

Aggregate Optimization Chart

PLANT #: **12**

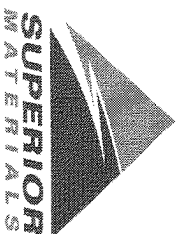
Sample Date: **8/7/23**

Dates Test Represents: **8/8/2023** through **8/14/2023**

Concrete Grade: **P1M, 3500HP**

Contractor: _____

MDOT No.: _____



Superior Materials, LLC
30701 W. 10 Mile Rd.
Suite 500
Farmington Hills, MI 48336

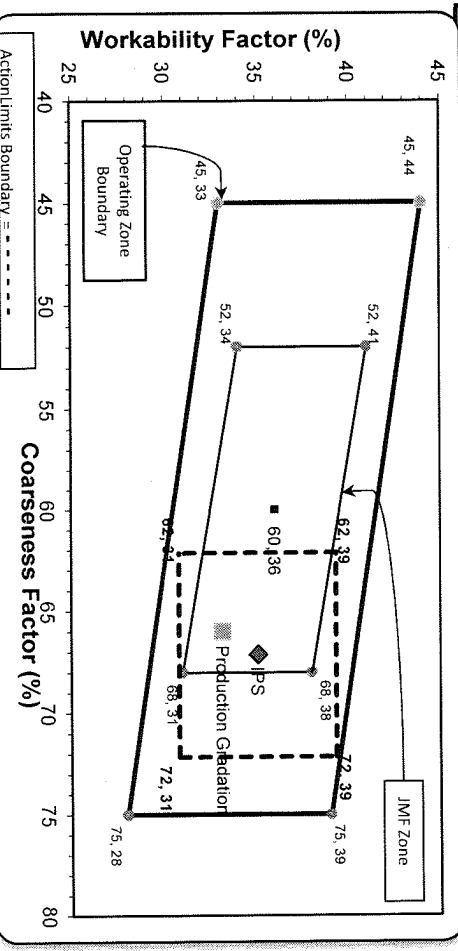
Aggr. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	% Contribution
CA	71-47	Presque Isle	1020	6.24	2.62	33.2
IA	71-47	Presque Isle	850	5.20	2.62	27.7
ZNS	63-115	Ray Rd	1200	7.26	2.65	39.1
Total Wt.			3070	18.70		100.0

Sieve	CA	IA	ZNS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	97.6	100.0	100.0	99.2	0.8	0.8
1"	41.5	100.0	100.0	80.6	18.6	19.4
3/4"	15.0	100.0	100.0	71.4	9.1	28.6
1/2"	4.8	81.0	100.0	63.1	8.3	36.9
3/8"	3.4	56.6	100.0	55.9	7.2	44.1
#4	2.8	11.1	95.4	41.3	14.6	58.7
#8	2.6	3.6	80.1	33.2	8.1	66.8
#16	2.4	2.5	64.9	26.9	6.3	73.1
#30	2.3	2.3	49.4	20.7	6.1	79.3
#50	2.1	2.2	25.3	11.2	9.5	88.8
#100	1.8	2.0	6.3	3.6	7.6	96.4
LBW	1.3	1.8	0.9	1.3	2.3	98.7

*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: **66** Workability Factor: **33**



Initial Production Sample (IPS)

Sieve	Coarseness Factor:	Workability Factor:	% Cumulative Passing	% Retained	Cumulative % Retained
2"	67	35	100.0	0.0	0.0
1.5"			99.6	0.4	0.4
1"			83.9	15.7	16.1
3/4"			74.0	9.8	26.0
1/2"			63.7	10.3	36.3
3/8"			56.4	7.3	43.6
#4			43.0	13.4	57.0
#8			35.1	7.9	64.9
#16			29.0	6.1	71.0
#30			20.9	8.0	79.1
#50			8.1	12.8	91.9
#100			1.6	6.5	98.4
LBW			0.9	0.8	99.1

PREPARED BY:
SM, LLC Technical Service

Approved By: _____



Plant S12-Onsite Southfield

Product 7919-COARSE AGG P1M LS

Period: 08/06/2023 - 08/12/2023

Name/Title Doug Storey / QC Technician

Report Date 08/12/2023

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	97.6	%	
	1" (25mm)	41.5	%	
	3/4" (19mm)	15.0	%	
	1/2" (12.5mm)	4.8	%	
	3/8" (9.5mm)	3.4	%	
	#4 (4.75mm)	2.8	%	
	#8 (2.36mm)	2.6	%	
	#16 (1.18mm)	2.4	%	
	#30 (.6mm)	2.3	%	
	#50 (.3mm)	2.1	%	
	#100 (.15mm)	1.8	%	
	#200 (75µm)	1.5	%	
	Wash Loss (#200/75um)	1.3	%	0-2
	Total Moisture	0.24	%	



Plant S12-Onsite Southfield

Product 7920-INTERMED AGG P1M LS

Name/Title Doug Storey / QC Technician

Period: 08/06/2023 - 08/12/2023

Report Date 08/12/2023

Procedure	Sieve/Test	Result	Unit	Intermed Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	100.0	%	
	3/4" (19mm)	98.8	%	
	1/2" (12.5mm)	81.0	%	
	3/8" (9.5mm)	56.6	%	
	#4 (4.75mm)	11.1	%	
	#8 (2.36mm)	3.6	%	
	#16 (1.18mm)	2.5	%	
	#30 (.6mm)	2.3	%	
	#50 (.3mm)	2.2	%	
	#100 (.15mm)	2.0	%	
	#200 (75µm)	1.9	%	
	Wash Loss (#200/75um)	1.8	%	0-3
	Total Moisture	1.48	%	



Plant S12-Onsite Southfield

Product 1022-2NS GR

Period: 08/06/2023 - 08/12/2023

Name/Title Doug Storey / QC Technician

Report Date 08/12/2023

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	95.4	%	95-100
	#8 (2.36mm)	80.1	%	65-95
	#16 (1.18mm)	64.9	%	35-75
	#30 (.6mm)	49.4	%	20-55
	#50 (.3mm)	25.3	%	10-30
	#100 (.15mm)	6.3	%	0-10
	#200 (75µm)	1.2	%	
	FM	2.79		2.6-3
	Wash Loss (#200/75um)	0.9	%	0-3
	Total Moisture	4.04	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: **20**

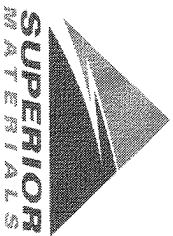
Sample Date: **8/7/23**

Dates Test Represents: **8/8/2023** through **8/14/2023**

Concrete Grade: **P1M, 3500HP**

Contractor: _____

MDOT No.: _____



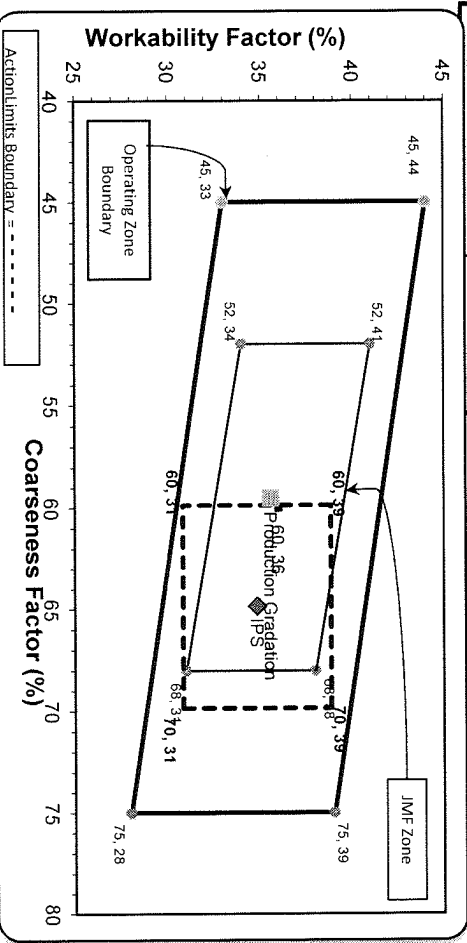
Superior Materials, LLC
30701 W. 10 Mile Rd.
Suite 500
Farmington Hills, MI 48336

Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	Cumulative % Passing	% Retained	Cumulative % Retained
CA	71-47	Presque Isle	970	5.93	2.62	31.6	0.0	0.0
IA	71-47	Presque Isle	900	5.50	2.62	29.3	0.5	0.5
NNS	63-92	Grange Hall	1200	7.26	2.65	39.1	16.0	16.5
		Total Wt	3070	18.70		100.0	10.3	26.8
Sieve	CA	IA	NNS					
2"	100.0	100.0	100.0			100.0	0.0	0.0
1.5"	98.4	100.0	100.0			99.5	0.5	0.5
1"	47.7	100.0	100.0			83.5	16.0	16.5
3/4"	15.2	100.0	100.0			73.2	10.3	26.8
1/2"	5.3	91.0	100.0			67.4	5.8	32.6
3/8"	3.3	73.5	100.0			61.7	5.8	38.3
#4	1.2	24.3	97.7			45.7	16.0	54.3
#8	0.6	7.3	85.1			35.6	10.1	64.4
#16	0.5	3.5	70.6			28.8	6.8	71.2
#30	0.5	2.6	51.7			21.1	7.7	78.9
#50	0.5	2.3	20.2			8.7	12.4	91.3
#100	0.5	2.1	3.2			2.0	6.7	98.0
LBW	0.3	1.4	0.4			0.7	1.4	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. 1.5") aggregate is used.

Production Gradation Batch Plant Gradations Aggregate Supplier Gradations

Initial Production Sample (IPS)



Sieve	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	0.0	0.0
1.5"	99.1	0.9	0.9
1"	80.8	18.2	19.2
3/4"	71.3	9.6	28.7
1/2"	64.0	7.3	36.0
3/8"	57.7	6.2	42.3
#4	42.8	15.0	57.2
#8	34.8	7.9	65.2
#16	28.4	6.4	71.6
#30	20.2	8.2	79.8
#50	7.6	12.6	92.4
#100	1.6	6.0	98.4
LBW	1.0	0.6	99.0

PREPARED BY:
SM, LLC Technical Service

Approved By: _____



Plant S20-Superior Flint
 Product 7919-COARSE AGG P1M LS
 Period: 08/06/2023 - 08/12/2023

Name/Title Doug Storey / QC Technician
 Report Date 08/12/2023

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	98.4	%	
	1" (25mm)	47.7	%	
	3/4" (19mm)	15.2	%	
	1/2" (12.5mm)	5.3	%	
	3/8" (9.5mm)	3.3	%	
	#4 (4.75mm)	1.2	%	
	#8 (2.36mm)	0.6	%	
	#16 (1.18mm)	0.5	%	
	#30 (.6mm)	0.5	%	
	#50 (.3mm)	0.5	%	
	#100 (.15mm)	0.5	%	
	#200 (75µm)	0.4	%	
	Wash Loss (#200/75um)	0.3	%	0-2
	Total Moisture	0.45	%	



Plant S20-Superior Flint
 Product 7920-INTERMED AGG P1M LS
 Period: 08/06/2023 - 08/12/2023

Name/Title Doug Storey / QC Technician
 Report Date 08/12/2023

Procedure	Sieve/Test	Result	Unit	Intermed Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	100.0	%	
	3/4" (19mm)	100.0	%	
	1/2" (12.5mm)	91.0	%	
	3/8" (9.5mm)	73.5	%	
	#4 (4.75mm)	24.3	%	
	#8 (2.36mm)	7.3	%	
	#16 (1.18mm)	3.5	%	
	#30 (.6mm)	2.6	%	
	#50 (.3mm)	2.3	%	
	#100 (.15mm)	2.1	%	
	#200 (75µm)	1.8	%	
	Wash Loss (#200/75um)	1.4	%	0-3
	Total Moisture	3.33	%	



Plant S20-Superior Flint
Product 1022-2NS GR
Period: 08/06/2023 - 08/12/2023

Name/Title Doug Storey / QC Technician
Report Date 08/12/2023

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	97.7	%	95-100
	#8 (2.36mm)	85.1	%	65-95
	#16 (1.18mm)	70.6	%	35-75
	#30 (.6mm)	51.7	%	20-55
	#50 (.3mm)	20.2	%	10-30
	#100 (.15mm)	3.2	%	0-10
	#200 (75µm)	0.6	%	
	FM	2.72		2.6-3
	Wash Loss (#200/75um)	0.4	%	0-3
	Total Moisture	3.21	%	

Aggregate Optimization Chart

PLANT #: **P-35**

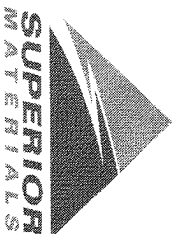
Sample Date: **8/7/23**

Dates Test Represents: **8/8/2023** through **8/14/2023**

Concrete Grade: **P1M, 3500HP**

Contractor: _____

MDOT No.: _____



Superior Materials, LLC
30701 W. 10 Mile Rd.
Suite 500
Farmington Hills, MI 48336

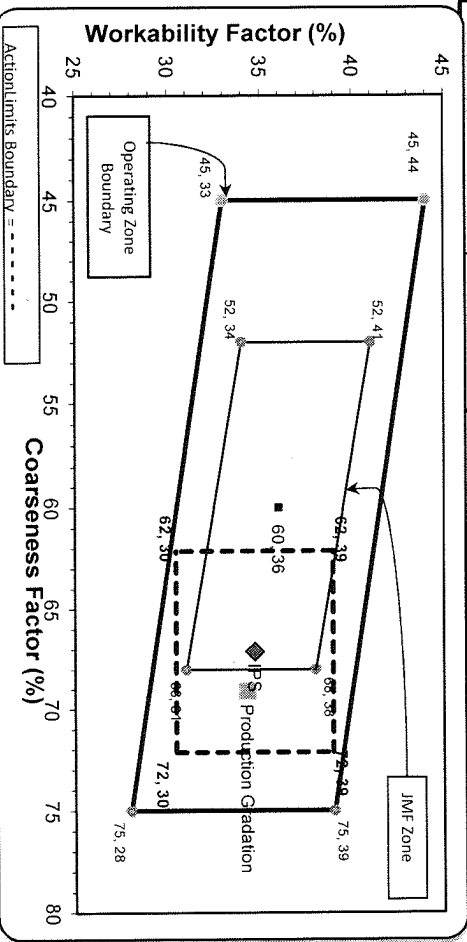
Agg. Class	Pit #	Source	Weight (ssd)	ft ³	Specific Gravity	% Contribution
CA	58-003	Stoneco	1370	8.16	2.69	43.9
IA	58-003	Stoneco	550	3.28	2.69	17.6
NNS	81-019	Pleasant Lake	1200	7.26	2.65	38.5
			Total Wt	3120		100.0

Sieve	CA	IA	NNS	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"	56.9	100.0	100.0	81.1	18.9	18.9
3/4"	24.4	100.0	100.0	66.8	33.2	33.2
1/2"	12.1	92.3	100.0	60.0	40.0	40.0
3/8"	7.5	72.9	100.0	54.6	45.4	45.4
#4	2.6	18.4	97.8	42.0	58.0	58.0
#8	2.0	6.9	83.7	34.3	65.7	65.7
#16	1.8	4.2	68.2	27.8	72.2	72.2
#30	1.7	3.3	51.2	21.0	79.0	79.0
#50	1.6	2.9	26.2	11.3	88.7	88.7
#100	1.5	2.8	8.0	4.2	95.8	95.8
LBW	1.3	2.6	1.9	1.8	98.2	98.2

*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

Coarseness Factor: **69** Workability Factor: **34**



Initial Production Sample (IPS)

Sieve	Coarseness Factor:	Workability Factor:	Cumulative % Passing	% Retained	Cumulative % Retained
2"	67	35	100.0	0.0	0.0
1.5"			100.0	0.0	0.0
1"			86.9	13.1	13.1
3/4"			76.1	10.8	23.9
1/2"			63.7	12.4	36.3
3/8"			56.2	7.5	43.8
#4			43.2	13.0	56.8
#8			34.7	8.5	65.3
#16			27.5	7.2	72.5
#30			20.6	7.0	79.4
#50			9.0	11.6	91.0
#100			2.1	6.9	97.9
LBW			1.0	1.1	99.0

PREPARED BY:
SM, LLC Technical Service

Approved By:



Plant S35-Superior Romulus
Product 7919-COARSE AGG P1M LS
Period: 08/06/2023 - 08/12/2023

Name/Title Doug Storey / QC Technician
Report Date 08/12/2023

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	56.9	%	
	3/4" (19mm)	24.4	%	
	1/2" (12.5mm)	12.1	%	
	3/8" (9.5mm)	7.5	%	
	#4 (4.75mm)	2.6	%	
	#8 (2.36mm)	2.0	%	
	#16 (1.18mm)	1.8	%	
	#30 (.6mm)	1.7	%	
	#50 (.3mm)	1.6	%	
	#100 (.15mm)	1.5	%	
	#200 (75µm)	1.4	%	
	Wash Loss (#200/75µm)	1.3	%	0-2
ASTM C566	Total Moisture	2.12	%	



Plant S35-Superior Romulus
 Product 7920-INTERMED AGG P1M LS
 Period: 08/06/2023 - 08/12/2023

Name/Title Doug Storey / QC Technician
 Report Date 08/12/2023

Procedure	Sieve/Test	Result	Unit	Intermed Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	100.0	%	
	3/4" (19mm)	100.0	%	
	1/2" (12.5mm)	92.3	%	
	3/8" (9.5mm)	72.9	%	
	#4 (4.75mm)	18.4	%	
	#8 (2.36mm)	6.9	%	
	#16 (1.18mm)	4.2	%	
	#30 (.6mm)	3.3	%	
	#50 (.3mm)	2.9	%	
	#100 (.15mm)	2.8	%	
	#200 (75µm)	2.6	%	
	Wash Loss (#200/75um)	2.6	%	0-3
ASTM C566	Total Moisture	3.22	%	



Plant S35-Superior Romulus
 Product 1022-2NS GR
 Period: 08/06/2023 - 08/12/2023

Name/Title Doug Storey / QC Technician
 Report Date 08/12/2023

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)	83.7	%	65-95
	#16 (1.18mm)	68.2	%	35-75
	#30 (.6mm)	51.2	%	20-55
	#50 (.3mm)	26.2	%	10-30
	#100 (.15mm)	8.0	%	0-10
	#200 (75µm)	2.2	%	
	FM	2.65		2.6-3
	Wash Loss (#200/75um)	1.9	%	0-3
ASTM C566	Total Moisture	3.40	%	

Aggregate Optimization Chart

Production Gradation Report

PLANT #: **P-39**

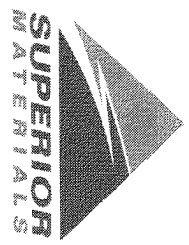
Sample Date: **8/7/23**

Dates Test Represents: **8/8/2023** through **8/14/2023**

Concrete Grade: **P1M, 3500HP**

Contractor: _____

MDOT No.: _____



Superior Materials, LLC
 30701 W. 10 Mile Rd.
 Suite 500
 Farmington Hills, MI 48336

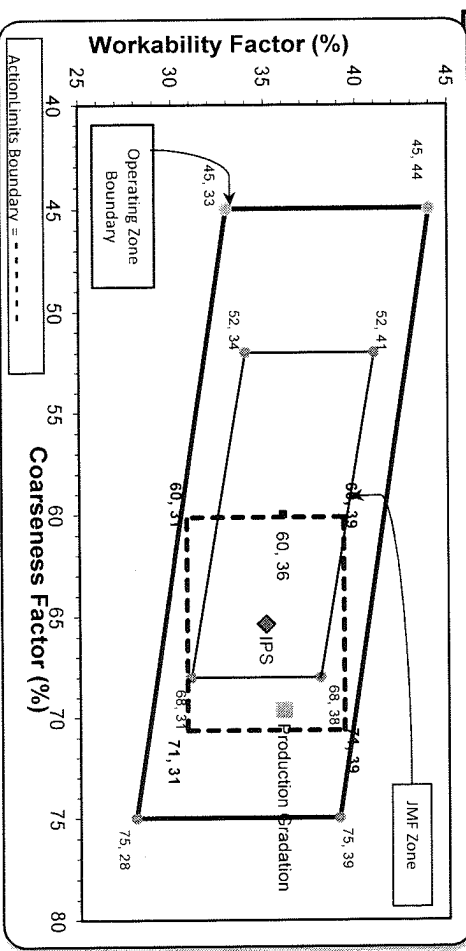
Agg. Class	Pit #	Source	Weight (SSD)	ft ³	Specific Gravity	Contribution %
CA	71-47	Presque Isle	1020	6.24	2.62	33.2
IA	71-47	Presque Isle	800	4.89	2.62	26.1
NNS	44-051	Krake Willis Rd	1250	7.56	2.65	40.7
			Total Wt	3070	18.69	100.0

