

## **SAN ANTONIO UPDATE**

### **TYPE C MIX (WITH 15% RAP)**

4.7% PG 70-22 + limestone

TGC density: 96.5%

TTI Hamburg results: **5.6 mm after 20 k passes.**

TTI OT results: **22 cycles**

### **Proposed modifications (see attached spreadsheet)**

- 1) Change design TGC density to 97.0% or higher. (5.0% Binder)
- 2) Change aggregate blend (Richard).
- 3) Add lime
- 4) Measure aggregate absorption; modify design by reducing worst aggregate.
- 5) Try WMA (less absorption)

## Type C Original

MATERIAL CODE:		MIX TYPE:	ITEM340_C_Coarse_Surface
MATERIAL NAME:			
PRODUCER:	COLORADO MATERIALS, HUNTER PLANT		
AREA ENGINEER:		PROJECT MANAGER:	
COURSE\LIFT:		STATION:	
		DIST. FROM CL:	
CONTRACTOR DESIGN # :		C-RAP-70-HU	

	BIN FRACTIONS																		
	Bin No.1		Bin No.2		Bin No.3		Bin No.4		Bin No.5		Bin No.6		Bin No.7						
Aggregate Source:	Colorado Matls		Colorado Matls		Colorado Matls		Colorado Matls		Colorado Matls		Colorado Matls								
Aggregate Number:	1504605		1504605		1504605		1504605												
Sample ID:	C-Rock		D-Rock		F-Rock		Man Sand		Field Sand		RAP				Combined Gradation				
Rap?, Asphalt%:											Yes	5.4			Total Bin				
Individual Bin (%):	10.0	Percent	25.0	Percent	20.0	Percent	20.0	Percent	10.0	Percent	15.0	Percent		Percent	100.0%	Lower & Upper Specification Limits		Within Spec's	Restr Zon
Sieve Size:	Cum.% Passing	Wtd Cum. %	Cum.% Passing	Wtd Cum. %	Cum.% Passing	Wtd Cum. %	Cum.% Passing	Wtd Cum. %	Cum.% Passing	Wtd Cum. %	Cum.% Passing	Wtd Cum. %	Cum.% Passing	Wtd Cum. %	Cum. % Passing				
1"	100.0	10.0	100.0	25.0	100.0	20.0	100.0	20.0	100.0	10.0	100.0	15.0		0.0	100.0	100.0	100.0	Yes	
3/4"	100.0	10.0	100.0	25.0	100.0	20.0	100.0	20.0	100.0	10.0	100.0	15.0		0.0	100.0	95.0	100.0	Yes	
3/8"	8.9	0.9	70.1	17.5	100.0	20.0	100.0	20.0	100.0	10.0	98.0	14.7		0.0	83.1	70.0	85.0	Yes	
No. 4	4.5	0.5	6.6	1.7	68.8	13.8	99.0	19.8	100.0	10.0	79.2	11.9		0.0	57.5	43.0	63.0	Yes	
No. 8	3.1	0.3	3.6	0.9	5.8	1.2	86.7	17.3	99.0	9.9	60.4	9.1		0.0	38.7	32.0	44.0	Yes	
No. 30	2.3	0.2	2.5	0.6	3.5	0.7	36.5	7.3	86.9	8.7	40.2	6.0		0.0	23.6	14.0	28.0	Yes	
No. 50	1.8	0.2	1.9	0.5	3.0	0.6	24.4	4.9	61.1	6.1	30.8	4.6		0.0	16.9	7.0	21.0	Yes	
No. 200	1.0	0.1	1.2	0.3	1.5	0.3	8.4	1.7	11.0	1.1	15.1	2.3		0.0	5.7	2.0	7.0	Yes	

# Not within specifications    # Not cumulative

Asphalt Source & Grade:	Valero PG 70-22	Binder Percent, (%):	4.7	Asphalt Spec. Grav.:	1.035
Antistripping Agent:		Percent, (%):			

<b>Target Density:</b>	<b>96.5</b>	Percent
<b>Number of Gyration:</b>		

							<b>Mixture Evaluation</b>
Asphalt Content (%)	Specific Gravity Of Specimen (Ga)	Maximum Specific Gravity (Gr)	Effective Gravity (Ge)	Theo. Max. Specific Gravity (Gt)	Density from Gt (Percent)	VMA (Percent)	Indirect Tensile Strength (psi)
3.5	2.311		0.000	2.474	93.4	14.4	181
4.0	2.322	2.457	2.606	2.456	94.5	14.4	
4.5	2.341	2.441	2.608	2.439	96.0	14.2	
5.0	2.360	2.419	2.602	2.422	97.5	13.9	
5.5	2.373		0.000	2.405	98.7	13.9	

<b>Effective Specific Gravity:</b>	2.605
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<b>Estimated Percent of Stripping, %:</b>	<b>0</b>
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<b>Optimum Asphalt Content :</b>	<b>4.7</b>
<b>VMA @ Optimum AC:</b>	<b>14.1</b>

<b>Interpolated Values</b>	
Specific Gravity (Ga):	2.348
Max. Specific Gravity (Gr):	2.433
Theo. Max. Specific Gravity (Gt):	2.433

