WEAVER GENERAL CONSTRUCTION COMPANY
3679 S. Huron St., Suite 404
Englewood, CO 80110
Phone: (303) 789-4111 FAX: (303) 789-4310

SUBMITTAL TRANSMITAL

November 10, 2010
WGC Submittal No: 02500-01

PROJECT: **Harold Thompson WRF**
Birdsall Rd.
Fountain, CO 80817
Job No. 2908

ENGINEER: **GMS, Inc.**
611 No. Weber St., #300
Colorado Springs, CO 80903
719-475-2935 Roger Sams

OWNER: **Lower Fountain Metropolitan Sewage Disposal District**
901 S. Santa Fe Ave.
Fountain, CO 80817
719-382-5303 James Heckman

CONTRACTOR: **Weaver General Construction**

SUBJECT: Asphalt submittal for pavement on access road

SPEC SECTION: 02500 (no spec)

PREVIOUS SUBMISSION DATES: None

DEVIATIONS FROM SPEC: ___ YES _X_ NO

CONTRACTOR'S STAMP: This submittal has been reviewed by Weaver General Construction and approved with respect to the means, methods, techniques, & safety precautions & programs incidental thereto. Weaver General Construction also warrants that this submittal complies with contracted documents and comprises on deviations thereto:

Contractor's Stamp:	Engineer's Stamp:
Date: 11/10/10 Reviewed by: H.C. Myers (X) Reviewed Without Comments ( ) Reviewed With Comments	

ENGINEER'S COMMENTS:_____

S75R6422-10

2/3/10

Schmidt Quality Control Laboratory
Schmidt Construction Company
Colorado Springs, Colorado 80910
AMRL/AASHTO Accredited Laboratory No. 2531

Subject: Hot Mix Asphalt Mix Design
SHRP Design Method – 75 Gyrations
Grading S w/RAP PG64-22
Delta Plant
Mix Design No. S75R6422-10

Attached are the results of a hot mix asphalt mix design performed in accordance with AASHTO, CDOT and/or ASTM procedures, utilizing the SHRP method for specimen compaction. Aggregates used in the mix design were from Menzer and Fountain Quarries. The asphalt binder was a PG 64-22, with a specific gravity of 1.041, a mixing temperature of 325F, and a compaction temperature of 300F, supplied by SUNCOR/SEM Materials. The anti-stripping additive used was 1% hydrated lime from Pete Lien.

The aggregate was blended to meet CDOT Grading S criteria by blending 21% Fountain ½" HMA, 35% Menzer Asphalt Fines, 5% Menzer ½" Rock, 18% Menzer 3/4" Rock, 20% Crushed RAP and 1% Hydrated Lime. The individual gradations, combined blend and aggregate physical properties are presented on page 1 (one) and a graphical presentation of the volumetric properties and the combined gradation, plotted on a 0.45 Power Graph, begin on page 3 (three).

This design was performed using SHRP Mix Design guidelines. The design was performed at asphalt contents of 4.5, 5.0, 5.5 and 6.0 percent. The results of the tests performed at each asphalt content are presented on page 2 (two) of the design. Based on these results the properties of this mix are:

Optimum AC Content, %	5.4
Theoretical Maximum Specific Gravity	2.441
Air Voids, %	4.0
Voids in Mineral Aggregate, %	15.0
Voids Filled with Asphalt, %	74
Tensile Strength Ratio	85

This hot mix asphalt design is based on specific materials and laboratory preparation of the test specimens. Variation between laboratory-produced and field-produced samples should be anticipated. It is recommended that the mix design be field verified during initial production. Field verification often results in the optimum asphalt cement content being adjusted to meet design air voids or voids in the mineral aggregate criteria.

If you have any questions concerning this mix design, please contact us at (719) 392-4207.

Performed By: Schmidt Quality Control Laboratory

Rueben Roberts, QC Manager

Reviewed By: Tom Blair — Tom Blair, E.I.T

Approved By: Rudy Keng — Rudy Keng, P.E.

2/24/10

COLORADO REGISTERED RUDOLPH HSUN KENG 25270 PROFESSIONAL ENGINEER

SCHMIDT CONSTRUCTION, COLORADO SPRINGS, CO — **AMRL/AASHTO Lab No.** 2531

Laboratory Design for Hot Bituminous Pavement-SHRP Method

Mix Identification: S75R6422-10

Date: 2/3/10
Project: 2010 MIX DESIGN S75R
Location: DELTA PLANT

Contractor/Supplier: Schmidt Construction
Pit Name: Menzer Quarry / Fountain Pit

Grading: S w/RAP 75 Gyrations
AC Source & Grade: SUNCOR PG 64-22
Mixing/Compacting Temperatures: 325F / 300F

Aggregate Data (T-11, T-27, T-30, T-37):

Aggregate Sampled by (T-2, T-48):

Aggregate Source		FNTN 1/2" HMA	C/S MNZR ASPHALT FINES	MENZER 1/2"	MENZER 3/4"	LIME	Virgin Aggregate Gradation	RAP	Combined Gradation	Control Points	
Percent in Mix		**21**	**35**	**5**	**18**	**1**	80	**20**	100		
Passing 1 1/2	(37.5)	100	100	100	100	100	100	100	**100**		
Passing 1	(25.0)	100	100	100	100	100	100	100	**100**	100	100
Passing 3/4	(19.0)	100	100	100	100	100	100	100	**100**	90	100
Passing 1/2	(12.5)	98	100	100	46	100	87	97	**89**		
Passing 3/8	(9.5)	92	100	90	10	100	77	92	**80**		
Passing 4	(4.75)	73	80	6	2	100	56	71	**59**		
Passing 8	(2.36)	55	57	2	1	100	41	55	**44**	23	49
Passing 16	(1.18)	39	41	2	1	100	30	41	**32**		
Passing 30	(0.60)	25	29	1	1	100	21	30	**23**		
Passing 50	(0.30)	14	19	1	1	100	14	20	**15**		
Passing 100	(0.15)	8	12	1	1	99	9	11	**9**		
Passing 200	(0.075)	5.6	6.8	0.8	0.5	99.2	5.8	6.7	**6.0**	2.0	8.0
Plastic or Non-Plastic (T-90)		N/P	N/P	N/P	N/P		RAP AC %	4.51			
Aggregate Bulk SpG (T-84 & T-85)		2.586	2.607	2.594	2.591				**2.609**		
Aggregate App. SpG (T-84 & T85)		2.649	2.674	2.654	2.646	2.634			**2.658**		
Agg Water Abs (%) (T-84 & T85)		0.92	0.97	0.87	0.81				**0.90**		
Aggregate Eff. SpG(T-84 & T-85)								2.655	**2.644**		
Fine Agg. Bulk SpG (T-84)									**2.599**		
Coarse Agg. Bulk SpG (T-85)									**2.592**	**Specs:**	
Binder SpG									**1.041**	Min.	Max.
Fractured Faces (CP-45, ASTM D-5821)									**89**	60%	
Sand Equivalent (T-176)									**61**	45%	
LA Abrasion (T-96)		41.0	38.8	37.1	35.4				**38**		45%
Fine Aggregate Angularity (T-304)									**51**	45%	
Micro-Deval (CP-L 4211)									**15**		18%
Sodium Soundness (T-104)									**2.4**		12%

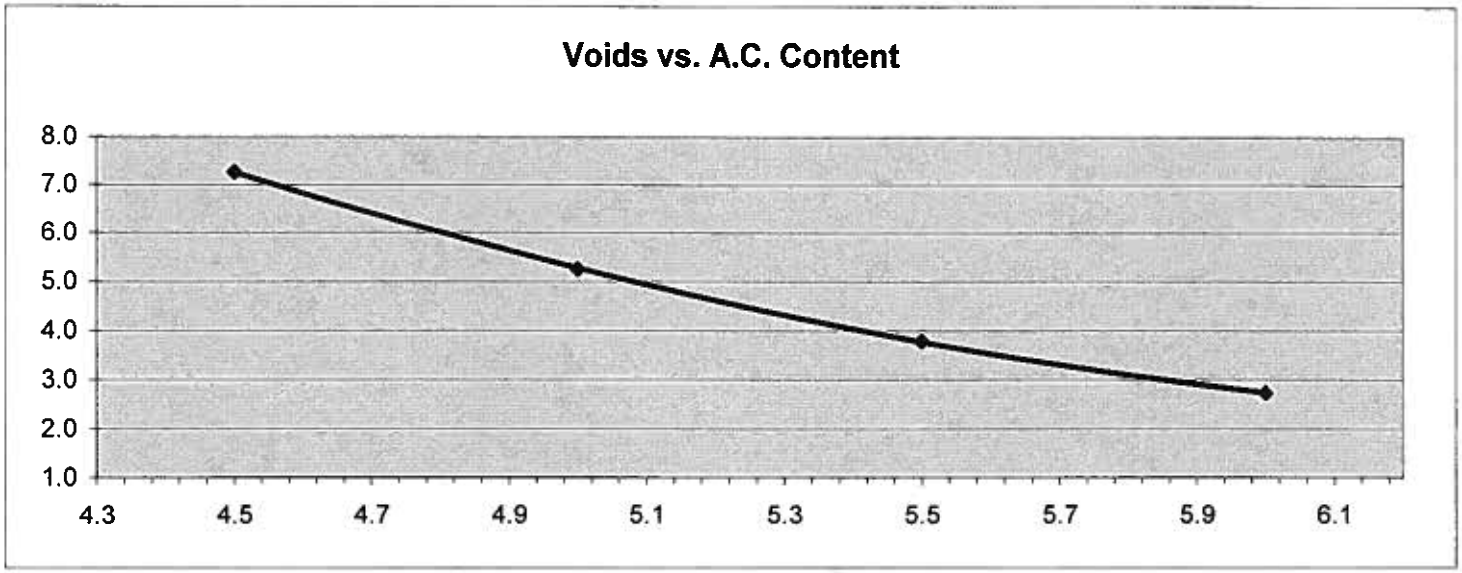
COLORADO REGISTERED RUDOLPH HSIEH KENT CO 25270 PROFESSIONAL ENGINEER

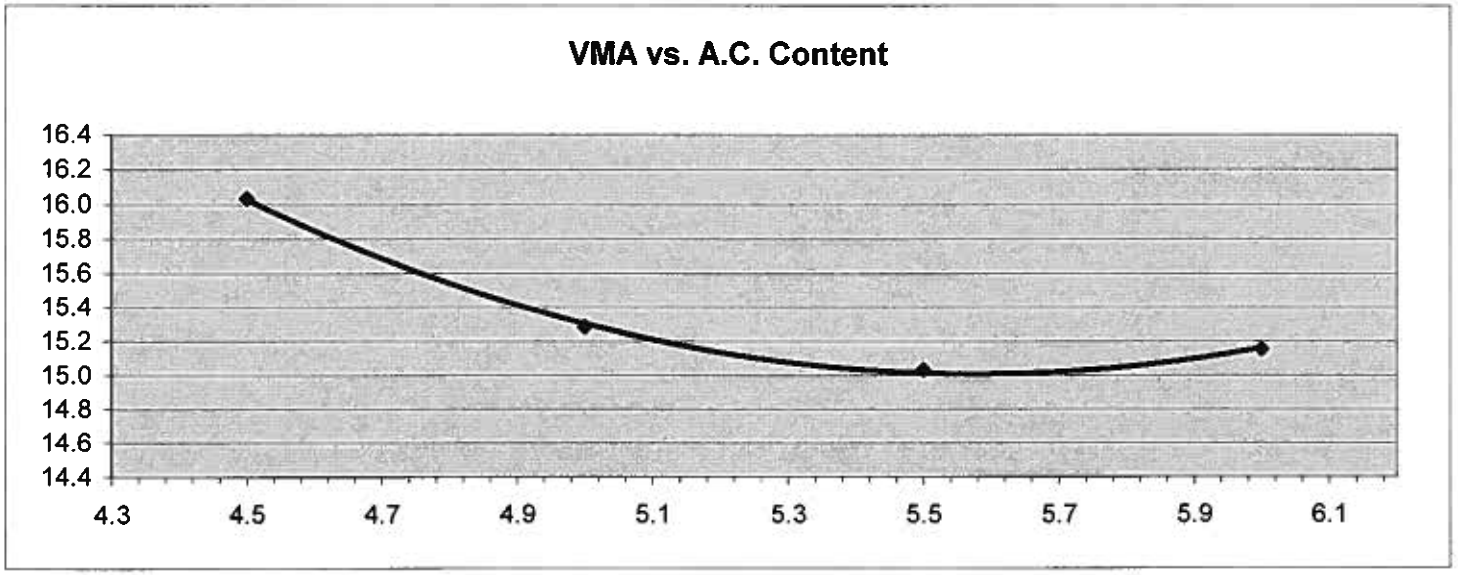
3/29/10

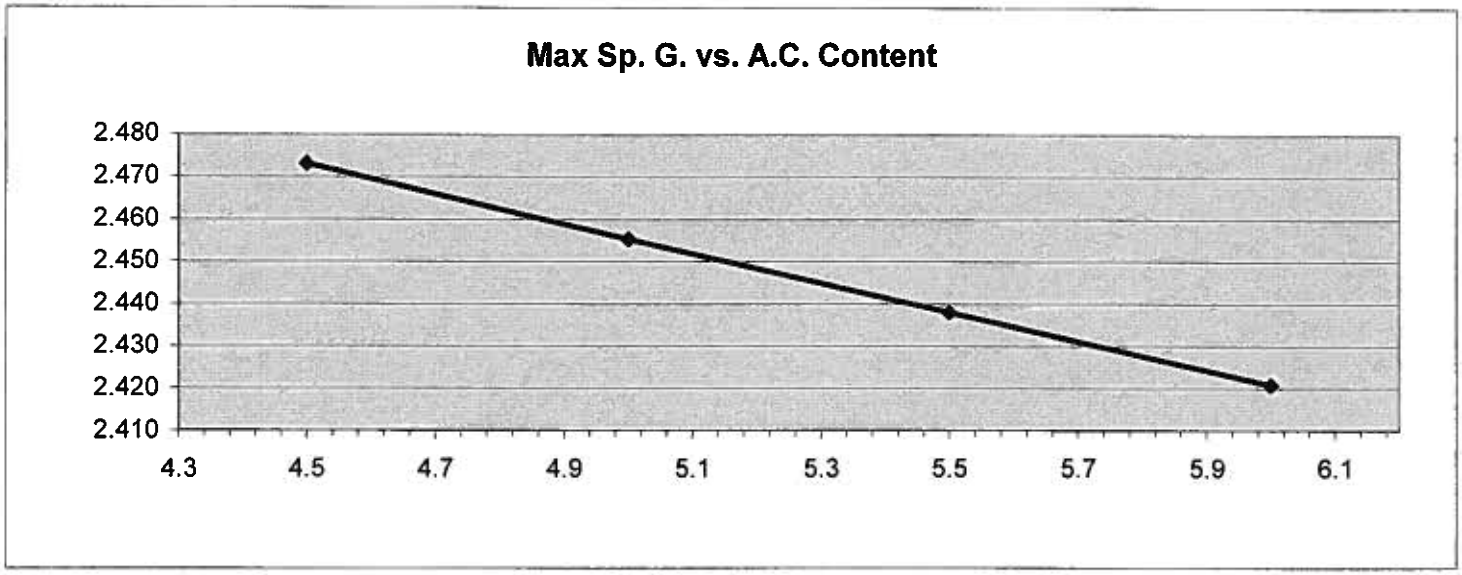
SCHMIDT CONSTRUCTION, COLORADO SPRINGS, CO Laboratory Design for Hot Bituminous Pavement-SHRP Method						Lab No. 2531 Version	
Mix Design A.C. Content Determination Results:							
Rice = 2.438 @ 5.5 %AC							
A.C. Content (percent)		4.5	5.0	5.5	6.0		
Rice Data (CP-51, T-209)		2.473	2.455	2.438	2.421		
Specimen SpG. Data (CP-L 5115 & CP-L 5106):							
Bulks @ Ninit		2.139	2.154	2.174	2.186		
Bulks @ Ndes		2.294	2.326	2.346	2.355		
Height @ Ndes (mm)		65.3	64.0	63.2	62.6	**Voids Specs:**	
Voids Data:						**Min**	**Max**
Voids @ Ninit (percent)		13.5	12.3	10.8	9.7		
Voids @ Ndes (percent)		7.3	5.3	3.8	2.7	3.5%	4.5%
Other Data:							
VMA @ Ndes (CP-48) (percent)		16.0	15.3	15.0	15.2	13.7%	
VFA @ Ndes (percent)		55	66	75	82	65%	75%
Aggregate Effective SpG (T-84 & T-85)		2.644	2.644	2.644	2.644		
Effective Ashpalt Content (percent)		3.98	4.49	4.99	5.49		
Dust to A.C. Ratio (CP-50)		1.3	1.1	1.0	0.9	0.6	1.2
Stability (CP-L5106)		44	42	40	37	30	
Optimum A.C. Content Results:							
Optimum A.C. Content (percent)	**5.4**		Voids at Ninit at Optimum A.C. (percent)			**11.1**	
Rice at Optimum A.C.	**2.441**		Voids at Ndes at Optimum A.C. (percent)			**4.0**	
Hveem Stability	**40**		VMA at Optimum A.C. (percent)			**15.0**	
Voids Filled with Asphalt (VFA) (percent)	**74**		Dust to Asphalt Ratio			**1.0**	
Lottman Moisture Sensitivity Results (CP-L 5109, Method B):						**Lottman Specs:**	
Asphalt Content (percent)	**5.4**					**Min**	**Max**
Tensile Strength Retained (percent)	**85**					80	
Avg. Dry Tensile Strength (psi)	**142.6**					30	
Avg. Cond. Tensile Strength (psi)	120.6						
Avg. Specimen Voids (percent)	**6.8**					6.0%	8.0%
Avg. Saturation (percent)	**92.1**						

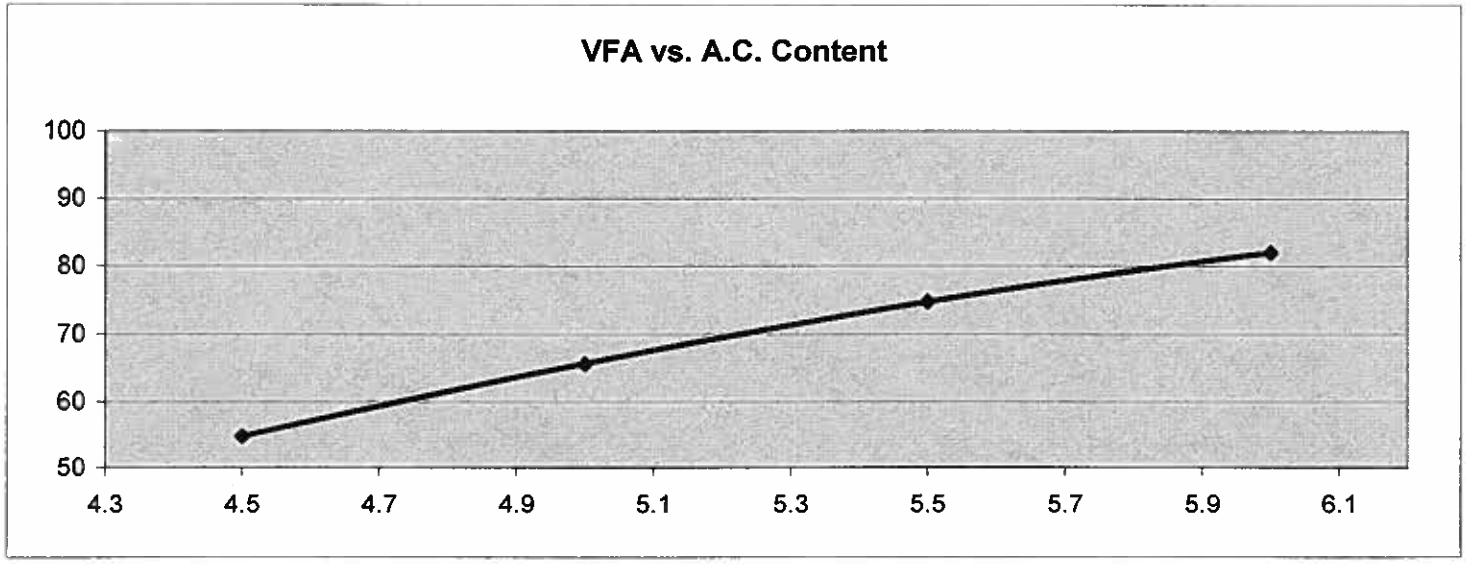
COLORADO REGISTERED RUDOLPH RISUM 25270 PROFESSIONAL ENGINEER

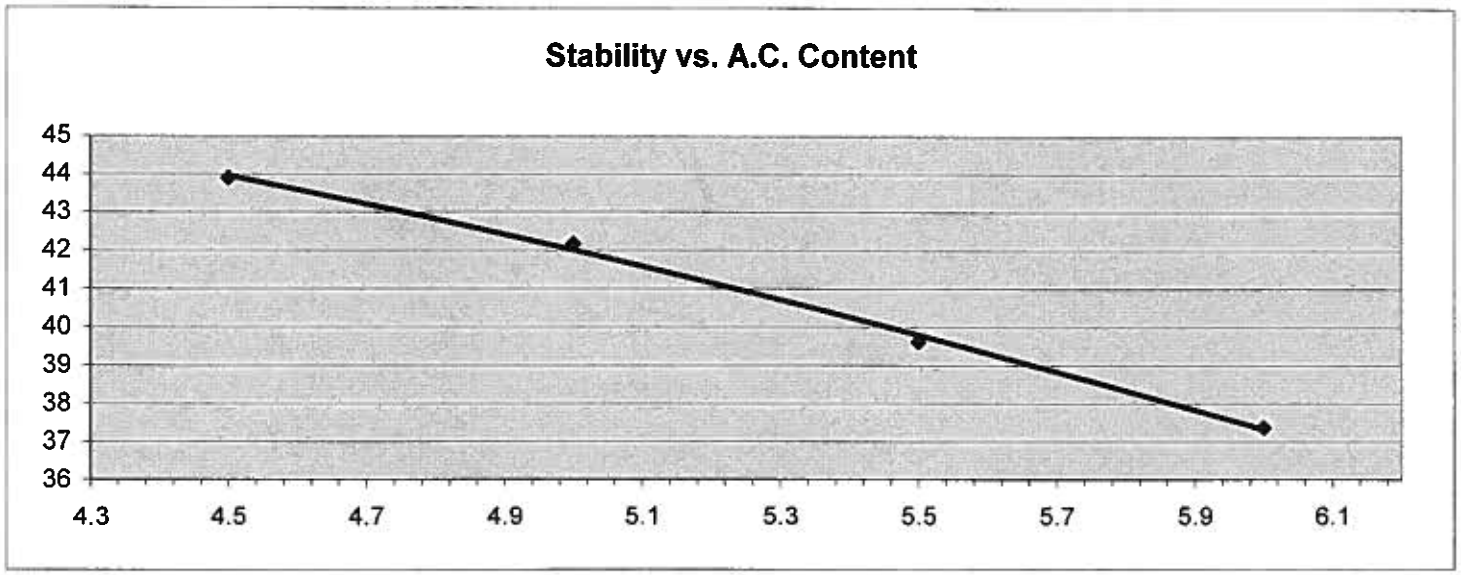
3/29/10

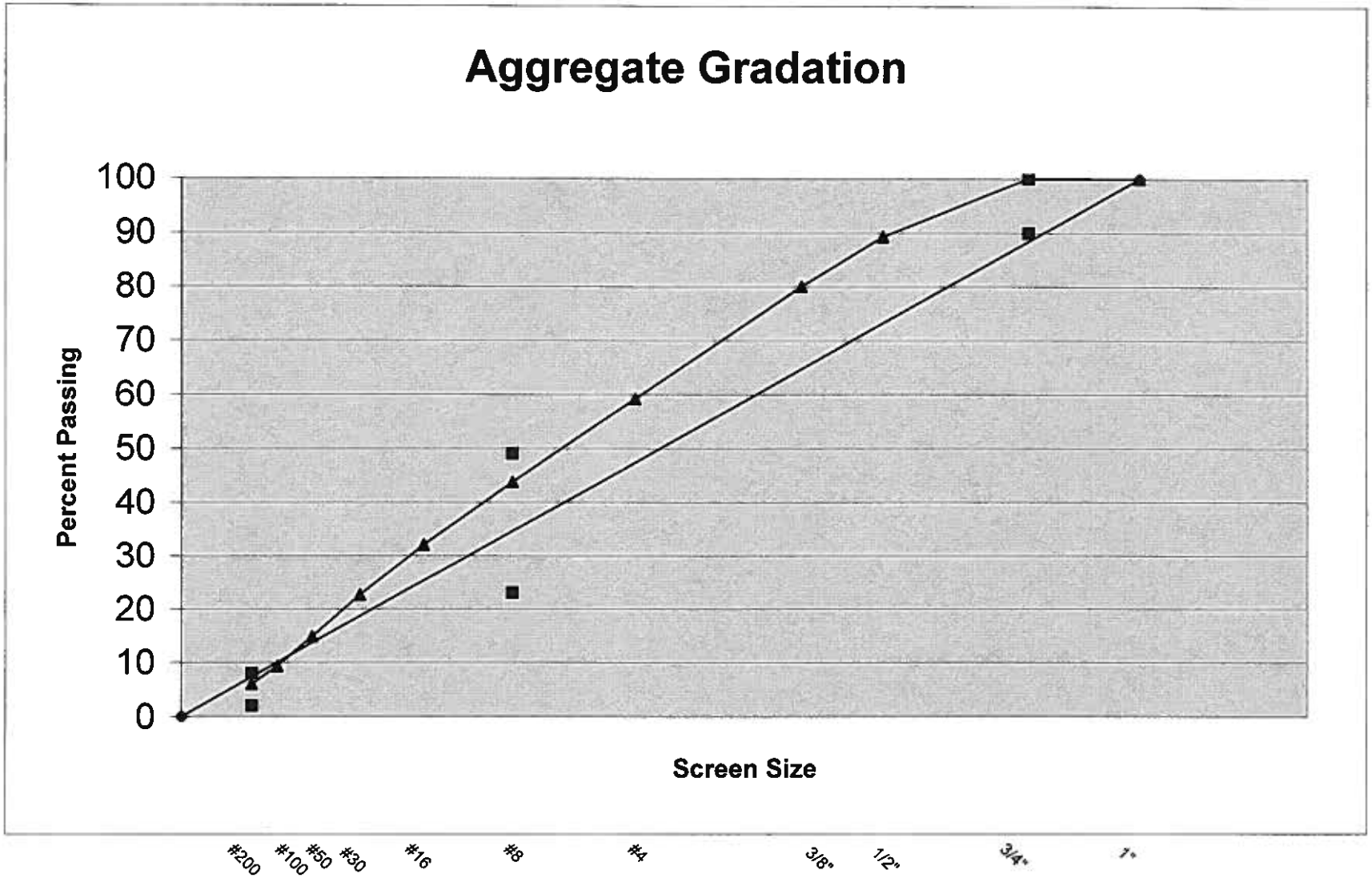

Voids vs. A.C. Content
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
4.3
4.5
4.7
4.9
5.1
5.3
5.5
5.7
5.9
6.1


VMA vs. A.C. Content
16.4
16.2
16.0
15.8
15.6
15.4
15.2
15.0
14.8
14.6
14.4
4.3
4.5
4.7
4.9
5.1
5.3
5.5
5.7
5.9
6.1


Max Sp. G. vs. A.C. Content
2.480
2.470
2.460
2.450
2.440
2.430
2.420
2.410
4.3
4.5
4.7
4.9
5.1
5.3
5.5
5.7
5.9
6.1


VFA vs. A.C. Content
100
90
80
70
60
50
4.3
4.5
4.7
4.9
5.1
5.3
5.5
5.7
5.9
6.1


Stability vs. A.C. Content
45
44
43
42
41
40
39
38
37
36
4.3
4.5
4.7
4.9
5.1
5.3
5.5
5.7
5.9
6.1


Aggregate Gradation
Percent Passing
100
90
80
70
60
50
40
30
20
10
0
Screen Size
#200
#100
#50
#30
#16
#8
#4
3/8"
1/2"
3/4"
1"
Sieve Size Raised to the .45 Power