Sieve	CA	IA	NNS	Cumulative % Passing	% Retained	Cumulative % Retained
2"	100.0	100.0	100.0	100.0	0.0	0.0
1.5"	92.4	100.0	100.0	97.5	2.5	2.5
1"	25.0	100.0	100.0	75.1	22.4	24.9
3/4"	5.0	99.2	100.0	68.2	6.9	31.8
1/2"	1.5	79.8	100.0	62.0	6.2	38.0
3/8"	1.5	54.6	100.0	55.4	6.6	44.6
#4	1.5	10.8	98.6	43.5	12.0	56.5
#8	1.5	3.6	84.9	36.0	7.5	64.0
#16	1.5	2.7	70.3	29.8	6.2	70.2
#30	1.5	2.4	52.8	22.6	7.2	77.4
#50	1.4	2.3	22.9	10.4	12.2	89.6
#100	1.3	2.1	5.2	3.1	7.3	96.9
LBW	1.0	1.7	0.9	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: **70** Workability Factor: **36**



Initial Production Sample (IPS)

Sieve	Coarseness Factor:	Workability Factor:	Cumulative % Passing	% Retained	Cumulative % Retained
2"	65	35	100.0	0.0	0.0
1.5"			99.6	0.4	0.4
1"			83.9	15.7	16.1
3/4"			74.1	9.8	25.9
1/2"			64.3	9.7	35.7
3/8"			57.5	6.8	42.5
#4			44.5	13.1	55.5
#8			35.1	9.4	64.9
#16			27.9	7.2	72.1
#30			21.7	6.2	78.3
#50			12.6	9.1	87.4
#100			3.5	9.1	96.5
LBW			1.2	2.4	98.8

PREPARED BY:
 SM, LLC Technical Service

Approved By: _____



Plant S39-Superior Sterling Heights

Product 7919-COARSE AGG P1M LS

Period: 08/06/2023 - 08/12/2023

Name/Title Doug Storey / QC Technician

Report Date 08/12/2023

Procedure	Sieve/Test	Result	Unit	Coarse Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	92.4	%	
	1" (25mm)	25.0	%	
	3/4" (19mm)	5.0	%	
	1/2" (12.5mm)	1.5	%	
	3/8" (9.5mm)	1.5	%	
	#4 (4.75mm)	1.5	%	
	#8 (2.36mm)	1.5	%	
	#16 (1.18mm)	1.5	%	
	#30 (.6mm)	1.5	%	
	#50 (.3mm)	1.4	%	
	#100 (.15mm)	1.3	%	
	#200 (75µm)	1.2	%	
	Wash Loss (#200/75um)	1.0	%	0-2
	Total Moisture	0.43	%	



Plant S39-Superior Sterling Heights
 Product 7920-INTERMED AGG P1M LS
 Period: 08/06/2023 - 08/12/2023

Name/Title Doug Storey / QC Technician
 Report Date 08/12/2023

Procedure	Sieve/Test	Result	Unit	Intermed Agg P1M LS Target
	2" (50mm)	100.0	%	
	1 1/2" (37.5mm)	100.0	%	
	1" (25mm)	100.0	%	
	3/4" (19mm)	99.2	%	
	1/2" (12.5mm)	79.8	%	
	3/8" (9.5mm)	54.6	%	
	#4 (4.75mm)	10.8	%	
	#8 (2.36mm)	3.6	%	
	#16 (1.18mm)	2.7	%	
	#30 (.6mm)	2.4	%	
	#50 (.3mm)	2.3	%	
	#100 (.15mm)	2.1	%	
	#200 (75µm)	1.8	%	
	Wash Loss (#200/75um)	1.7	%	0-3
	Total Moisture	1.67	%	



Plant S39-Superior Sterling Heights

Product 1022-2NS GR

Period: 08/06/2023 - 08/12/2023

Name/Title Doug Storey / QC Technician

Report Date 08/12/2023

Procedure	Sieve/Test	Result	Unit	2NS GR Spec
	3/8" (9.5mm)	100.0	%	100-100
	#4 (4.75mm)	98.6	%	95-100
	#8 (2.36mm)	84.9	%	65-95
	#16 (1.18mm)	70.3	%	35-75
	#30 (.6mm)	52.8	%	20-55
	#50 (.3mm)	22.9	%	10-30
	#100 (.15mm)	5.2	%	0-10
	#200 (75µm)	1.4	%	
	FM	2.65		2.6-3
	Wash Loss (#200/75um)	0.9	%	0-3
	Total Moisture	3.60	%	