

Aggregate Optimization Chart

MIX ID'S: DDD0K7E7, DDD0K7E8 and DDD0K7E9

Production Gradation Report

PLANT #: **P-102**

Sample Date: 10/29/18

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 10/30/2018 through 11/5/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1475	8.79	2.69	49.2
26A	58-003	Stoneco	400	2.38	2.69	13.4
2NS	38-046	Chelsea	1120	6.77	2.65	37.4
Total Wt			2995	17.94		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"	84.4	100.0	100.0	92.3	7.7	7.7
1/2"	41.8	99.7	100.0	71.3	21.0	28.7
3/8"	20.5	87.0	100.0	59.1	12.2	40.9
#4	3.2	14.2	100.0	40.9	18.2	59.1
#8	1.3	2.8	88.0	33.9	6.9	66.1
#16	1.1	1.2	64.0	24.6	9.3	75.4
#30	1.0	1.0	42.0	16.3	8.3	83.7
#50	0.9	0.9	22.0	8.8	7.5	91.2
#100	0.8	0.8	5.0	2.4	6.4	97.6
LBW	0.6	0.6	0.8	0.7	1.7	99.3



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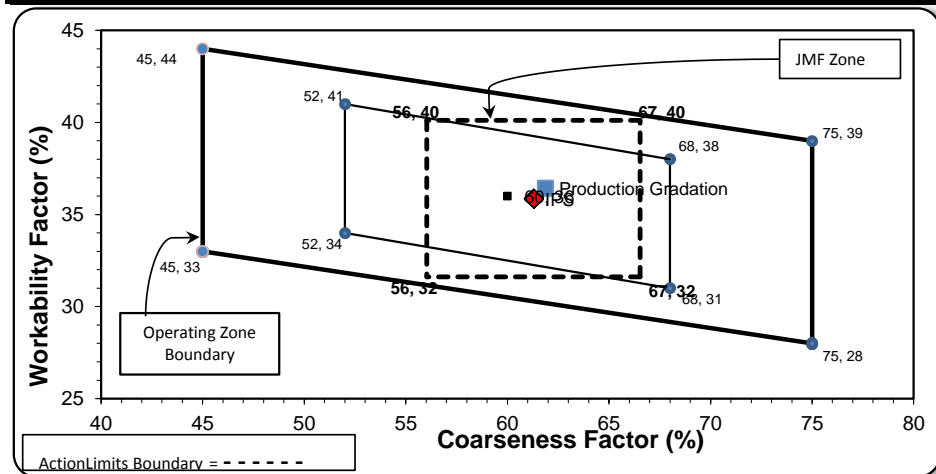
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	62	Workability Factor:	34	Adjusted WF	36.4
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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

MIX ID'S: DDD0K7E7, DDD0K7E8 and DDD0K7E9

Production Gradation Report

PLANT #: **P-20**

Sample Date: 10/29/18

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 10/30/2018 through 11/5/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1500	9.17	2.62	50.8
26A	71-47	Presque Isle	300	1.83	2.62	10.2
2NS	63-92	AA Grange Hall	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"	99.2	100.0	100.0	99.6	0.4	0.4
3/4"	83.9	100.0	100.0	91.8	7.8	8.2
1/2"	40.3	98.0	100.0	69.4	22.4	30.6
3/8"	20.8	89.6	100.0	58.7	10.8	41.3
#4	3.2	22.9	97.2	41.8	16.8	58.2
#8	2.2	6.0	84.5	34.7	7.2	65.3
#16	1.9	2.7	69.4	28.3	6.4	71.7
#30	1.8	2.0	51.2	21.1	7.2	78.9
#50	1.7	1.8	23.6	10.2	10.8	89.8
#100	1.7	1.7	3.9	2.6	7.7	97.4
LBW	1.6	1.5	0.4	1.1	1.4	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.



