

Aggregate Optimization Chart

PLANT #: **P-101**

Sample Date: 11/20/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 11/21/2023 through 11/27/2023

Contractor: _____

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	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"	94.0	100.0	100.0	97.9	2.1	2.1
1"	34.6	100.0	100.0	77.2	20.7	22.8
3/4"	8.8	98.5	100.0	67.8	9.4	32.2
1/2"	3.2	83.2	100.0	61.9	5.9	38.1
3/8"	3.0	63.7	100.0	56.7	5.2	43.3
#4	2.5	17.3	96.3	43.0	13.7	57.0
#8	2.4	4.5	82.4	34.2	8.8	65.8
#16	2.4	2.7	67.4	27.9	6.3	72.1
#30	2.3	2.3	50.4	21.1	6.8	78.9
#50	2.2	2.1	25.9	11.4	9.7	88.6
#100	2.0	1.9	6.6	3.8	7.7	96.2
LBW	1.6	1.7	0.8	1.3	2.5	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.

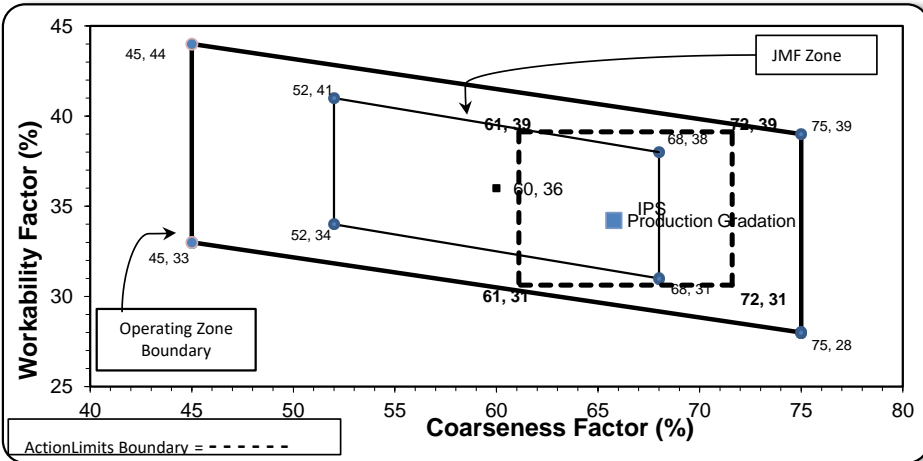
Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Coarseness Factor:	66	Workability Factor:	34
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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-102**

Sample Date: 11/20/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 11/21/2023 through 11/27/2023

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	58-003	Stoneco	1370	8.16	2.69	43.9
IA	58-003	Stoneco	550	3.28	2.69	17.6
2NS	81-019	Pleasant Lake	1200	7.26	2.65	38.5
Total Wt			3120	18.70		100.0

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



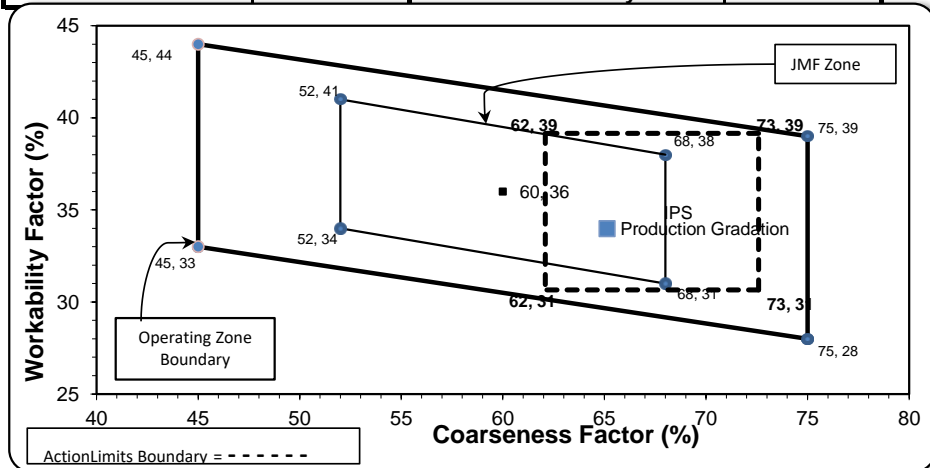
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 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	63.0	100.0	100.0	83.8	16.2	16.2
3/4"	39.3	100.0	100.0	73.3	10.4	26.7
1/2"	17.7	93.5	100.0	62.7	10.6	37.3
3/8"	11.4	76.8	100.0	57.0	5.7	43.0
#4	2.3	18.3	98.4	42.1	14.9	57.9
#8	1.4	4.7	84.6	34.0	8.1	66.0
#16	1.2	3.5	66.9	26.9	7.1	73.1
#30	1.1	2.6	44.8	18.2	8.7	81.8
#50	1.0	2.2	16.7	7.3	10.9	92.8
#100	1.0	2.0	2.7	1.8	5.4	98.2
LBW	0.8	1.8	0.5	0.9	1.0	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

Coarseness Factor: 65 **Workability Factor:** 34



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"	85.5	14.5	14.5
3/4"	73.4	12.1	26.6
1/2"	61.0	12.4	39.0
3/8"	56.2	4.8	43.8
#4	43.1	13.1	56.9
#8	34.9	8.2	65.1
#16	29.4	5.5	70.6
#30	21.6	7.8	78.4
#50	8.1	13.4	91.9
#100	2.2	5.9	97.8
LBW	1.4	0.8	98.6

PREPARED BY:
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Aggregate Optimization Chart

PLANT #: 12

Sample Date: 11/20/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 11/21/2023 through 11/27/2023

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	1020	6.24	2.62	33.2
IA	71-47	Presque Isle	850	5.20	2.62	27.7
2NS	63-115	Ray Rd	1200	7.26	2.65	39.1
Total Wt			3070	18.70		100.0

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



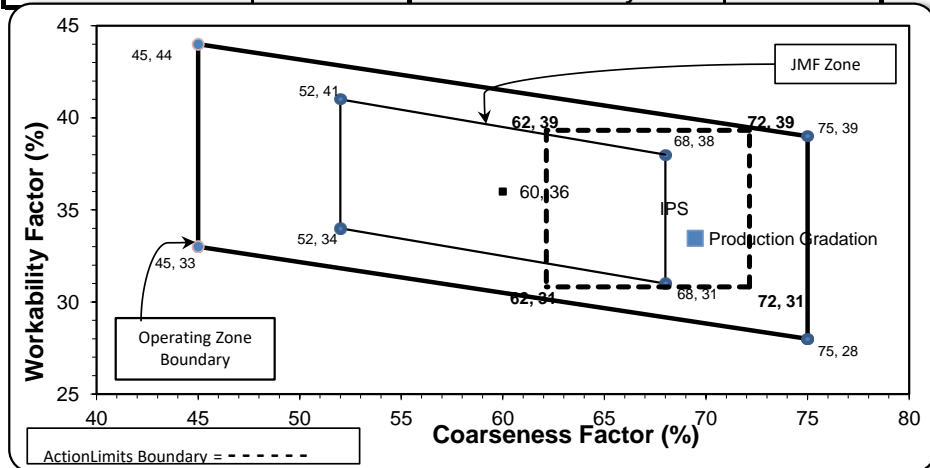
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 Suite 500
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.0	100.0	100.0	99.3	0.7	0.7
1"	40.7	100.0	100.0	80.3	19.0	19.7
3/4"	12.8	97.2	100.0	70.3	10.0	29.7
1/2"	4.4	74.4	100.0	61.1	9.1	38.9
3/8"	3.6	48.7	100.0	53.8	7.4	46.2
#4	3.0	7.0	96.7	40.7	13.0	59.3
#8	2.6	2.5	81.6	33.5	7.3	66.5
#16	2.5	2.0	65.7	27.1	6.4	72.9
#30	2.4	1.9	49.8	20.8	6.3	79.2
#50	2.3	1.8	25.6	11.3	9.5	88.7
#100	2.1	1.8	5.4	3.3	8.0	96.7
LBW	1.7	1.5	0.6	1.2	2.1	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: 69 **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"	99.6	0.4	0.4
1"	83.9	15.7	16.1
3/4"	74.0	9.8	26.0
1/2"	63.7	10.3	36.3
3/8"	56.4	7.3	43.6
#4	43.0	13.4	57.0
#8	35.1	7.9	64.9
#16	29.0	6.1	71.0
#30	20.9	8.0	79.1
#50	8.1	12.8	91.9
#100	1.6	6.5	98.4
LBW	0.9	0.8	99.1

PREPARED BY:
 SM, LLC Technical Service

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Aggregate Optimization Chart

PLANT #: **P-35**

Sample Date: 11/20/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 11/21/2023 through 11/27/2023

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	58-003	Stoneco	1370	8.16	2.69	43.9
IA	58-003	Stoneco	550	3.28	2.69	17.6
2NS	81-019	Pleasant Lake	1200	7.26	2.65	38.5
Total Wt			3120	18.70		100.0

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



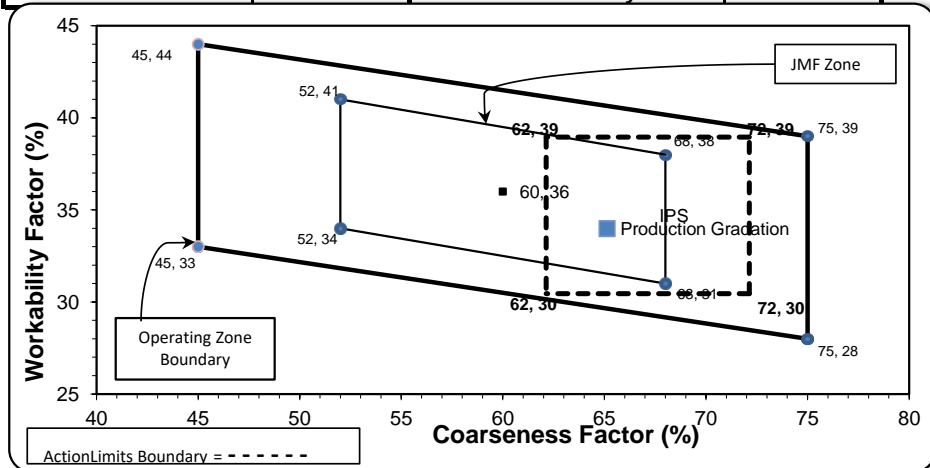
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	63.0	100.0	100.0	83.8	16.2	16.2
3/4"	39.3	100.0	100.0	73.3	10.4	26.7
1/2"	17.7	93.5	100.0	62.7	10.6	37.3
3/8"	11.4	76.8	100.0	57.0	5.7	43.0
#4	2.3	18.3	98.4	42.1	14.9	57.9
#8	1.4	4.7	84.6	34.0	8.1	66.0
#16	1.2	3.5	66.9	26.9	7.1	73.1
#30	1.1	2.6	44.8	18.2	8.7	81.8
#50	1.0	2.2	16.7	7.3	10.9	92.8
#100	1.0	2.0	2.7	1.8	5.4	98.2
LBW	0.8	1.8	0.5	0.9	1.0	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

Coarseness Factor: **65** **Workability Factor:** **34**



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"	86.9	13.1	13.1
3/4"	76.1	10.8	23.9
1/2"	63.7	12.4	36.3
3/8"	56.2	7.5	43.8
#4	43.2	13.0	56.8
#8	34.7	8.5	65.3
#16	27.5	7.2	72.5
#30	20.6	7.0	79.4
#50	9.0	11.6	91.0
#100	2.1	6.9	97.9
LBW	1.0	1.1	99.0

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-36**

Sample Date: 11/20/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 11/21/2023 through 11/27/2023

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	870	5.32	2.62	28.3
2NS	63-92	Grange Hall	1200	7.26	2.65	39.1
Total Wt			3070	18.70		100.0

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



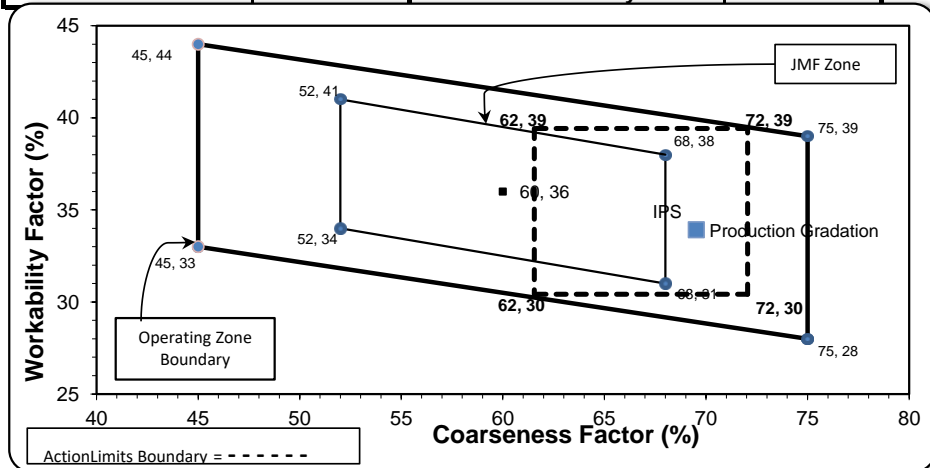
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 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.0	100.0	100.0	99.3	0.7	0.7
1"	40.7	100.0	100.0	80.7	18.7	19.3
3/4"	12.8	97.2	100.0	70.8	9.9	29.2
1/2"	4.4	74.4	100.0	61.6	9.2	38.4
3/8"	3.6	48.7	100.0	54.1	7.5	45.9
#4	3.0	7.0	97.3	41.0	13.1	59.0
#8	2.6	2.5	82.8	33.9	7.1	66.1
#16	2.5	2.0	67.4	27.7	6.2	72.3
#30	2.4	1.9	49.2	20.6	7.2	79.4
#50	2.3	1.8	20.9	9.4	11.1	90.6
#100	2.1	1.8	2.8	2.3	7.1	97.7
LBW	1.7	1.5	0.4	1.1	1.2	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:	70	Workability Factor:	34
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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: 11/20/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 11/21/2023 through 11/27/2023

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	1020	6.24	2.62	33.2
IA	71-47	Presque Isle	800	4.89	2.62	26.1
2NS	44-051	Krake Willis Rd	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

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



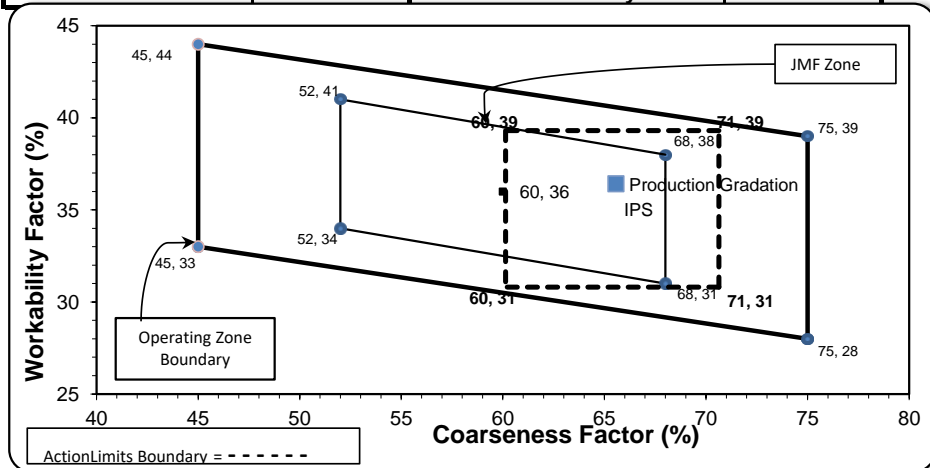
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	94.0	100.0	100.0	98.0	2.0	2.0
1"	34.6	100.0	100.0	78.3	19.7	21.7
3/4"	8.8	98.5	100.0	69.3	9.0	30.7
1/2"	3.2	83.2	100.0	63.5	5.8	36.5
3/8"	3.0	63.7	100.0	58.3	5.1	41.7
#4	2.5	17.3	98.8	45.6	12.7	54.4
#8	2.4	4.5	84.6	36.4	9.2	63.6
#16	2.4	2.7	67.0	28.8	7.6	71.2
#30	2.3	2.3	48.4	21.1	7.7	78.9
#50	2.2	2.1	21.6	10.1	11.0	89.9
#100	2.0	1.9	5.2	3.3	6.8	96.7
LBW	1.6	1.7	1.0	1.4	1.9	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

Coarseness Factor: 66 **Workability Factor:** 36



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: 11/20/23

Concrete Grade: **P1M, 3500HP**

Dates Test Represents: 11/21/2023 through 11/27/2023

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	1020	6.24	2.62	33.2
IA	71-47	Presque Isle	850	5.20	2.62	27.7
2NS	63-115	Ray Rd	1200	7.26	2.65	39.1
Total Wt			3070	18.70		100.0

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



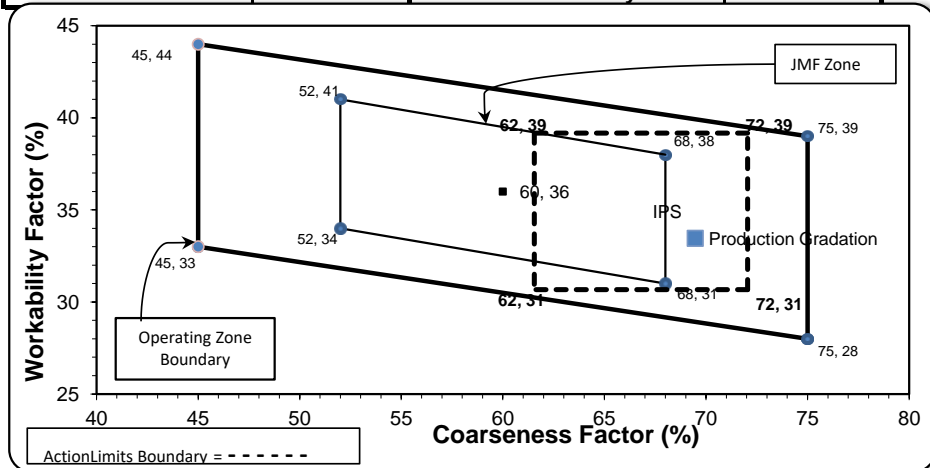
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.0	100.0	100.0	99.3	0.7	0.7
1"	40.7	100.0	100.0	80.3	19.0	19.7
3/4"	12.8	97.2	100.0	70.3	10.0	29.7
1/2"	4.4	74.4	100.0	61.1	9.1	38.9
3/8"	3.6	48.7	100.0	53.8	7.4	46.2
#4	3.0	7.0	96.7	40.7	13.0	59.3
#8	2.6	2.5	81.6	33.5	7.3	66.5
#16	2.5	2.0	65.7	27.1	6.4	72.9
#30	2.4	1.9	49.8	20.8	6.3	79.2
#50	2.3	1.8	25.6	11.3	9.5	88.7
#100	2.1	1.8	5.4	3.3	8.0	96.7
LBW	1.7	1.5	0.6	1.2	2.1	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: 69 **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: