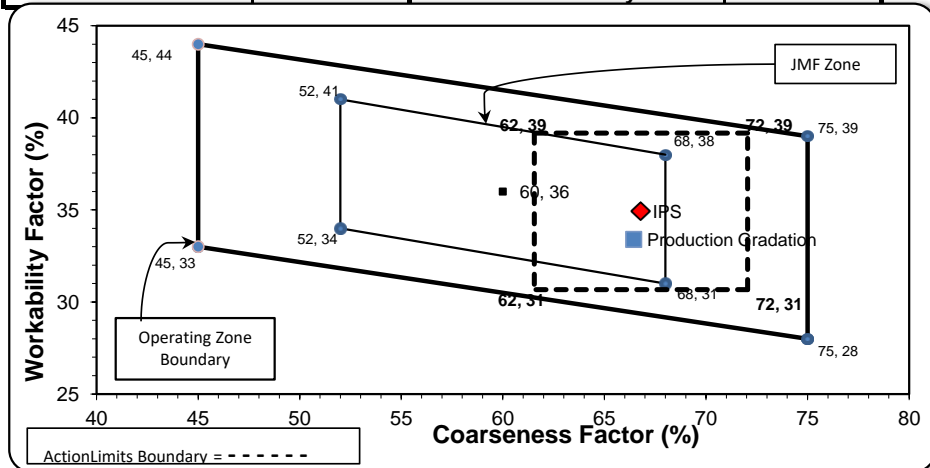
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

| Sieve | CA | IA | 2NS | Cumulative % Passing | % Retained | Cumulative % Retained |
|-------|-------|-------|-------|----------------------|------------|-----------------------|
| 2" | 100.0 | 100.0 | 100.0 | 100.0 | 0.0 | 0.0 |
| 1.5" | 95.8 | 100.0 | 100.0 | 98.6 | 1.4 | 1.4 |
| 1" | 35.1 | 100.0 | 100.0 | 78.9 | 19.8 | 21.1 |
| 3/4" | 12.9 | 97.5 | 100.0 | 71.0 | 7.9 | 29.0 |
| 1/2" | 4.4 | 74.0 | 100.0 | 61.9 | 9.0 | 38.1 |
| 3/8" | 3.1 | 52.5 | 100.0 | 55.7 | 6.2 | 44.3 |
| #4 | 2.2 | 11.4 | 96.4 | 43.0 | 12.7 | 57.0 |
| #8 | 2.1 | 4.5 | 77.4 | 33.4 | 9.6 | 66.6 |
| #16 | 2.0 | 3.3 | 60.8 | 26.3 | 7.1 | 73.7 |
| #30 | 1.9 | 3.0 | 45.3 | 19.9 | 6.4 | 80.1 |
| #50 | 1.8 | 2.9 | 21.0 | 9.9 | 10.0 | 90.1 |
| #100 | 1.7 | 2.7 | 3.4 | 2.7 | 7.3 | 97.3 |
| LBW | 1.3 | 2.2 | 0.3 | 1.1 | 1.5 | 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

Coarseness Factor: **66** **Workability Factor:** **33**



Initial Production Sample (IPS)

Coarseness Factor: **67**
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" | 85.0 | 15.0 | 15.0 |
| 3/4" | 72.3 | 12.7 | 27.7 |
| 1/2" | 64.5 | 7.8 | 35.5 |
| 3/8" | 56.5 | 8.0 | 43.5 |
| #4 | 42.7 | 13.8 | 57.3 |
| #8 | 34.9 | 7.8 | 65.1 |
| #16 | 29.0 | 5.9 | 71.0 |
| #30 | 21.0 | 8.0 | 79.0 |
| #50 | 8.2 | 12.8 | 91.8 |
| #100 | 1.6 | 6.5 | 98.4 |
| LBW | 0.7 | 0.9 | 99.3 |

PREPARED BY:
 SM, LLC Technical Service

Approved By: