Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-32

Sample Date: 4/4/22

Concrete Grade: **DM, 4500HP**

Contractor: _____

Dates Test Represents: 4/5/2022 through 4/11/2022

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft^3	Specific Gravity	% Contribution
6AA	71-47	Presque Isle	1505	9.21	2.62	51.8
26A	71-47	Presque Isle	250	1.53	2.62	8.6
2NS	95-013	Smelter Bay	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"	97.9	100.0	100.0	98.9	1.1	1.1
3/4"	85.1	100.0	100.0	92.3	6.6	7.7
1/2"	39.7	97.0	100.0	68.5	23.8	31.5
3/8"	21.8	86.1	100.0	58.3	10.2	41.7
#4	4.2	27.5	96.2	42.6	15.7	57.4
#8	2.2	10.2	82.3	34.6	8.0	65.4
#16	1.8	4.8	67.7	28.1	6.5	71.9
#30	1.8	3.3	49.0	20.6	7.5	79.4
#50	1.6	2.9	25.2	11.1	9.6	88.9
#100	1.4	2.6	7.6	4.0	7.1	96.0
LBW	1.0	2.0	1.9	1.4	2.5	98.6

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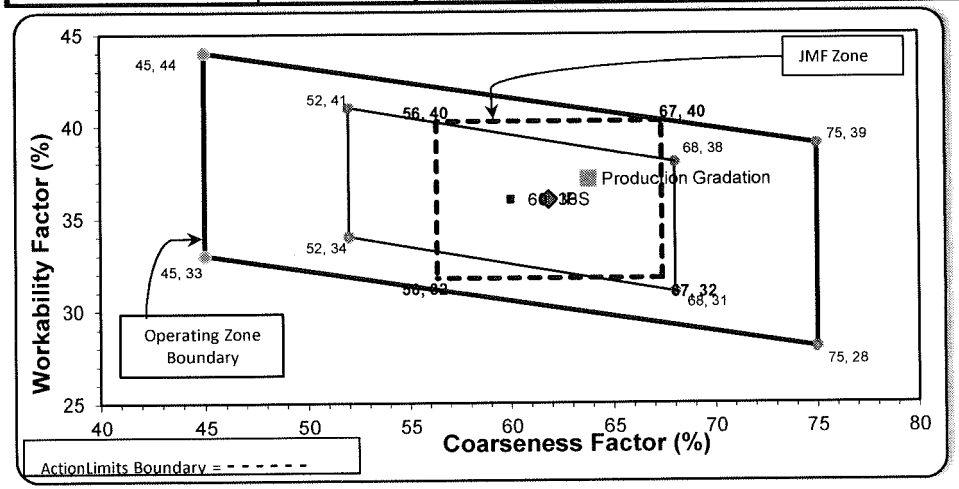
Farmington Hills, MI 48336

*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	Adjusted WF	37.1



Intial Production Sample (IPS)

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:

Edw. C. Levy Co.

JMT
8911 W. Jefferson
Detroit, 48209
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Plant 958-JMT

Product 1022-2NS GR - Smelter Bay

Period: 04/03/2022 - 04/09/2022

Name/Title Doug Storey / QC Technician

Report Date 04/07/2022

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	96.2	%	95-100
	#8 (2.36mm)	82.3	%	65-95
	#16 (1.18mm)	67.7	%	35-75
	#30 (.6mm)	49.0	%	20-55
	#50 (.3mm)	25.2	%	10-30
	#100 (.15mm)	7.6	%	0-10
	#200 (75µm)	2.3	%	
	FM	2.72		2.6-3
	Wash Loss (#200/75um)	1.9	%	0-3
	Total Moisture	5.0	%	

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Plant 958-JMT

Product 1067-26A Mod LS

Period: 04/03/2022 - 04/09/2022

Name/Title Doug Storey / QC Technician

Report Date 04/08/2022

Procedure	Sieve/Test	Result	Unit	26A Mod LS Spec
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	100.0	%	
	3/4" (19mm)	100.0	%	100-100
	1/2" (12.5mm)	97.0	%	95-100
	3/8" (9.5mm)	86.1	%	60-95
	#4 (4.75mm)	27.5	%	5-30
	#8 (2.36mm)	10.2	%	0-12
	#16 (1.18mm)	4.8	%	
	#30 (.6mm)	3.3	%	
	#50 (.3mm)	2.9	%	
	#100 (.15mm)	2.6	%	
	#200 (75µm)	2.2	%	
	Wash Loss (#200/75um)	2.0	%	0-3
	Total Moisture	4.1	%	

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Plant 958-JMT

Product 1054-6AA LS PI

Period: 04/03/2022 - 04/09/2022

Name/Title Doug Storey / QC Technician

Report Date 04/08/2022

Procedure	Sieve/Test	Result	Unit	6AA LS PI Spec
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	97.9	%	95-100
	3/4" (19mm)	85.1	%	
	1/2" (12.5mm)	39.7	%	30-60
	3/8" (9.5mm)	21.8	%	
	#4 (4.75mm)	4.2	%	0-8
	#8 (2.36mm)	2.2	%	
	#16 (1.18mm)	1.8	%	
	#30 (.6mm)	1.8	%	
	#50 (.3mm)	1.6	%	
	#100 (.15mm)	1.4	%	
	#200 (75µm)	1.2	%	
	Wash Loss (#200/75um)	1.0	%	0-2
	Total Moisture	3.2	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: P-36

Sample Date: 4/4/22

Concrete Grade: **DM, 4500HP**

Contractor: _____

Dates Test Represents: 4/5/2022 through 4/11/2022

MDOT No.: _____

Agg. Class	Pit #	Source	Weight (SSD)	ft³	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"	100.0	100.0	100.0	100.0	0.0	0.0
3/4"	86.6	100.0	100.0	93.5	6.5	6.5
1/2"	38.1	95.5	100.0	69.5	24.0	30.5
3/8"	21.3	81.2	100.0	59.5	10.1	40.5
#4	4.8	17.7	97.8	41.8	17.6	58.2
#8	3.0	6.0	84.3	34.2	7.6	65.8
#16	2.7	3.3	68.8	27.8	6.4	72.2
#30	2.5	2.5	49.3	20.2	7.6	79.8
#50	2.4	2.2	20.8	9.3	10.9	90.7
#100	2.3	2.0	4.2	3.0	6.4	97.0
LBW	1.8	1.7	1.2	1.6	1.4	98.4

*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.

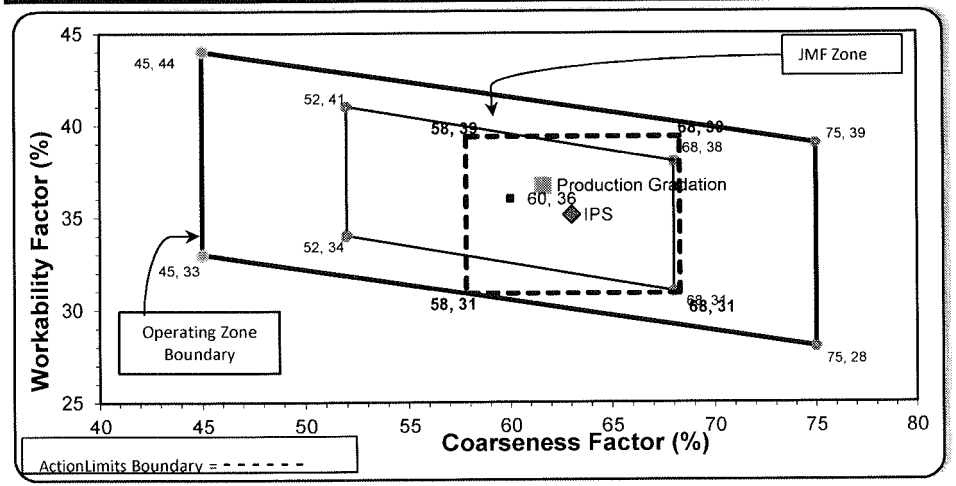
Production Gradation ◉ Batch Plant Gradations ○ Aggregate Supplier Gradations

Coarseness Factor:	62	Workability Factor:	34	Adjusted WF 36.7

Intial Production Sample (IPS)

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



PREPARED BY:
SM, LLC Technical Service

Approved By:

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2470 Auburn Road
Auburn Hills, MI 48432

Plant S36-Superior Auburn Hills

Product 1022-2NS GR

Period: 04/03/2022 - 04/09/2022

Name/Title Doug Storey / QC Technician

Report Date 04/08/2022

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	97.8	%	95-100
	#8 (2.36mm)	84.3	%	65-95
	#16 (1.18mm)	68.8	%	35-75
	#30 (.6mm)	49.3	%	20-55
	#50 (.3mm)	20.8	%	10-30
	#100 (.15mm)	4.2	%	0-10
	#200 (75µm)	1.5	%	
	FM	2.75		2.6-3
	Wash Loss (#200/75um)	1.2	%	0-3
	Total Moisture	2.85	%	

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Plant S36-Superior Auburn Hills

Product 1067-26A Mod LS

Period: 04/03/2022 - 04/09/2022

Name/Title Doug Storey / QC Technician

Report Date 04/08/2022

Procedure	Sieve/Test	Result	Unit	26A LS Spec
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	100.0	%	
	3/4" (19mm)	100.0	%	100-100
	1/2" (12.5mm)	95.5	%	95-100
	3/8" (9.5mm)	81.2	%	60-95
	#4 (4.75mm)	17.7	%	5-30
	#8 (2.36mm)	6.0	%	0-12
	#16 (1.18mm)	3.3	%	
	#30 (.6mm)	2.5	%	
	#50 (.3mm)	2.2	%	
	#100 (.15mm)	2.0	%	
	#200 (75µm)	1.7	%	
	Wash Loss (#200/75um)	1.7	%	0-3
	Total Moisture	2.72	%	

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Auburn Hills, MI 48432

Plant S36-Superior Auburn Hills

Product 1051-6AA LS

Period: 04/03/2022 - 04/09/2022

Name/Title Doug Storey / QC Technician

Report Date 04/08/2022

Procedure	Sieve/Test	Result	Unit	6AA LS
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	100-100
	1" (25mm)	100.0	%	95-100
	3/4" (19mm)	86.6	%	
	1/2" (12.5mm)	38.1	%	30-60
	3/8" (9.5mm)	21.3	%	
	#4 (4.75mm)	4.8	%	0-8
	#8 (2.36mm)	3.0	%	
	#16 (1.18mm)	2.7	%	
	#30 (.6mm)	2.5	%	
	#50 (.3mm)	2.4	%	
	#100 (.15mm)	2.3	%	
	#200 (75µm)	2.0	%	
AASHTO T11	#200 (75um)	1.96	%	
	Wash Loss (#200/75um)	1.8	%	0-2
	Total Moisture	2.03	%	