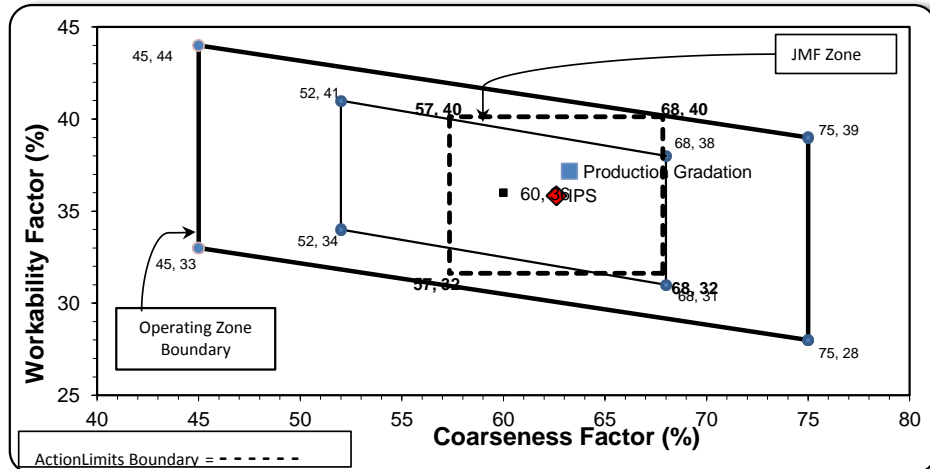
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 Suite 500
 Farmington Hills, MI 48336

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	63	Workability Factor:	35
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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:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

MIX ID'S: DDD0K7E7, DDD0K7E8 and DDD0K7E9

Production Gradation Report

PLANT #: **P-32**

Sample Date: 10/29/18

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 10/30/2018 through 11/5/2018

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	95-13	Smelter Bay	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"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	87.1	100.0	100.0	93.0	7.0	7.0
1/2"	46.0	95.8	100.0	70.4	22.6	29.6
3/8"	27.6	80.3	100.0	59.4	11.0	40.6
#4	4.6	17.5	97.4	41.7	17.7	58.3
#8	2.2	6.4	85.2	34.8	6.8	65.2
#16	1.8	4.1	69.0	28.2	6.7	71.8
#30	1.7	3.2	48.5	20.0	8.1	80.0
#50	1.7	2.8	20.7	9.2	10.9	90.8
#100	1.6	2.5	3.5	2.4	6.8	97.6
LBW	1.3	1.8	0.4	1.0	1.4	99.0

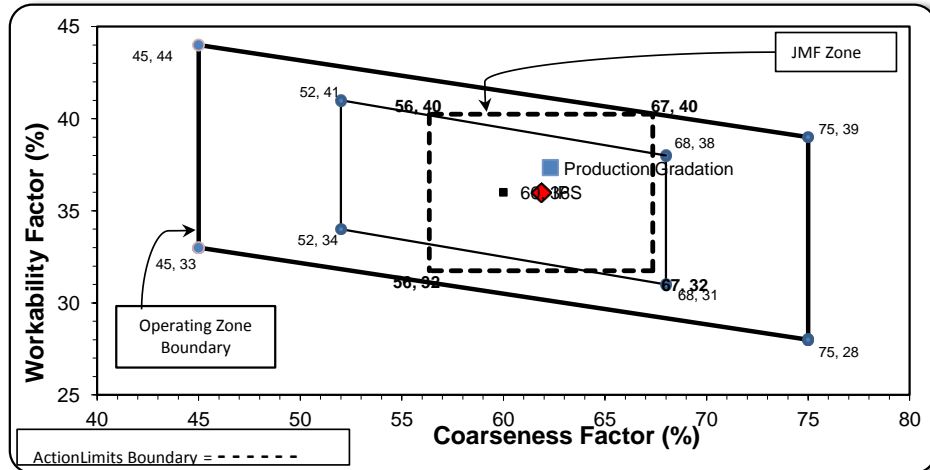
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	62	Workability Factor:	35
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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:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

MIX ID'S: DDD0K7E7, DDD0K7E8 and DDD0K7E9

Production Gradation Report

PLANT #: **P-35**

Sample Date: 10/29/18

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 10/30/2018 through 11/5/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	58-003	Stoneco	1540	9.17	2.69	51.5
26A	58-003	Stoneco	250	1.49	2.69	8.4
2NS	81-93	Burmeister	1200	7.28	2.64	40.1
Total Wt			2990	17.95		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"	84.4	100.0	100.0	92.0	8.0	8.0
1/2"	41.8	99.7	100.0	70.0	22.0	30.0
3/8"	20.5	87.0	100.0	58.0	12.0	42.0
#4	3.2	14.2	97.6	42.0	16.0	58.0
#8	1.3	2.8	81.4	33.6	8.4	66.4
#16	1.1	1.2	62.6	25.8	7.8	74.2
#30	1.0	1.0	42.2	17.5	8.3	82.5
#50	0.9	0.9	15.3	6.7	10.9	93.3
#100	0.8	0.8	3.0	1.7	5.0	98.3
LBW	0.6	0.6	0.8	0.7	1.0	99.3

*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.



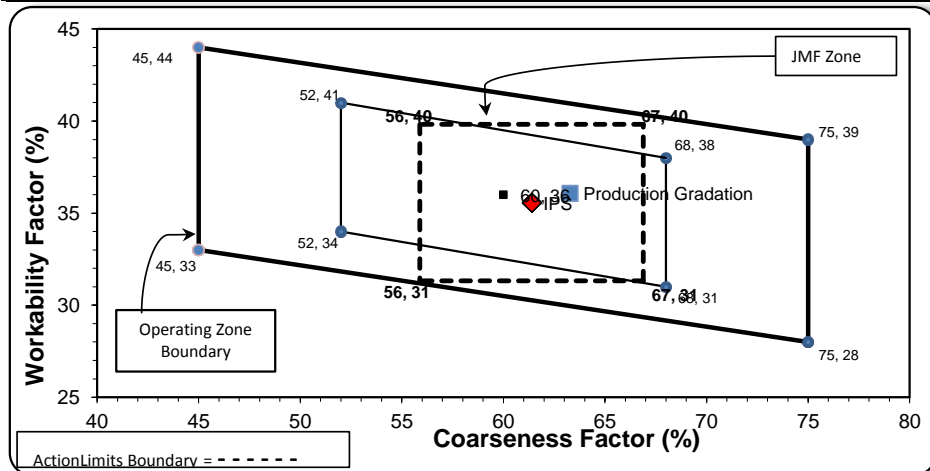
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Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	63	Workability Factor:	34	Adjusted WF	36.1
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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

MIX ID'S: DDD0K7E7, DDD0K7E8 and DDD0K7E9

Production Gradation Report

PLANT #: **P-36**

Sample Date: 10/29/18

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 10/30/2018 through 11/5/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1500	9.17	2.62	50.8
26A	71-47	Presque Isle	300	1.83	2.62	10.2
2NS	63-92	AA Grange Hall	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"	97.4	100.0	100.0	98.7	1.3	1.3
3/4"	79.7	100.0	100.0	89.7	9.0	10.3
1/2"	39.2	95.8	100.0	68.7	21.0	31.3
3/8"	20.1	80.3	100.0	57.4	11.3	42.6
#4	4.4	17.5	97.2	41.9	15.5	58.1
#8	2.6	6.4	84.5	34.9	7.0	65.1
#16	2.3	4.1	69.4	28.6	6.3	71.4
#30	2.2	3.2	51.2	21.4	7.2	78.6
#50	2.0	2.8	23.6	10.5	10.9	89.5
#100	1.9	2.5	3.9	2.7	7.8	97.3
LBW	1.4	1.8	0.4	1.1	1.7	98.9



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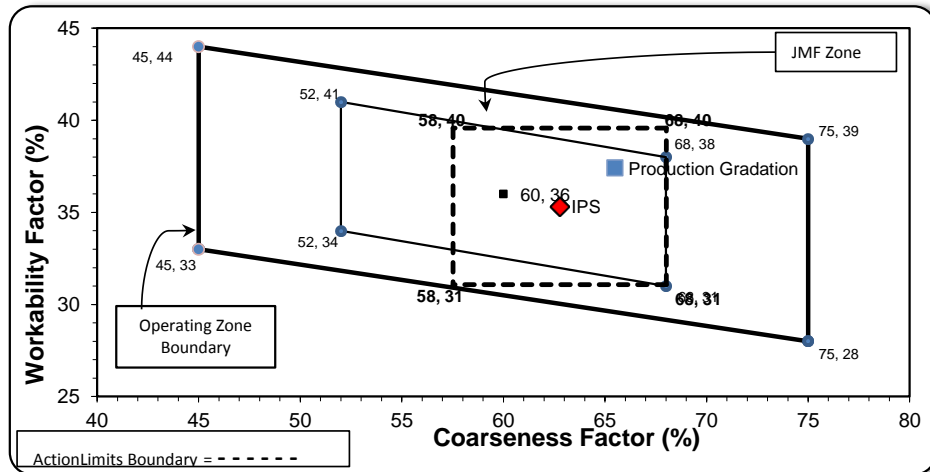
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	65	Workability Factor:	35	Adjusted WF	37.4
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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"	99.9	0.1	0.1
3/4"	89.1	10.8	10.9
1/2"	71.3	17.8	28.7
3/8"	59.4	11.9	40.6
#4	42.6	16.8	57.4
#8	35.3	7.3	64.7
#16	28.5	6.8	71.5
#30	20.9	7.6	79.1
#50	9.0	12.0	91.0
#100	1.7	7.3	98.3
LBW	0.7	1.0	99.3

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

MIX ID'S: DDD0K7E7, DDD0K7E8 and DDD0K7E9

Production Gradation Report

PLANT #: **P-02**

Sample Date: 10/29/18

Concrete Grade: **DM**

Contractor: _____

Dates Test Represents: 10/30/2018 through 11/5/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1500	9.17	2.62	50.8
26A	71-47	Presque Isle	300	1.83	2.62	10.2
2NS	63-92	AA Grange Hall	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"	97.4	100.0	100.0	98.7	1.3	1.3
3/4"	79.7	100.0	100.0	89.7	9.0	10.3
1/2"	39.2	95.8	100.0	68.7	21.0	31.3
3/8"	20.1	80.3	100.0	57.4	11.3	42.6
#4	4.4	17.5	97.2	41.9	15.5	58.1
#8	2.6	6.4	84.5	34.9	7.0	65.1
#16	2.3	4.1	69.4	28.6	6.3	71.4
#30	2.2	3.2	51.2	21.4	7.2	78.6
#50	2.0	2.8	23.6	10.5	10.9	89.5
#100	1.9	2.5	3.9	2.7	7.8	97.3
LBW	1.4	1.8	0.4	1.1	1.7	98.9



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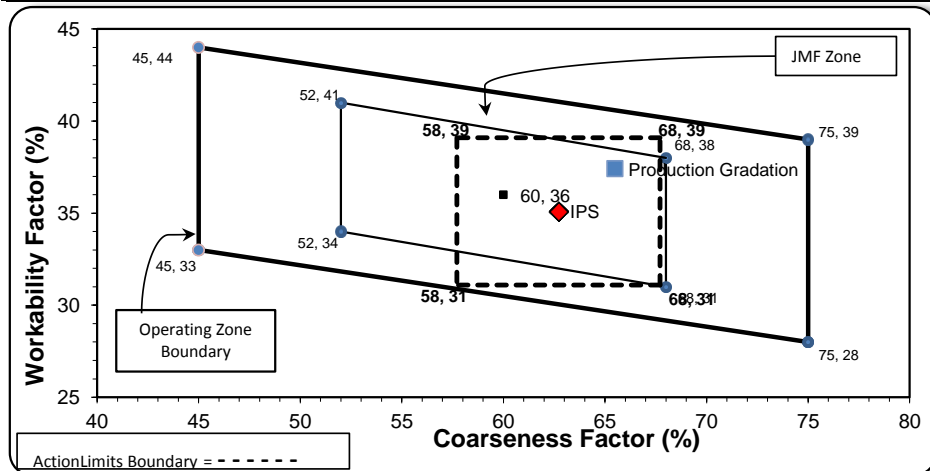
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Adjusted WF Initial Production Sample (IPS)

Coarseness Factor:	65	Workability Factor:	35	Adjusted WF	37.4
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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: