

Aggregate Optimization Chart

MIX ID'S: DDP154E7, DDP154E8, DDP164E7 and DDP164E8

Production Gradation Report

PLANT #: **P-101**

Sample Date: 7/23/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 7/24/2018 through 7/30/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	950	5.81	2.62	30.9
IA	71-47	Presque Isle	875	5.35	2.62	28.5
2NS	75-051	Mid-Michigan	1250	7.53	2.66	40.7
Total Wt			3075	18.69		100.0

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

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	96.2	100.0	100.0	98.8	1.2	1.2
1"	44.0	100.0	100.0	82.7	16.1	17.3
3/4"	12.0	98.5	100.0	72.4	10.3	27.6
1/2"	2.6	82.1	100.0	64.8	7.6	35.2
3/8"	1.9	60.0	100.0	58.3	6.5	41.7
#4	1.7	10.6	98.9	43.7	14.6	56.3
#8	1.6	3.1	81.4	34.5	9.3	65.5
#16	1.6	2.2	65.2	27.6	6.8	72.4
#30	1.5	1.9	48.9	20.9	6.7	79.1
#50	1.4	1.8	23.3	10.4	10.5	89.6
#100	1.4	1.7	5.6	3.2	7.2	96.8
LBW	1.2	1.5	0.8	1.1	2.1	98.9



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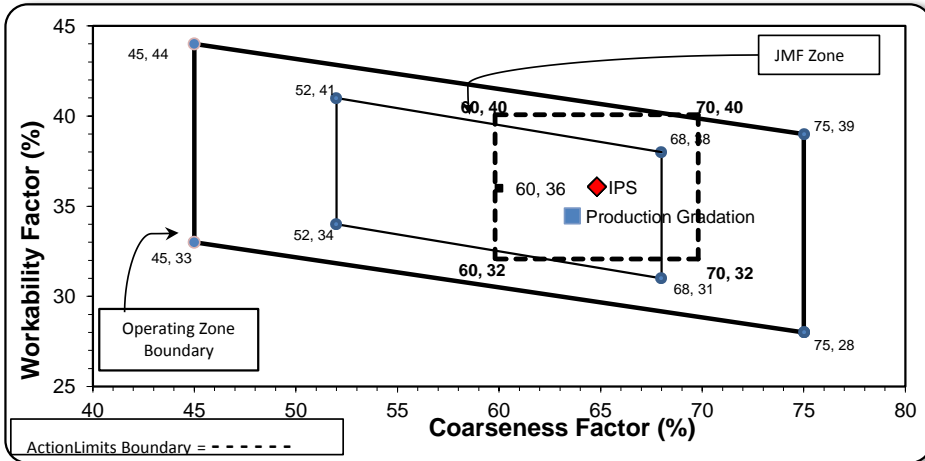
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Coarseness Factor:	64	Workability Factor:	34
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Initial Production Sample (IPS)

Coarseness Factor:	65		
Workability Factor:	36		
Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.3	0.7	0.7
1"	83.6	15.7	16.4
3/4"	73.0	10.6	27.0
1/2"	65.1	7.9	34.9
3/8"	58.6	6.5	41.4
#4	45.8	12.8	54.2
#8	36.1	9.7	63.9
#16	28.8	7.3	71.2
#30	21.7	7.1	78.3
#50	10.3	11.4	89.7
#100	3.1	7.2	96.9
LBW	1.3	1.8	98.7



PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

MIX ID'S: DDP154E7, DDP154E8, DDP164E7 and DDP164E8

Production Gradation Report

PLANT #: **P-102**

Sample Date: 7/23/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 7/24/2018 through 7/30/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	58-003	Stoneco	1350	8.04	2.69	43.3
IA	58-003	Stoneco	570	3.40	2.69	18.3
2NS	38-046	Chelsea	1200	7.26	2.65	38.5
Total Wt			3120	18.70		100.0

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



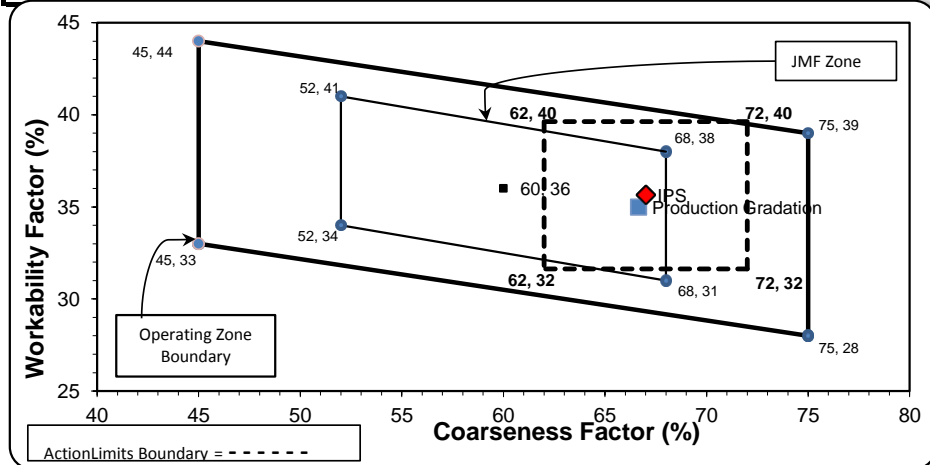
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	100.0	100.0	100.0	100.0	0.0	0.0
1"	67.3	100.0	100.0	85.9	14.1	14.1
3/4"	37.6	100.0	100.0	73.0	12.9	27.0
1/2"	14.7	93.0	100.0	61.8	11.2	38.2
3/8"	7.0	83.0	100.0	56.7	5.2	43.3
#4	2.5	23.3	100.0	43.8	12.9	56.2
#8	1.6	6.6	86.0	35.0	8.8	65.0
#16	1.4	2.9	64.0	25.8	9.2	74.2
#30	1.3	2.1	45.0	18.3	7.5	81.7
#50	1.2	1.8	25.0	10.5	7.8	89.5
#100	1.1	1.7	6.0	3.1	7.4	96.9
LBW	1.0	1.5	1.1	1.1	2.0	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

Coarseness Factor: 67 **Workability Factor: 35**



Initial Production Sample (IPS)

Coarseness Factor: 67		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"	87.2	12.8	12.8
3/4"	76.6	10.6	23.4
1/2"	64.4	12.2	35.6
3/8"	56.9	7.6	43.1
#4	44.1	12.7	55.9
#8	35.6	8.5	64.4
#16	27.7	8.0	72.3
#30	19.5	8.2	80.5
#50	7.8	11.6	92.2
#100	2.3	5.6	97.7
LBW	0.6	1.6	99.4

PREPARED BY:
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Aggregate Optimization Chart

MIX ID'S: DDP154E7, DDP154E8, DDP164E7 and DDP164E8

Production Gradation Report

PLANT #: **P-103**

Sample Date: 7/23/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 7/24/2018 through 7/30/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	58-003	Stoneco	1350	8.04	2.69	43.3
IA	58-003	Stoneco	570	3.40	2.69	18.3
2NS	38-046	Chelsea	1200	7.26	2.65	38.5
Total Wt			3120	18.70		100.0

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

Sieve	CA	IA	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"	67.3	100.0	100.0	85.9	14.1	14.1
3/4"	37.6	100.0	100.0	73.0	12.9	27.0
1/2"	14.7	93.0	100.0	61.8	11.2	38.2
3/8"	7.0	83.0	100.0	56.7	5.2	43.3
#4	2.5	23.3	100.0	43.8	12.9	56.2
#8	1.6	6.6	86.0	35.0	8.8	65.0
#16	1.4	2.9	64.0	25.8	9.2	74.2
#30	1.3	2.1	45.0	18.3	7.5	81.7
#50	1.2	1.8	25.0	10.5	7.8	89.5
#100	1.1	1.7	6.0	3.1	7.4	96.9
LBW	1.0	1.5	1.1	1.1	2.0	98.9

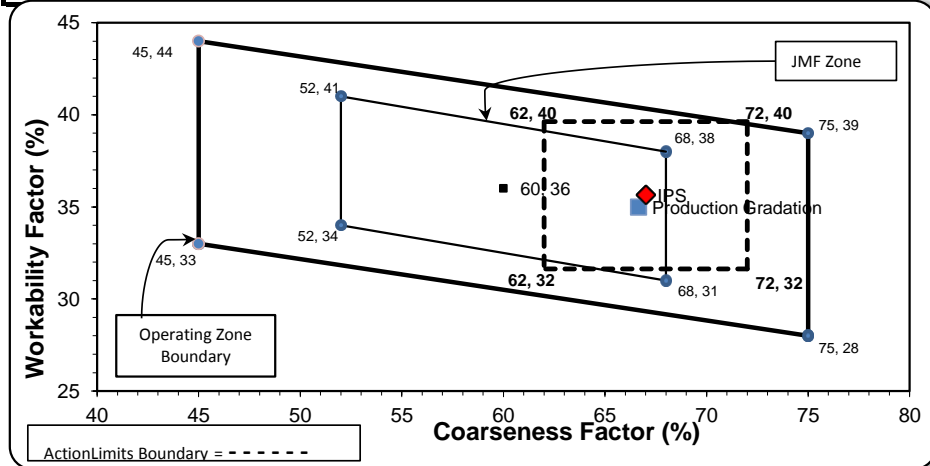
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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



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Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Coarseness Factor: 67 **Workability Factor: 35**



Initial Production Sample (IPS)

Coarseness Factor: 67		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"	87.2	12.8	12.8
3/4"	76.6	10.6	23.4
1/2"	64.4	12.2	35.6
3/8"	56.9	7.6	43.1
#4	44.1	12.7	55.9
#8	35.6	8.5	64.4
#16	27.7	8.0	72.3
#30	19.5	8.2	80.5
#50	7.8	11.6	92.2
#100	2.3	5.6	97.7
LBW	0.6	1.6	99.4

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Aggregate Optimization Chart

MIX ID'S: DDP154E7, DDP154E8, DDP164E7 and DDP164E8

Production Gradation Report

PLANT #: **P-36**

Sample Date: 7/23/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 7/24/2018 through 7/30/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	870	5.32	2.62	28.3
IA	71-47	Presque Isle	900	5.50	2.62	29.3
2NS	63-92	AA Grange Hall	1300	7.86	2.65	42.3
Total Wt			3070	18.69		100.0

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

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	94.5	100.0	100.0	98.4	1.6	1.6
1"	38.5	100.0	100.0	82.6	15.9	17.4
3/4"	7.4	99.5	100.0	73.6	9.0	26.4
1/2"	1.7	80.1	100.0	66.3	7.3	33.7
3/8"	1.3	54.1	100.0	58.6	7.7	41.4
#4	1.2	9.9	96.8	44.2	14.3	55.8
#8	1.2	3.0	82.6	36.2	8.0	63.8
#16	1.2	2.3	67.2	29.5	6.7	70.5
#30	1.2	2.1	49.4	21.9	7.6	78.1
#50	1.1	2.0	23.5	10.8	11.0	89.2
#100	1.1	1.9	3.3	2.3	8.6	97.7
LBW	0.7	1.5	0.2	0.7	1.5	99.3

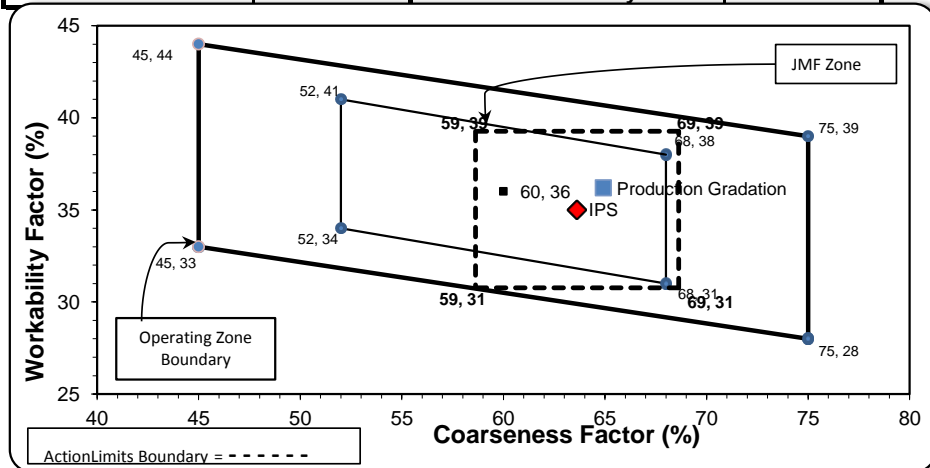
*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 8% for the 1" sieve when a 2" max. size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



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Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Coarseness Factor: **65** Workability Factor: **36**



Initial Production Sample (IPS)

Coarseness Factor: 64		Workability Factor: 35	
Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.4	0.6	0.6
1"	84.6	14.7	15.4
3/4"	74.4	10.3	25.6
1/2"	66.0	8.4	34.0
3/8"	58.7	7.4	41.3
#4	44.6	14.0	55.4
#8	35.0	9.6	65.0
#16	27.6	7.4	72.4
#30	19.5	8.1	80.5
#50	8.6	11.0	91.4
#100	2.0	6.6	98.0
LBW	0.9	1.1	99.1

PREPARED BY:
 SM, LLC Technical Service

Approved By:

Aggregate Optimization Chart

MIX ID'S: DDP154E7, DDP154E8, DDP164E7 and DDP164E8

Production Gradation Report

PLANT #: **P-39**

Sample Date: 7/23/18

Concrete Grade: **P1M**

Contractor: _____

Dates Test Represents: 7/24/2018 through 7/30/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	1000	6.12	2.62	32.6
IA	71-47	Presque Isle	750	4.59	2.62	24.4
2NS	63-115	Ray Road	1320	7.98	2.65	43.0
Total Wt			3070	18.69		100.0

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



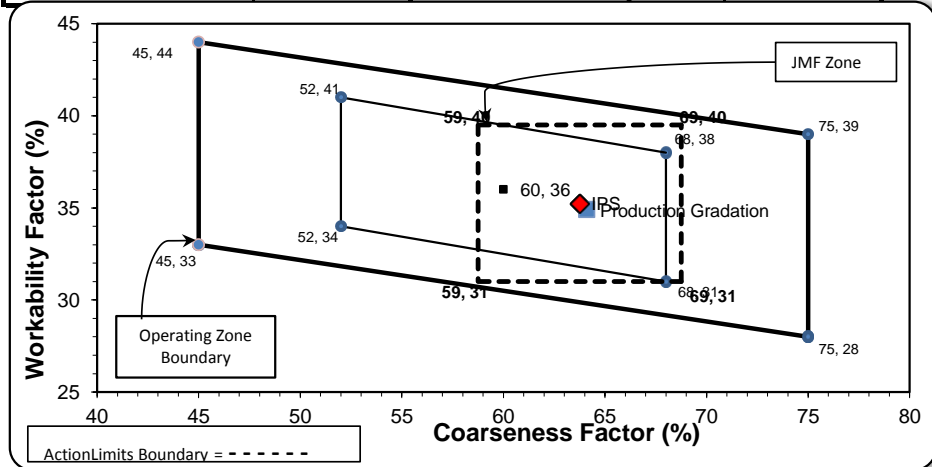
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 Suite 500
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Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	96.2	100.0	100.0	98.8	1.2	1.2
1"	44.0	100.0	100.0	81.8	17.0	18.2
3/4"	12.0	98.5	100.0	71.0	10.8	29.0
1/2"	2.6	82.1	100.0	63.9	7.1	36.1
3/8"	1.9	60.0	100.0	58.3	5.6	41.7
#4	1.7	10.6	96.6	44.7	13.6	55.3
#8	1.6	3.1	78.2	34.9	9.8	65.1
#16	1.6	2.2	60.7	27.2	7.7	72.8
#30	1.5	1.9	45.2	20.4	6.8	79.6
#50	1.4	1.8	23.9	11.2	9.2	88.8
#100	1.4	1.7	6.2	3.5	7.6	96.5
LBW	1.2	1.5	0.5	1.0	2.6	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

Coarseness Factor:	64	Workability Factor:	35
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Initial Production Sample (IPS)

Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.4	0.6	0.6
1"	84.3	15.1	15.7
3/4"	73.9	10.4	26.1
1/2"	65.7	8.2	34.3
3/8"	58.7	7.0	41.3
#4	45.1	13.6	54.9
#8	35.3	9.8	64.7
#16	28.1	7.2	71.9
#30	21.2	6.9	78.8
#50	10.1	11.1	89.9
#100	3.1	7.0	96.9
LBW	1.4	1.7	98.6

PREPARED BY:
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Approved By:

Aggregate Optimization Chart

MIX ID'S: DDP154E7, DDP154E8, DDP164E7 and DDP164E8

Production Gradation Report

PLANT #: P-02

Sample Date: 7/23/18

Concrete Grade: P1M

Contractor: _____

Dates Test Represents: 7/24/2018 through 7/30/2018

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	900	5.50	2.62	29.3
IA	71-47	Presque Isle	930	5.69	2.62	30.3
2NS	47-16	Buno Road	1240	7.50	2.65	40.4
Total Wt			3070	18.69		100.0

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

Sieve	CA	IA	2NS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	94.5	100.0	100.0	98.4	1.6	1.6
1"	38.5	100.0	100.0	82.0	16.4	18.0
3/4"	7.4	99.5	100.0	72.7	9.3	27.3
1/2"	1.7	80.1	100.0	65.2	7.5	34.8
3/8"	1.3	54.1	100.0	57.2	8.0	42.8
#4	1.2	9.9	96.3	42.2	14.9	57.8
#8	1.2	3.0	85.8	35.9	6.3	64.1
#16	1.2	2.3	72.1	30.2	5.7	69.8
#30	1.2	2.1	52.4	22.2	8.0	77.8
#50	1.1	2.0	18.6	8.4	13.7	91.6
#100	1.1	1.9	2.4	1.9	6.6	98.1
LBW	0.7	1.5	0.4	0.8	1.0	99.2

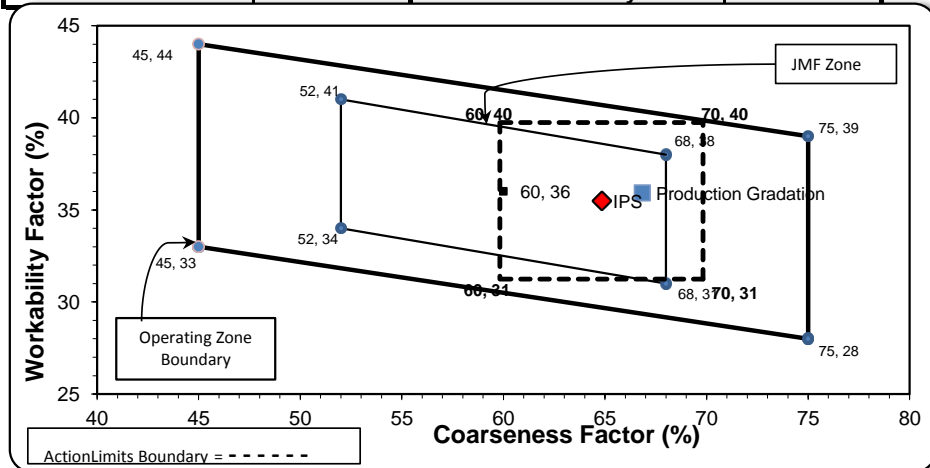


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*Maximum % Retained must be above the 3/8" sieve.
 *Any two adjacent sieves must equal 10% except max., nom. max., #100 and #200 sieves.
 *% Retained must be at least 4% for each sieve except max., nom. max., #100 and #200 sieves.
 *% Retained must 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

Coarseness Factor:	67	Workability Factor:	36
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Initial Production Sample (IPS)

Coarseness Factor:		65	
Workability Factor:		35	
Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.4	0.6	0.6
1"	84.0	15.3	16.0
3/4"	73.5	10.5	26.5
1/2"	65.2	8.2	34.8
3/8"	58.2	7.1	41.8
#4	44.1	14.1	55.9
#8	35.5	8.6	64.5
#16	29.1	6.4	70.9
#30	21.9	7.3	78.1
#50	9.6	12.2	90.4
#100	2.6	7.1	97.4
LBW	1.0	1.6	99.0

PREPARED BY:
 SM, LLC Technical Service

Approved By: