

Aggregate Optimization Chart

Production Gradation Report

PLANT #: **P-101**

Sample Date: 4/5/21

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 4/6/2021 through 4/12/2021

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%



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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"	98.5	100.0	100.0	99.2	0.8	0.8
3/4"	82.8	100.0	100.0	90.8	8.4	9.2
1/2"	44.5	97.8	100.0	70.1	20.7	29.9
3/8"	24.7	89.4	100.0	58.9	11.2	41.1
#4	2.9	21.8	98.3	41.9	17.0	58.1
#8	1.9	5.4	83.6	34.4	7.5	65.6
#16	1.6	2.8	68.5	28.1	6.3	71.9
#30	1.5	2.4	50.8	21.0	7.1	79.0
#50	1.4	2.3	23.8	10.3	10.7	89.7
#100	1.3	2.1	3.6	2.3	8.1	97.7
LBW	1.2	1.9	0.4	0.9	1.3	99.1

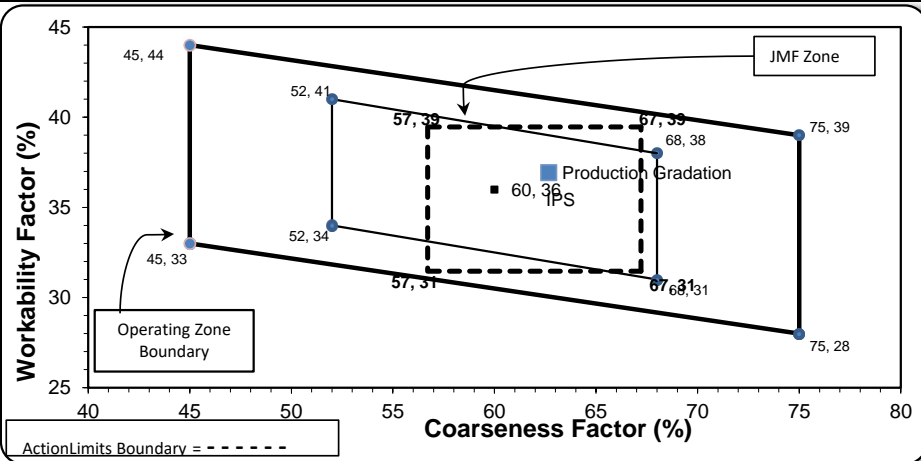
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	63	Workability Factor:	34	Adjusted WF	36.9
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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-20**

Sample Date: 4/5/21

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 4/6/2021 through 4/12/2021

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"	98.7	100.0	100.0	99.3	0.7	0.7
3/4"	84.1	100.0	100.0	91.5	7.8	8.5
1/2"	46.5	98.9	100.0	71.3	20.2	28.7
3/8"	28.0	91.4	100.0	60.7	10.5	39.3
#4	5.6	27.7	97.7	42.4	18.3	57.6
#8	2.5	6.8	85.6	34.3	8.0	65.7
#16	2.1	3.3	71.5	28.5	5.9	71.5
#30	2.0	2.6	50.8	20.5	8.0	79.5
#50	1.9	2.4	19.8	8.7	11.8	91.3
#100	1.8	2.2	2.6	2.1	6.6	97.9
LBW	1.7	2.0	0.5	1.3	0.9	98.7

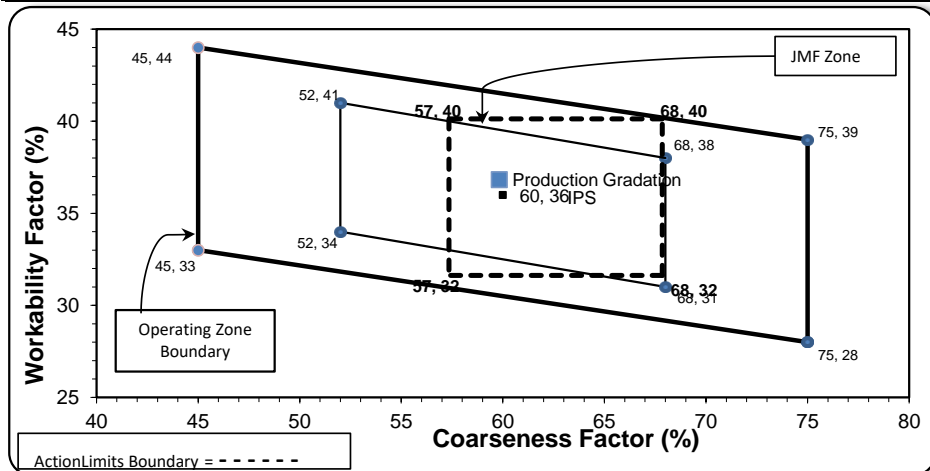
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	60	Workability Factor:	34	Adjusted WF	36.8
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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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 SM, LLC Technical Service

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Aggregate Optimization Chart

PLANT #: **P-32**

Sample Date: 4/5/21 Concrete Grade: **DM**

Dates Test Represents: 4/6/2021 through 4/12/2021

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1550	9.48	2.62	53.4
26A	71-47	Presque Isle	205	1.25	2.62	7.1
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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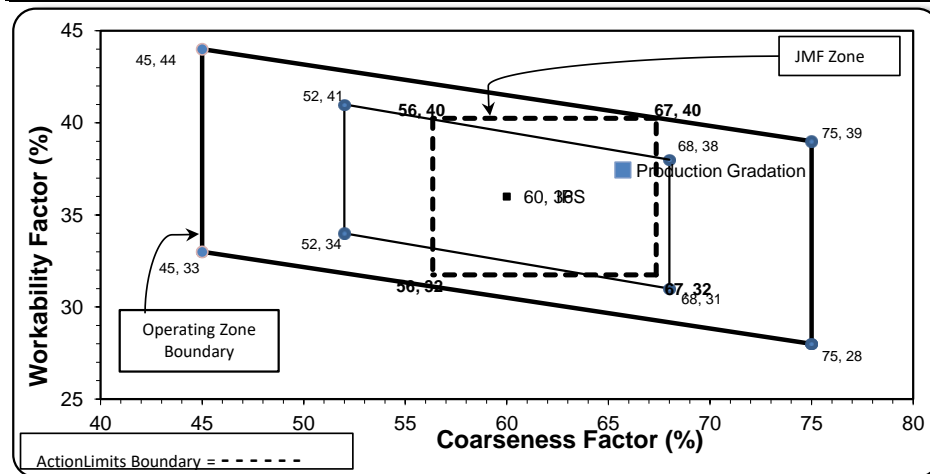
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	81.0	100.0	100.0	89.9	10.1	10.1
1/2"	39.7	97.8	100.0	67.7	22.2	32.3
3/8"	21.3	89.4	100.0	57.3	10.4	42.7
#4	3.6	21.8	96.2	41.5	15.7	58.5
#8	2.4	5.4	84.1	35.0	6.6	65.0
#16	2.1	2.8	68.4	28.4	6.6	71.6
#30	2.0	2.4	48.7	20.5	7.9	79.5
#50	1.9	2.3	21.7	9.8	10.7	90.2
#100	1.7	2.1	5.6	3.3	6.5	96.7
LBW	1.2	1.9	1.3	1.3	2.0	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 Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	66	Workability Factor:	35	Adjusted WF	37.5
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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-36**

Sample Date: 4/5/21

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 4/6/2021 through 4/12/2021

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1550	9.48	2.62	53.4
26A	71-47	Presque Isle	255	1.56	2.62	8.8
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"	98.7	100.0	100.0	99.3	0.7	0.7
3/4"	86.1	100.0	100.0	92.6	6.7	7.4
1/2"	50.0	97.8	100.0	73.1	19.5	26.9
3/8"	30.0	89.4	100.0	61.7	11.4	38.3
#4	6.4	21.8	97.7	42.3	19.4	57.7
#8	3.0	5.4	85.6	34.5	7.8	65.5
#16	2.5	2.8	71.5	28.7	5.8	71.3
#30	2.3	2.4	50.8	20.7	8.0	79.3
#50	2.2	2.3	19.8	8.9	11.8	91.1
#100	2.0	2.1	2.6	2.2	6.6	97.8
LBW	1.6	1.9	0.5	1.2	1.0	98.8

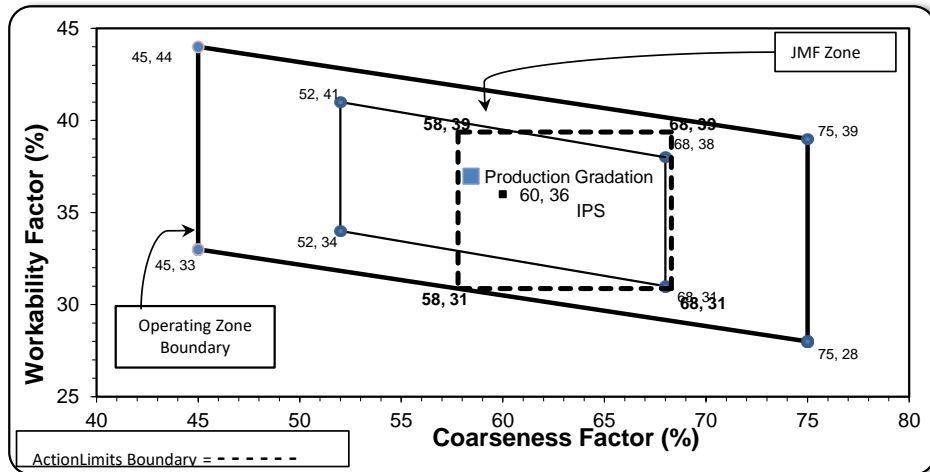
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	58	Workability Factor:	34	37.0
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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

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Approved By:

Aggregate Optimization Chart

PLANT #: **P-39**

Sample Date: 4/5/21 Concrete Grade: **DM**

Dates Test Represents: 4/6/2021 through 4/12/2021

Contractor: _____

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%



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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"	98.5	100.0	100.0	99.2	0.8	0.8
3/4"	82.8	100.0	100.0	90.5	8.7	9.5
1/2"	44.5	97.8	100.0	69.2	21.3	30.8
3/8"	24.7	89.4	100.0	57.7	11.5	42.3
#4	2.9	21.8	95.6	39.3	18.4	60.7
#8	1.9	5.4	80.6	31.9	7.4	68.1
#16	1.6	2.8	68.0	26.8	5.1	73.2
#30	1.5	2.4	53.3	21.2	5.6	78.8
#50	1.4	2.3	27.6	11.4	9.8	88.6
#100	1.3	2.1	8.3	4.0	7.4	96.0
LBW	1.2	1.9	1.2	1.2	2.8	98.8

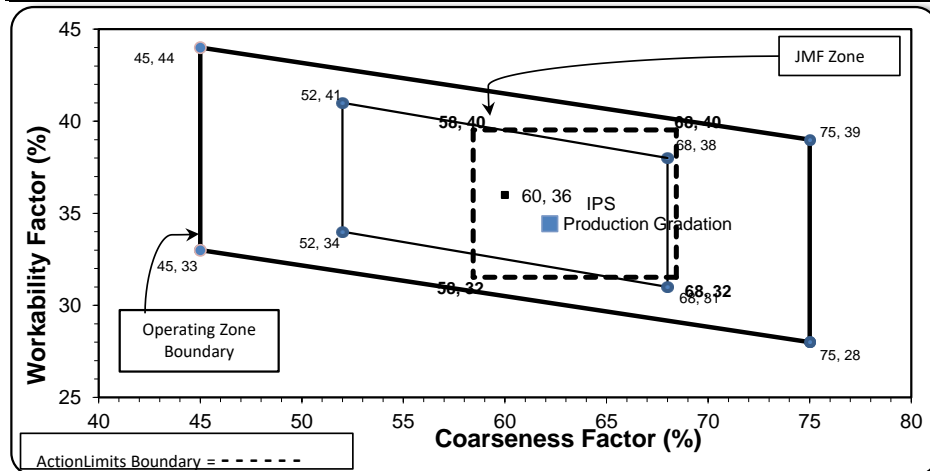
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	62	Workability Factor:	32	34.4
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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: 4/5/21 Concrete Grade: **DM**
 Dates Test Represents: 4/6/2021 through 4/12/2021

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	63-115	Ray 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"	98.7	100.0	100.0	99.3	0.7	0.7
3/4"	86.1	100.0	100.0	92.3	6.9	7.7
1/2"	50.0	97.8	100.0	72.3	20.0	27.7
3/8"	30.0	89.4	100.0	60.9	11.5	39.1
#4	6.4	21.8	97.5	43.3	17.6	56.7
#8	3.0	5.4	81.7	34.3	9.0	65.7
#16	2.5	2.8	66.8	28.0	6.3	72.0
#30	2.3	2.4	50.9	21.5	6.4	78.5
#50	2.2	2.3	25.3	11.3	10.2	88.7
#100	2.0	2.1	4.6	3.0	8.3	97.0
LBW	1.6	1.9	0.7	1.3	1.8	98.7

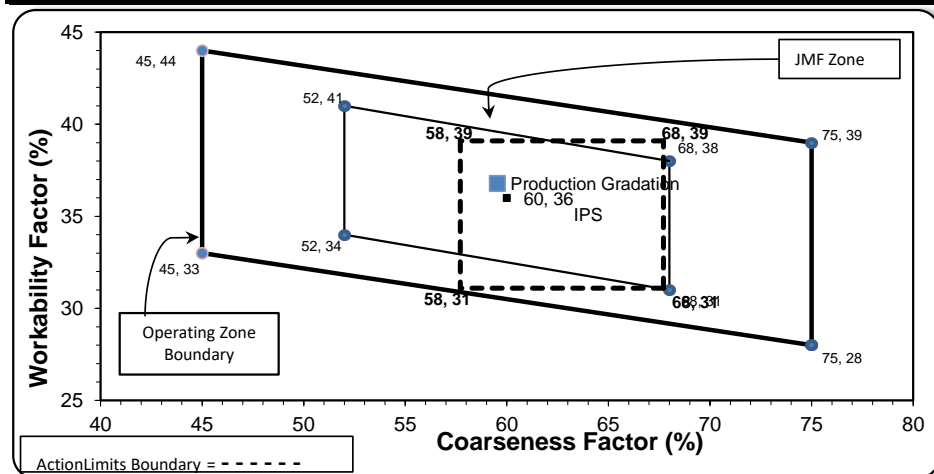
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	60	Workability Factor:	34	Adjusted WF	36.8
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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: