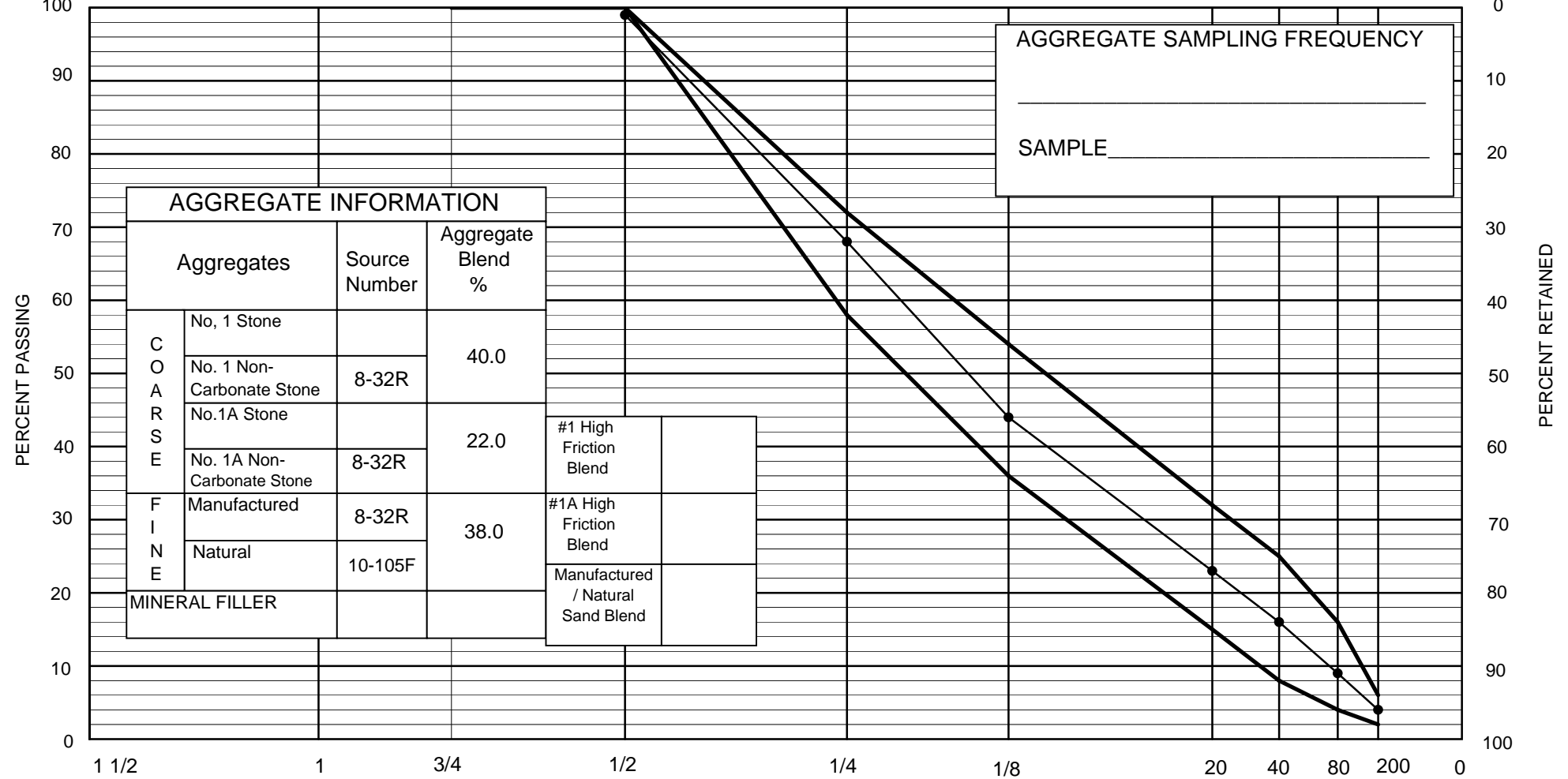


NEW YORK STATE
DEPARTMENT OF TRANSPORTATION
MATERIALS BUREAU
JOB MIX FORMULA

Facility No. _____ Formula No. _____
Plant _____ **Willets Point Asphalt** Region **11**
Plant Location **Flushing, NY**
Submitted **Willets Point Asphalt** Date **05/01/09**

NYSOT TYPE 6FHD/RA TOP COURSE (HIGH FRICTION)



U.S. STD. - SIZES RAISED TO 0.45 POWER

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	58-72	36-54	15-32	8-25	4-16	2-6	5.0-6.2
	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
6FHD/RA
Willets Point Asphalt
Flushing, NY

NO. OF COMPOSITE/STOCKPILES AVERAGED 10

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	Manuf./Nat. Sand
Natural					
				Blend	
MINERAL FILLER					

AVERAGE BIN BREAKDOWN

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 05/01/09

**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 wgt)= <u>1230</u> x <u>4.5</u> %A.C. = <u>55.4</u> gr. A.C.										
	Total	100.0	1174.6	(Specimen wgt)= <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 wgt)= <u>1230</u> x <u>5.0</u> %A.C. = <u>61.5</u> gr. A.C.										
	Total	100.0	1168.5	(Specimen wgt)= <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 wgt)= <u>1230</u> x <u>5.5</u> %A.C. = <u>67.7</u> gr. A.C.										
	Total	100.0	1162.3	(Specimen wgt)= <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 wgt)= <u>1230</u> x <u>6.0</u> %A.C. = <u>73.8</u> gr. A.C.										
	Total	100.0	1156.2	(Specimen wgt)= <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 wgt)= <u>1230</u> x <u>6.5</u> %A.C. = <u>80.0</u> gr. A.C.										
	Total	100.0	1150.0	(Specimen wgt)= <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 11MIX TYPE 6FHD/RAPRODUCER Willets Point AsphaltLOCATION Flushing, NY

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		1192.1	699.0	1196.5	497.5	2.396		3060	1.04	3182	9.0	
B		1193.7	703.6	1200.9	497.3	2.400		3000	1.04	3120	10.0	
C		1194.5	701.8	1199.9	498.1	2.398		3030	1.04	3151	9.5	
AVG.	4.5					2.398	149.6			3151	9.5	332
A		1187.9	698.7	1192.2	493.5	2.407		3125	1.09	3406	9.5	
B		1190.0	698.7	1192.1	493.4	2.412		2700	1.09	2943	10.0	
C		1192.1	699.4	1194.2	494.8	2.409		2950	1.09	3216	10.0	
AVG.	5.0					2.409	150.3			3188	9.8	325
A		1195.2	707.2	1196.4	489.2	2.443		2950	1.09	3216	10.0	
B		1185.6	701.8	1187.3	485.5	2.442		3060	1.09	3335	9.0	
C		1192.4	705.2	1194.7	489.5	2.436		2910	1.09	3172	11.0	
AVG.	5.5					2.440	152.3			3241	10.0	324
A		1185.0	705.5	1185.4	479.9	2.469		2800	1.14	3192	11.5	
B		1186.4	707.3	1187.2	479.9	2.472		2750	1.14	3135	11.0	
C		1192.5	710.4	1193.0	482.6	2.471		2825	1.14	3221	12.0	
AVG.	6.0					2.471	154.2			3183	11.5	277
A		1198.1	714.8	1198.8	484.0	2.475		2750	1.09	2998	12.0	
B		1197.5	715.0	1198.0	483.0	2.479		2725	1.09	2970	11.5	
C		1197.1	715.1	1197.8	482.7	2.480		2725	1.14	3107	12.5	
AVG.	6.5					2.478	154.6			3025	12.0	252

PREPARED BY Willets Point AsphaltDATE 05/01/09

BR 76 M (12/94)

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

MIX TYPE 6FHD/RA 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 %	
TEST NO.	1	2	1	2	1	2	1	2	1	2
A	1195.0	1189.7	1196.1	1183.6	1190.7	1190.9	1193.8	1193.2	1197.7	1196.9
D	7384.6	7384.6	7384.5	7384.5	7383.2	7383.2	7384.2	7384.2	7384.6	7384.6
E	8117.2	8114.3	8112.3	8106.4	8105.6	8106.9	8105.3	8103.7	8105.2	8106.2
A+D-E	462.4	460.0	468.3	461.7	468.3	467.2	472.7	473.7	477.1	475.3
Gmm	2.584	2.586	2.554	2.564	2.543	2.549	2.525	2.519	2.510	2.518
Average Gmm	2.585		2.559		2.546		2.522		2.514	

TESTED BY Willets Point Asphalt ON 05/01/09

NEW YORK STATE
DEPARTMENT OF TRANSPORTATION
MATERIALS BUREAU

ITEM _____ REGION 11
MIX TYPE 6FHD/RA
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

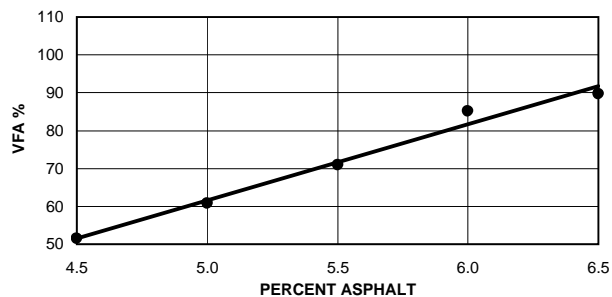
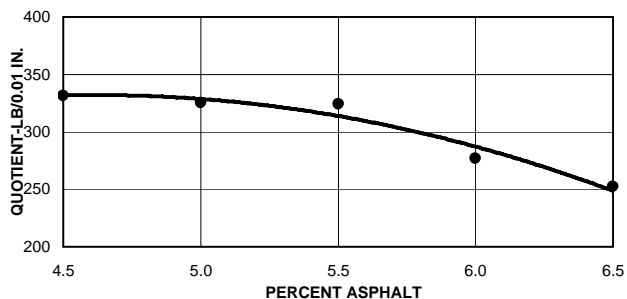
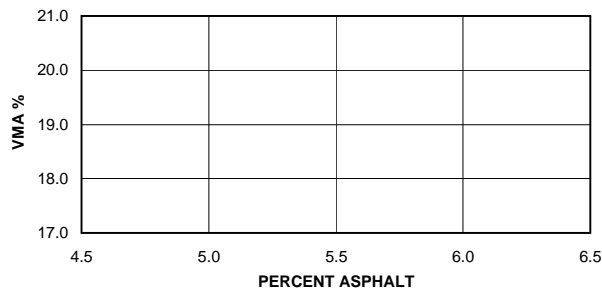
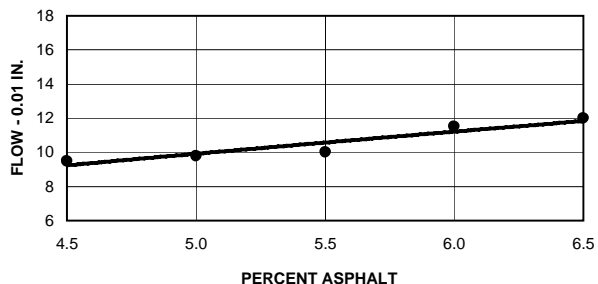
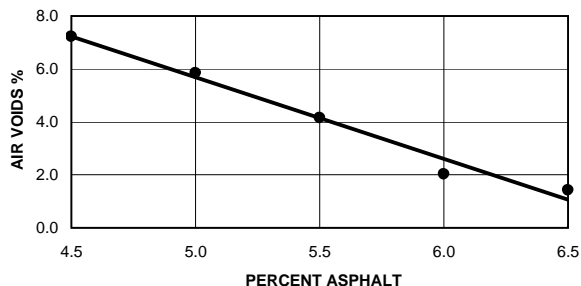
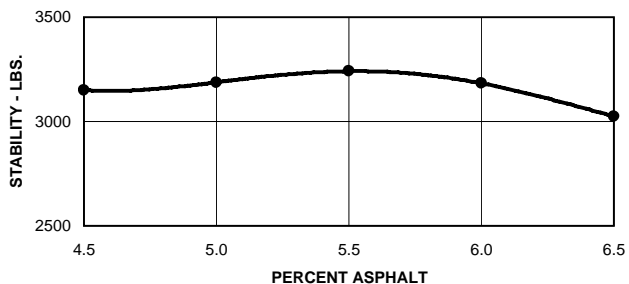
CONSTITUENT MATERIAL		NYS DOT	Specific Gravity		Mix Composition, % by weight of Total Mix, P						
			Source Number	Apparent	Bulk	Region Verification	Mix or Trial Number				
		1					2	3	4	5	
CA	No. 2 Stone				P1						
	No. 1 Stone				P2						
	No. 1 Non-Carbonate Stone	8-32R	2.731	2.676	P3	38.20	38.00	37.80	37.60	37.40	
	No. 1A Stone				P4						
	No. 1A Non-Carbonate Stone	8-32R	2.731	2.595	P5	21.01	20.90	20.79	20.68	20.57	
FA	Manufactured Sand				P6						
	Natural Sand	10-105F	2.818	2.766	P7	36.29	36.10	35.91	35.72	35.53	
					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)						2.585	2.559	2.546	2.522	2.514
Gmb	Bulk Sp. Gr. of compacted mix (AASHTO T166)						2.398	2.409	2.440	2.471	2.478
Gsb	Bulk Sp. Gr. of total aggregate*						2.691	2.691	2.691	2.691	2.691
Gse	Effective Sp. Gr. of total aggregate*						2.786	2.780	2.789	2.784	2.799
Gsa	Apparent Sp. Gr. of total aggregate						2.763	2.763	2.763	2.763	2.763
VMA	100 - (Gmb x Ps/Gsb)						14.90	14.96	14.31	13.68	13.90
Pa	Pa = 100[(Gmm - Gmb)/Gmm]						7.23	5.86	4.16	2.02	1.43
VFA	VFA = 100 [(VMA - Pa)/VMA]						51.48	60.83	70.93	85.23	89.71
Pbe	Effective Asphalt Content = Gb(VMA - Pa)/Gmb						3.26	3.85	4.24	4.81	5.13
	Stability (CORRECTED)						3151	3188	3241	3183	3025
	Flow						9.5	9.8	10.0	11.5	12.0
	Marshall Quotient = Stability(corrected)/Flow						332	325	324	277	252
	Unit Weight						149.6	150.3	152.3	154.2	154.6

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

Prepared By Willets Point Asphalt

On 05/01/09

MARSHALL TEST PROPERTY CURVES AND RANGE DATA



COMMON OVERLAP RANGE 4.7-5.5
 MID POINT 5.1
 (OPTIMUM AC CONTENT) 5.1

SUBMITTED BY Willets Point Asphalt

DATE 05/01/09

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	2900	10	290	4.0	16.9	75