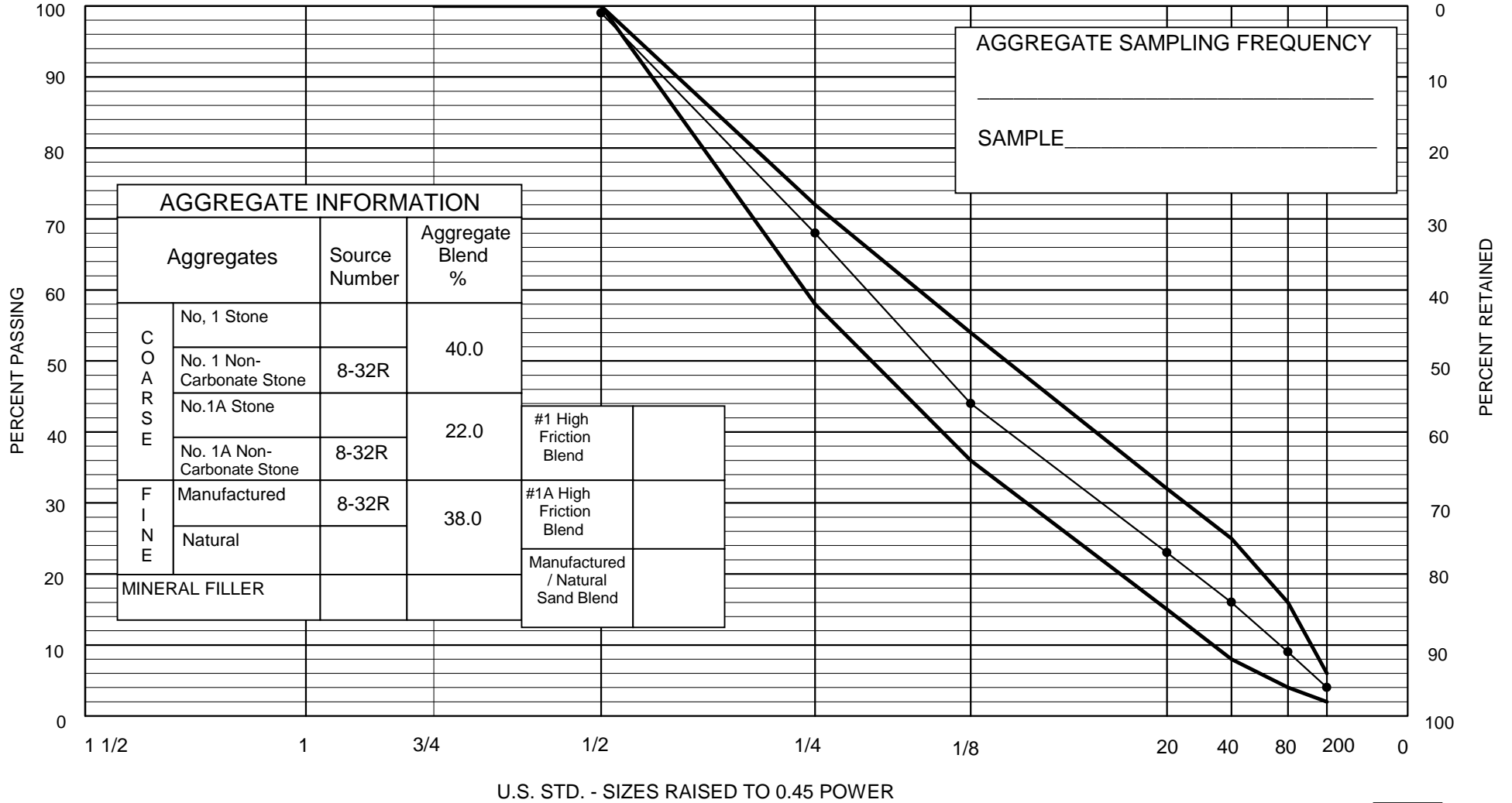


NEW YORK STATE
DEPARTMENT OF TRANSPORTATION
MATERIALS BUREAU
JOB MIX FORMULA

Facility No. _____ Formula No. _____
Plant Willets Point Asphalt Region 11
Plant Location Flushing, NY
Submitted Willets Point Asphalt Date 3/4/2019

NYSDOT TYPE 6F HDRA TOP COURSE



Sieve Size		1 1/2"	1"	3/4"	1/2"	1/4"	1/8"	No. 20	No. 40	No. 80	No. 200	Asphalt Content (Percent)
% Passing	1. General Limits			100	95-100	65-85	36-65	15-39	8-27	4-16	2-6	5.4-7.0
	2. JMF Range			100	95-100	63-73	40-48	19-27	12-20	6-12	2-6	-
	3. Target Value			100	99	68	44	23	16	9	4	5.5

Asphalt Grade
AC 20 PG 64-22

Recommended for Approval by Regional Director _____

Date: _____

Approved by Director, Materials Bureau _____

Date: _____

Remarks: _____

**NEW YORK STATE
DEPARTMENT OF TRANSPORTATION
MATERIALS BUREAU
MARSHALL GRADATION ANALYSIS WORKSHEET**

**REGION
ITEM
MIX TYPE
PRODUCER
LOCATION**

11
6F HDRA
WILLETS PT ASPHALT
Flushing, NY

NO. OF COMPOSITE/STOCKPILES AVERAGED 10

AVERAGE BIN BREAKDOWN

AGGREGATE INFORMATION				
AGGREGATES		SOURCE NUMBER	AGGREGATE BLEND %	
COARSE	No. 2 Stone			
	No. 1 Stone			# 1 High
	No. 1 Non-Carbonate Stone	8-32R	40.0	Friction Blend
	No. 1A Stone			# 1A High
	No. 1A Non-Carbonate Stone	8-32R	22.0	Friction Blend
	FINE	Manufactured	8-32R	38.0
	Natural			
	R.A.P.		Blend	
MINERAL FILLER				

Sieve Size	BIN NO. 5		BIN 3/4" NO. 4		BIN 3/8" NO. 3		BIN 1/4" NO. 2		BIN Sand NO. 1		MF			
	%		%		%		%		%		%			
	ret.	pass	ret.	pass.	ret.	pass.	ret.	pass.	ret.	pass.	ret.	pass.		
1 1/2"					-	100.0	-	100.0	-	100.0	-	100		
1"					0.0	100.0	0.0	100.0	0.0	100.0	0.0	100		
3/4"					0.0	100.0	0.0	100.0	0.0	100.0	0.0	100		
1/2"					2.3	97.7	0.0	100.0	0.0	100.0	0.0	100		
1/4"					68.5	29.2	14.8	85.2	0.0	100.0	0.0	100		
1/8"					20.9	8.3	64.2	21.0	4.6	95.4	0.0	100		
20					3.7	4.6	16.2	4.8	43.4	52.0	0.0	100		
40					0.8	3.8	1.4	3.4	15.2	36.8	0.0	100		
80					1.4	2.4	1.8	1.6	17.7	19.1	0.0	100		
200					1.2	1.2	1.0	0.6	10.6	8.5	20.0	80		
PAN					100.0	-	1.2	-	0.6	-	8.5	-	80.0	-
Totals					100.0	-	100.0	-	100.0	-	100.0	-	100.0	-

COMBINED AVERAGE GRADATION

BIN	% Batched	% PASSING SIEVE									
		1 1/2"	1"	3/4"	1/2"	1/4"	1/8"	20	40	80	200
-	0.0										
3/4"	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3/8"	40.0	40.0	40.0	40.0	39.1	11.7	3.3	1.8	1.5	1.0	0.5
1/4"	22.0	22.0	22.0	22.0	22.0	18.7	4.6	1.1	0.7	0.4	0.1
Sand	38.0	38.0	38.0	38.0	38.0	38.0	36.3	19.8	14.0	7.3	3.2
MF	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	100.0	100.0	100.0	100.0	99.1	68.4	44.2	22.7	16.2	8.7	3.8
Specification Limits		100	100	100	95-100	58-72	36-54	15-32	8-25	4-16	2-6

REMARKS _____

TESTED BY Willets Point Asphalt ON 3/4/2019

**COMBINED MARSHALL GRADATION
AT THE % ASPHALT CEMENT INDICATED**

% A.C.	AGGREGATE COMPONENT	% BATCH	GRAMS BATCH	WEIGHT RETAINED (GRAMS)										Total WGT. RET.
				1	3/4	1/2	1/4	1/8	20	40	80	200	Pan	
4.5	5	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
	4	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
	3	40.0	469.8	0.0	0.0	10.8	321.8	98.2	17.4	3.8	6.6	0.0	11.2	469.8
	2	22.0	258.4	0.0	0.0	0.0	38.2	165.9	41.9	3.6	4.7	0.0	4.1	258.4
	1	38.0	446.3	0.0	0.0	0.0	0.0	20.5	193.7	67.8	79.0	0.0	85.3	446.3
	MF	0.0	0.0	(Specimen wtg)= <u>1230</u> x <u>4.5</u> %A.C. = <u>55.4</u> gr. A.C.										
	Total	100.0	1174.6	(Specimen wtg)= <u>1230</u> - <u>55.4</u> gr. A.C. = <u>1174.6</u> gr. Aggregate										

% A.C.	AGGREGATE COMPONENT	% BATCH	GRAMS BATCH	WEIGHT RETAINED (GRAMS)										Total WGT. RET.
				1	3/4	1/2	1/4	1/8	20	40	80	200	Pan	
5.0	5	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
	4	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
	3	40.0	467.4	0.0	0.0	10.8	320.2	97.7	17.3	3.7	6.5	0.0	11.2	467.4
	2	22.0	257.1	0.0	0.0	0.0	38.0	165.0	41.6	3.6	4.6	0.0	4.3	257.1
	1	38.0	444.0	0.0	0.0	0.0	0.0	20.4	192.7	67.5	78.6	0.0	84.8	444.0
	MF	0.0	0.0	(Specimen wtg)= <u>1230</u> x <u>5.0</u> %A.C. = <u>61.5</u> gr. A.C.										
	Total	100.0	1168.5	(Specimen wtg)= <u>1230</u> - <u>61.5</u> gr. A.C. = <u>1168.5</u> gr. Aggregate										

% A.C.	AGGREGATE COMPONENT	% BATCH	GRAMS BATCH	WEIGHT RETAINED (GRAMS)										Total WGT. RET.
				1	3/4	1/2	1/4	1/8	20	40	80	200	Pan	
5.5	5	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
	4	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
	3	40.0	464.9	0.0	0.0	10.7	318.5	97.2	17.2	3.7	6.5	0.0	11.1	464.9
	2	22.0	255.7	0.0	0.0	0.0	37.8	164.2	41.4	3.6	4.6	0.0	4.1	255.7
	1	38.0	441.7	0.0	0.0	0.0	0.0	20.3	191.7	67.1	78.2	0.0	84.4	441.7
	MF	0.0	0.0	(Specimen wtg)= <u>1230</u> x <u>5.5</u> %A.C. = <u>67.7</u> gr. A.C.										
	Total	100.0	1162.3	(Specimen wtg)= <u>1230</u> - <u>67.7</u> gr. A.C. = <u>1162.3</u> gr. Aggregate										

% A.C.	AGGREGATE COMPONENT	% BATCH	GRAMS BATCH	WEIGHT RETAINED (GRAMS)										Total WGT. RET.
				1	3/4	1/2	1/4	1/8	20	40	80	200	Pan	
6.0	5	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
	4	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
	3	40.0	462.5	0.0	0.0	10.6	316.8	96.7	17.1	3.7	6.5	0.0	11.1	462.5
	2	22.0	254.4	0.0	0.0	0.0	37.6	163.3	41.2	3.6	4.6	0.0	4.1	254.4
	1	38.0	439.4	0.0	0.0	0.0	0.0	20.2	190.7	66.8	77.8	0.0	83.9	439.4
	MF	0.0	0.0	(Specimen wtg)= <u>1230</u> x <u>6.0</u> %A.C. = <u>73.8</u> gr. A.C.										
	Total	100.0	1156.2	(Specimen wtg)= <u>1230</u> - <u>73.8</u> gr. A.C. = <u>1156.2</u> gr. Aggregate										

% A.C.	AGGREGATE COMPONENT	% BATCH	GRAMS BATCH	WEIGHT RETAINED (GRAMS)										Total WGT. RET.
				1	3/4	1/2	1/4	1/8	20	40	80	200	Pan	
6.5	5	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
	4	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
	3	40.0	460.0	0.0	0.0	10.6	315.1	96.1	17.0	3.7	6.4	0.0	11.1	460.0
	2	22.0	253.0	0.0	0.0	0.0	37.4	162.4	41.0	3.5	4.6	0.0	4.1	253.0
	1	38.0	437.0	0.0	0.0	0.0	0.0	20.1	189.7	66.4	77.3	0.0	83.5	437.0
	MF	0.0	0.0	(Specimen wtg)= <u>1230</u> x <u>6.5</u> %A.C. = <u>80.0</u> gr. A.C.										
	Total	100.0	1150.0	(Specimen wtg)= <u>1230</u> - <u>80.0</u> gr. A.C. = <u>1150.0</u> gr. Aggregate										

**NEW YORK STATE
DEPARTMENT OF TRANSPORTATION
MATERIALS BUREAU**

**COMPUTATION OF MARSHALL
MIX PROPERTIES**

ITEM _____ REGION 11
MIX TYPE 6F HDRA
LOCATION Flushing, NY

PRODUCER Willets Point Asphalt

Specimen	Asphalt Content	Weight - Grams			Volume CC	Bulk Specific Gravity Gmb	Unit Wt. lb/cu. Ft.	Stability - Lbs.			Flow 0.01 in	Marshall Quotient lb/0.01 in.
		In Air	In Water	S.S.D.				Measured	Correction Factor	Corrected		
a	b	c	d	e	f	g	h	i	j	k	l	m
					e-d	c/f	g*62.4					k/l
A		1196.3	697.8	1199.1	501.3	2.386		2675	1.04	2782	9.0	
B		1198.6	698.4	1201.1	502.7	2.384		2850	1.04	2964	10.0	
C		1197.8	699.0	1200.8	501.8	2.387		2750	1.04	2860	9.5	
AVG.	4.5					2.386	148.9			2869	9.5	302
A		1192.1	699.0	1196.5	497.5	2.396		3125	1.04	3250	9.5	
B		1193.7	703.6	1200.9	497.3	2.400		2700	1.04	2808	10.0	
C		1194.5	701.8	1199.9	498.1	2.398		2950	1.04	3068	10.0	
AVG.	5.0					2.398	149.6			3042	9.8	310
A		1187.9	699.1	1192.2	493.1	2.409		2950	1.09	3216	10.0	
B		1190.0	698.7	1192.1	493.4	2.412		2800	1.09	3052	9.0	
C		1192.1	699.4	1194.2	494.8	2.409		2910	1.09	3172	11.0	
AVG.	5.5					2.410	150.4			3147	10.0	315
A		1197.8	705.2	1199.2	494.0	2.425		2800	1.09	3052	11.5	
B		1198.2	707.4	1201.4	494.0	2.426		2850	1.09	3107	11.0	
C		1201.5	708.9	1203.7	494.8	2.428		2825	1.09	3079	12.0	
AVG.	6.0					2.426	151.4			3079	11.5	268
A		1199.3	711.2	1203.1	491.9	2.438		2600	1.09	2834	12.0	
B		1197.6	710.5	1200.7	490.2	2.443		2650	1.09	2889	11.5	
C		1198.2	710.5	1201.3	490.8	2.441		2725	1.09	2970	12.5	
AVG.	6.5					2.441	152.3			2898	12.0	242

PREPARED BY Willets Point Asphalt

DATE 3/4/2019

BR 76 M (12/94)

**NEW YORK STATE
DEPARTMENT OF TRANSPORTATION
MATERIALS BUREAU**

MIX TYPE 6F HDRA REGION 11

PRODUCER Willets Point Asphalt

LOCATION Flushing, NY

**MAXIMUM SPECIFIC GRAVITY OF HOT MIX ASPHALT
AASHTO T209**

- Gmm** = Maximum Specific Gravity of Hot Mix Asphalt
- A** = Weight of sample in air (grams)
- D** = Weight of pycnometer filled with airless water at 25 C (grams)
- E** = Weight of pycnometer filled with water and sample at 25 C (grams)
- Gmm** = $\frac{A}{A+D-E}$

ASPHALT CONTENT	4.5 %		5.0 %		5.5 %		6.0 %		6.5 %	
	1	2	1	2	1	2	1	2	1	2
A	1197.8	1198.3	1197.2	1198.4	1199.3	1200.4	1200.6	1201.3	1197.5	1196.2
D	7384.5	7384.5	7383.2	7383.2	7384.6	7384.6	7384.5	7384.5	7384.6	7384.6
E	8110.5	8109.2	8106.7	8107.0	8107.0	8106.3	8105.4	8107.0	8101.4	8102.2
A+D-E	471.8	473.6	473.7	474.6	476.9	478.7	479.7	478.8	480.7	478.6
Gmm	2.539	2.530	2.527	2.525	2.515	2.508	2.503	2.509	2.491	2.499
Average Gmm	2.535		2.526		2.512		2.506		2.495	

TESTED BY Willets Point Asphalt ON 3/4/2019

**NEW YORK STATE
DEPARTMENT OF TRANSPORTATION
MATERIALS BUREAU**

ITEM _____ REGION 11
MIX TYPE 6F HDRA
PRODUCER Willets Point Asphalt
LOCATION Flushing, NY
COMPACTION 75 BLOWS PER SIDE

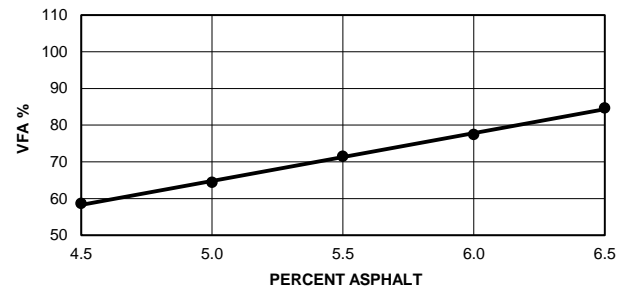
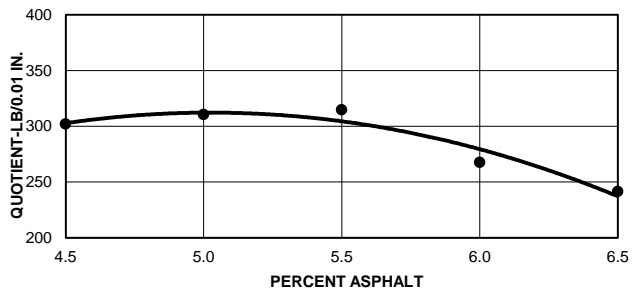
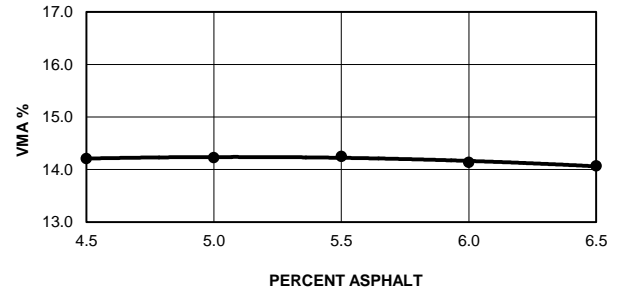
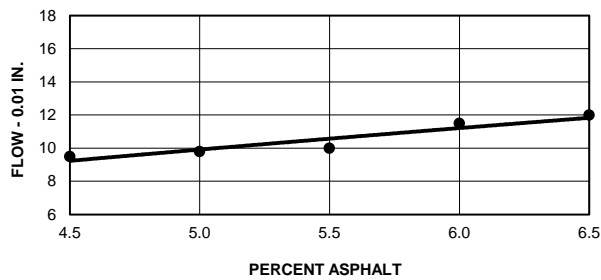
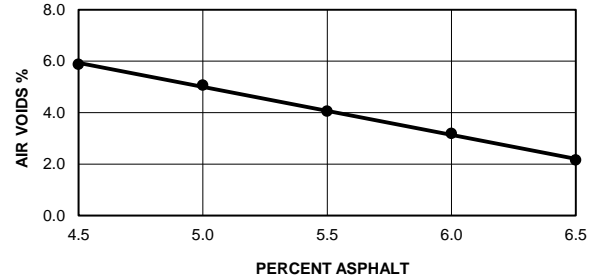
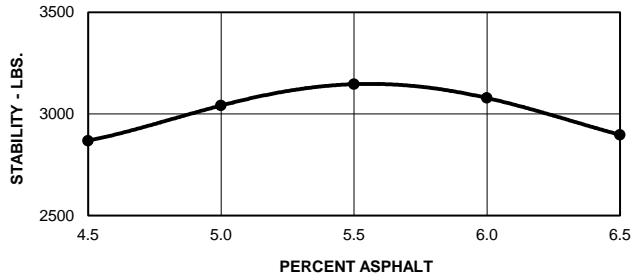
WORKSHEET FOR ANALYSIS OF
COMPACTED PAVING MIXTURE

(Analysis by weight of total mixture)
COMPOSITION OF PAVING MIXTURE

CONSTITUENT MATERIAL		NYS DOT	Specific Gravity		Mix Composition, % by weight of Total Mix, P					
			Source Number	Apparent	Bulk	Region Verification	Mix or Trial Number			
		1					2	3	4	5
CA	No. 2 Stone				P1					
	No. 1 Stone				P2					
	No. 1 Non-Carbonate Stone	8-32R	2.697	2.659	P3	38.20	38.00	37.80	37.60	37.40
	No. 1A Stone				P4					
	No. 1A Non-Carbonate Stone	8-32R	2.697	2.659	P5	21.01	20.90	20.79	20.68	20.57
FA	Natural Sand				P6					
	Manufactured Sand	8-32R	2.691	2.650	P7	36.29	36.10	35.91	35.72	35.53
	R.A.P.				P8					
MINERAL FILLER					P9					
TOTAL AGGREGATE					Ps	95.5	95.0	94.5	94.0	93.5
ASPHALT CEMENT @ 25 C				1.020	PB	4.5	5.0	5.5	6.0	6.5
Gmm	Max Sp. Gr. of Paving Mix (AASHTO T209)					2.535	2.526	2.512	2.506	2.495
Gmb	Bulk Sp. Gr. of compacted mix (AASHTO T166)					2.386	2.398	2.410	2.426	2.441
Gsb	Bulk Sp. Gr. of total aggregate*					2.656	2.656	2.656	2.656	2.656
Gse	Effective Sp. Gr. of total aggregate*					2.726	2.739	2.746	2.763	2.774
Gsa	Apparent Sp. Gr. of total aggregate					2.695	2.695	2.695	2.695	2.695
VMA	100 - (Gmb x Ps/Gsb)					14.21	14.23	14.25	14.14	14.07
Pa	Pa = 100[(Gmm - Gmb)/Gmm]					5.88	5.07	4.06	3.19	2.16
VFA	VFA = 100 [(VMA - Pa)/VMA]					58.62	64.37	71.51	77.44	84.65
Pbe	Effective Asphalt Content = Gb(VMA - Pa)/Gmb					3.56	3.90	4.31	4.60	4.98
	Stability (CORRECTED)					2869	3042	3147	3079	2898
	Flow					9.5	9.8	10.0	11.5	12.0
	Marshall Quotient = Stability(corrected)/Flow					302	310	315	268	242
	Unit Weight					148.9	149.6	150.4	151.4	152.3

* EQUATIONS FROM CHAPTER V, SECTION E, NY MATERIALS METHOD 5.13

MARSHALL TEST PROPERTY CURVES AND RANGE DATA



COMMON OVERLAP RANGE 5.0-6.0
 MID POINT 5.5
 (OPTIMUM AC CONTENT) 5.5

SUBMITTED BY Willets Point Asphalt
 DATE 3/4/2019

VALUES AT OPTIMUM AC CONTENT

PROPERTY	STABILITY	FLOW	QUOTIENT	AIR VOIDS	VMA	VFA
SPECIFICATION	1500 min.	8.0 min.	150 min	3.0-5.0	14.0 min.	65 - 75
ACTUAL	3150	10	300	4.0	14.3	70