GMS, INC.
CONSULTING ENGINEERS
611 NORTH WEBER, SUITE 300
COLORADO SPRINGS, COLORADO 80903-1074

TELEPHONE (719) 475-2935
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EDWARD D. MEYER, P.E.
ROGER J. SAMS, P.E.
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THOMAS A. McCLERNAN, P.E.

KEN L. WHITE, P.L.S.
DAVID R. FRISCH, P.L.S.
MARK A. MORTON, P.E.
JASON D. MEYER, P.E.

April 10, 2013

Mr. Wes Weaver, President
Weaver Construction Management, Inc.
c/o Garney Construction
7911 Shaffer Parkway
Littleton, CO 80127

Via Email to: wes@weavercm.com
No Hard Copy to Follow

Re: Harold D. Thompson Regional Water Reclamation Facility (HDTRWRF)
Lower Fountain Metropolitan Sewage Disposal District (LFMSDD)

Dear Wes:

Reference is made to your shop submittal identified as follows:

Submittal No.:	02500-002
Date of Submittal:	April 10, 2013
Title:	Asphalt Paving, Grading S and SX
Specification Section:	02500
Manufacturer:	Schmidt Construction Company

The referenced submittal has been stamped ***"No Exception Taken"***. No additional information or resubmittal is required on this item.

Please call if you should have any questions.

Sincerely,

David R. Frisch
kmw

David R. Frisch, P.L.S.

DRF/kmw
ec (letter only):
Mr. Jim Heckman, Manager, LFMSDD, lfmanager@lfmsdd.org
Ms. Cindy Murray, Office Manager, Fountain Sanitation District, fsdistrict@fsd901.org
Mr. Jeff Burst, Project Supt., Weaver Construction Management, Inc., jeff@weavercm.com
Mr. John Jacob, Project Mgr., Weaver Construction Management, Inc., john@weavercm.com
Mr. Adam Roeder, Weaver Construction Management, Inc., aroeder@weavercm.com
Ms. Solange Huggins, Project Engineer, Garney Construction, shuggins@garney.com
cc (w/attachments): Mr. Jerry Miller, Resident Project Representative, GMS, Inc.

Weaver
CONSTRUCTION MANAGEMENT
7911 Shaffer Parkway Littleton, CO 80127
(P) 303-791-3600 (F) 303.791.1801

SUBMITTAL TRANSMITAL

April 10, 2013
Submittal No: 02500-02

PROJECT: **Harold Thompson Regional 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: Schmidt Construction Company
2635 Delta Drive
Colorado Springs, Colorado 80910
Phone 719-395-4207

SUBJECT: Asphalt Paving 02500 Both Grading S and SX – Schmidt

SPEC SECTION: 02500 Paving and Surfacing

PREVIOUS SUBMISSION DATES:
DEVIATIONS FROM SPEC: ___ YES _X_ NO

CONTRACTOR'S STAMP: This submittal has been reviewed by Weaver Construction Management and, unless indicated otherwise, has been found to be in conformance with the intent of the contract documents.

Contractor's Stamp:	Engineer's Stamp:
Date: 4/10/13 Reviewed by: John Jacob (X) Reviewed Without Comments ( ) Reviewed With Comments	

ENGINEER'S
COMMENTS:_____
_____

2013 C/S MIX SPECS

SUNCOR PG 64-22	DELTA YARD MIXES								
2013	**SR**		**SR PPRAS**	**SXR**		**SXR PPRAS**	**SXFR**	**SXFR PPRAS**	
PRODUCT CODE	**2560**	**2559**	**2559**	**2563**	**2562**	**2562**			
MIX #	S100R6422-13	S75R6422-13	S75R6422-13	SX100R6422-13	SX75R6422-13	SX75R6422-13	SXF75R6422-13	SXF75R6422-13	MIX #
GYRATION LEVEL	100	75	75	100	75	75	75	75	
BINDER	64-22	64-22	64-22	64-22	64-22	64-22	64-22	64-22	BINDER
AC OPTIMUM	**5.1**	**5.3**	**5.5**	**5.5**	**5.8**	**6.0**	**5.7**	**5.9**	**AC OPTIMUM**
CDOT AC SPEC	4.8-5.4	5.0-5.6		5.2-5.8	5.5-6.1		5.4-6.0		AC SPEC
PPRAS AC SPEC	4.7-5.5		5.1-5.9	5.1-5.9		5.6-6.4		5.5-6.3	
IGNITION CORRECTION	-0.08			-0.10			-0.04		- SUBTRACT FROM
CDOT/PPRAS JOB MIX FORMULA TOLERANCES									+ ADD TO
GRADATION 1"	100		Virgin	100		Virgin	100	Virgin	1" GRADATION
+/-6 3/4"	100		100	100		100	100	100	3/4"
+/-6 1/2"	83-95		87	90-100		95	100	100	1/2"
+/-6 3/8"	73-85		76	83-95		89	89-100	96	3/8"
+/-5 #4	58-68		60	61-71		65	63-73	67	#4
+/-5 #8	42-52		44	44-54		47	46-56	48	#8
#16			31			33		35	#16
+/-4 #30	20-28		22	22-30		24	22-30	25	#30
+/-4 #50	13-21		15	13-21		16	14-22	17	#50
#100			10			10		11	#100
+/-2 #200	4.7-8.7		6.3	5.0-9.0		6.7	5.1-9.1	6.9	#200
RICE	2.461	2.453	2.446	2.445	2.435	2.426	2.438	2.431	RICE
LBS/FT^3	153.6	153.1	152.6	152.6	151.9	151.4	152.1	151.7	LBS/FT^3
AGG BULK SP.G.	2.618			2.618					AGG BULK SP.G.
LABORATORY MIXINGTEMP/	325F			325F			325F		
COMPACTION TEMP	300F			300F			300F		
AGGREGATE BLENDS									
FOUNTAIN 1/2" HMA	20			20			20		
MENZER 3/4" ROCK	22			8					
MENZER 1/2" ROCK				10			16		
MENZER GRANITE SAND	37			41			43		
RAP	20			20			20		
LIME	1			1			1		

UPDATED 3/20/2013

S75R6422-13

2/18/2013
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. S75R6422-13

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 are from Menzer and Fountain Quarries. The asphalt binder is a PG 64-22, with a specific gravity of 1.038, a mixing temperature of 325F, and a compaction temperature of 300F, supplied by SUNCOR Materials. The anti-stripping additive used is 1% hydrated lime from Pete Lien.

The aggregate was blended to meet CDOT Grading S criteria by blending 20% Fountain ½" HMA, 37% Menzer Asphalt Fines, 22% Menzer 3/4" Rock, 20% Crushed RAP and 1% Hydrated Lime. The individual gradations, combined blend and aggregate physical properties are presented on page one (1) and a graphical presentation of the volumetric properties and the combined gradation, plotted on a 0.45 Power Graph, begins on page four (4).

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 pages two (2) and three (3) of the design. Optimum values for our Standard Mix Design are chosen at 4.0% VTM and are presented on page two (2). Optimum values for the PPRAS Criteria Mix Design are chosen at 3.5% VTM and are presented on page three (3). Based on these results the optimum properties of this mix are:

VALUES @	STANDARD OPTIMUM	PPRAS OPTIMUM
Optimum AC Content, %	5.3	5.5
Theoretical Maximum Specific Gravity	2.453	2.446
Air Voids, %	4.0	3.5
Voids in Mineral Aggregate, %	14.8	14.8
Voids Filled with Asphalt, %	73	77
Tensile Strength Ratio	94	94

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 Construction Testing Laboratory

Rueben Roberts, QC Mgr.

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

Approved By: Rudy Keng, P.E.

3/12/2013

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

Laboratory Design for Hot Bituminous Pavement-SHRP Method

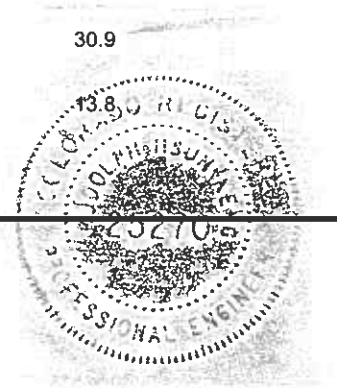
Mix Identification:		Date:	2/18/13
S75R6422-13		Project:	2013 MIX DESIGN S75R
		Location:	DELTA PLANT

Contractor/Supplier: Schmidt Construction — Grading: S w/RAP — 75 Gyrations

Pit Name: Menzer Quarry / Fountain Pit — 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		Fountain 1/2" HMA Rock	Menzer Asphalt Fines	Menzer 3/4" Rock	Lime	Virgin Aggregate Gradation	RAP	Combined Gradation	Control	Points
Percent in Mix		**20**	**37**	**22**	**1**	**80**	**20**	**100**		
Passing 1 1/2	(37.5)	100	100	100	100	100	100	**100**		
Passing 1	(25.0)	100	100	100	100	100	100	**100**	100	100
Passing 3/4	(19.0)	100	100	100	100	100	100	**100**	90	100
Passing 1/2	(12.5)	100	100	53	100	87	99	**89**		
Passing 3/8	(9.5)	95	100	16	100	76	93	**79**		
Passing 4	(4.75)	75	86	2	100	60	73	**63**		
Passing 8	(2.36)	56	61	1	100	44	60	**47**	23	49
Passing 16	(1.18)	39	43	1	100	31	45	**34**		
Passing 30	(0.60)	26	31	1	100	22	33	**24**		
Passing 50	(0.30)	15	21	1	100	15	23	**17**		
Passing 100	(0.15)	8	13	1	100	10	14	**10**		
Passing 200	(0.075)	5.5	7.6	0.7	98.6	6.3	8.0	**6.7**	2.0	8.0
Plastic or Non-Plastic (T-90)		N/P	N/P	N/P		RAP AC %	4.45			
Aggregate Bulk SpG (T-84 & T-85)		2.582	2.621	2.611	2.380			**2.618**		
Aggregate App. SpG (T-84 & T-85)		2.650	2.680	2.661	2.380			**2.665**		
Agg Water Abs (%) (T-84 & T-85)		0.98	0.85	0.72				**0.82**		
Aggregate Eff. SpG (T-84 & T-85)							2.671	**2.656**		
Fine Agg. Bulk SpG (T-84)								**2.607**		
Coarse Agg. Bulk SpG (T-85)								**2.611**	**Specs:**	
Binder SpG								**1.038**	Min.	Max.
Fractured Faces (CP-45, ASTM D-5821)								**90**	60%	
Sand Equivalent (T-176)								**62**	45	
LA Abrasion (T-96)		37.6	33.6	30.9				**32**		45%
Fine Aggregate Angularity (T-304)								**47**	45	
Micro-Deval (CP-L 4211)		10.5	16.2	13.8				**14**		18%
Sodium Soundness (T-104)								**1.0**		12%
Flat & Elongated - Ratio 3:1 (ASTM D-4791)								**0.2**		
Flat & Elongated - Ratio 5:1 (ASTM D-4791)								**0.0**		



Standard

SCHMIDT CONSTRUCTION, COLORADO SPRINGS, CO	Lab No. 2531
Laboratory Design for Hot Bituminous Pavement-SHRP Method	Version
Standard Mix Design Criteria	

Mix Design A.C. Content Determination Results:

Rice = 2.446 @ 5.5 %AC

A.C. Content	4.5	5.0	5.5	6.0	%	
Rice Data (CP-51, T-209)	2.482	2.464	2.446	2.429		
Specimen SpG Data (CP-L5115 & CP-L5106):						
Bulks SpG @ Ninit	2.143	2.146	2.174	2.185		
Bulks SpG @ Ndes	2.302	2.342	2.362	2.363		
Height @ Ndes	65.1	64.1	63.2	62.9	mm	

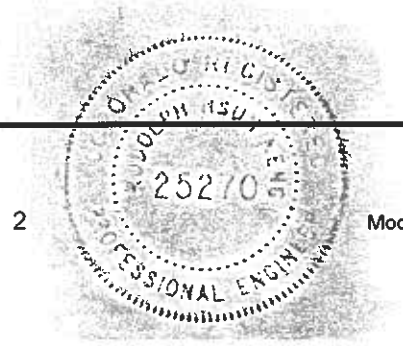
Voids Data:						**Voids Specs:** Min	Max
Voids @ Ninit	13.6	12.9	11.1	10.0	%		
Voids @ Ndes	7.2	4.9	3.5	2.7	%	3.5%	4.5%
Other Data:							
VMA @ Ndes (CP-48)	16.0	15.0	14.8	15.1	%	13.7%	
VFA @ Ndes	55	67	77	82	%	65%	80%
Aggregate Effective SpG (T-84 & T-85)	2.656	2.656	2.656	2.656			
Effective Asphalt Content	3.96	4.46	4.96	5.47	%		
Dust to A.C. Ratio (CP-50)	1.4	1.3	1.1	1.0		0.6	1.2
Stability (CP-L5106)	41	41	40	39		30	

Optimum A.C. Content Results:

Optimum A.C. Content	**5.3**	%	Voids at Ninit at Optimum A.C.	**11.8**	%
Rice at Optimum A.C.	**2.453**		Voids at Ndes at Optimum A.C.	**4.0**	%
Hveem Stability	**40**		VMA at Optimum A.C.	**14.8**	%
Voids Filled with Asphalt (VFA)	**73**	%	Dust to Asphalt Ratio	**1.2**	

Lottman Moisture Sensitivity Results (CP-L 5109, Method B):

			Lottman Specs: Min	Max
Asphalt Content (percent)	**5.3**	%		
Tensile Strength Retained (percent)	**94**	%	80%	
Avg. Dry Tensile Strength (psi)	**83.5**	psi	30psi	
Avg. Cond. Tensile Strength (psi)	78.3	psi		
Avg. Specimen Voids (percent)	**6.8**	%	6.0%	8.0%
Avg. Saturation (percent)	**96.5**	%		



PPRAS

SCHMIDT CONSTRUCTION, COLORADO SPRINGS, CO	Lab No. 2531
Laboratory Design for Hot Bituminous Pavement-SHRP Method	Version
Pikes Peak Regional Asphalt Specifiction Mix Design Criteria	

Mix Design A.C. Content Determination Results:

Rice = 2.446 @ 5.5 %AC

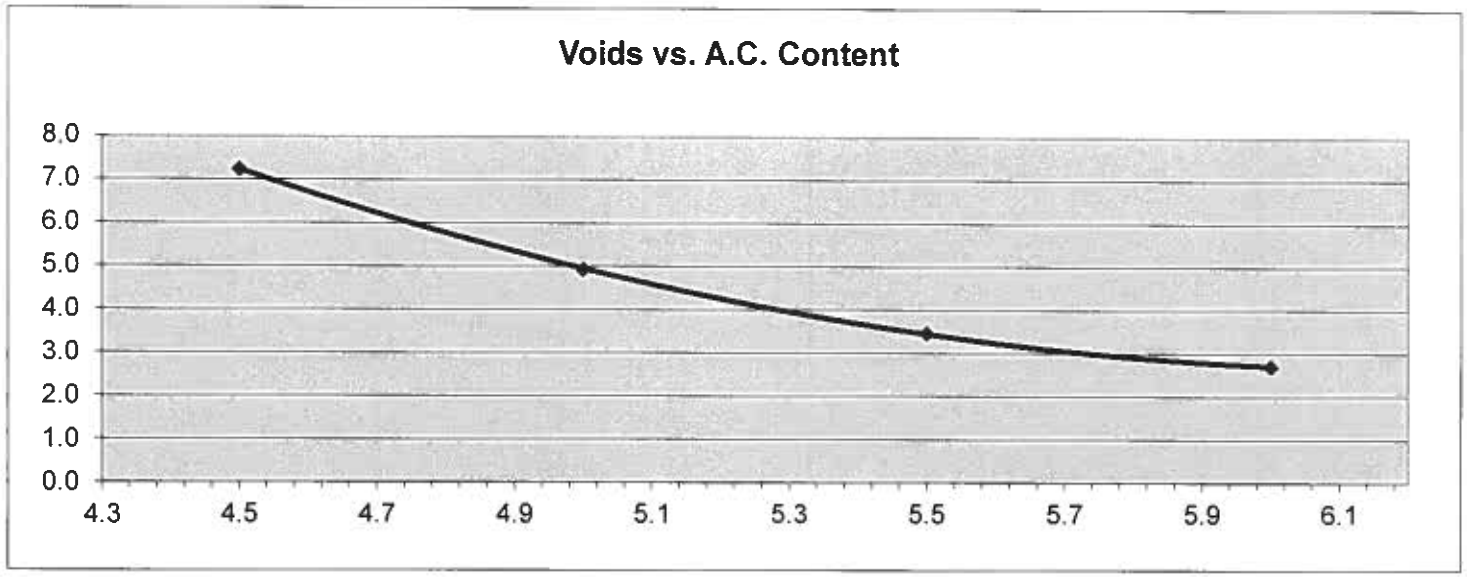
A.C. Content	4.5	5.0	5.5	6.0	%	
Rice Data (CP-51, T-209)	2.482	2.464	2.446	2.429		
Specimen SpG Data (CP-L5115 & CP-L5106):						
Bulks SpG @ Ninit	2.143	2.146	2.174	2.185		
Bulks SpG @ Ndes	2.302	2.342	2.362	2.363		
Height @ Ndes	65.1	64.1	63.2	62.9	mm	
Voids Data:						**Voids Specs:** Min / Max
Voids @ Ninit	13.6	12.9	11.1	10.0	%	
Voids @ Ndes	7.2	4.9	3.5	2.7	%	3.0% / 4.0%
Other Data:						
VMA @ Ndes (CP-48)	16.0	15.0	14.8	15.1	%	13.6%
VFA @ Ndes	55	67	77	82	%	65% / 80%
Aggregate Effective SpG (T-84 & T-85)	2.656	2.656	2.656	2.656		
Effective Asphalt Content	3.96	4.46	4.96	5.47	%	
Dust to A.C. Ratio (CP-50)	1.4	1.3	1.1	1.0		0.6 / 1.2
Stability (CP-L5106)	41	41	40	39		30

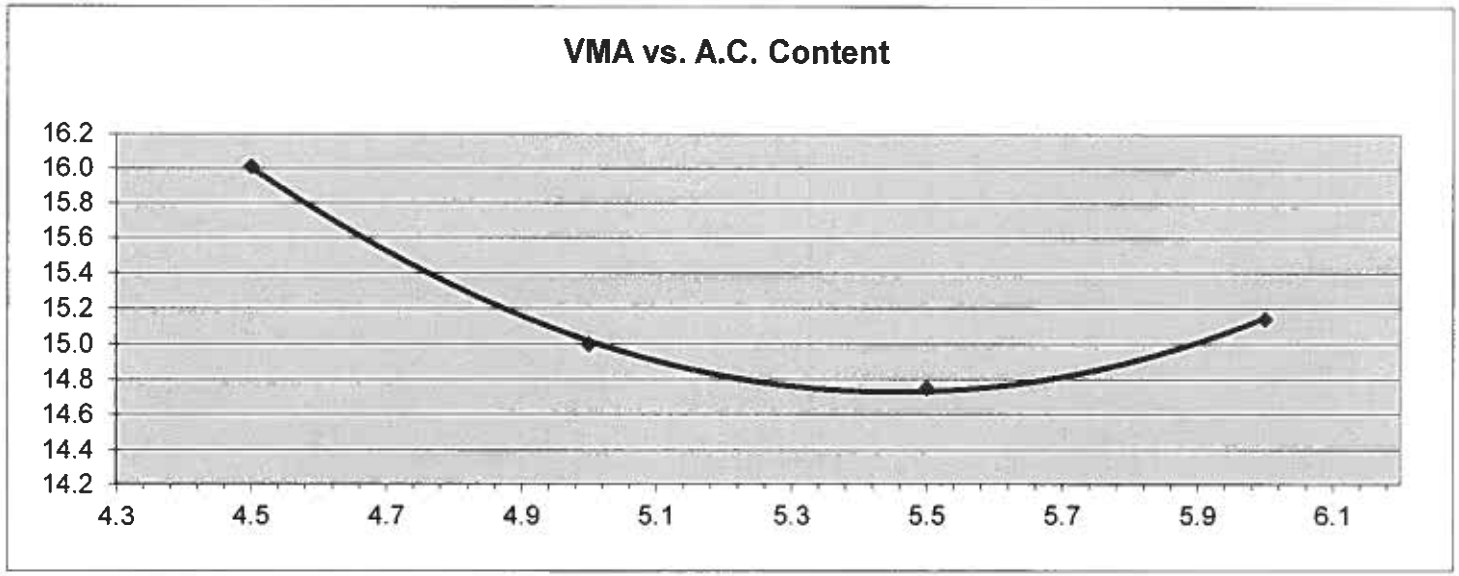
Optimum A.C. Content Results: PPRAS Criteria

Optimum A.C. Content	**5.5**	%	Voids at Ninit at Optimum A.C.	**11.1**	%
Rice at Optimum A.C.	**2.446**		Voids at Ndes at Optimum A.C.	**3.5**	%
Hveem Stability	**40**		VMA at Optimum A.C.	**14.8**	%
Voids Filled with Asphalt (VFA)	**77**	%	Dust to Asphalt Ratio	**1.1**	

Lottman Moisture Sensitivity Results (CP-L 5109, Method B):

			Lottman Specs: Min	Max
Asphalt Content (percent)	**5.3**	%		
Tensile Strength Retained (percent)	**94**	%	80%	
Avg. Dry Tensile Strength (psi)	**83.5**	psi	30psi	
Avg. Cond. Tensile Strength (psi)	78.3	psi		
Avg. Specimen Voids (percent)	**6.8**	%	6.0%	8.0%
Avg. Saturation (percent)	**96.5**	%		


Voids vs. A.C. Content
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
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
16.2
16.0
15.8
15.6
15.4
15.2
15.0
14.8
14.6
14.4
14.2
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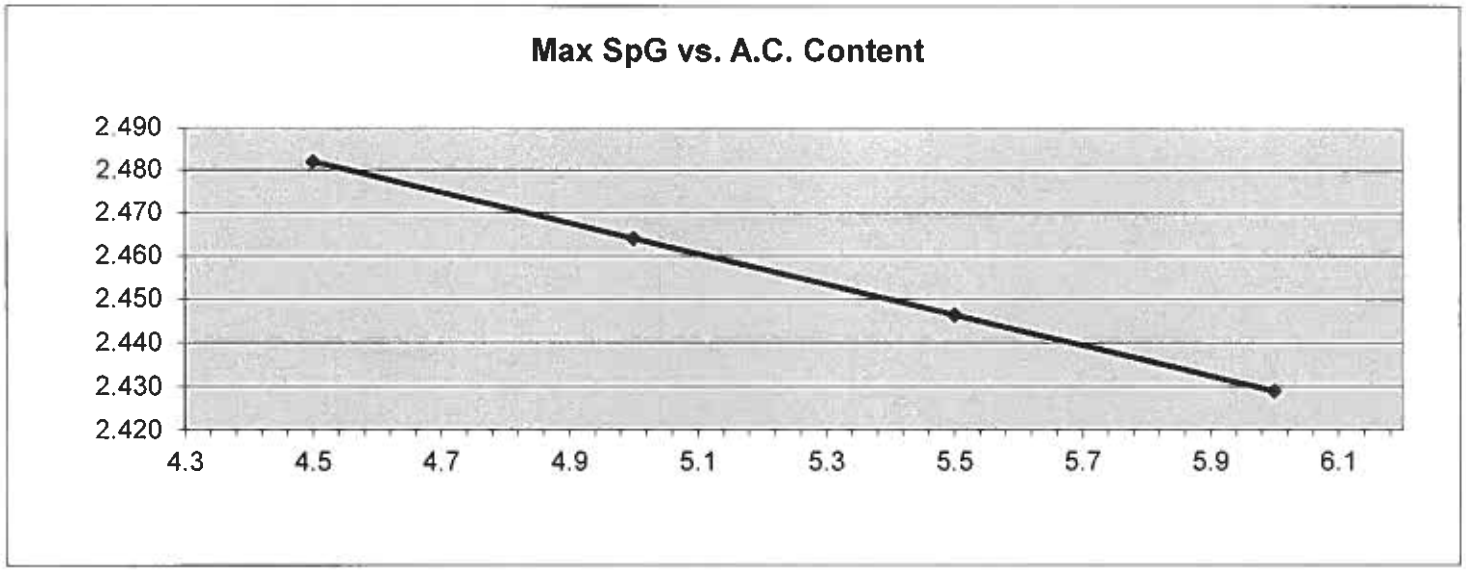
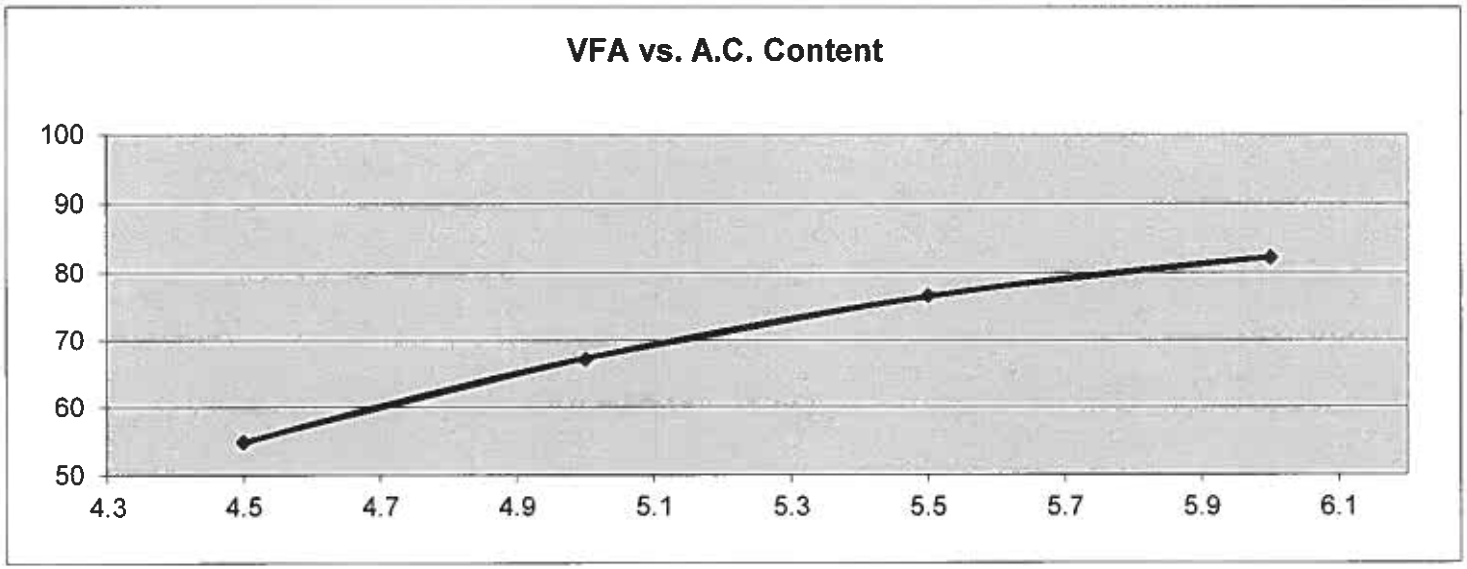
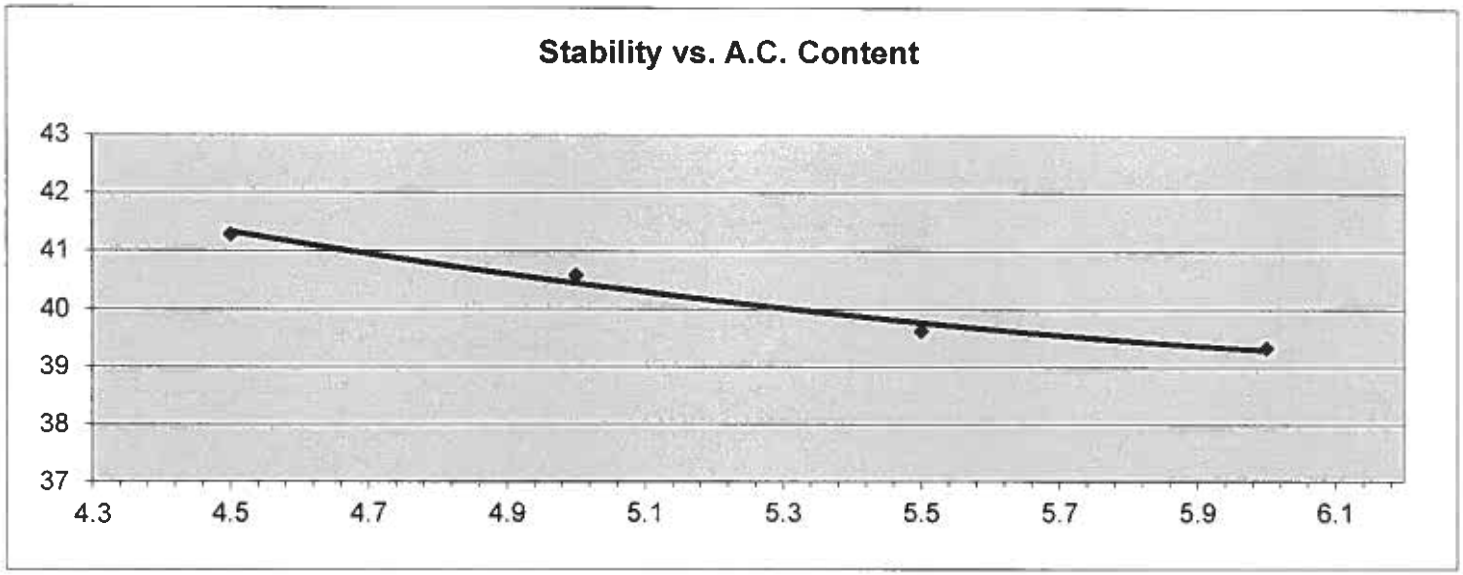
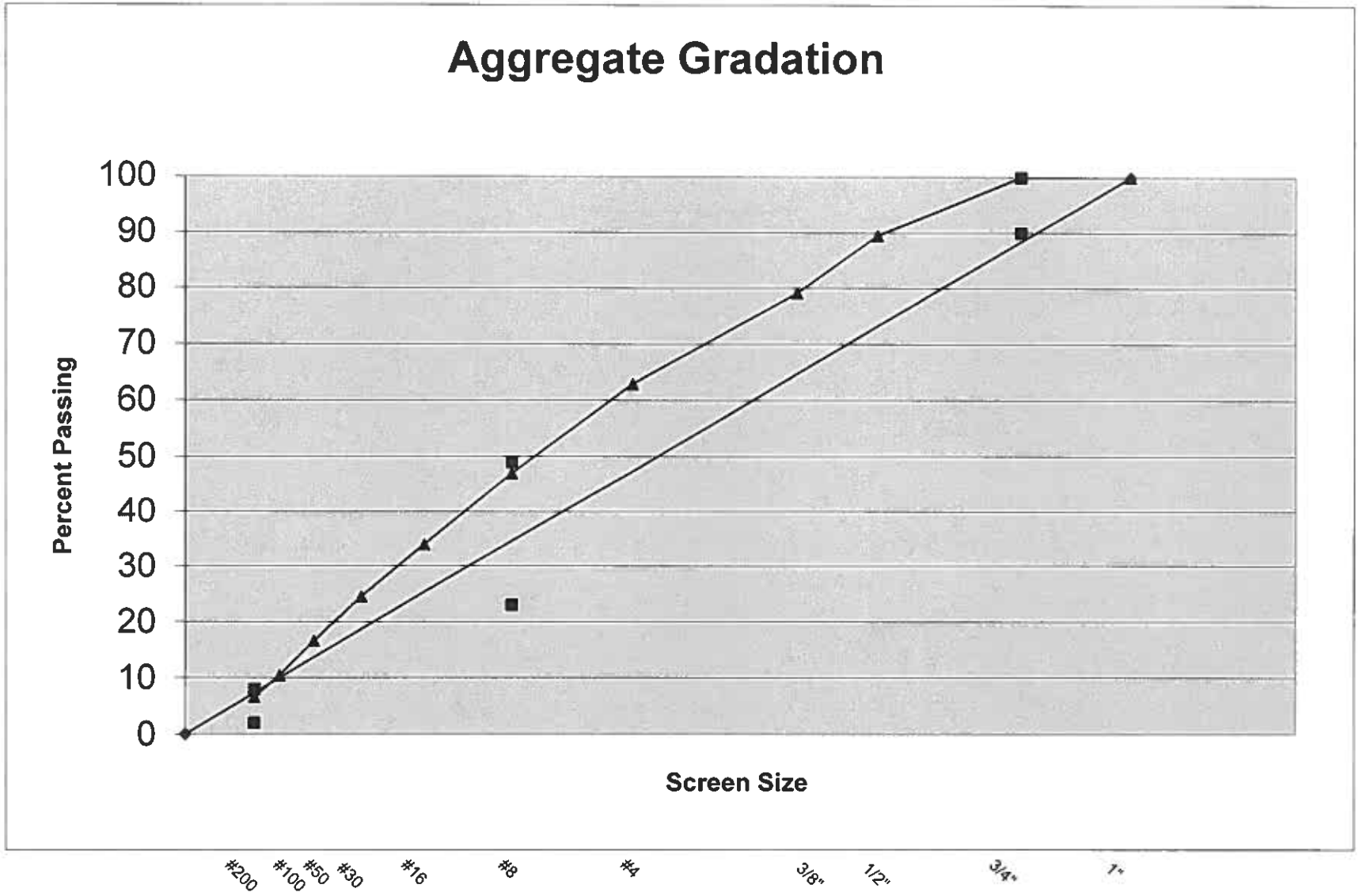
5.1
5.3
5.5
5.7
5.9
6.1


Max SpG vs. A.C. Content
2.490
2.480
2.470
2.460
2.450
2.440
2.430
2.420
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
43
42
41
40
39
38
37
4.3
4.5
4.7
4.9
5.1
5.3
5.5
5.7
5.9
6.1



Sieve Size Raised to the .45 Power

SX75R6422-13

2/15/13
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 SX w/RAP PG64-22
Delta Plant
Mix Design No. SX75R6422-13

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 are from Menzer and Fountain Quarries. The asphalt binder is a PG 64-22, with a specific gravity of 1.038, a mixing temperature of 325F, and a compaction temperature of 300F, supplied by SUNCOR Materials. The anti-stripping additive used is 1% hydrated lime from Pete Lien.

The aggregate was blended to meet CDOT Grading SX criteria by blending 20% Fountain ½" HMA, 41% Menzer Asphalt Fines, 10% Menzer ½" Rock, 8% Menzer 3/4" Rock, 20% Crushed RAP and 1% Hydrated Lime. The individual gradations, combined blend and aggregate physical properties are presented on page one (1) and a graphical presentation of the volumetric properties and the combined gradation, plotted on a 0.45 Power Graph, begins on page four (4).

This design was performed using SHRP Mix Design guidelines. The design was performed at asphalt contents of 5.0, 5.5, 6.0 and 6.5 percent. The results of the tests performed at each asphalt content are presented on page two (2) of the design. Optimum values for our Standard Mix Design are chosen at 4.0% VTM and are presented on page two (2). Optimum values for the PPRAS Criteria Mix Design are chosen at 3.5% VTM and are presented on page three (3). Based on these results the properties of this mix are:

VALUES @	STANDARD OPTIMUM	PPRAS OPTIMUM
Optimum AC Content, %	5.8	6.0
Theoretical Maximum Specific Gravity	2.435	2.426
Air Voids, %	4.0	3.4
Voids in Mineral Aggregate, %	15.9	15.9
Voids Filled with Asphalt, %	75	78
Tensile Strength Ratio	93	93

This hot mix asphalt mix 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.

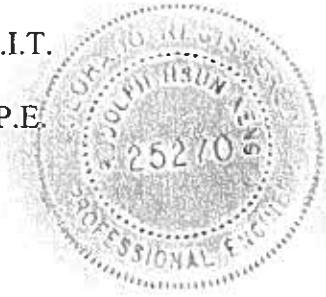
Performed By: Schmidt Quality Control Laboratory

Rueben Roberts, QC Manager

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

Approved By: — Rudy Keng, P.E.

3/12/2013



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

Laboratory Design for Hot Bituminous Pavement-SHRP Method

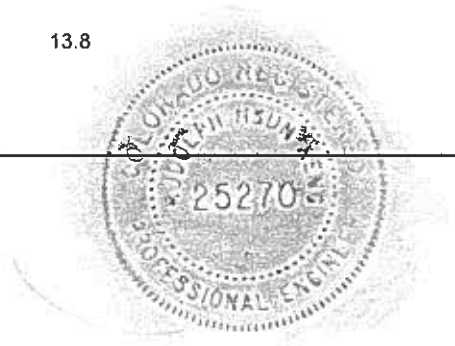
Mix Identification: SX75R6422-13 | Date: 2/15/13 | Project: 2013 MIX DESIGN SX75R | Location: DELTA PLANT

Contractor/Supplier: Schmidt Construction | Grading: SX w/RAP | 75 Gyrations

Pit Name: Menzer Quarry / Fountain Pit | 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		Fountain 1/2" HMA Rock	Menzer Asphalt Fines	Menzer 1/2" Rock	Menzer 3/4" Rock	Lime	Virgin Aggregate Gradation	RAP	Combined Gradation	Control	Points
Percent in Mix		**20**	**41**	**10**	**8**	**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**		
Passing 3/4	(19.0)	100	100	100	100	100	100	100	**100**		100
Passing 1/2	(12.5)	100	100	100	53	100	95	99	**96**	90	100
Passing 3/8	(9.5)	95	100	86	16	100	89	93	**89**		
Passing 4	(4.75)	75	86	4	2	100	65	73	**66**		
Passing 8	(2.36)	56	61	2	1	100	47	60	**49**	28	58
Passing 16	(1.18)	39	43	2	1	100	33	45	**36**		
Passing 30	(0.60)	26	31	2	1	100	24	33	**26**		
Passing 50	(0.30)	15	21	2	1	100	16	23	**17**		
Passing 100	(0.15)	8	13	2	1	100	10	14	**11**		
Passing 200	(0.075)	5.5	7.6	1.0	0.7	98.6	6.7	8.0	**7.0**	2.0	10.0
Plastic or Non-Plastic (T-90)		N/P	N/P	N/P	N/P		RAP AC %	4.45			
Aggregate Bulk SpG (T-84 & T-85)		2.582	2.621	2.619	2.611	2.380			**2.619**		
Aggregate App. SpG (T-84 & T-85)		2.650	2.680	2.687	2.661	2.380			**2.668**		
Agg Water Abs (%) (T-84 & T-85)		0.98	0.85	0.96	0.72				**0.86**		
Aggregate Eff. SpG (T-84 & T-85)								2.671	**2.661**		
Fine Agg. Bulk SpG (T-84)									**2.608**		
Coarse Agg. Bulk SpG (T-85)									**2.615**	**Specs:**	
Binder SpG									**1.038**	Min.	Max.
Fractured Faces (CP-45, ASTM D-5821)									**90**	60%	
Sand Equivalent (T-176)									**62**	45	
LA Abrasion (T-96)		37.6	33.6	32.8	30.9				**33**		45%
Fine Aggregate Angularity (T-304)									**48**	45	
Micro-Deval (CP-L 4211)		10.5	16.2	14.4	13.8				**14**		18%
Sodium Soundness (T-104)									**1**		12%
Flat & Elongated - Ratio 5:1 (ASTM D-4791)									**0.0**		
Flat & Elongated - Ratio 3:1 (ASTM D-4791)									**0.2**		



Standard

SCHMIDT CONSTRUCTION, COLORADO SPRINGS, CO								**Lab No.**	2531	
Laboratory Design for Hot Bituminous Pavement-SHRP Method								**Version**		
Standard Mix Design Criteria										
Mix Design A.C. Content Determination Results:										
	Rice =	2.428	@	6.0	%AC					
	A.C. Content				5.0	5.5	6.0	6.5	%	
	Rice Data (T-209)				2.463	2.445	2.428	2.411		
Specimen SpG Data (CP-L5115 & CP-L5106):										
	Bulk SpG @ Ninit				2.109	2.152	2.161	2.186		
	Bulk SpG @ Ndes				2.290	2.327	2.345	2.353		
	Height @ Ndes				64.5	64.0	63.3	62.9	mm	**Voids Specs:**
Voids Data:										**Min** **Max**
	Voids @ Ninit				14.4	12.0	11.0	9.3	%	
	Voids @ Ndes				7.0	4.8	3.4	2.4	%	3.5% 4.5%
Other Data:										
	VMA @ Ndes (CP-48)				16.9	16.0	15.9	16.0	%	14.7%
	VFA @ Ndes				59	70	78	85	%	65% 80%
	Aggregate Effective SpG (T-84 & T-85)				2.655	2.655	2.655	2.655		
	Effective Asphalt Content				4.50	5.00	5.50	6.01		
	Dust to A.C. Ratio (CP-50)				1.3	1.2	1.1	1.0		0.6 1.2
	Stability (CP-L5106)				39	39	38	37		30

Optimum A.C. Content Results:					
Optimum A.C. Content	**5.8**	%	Voids at Ninit at Optimum A.C.	**11.4**	%
Rice at Optimum A.C.	**2.435**		Voids at Ndes at Optimum A.C.	**4.0**	%
Hveem Stability	**38**		VMA at Optimum A.C.	**15.9**	%
Voids Filled with Asphalt (VFA)	**75**	%	Dust to Asphalt Ratio	**1.1**	

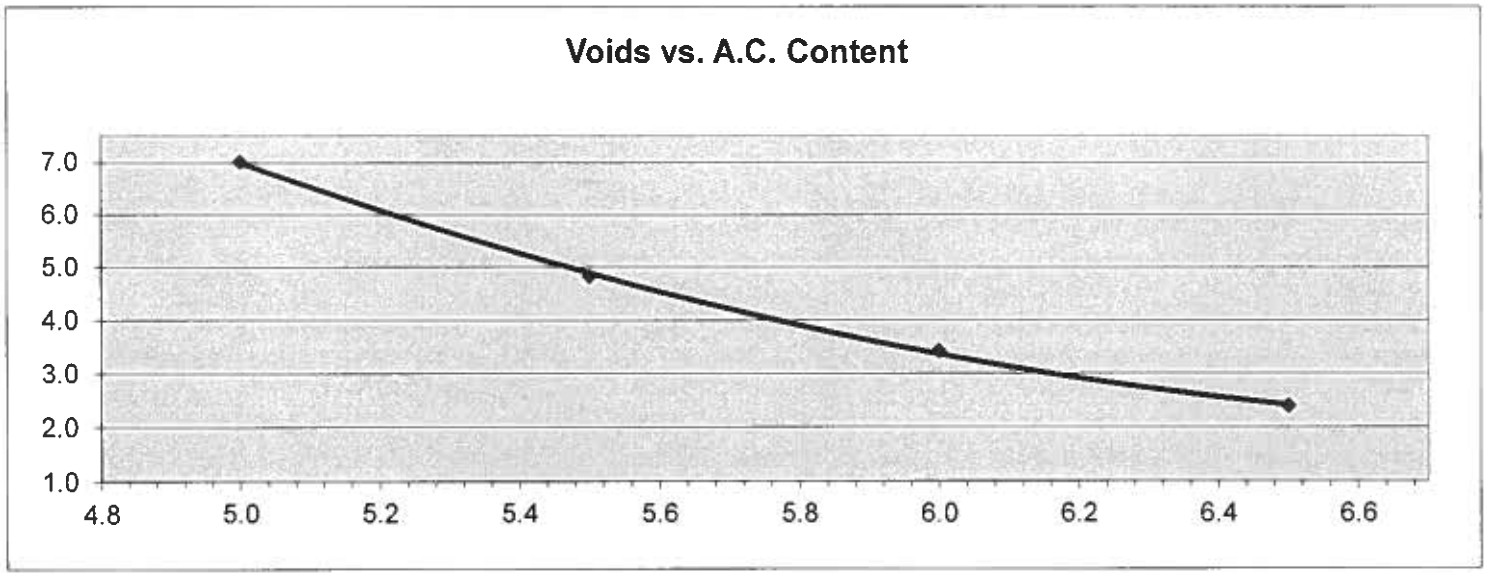
Lottman Moisture Sensitivity Results (CP-L5109, Method B)			**Lottman Specs:**	
			Min	**Max**
Asphalt Content	5.8	%		
Tensile Strength Ratio	**93**		80%	
Avg. Dry Tensile Strength	**110.6**	psi	30psi	
Avg. Cond. Tensile Strength	102.9	psi		
Avg. Specimen Voids	6.8	%	6.0%	8.0%
Avg. Saturation	91.7	%		

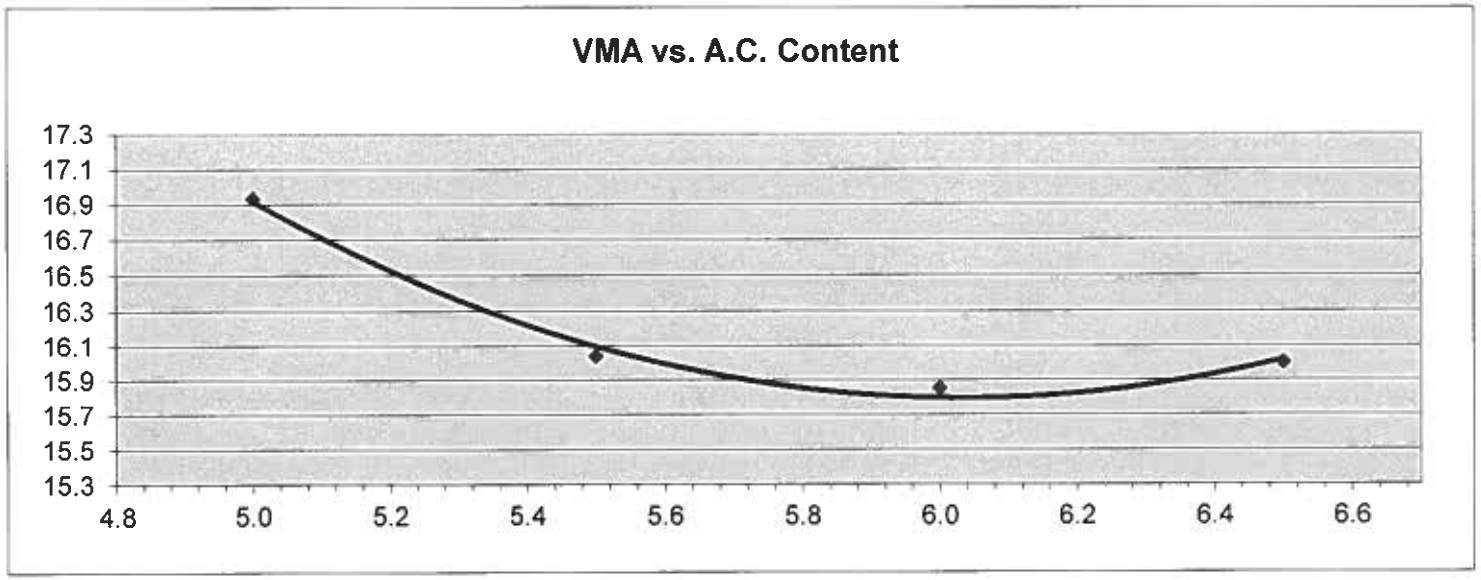
PPRAS

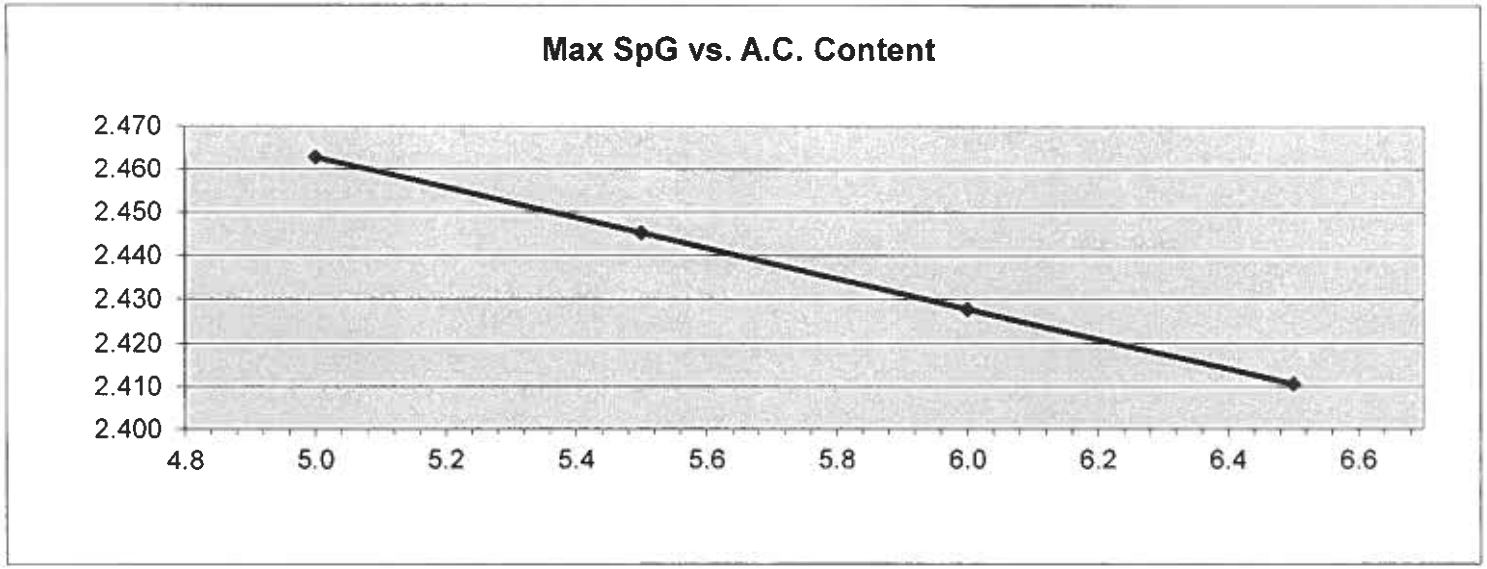
SCHMIDT CONSTRUCTION, COLORADO SPRINGS, CO								Lab No.	2531	
Laboratory Design for Hot Bituminous Pavement-SHRP Method								Version		
Pikes Peak Regional Asphlat Specification Mix Design Criteria										
Mix Design A.C. Content Determination Results:										
	Rice =	2.428	@	6.0	%AC					
	A.C. Content			5.0	5.5	6.0	6.5	%		
	Rice Data (T-209)			2.463	2.445	2.428	2.411			
Specimen SpG Data (CP-L5115 & CP-L5106):										
	Bulk SpG @ Ninit			2.109	2.152	2.161	2.186			
	Bulk SpG @ Ndes			2.290	2.327	2.345	2.353			
	Height @ Ndes			64.5	64.0	63.3	62.9	mm	Voids Specs:	
Voids Data:									Min	Max
	Voids @ Ninit			14.4	12.0	11.0	9.3	%		
	Voids @ Ndes			7.0	4.8	3.4	2.4	%	3.0%	4.0%
Other Data:										
	VMA @ Ndes (CP-48)			16.9	16.0	15.9	16.0	%	14.6%	
	VFA @ Ndes			59	70	78	85	%	65%	80%
	Aggregate Effective SpG (T-84 & T-85)			2.655	2.655	2.655	2.655			
	Effective Asphalt Content			4.50	5.00	5.50	6.01			
	Dust to A.C. Ratio (CP-50)			1.3	1.2	1.1	1.0		0.6	1.2
	Stability (CP-L5106)			39	39	38	37		30	

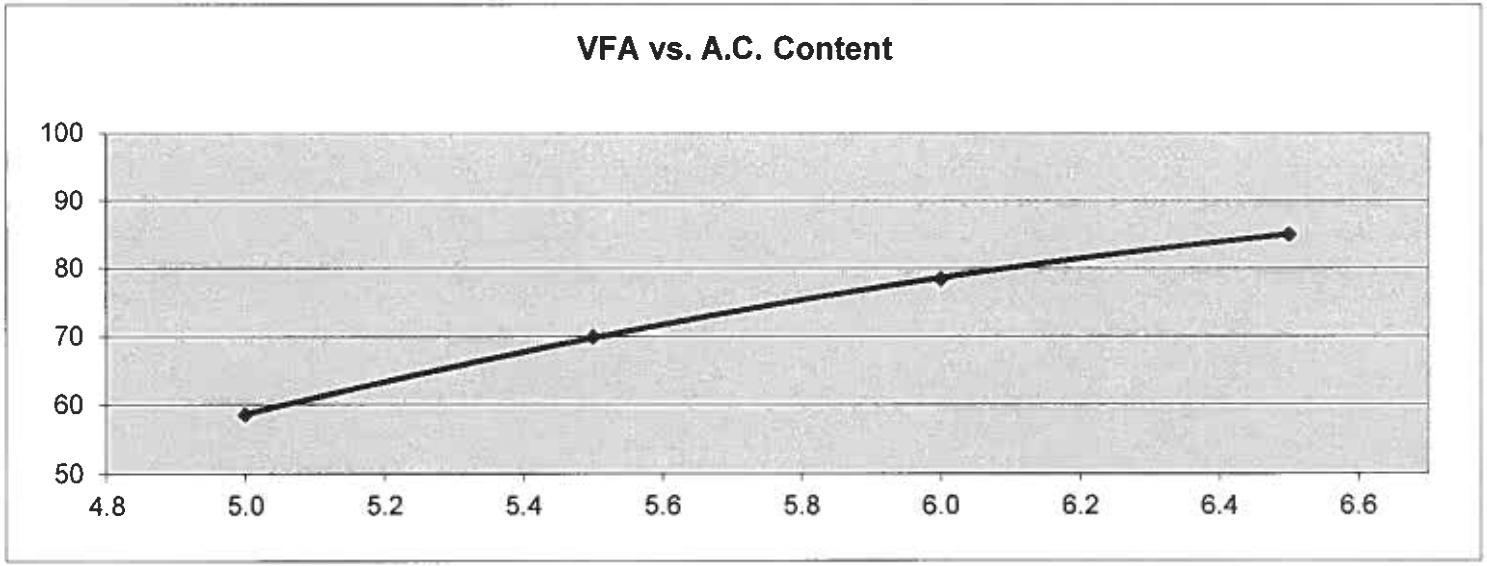
Optimum A.C. Content Results:					
Optimum A.C. Content	**6.0**	%	Voids at Ninit at Optimum A.C.	**11.0**	%
Rice at Optimum A.C.	**2.428**		Voids at Ndes at Optimum A.C.	**3.4**	%
Hveem Stability	**38**		VMA at Optimum A.C.	**15.9**	%
Voids Filled with Asphalt (VFA)	**78**	%	Dust to Asphalt Ratio	**1.1**	

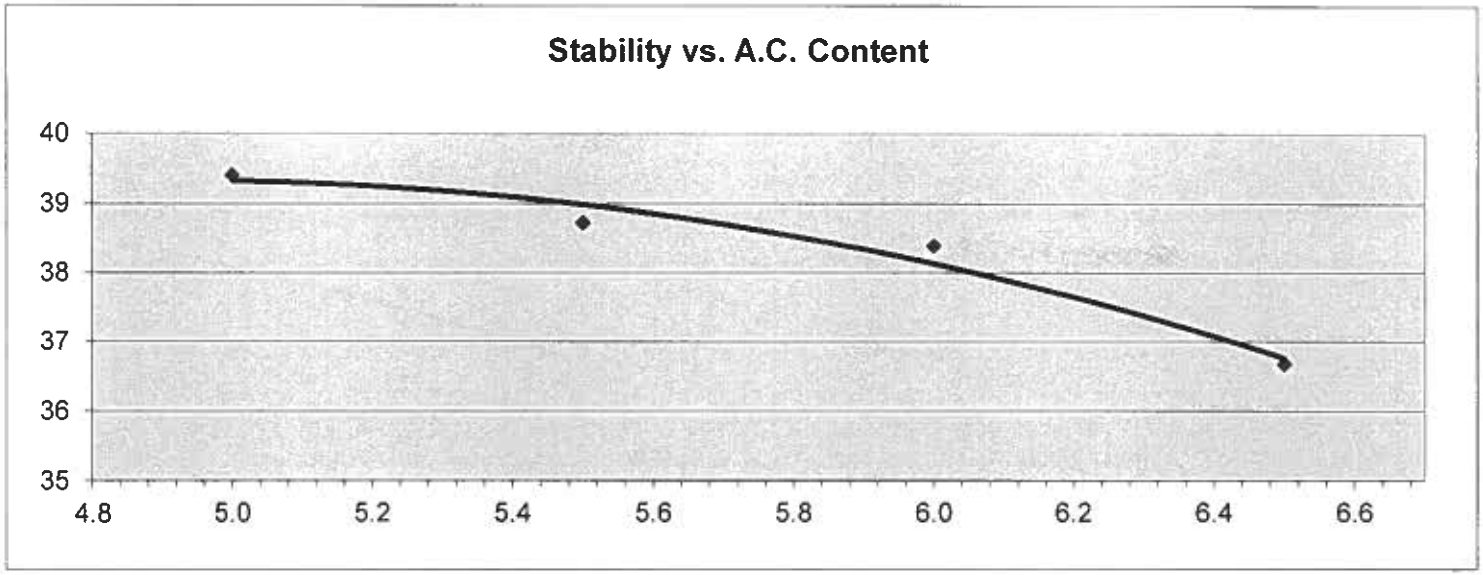
Lottman Moisture Sensitivity Results (CP-L5109, Method B)			**Lottman Specs:**	
			Min	**Max**
Asphalt Content	5.8	%		
Tensile Strength Ratio	**93**		80%	
Avg. Dry Tensile Strength	**110.6**	psi	30psi	
Avg. Cond. Tensile Strength	102.9	psi		
Avg. Specimen Voids	6.8	%	6.0%	8.0%
Avg. Saturation	91.7	%		


Voids vs. A.C. Content
7.0
6.0
5.0
4.0
3.0
2.0
1.0
4.8
5.0
5.2
5.4
5.6
5.8
6.0
6.2
6.4
6.6

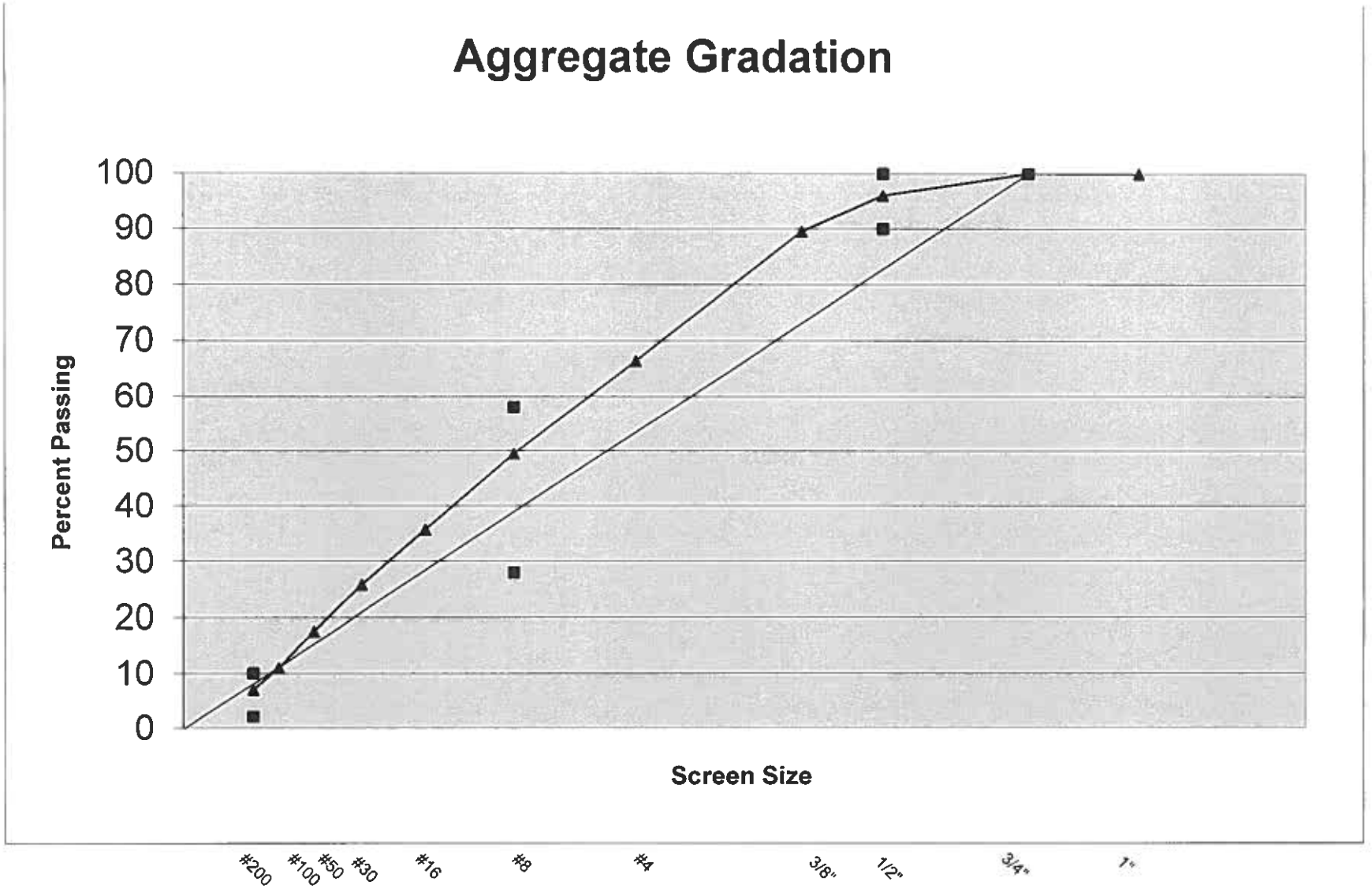

VMA vs. A.C. Content
17.3
17.1
16.9
16.7
16.5
16.3
16.1
15.9
15.7
15.5
15.3
4.8
5.0
5.2
5.4
5.6
5.8
6.0
6.2
6.4
6.6


Max SpG vs. A.C. Content
2.470
2.460
2.450
2.440
2.430
2.420
2.410
2.400
4.8
5.0
5.2
5.4
5.6
5.8
6.0
6.2
6.4
6.6


VFA vs. A.C. Content
100
90
80
70
60
50
4.8
5.0
5.2
5.4
5.6
5.8
6.0
6.2
6.4
6.6


Stability vs. A.C. Content
40
39
38
37
36
35
4.8
5.0
5.2
5.4
5.6
5.8
6.0
6.2
6.4
6.6

Aggregate Gradation



Sieve Size Raised to the .45 Power