

Aggregate Optimization Chart

PLANT #: P-101

Sample Date: 6/24/19

Concrete Grade: P1M

Contractor: _____

Dates Test Represents: 6/25/2019 through 7/1/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	1120	6.85	2.62	36.5
IA	71-47	Presque Isle	750	4.59	2.62	24.4
2NS	75-051	Mid-Michigan	1200	7.23	2.66	39.1
Total Wt			3070	18.67		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"	97.2	100.0	100.0	99.0	1.0	1.0
1"	42.7	100.0	100.0	79.1	19.9	20.9
3/4"	11.6	98.0	100.0	67.3	11.8	32.7
1/2"	4.5	80.3	100.0	60.3	6.9	39.7
3/8"	3.0	57.5	100.0	54.2	6.1	45.8
#4	2.0	12.2	97.8	41.9	12.3	58.1
#8	1.6	3.9	82.7	33.9	8.1	66.1
#16	1.5	2.5	68.9	28.1	5.8	71.9
#30	1.4	2.2	53.3	21.9	6.2	78.1
#50	1.3	2.0	23.2	10.0	11.9	90.0
#100	1.2	1.9	7.5	3.8	6.2	96.2
LBW	1.1	1.7	1.2	1.3	2.5	98.7

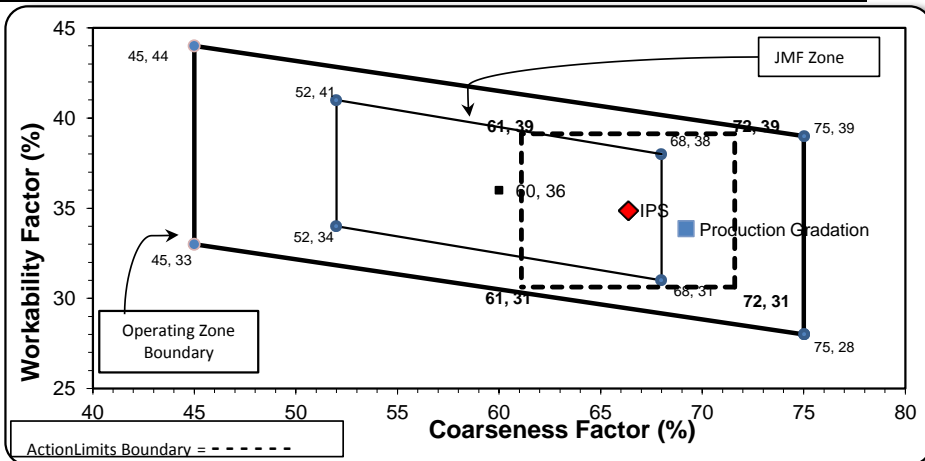
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Coarseness Factor:	69	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: 6/24/19

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 6/25/2019 through 7/1/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	58-003	Stoneco	1270	7.57	2.69	40.7
IA	58-003	Stoneco	650	3.87	2.69	20.8
2NS	38-046	Chelsea	1200	7.28	2.64	38.5
Total Wt			3120	18.72		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"	100.0	100.0	100.0	100.0	0.0	0.0
1"	68.7	100.0	100.0	87.3	12.7	12.7
3/4"	30.4	100.0	100.0	71.7	15.6	28.3
1/2"	10.4	94.1	100.0	62.3	9.4	37.7
3/8"	4.9	83.6	100.0	57.9	4.4	42.1
#4	2.5	23.5	99.9	44.3	13.5	55.7
#8	2.1	5.3	89.0	36.2	8.1	63.8
#16	1.8	2.3	64.9	26.2	10.0	73.8
#30	1.5	1.8	40.2	16.4	9.7	83.6
#50	1.4	1.7	18.4	8.0	8.4	92.0
#100	1.3	1.6	3.7	2.3	5.7	97.7
LBW	1.2	1.4	0.9	1.1	1.2	98.9

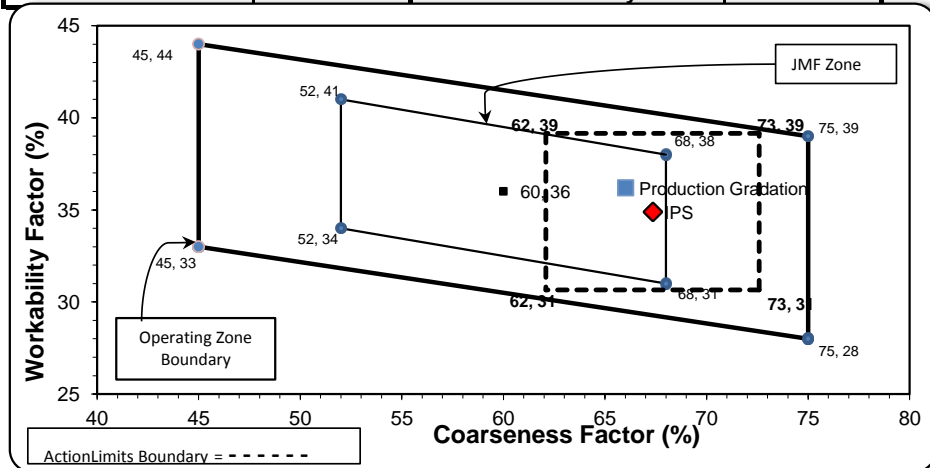


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*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must 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
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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:
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Aggregate Optimization Chart

PLANT #: **P-32**

Sample Date: 6/24/19

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 6/25/2019 through 7/1/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	870	5.32	2.62	28.3
IA	71-47	Presque Isle	1000	6.12	2.62	32.6
2NS	47-16	Buno Rd	1200	7.26	2.65	39.1
Total Wt			3070	18.70		100.0

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



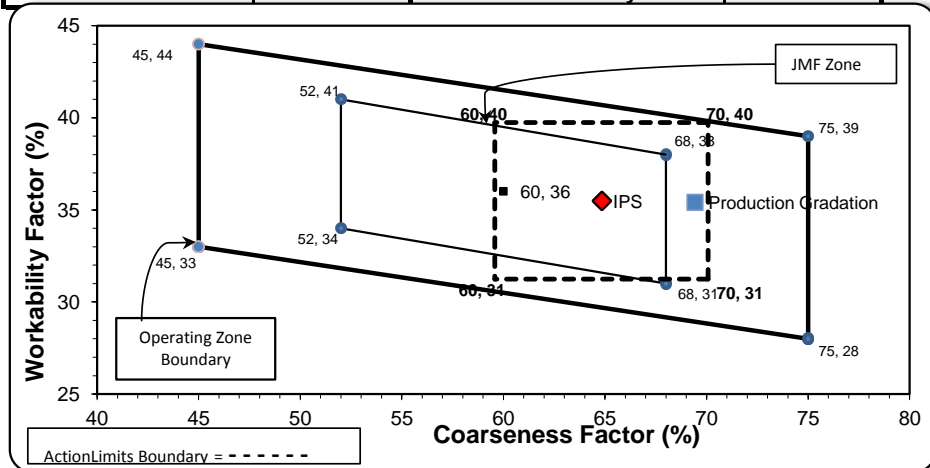
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	87.0	100.0	100.0	96.3	3.7	3.7
1"	18.7	100.0	100.0	77.0	19.4	23.0
3/4"	5.2	97.5	100.0	72.3	4.6	27.7
1/2"	3.0	71.2	100.0	63.1	9.2	36.9
3/8"	2.2	47.4	100.0	55.2	8.0	44.8
#4	1.9	9.2	96.6	41.3	13.9	58.7
#8	1.7	3.9	86.1	35.4	5.9	64.6
#16	1.6	3.0	71.5	29.4	6.0	70.6
#30	1.4	2.8	51.0	21.2	8.1	78.8
#50	1.4	2.6	15.9	7.5	13.8	92.5
#100	1.2	2.5	1.7	1.8	5.6	98.2
LBW	1.0	1.8	0.3	1.0	0.8	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

Coarseness Factor:	69	Workability Factor:	35
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Initial Production Sample (IPS)

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-35**

Sample Date: 6/24/19

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 6/25/2019 through 7/1/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	58-003	Stoneco	1280	7.63	2.69	41.0
IA	58-003	Stoneco	590	3.51	2.69	18.9
2NS	81-093	Burmeister	1250	7.56	2.65	40.1
Total Wt			3120	18.70		100.0

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



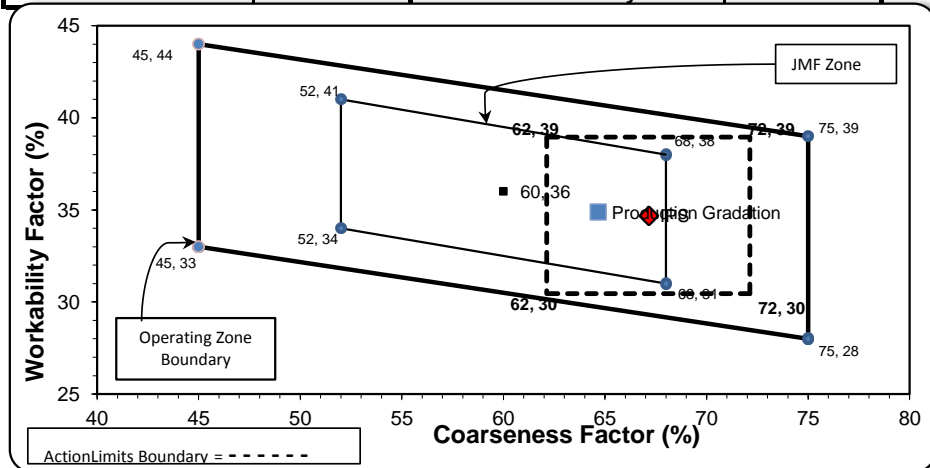
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	68.7	100.0	100.0	87.2	12.8	12.8
3/4"	30.4	100.0	100.0	71.4	15.7	28.6
1/2"	10.4	94.1	100.0	62.1	9.3	37.9
3/8"	4.9	83.6	100.0	57.9	4.2	42.1
#4	2.5	23.5	94.7	43.4	14.5	56.6
#8	2.1	5.3	82.4	34.9	8.5	65.1
#16	1.8	2.3	64.2	26.9	8.0	73.1
#30	1.5	1.8	46.8	19.7	7.2	80.3
#50	1.4	1.7	20.0	8.9	10.8	91.1
#100	1.3	1.6	4.1	2.5	6.4	97.5
LBW	1.2	1.4	1.3	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:	65	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"	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:
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Approved By:

Aggregate Optimization Chart

PLANT #: **P-36**

Sample Date: 6/24/19

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 6/25/2019 through 7/1/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	920	5.63	2.62	30.0
IA	71-47	Presque Isle	900	5.50	2.62	29.3
2NS	63-92	Grange Hall	1250	7.56	2.65	40.7
Total Wt			3070	18.69		100.0

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



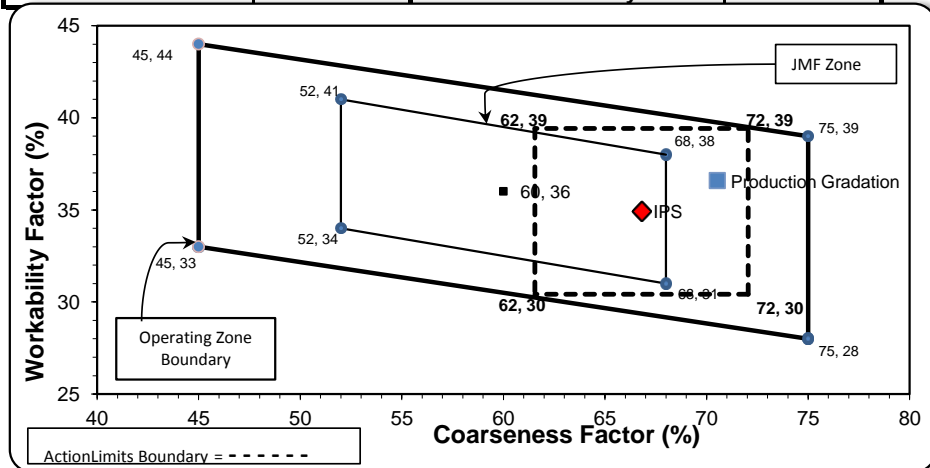
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 Farmington Hills, MI 48336

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	87.0	100.0	100.0	96.1	3.9	3.9
1"	18.7	100.0	100.0	75.6	20.5	24.4
3/4"	7.0	97.5	100.0	71.4	4.2	28.6
1/2"	3.0	71.2	100.0	62.5	8.9	37.5
3/8"	2.2	47.4	100.0	55.3	7.2	44.7
#4	1.9	9.2	97.5	43.0	12.3	57.0
#8	1.7	3.9	85.8	36.6	6.4	63.4
#16	1.6	3.0	71.1	30.3	6.3	69.7
#30	1.4	2.8	51.9	22.4	7.9	77.6
#50	1.4	2.6	19.2	9.0	13.4	91.0
#100	1.2	2.5	2.4	2.1	6.9	97.9
LBW	1.0	1.8	0.3	0.9	1.1	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: **71** **Workability Factor:** **37**



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: 6/24/19

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 6/25/2019 through 7/1/2019

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	850	5.20	2.62	27.7
2NS	44-051	Krake Willis Rd	1270	7.68	2.65	41.4
Total Wt			3070	18.69		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"	97.2	100.0	100.0	99.1	0.9	0.9
1"	42.7	100.0	100.0	82.3	16.9	17.7
3/4"	11.6	98.0	100.0	72.1	10.2	27.9
1/2"	4.5	80.3	100.0	65.0	7.1	35.0
3/8"	3.0	57.5	100.0	58.2	6.8	41.8
#4	2.0	12.2	95.8	43.6	14.6	56.4
#8	1.6	3.9	82.7	35.8	7.8	64.2
#16	1.5	2.5	68.4	29.5	6.3	70.5
#30	1.4	2.2	52.4	22.7	6.7	77.3
#50	1.3	2.0	25.9	11.7	11.0	88.3
#100	1.2	1.9	8.4	4.4	7.3	95.6
LBW	1.1	1.7	1.2	1.3	3.1	98.7

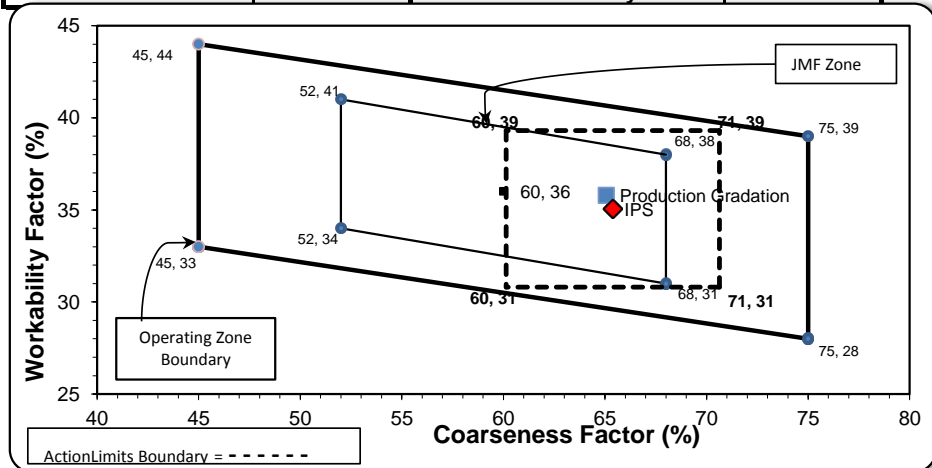


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*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must 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:	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: 6/24/19

Concrete Grade: P1M

Contractor: _____

Dates Test Represents: 6/25/2019 through 7/1/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	870	5.32	2.62	28.3
IA	71-47	Presque Isle	1000	6.12	2.62	32.6
2NS	47-16	Buno Rd	1200	7.26	2.65	39.1
Total Wt			3070	18.70		100.0

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



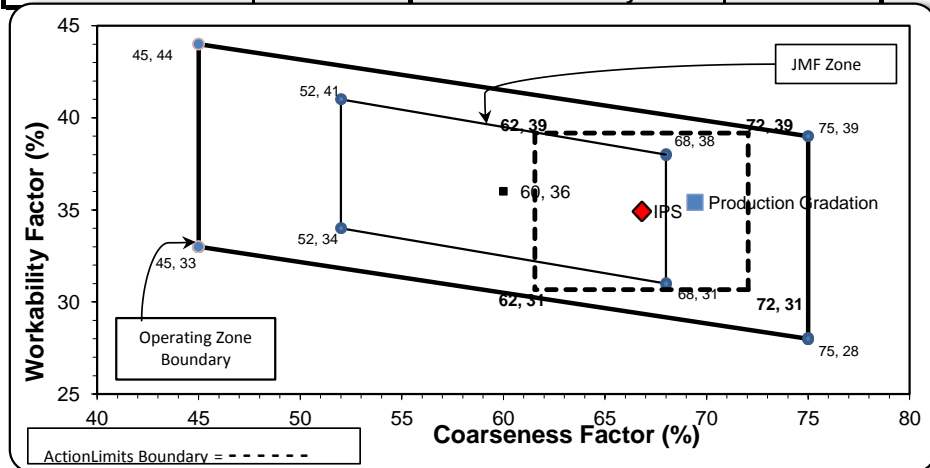
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	87.0	100.0	100.0	96.3	3.7	3.7
1"	18.7	100.0	100.0	77.0	19.4	23.0
3/4"	5.2	97.5	100.0	72.3	4.6	27.7
1/2"	3.0	71.2	100.0	63.1	9.2	36.9
3/8"	2.2	47.4	100.0	55.2	8.0	44.8
#4	1.9	9.2	96.6	41.3	13.9	58.7
#8	1.7	3.9	86.1	35.4	5.9	64.6
#16	1.6	3.0	71.5	29.4	6.0	70.6
#30	1.4	2.8	51.0	21.2	8.1	78.8
#50	1.4	2.6	15.9	7.5	13.8	92.5
#100	1.2	2.5	1.7	1.8	5.6	98.2
LBW	1.0	1.8	0.3	1.0	0.8	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

Coarseness Factor:	69	Workability Factor:	35
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Initial Production Sample (IPS)

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: