

Aggregate Optimization Chart

PLANT #: **P-101**

Sample Date: 12/20/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 12/21/2021 through 12/27/2021

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	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"	98.6	100.0	100.0	99.5	0.5	0.5
1"	46.9	100.0	100.0	81.5	18.0	18.5
3/4"	13.5	98.2	100.0	69.4	12.1	30.6
1/2"	3.4	82.1	100.0	61.7	7.7	38.3
3/8"	2.5	59.1	100.0	55.4	6.3	44.6
#4	2.0	13.2	98.5	42.6	12.7	57.4
#8	1.8	4.9	83.3	34.5	8.2	65.5
#16	1.7	2.8	68.3	28.0	6.4	72.0
#30	1.7	2.4	53.3	22.1	6.0	77.9
#50	1.6	2.2	29.2	12.5	9.5	87.5
#100	1.5	2.1	7.3	3.9	8.6	96.1
LBW	1.3	1.8	0.6	1.2	2.8	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.

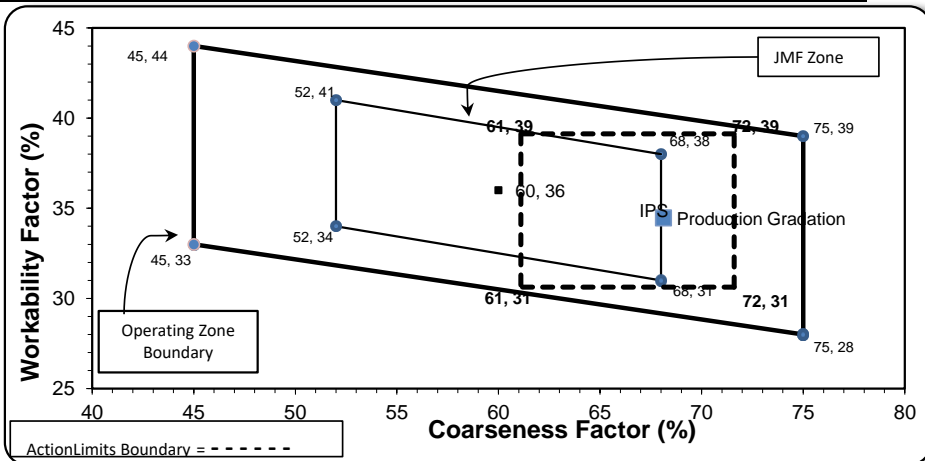
Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Coarseness Factor:	68	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: 12/20/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 12/21/2021 through 12/27/2021

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	58-003	Stoneco	1350	8.04	2.69	43.3
IA	58-003	Stoneco	620	3.69	2.69	19.9
2NS	63-114	Highland	1150	6.95	2.65	36.9
Total Wt			3120	18.69		100.0

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



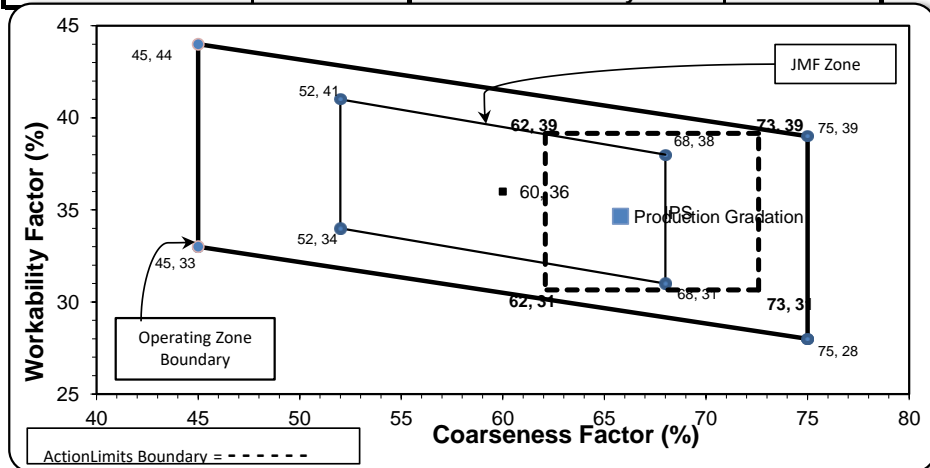
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 Suite 500
 Farmington Hills, MI 48336

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"	65.6	100.0	100.0	85.1	14.9	14.9
3/4"	35.4	100.0	100.0	72.0	13.1	28.0
1/2"	12.1	95.0	100.0	61.0	11.1	39.0
3/8"	7.9	84.2	100.0	57.0	4.0	43.0
#4	2.9	24.9	99.5	42.9	14.1	57.1
#8	2.1	7.9	87.3	34.7	8.2	65.3
#16	1.7	3.8	70.9	27.6	7.0	72.4
#30	1.6	2.8	50.3	19.8	7.8	80.2
#50	1.5	2.6	19.4	8.3	11.5	91.7
#100	1.3	2.5	2.5	2.0	6.3	98.0
LBW	1.2	2.2	0.5	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

Coarseness Factor: **66** **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"	85.5	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 #: P-12

Sample Date: 12/20/21

Concrete Grade: P1M

Contractor: _____

Dates Test Represents: 12/21/2021 through 12/27/2021

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	63-115	Ray Rd	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

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



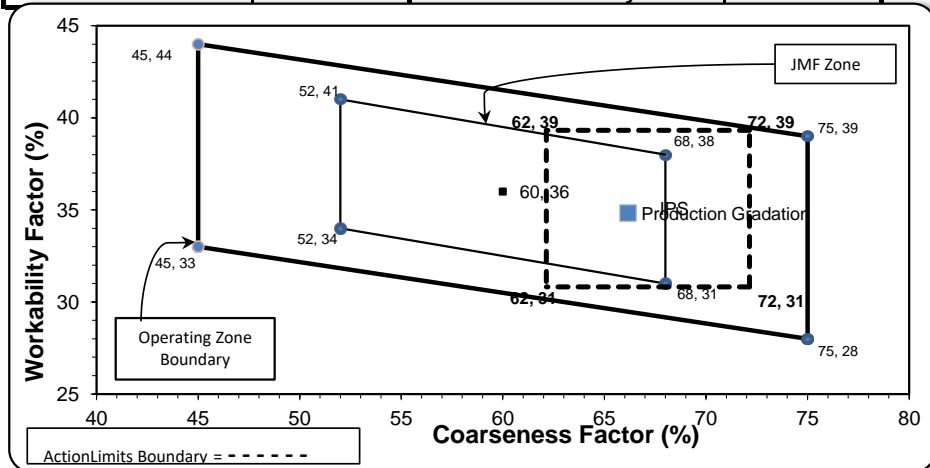
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	96.6	100.0	100.0	98.9	1.1	1.1
1"	40.1	100.0	100.0	80.1	18.8	19.9
3/4"	9.6	98.0	100.0	69.4	10.7	30.6
1/2"	2.7	81.6	100.0	62.9	6.6	37.1
3/8"	2.3	59.1	100.0	56.9	6.0	43.1
#4	1.9	17.2	97.0	44.6	12.3	55.4
#8	1.8	6.5	79.9	34.8	9.8	65.2
#16	1.7	3.8	63.1	27.2	7.6	72.8
#30	1.7	3.1	46.0	20.1	7.1	79.9
#50	1.6	2.7	22.9	10.6	9.5	89.4
#100	1.5	2.4	5.0	3.2	7.4	96.8
LBW	1.2	1.8	1.2	1.4	1.8	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:** 35



Intial 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

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 SM, LLC Technical Service

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Aggregate Optimization Chart

PLANT #: **P-32**

Sample Date: 12/20/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 12/21/2021 through 12/27/2021

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	950	5.81	2.62	30.9
IA	71-47	Presque Isle	870	5.32	2.62	28.3
2NS	95-013	Smelter Bay	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

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



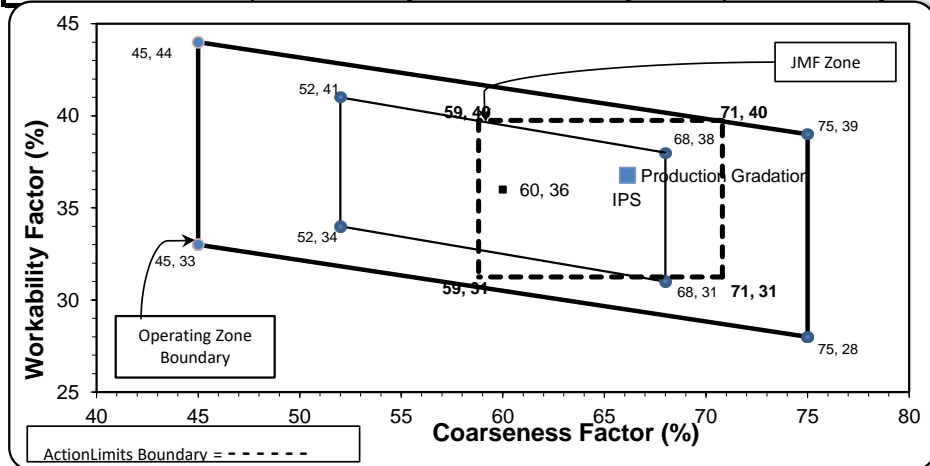
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	96.6	100.0	100.0	98.9	1.1	1.1
1"	40.1	100.0	100.0	81.5	17.5	18.5
3/4"	9.6	98.0	100.0	71.5	10.0	28.5
1/2"	2.7	81.6	100.0	64.7	6.8	35.3
3/8"	2.3	59.1	100.0	58.2	6.5	41.8
#4	1.9	17.2	96.4	44.7	13.5	55.3
#8	1.8	6.5	84.4	36.8	7.9	63.2
#16	1.7	3.8	69.2	29.8	7.0	70.2
#30	1.7	3.1	49.0	21.4	8.4	78.6
#50	1.6	2.7	23.6	10.9	10.5	89.1
#100	1.5	2.4	6.2	3.7	7.2	96.3
LBW	1.2	1.8	1.0	1.3	2.4	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:** **37**



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

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Aggregate Optimization Chart

PLANT #: **P-35**

Sample Date: 12/20/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 12/21/2021 through 12/27/2021

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	58-003	Stoneco	1380	8.22	2.69	44.2
IA	58-003	Stoneco	620	3.69	2.69	19.9
2NS	81-093	Burmeister	1120	6.77	2.65	35.9
Total Wt			3120	18.69		100.0

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



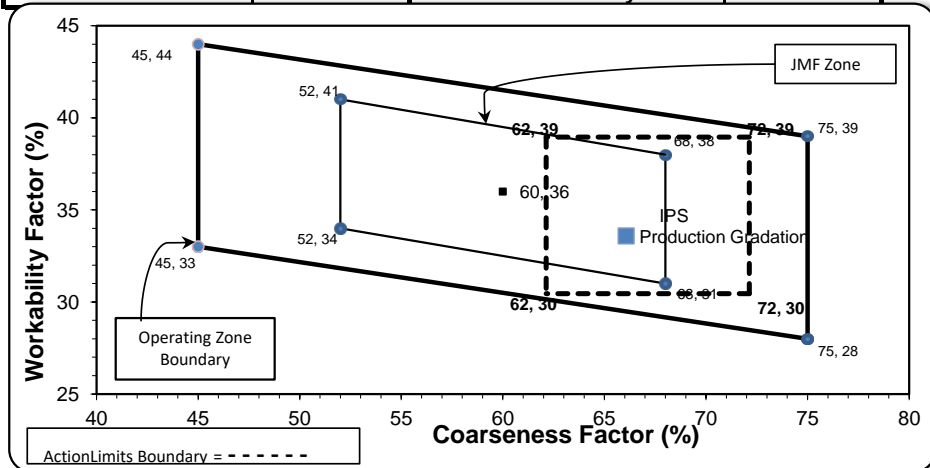
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	65.6	100.0	100.0	84.8	15.2	15.2
3/4"	35.4	100.0	100.0	71.4	13.4	28.6
1/2"	12.1	95.0	100.0	60.1	11.3	39.9
3/8"	7.9	84.2	100.0	56.1	4.0	43.9
#4	2.9	24.9	97.9	41.4	14.7	58.6
#8	2.1	7.9	86.6	33.6	7.8	66.4
#16	1.7	3.8	71.7	27.2	6.3	72.8
#30	1.6	2.8	54.4	20.8	6.5	79.2
#50	1.5	2.6	21.4	8.9	11.9	91.1
#100	1.3	2.5	5.1	2.9	6.0	97.1
LBW	1.2	2.2	1.7	1.6	1.3	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:	66	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"	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-39**

Sample Date: 12/20/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 12/21/2021 through 12/27/2021

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	750	4.59	2.62	24.4
2NS	63-92	Grange Hall	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

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



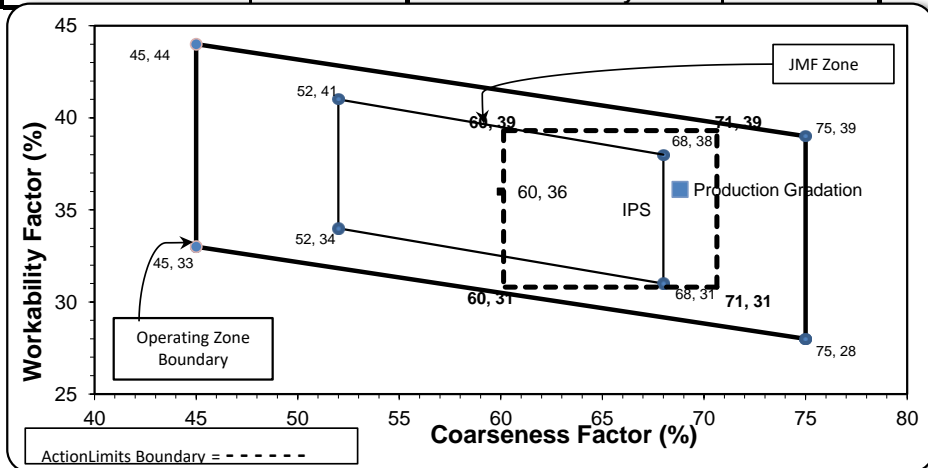
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.6	100.0	100.0	99.5	0.5	0.5
1"	46.9	100.0	100.0	81.5	18.0	18.5
3/4"	13.5	98.2	100.0	69.4	12.1	30.6
1/2"	3.4	82.1	100.0	62.0	7.5	38.0
3/8"	2.5	59.1	100.0	56.0	5.9	44.0
#4	2.0	13.2	97.8	43.7	12.3	56.3
#8	1.8	4.9	84.2	36.1	7.6	63.9
#16	1.7	2.8	69.1	29.4	6.7	70.6
#30	1.7	2.4	50.2	21.6	7.8	78.4
#50	1.6	2.2	23.4	10.6	11.0	89.4
#100	1.5	2.1	3.1	2.3	8.3	97.7
LBW	1.3	1.8	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:	69	Workability Factor:	36
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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: 12/20/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 12/21/2021 through 12/27/2021

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	850	5.20	2.62	27.7
2NS	63-115	Ray Rd	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

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



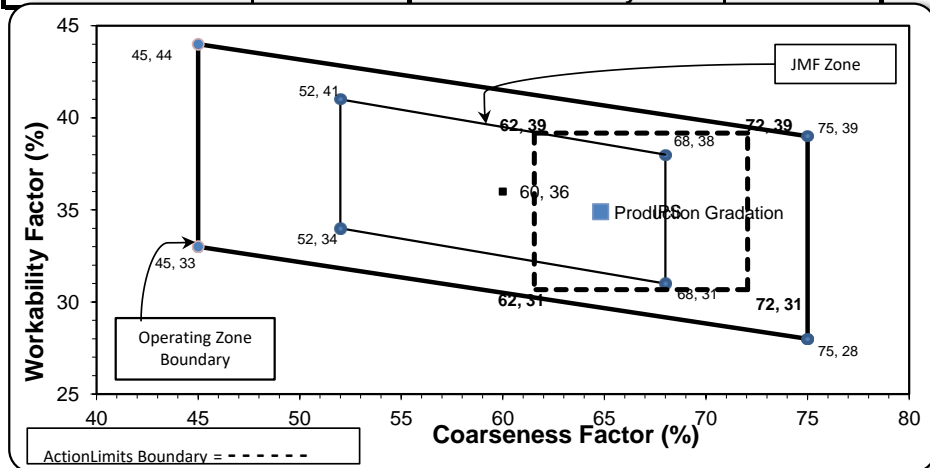
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	96.6	100.0	100.0	98.9	1.1	1.1
1"	40.1	100.0	100.0	81.1	17.9	18.9
3/4"	9.6	98.0	100.0	70.9	10.2	29.1
1/2"	2.7	81.6	100.0	64.2	6.7	35.8
3/8"	2.3	59.1	100.0	57.8	6.4	42.2
#4	1.9	17.2	97.0	44.9	12.9	55.1
#8	1.8	6.5	79.9	34.9	10.0	65.1
#16	1.7	3.8	63.1	27.3	7.6	72.7
#30	1.7	3.1	46.0	20.1	7.2	79.9
#50	1.6	2.7	22.9	10.6	9.5	89.4
#100	1.5	2.4	5.0	3.2	7.4	96.8
LBW	1.2	1.8	1.2	1.4	1.8	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: **65** **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"	72.3	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: