

Aggregate Optimization Chart

Production Gradation Report

PLANT #: **P-101**

Sample Date: 3/15/21

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 3/16/2021 through 3/22/2021

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"	99.4	100.0	100.0	99.7	0.3	0.3
3/4"	89.1	100.0	100.0	94.2	5.5	5.8
1/2"	51.4	98.8	100.0	73.9	20.3	26.1
3/8"	29.8	89.6	100.0	61.7	12.2	38.3
#4	5.1	21.7	98.3	43.1	18.6	56.9
#8	2.8	5.9	83.6	34.9	8.1	65.1
#16	2.0	2.7	68.5	28.3	6.6	71.7
#30	1.9	2.0	50.8	21.2	7.1	78.8
#50	1.8	1.8	23.8	10.5	10.7	89.5
#100	1.7	1.6	3.6	2.4	8.1	97.6
LBW	1.6	1.5	0.4	1.1	1.3	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.

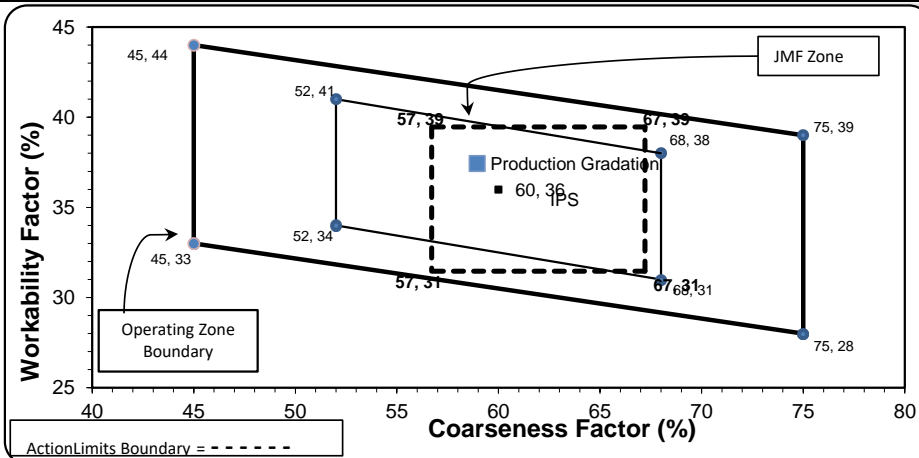
Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	59	Workability Factor:	35	Adjusted WF	37.4
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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: 3/15/21 Concrete Grade: **DM**

Dates Test Represents: 3/16/2021 through 3/22/2021

Contractor: _____

MDOT No.: _____



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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%

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"	84.1	100.0	100.0	91.5	7.8	8.5
1/2"	41.4	97.2	100.0	68.4	23.1	31.6
3/8"	23.2	90.6	100.0	58.1	10.3	41.9
#4	5.1	28.9	97.6	42.2	15.9	57.8
#8	2.6	7.8	85.3	34.4	7.8	65.6
#16	2.2	3.1	69.7	27.8	6.5	72.2
#30	2.0	2.2	48.4	19.6	8.2	80.4
#50	2.0	1.9	19.4	8.6	11.0	91.4
#100	1.9	1.8	2.7	2.2	6.4	97.8
LBW	1.7	1.6	0.5	1.2	1.0	98.8

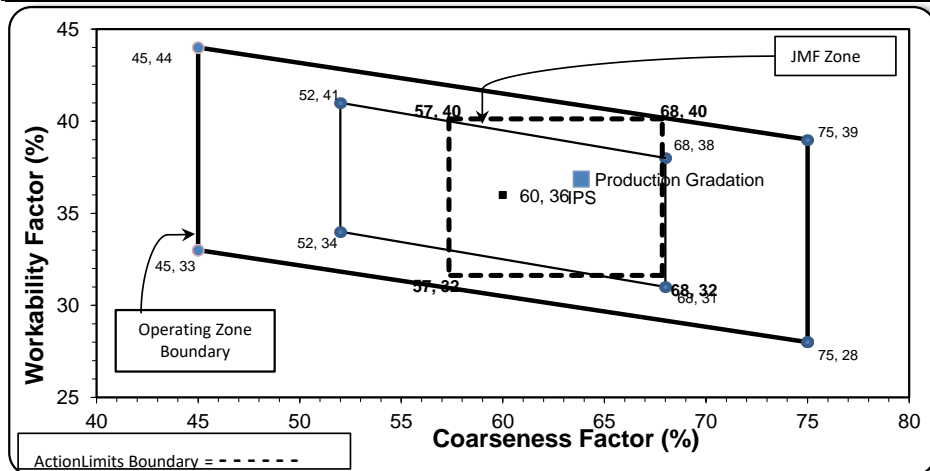
*Maximum % Retained must be above the 3/8" sieve.
*Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
*% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
*% Retained must be at least 8% for the 1" sieve when a 2" max. size (nom.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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	64	Workability Factor:	34	Adjusted WF	36.9
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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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SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

PLANT #: **P-32**

Sample Date: 3/15/21

Concrete Grade: DM

Contractor: _____

Dates Test Represents: 3/16/2021 through 3/22/2021

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1400	8.56	2.62	48.2
26A	71-47	Presque Isle	355	2.17	2.62	12.2
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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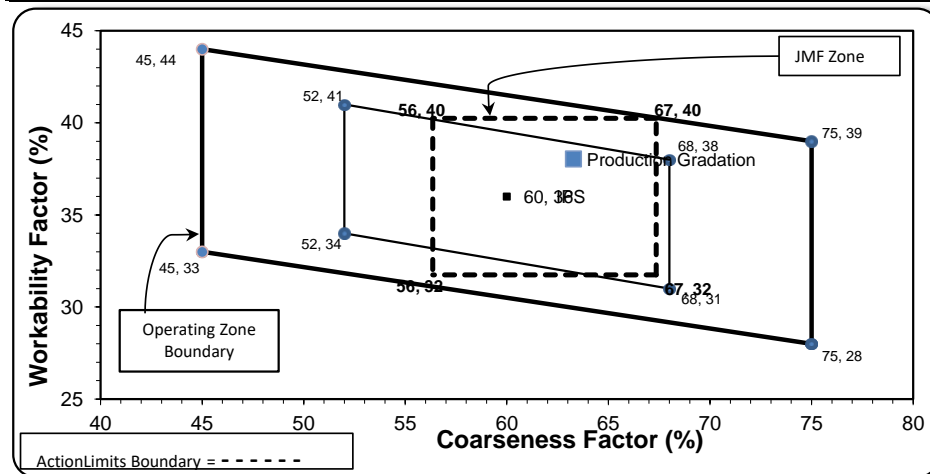
Sieve	6AA	26A	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	99.0	100.0	100.0	99.5	0.5	0.5
3/4"	73.4	100.0	100.0	87.2	12.3	12.8
1/2"	35.3	98.8	100.0	68.7	18.5	31.3
3/8"	18.0	89.6	100.0	59.2	9.5	40.8
#4	4.2	21.7	97.0	43.1	16.1	56.9
#8	2.6	5.9	84.8	35.5	7.5	64.5
#16	2.2	2.7	68.9	28.7	6.9	71.3
#30	2.0	2.0	43.7	18.5	10.2	81.5
#50	1.8	1.8	18.7	8.5	10.0	91.5
#100	1.6	1.6	3.6	2.4	6.1	97.6
LBW	1.3	1.5	0.7	1.1	1.3	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:	63	Workability Factor:	36	38.0	Coarseness Factor:	62
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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"	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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 SM, LLC Technical Service

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Aggregate Optimization Chart

PLANT #: **P-36**

Sample Date: 3/15/21

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 3/16/2021 through 3/22/2021

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1400	8.56	2.62	48.2
26A	71-47	Presque Isle	405	2.48	2.62	13.9
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"	97.7	100.0	100.0	98.9	1.1	1.1
3/4"	65.4	100.0	100.0	83.3	15.6	16.7
1/2"	31.7	98.8	100.0	66.9	16.4	33.1
3/8"	12.1	89.6	100.0	56.2	10.7	43.8
#4	3.3	21.7	97.6	41.6	14.6	58.4
#8	2.2	5.9	85.3	34.2	7.4	65.8
#16	2.0	2.7	69.7	27.7	6.4	72.3
#30	1.9	2.0	48.4	19.5	8.2	80.5
#50	1.8	1.8	19.4	8.5	11.1	91.5
#100	1.7	1.6	2.7	2.1	6.4	97.9
LBW	1.2	1.5	0.5	1.0	1.1	99.0

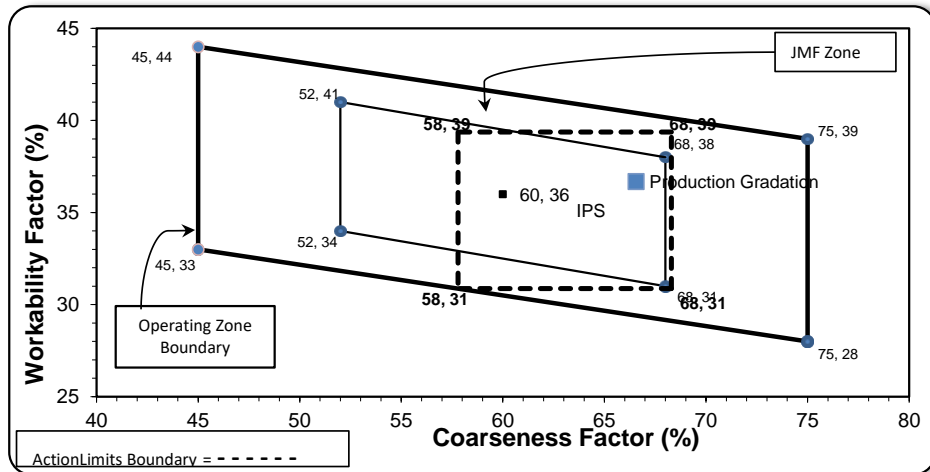
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	67	Workability Factor:	34	Adjusted WF	36.7
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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: 3/15/21

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 3/16/2021 through 3/22/2021

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	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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 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"	99.4	100.0	100.0	99.7	0.3	0.3
3/4"	89.1	100.0	100.0	94.0	5.7	6.0
1/2"	51.4	98.8	100.0	73.1	20.9	26.9
3/8"	29.8	89.6	100.0	60.5	12.6	39.5
#4	5.1	21.7	97.6	41.3	19.2	58.7
#8	2.8	5.9	85.3	34.3	7.0	65.7
#16	2.0	2.7	69.7	27.7	6.6	72.3
#30	1.9	2.0	48.4	19.5	8.2	80.5
#50	1.8	1.8	19.4	8.5	11.1	91.5
#100	1.7	1.6	2.7	2.1	6.4	97.9
LBW	1.6	1.5	0.5	1.2	0.9	98.8

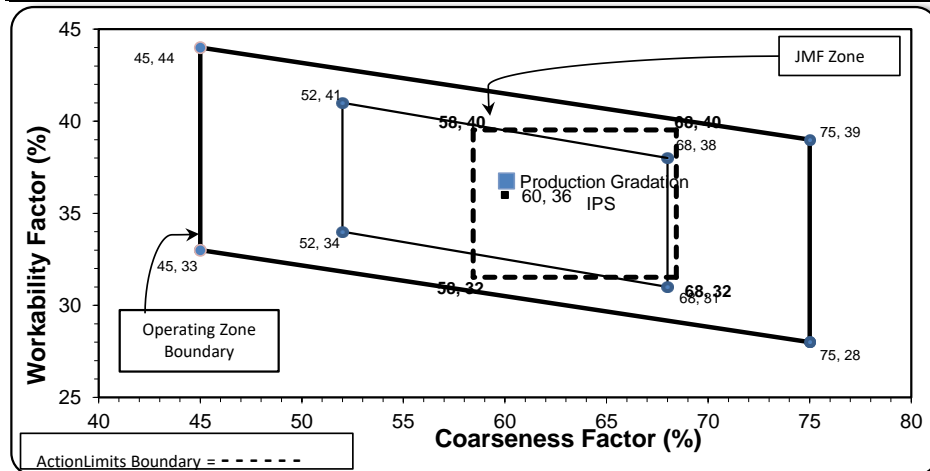
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	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"	89.7	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: 3/15/21 Concrete Grade: DM

Dates Test Represents: 3/16/2021 through 3/22/2021

Contractor: _____

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1400	8.56	2.62	48.2
26A	71-47	Presque Isle	355	2.17	2.62	12.2
2NS	63-115	Ray Rd	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"	97.7	100.0	100.0	98.9	1.1	1.1
3/4"	65.4	100.0	100.0	83.3	15.6	16.7
1/2"	31.7	98.8	100.0	66.9	16.4	33.1
3/8"	12.1	89.6	100.0	56.4	10.6	43.6
#4	3.3	21.7	97.2	42.7	13.6	57.3
#8	2.2	5.9	80.4	33.6	9.1	66.4
#16	2.0	2.7	63.3	26.4	7.3	73.6
#30	1.9	2.0	47.4	19.9	6.4	80.1
#50	1.8	1.8	22.4	10.0	10.0	90.0
#100	1.7	1.6	4.0	2.6	7.4	97.4
LBW	1.2	1.5	0.6	1.0	1.6	99.0



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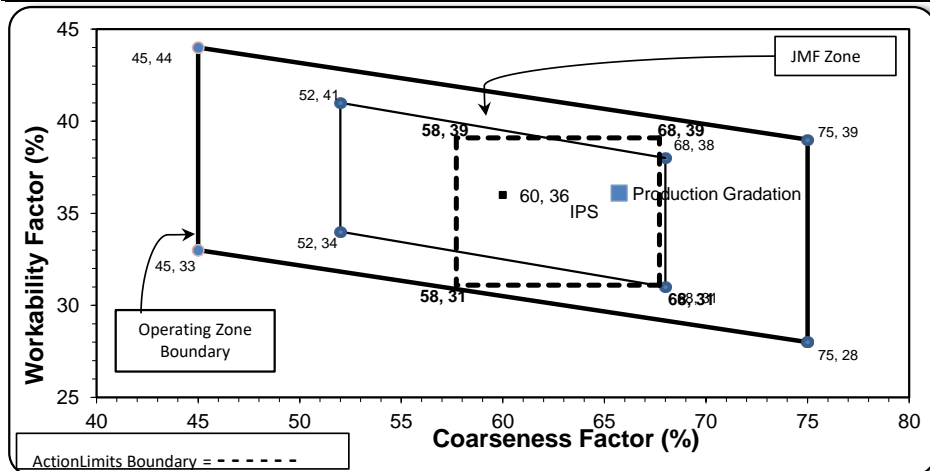
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	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"	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: