

Aggregate Optimization Chart

PLANT #: **P-101**

Sample Date: 4/19/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 4/20/2021 through 4/26/2021

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%

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.3	100.0	100.0	99.4	0.6	0.6
1"	53.1	100.0	100.0	83.7	15.8	16.3
3/4"	15.8	98.8	100.0	70.3	13.3	29.7
1/2"	2.8	83.5	100.0	61.8	8.5	38.2
3/8"	2.1	64.4	100.0	56.6	5.2	43.4
#4	1.7	13.8	98.4	42.7	14.0	57.3
#8	1.6	4.1	83.2	34.1	8.5	65.9
#16	1.5	2.5	68.6	28.0	6.2	72.0
#30	1.5	2.2	52.9	21.8	6.2	78.2
#50	1.4	2.0	24.3	10.5	11.3	89.5
#100	1.3	1.9	3.8	2.4	8.1	97.6
LBW	1.1	1.7	0.4	1.0	1.5	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.



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 Suite 500
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Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

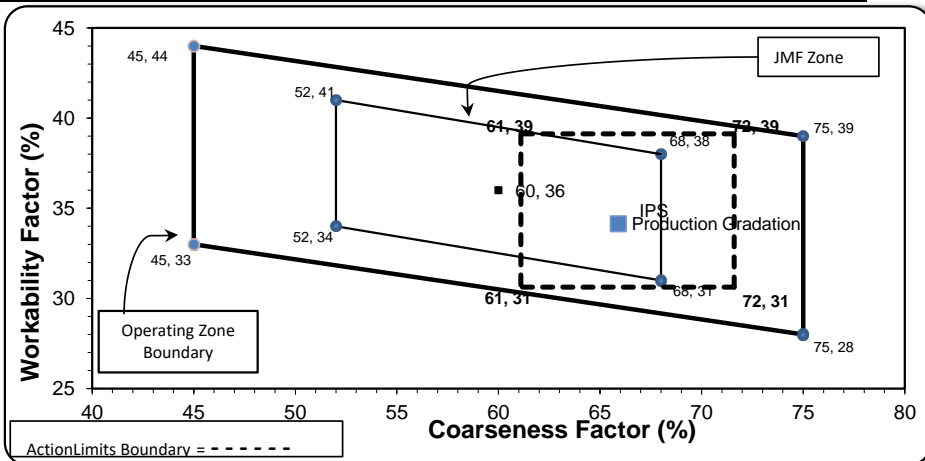
Coarseness Factor: **66** **Workability Factor:** **34**

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: 4/19/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 4/20/2021 through 4/26/2021

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	58-003	Stoneco	1420	8.46	2.69	45.5
IA	58-003	Stoneco	500	2.98	2.69	16.0
2NS	63-114	Highland	1200	7.26	2.65	38.5
Total Wt			3120	18.70		100.0

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



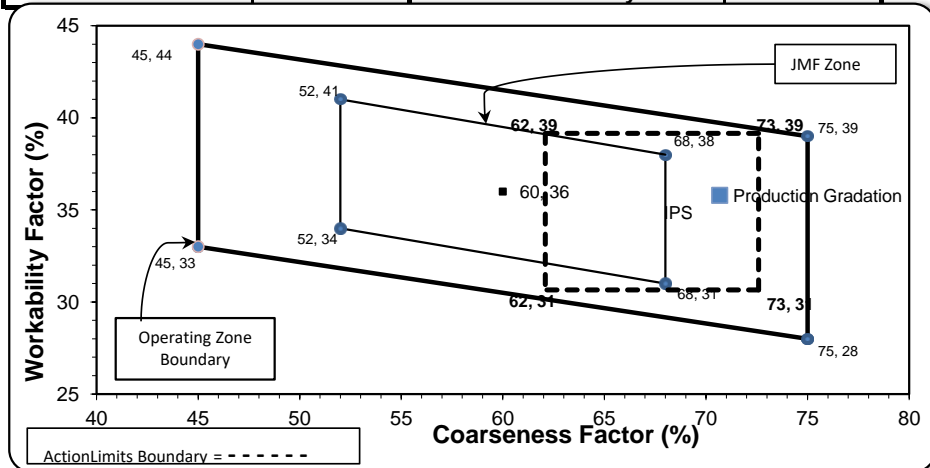
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	66.6	100.0	100.0	84.8	15.2	15.2
3/4"	32.7	100.0	100.0	69.4	15.4	30.6
1/2"	12.4	94.3	100.0	59.2	10.2	40.8
3/8"	6.5	82.4	100.0	54.6	4.6	45.4
#4	2.7	27.2	99.7	43.9	10.7	56.1
#8	2.0	7.7	87.5	35.8	8.1	64.2
#16	1.7	3.5	69.8	28.2	7.6	71.8
#30	1.5	2.5	49.1	20.0	8.2	80.0
#50	1.4	2.2	16.2	7.2	12.7	92.8
#100	1.3	2.1	2.7	2.0	5.3	98.0
LBW	1.2	1.9	0.8	1.2	0.8	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: **71** **Workability Factor:** **36**



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

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Aggregate Optimization Chart

PLANT #: **P-12**

Sample Date: 4/19/21 Concrete Grade: **P1M**
 Dates Test Represents: 4/20/2021 through 4/26/2021

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	750	4.59	2.62	24.4
2NS	63-115	Ray Rd	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

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



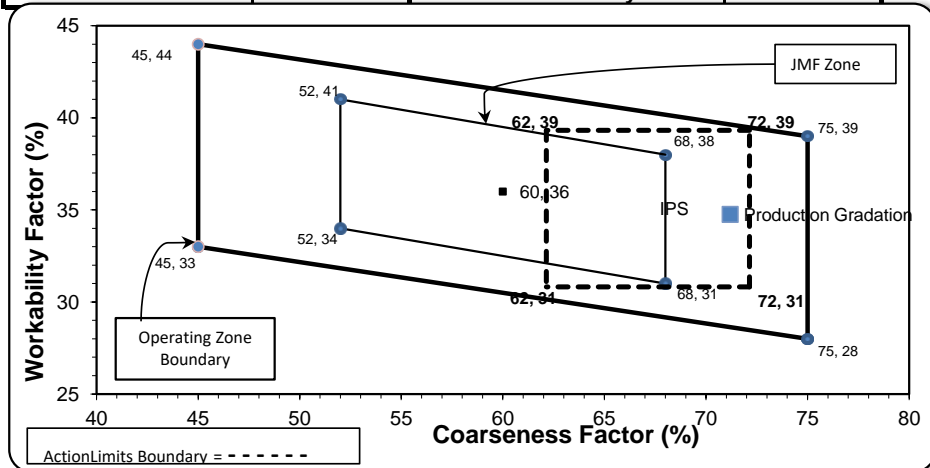
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	94.2	100.0	100.0	98.0	2.0	2.0
1"	29.8	100.0	100.0	75.5	22.4	24.5
3/4"	11.6	97.5	100.0	68.6	7.0	31.4
1/2"	4.0	75.0	100.0	60.4	8.1	39.6
3/8"	2.9	48.4	100.0	53.6	6.9	46.4
#4	2.4	8.3	96.0	42.0	11.6	58.0
#8	2.3	5.5	80.1	34.8	7.2	65.2
#16	2.2	3.8	65.6	28.4	6.4	71.6
#30	2.0	2.9	50.3	21.9	6.5	78.1
#50	1.9	2.5	26.4	12.0	9.9	88.0
#100	1.8	2.2	5.0	3.2	8.8	96.8
LBW	1.5	1.6	0.7	1.2	2.0	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: **71** **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"	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: 4/19/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 4/20/2021 through 4/26/2021

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	95-013	Smelter Bay	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

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



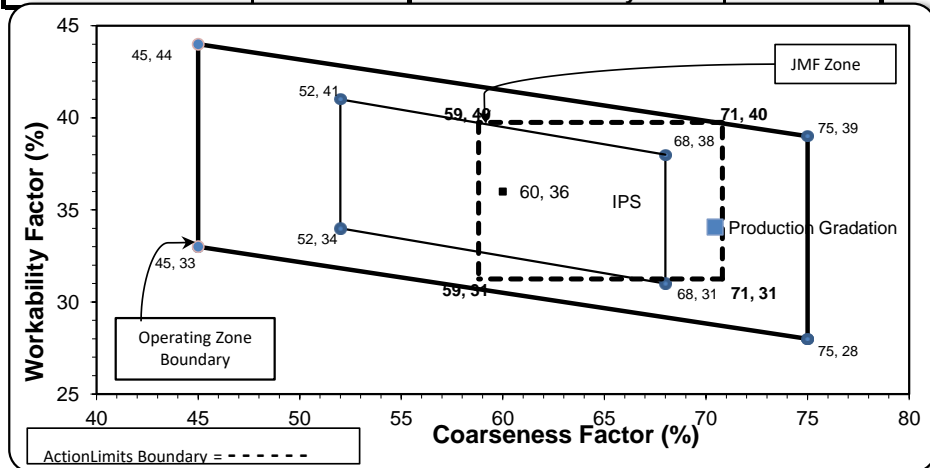
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	94.2	100.0	100.0	98.0	2.0	2.0
1"	29.8	100.0	100.0	75.5	22.4	24.5
3/4"	11.6	97.5	100.0	68.6	7.0	31.4
1/2"	4.0	75.0	100.0	60.4	8.1	39.6
3/8"	2.9	48.4	100.0	53.6	6.9	46.4
#4	2.4	8.3	95.2	41.6	11.9	58.4
#8	2.3	5.5	78.4	34.1	7.6	65.9
#16	2.2	3.8	63.5	27.6	6.5	72.4
#30	2.0	2.9	47.9	20.9	6.6	79.1
#50	1.9	2.5	27.4	12.4	8.5	87.6
#100	1.8	2.2	2.6	2.2	10.2	97.8
LBW	1.5	1.6	1.4	1.5	0.7	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: **70** **Workability Factor:** **34**



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:
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Aggregate Optimization Chart

PLANT #: **P-36**

Sample Date: 4/19/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 4/20/2021 through 4/26/2021

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	63-92	Grange Hall	1200	7.26	2.65	39.1
Total Wt			3070	18.70		100.0

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



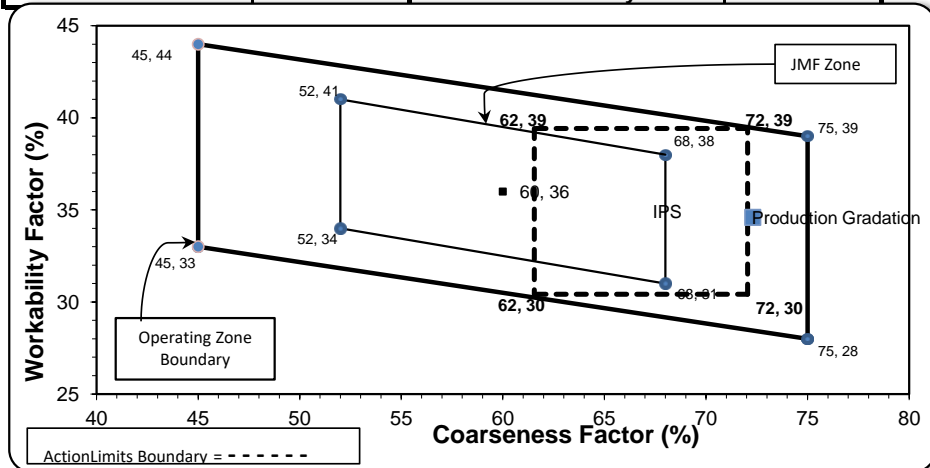
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	94.2	100.0	100.0	98.0	2.0	2.0
1"	29.8	100.0	100.0	75.5	22.4	24.5
3/4"	11.6	97.5	100.0	68.5	7.0	31.5
1/2"	4.0	75.0	100.0	60.0	8.5	40.0
3/8"	2.9	48.4	100.0	52.7	7.3	47.3
#4	2.4	8.3	96.8	40.8	11.9	59.2
#8	2.3	5.5	82.8	34.6	6.2	65.4
#16	2.2	3.8	67.4	28.1	6.5	71.9
#30	2.0	2.9	47.1	19.9	8.2	80.1
#50	1.9	2.5	20.7	9.4	10.5	90.6
#100	1.8	2.2	2.7	2.3	7.1	97.7
LBW	1.5	1.6	0.3	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:	72	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"	72.1	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:
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Approved By:

Aggregate Optimization Chart

PLANT #: **P-39**

Sample Date: 4/19/21

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 4/20/2021 through 4/26/2021

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	44-051	Krake Willis Rd	1200	7.26	2.65	39.1
Total Wt			3070	18.70		100.0

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



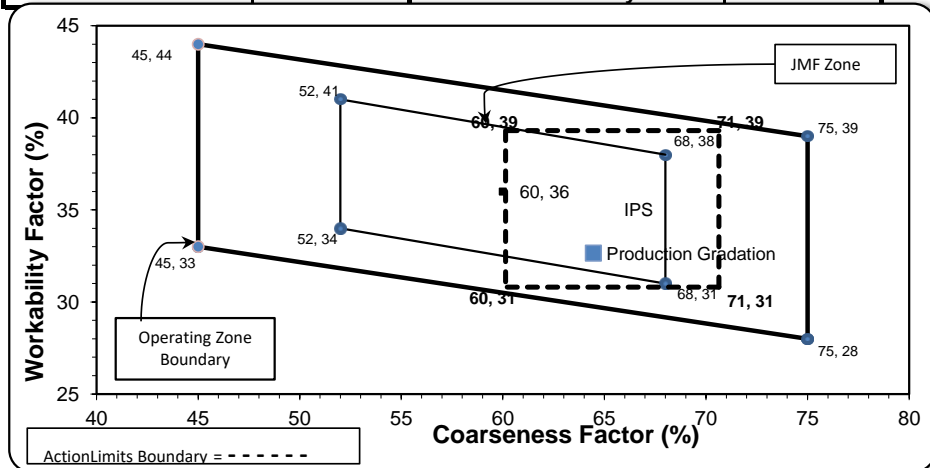
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 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	98.3	100.0	100.0	99.4	0.6	0.6
1"	53.1	100.0	100.0	83.7	15.8	16.3
3/4"	15.8	98.8	100.0	70.3	13.3	29.7
1/2"	2.8	83.5	100.0	61.8	8.5	38.2
3/8"	2.1	64.4	100.0	56.6	5.2	43.4
#4	1.7	13.8	96.3	41.8	14.8	58.2
#8	1.6	4.1	79.4	32.7	9.2	67.3
#16	1.5	2.5	64.6	26.4	6.2	73.6
#30	1.5	2.2	49.4	20.4	6.0	79.6
#50	1.4	2.0	26.6	11.4	9.0	88.6
#100	1.3	1.9	6.8	3.6	7.8	96.4
LBW	1.1	1.7	0.6	1.1	2.5	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:	64	Workability Factor:	33
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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: 4/19/21 Concrete Grade: **P1M**
 Dates Test Represents: 4/20/2021 through 4/26/2021

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	750	4.59	2.62	24.4
2NS	63-115	Ray Rd	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

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



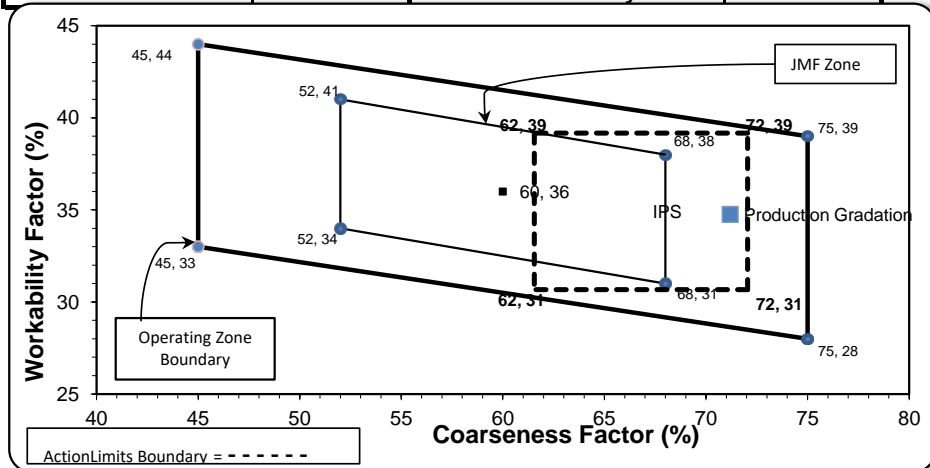
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	94.2	100.0	100.0	98.0	2.0	2.0
1"	29.8	100.0	100.0	75.5	22.4	24.5
3/4"	11.6	97.5	100.0	68.6	7.0	31.4
1/2"	4.0	75.0	100.0	60.4	8.1	39.6
3/8"	2.9	48.4	100.0	53.6	6.9	46.4
#4	2.4	8.3	96.0	42.0	11.6	58.0
#8	2.3	5.5	80.1	34.8	7.2	65.2
#16	2.2	3.8	65.6	28.4	6.4	71.6
#30	2.0	2.9	50.3	21.9	6.5	78.1
#50	1.9	2.5	26.4	12.0	9.9	88.0
#100	1.8	2.2	5.0	3.2	8.8	96.8
LBW	1.5	1.6	0.7	1.2	2.0	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: **71** **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: