Department of Design and Construction

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Commissioner

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Safety & Site Support

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Safety & Site Support Division
Office of Quality Assurance

Concrete and Asphalt Generic Mix Design Approval # 2023 - 133

Date: **12/15/2023**

To: **Matthew D. Harrison,**
Green Asphalt

From: **Juan Martinez, PE, Director**
Office of Quality Assurance

Date Submitted: 12/13/2023

Plant: Green Asphalt

NYSDOT Facility Numbers: H0385

Laboratory: MT Group - Intertek

Mix Design Type: 3RA Binder - 50% RAP

Generic Mix Design Serial Number: Green Asphalt/3RA/Binder/Generic/NYCDDC/12/23/133

Generic Mix Design Date: 11/20/2023

Generic Mix Design Expiration Date: 12/31/2025

Comments:
1) This mix design is approved only for the NYSDOT Facility Numbers listed above.
2) Approval is valid only if facilities listed above remain on the DDC OQA Approved list of Concrete and/or Asphalt Plants.
3) Approval is limited to the material sources and aggregate sizes shown on the mix design.
4) Dosage of admixtures may be adjusted by the plant within manufacturer's written guidelines, but admixtures not listed may not be added.

Reviewed & prepared by: Scott Cruz, QA Inspector

Recommended for Acceptance by: Nader Shehata, PE, Deputy Director

NYC Department of Design and Construction

QA & CONSTRUCTION SAFETY BUREAU

ASPHALT JOB MIX FORMULA SHEET - 3 RA BINDER MIX

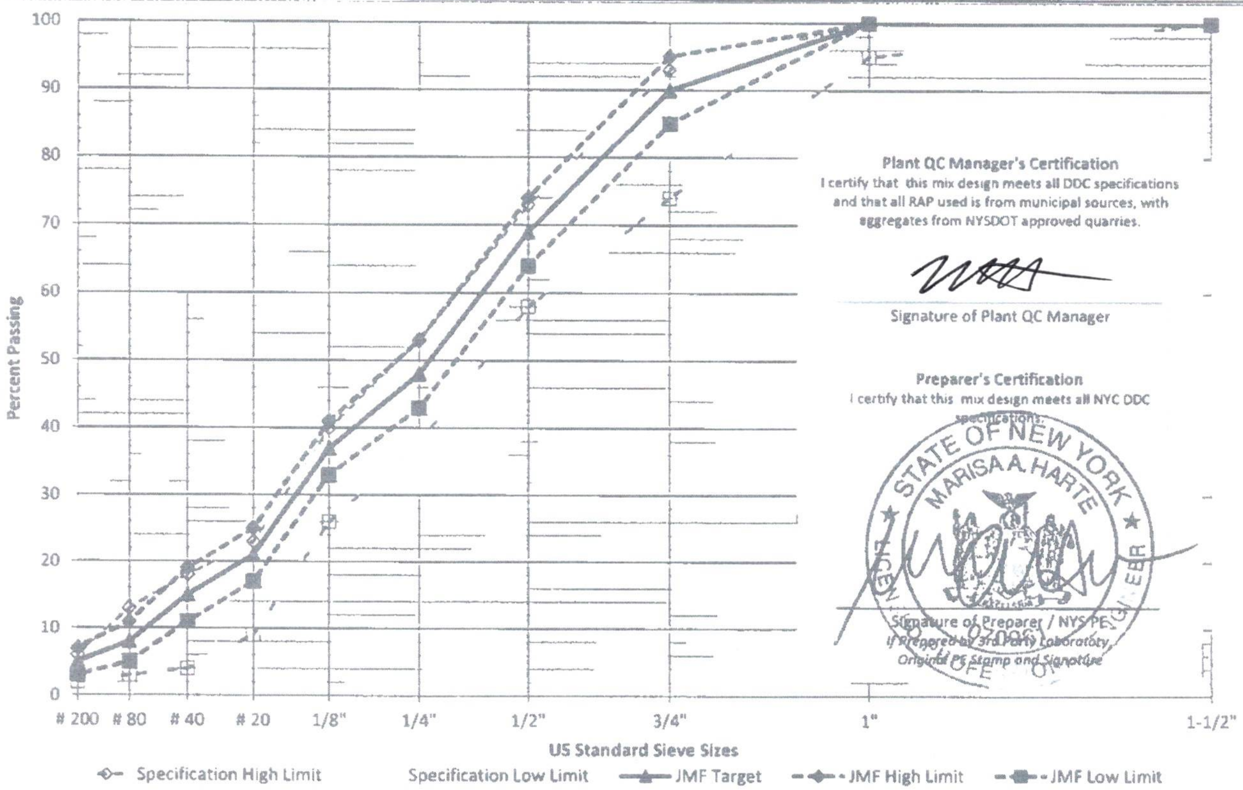
PLANT NAME:	Green Asphalt	MIX DESIGN DATE:	11/20/2023
NYSDOT FACILITY #:	H0385	PREPARED BY:	Alex Cantos
PLANT ADDRESS:	37-98 Railroad Ave	COMPANY:	MT Group
	Long Island City, NY 11101	PLANT QC MGR:	Matthew Harrison

Item	Supplier / Quarry		NYSDOT Source	High Friction	Agg. Blend %	Mix %	Lbs / Ton
						0.0%	0
#67 Stone	A. Colarusso & Son, Inc		8-17R	Yes	40.0%	39.2%	785
						0.0%	0
						0.0%	0
Natural Sand	North American Aggregates		10-105F2	N/A	10.0%	9.8%	196
				N/A		0.0%	0
5/16" RAP	Green Asphalt		N/A	Yes	20.0%	19.6%	392
	RAP % Asphalt:	4.0%		RAP AC		0.8%	16
All RAP to be from Municipal Sources - Aggregates from State Quarries				RAP Aggregate		18.8%	376
Fine RAP	Green Asphalt		N/A	Yes	30.0%	29.4%	589
	RAP % Asphalt:	6.1%		RAP AC		1.8%	36
All RAP to be from Municipal Sources - Aggregates from State Quarries				RAP Aggregate		27.6%	553
Virgin Asphalt	Grade:	PG64-22	SG (G_b):	1.031		1.9%	38
Total Asphalt Content (P_b):						4.5%	90
					100.0%	100.0%	2,000

Project No: Generic
"APPROVED"
NYC DDC - Office of Quality Assurance
Date: 12/12/23 Reviewed By: S.C.
LOG No: 2023-133
QA&CS APPROVAL STAMP

GreenAsphalt/3RA/Binder/Generic/NYCDDC/12/23/133 Expiration: 12/31/2025
QA&CS SERIAL NUMBER & EXPIRATION DATE

Sieve Size	1-1/2"	1"	3/4"	1/2"	1/4"	1/8"	# 20	# 40	# 80	# 200	P_b
Specification Limits	100	95-100	74-93	58-73	38-53	26-40	9-23	4-18	3-13	2-6	4.0-6.0
JMF Target	100	100	90	69	48	37	21	15	8	5	4.5
JMF Range	100	100	85-95	64-74	43-53	33-41	17-25	11-19	5-11	3-7	4.0-5.2



Plant QC Manager's Certification
I certify that this mix design meets all DDC specifications and that all RAP used is from municipal sources, with aggregates from NYSDOT approved quarries.

Signature of Plant QC Manager

Preparer's Certification
I certify that this mix design meets all NYC DDC specifications.

STATE OF NEW YORK · MARISA A. HARTE · LICENSED PROFESSIONAL ENGINEER

Signature of Preparer / NYS PE
If Prepared by 3rd Party Laboratory, Original PE Stamp and Signature

QA & CONSTRUCTION SAFETY BUREAU

AGGREGATE SPECIFIC GRAVITY & COMBINED GRADATION WORKSHEET - 3 RA BINDER MIX

PLANT NAME:	Green Asphalt	NYSDOT FACILITY #:	H0385	MIX DESIGN DATE	11/20/2023

Average Bin Gradations

	Not Used		#67 Stone		Not Used		Not Used		Natural Sand		Not Used		5/16" RAP		Fine RAP	
Sieve	% Ret	% Pass	% Ret.	% Pass	% Ret.	% Pass	% Ret	% Pass	% Ret.	% Pass	% Ret.	% Pass	% Ret.	% Pass	% Ret.	% Pass
1.5"		100.0	0.0	100.0		100.0		100.0	0.0	100.0		100.0	0.0	100.0	0.0	100.0
1"		100.0	0.0	100.0		100.0		100.0	0.0	100.0		100.0	0.0	100.0	0.0	100.0
3/4"		100.0	25.6	74.4		100.0		100.0	0.0	100.0		100.0	0.0	100.0	0.0	100.0
1/2"		100.0	51 5	22 9		100.0		100.0	0.0	100.0		100.0	0.0	100.0	0.0	100.0
1/4"		100.0	16.7	6.2		100.0		100.0	0.0	100.0		100.0	63.4	36.6	5.6	94.4
1/8"		100.0	5.1	1.1		100.0		100.0	4.9	95 1		100.0	18.6	18.0	15.7	78.7
#20		100.0	0.0	1.1		100.0		100.0	5.1	60.0		100.0	9.7	8.3	37.4	41 3
#40		100.0	0.0	1.1		100.0		100.0	5.5	34 5		100.0	0.0	8.3	8.8	32 5
#80		100.0	0.0	1.1		100.0		100.0	9.4	5.1		100.0	0.0	8.3	13.4	19 1
#200		100.0	0.0	1.1		100.0		100.0	2.3	2.8		100.0	0.0	8.3	9.9	9.2
Pan			1.1						2.8				8.3		9.2	
Totals	0.0		100.0		0.0		0.0		100.0		0.0		100.0		100.0	

Stockpiles Sampled By: Alex antos Date Sampled: 11/3/2023

Gradation Technician: Izak Aranov Date Tested: 11/6/2023

Coarse Aggregate Specific Gravity per ASTM C127

Discard portion of sample that passes the 1/4 sieve.

Only Perform this test if aggregate is 10% or more coarse (less than 90% passing the 1/4" sieve)

	Not Used	#67 Stone	Not Used	Not Used	Natural Sand	Not Used	5/16" RAP	Fine RAP
% Coarse Agg.	---	93.8%	---	---	0.0%	---	63.4%	5.6%
Test Required?	NO	YES	NO	NO	NO	NO	YES	NO
A) Wt. in Air		3156.8					3236 4	
B) Wt. SSD		3174 1					3247 6	
C) Wt. in Water		2005 8					2063 7	
G_{sb} (A/(B-C)	---	2.702	---	---	---	---	2.734	---
G_{sa} (A/(A-C)	---	2.743	---	---	---	---	2.760	---

Fine Aggregate Specific Gravity per ASTM C128

Discard portion of sample that does not pass the #4 sieve

Only Perform this test if 10% or more passes the 1/4" Sieve.

	Not Used	#67 Stone	Not Used	Not Used	Natural Sand	Not Used	5/16" RAP	Fine RAP
% Fine Agg.		6.2%	---	---	100.0%	---	36.6%	94.4%
Test Required?	NO	NO	NO	NO	YES	NO	YES	YES
A) Wt. in Air					498.4		499.0	502.5
B) Wt. Flask + Water					1451.6		1451	1451 6
C) Wt. Flask + Water + Sample					1764.5		1769	1770 7
S) Wt. SSD					501.3		501 9	504 1
G_{sb} (A/(B+S-C)	-	---	---	---	2.645	---	2.714	2 716
G_{sa} (A/(B+A-C)	- -	---	---	---	2.687	---	2.748	2 740

Combined Aggregate Specific Gravity

	Not Used	#67 Stone	Not Used	Not Used	Natural Sand	Not Used	5/16" RAP	Fine RAP
Combined G_{sb}		2.702	-	---	2.645	---	2.726	2 716
Combined G_{sa}		2.743	---	---	2.687	---	2.755	2 740

S. G. Technician: Alex Cantos Date Tested: 11/6/2023

Combined Average Gradations, % Passing

Bin	Agg Blend	1.5"	1"	3/4"	1/2"	1/4"	1/8"	#20	#40	#80	#200
Not Used	0.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
#67 Stone	40.0%	40.0	40.0	29.8	9.2	2.5	0.4	0.4	0.4	0.4	0.4
Not Used	0.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Not Used	0.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Natura Sand	10.0%	10.0	10.0	10.0	10.0	10.0	9.5	6.0	3.5	0.5	0.3
Not Used	0.0%	0.0	0.0	0 0	0.0	0.0	0 0	0.0	0.0	0.0	0.0
5/16" RAP	20.0%	20.0	20.0	20 0	20.0	7.3	3.6	1.7	1.7	1.7	1.7
Fine RAP	30.0%	30.0	30.0	30.0	30.0	28.3	23.6	12.4	9.8	5.7	2.8
Total	100.0%	100.0	100.0	89.8	69.2	48.1	37.2	20.5	15.3	8.3	5.1
Specification Limits		100	95-100	74-93	58 73	38-53	26-40	9-23	4-18	3-13	2-6

QA & CONSTRUCTION SAFETY BUREAU

ASPHALT TRIAL GRADATION WORKSHEET - 3 RA BINDER MIX

PLANT NAME	Green Asphalt	NYSDOT FACILITY #	H0385	MIX DESIGN DATE	11/20/2023

BATCH 1

Batch P_b =

Batch Grams: 12

Batch Weights, Retained on Sieve - Grams

Bin	Agg Blend	Mix Blend	Batch Grams	Asph Grams	1.5"	1"	3/4"	1/2"	1/4"	1/8"	#20	#40	#80	#200	Pan	
Not Used	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
#67 Stone	40.0%	38.6%	494.1		0.0	0.0	126.5	254.5	82.5	25.2	0.0	0.0	0.0	0.0	5.4	494.1
Not Used	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Not Used	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Natural Sand	10.0%	9.7%	123.5		0.0	0.0	0.0	0.0	0.0	6.1	43.4	31.5	36.3	2.8	3.5	123.5
Not Used	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5/16" RAP	20.0%	20.1%	257.3	10.3	0.0	0.0	0.0	0.0	163.1	47.9	25.0	0.0	0.0	0.0	11.1	257.3
Fine RAP	30.0%	30.8%	394.6	24.1	0.0	0.0	0.0	0.0	22.1	62.0	147.6	34.7	52.9	39.1	12.2	394.6
Virgin Asphalt		0.8%	10.4	10.4												10.4
Total Mix	100.0%	100.0%	1280.0	44.8	0.0	0.0	126.5	254.5	267.8	141.1	215.9	66.2	89.2	41.9	32.2	1280.0

3.50%

BATCH 2

Batch P_b = 4

Batch Grams: 12

Batch Weights, Retained on Sieve - Grams

Bin	Agg. Blend	Mix Blend	Batch Grams	Asph Grams	1.5"	1"	3/4"	1/2"	1/4"	1/8"	#20	#40	#80	#200	Pan	
Not Used	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
#67 Stone	40.0%	38.4%	491.5		0.0	0.0	125.8	253.1	82.1	25.1	0.0	0.0	0.0	0.0	5.4	491.5
Not Used	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Not Used	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Natural Sand	10.0%	9.6%	122.9		0.0	0.0	0.0	0.0	0.0	6.0	43.1	31.3	36.1	2.8	3.4	122.9
Not Used	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5/16" RAP	20.0%	20.0%	256.0	10.2	0.0	0.0	0.0	0.0	162.3	47.6	24.8	0.0	0.0	0.0	11.0	256.0
Fine RAP	30.0%	30.7%	392.6	23.9	0.0	0.0	0.0	0.0	22.0	61.6	146.8	34.5	52.6	38.9	12.2	392.6
Virgin Asphalt		1.3%	17.0	17.0												17.0
Total Mix	100.0%	100.0%	1280.0	51.2	0.0	0.0	125.8	253.1	266.4	140.3	214.8	65.9	88.7	41.7	32.0	1280.0

4.00%

BATCH 3

Batch P_b = 4

Batch Grams: 12

Batch Weights, Retained on Sieve Grams

Bin	Agg. Blend	Mix Blend	Batch Grams	Asph Grams	1.5"	1"	3/4"	1/2"	1/4"	1/8"	#20	#40	#80	#200	Pan	
Not Used	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
#67 Stone	40.0%	38.2%	489.0		0.0	0.0	125.2	251.8	81.7	24.9	0.0	0.0	0.0	0.0	5.4	489.0
Not Used	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Not Used	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Natural Sand	10.0%	9.6%	122.2		0.0	0.0	0.0	0.0	0.0	6.0	42.9	31.2	35.9	2.8	3.4	122.2
Not Used	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5/16" RAP	20.0%	19.9%	254.7	10.2	0.0	0.0	0.0	0.0	161.5	47.4	24.7	0.0	0.0	0.0	11.0	254.7
Fine RAP	30.0%	30.5%	390.5	23.8	0.0	0.0	0.0	0.0	21.9	61.3	146.1	34.4	52.3	38.7	12.1	390.5
Virgin Asphalt		1.8%	23.6	23.6												23.6
Total Mix	100.0%	100.0%	1280.0	57.6	0.0	0.0	125.2	251.8	265.0	139.6	213.7	65.5	88.3	41.5	31.9	1280.0

4.50%

BATCH 4

Batch P_b = 5.

Batch Grams: 128

Batch Weights, Retained on Sieve - Grams

Bin	Agg. Blend	Mix Blend	Batch Grams	Asph. Grams	1.5"	1"	3/4"	1/2"	1/4"	1/8"	#20	#40	#80	#200	Pan	
Not Used	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
#67 Stone	40.0%	38.0%	486.4		0.0	0.0	124.5	250.5	81.2	24.8	0.0	0.0	0.0	0.0	5.4	486.4
Not Used	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Not Used	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Natural Sand	10.0%	9.5%	121.6		0.0	0.0	0.0	0.0	0.0	6.0	42.7	31.0	35.8	2.8	3.4	121.6
Not Used	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5/16" RAP	20.0%	19.8%	253.3	10.1	0.0	0.0	0.0	0.0	160.6	47.1	24.6	0.0	0.0	0.0	10.9	253.3
Fine RAP	30.0%	30.4%	388.5	23.7	0.0	0.0	0.0	0.0	21.8	61.0	145.3	34.2	52.1	38.5	12.0	388.5
Virgin Asphalt		2.4%	30.2	30.2												30.2
Total Mix	100.0%	100.0%	1280.0	64.0	0.0	0.0	124.5	250.5	263.6	138.9	212.6	65.2	87.8	41.3	31.7	1280.0

5.00%

BATCH 5

Batch P_b =

Batch Grams: 128

Batch Weights, Retained on Sieve - Grams

Bin	Agg. Blend	Mix Blend	Batch Grams	Asph. Grams	1.5"	1"	3/4"	1/2"	1/4"	1/8"	#20	#40	#80	#200	Pan	
Not Used	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
#67 Stone	40.0%	37.8%	483.8		0.0	0.0	123.9	249.2	80.8	24.7	0.0	0.0	0.0	0.0	5.3	483.8
Not Used	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Not Used	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Natural Sand	10.0%	9.5%	121.0		0.0	0.0	0.0	0.0	0.0	5.9	42.5	30.8	35.6	2.8	3.4	121.0
Not Used	0.0%	0.0%	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5/16" RAP	20.0%	19.7%	252.0	10.1	0.0	0.0	0.0	0.0	159.8	46.9	24.4	0.0	0.0	0.0	10.8	252.0
Fine RAP	30.0%	30.2%	386.5	23.6	0.0	0.0	0.0	0.0	21.6	60.7	144.5	34.0	51.8	38.3	12.0	386.5
Virgin Asphalt		2.9%	36.7	36.7												36.7
Total Mix	100.0%	100.0%	1280.0	70.4	0.0	0.0	123.9	249.2	262.2	138.1	211.4	64.9	87.3	41.0	31.5	1280.0

5.50%

Department of Design and Construction

QA & CONSTRUCTION SAFETY BUREAU

ASPHALT MAXIMUM DENSITY & MARSHALL PROPERTIES WORKSHEET - 3 RA BINDER MIX

PLANT NAME:	Green Asphalt	NYSDOT FACILITY #:	H0385	MIX DESIGN DATE:	11/20/2023

Theoretical Maximum Specific Gravity G_{mm} per ASTM D2041

Trial Batch	1		2		3		4		5	
P_b	3.5%		4.0%		4.5%		5.0%		5.5%	
A) Sample in Air (grams)	2073.5	2052.8	2023.4	2010.6	2062.3	2033.4	2055.6	2063.2	2069.1	2039.7
B) Pycnometer in Water (Grams)	1318.8	1326.5	1318.8	1326.5	1318.8	1326.5	1318.8	1326.5	1318.8	1326.5
C) Sample & Pycnometer in Water (Grams)	2589.4	2587.4	2552.3	2550.5	2568.9	2558.0	2560.0	2570.3	2558.2	2553.7
G_{mm} (A/(A+B-C))	2.583	2.592	2.562	2.556	2.539	2.536	2.524	2.518	2.494	2.510
Average G_{mm}	2.587		2.559		2.537		2.521		2.502	

Density Technician:	Alex Cantos	Date Tested.	11/20/2023

Computation of Marshall Mix Properties (75 Blows per Side)

	Weight In Air	SSD Weight	Weight In Water	Sample Volume	Bulk SG G_{mb}	Max SG G_{mm}	% Air P_a	Unit Weight	Meas Stability	Corr Factor	Corr. Stability	Marshall Flow	Marshall Quotient
	Grams	Grams	Grams	CC	---	---	%	PCF	lbs	lbs	lbs	0.01"	lb/0.01"
	A	B	C	D	E	F	G	H	J	K	I	M	N
	---	---	---	B-C	A/D	---	(F-E)/F	E*62.4			J*K	---	L/M
TRIAL BATCH 1						P_b = 3.5%							
Specimen A	1271.4	1273.6	744.0	529.6	2.401	2.587	7.20%		2960	0.96	2840	8.1	351
Specimen B	1271.6	1273.6	745.4	528.2	2.407	2.587	6.94%		2940	0.96	2820	7.9	357
Specimen C	1273.1	1275.4	746.0	529.4	2.405	2.587	7.04%		3020	0.96	2900	7.5	387
Average					2.404	2.587	7.07%	150.0			2850	7.8	365
TRIAL BATCH 2						P_b = 4.0%							
Specimen A	1268.6	1270.2	746.6	523.6	2.423	2.559	5.32%		2910	0.96	2790	8.4	332
Specimen B	1270.2	1272.8	748.0	524.8	2.420	2.559	5.42%		3150	0.96	3020	8.9	339
Specimen C	1269.4	1271.0	745.0	526.0	2.413	2.559	5.69%		2960	0.96	2840	8.8	323
Average					2.419	2.559	5.47%	150.9			2880	8.7	331
TRIAL BATCH 3						P_b = 4.5%							
Specimen A	1269.7	1270.6	750.0	520.6	2.439	2.537	3.87%		3240	1	3240	10.5	309
Specimen B	1271.4	1272.4	749.4	523.0	2.431	2.537	4.18%		3450	0.96	3310	10.1	328
Specimen C	1269.9	1270.9	749.4	521.5	2.435	2.537	4.02%		3070	1	3070	10.7	287
Average					2.435	2.537	4.02%	151.9			3210	10.4	308
TRIAL BATCH 4						P_b = 5.0%							
Specimen A	1270.4	1271.2	752.3	518.9	2.448	2.521	2.89%		3310	1	3310	11.4	290
Specimen B	1270.9	1271.7	751.4	520.3	2.443	2.521	3.11%		3260	1	3260	11.5	283
Specimen C	1268.6	1269.5	749.6	519.9	2.440	2.521	3.21%		3260	1	3260	11.2	291
Average					2.444	2.521	3.05%	152.5			3280	11.4	288
TRIAL BATCH 5						P_b = 5.5%							
Specimen A	1271.2	1271.9	756.5	515.4	2.466	2.502	1.42%		3240	1	3240	12.9	251
Specimen B	1270.6	1271.5	752.8	518.7	2.450	2.502	2.09%		3290	1	3290	13.1	251
Specimen C	1268.9	1269.6	751.9	517.7	2.451	2.502	2.04%		3310	1	3310	13.7	242
Average					2.456	2.502	1.84%	153.3			3280	13.2	248

Marshall Technician:	Alex Cantos	Date Tested:	11/20/2023

Department of Design and Construction

QA & CONSTRUCTION SAFETY BUREAU

MIX VOLUMETRIC PROPERTIES WORKSHEET - 3 RA BINDER MIX

PLANT:	Green Asphalt	NYSDOT FACILITY #:	H0385	MIX DESIGN DATE:	11/20/2023

Agg. Blend %	Constituent Material	NYSDOT Source	G_{sa}	G_{sb}	Total Mix Composition by Weight				
					Trial Batch				
					1	2	3	4	5
0.0%	Not Used	---	---	---	0.0%	0.0%	0.0%	0.0%	0.0%
40.0%	#67 Stone	8-17R	2.743	2.702	38.6%	38.4%	38.2%	38.0%	37.8%
0.0%	Not Used	---	---	---	0.0%	0.0%	0.0%	0.0%	0.0%
0.0%	Not Used	---	---	---	0.0%	0.0%	0.0%	0.0%	0.0%
10.0%	Natural Sand	10-105F2	2.687	2.645	9.7%	9.6%	9.6%	9.5%	9.5%
0.0%	Not Used	---	---	---	0.0%	0.0%	0.0%	0.0%	0.0%
20.0%	5/16" RAP		2.755	2.726	20.1%	20.0%	19.9%	19.8%	19.7%
30.0%	Fine RAP		2.740	2.716	30.8%	30.7%	30.5%	30.4%	30.2%
	Virgin Asphalt				0.8%	1.3%	1.8%	2.4%	2.9%
100.0%					100.0%	100.0%	100.0%	100.0%	100.0%

Mix General Properties				Trial Batch				
				1	2	3	4	5
P_b	Percent Total Asphalt Binder, %			3.5%	4.0%	4.5%	5.0%	5.5%
P_{ba}	Percent Absorbed Asphalt Binder, %			0.45%	0.31%	0.28%	0.34%	0.34%
P_{be}	Percent Effective Asphalt Binder, %			3.07%	3.70%	4.23%	4.68%	5.18%
DP	Dust Proportion (0.6 to 1.2 desired)			0.6	0.7	0.8	0.9	1.0
G_{mm}	Mix Maximum Specific Gravity			2.587	2.559	2.537	2.521	2.502
G_{mb}	Mix Bulk Specific Gravity			2.404	2.419	2.435	2.444	2.456
G_{sb}	Aggregate Bulk Gravity			2.705	2.705	2.705	2.705	2.705
G_{se}	Aggregate Effective Gravity			2.737	2.727	2.725	2.729	2.729
G_{sa}	Aggregate Apparent Specific Gravity			2.739	2.739	2.739	2.739	2.739

Mix Acceptance Properties		Low Limit	High Limit	Trial Batch				
				1	2	3	4	5
VMA	Voids in Mineral Aggregate, %	13.5%		✓ 14.2%	✓ 14.2%	✓ 14.0%	✓ 14.2%	✓ 14.2%
	Note: All five trial batches must meet the minimum VMA requirement.							
VFA	Voids Filled with Asphalt, %	65%	75%	✗ 50.3%	✗ 61.3%	✓ 71.4%	✗ 78.5%	✗ 87.0%
P_a	Percent Air Voids, %	3.0%	5.0%	✗ 7.1%	✗ 5.5%	✓ 4.0%	✓ 3.1%	✗ 1.8%
---	Marshall Stability (Corrected), lb	1500		✓ 2850	✓ 2880	✓ 3210	✓ 3280	✓ 3280
---	Marshall Flow, 0.01"	8	12	✗ 7.8	✓ 8.7	✓ 10.4	✓ 11.4	✗ 13.2
---	Marshall Quotient, lb/0.01"	150		✓ 365	✓ 331	✓ 308	✓ 288	✓ 248

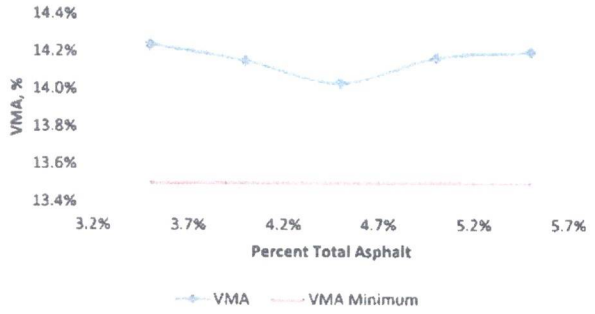
Department of Design and Construction

QA & CONSTRUCTION SAFETY BUREAU

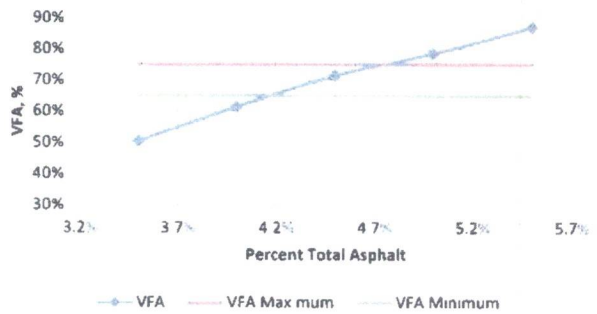
PROPERTY CURVES & DESIRED ASPHALT CONTENT WORKSHEET - 3 RA BINDER MIX

PLANT NAME:	Green Asphalt	NYSDOT FACILITY #:	H0385	MIX DESIGN DATE:	11/20/2023

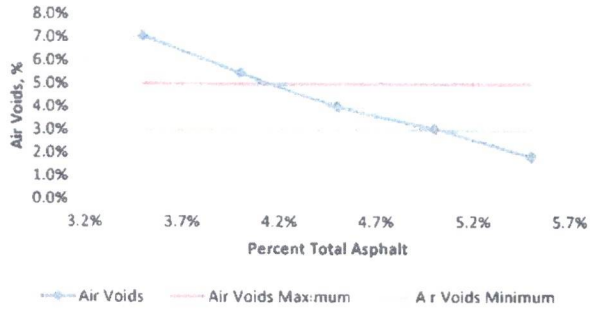
Voids in Mineral Aggregate



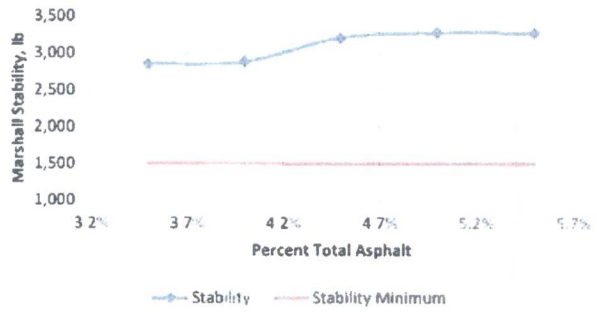
Voids Filled with Asphalt



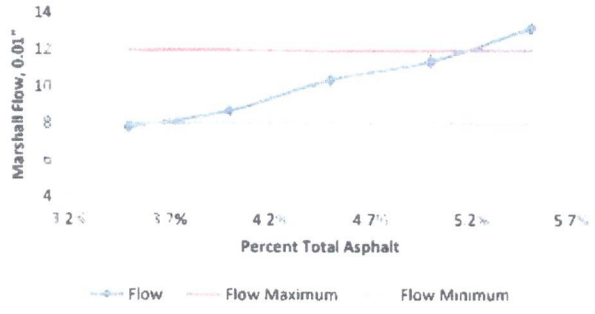
Air Voids



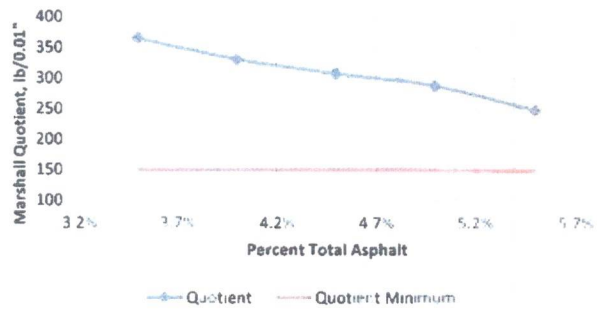
Marshall Stability



Marshall Flow



Marshall Quotient



Property	High	Low
Voids in Mineral Aggregate (VMA), %	3.5%	5.5%
Voids Filled with Asphalt (VFA), %	4.2%	4.8%
Percent Air Voids, %	4.2%	4.9%
Marshall Stability (Corrected), lb	3.5%	5.5%
Marshall Flow, 0.01"	3.5%	5.2%
Marshall Quotient, lb/0.01"	3.5%	5.5%
Overlap	4.2%	4.8%

Properties at Desired AC%
14.0%
71.4%
4.0%
3210
10.4
308

Midpoint	4.5%

Desired Total Asphalt Content P_b	4.5%

Desired Asphalt Content is the midpoint, unless the midpoint is on the VMA curve's positive slope.
If this is the case, the Desired Asphalt Content is as close as possible to the bottom of the VMA curve, within the Overlap Range.