

Aggregate Optimization Chart

PLANT #: **P-102**

Sample Date: 9/16/19

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 9/17/2019 through 9/23/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1600	9.53	2.69	54.2
26A	58-003	Stoneco	250	1.49	2.69	8.5
2NS	47-16	Buno Rd	1100	6.65	2.65	37.3
Total Wt			2950	17.67		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"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	79.7	100.0	100.0	89.0	11.0	11.0
1/2"	40.4	99.8	100.0	67.7	21.3	32.3
3/8"	20.7	87.2	100.0	55.9	11.8	44.1
#4	3.9	9.3	96.6	38.9	17.0	61.1
#8	1.3	4.3	86.1	33.2	5.7	66.8
#16	1.0	2.8	72.3	27.7	5.4	72.3
#30	0.9	2.2	52.9	20.4	7.3	79.6
#50	0.8	2.1	19.6	7.9	12.5	92.1
#100	0.8	2.0	2.8	1.6	6.3	98.4
LBW	0.8	1.7	0.6	0.8	0.8	99.2



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 Suite 500
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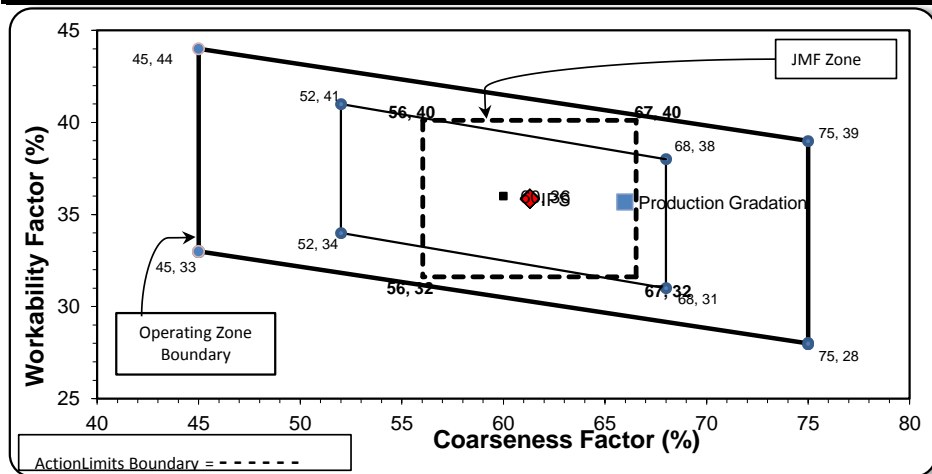
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	66	Workability Factor:	33	Adjusted WF	35.7
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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-103**

Sample Date: 9/16/19

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 9/17/2019 through 9/23/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1600	9.53	2.69	54.2
26A	58-003	Stoneco	250	1.49	2.69	8.5
2NS	47-16	Buno Rd	1100	6.65	2.65	37.3
Total Wt			2950	17.67		100.0

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



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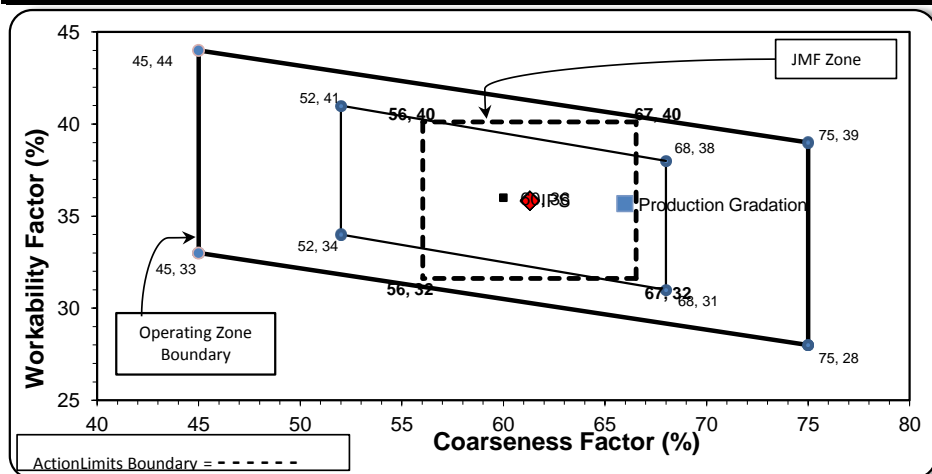
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	79.7	100.0	100.0	89.0	11.0	11.0
1/2"	40.4	99.8	100.0	67.7	21.3	32.3
3/8"	20.7	87.2	100.0	55.9	11.8	44.1
#4	3.9	9.3	96.6	38.9	17.0	61.1
#8	1.3	4.3	86.1	33.2	5.7	66.8
#16	1.0	2.8	72.3	27.7	5.4	72.3
#30	0.9	2.2	52.9	20.4	7.3	79.6
#50	0.8	2.1	19.6	7.9	12.5	92.1
#100	0.8	2.0	2.8	1.6	6.3	98.4
LBW	0.8	1.7	0.6	0.8	0.8	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:	66	Workability Factor:	33	Adjusted WF	35.7
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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

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Aggregate Optimization Chart

PLANT #: **P-20**

Sample Date: 9/16/19

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 9/17/2019 through 9/23/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1805	11.04	2.62	62.1
26A	71-47	Presque Isle	0	0.00	2.62	0.0
2NS	63-54	Holly	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"	98.6	100.0	100.0	99.1	0.9	0.9
3/4"	82.6	100.0	100.0	89.2	9.9	10.8
1/2"	47.4	98.7	100.0	67.3	21.9	32.7
3/8"	30.2	91.6	100.0	56.6	10.7	43.4
#4	4.7	20.5	97.4	39.8	16.8	60.2
#8	1.9	6.1	85.2	33.4	6.4	66.6
#16	1.8	2.8	69.0	27.2	6.2	72.8
#30	1.8	2.0	50.3	20.2	7.1	79.8
#50	1.7	1.8	21.6	9.2	10.9	90.8
#100	1.7	1.7	2.4	2.0	7.3	98.0
LBW	1.6	1.5	0.3	1.1	0.9	98.9

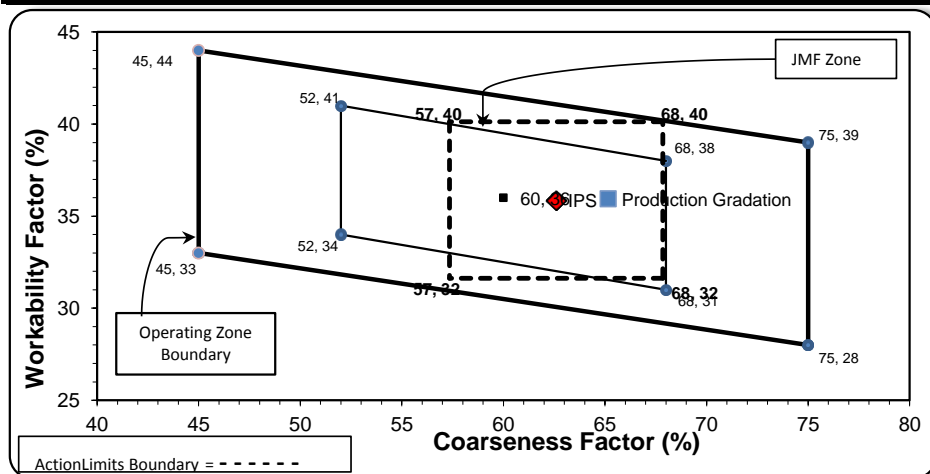
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	65	Workability Factor:	33	Adjusted WF	35.9
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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

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Aggregate Optimization Chart

PLANT #: **P-32**

Sample Date: 9/16/19

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 9/17/2019 through 9/23/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1500	9.17	2.62	51.6
26A	71-47	Presque Isle	255	1.56	2.62	8.8
2NS	95-013	Smelter Bay	1150	6.95	2.65	39.6
Total Wt			2905	17.69		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"	96.8	100.0	100.0	98.3	1.7	1.7
3/4"	77.7	100.0	100.0	88.5	9.9	11.5
1/2"	38.6	98.4	100.0	68.2	20.3	31.8
3/8"	22.4	89.0	100.0	59.0	9.2	41.0
#4	4.8	29.5	96.7	43.3	15.6	56.7
#8	2.6	8.7	82.6	34.8	8.5	65.2
#16	2.2	3.8	66.9	28.0	6.9	72.0
#30	2.0	2.8	47.4	20.0	7.9	80.0
#50	1.9	2.5	21.1	9.6	10.5	90.4
#100	1.8	2.3	5.1	3.2	6.4	96.8
LBW	1.2	1.8	0.8	1.1	2.1	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.



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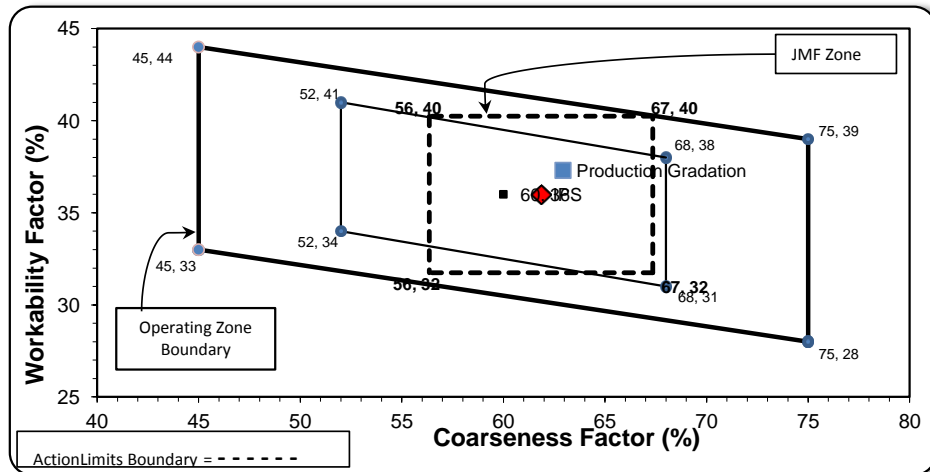
Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	63	Workability Factor:	35	37.3
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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:
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Approved By:

Aggregate Optimization Chart

PLANT #: **P-35**

Sample Date: 9/16/19

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 9/17/2019 through 9/23/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1600	9.53	2.69	54.2
26A	58-003	Stoneco	250	1.49	2.69	8.5
2NS	81-093	Burmeister	1100	6.65	2.65	37.3
Total Wt			2950	17.67		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"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	79.7	100.0	100.0	89.0	11.0	11.0
1/2"	40.4	99.8	100.0	67.7	21.3	32.3
3/8"	20.7	87.2	100.0	55.9	11.8	44.1
#4	3.9	9.3	96.6	38.9	17.0	61.1
#8	1.3	4.3	87.8	33.8	5.1	66.2
#16	1.0	2.8	63.4	24.4	9.4	75.6
#30	0.9	2.2	42.3	16.4	8.0	83.6
#50	0.8	2.1	15.3	6.3	10.1	93.7
#100	0.8	2.0	2.4	1.5	4.8	98.5
LBW	0.8	1.7	0.8	0.9	0.6	99.1

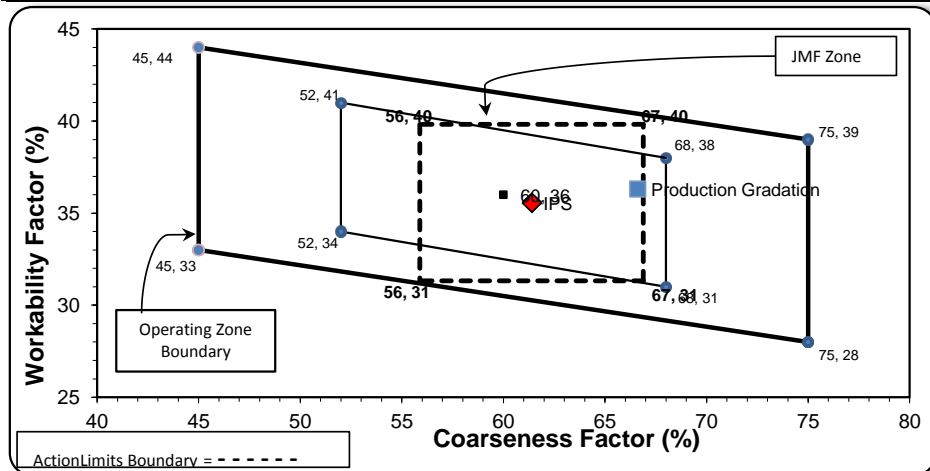
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	67	Workability Factor:	34	36.3
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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: 9/16/19

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 9/17/2019 through 9/23/2019

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	63-92	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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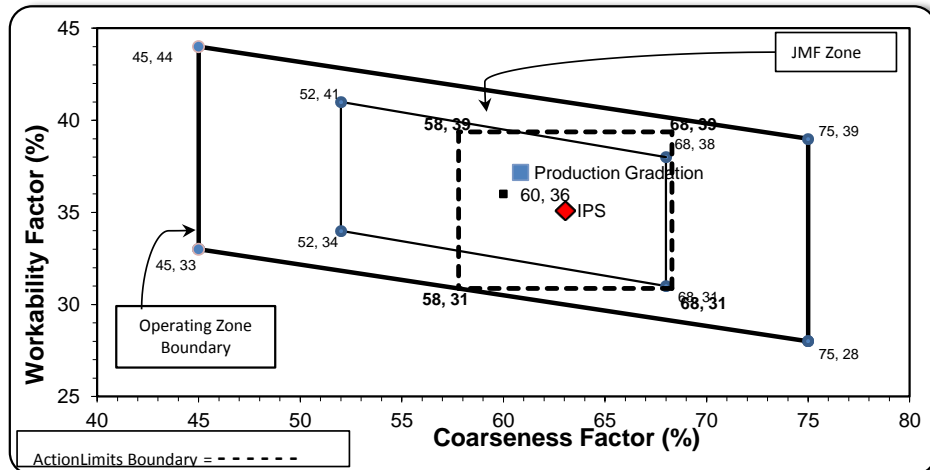
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	97.5	100.0	100.0	98.7	1.3	1.3
3/4"	81.8	100.0	100.0	90.3	8.4	9.7
1/2"	45.9	98.4	100.0	70.9	19.4	29.1
3/8"	27.5	89.0	100.0	60.2	10.7	39.8
#4	6.1	29.5	97.4	42.7	17.6	57.3
#8	3.1	8.7	85.2	34.7	8.0	65.3
#16	2.7	3.8	69.0	27.9	6.8	72.1
#30	2.5	2.8	50.3	20.6	7.3	79.4
#50	2.4	2.5	21.6	9.7	10.9	90.3
#100	2.2	2.3	2.4	2.3	7.4	97.7
LBW	1.5	1.8	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 Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	61	Workability Factor:	35	Adjusted WF	37.2	Coarseness Factor:	63
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Workability Factor:	35
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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: 9/16/19

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 9/17/2019 through 9/23/2019

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1500	9.17	2.62	51.6
26A	71-47	Presque Isle	255	1.56	2.62	8.8
2NS	44-051	Krake Willis Rd	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"	98.6	100.0	100.0	99.3	0.7	0.7
3/4"	82.1	100.0	100.0	90.8	8.5	9.2
1/2"	36.9	98.8	100.0	67.3	23.4	32.7
3/8"	17.1	90.6	100.0	56.4	10.9	43.6
#4	1.9	19.8	96.0	40.7	15.6	59.3
#8	1.6	5.2	82.2	33.8	6.9	66.2
#16	1.5	3.1	67.0	27.6	6.3	72.4
#30	1.4	2.4	51.2	21.2	6.4	78.8
#50	1.3	2.2	25.0	10.8	10.4	89.2
#100	1.2	2.0	4.6	2.6	8.1	97.4
LBW	1.1	1.8	0.8	1.0	1.6	99.0

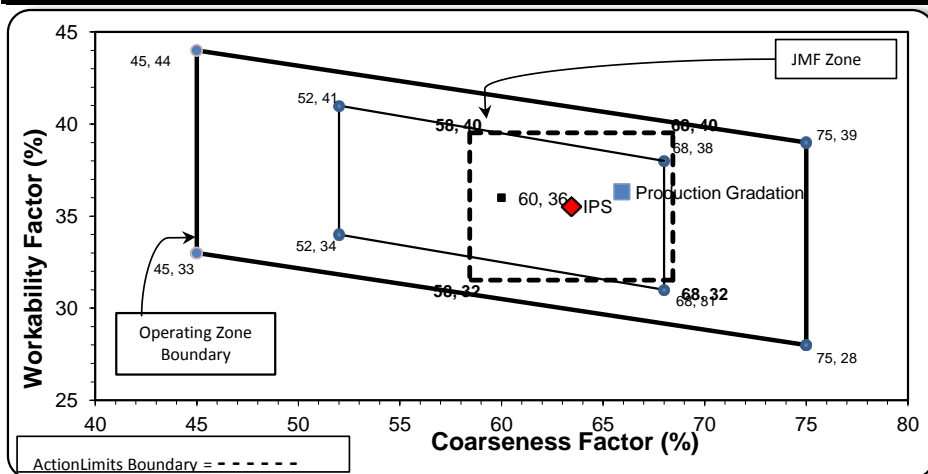
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	66	Workability Factor:	34	Adjusted WF	36.3
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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: 9/16/19

Concrete Grade: DM

Contractor: _____

Dates Test Represents: 9/17/2019 through 9/23/2019

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	47-16	Buno Rd	1100	6.65	2.65	37.9
Total Wt			2905	17.69		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"	97.5	100.0	100.0	98.7	1.3	1.3
3/4"	81.8	100.0	100.0	90.3	8.4	9.7
1/2"	45.9	98.4	100.0	70.9	19.4	29.1
3/8"	27.5	89.0	100.0	60.2	10.7	39.8
#4	6.1	29.5	96.6	42.4	17.9	57.6
#8	3.1	8.7	86.1	35.0	7.4	65.0
#16	2.7	3.8	72.3	29.1	5.9	70.9
#30	2.5	2.8	52.9	21.6	7.5	78.4
#50	2.4	2.5	19.6	8.9	12.7	91.1
#100	2.2	2.3	2.8	2.4	6.5	97.6
LBW	1.5	1.8	0.6	1.2	1.3	98.8



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 30701 W. 10 Mile Rd.
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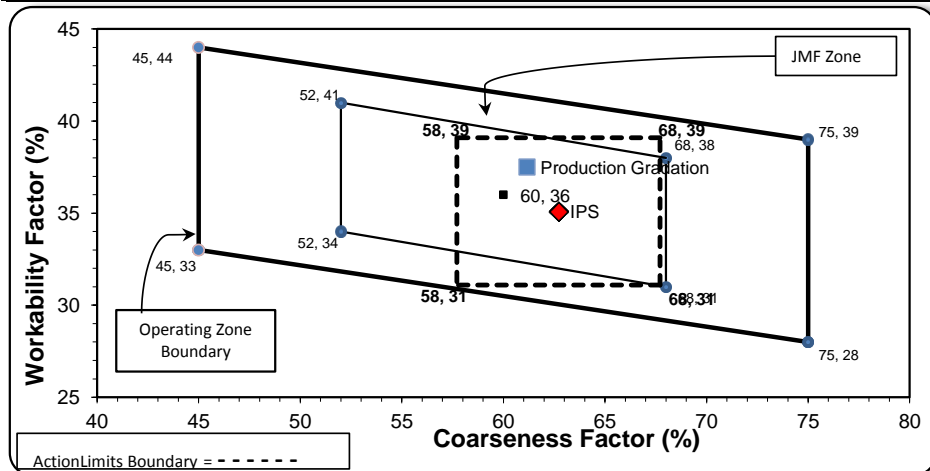
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom. Max. 1.5") aggregate is used.

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	61	Workability Factor:	35	Adjusted WF	37.5
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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"	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: