

Aggregate Optimization Chart

PLANT #: **P-102**

Sample Date: 5/20/19

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 5/21/2019 through 5/27/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1550	9.23	2.69	51.8
26A	58-003	Stoneco	295	1.76	2.69	9.8
2NS	38-046	Chelsea	1150	6.98	2.64	38.4
Total Wt			2995	17.97		100.0

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



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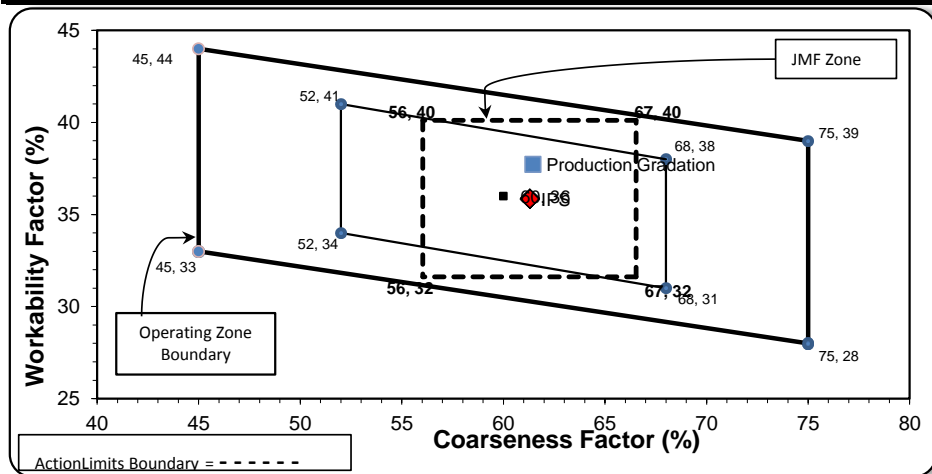
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	99.7	100.0	100.0	99.8	0.2	0.2
3/4"	86.0	100.0	100.0	92.8	7.1	7.2
1/2"	47.9	99.8	100.0	73.0	19.7	27.0
3/8"	25.0	89.9	100.0	60.2	12.8	39.8
#4	4.2	25.9	100.0	43.1	17.1	56.9
#8	1.3	6.9	88.2	35.2	7.9	64.8
#16	1.0	2.9	65.2	25.8	9.4	74.2
#30	0.9	2.1	41.8	16.7	9.1	83.3
#50	0.8	2.0	21.6	8.9	7.8	91.1
#100	0.7	1.9	4.8	2.4	6.5	97.6
LBW	0.6	1.6	1.2	0.9	1.5	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 Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	61	Workability Factor:	35	Adjusted WF	37.7
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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**

Sample Date: 5/20/19

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 5/21/2019 through 5/27/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1550	9.48	2.62	52.5
26A	71-47	Presque Isle	250	1.53	2.62	8.5
2NS	63-54	Holly	1150	6.95	2.65	39.0
Total Wt			2950	17.96		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"	99.4	100.0	100.0	99.7	0.3	0.3
3/4"	88.7	100.0	100.0	94.1	5.6	5.9
1/2"	40.1	97.8	100.0	68.3	25.7	31.7
3/8"	20.8	89.3	100.0	57.5	10.9	42.5
#4	3.0	21.0	96.7	41.1	16.4	58.9
#8	1.8	5.3	83.4	33.9	7.1	66.1
#16	1.6	2.6	67.8	27.5	6.4	72.5
#30	1.5	2.1	49.3	20.2	7.3	79.8
#50	1.5	2.0	20.0	8.8	11.4	91.2
#100	1.4	1.9	2.5	1.9	6.9	98.1
LBW	1.3	1.7	0.3	0.9	0.9	99.1

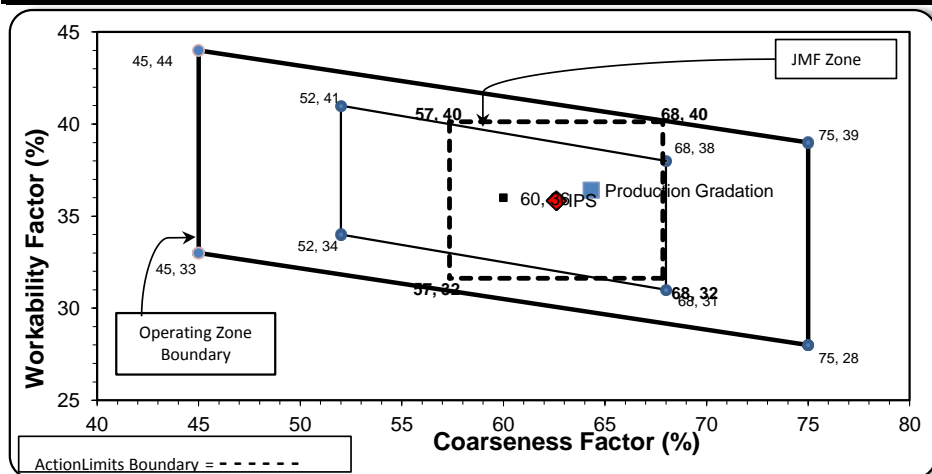
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	64	Workability Factor:	34	Adjusted WF	36.4
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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"	89.2	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:
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Aggregate Optimization Chart

PLANT #: **P-32**

Sample Date: 5/20/19

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 5/21/2019 through 5/27/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1550	9.48	2.62	52.5
26A	71-47	Presque Isle	200	1.22	2.62	6.8
2NS	95-013	Smelter Bay	1200	7.26	2.65	40.7
Total Wt			2950	17.96		100.0

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

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"	96.7	100.0	100.0	98.3	1.7	1.7
3/4"	80.7	100.0	100.0	89.9	8.4	10.1
1/2"	43.4	96.9	100.0	70.1	19.8	29.9
3/8"	29.0	82.4	100.0	61.5	8.5	38.5
#4	4.2	10.2	97.1	42.4	19.1	57.6
#8	2.1	2.3	84.2	35.5	6.9	64.5
#16	1.8	1.6	65.7	27.8	7.7	72.2
#30	1.7	1.4	44.2	19.0	8.8	81.0
#50	1.6	1.3	18.0	8.3	10.7	91.7
#100	1.5	1.2	3.5	2.3	6.0	97.7
LBW	1.1	0.8	0.9	1.0	1.3	99.0



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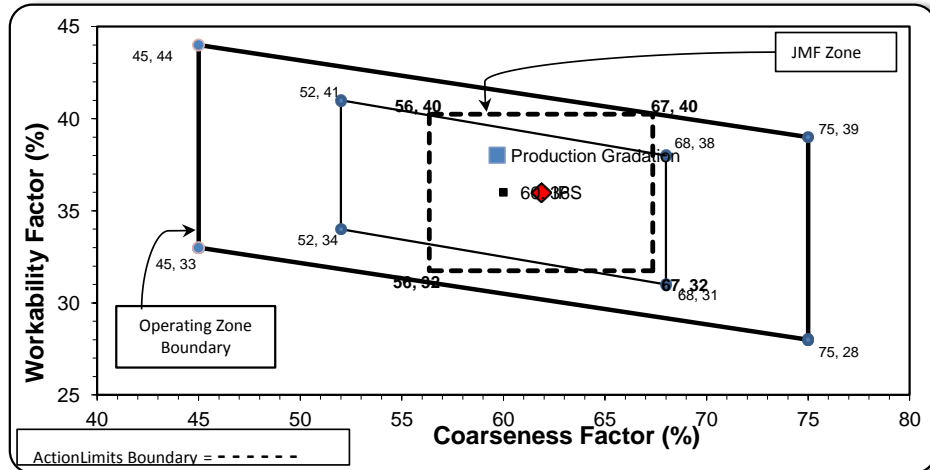
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	60	Workability Factor:	36	Adjusted WF	38.0
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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

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Aggregate Optimization Chart

PLANT #: **P-35**

Sample Date: 5/20/19

Concrete Grade: DM

Contractor: _____

Dates Test Represents: 5/21/2019 through 5/27/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1500	8.94	2.69	50.0
26A	58-003	Stoneco	275	1.64	2.69	9.2
2NS	81-093	Burmeister	1225	7.41	2.65	40.8
Total Wt			3000	17.98		100.0

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



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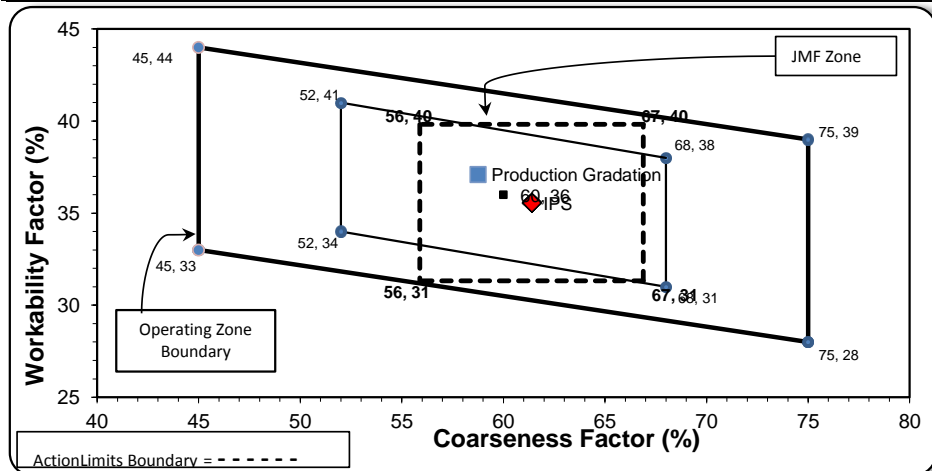
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	99.7	100.0	100.0	99.9	0.2	0.2
3/4"	86.0	100.0	100.0	93.0	6.8	7.0
1/2"	47.9	99.8	100.0	73.9	19.1	26.1
3/8"	25.0	89.9	100.0	61.6	12.4	38.4
#4	4.2	25.9	96.3	43.8	17.8	56.2
#8	1.3	6.9	81.6	34.6	9.2	65.4
#16	1.0	2.9	59.6	25.1	9.5	74.9
#30	0.9	2.1	39.0	16.6	8.5	83.4
#50	0.8	2.0	13.7	6.2	10.4	93.8
#100	0.7	1.9	2.3	1.5	4.7	98.5
LBW	0.6	1.6	0.8	0.8	0.7	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:	59	Workability Factor:	35	Adjusted WF	37.1
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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: 5/20/19

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 5/21/2019 through 5/27/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1600	9.79	2.62	54.2
26A	71-47	Presque Isle	200	1.22	2.62	6.8
2NS	63-92	Grange Hall	1150	6.95	2.65	39.0
Total Wt			2950	17.96		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"	97.8	100.0	100.0	98.8	1.2	1.2
3/4"	80.9	100.0	100.0	89.6	9.2	10.4
1/2"	38.3	96.9	100.0	66.3	23.3	33.7
3/8"	21.0	82.4	100.0	56.0	10.4	44.0
#4	3.6	10.2	96.7	40.3	15.6	59.7
#8	1.7	2.3	83.4	33.6	6.8	66.4
#16	1.4	1.6	67.8	27.3	6.3	72.7
#30	1.3	1.4	49.3	20.0	7.3	80.0
#50	1.3	1.3	20.0	8.6	11.4	91.4
#100	1.2	1.2	2.5	1.7	6.9	98.3
LBW	0.8	0.8	0.3	0.6	1.1	99.4

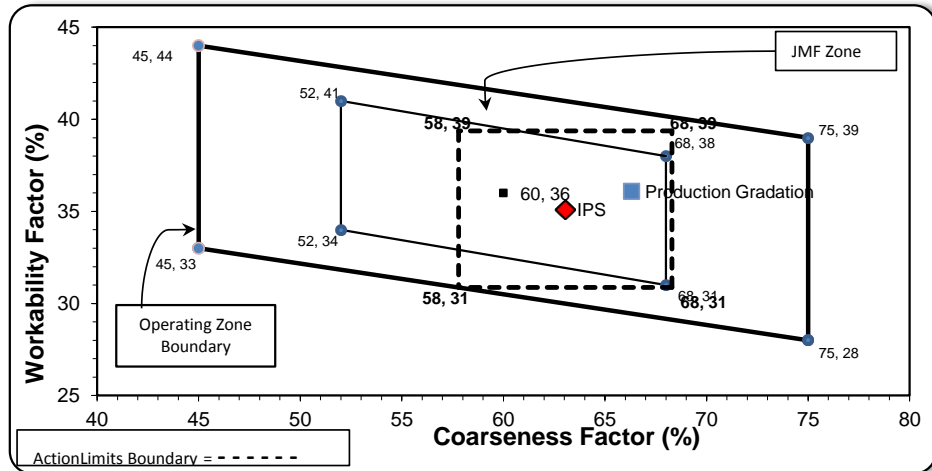
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	66	Workability Factor:	34	Adjusted WF	36.1
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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: 5/20/19

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 5/21/2019 through 5/27/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1750	10.70	2.62	59.3
26A	71-47	Presque Isle	0	0.00	2.62	0.0
2NS	44-051	Krake Willis Rd	1200	7.26	2.65	40.7
Total Wt			2950	17.96		100.0

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

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	99.3	0.7	0.7
3/4"	85.9	100.0	100.0	91.6	7.7	8.4
1/2"	49.0	97.7	100.0	69.7	21.9	30.3
3/8"	30.3	89.7	100.0	58.7	11.1	41.3
#4	3.0	14.2	95.9	40.8	17.9	59.2
#8	1.3	3.9	83.9	34.9	5.9	65.1
#16	1.0	2.1	68.6	28.5	6.4	71.5
#30	1.0	1.6	49.5	20.7	7.8	79.3
#50	1.0	1.4	22.0	9.5	11.2	90.5
#100	0.9	1.4	6.8	3.3	6.2	96.7
LBW	0.9	1.2	1.3	1.1	2.2	98.9



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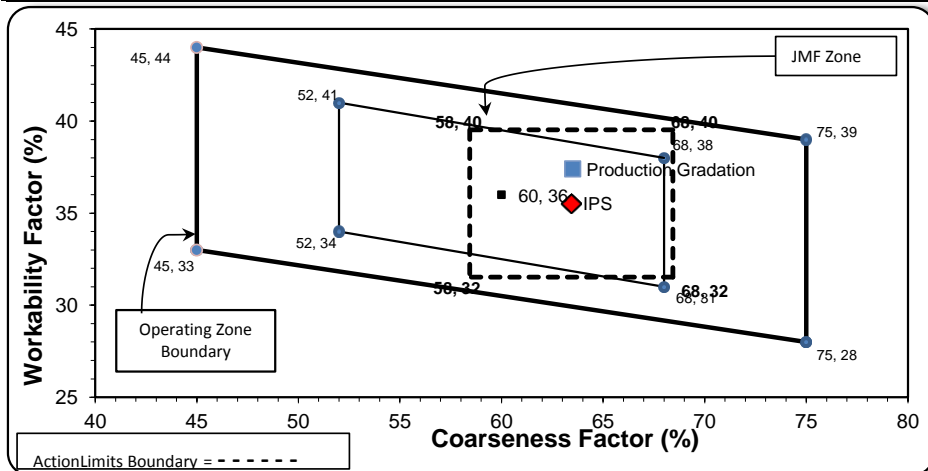
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	64	Workability Factor:	35	Adjusted WF	37.4
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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: 5/20/19

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 5/21/2019 through 5/27/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1600	9.79	2.62	54.2
26A	71-47	Presque Isle	200	1.22	2.62	6.8
2NS	47-16	Buno Rd	1150	6.95	2.65	39.0
Total Wt			2950	17.96		100.0

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

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"	97.8	100.0	100.0	98.8	1.2	1.2
3/4"	80.9	100.0	100.0	89.6	9.2	10.4
1/2"	38.3	96.9	100.0	66.3	23.3	33.7
3/8"	21.0	82.4	100.0	56.0	10.4	44.0
#4	3.6	10.2	96.1	40.1	15.9	59.9
#8	1.7	2.3	85.4	34.4	5.7	65.6
#16	1.4	1.6	72.0	28.9	5.4	71.1
#30	1.3	1.4	52.6	21.3	7.6	78.7
#50	1.3	1.3	17.5	7.6	13.7	92.4
#100	1.2	1.2	2.0	1.5	6.1	98.5
LBW	0.8	0.8	0.3	0.6	0.9	99.4



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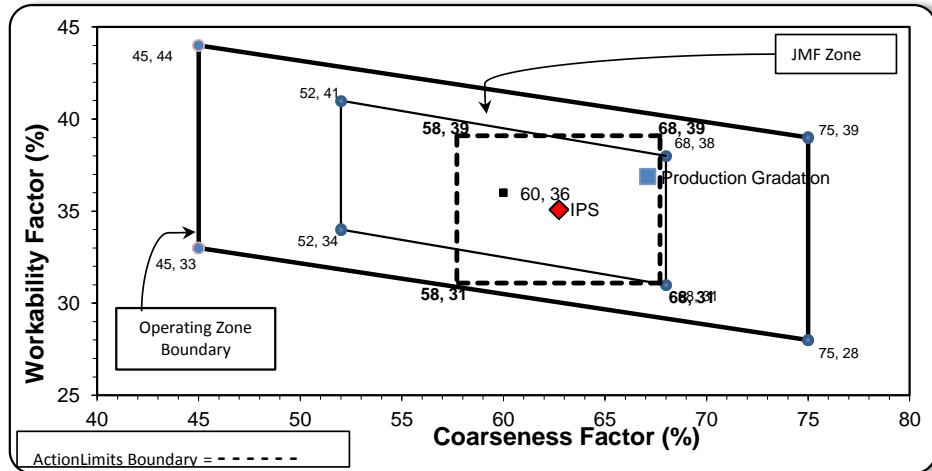
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	67	Workability Factor:	34
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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

PREPARED BY:
 SM, LLC Technical Service

Approved By: