

Aggregate Optimization Chart

PLANT #: **P-101**

Sample Date: 7/6/20 Concrete Grade: **P1M**
 Dates Test Represents: 7/7/2020 through 7/13/2020

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	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"	100.0	100.0	100.0	100.0	0.0	0.0
1"	42.9	100.0	100.0	81.0	19.0	19.0
3/4"	15.0	99.0	100.0	71.5	9.5	28.5
1/2"	4.9	81.2	100.0	63.2	8.3	36.8
3/8"	2.8	54.0	100.0	55.0	8.2	45.0
#4	2.2	10.7	98.3	42.1	12.9	57.9
#8	2.0	4.2	82.2	34.0	8.2	66.0
#16	2.0	2.8	66.3	27.4	6.6	72.6
#30	1.9	2.5	50.0	20.9	6.5	79.1
#50	1.9	2.4	26.5	11.7	9.2	88.3
#100	1.8	2.3	6.8	3.9	7.8	96.1
LBW	1.7	2.1	1.0	1.5	2.4	98.5

*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

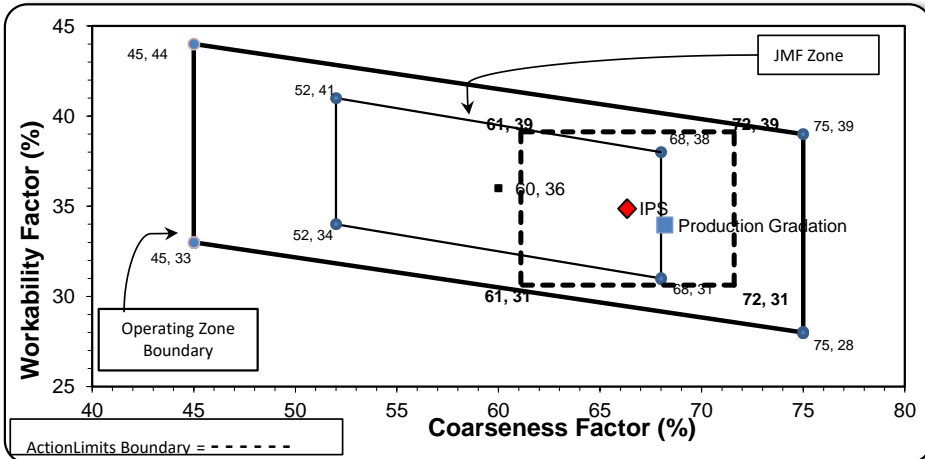
Coarseness Factor: **68** **Workability Factor:** **34**

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: 7/6/20

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 7/7/2020 through 7/13/2020

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	58-003	Stoneco	1320	7.86	2.69	42.3
IA	58-003	Stoneco	600	3.57	2.69	19.2
2NS	63-114	Highland	1200	7.26	2.65	38.5
Total Wt			3120	18.70		100.0

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



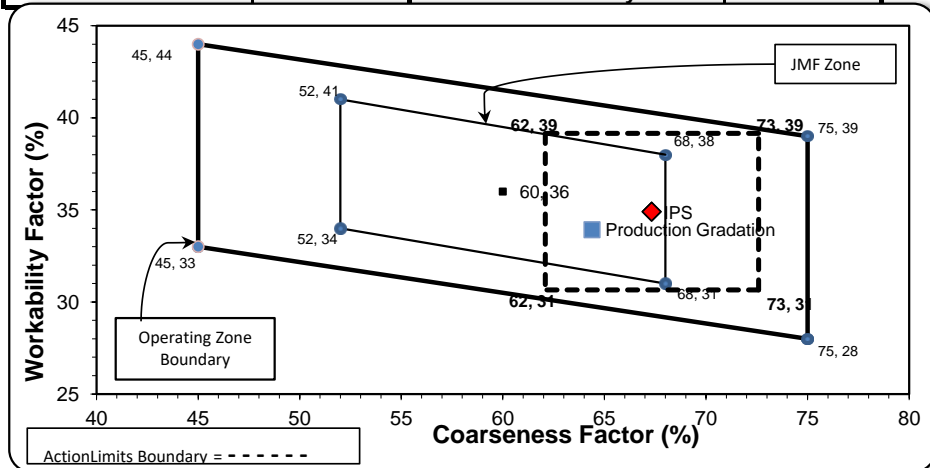
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 Suite 500
 Farmington Hills, MI 48336

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"	66.6	100.0	100.0	85.9	14.1	14.1
3/4"	41.8	100.0	100.0	75.4	10.5	24.6
1/2"	15.3	87.9	100.0	61.8	13.5	38.2
3/8"	8.8	79.4	100.0	57.5	4.4	42.5
#4	3.1	25.8	99.3	44.5	13.0	55.5
#8	2.1	5.8	83.0	33.9	10.5	66.1
#16	1.7	1.7	64.1	25.7	8.2	74.3
#30	1.4	1.2	47.0	18.9	6.8	81.1
#50	1.3	1.0	21.5	9.0	9.9	91.0
#100	1.2	0.9	4.3	2.3	6.7	97.7
LBW	1.1	0.7	0.3	0.7	1.6	99.3

*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
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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"	85.5	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:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-12**

Sample Date: 7/6/20

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 7/7/2020 through 7/13/2020

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	850	5.20	2.62	27.7
IA	71-47	Presque Isle	970	5.93	2.62	31.6
2NS	63-115	Ray Rd	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

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



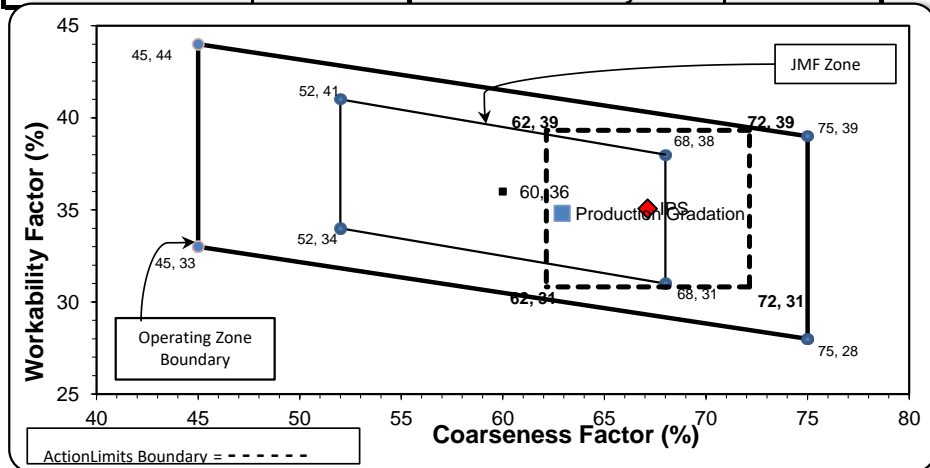
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.8	100.0	100.0	99.4	0.6	0.6
1"	45.2	100.0	100.0	84.8	14.6	15.2
3/4"	11.4	98.6	100.0	75.0	9.8	25.0
1/2"	3.1	79.1	100.0	66.6	8.5	33.4
3/8"	2.2	55.9	100.0	59.0	7.6	41.0
#4	1.9	13.4	98.1	44.7	14.3	55.3
#8	1.8	5.0	80.4	34.8	9.9	65.2
#16	1.7	3.4	63.3	27.3	7.5	72.7
#30	1.7	3.0	47.2	20.6	6.7	79.4
#50	1.6	2.7	22.6	10.5	10.1	89.5
#100	1.6	2.6	4.4	3.1	7.4	96.9
LBW	1.3	2.2	0.7	1.3	1.7	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:	63	Workability Factor:	35
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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"	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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Aggregate Optimization Chart

PLANT #: **P-32**

Sample Date: 7/6/20

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 7/7/2020 through 7/13/2020

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%



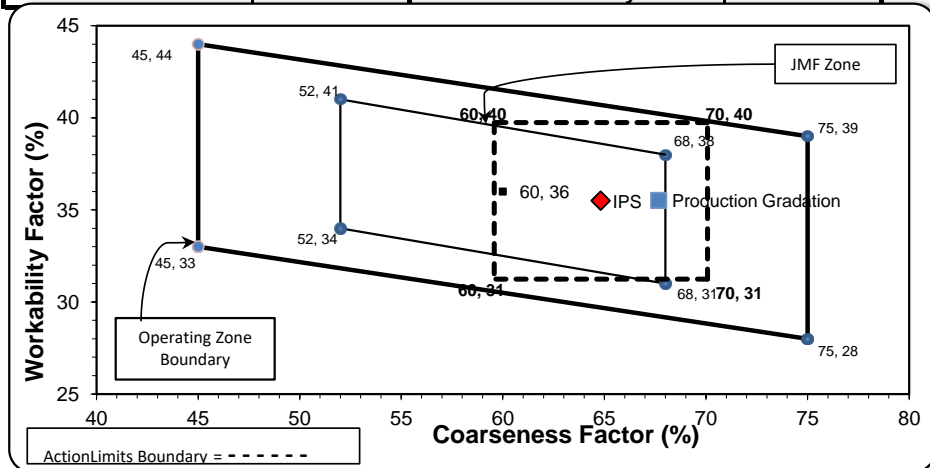
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.8	100.0	100.0	99.3	0.7	0.7
1"	45.2	100.0	100.0	82.1	17.1	17.9
3/4"	11.4	98.6	100.0	70.8	11.4	29.2
1/2"	3.1	79.1	100.0	62.9	7.9	37.1
3/8"	2.2	55.9	100.0	56.4	6.5	43.6
#4	1.9	13.4	96.0	43.3	13.1	56.7
#8	1.8	5.0	82.5	35.5	7.8	64.5
#16	1.7	3.4	66.6	28.6	6.9	71.4
#30	1.7	3.0	47.0	20.5	8.1	79.5
#50	1.6	2.7	21.4	10.0	10.5	90.0
#100	1.6	2.6	5.8	3.6	6.4	96.4
LBW	1.3	2.2	1.2	1.5	2.1	98.5

*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:** **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"	99.4	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

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Aggregate Optimization Chart

PLANT #: **P-36**

Sample Date: 7/6/20

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 7/7/2020 through 7/13/2020

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	920	5.63	2.62	30.0
2NS	63-92	Grange Hall	1200	7.26	2.65	39.1
Total Wt			3070	18.70		100.0

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



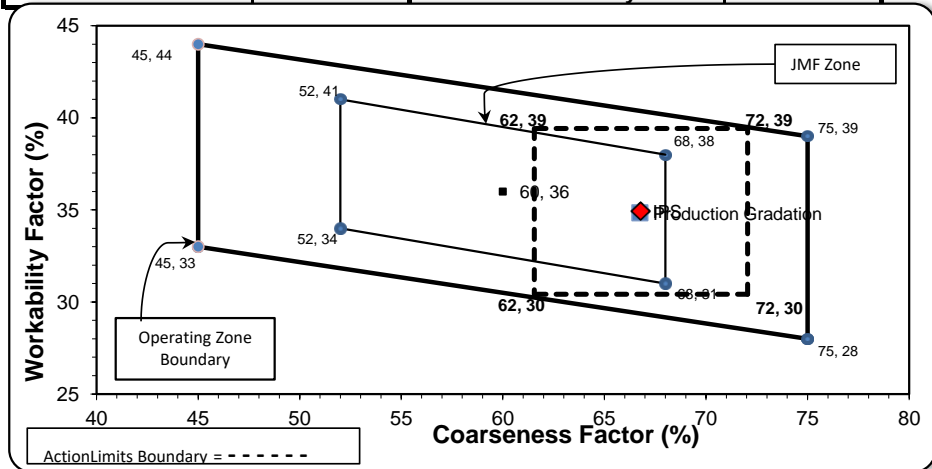
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 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.8	100.0	100.0	99.3	0.7	0.7
1"	45.2	100.0	100.0	83.0	16.3	17.0
3/4"	11.4	98.6	100.0	72.2	10.9	27.8
1/2"	3.1	79.1	100.0	63.8	8.4	36.2
3/8"	2.2	55.9	100.0	56.5	7.2	43.5
#4	1.9	13.4	96.9	42.5	14.0	57.5
#8	1.8	5.0	83.9	34.9	7.6	65.1
#16	1.7	3.4	68.5	28.3	6.5	71.7
#30	1.7	3.0	48.1	20.2	8.1	79.8
#50	1.6	2.7	20.2	9.2	11.0	90.8
#100	1.6	2.6	3.1	2.5	6.7	97.5
LBW	1.3	2.2	0.6	1.3	1.2	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: **67** **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: 7/6/20

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 7/7/2020 through 7/13/2020

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	850	5.20	2.62	27.7
2NS	44-051	Krake Willis Rd	1220	7.38	2.65	39.7
Total Wt			3070	18.69		100.0

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



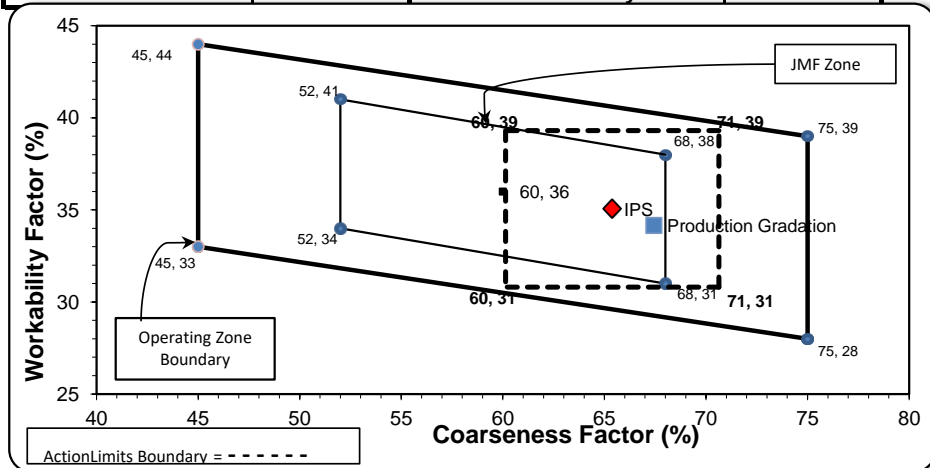
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	42.9	100.0	100.0	81.4	18.6	18.6
3/4"	15.0	99.0	100.0	72.0	9.4	28.0
1/2"	4.9	81.2	100.0	63.8	8.2	36.2
3/8"	2.8	54.0	100.0	55.6	8.2	44.4
#4	2.2	10.7	95.9	41.8	13.8	58.2
#8	2.0	4.2	81.4	34.2	7.6	65.8
#16	2.0	2.8	66.5	27.9	6.3	72.1
#30	1.9	2.5	50.5	21.4	6.5	78.6
#50	1.9	2.4	23.8	10.7	10.6	89.3
#100	1.8	2.3	6.3	3.7	7.0	96.3
LBW	1.7	2.1	0.8	1.5	2.3	98.5

*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**



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: 7/6/20

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 7/7/2020 through 7/13/2020

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	850	5.20	2.62	27.7
IA	71-47	Presque Isle	970	5.93	2.62	31.6
2NS	63-115	Ray Rd	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

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



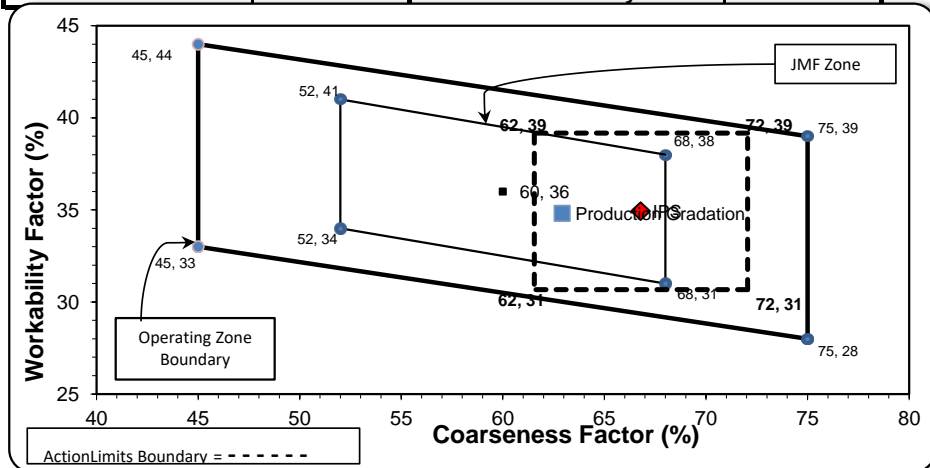
Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.8	100.0	100.0	99.4	0.6	0.6
1"	45.2	100.0	100.0	84.8	14.6	15.2
3/4"	11.4	98.6	100.0	75.0	9.8	25.0
1/2"	3.1	79.1	100.0	66.6	8.5	33.4
3/8"	2.2	55.9	100.0	59.0	7.6	41.0
#4	1.9	13.4	98.1	44.7	14.3	55.3
#8	1.8	5.0	80.4	34.8	9.9	65.2
#16	1.7	3.4	63.3	27.3	7.5	72.7
#30	1.7	3.0	47.2	20.6	6.7	79.4
#50	1.6	2.7	22.6	10.5	10.1	89.5
#100	1.6	2.6	4.4	3.1	7.4	96.9
LBW	1.3	2.2	0.7	1.3	1.7	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:	63	Workability Factor:	35
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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"	72.3	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: