



MATHY CONSTRUCTION CO.

GENERAL CONTRACTORS

920 10TH AVE N POST OFFICE BOX 189 ONALASKA, WI 54650

PHONE 608-781-4683 FAX 608-781-4694

Report of Bituminous Mix Design

Project Name	Tomah - Necedah STH 21
Date	August 12, 2016
Project #	7010-01-61
Test#	15-16-1387-5 MT-58-28S(R) 250-0274-2016
County	Juneau
Specifications	5 MT-58-28S design
Course/Layer	



Aggregate Sources

Aggregate Source											
	Percent	Material				Location / Source				G _{sb}	
1	16	Washed CA 13 Bit Rock(3243)				Tork/1,22,5E Wood				2.678	
2	17	3/8" Washed Gravel Man Sand(5400)				Manthey East Pit/26,17,7E Adams				2.736	
3	35	1/4" Washed Man Sand(3402)				Rock Springs/28,12,5E Sauk				2.651	
4	10	5/8" Screen Sand(5501)				Manthey East Pit/26,17,7E Adams				2.676	
5	14	3/8" Bit Agg(5225)				Manthey East Pit/26,17,7E Adams				2.653	
6	8	RAP(4.9%AC)				Hwy 21 Millings				2.672	
7											
8											
Total		1	2	3	4	5	6	7	8	Comb G _{sb}	2.674
Virgin Agg Blend		17.39	18.48	38.04	10.87	15.22				Comb G _{se}	2.722

Aggregate Gradations

Sieve		Material								Job Mix	Spec	
(Std)	(mm)	1	2	3	4	5	6	7	8		High	Low
2"	50	100.0	100.0	100.0	100.0	100.0	100.0			100.0		
1.5"	37.5	100.0	100.0	100.0	100.0	100.0	100.0			100.0		
1"	25	100.0	100.0	100.0	100.0	100.0	100.0			100.0		
3/4"	19	100.0	100.0	100.0	100.0	100.0	100.0			100.0		
1/2"	12.5	100.0	100.0	100.0	98.0	100.0	97.0			99.6		
3/8"	9.5	78.0	100.0	100.0	94.0	100.0	92.0			95.2		
#4	4.75	22.0	72.0	97.0	84.0	76.0	73.0			74.6		
#8	2.36	4.1	43.0	76.0	76.0	52.0	56.0			53.9		
#16	1.18	3.2	26.0	51.0	71.0	37.0	44.0			38.6		
#30	0.6	2.9	17.0	31.0	55.0	29.0	36.0			26.6		
#50	0.3	2.7	9.7	16.0	22.0	22.0	24.0			14.9		
#100	0.15	2.4	3.4	3.7	6.0	15.0	14.0			6.1		
#200	0.075	2.3	1.4	1.8	2.5	10.4	9.3			3.7		
Soundness		225-20	225-133	225-127	225-133	225-133					12	Max
LAR 100/500 Rev		2014	2016	2015	2016	2016					13 &	45 Max
Crush 1 Face (%)		100.0	100.0	100.0	34.0	100.0	99.0			95.8	75	Min
Crush 2 Face (%)		100.0	100.0	100.0	31.0	100.0	98.0			95.5	60	Min
Sand Equiv.										83	40	Min
Flat & Elong (%)		1.1	1.4	3.6	0.2	2.2	0.3			1.3	5	Max
Fine Agg Ang			46.5	48.5	38.8	47.2	40.7			45	43	Min
Water Abs.		0.4	1.1	0.2	0.6	1.8	1.0			0.7		

Test Methods: D312, T176/D2419, T11/C117, T27/C136, D4791, D5821, T304/C1252, T96/C131, T209/D2041, T166/D2726



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Mix Properties

Trial #	1	2	3	4	5	6
AC Content (% by Wt)	5.0	5.5	6.0	6.5		5.7
Compaction Level	Design	Design	Design	Design		Max
Air Voids V_a (%)	5.8	4.4	3.3	2.3		4.1
% G_{mm} @ N_i	87.4	88.7	89.4	90.8		88.7
% G_{mm} @ N_{final}	94.2	95.6	96.7	97.7		96.6
VMA (%)	15.8	15.7	15.8	16.0		15.2
VFA (%)	63.4	71.9	79.1	85.5		73.2
Density (kg/m^3)	2370	2386	2396	2402		2405
G_{mb}	2.370	2.386	2.396	2.402		2.405
G_{mm}	2.515	2.496	2.477	2.459		2.489

Gyrations	
N_i	7
N_d	75
N_m	115

Antistrip
None

Mix Design

Property	Value	Specification
Design P_b	5.7	
Added P_b	5.3	
V_a	4.0	4.0
VMA	15.7	15.5 Minimum
VFA	74.6	70 - 76
G_{mm}	2.489	
G_{mb}	2.389	
P_{be}	5.0	
P_{ba}	0.7	
Dust/Binder Ratio	0.7	0.6 - 1.2
% G_{mm} @ N_i	88.9	< 89.0 Rec
% G_{mm} @ N_d	95.9	~ 96.0
% G_{mm} @ N_m	96.6	98.0 Max
TSR Ratio	82.8	75 Minimum
Rec. Mix Temp.	275-300	

Primary AC Source	AC Type	G_b
MIA - La Crosse	58-28S	1.028
Alternate Sources		
MIA - La Crosse	52-34S	1.023
MIA - La Crosse	58-34S	1.023
MIA - La Crosse	58-28H	1.030

% Binder Replacement

6.9%

Average # of Gyrations	35
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Since this design is material specific, the conclusions and recommendations contained within are obtained from material submitted to and subjected to observations under laboratory conditions. Adjustments may become necessary when field laboratory data is obtained from plant produced mix. No guarantee or warranty is implied or offered.

Signature *John E. Jorgensen* Cert. No. 361 Date: 8/12/2016

Tomah - Necedah STH 21

Design # 15-16-1387-5 MT-58-28S(R) -- 9.5 mm Mix -- Blend 1

