

Aggregate Optimization Chart

Production Gradation Report

PLANT #: **P-101**

Sample Date: 12/27/21

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 12/28/2021 through 1/3/2022

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"	98.7	100.0	100.0	99.3	0.7	0.7
3/4"	84.2	100.0	100.0	91.5	7.8	8.5
1/2"	39.1	96.5	100.0	67.1	24.4	32.9
3/8"	23.1	84.8	100.0	57.7	9.4	42.3
#4	2.8	14.4	98.5	41.4	16.3	58.6
#8	1.8	3.5	83.3	34.1	7.3	65.9
#16	1.6	1.7	68.3	28.0	6.2	72.0
#30	1.4	1.4	53.3	21.9	6.1	78.1
#50	1.3	1.4	29.2	12.3	9.6	87.7
#100	1.3	1.3	7.3	3.7	8.7	96.3
LBW	1.1	1.2	0.6	0.9	2.8	99.1

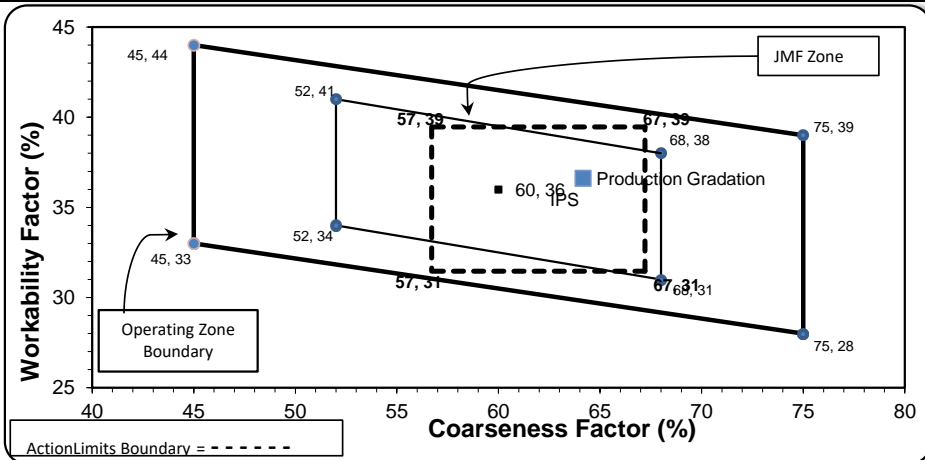
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size (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	36.6
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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-102**

Sample Date: 12/27/21

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 12/28/2021 through 1/3/2022

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1350	8.04	2.69	45.7
26A	58-003	Stoneco	455	2.71	2.69	15.4
2NS	63-114	Highland	1150	6.95	2.65	38.9
Total Wt			2955	17.71		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"	84.1	100.0	100.0	92.7	7.3	7.3
1/2"	35.0	99.3	100.0	70.2	22.5	29.8
3/8"	15.3	73.6	100.0	57.2	13.0	42.8
#4	2.1	8.3	99.7	41.0	16.2	59.0
#8	1.1	3.5	87.5	35.1	5.9	64.9
#16	0.8	2.4	68.2	27.3	7.8	72.7
#30	0.7	1.8	46.1	18.5	8.7	81.5
#50	0.6	1.7	18.3	7.7	10.9	92.3
#100	0.5	1.5	2.9	1.6	6.1	98.4
LBW	0.5	1.2	0.4	0.6	1.0	99.4

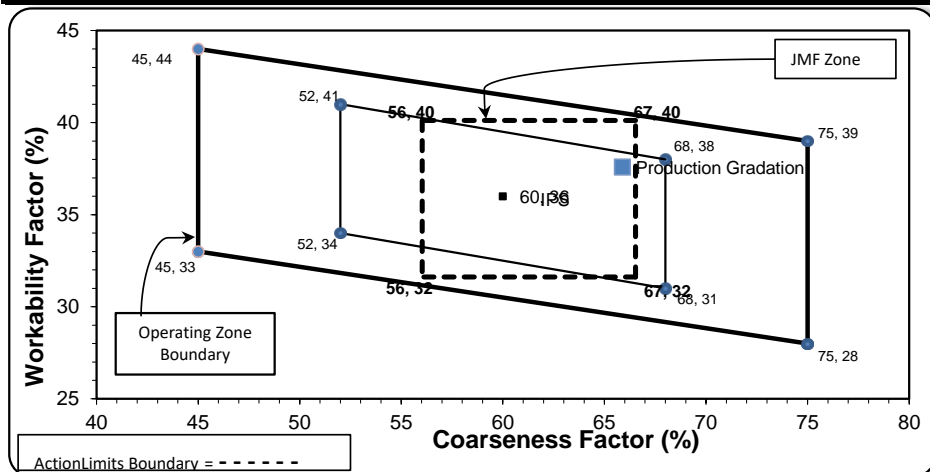
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size (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:	35	37.6
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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

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Aggregate Optimization Chart

PLANT #: **P-32**

Sample Date: 12/27/21

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 12/28/2021 through 1/3/2022

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1455	8.90	2.62	50.1
26A	71-47	Presque Isle	300	1.83	2.62	10.3
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"	98.9	100.0	100.0	99.4	0.6	0.6
3/4"	82.7	100.0	100.0	91.3	8.1	8.7
1/2"	45.0	97.9	100.0	72.2	19.1	27.8
3/8"	26.8	91.5	100.0	62.5	9.8	37.5
#4	6.9	29.8	96.4	44.7	17.8	55.3
#8	3.5	7.3	83.3	35.5	9.2	64.5
#16	2.9	2.8	67.6	28.5	7.0	71.5
#30	2.7	2.3	48.7	20.9	7.6	79.1
#50	2.6	2.1	23.0	10.6	10.2	89.4
#100	2.4	2.1	6.6	4.0	6.6	96.0
LBW	1.8	1.9	0.8	1.4	2.6	98.6

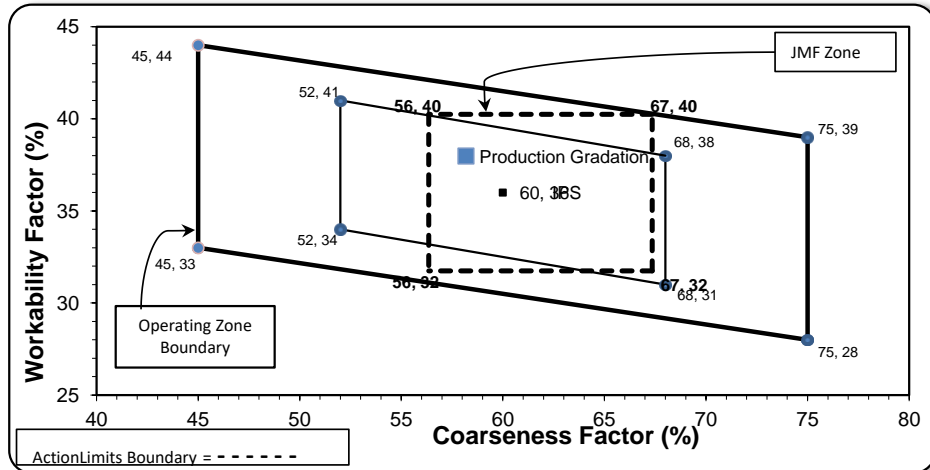
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size (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:	35	38.0	Coarseness Factor:	62
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Workability Factor:	36
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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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Aggregate Optimization Chart

PLANT #: **P-35**

Sample Date: 12/27/21

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 12/28/2021 through 1/3/2022

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1400	8.34	2.69	47.4
26A	58-003	Stoneco	455	2.71	2.69	15.4
2NS	81-093	Burmeister	1100	6.65	2.65	37.2
Total Wt			2955	17.70		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"	84.1	100.0	100.0	92.5	7.5	7.5
1/2"	35.0	99.3	100.0	69.1	23.4	30.9
3/8"	15.3	73.6	100.0	55.8	13.3	44.2
#4	2.1	8.3	98.6	39.0	16.8	61.0
#8	1.1	3.5	85.3	32.8	6.2	67.2
#16	0.8	2.4	69.0	26.4	6.4	73.6
#30	0.7	1.8	51.0	19.6	6.8	80.4
#50	0.6	1.7	20.2	8.1	11.5	91.9
#100	0.5	1.5	3.8	1.9	6.2	98.1
LBW	0.5	1.2	1.4	0.9	0.9	99.1

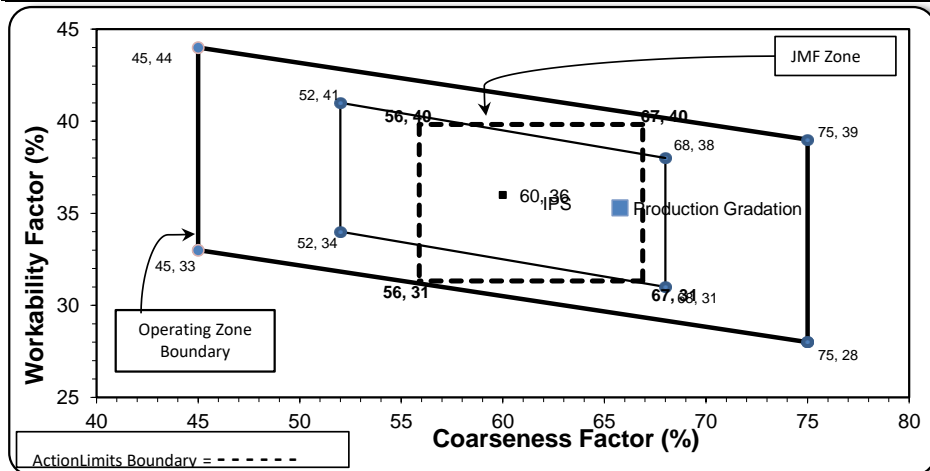
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Intial Production Sample (IPS)

Coarseness Factor:	66	Workability Factor:	33	35.3
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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:
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Approved By:

Aggregate Optimization Chart

PLANT #: **P-39**

Sample Date: 12/27/21

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 12/28/2021 through 1/3/2022

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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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"	84.2	100.0	100.0	91.3	8.0	8.7
1/2"	39.1	96.5	100.0	66.1	25.2	33.9
3/8"	23.1	84.8	100.0	56.5	9.6	43.5
#4	2.8	14.4	97.4	39.4	17.0	60.6
#8	1.8	3.5	82.9	32.6	6.8	67.4
#16	1.6	1.7	68.0	26.7	5.9	73.3
#30	1.4	1.4	49.9	19.8	7.0	80.2
#50	1.3	1.4	24.9	10.2	9.5	89.8
#100	1.3	1.3	3.4	2.1	8.1	97.9
LBW	1.1	1.2	0.3	0.8	1.3	99.2

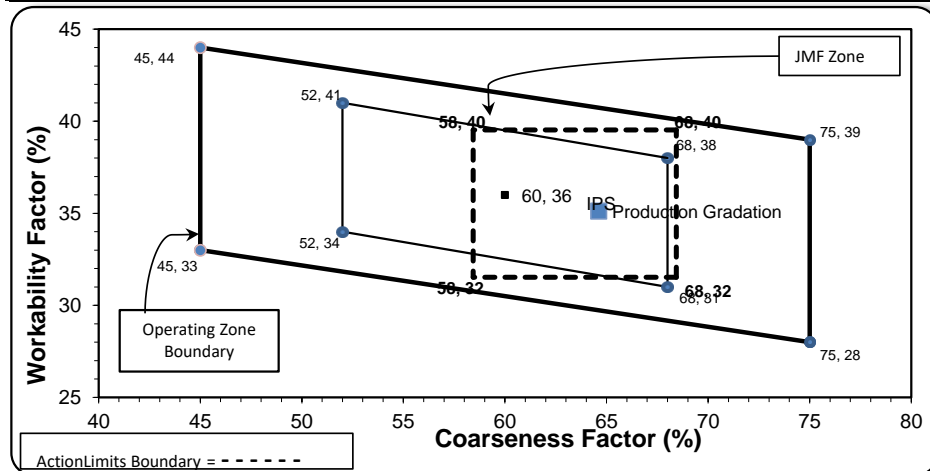
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	65	Workability Factor:	33	Adjusted WF	35.1
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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: 12/27/21

Concrete Grade: DM

Contractor: _____

Dates Test Represents: 12/28/2021 through 1/3/2022

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	63-115	Ray Rd	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"	99.3	100.0	100.0	99.6	0.4	0.4
3/4"	87.6	100.0	100.0	93.1	6.5	6.9
1/2"	48.7	97.9	100.0	71.5	21.6	28.5
3/8"	27.7	91.5	100.0	59.5	12.0	40.5
#4	5.8	29.8	96.4	41.8	17.7	58.2
#8	3.2	7.3	78.6	32.0	9.7	68.0
#16	2.7	2.8	62.1	25.2	6.8	74.8
#30	2.5	2.3	45.5	18.8	6.4	81.2
#50	2.4	2.1	24.3	10.7	8.1	89.3
#100	2.3	2.1	4.9	3.3	7.4	96.7
LBW	1.7	1.9	0.9	1.4	1.9	98.6

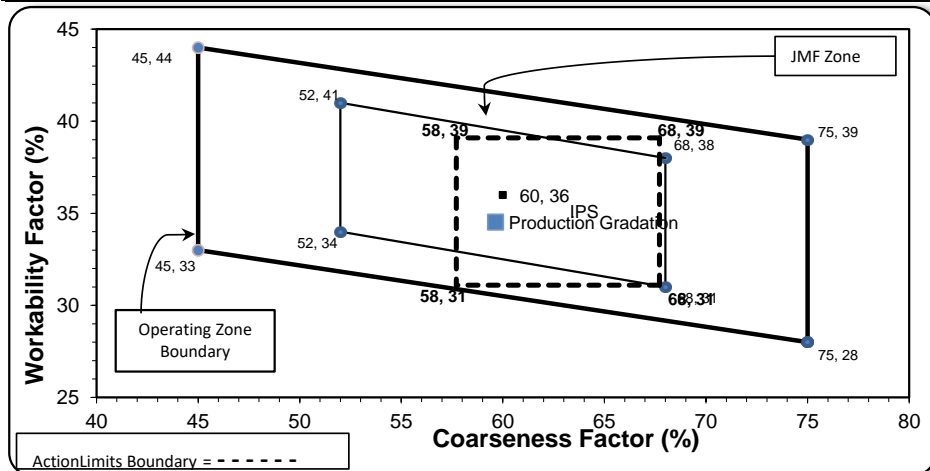
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size (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:	32	Adjusted WF	34.5
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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

PREPARED BY:
 SM, LLC Technical Service

Approved By: