

Aggregate Optimization Chart

Production Gradation Report

PLANT #: **P-101**

Sample Date: 9/27/21

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 9/28/2021 through 10/4/2021

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1560	9.54	2.62	53.6
26A	71-47	Presque Isle	200	1.22	2.62	6.9
2NS	75-051	Mid-Michigan	1150	6.93	2.66	39.5
Total Wt			2910	17.69		100.0

<----- 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"	98.4	100.0	100.0	99.1	0.9	0.9
3/4"	82.7	100.0	100.0	90.7	8.4	9.3
1/2"	43.9	97.0	100.0	69.7	21.0	30.3
3/8"	25.0	86.7	100.0	58.9	10.8	41.1
#4	5.2	20.5	99.0	43.3	15.6	56.7
#8	2.5	6.2	81.2	33.9	9.5	66.1
#16	2.0	3.4	62.6	26.0	7.8	74.0
#30	1.9	2.7	47.2	19.9	6.2	80.1
#50	1.9	2.4	25.2	11.1	8.7	88.9
#100	1.8	2.2	7.3	4.0	7.1	96.0
LBW	1.7	2.1	1.1	1.5	2.5	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.

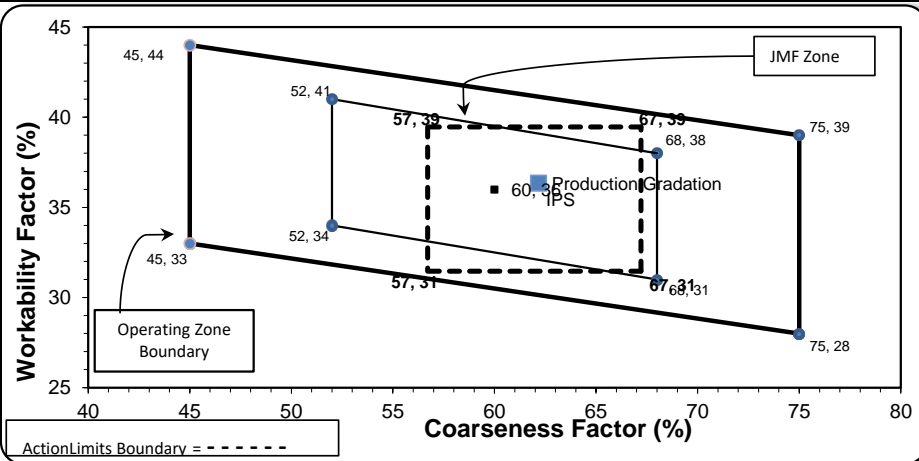
Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	62	Workability Factor:	34	36.4
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Coarseness Factor:	62
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"	100.0	0.0	0.0
3/4"	95.0	5.0	5.0
1/2"	70.5	24.5	29.5
3/8"	60.0	10.5	40.0
#4	44.4	15.6	55.6
#8	35.5	9.0	64.5
#16	28.5	7.0	71.5
#30	21.5	7.0	78.5
#50	10.2	11.3	89.8
#100	3.1	7.1	96.9
LBW	1.3	1.8	98.7



PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-102**

Sample Date: 9/27/21

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 9/28/2021 through 10/4/2021

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1550	9.23	2.69	52.5
26A	58-003	Stoneco	255	1.52	2.69	8.6
2NS	63-114	Highland	1150	6.95	2.65	38.9
Total Wt			2955	17.71		100.0

<----- 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"	99.8	100.0	100.0	99.9	0.1	0.1
3/4"	82.0	100.0	100.0	90.6	9.3	9.4
1/2"	42.5	99.5	100.0	69.8	20.8	30.2
3/8"	22.1	87.7	100.0	58.1	11.7	41.9
#4	4.4	8.0	98.9	41.5	16.6	58.5
#8	1.5	2.4	83.6	33.5	8.0	66.5
#16	0.8	1.7	66.1	26.3	7.2	73.7
#30	0.7	1.5	47.2	18.9	7.4	81.1
#50	0.6	1.4	21.3	8.7	10.1	91.3
#100	0.6	1.4	4.6	2.2	6.5	97.8
LBW	0.6	1.3	0.9	0.8	1.4	99.2

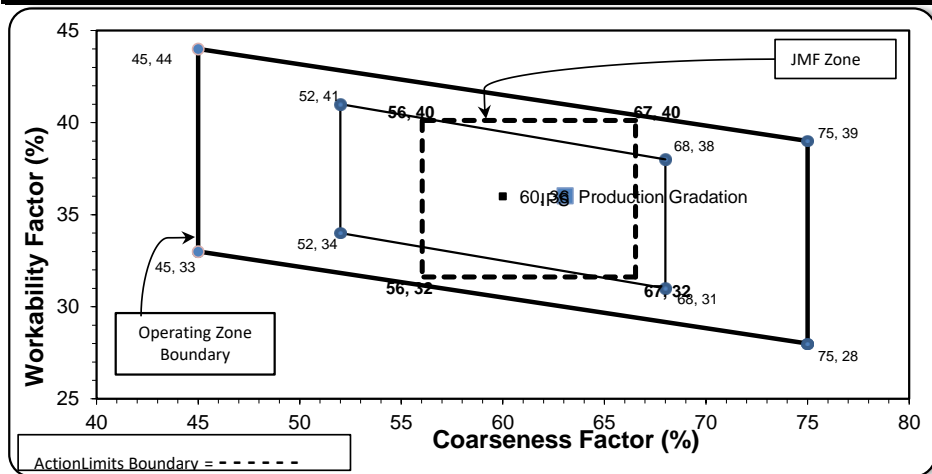
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	63	Workability Factor:	34	36.0
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Coarseness Factor:	61
Workability Factor:	36



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 #: **P-20**

Contractor: _____

Sample Date: 9/27/21

Concrete Grade: **DM**

Dates Test Represents: 9/28/2021 through 10/4/2021

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1605	9.82	2.62	55.2
26A	71-47	Presque Isle	200	1.22	2.62	6.9
2NS	63-92	Grange Hall	1100	6.65	2.65	37.9
Total Wt			2905	17.69		100.0

<----- 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"	98.4	100.0	100.0	99.1	0.9	0.9
3/4"	85.0	100.0	100.0	91.7	7.4	8.3
1/2"	41.6	97.7	100.0	67.6	24.1	32.4
3/8"	24.0	85.7	100.0	57.0	10.6	43.0
#4	3.4	17.9	97.6	40.1	17.0	59.9
#8	1.9	5.5	84.0	33.2	6.8	66.8
#16	1.7	3.1	67.7	26.8	6.4	73.2
#30	1.6	2.5	48.6	19.5	7.3	80.5
#50	1.5	2.3	20.4	8.7	10.7	91.3
#100	1.4	2.1	5.9	3.2	5.6	96.8
LBW	1.3	2.0	0.5	1.0	2.1	99.0

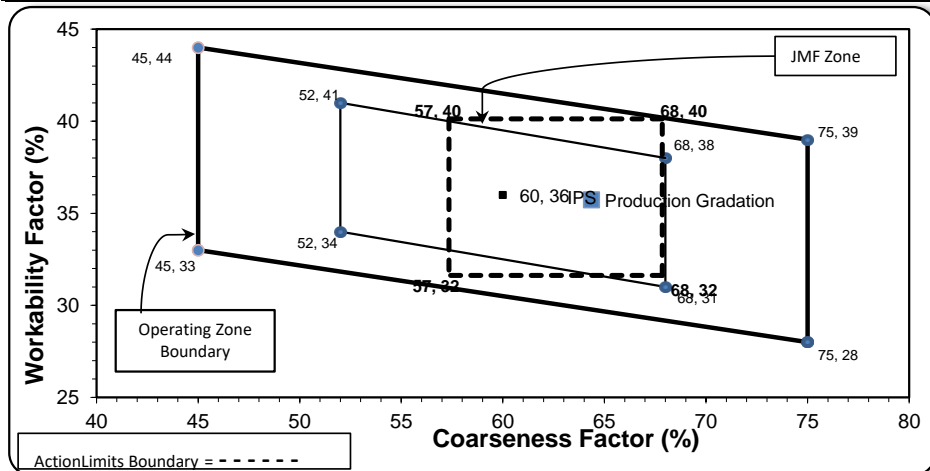
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	64	Workability Factor:	33	Adjusted WF	35.7
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Coarseness Factor:	63
Workability Factor:	36



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"	89.2	10.8	10.8
1/2"	68.4	20.8	31.6
3/8"	59.9	8.6	40.1
#4	43.0	16.9	57.0
#8	35.9	7.1	64.1
#16	29.0	6.8	71.0
#30	21.3	7.7	78.7
#50	9.9	11.4	90.1
#100	2.4	7.5	97.6
LBW	1.2	1.2	98.8

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-32**

Sample Date: 9/27/21 Concrete Grade: DM
 Dates Test Represents: 9/28/2021 through 10/4/2021

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1600	9.79	2.62	55.1
26A	71-47	Presque Isle	155	0.95	2.62	5.3
2NS	95-013	Smelter Bay	1150	6.95	2.65	39.6
Total Wt			2905	17.69		100.0

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



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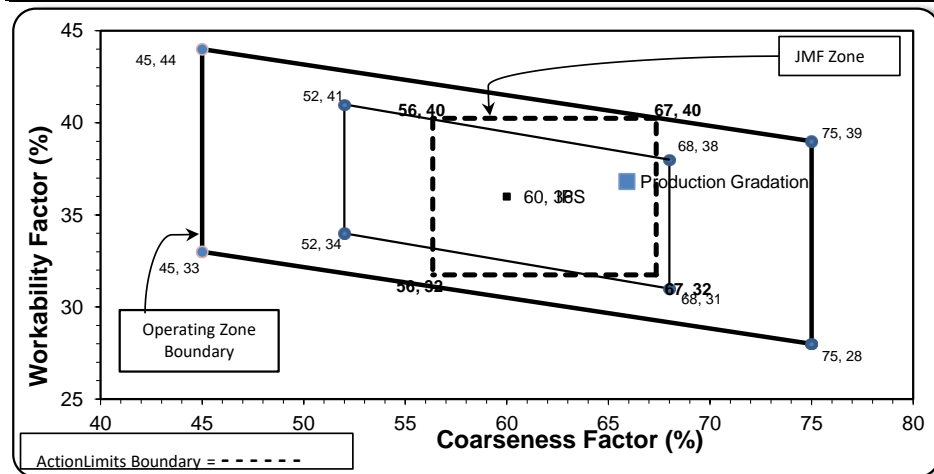
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	96.3	100.0	100.0	98.0	2.0	2.0
3/4"	73.5	100.0	100.0	85.4	12.6	14.6
1/2"	37.2	96.0	100.0	65.2	20.2	34.8
3/8"	23.1	82.5	100.0	56.7	8.5	43.3
#4	4.4	28.5	95.3	41.7	15.0	58.3
#8	1.7	8.4	83.2	34.3	7.3	65.7
#16	1.3	4.0	67.9	27.8	6.5	72.2
#30	1.2	2.7	49.8	20.5	7.3	79.5
#50	1.2	2.2	25.3	10.8	9.7	89.2
#100	1.1	2.0	8.4	4.0	6.8	96.0
LBW	0.8	1.7	1.7	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 Adjusted WF Initial Production Sample (IPS)

Coarseness Factor: 66	Workability Factor: 34	Adjusted WF 36.8
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Coarseness Factor: 62
Workability Factor: 36



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: 9/27/21 Concrete Grade: DM
 Dates Test Represents: 9/28/2021 through 10/4/2021

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1555	9.26	2.69	52.6
26A	58-003	Stoneco	300	1.79	2.69	10.2
2NS	81-093	Burmeister	1100	6.65	2.65	37.2
Total Wt			2955	17.70		100.0

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



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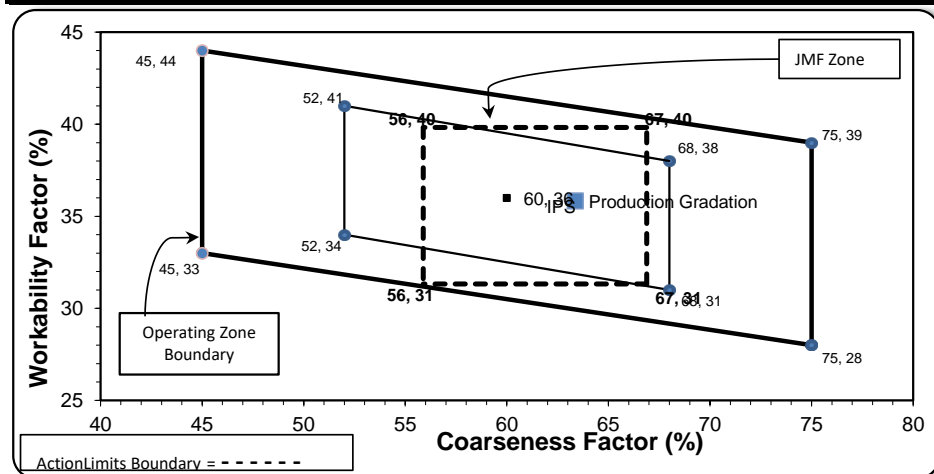
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	99.8	100.0	100.0	99.9	0.1	0.1
3/4"	82.0	100.0	100.0	90.5	9.4	9.5
1/2"	42.5	99.5	100.0	69.7	20.8	30.3
3/8"	22.1	87.7	100.0	57.8	11.9	42.2
#4	4.4	8.0	99.2	40.1	17.7	59.9
#8	1.5	2.4	86.8	33.3	6.7	66.7
#16	0.8	1.7	70.9	27.0	6.4	73.0
#30	0.7	1.5	52.4	20.0	7.0	80.0
#50	0.6	1.4	18.7	7.4	12.6	92.6
#100	0.6	1.4	2.7	1.5	6.0	98.5
LBW	0.6	1.3	1.0	0.8	0.6	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 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 Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	63	Workability Factor:	33	Adjusted WF	35.8
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Coarseness Factor:	61
Workability Factor:	36



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

PLANT #: **P-36**

Sample Date: 9/27/21

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 9/28/2021 through 10/4/2021

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1505	9.21	2.62	51.8
26A	71-47	Presque Isle	300	1.83	2.62	10.3
2NS	63-92	Grange Hall	1100	6.65	2.65	37.9
Total Wt			2905	17.69		100.0

<---- 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"	98.8	100.0	100.0	99.4	0.6	0.6
3/4"	89.6	100.0	100.0	94.6	4.8	5.4
1/2"	52.0	96.0	100.0	74.7	19.9	25.3
3/8"	28.2	82.5	100.0	61.0	13.7	39.0
#4	4.8	28.5	97.6	42.4	18.6	57.6
#8	2.6	8.4	84.0	34.0	8.4	66.0
#16	2.2	4.0	67.7	27.2	6.8	72.8
#30	1.8	2.7	48.6	19.6	7.6	80.4
#50	1.7	2.2	20.4	8.8	10.8	91.2
#100	1.6	2.0	5.9	3.3	5.6	96.7
LBW	1.2	1.7	0.5	1.0	2.3	99.0

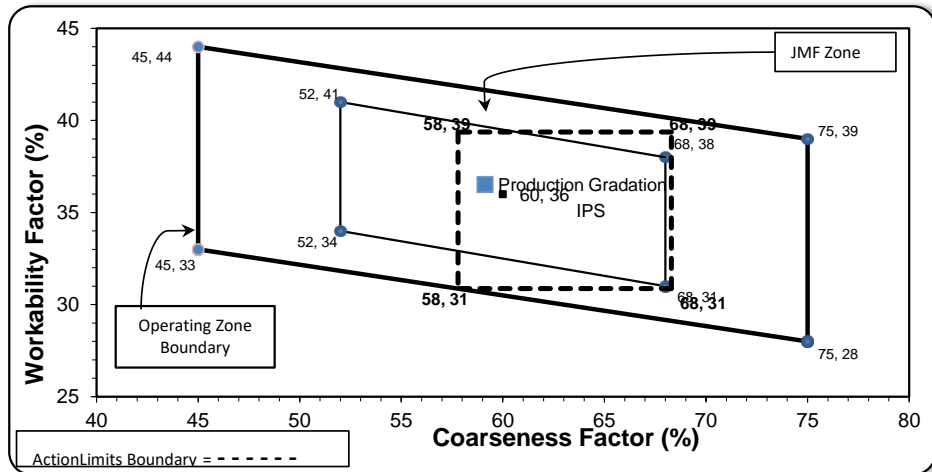
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	59	Workability Factor:	34	Adjusted WF	36.5
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Coarseness Factor:	63
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"	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

PLANT #: **P-39**

Sample Date: 9/27/21

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 9/28/2021 through 10/4/2021

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1605	9.82	2.62	55.2
26A	71-47	Presque Isle	200	1.22	2.62	6.9
2NS	44-051	Krake Willis Rd	1100	6.65	2.65	37.9
Total Wt			2905	17.69		100.0

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



Superior Materials, LLC
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 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"	98.4	100.0	100.0	99.1	0.9	0.9
3/4"	82.7	100.0	100.0	90.4	8.7	9.6
1/2"	43.9	97.0	100.0	68.8	21.6	31.2
3/8"	25.0	86.7	100.0	57.6	11.2	42.4
#4	5.2	20.5	97.4	41.2	16.5	58.8
#8	2.5	6.2	82.2	32.9	8.2	67.1
#16	2.0	3.4	66.3	26.4	6.5	73.6
#30	1.9	2.7	48.4	19.6	6.9	80.4
#50	1.9	2.4	24.2	10.4	9.2	89.6
#100	1.8	2.2	7.4	3.9	6.4	96.1
LBW	1.7	2.1	0.9	1.4	2.5	98.6

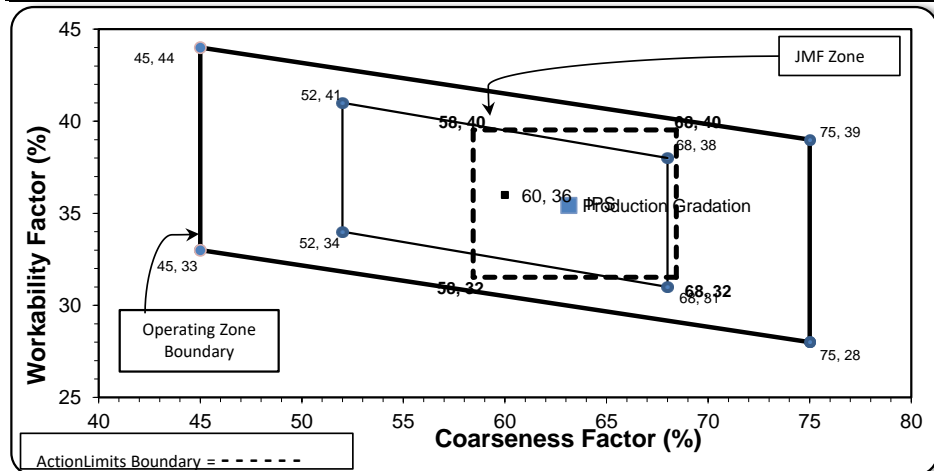
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	63	Workability Factor:	33	Adjusted WF	35.4
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Coarseness Factor:	63
Workability Factor:	36



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"	89.7	10.3	10.3
1/2"	70.3	19.4	29.7
3/8"	59.1	11.2	40.9
#4	42.8	16.3	57.2
#8	35.5	7.3	64.5
#16	29.0	6.5	71.0
#30	21.2	7.7	78.8
#50	9.8	11.5	90.2
#100	3.7	6.1	96.3
LBW	1.2	2.5	98.8

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-02**

Sample Date: 9/27/21 Concrete Grade: DM
 Dates Test Represents: 9/28/2021 through 10/4/2021

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1555	9.51	2.62	53.5
26A	71-47	Presque Isle	250	1.53	2.62	8.6
2NS	63-115	Ray Rd	1100	6.65	2.65	37.9
Total Wt			2905	17.69		100.0

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



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

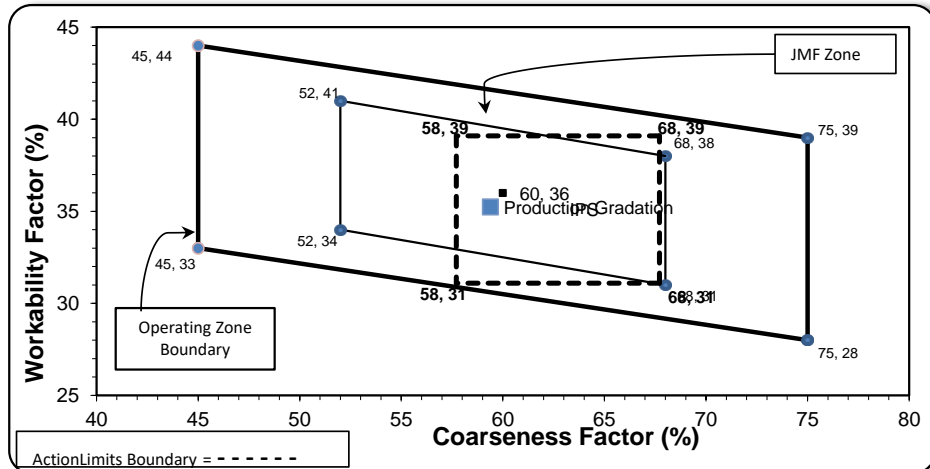
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	98.8	100.0	100.0	99.4	0.6	0.6
3/4"	89.6	100.0	100.0	94.4	4.9	5.6
1/2"	52.0	96.0	100.0	74.0	20.5	26.0
3/8"	28.2	82.5	100.0	60.1	13.9	39.9
#4	4.8	28.5	96.4	41.5	18.5	58.5
#8	2.6	8.4	80.9	32.7	8.8	67.3
#16	2.2	4.0	66.3	26.6	6.1	73.4
#30	1.8	2.7	50.5	20.3	6.3	79.7
#50	1.7	2.2	26.4	11.1	9.2	88.9
#100	1.6	2.0	6.2	3.4	7.7	96.6
LBW	1.2	1.7	0.9	1.1	2.2	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 Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	59	Workability Factor:	33	Adjusted WF	35.2
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Coarseness Factor:	63
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"	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

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 SM, LLC Technical Service

Approved By: