

# Aggregate Optimization Chart

# Production Gradation Report

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

Sample Date: 12/11/23

Concrete Grade: **DM, 4500HP**

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

Dates Test Represents: 12/12/2023 through 12/18/2023

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1400	8.34	2.69	47.5
26A	58-003	Stoneco	400	2.38	2.69	13.6
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0
<b>Total Wt</b>			<b>2950</b>	<b>17.68</b>		<b>100.0</b>

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



**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"	82.6	100.0	100.0	91.7	8.3	8.3
1/2"	39.9	98.5	100.0	71.3	20.5	28.7
3/8"	14.9	86.7	100.0	57.8	13.5	42.2
#4	2.7	13.3	98.8	41.6	16.2	58.4
#8	1.6	4.2	86.6	35.1	6.5	64.9
#16	1.5	2.7	67.7	27.5	7.6	72.5
#30	1.4	2.2	44.0	18.1	9.4	81.9
#50	1.3	2.0	14.6	6.6	11.5	93.4
#100	1.2	1.8	1.8	1.5	5.1	98.5
LBW	0.9	1.7	0.4	0.8	0.7	99.2

\*Maximum % Retained must be above the 3/8" sieve.

\*Any two adjacent sieves must equal 10% except max.,

nom. max., #100 and #200 sieves.

\*% Retained must be at least 4% for each sieve except max.,

nom. max., #100 and #200 sieves.

\*% Retained must be at least 4% for the 3/4" sieve when

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

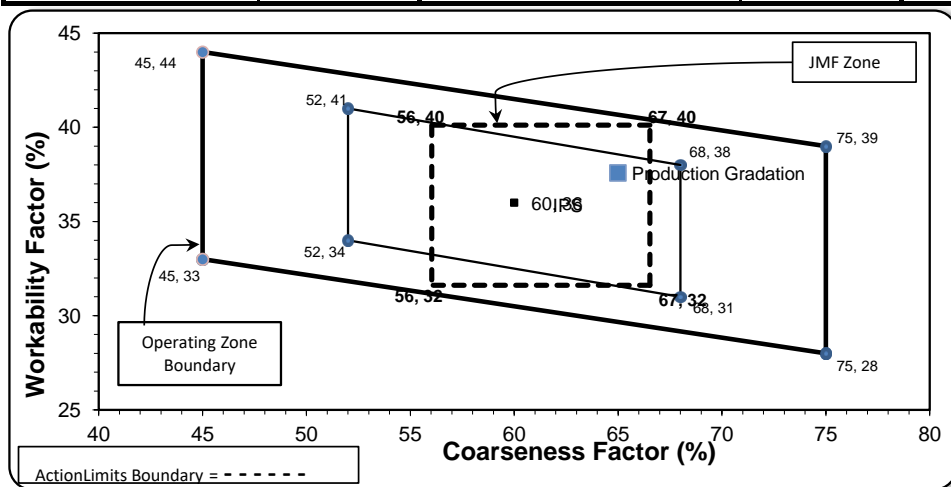
Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

<b>Coarseness Factor:</b>	<b>65</b>	<b>Workability Factor:</b>	<b>35</b>	<b>37.6</b>
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<b>Coarseness Factor:</b>	<b>61</b>
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<b>Workability Factor:</b>	<b>36</b>
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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-103**

Sample Date: 12/11/23

Concrete Grade: DM, 4500HP

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

Dates Test Represents: 12/12/2023 through 12/18/2023

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1400	8.34	2.69	47.5
26A	58-003	Stoneco	400	2.38	2.69	13.6
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0
<b>Total Wt</b>			<b>2950</b>	<b>17.68</b>		<b>100.0</b>

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



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 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"	82.6	100.0	100.0	91.7	8.3	8.3
1/2"	39.9	98.5	100.0	71.3	20.5	28.7
3/8"	14.9	86.7	100.0	57.8	13.5	42.2
#4	2.7	13.3	98.8	41.6	16.2	58.4
#8	1.6	4.2	86.6	35.1	6.5	64.9
#16	1.5	2.7	67.7	27.5	7.6	72.5
#30	1.4	2.2	44.0	18.1	9.4	81.9
#50	1.3	2.0	14.6	6.6	11.5	93.4
#100	1.2	1.8	1.8	1.5	5.1	98.5
LBW	0.9	1.7	0.4	0.8	0.7	99.2

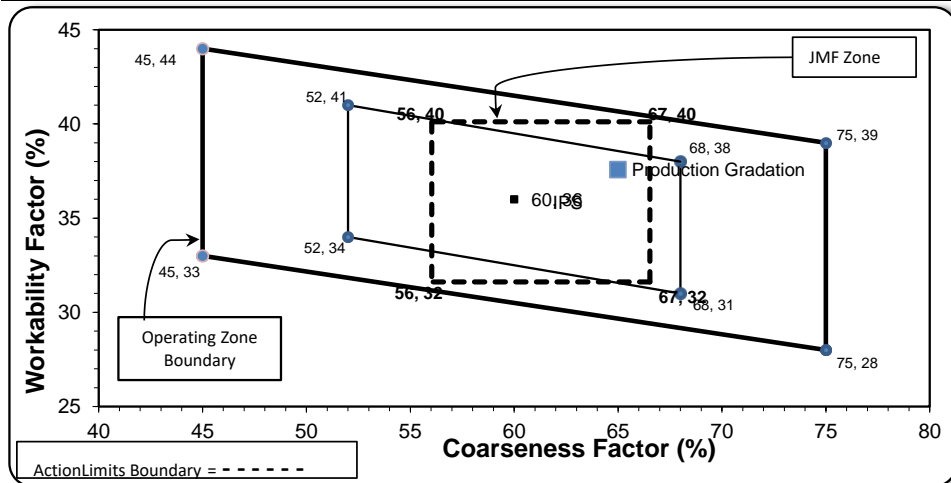
\*Maximum % Retained must be above the 3/8" sieve.  
 \*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.  
 \*% Retained must be at least 4% for the 3/4" sieve when a 1.5"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

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

<b>Coarseness Factor:</b>	<b>65</b>	<b>Workability Factor:</b>	<b>35</b>	<b>37.6</b>
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<b>Coarseness Factor:</b>	<b>61</b>
<b>Workability Factor:</b>	<b>36</b>

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



PREPARED BY:  
 SM, LLC Technical Service

Approved BY:

# Aggregate Optimization Chart

**PLANT #:** 12

Sample Date: 12/11/23

Concrete Grade: DM, 4500HP

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

Dates Test Represents: 12/12/2023 through 12/18/2023

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

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

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



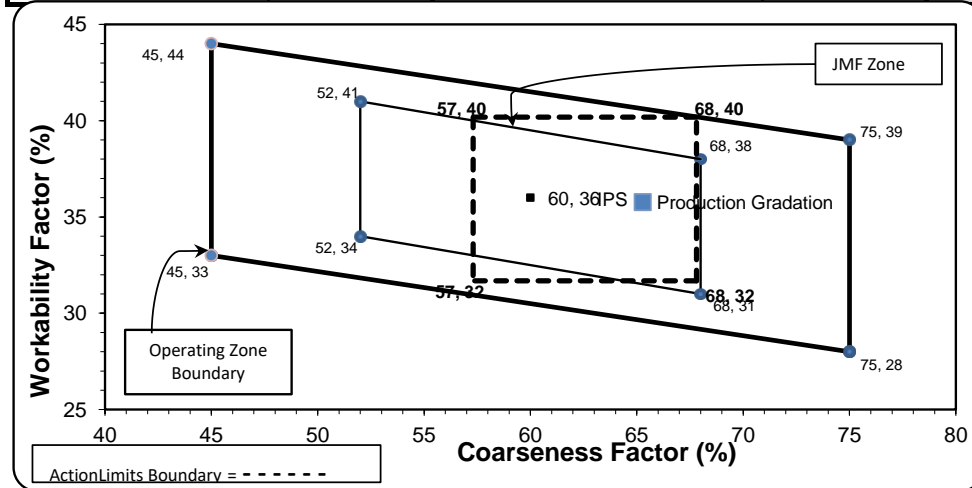
**Superior Materials, LLC**  
 30701 W. 10 Mile Rd.  
 Suite 500  
 Farmington Hills, MI 48336

Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	98.9	100.0	100.0	99.5	0.5	0.5
3/4"	72.8	100.0	100.0	86.4	13.0	13.6
1/2"	29.1	96.3	100.0	64.2	22.2	35.8
3/8"	15.8	85.4	100.0	56.4	7.8	43.6
#4	2.6	20.6	96.7	41.7	14.7	58.3
#8	1.4	4.0	81.2	33.3	8.5	66.7
#16	1.2	1.8	64.8	26.4	6.8	73.6
#30	1.1	1.5	48.8	20.0	6.4	80.0
#50	1.1	1.4	26.2	11.1	9.0	88.9
#100	1.0	1.3	5.6	2.9	8.2	97.1
LBW	0.9	1.2	1.1	1.0	1.8	99.0

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

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

<b>Coarseness Factor:</b>	<b>65</b>	<b>Workability Factor:</b>	<b>33</b>	<b>Adjusted WF</b>	<b>35.8</b>	<b>Coarseness Factor:</b>	<b>63</b>
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Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	99.3	0.7	0.7
3/4"	89.0	10.3	11.0
1/2"	70.3	18.7	29.7
3/8"	59.9	10.4	40.1
#4	41.9	18.0	58.1
#8	35.9	6.0	64.1
#16	27.8	8.2	72.2
#30	18.9	8.8	81.1
#50	6.3	12.6	93.7
#100	1.7	4.6	98.3
LBW	1.0	0.7	99.0

PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

**PLANT #:** p11

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

Sample Date: 12/11/23

Concrete Grade: DM, 4500HP

Dates Test Represents: 12/12/2023 through 12/18/2023

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	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	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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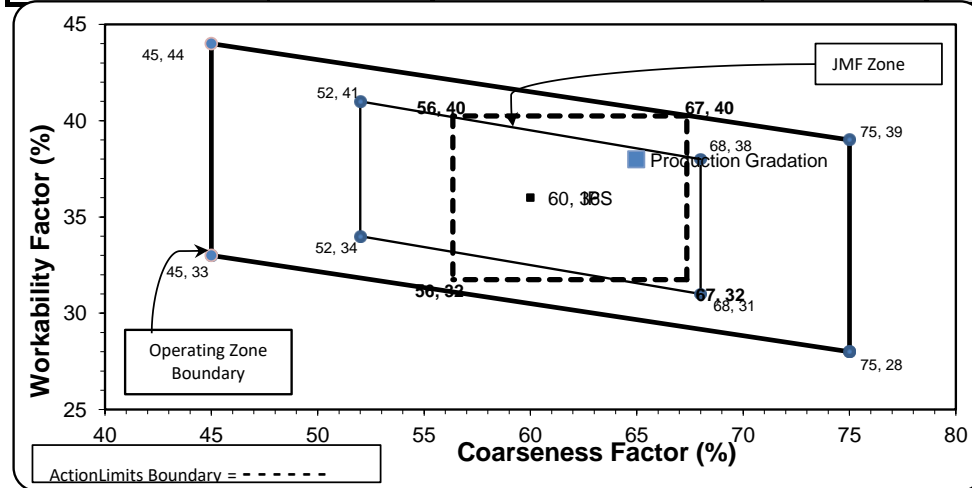
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	80.7	100.0	100.0	89.3	10.7	10.7
1/2"	44.9	96.3	100.0	69.4	20.0	30.6
3/8"	25.5	85.4	100.0	58.1	11.3	41.9
#4	4.3	20.6	96.3	41.6	16.5	58.4
#8	2.6	4.0	85.5	35.5	6.1	64.5
#16	2.3	1.8	70.7	29.4	6.1	70.6
#30	2.2	1.5	50.6	21.3	8.0	78.7
#50	2.1	1.4	23.7	10.6	10.7	89.4
#100	2.0	1.3	7.2	4.0	6.6	96.0
LBW	1.7	1.2	1.5	1.6	2.4	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 4% for the 3/4" sieve when a 1.5" max. size (nom. Max. 1.0") aggregate is used.

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

<b>Coarseness Factor:</b> 65	<b>Workability Factor:</b> 35	<b>38.0</b>	<b>Coarseness Factor:</b> 62
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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: 12/11/23

Concrete Grade: **DM, 4500HP**

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

Dates Test Represents: 12/12/2023 through 12/18/2023

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

Agg. Class	Pit #	Source	Weight (SSD)	ft <sup>3</sup>	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1400	8.34	2.69	47.5
26A	58-003	Stoneco	400	2.38	2.69	13.6
2NS	81-019	Pleasant Lake	1150	6.95	2.65	39.0
<b>Total Wt</b>			<b>2950</b>	<b>17.68</b>		<b>100.0</b>

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



**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"	82.6	100.0	100.0	91.7	8.3	8.3
1/2"	39.9	98.5	100.0	71.3	20.5	28.7
3/8"	14.9	86.7	100.0	57.8	13.5	42.2
#4	2.7	13.3	98.8	41.6	16.2	58.4
#8	1.6	4.2	86.6	35.1	6.5	64.9
#16	1.5	2.7	67.7	27.5	7.6	72.5
#30	1.4	2.2	44.0	18.1	9.4	81.9
#50	1.3	2.0	14.6	6.6	11.5	93.4
#100	1.2	1.8	1.8	1.5	5.1	98.5
LBW	0.9	1.7	0.4	0.8	0.7	99.2

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

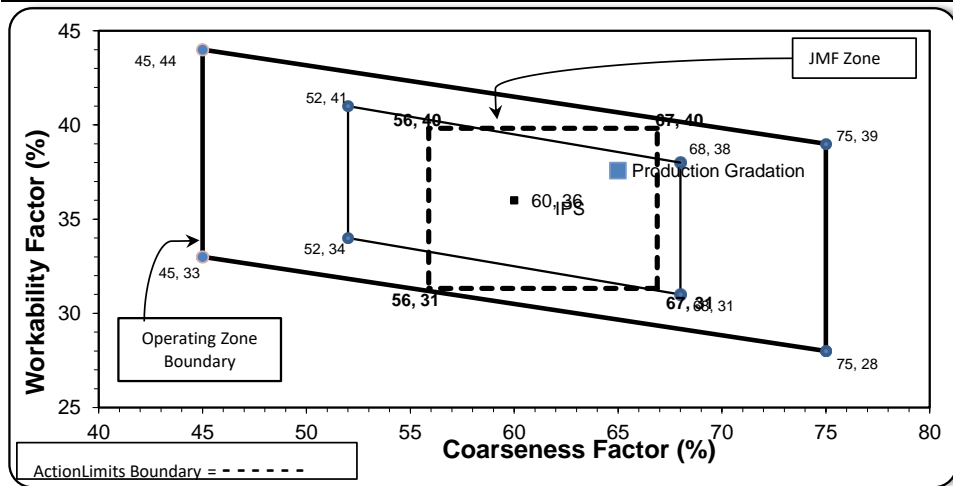
Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations  Adjusted WF Initial Production Sample (IPS)

<b>Coarseness Factor:</b>	<b>65</b>	<b>Workability Factor:</b>	<b>35</b>	<b>Adjusted WF</b>	<b>37.6</b>
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<b>Coarseness Factor:</b>	<b>61</b>
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<b>Workability Factor:</b>	<b>36</b>
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Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	100.0	0.0	0.0
1"	99.3	0.7	0.7
3/4"	89.1	10.2	10.9
1/2"	70.5	18.6	29.5
3/8"	60.5	10.0	39.5
#4	44.1	16.4	55.9
#8	35.6	8.5	64.4
#16	27.7	7.9	72.3
#30	20.6	7.1	79.4
#50	8.7	11.8	91.3
#100	1.6	7.1	98.4
LBW	1.1	0.6	98.9



PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

# Production Gradation Report

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

Sample Date: 12/11/23

Concrete Grade: **DM, 4500HP**

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

Dates Test Represents: 12/12/2023 through 12/18/2023

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

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

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



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

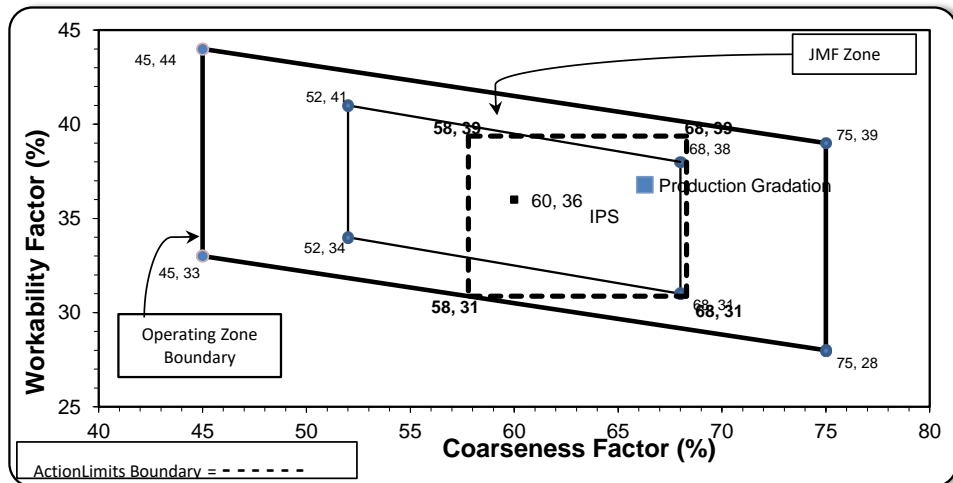
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	98.9	100.0	100.0	99.5	0.5	0.5
3/4"	72.8	100.0	100.0	86.4	13.0	13.6
1/2"	29.1	96.3	100.0	64.2	22.2	35.8
3/8"	15.8	85.4	100.0	56.4	7.8	43.6
#4	2.6	20.6	97.2	41.9	14.5	58.1
#8	1.4	4.0	83.8	34.3	7.6	65.7
#16	1.2	1.8	69.2	28.2	6.1	71.8
#30	1.1	1.5	50.8	20.8	7.4	79.2
#50	1.1	1.4	20.2	8.7	12.1	91.3
#100	1.0	1.3	2.6	1.7	7.0	98.3
LBW	0.9	1.2	0.5	0.8	0.9	99.2

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

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

<b>Coarseness Factor:</b>	<b>66</b>	<b>Workability Factor:</b>	<b>34</b>	<b>36.8</b>
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<b>Coarseness Factor:</b>	<b>63</b>
<b>Workability Factor:</b>	<b>35</b>



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

PREPARED BY:  
 SM, LLC Technical Service

Approved By:

# Aggregate Optimization Chart

# Production Gradation Report

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

Sample Date: 12/11/23

Concrete Grade: **DM, 4500HP**

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

Dates Test Represents: 12/12/2023 through 12/18/2023

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

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

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



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

Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	98.9	100.0	100.0	99.5	0.5	0.5
3/4"	72.8	100.0	100.0	86.4	13.0	13.6
1/2"	29.1	96.3	100.0	64.2	22.2	35.8
3/8"	15.8	85.4	100.0	56.4	7.8	43.6
#4	2.6	20.6	96.7	41.7	14.7	58.3
#8	1.4	4.0	81.2	33.3	8.5	66.7
#16	1.2	1.8	64.8	26.4	6.8	73.6
#30	1.1	1.5	48.8	20.0	6.4	80.0
#50	1.1	1.4	26.2	11.1	9.0	88.9
#100	1.0	1.3	5.6	2.9	8.2	97.1
LBW	0.9	1.2	1.1	1.0	1.8	99.0

\*Maximum % Retained must be above the 3/8" sieve.

\*Any two adjacent sieves must equal 10% except max.,

nom. max., #100 and #200 sieves.

\*% Retained must be at least 4% for each sieve except max.,

nom. max., #100 and #200 sieves.

\*% Retained must be at least 4% for the 3/4" sieve when

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

Production Gradation  Batch Plant Gradations  Aggregate Supplier Gradations

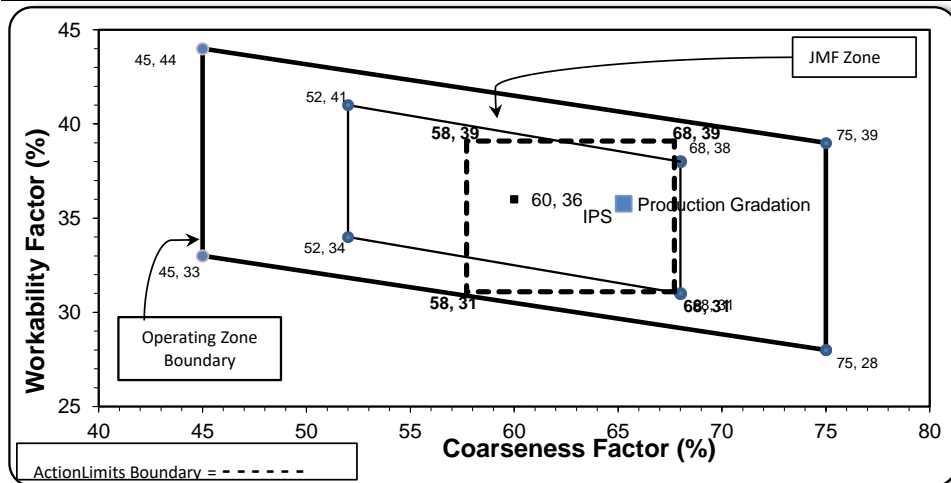
Adjusted WF Initial Production Sample (IPS)

<b>Coarseness Factor:</b>	<b>65</b>	<b>Workability Factor:</b>	<b>33</b>	<b>35.8</b>
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<b>Coarseness Factor:</b>	<b>63</b>
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<b>Workability Factor:</b>	<b>35</b>
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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: