

Appendix F
Noise Modeling Methods and Results

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Noise Impact and Mitigation Analysis

US50 West PEL Study, Swallows Road to Baltimore Avenue

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In association with: J.F. Sato and Associates

Presented to: Technical Advisory Team, July 12, 2011

Noise Study Methodology

- Noise impacts and mitigation were analyzed according to Colorado Department of Transportation's *Noise Analysis and Abatement Guidelines*, March 23, 2011.
- Noise levels were predicted using TNM v2.5.
- Traffic volumes used in the model were provided by J.F. Sato, and are based on Pueblo Area Council of Governments long range plan.
- Traffic speeds used in the model consist of posted speeds.
- Location of roadways and residences determined using Google Earth and land use maps provided by Pueblo County, as well as a tour of the corridor.
- Elevation considered only in the analysis of mitigation.
- Signalized intersections modeled in TNM. Interchange noise levels estimated qualitatively.

Noise Impact Analysis Results - Mainline

According to CDOT guidelines, a residential receptor is considered impacted by noise when traffic noise levels are projected to be 66 dBA or greater, or when design-year noise levels are projected to exceed existing levels by 10 dBA or more. Noise impacts were found at the following locations:

- Neighborhood in northeast quadrant of Baltimore and US50 (4 residences)
 - Isolated residences east of Purcell (4 residences)
 - Three groups of residences east of Main McCulloch (23 residences)
 - Large residential neighborhood in Pueblo West (24 residences)
 - Isolated residence east of West McCulloch (1 residences)
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- A total of 56 residences are impacted
 - There is no difference in impacts (at all) between Alternatives B, D, and E
 - Five (5) residences are impacted under existing conditions, and 14 under No Action

US50 PEL Predicted Noise Levels and Noise Impacts

* = impacted under all proposed alternatives (B,D and E)
 * = impacted under some proposed alternatives (B, D or E)

Figure	Receptor*	Existing Level (dBA)	No Action			Alternative B			Alternative D			Alternative E		
			Level (dBA)	Change (dBA)	Impact?	Level (dBA)	Change (dBA)	Impact?	Level (dBA)	Change (dBA)	Impact?	Level (dBA)	Change (dBA)	Impact?
1	R001	57	59	2	no	61	4	no	61	4	no	61	4	no
1	R002	58	59	1	no	61	3	no	61	3	no	61	3	no
1	R003	58	59	1	no	61	3	no	61	3	no	61	3	no
1	R004	59	61	2	no	63	4	no	63	4	no	63	4	no
1	R005	56	57	1	no	59	3	no	59	3	no	59	3	no
1	R006	55	57	2	no	58	3	no	58	3	no	58	3	no
1	R007	55	57	2	no	58	3	no	58	3	no	58	3	no
1	R008	54	55	1	no	57	3	no	57	3	no	57	3	no
1	R009	52	53	1	no	55	3	no	55	3	no	55	3	no
1	R010	53	55	2	no	57	4	no	57	4	no	57	4	no
1	R011	52	54	2	no	55	3	no	55	3	no	55	3	no
1	R012	55	57	2	no	58	3	no	58	3	no	58	3	no
1	R013	53	55	2	no	56	3	no	57	4	no	57	4	no
1	R014	53	55	2	no	56	3	no	57	4	no	57	4	no
1	R015	53	54	1	no	56	3	no	56	3	no	56	3	no
1	R016	55	56	1	no	58	3	no	58	3	no	58	3	no
1	R017	59	61	2	no	63	4	no	63	4	no	63	4	no
1	R018	59	60	1	no	62	3	no	62	3	no	62	3	no
1	R019	58	60	2	no	62	4	no	62	4	no	62	4	no
1	R020	58	59	1	no	61	3	no	61	3	no	61	3	no
1	R021	58	60	2	no	61	3	no	61	3	no	61	3	no
1	R022	61	61	0	no	62	1	no	62	1	no	62	1	no
1	R023	57	58	1	no	59	2	no	59	2	no	59	2	no
1	R024	56	57	1	no	59	3	no	59	3	no	59	3	no
1	R025	56	57	1	no	59	3	no	59	3	no	59	3	no
1	R026	56	57	1	no	59	3	no	59	3	no	59	3	no
1	R027	56	57	1	no	59	3	no	59	3	no	59	3	no
1	R028	56	58	2	no	59	3	no	59	3	no	59	3	no
1	R029	56	58	2	no	59	3	no	59	3	no	59	3	no
1	R030	55	56	1	no	58	3	no	58	3	no	58	3	no
1	R031	57	59	2	no	60	3	no	60	3	no	60	3	no
1	R032	56	58	2	no	59	3	no	59	3	no	59	3	no
1	R033	57	59	2	no	61	4	no	61	4	no	61	4	no
1	R034	57	58	1	no	60	3	no	60	3	no	60	3	no
1	R035	58	60	2	no	61	3	no	62	4	no	62	4	no
1	R036	57	58	1	no	60	3	no	60	3	no	60	3	no
1	R037	58	60	2	no	62	4	no	62	4	no	62	4	no
1	R038	59	60	1	no	62	3	no	63	4	no	63	4	no
1	R039	58	59	1	no	61	3	no	61	3	no	61	3	no
1	R040	57	58	1	no	60	3	no	60	3	no	60	3	no
1	R041	64	66	2	YES	67	3	YES	67	3	YES	67	3	YES

Figure	Receptor*	Existing	No Action			Alternative B			Alternative D			Alternative E		
		Level (dBA)	Level (dBA)	Change (dBA)	Impact?	Level (dBA)	Change (dBA)	Impact?	Level (dBA)	Change (dBA)	Impact?	Level (dBA)	Change (dBA)	Impact?
1	R042	64	65	1	no	67	3	YES	67	3	YES	67	3	YES
1	R043	64	65	1	no	67	3	YES	67	3	YES	67	3	YES
1	R044	62	63	1	no	66	4	YES	66	4	YES	66	4	YES
1	R045	61	62	1	no	65	4	no	65	4	no	65	4	no
1	R046	61	62	1	no	64	3	no	64	3	no	64	3	no
1	R047	61	62	1	no	63	2	no	63	2	no	63	2	no
1	R048	61	62	1	no	63	2	no	63	2	no	63	2	no
1	R049	62	62	0	no	63	1	no	63	1	no	63	1	no
1	R050	61	61	0	no	62	1	no	62	1	no	62	1	no
1	R051	57	58	1	no	60	3	no	61	4	no	61	4	no
1	R052	55	56	1	no	59	4	no	59	4	no	59	4	no
1	R053	54	56	2	no	58	4	no	58	4	no	58	4	no
1	R054	54	55	1	no	58	4	no	58	4	no	58	4	no
1	R055	55	56	1	no	58	3	no	58	3	no	58	3	no
1	R056	57	58	1	no	60	3	no	60	3	no	60	3	no
1	R057	59	60	1	no	62	3	no	62	3	no	62	3	no
1	R058	55	56	1	no	59	4	no	59	4	no	59	4	no
1	R059	55	56	1	no	59	4	no	59	4	no	59	4	no
1	R060	55	56	1	no	59	4	no	59	4	no	59	4	no
1	R061	55	57	2	no	59	4	no	59	4	no	59	4	no
1	R062	55	57	2	no	59	4	no	59	4	no	59	4	no
1	R063	55	57	2	no	59	4	no	59	4	no	59	4	no
1	R064	56	57	1	no	59	3	no	59	3	no	59	3	no
1	R065	56	57	1	no	59	3	no	60	4	no	60	4	no
1	R066	56	57	1	no	59	3	no	60	4	no	60	4	no
1	R067	56	57	1	no	60	4	no	60	4	no	60	4	no
1	R068	56	58	2	no	60	4	no	60	4	no	60	4	no
1	R069	57	58	1	no	61	4	no	61	4	no	61	4	no
1	R070	56	57	1	no	59	3	no	59	3	no	59	3	no
1	R071	55	56	1	no	59	4	no	59	4	no	59	4	no
1	R072	55	56	1	no	59	4	no	59	4	no	59	4	no
1	R073	54	56	2	no	58	4	no	59	5	no	59	5	no
1	R074	54	55	1	no	58	4	no	58	4	no	58	4	no
1	R075	53	55	2	no	58	5	no	58	5	no	58	5	no
1	R076	53	54	1	no	57	4	no	57	4	no	57	4	no
1	R077	53	54	1	no	57	4	no	57	4	no	57	4	no
1	R078	56	58	2	no	60	4	no	60	4	no	60	4	no
1	R079	58	59	1	no	61	3	no	61	3	no	61	3	no
1	R080	60	61	1	no	62	2	no	62	2	no	62	2	no
1	R081	63	64	1	no	65	2	no	65	2	no	65	2	no
1	R082	64	64	0	no	65	1	no	65	1	no	65	1	no
1	R083	60	61	1	no	63	3	no	63	3	no	63	3	no
1	R084	59	60	1	no	63	4	no	63	4	no	63	4	no
1	R085	58	60	2	no	63	5	no	63	5	no	63	5	no

Figure	Receptor*	Existing	No Action			Alternative B			Alternative D			Alternative E		
		Level (dBA)	Level (dBA)	Change (dBA)	Impact?	Level (dBA)	Change (dBA)	Impact?	Level (dBA)	Change (dBA)	Impact?	Level (dBA)	Change (dBA)	Impact?
1	R086	58	60	2	no	63	5	no	63	5	no	63	5	no
1	R087	58	60	2	no	63	5	no	63	5	no	63	5	no
1	R088	58	60	2	no	63	5	no	64	6	no	64	6	no
1	R089	59	60	1	no	64	5	no	64	5	no	64	5	no
1	R090	59	60	1	no	64	5	no	65	6	no	65	6	no
1	R091	58	60	2	no	63	5	no	64	6	no	64	6	no
1	R092	57	59	2	no	62	5	no	62	5	no	62	5	no
1	R093	57	58	1	no	61	4	no	61	4	no	61	4	no
1	R094	57	58	1	no	61	4	no	62	5	no	62	5	no
1	R095	57	58	1	no	61	4	no	61	4	no	61	4	no
1	R096	57	58	1	no	61	4	no	61	4	no	61	4	no
1	R097	57	58	1	no	61	4	no	61	4	no	61	4	no
1	R098	57	58	1	no	61	4	no	61	4	no	61	4	no
1	R099	57	58	1	no	60	3	no	61	4	no	61	4	no
1	R100	57	58	1	no	61	4	no	61	4	no	61	4	no
1	R101	58	59	1	no	61	3	no	61	3	no	61	3	no
1	R102	61	61	0	no	63	2	no	63	2	no	63	2	no
1	R103	61	61	0	no	62	1	no	62	1	no	62	1	no
1	R104	57	58	1	no	60	3	no	60	3	no	60	3	no
1	R105	55	56	1	no	58	3	no	59	4	no	59	4	no
1	R106	53	55	2	no	57	4	no	58	5	no	58	5	no
1	R107	53	54	1	no	57	4	no	57	4	no	57	4	no
1	R108	53	54	1	no	56	3	no	57	4	no	57	4	no
1	R109	52	54	2	no	56	4	no	57	5	no	57	5	no
1	R110	52	53	1	no	56	4	no	56	4	no	56	4	no
1	R111	52	53	1	no	55	3	no	55	3	no	55	3	no
1	R112	51	53	2	no	55	4	no	55	4	no	55	4	no
1	R113	51	53	2	no	55	4	no	55	4	no	55	4	no
1	R114	51	52	1	no	55	4	no	55	4	no	55	4	no
1	R115	51	53	2	no	54	3	no	55	4	no	55	4	no
1	R116	51	53	2	no	55	4	no	55	4	no	55	4	no
1	R117	53	54	1	no	55	2	no	55	2	no	55	2	no
1	R118	56	57	1	no	57	1	no	57	1	no	57	1	no
1	R119	60	61	1	no	61	1	no	61	1	no	61	1	no
1	R120	53	54	1	no	57	4	no	57	4	no	57	4	no
1	R121	53	54	1	no	56	3	no	56	3	no	56	3	no
1	R122	53	54	1	no	56	3	no	56	3	no	56	3	no
1	R123	53	54	1	no	56	3	no	56	3	no	56	3	no
1	R124	53	54	1	no	56	3	no	56	3	no	56	3	no
1	R125	54	55	1	no	57	3	no	57	3	no	57	3	no
1	R126	56	57	1	no	58	2	no	58	2	no	58	2	no
1	R127	61	62	1	no	62	1	no	62	1	no	62	1	no
1	R128	61	61	0	no	62	1	no	62	1	no	62	1	no
1	R129	62	62	0	no	62	0	no	62	0	no	62	0	no

Figure	Receptor*	Existing	No Action			Alternative B			Alternative D			Alternative E		
		Level (dBA)	Level (dBA)	Change (dBA)	Impact?	Level (dBA)	Change (dBA)	Impact?	Level (dBA)	Change (dBA)	Impact?	Level (dBA)	Change (dBA)	Impact?
3	R130	67	69	2	YES	72	5	YES	73	6	YES	73	6	YES
3	R131	59	61	2	no	63	4	no	64	5	no	64	5	no
3	R132	60	62	2	no	65	5	no	65	5	no	65	5	no
3	R133	62	64	2	no	67	5	YES	68	6	YES	68	6	YES
3	R134	60	62	2	no	65	5	no	65	5	no	65	5	no
3	R135	58	60	2	no	62	4	no	63	5	no	63	5	no
3	R136	56	58	2	no	60	4	no	61	5	no	61	5	no
3	R137	56	58	2	no	60	4	no	60	4	no	60	4	no
3/4	R138	62	64	2	no	66	4	YES	66	4	YES	66	4	YES
3	R139	69	71	2	YES	74	5	YES	74	5	YES	74	5	YES
5	R140	71	73	2	YES	75	4	YES	75	4	YES	75	4	YES
5	R141	71	73	2	YES	75	4	YES	75	4	YES	75	4	YES
5	R142	66	68	2	YES	71	5	YES	72	6	YES	72	6	YES
5	R143	60	62	2	no	66	6	YES	68	8	YES	68	8	YES
5	R144	63	66	3	YES	69	6	YES	71	8	YES	71	8	YES
5	R145	61	63	2	no	66	5	YES	68	7	YES	68	7	YES
5	R146	65	67	2	YES	71	6	YES	72	7	YES	72	7	YES
5	R147	60	62	2	no	66	6	YES	68	8	YES	68	8	YES
5	R148	66	68	2	YES	71	5	YES	72	6	YES	72	6	YES
5	R149	66	68	2	YES	71	5	YES	72	6	YES	72	6	YES
5	R150	66	68	2	YES	71	5	YES	72	6	YES	72	6	YES
5	R151	66	68	2	YES	71	5	YES	72	6	YES	72	6	YES
5	R152	66	68	2	YES	71	5	YES	72	6	YES	72	6	YES
5	R153	60	62	2	no	66	6	YES	68	8	YES	68	8	YES
5	R154	60	62	2	no	66	6	YES	68	8	YES	68	8	YES
5	R155	60	62	2	no	66	6	YES	68	8	YES	68	8	YES
5	R156	60	62	2	no	66	6	YES	68	8	YES	68	8	YES
5	R157	60	62	2	no	66	6	YES	68	8	YES	68	8	YES
5	R158	65	67	2	YES	71	6	YES	72	7	YES	72	7	YES
5	R159	61	63	2	no	66	5	YES	68	7	YES	68	7	YES
5	R160	62	64	2	no	68	6	YES	70	8	YES	70	8	YES
5	R161	61	64	3	no	67	6	YES	69	8	YES	69	8	YES
5	R162	61	63	2	no	66	5	YES	68	7	YES	68	7	YES
6	R163	58	61	3	no	63	5	no	65	7	no	64	6	no
6	R164	57	60	3	no	62	5	no	64	7	no	63	6	no
6	R165	54	57	3	no	60	6	no	61	7	no	60	6	no
6	R166	61	64	3	no	67	6	YES	69	8	YES	67	6	YES
6	R167	61	64	3	no	67	6	YES	68	7	YES	67	6	YES
6	R168	58	61	3	no	64	6	no	65	7	no	64	6	no
6	R169	57	60	3	no	62	5	no	63	6	no	63	6	no
6	R170	58	61	3	no	63	5	no	64	6	no	64	6	no
6	R171	56	59	3	no	62	6	no	61	5	no	62	6	no
6	R172	61	64	3	no	67	6	YES	68	7	YES	67	6	YES
6	R173	61	64	3	no	67	6	YES	68	7	YES	67	6	YES

Figure	Receptor*	Existing	No Action			Alternative B			Alternative D			Alternative E		
		Level (dBA)	Level (dBA)	Change (dBA)	Impact?	Level (dBA)	Change (dBA)	Impact?	Level (dBA)	Change (dBA)	Impact?	Level (dBA)	Change (dBA)	Impact?
6	R174	58	60	2	no	63	5	no	63	5	no	63	5	no
6	R175	58	61	3	no	63	5	no	64	6	no	64	6	no
6	R176	58	61	3	no	63	5	no	64	6	no	64	6	no
6	R177	61	64	3	no	66	5	YES	68	7	YES	67	6	YES
6	R178	61	63	2	no	66	5	YES	68	7	YES	66	5	YES
6	R179	61	63	2	no	66	5	YES	68	7	YES	66	5	YES
6	R180	57	60	3	no	63	6	no	64	7	no	63	6	no
6	R181	61	64	3	no	66	5	YES	68	7	YES	67	6	YES
6	R182	61	64	3	no	66	5	YES	69	8	YES	67	6	YES
6	R183	56	59	3	no	61	5	no	62	6	no	61	5	no
6	R184	57	60	3	no	63	6	no	64	7	no	63	6	no
6	R185	56	59	3	no	61	5	no	63	7	no	62	6	no
6	R186	56	59	3	no	62	6	no	63	7	no	62	6	no
6	R187	60	63	3	no	66	6	YES	68	8	YES	66	6	YES
6	R188	61	64	3	no	67	6	YES	69	8	YES	67	6	YES
6	R189	61	64	3	no	67	6	YES	69	8	YES	67	6	YES
6	R190	61	64	3	no	66	5	YES	69	8	YES	67	6	YES
6	R191	57	60	3	no	63	6	no	65	8	no	63	6	no
6	R192	56	59	3	no	62	6	no	63	7	no	62	6	no
6	R193	57	60	3	no	63	6	no	64	7	no	63	6	no
6	R194	57	60	3	no	62	5	no	64	7	no	62	5	no
6	R195	61	63	2	no	66	5	YES	68	7	YES	66	5	YES
6	R196	61	64	3	no	67	6	YES	69	8	YES	67	6	YES
6	R197	61	64	3	no	67	6	YES	69	8	YES	67	6	YES
6/7	R198	61	64	3	no	67	6	YES	69	8	YES	67	6	YES
6	R199	57	60	3	no	62	5	no	64	7	no	62	5	no
6/7	R200	57	60	3	no	62	5	no	64	7	no	63	6	no
6/7	R201	57	60	3	no	62	5	no	63	6	no	62	5	no
6/7	R202	62	64	2	no	67	5	YES	69	7	YES	67	5	YES
6/7	R203	57	60	3	no	63	6	no	64	7	no	63	6	no
6/7	R204	61	64	3	no	67	6	YES	69	8	YES	67	6	YES
6/7	R205	61	64	3	no	67	6	YES	69	8	YES	67	6	YES
6/7	R206	60	63	3	no	66	6	YES	68	8	YES	66	6	YES
6/7	R207	61	64	3	no	67	6	YES	69	8	YES	67	6	YES
6/7	R208	61	64	3	no	67	6	YES	68	7	YES	67	6	YES
6/7	R209	61	64	3	no	67	6	YES	69	8	YES	67	6	YES
6/7	R210	58	61	3	no	63	5	no	64	6	no	64	6	no
6/7	R211	58	61	3	no	63	5	no	64	6	no	64	6	no
6/7	R212	57	59	2	no	62	5	no	62	5	no	62	5	no
6/7	R213	57	59	2	no	62	5	no	62	5	no	62	5	no
6/7	R214	57	59	2	no	62	5	no	62	5	no	62	5	no
7	R215	58	60	2	no	63	5	no	63	5	no	63	5	no
7	R216	56	59	3	no	61	5	no	60	4	no	61	5	no
7	R217	60	63	3	no	66	6	YES	67	7	YES	66	6	YES

Figure	Receptor*	Existing	No Action			Alternative B			Alternative D			Alternative E		
		Level (dBA)	Level (dBA)	Change (dBA)	Impact?	Level (dBA)	Change (dBA)	Impact?	Level (dBA)	Change (dBA)	Impact?	Level (dBA)	Change (dBA)	Impact?
7	R218	59	61	2	no	64	5	no	64	5	no	64	5	no
7	R219	55	58	3	no	60	5	no	61	6	no	61	6	no
7	R220	56	57	1	no	57	1	no	57	1	no	57	1	no
7	R221	59	59	0	no	60	1	no	60	1	no	60	1	no
8	R222	55	58	3	no	60	5	no	60	5	no	60	5	no
8	R223	56	59	3	no	61	5	no	61	5	no	61	5	no
8	R224	56	59	3	no	61	5	no	62	6	no	62	6	no
8	R225	53	57	4	no	59	6	no	59	6	no	59	6	no
8	R226	53	57	4	no	59	6	no	59	6	no	59	6	no
8	R227	53	56	3	no	58	5	no	58	5	no	58	5	no
8	R228	52	55	3	no	57	5	no	58	6	no	58	6	no
8	R229	52	55	3	no	58	6	no	58	6	no	58	6	no
8	R230	52	56	4	no	58	6	no	58	6	no	58	6	no
8	R231	52	56	4	no	58	6	no	58	6	no	58	6	no
8	R232	52	56	4	no	58	6	no	58	6	no	58	6	no
8	R233	52	55	3	no	57	5	no	58	6	no	58	6	no
8	R234	52	55	3	no	57	5	no	58	6	no	58	6	no
8	R235	50	54	4	no	56	6	no	56	6	no	56	6	no
8	R236	49	52	3	no	55	6	no	55	6	no	55	6	no
8	R237	50	54	4	no	57	7	no	57	7	no	57	7	no
9	R238	50	53	3	no	55	5	no	55	5	no	55	5	no
9	R239	47	50	3	no	51	4	no	51	4	no	51	4	no
1	C001	67	69	2	no	69	2	no	69	2	no	69	2	no
1	C002	68	69	1	no	70	2	no	70	2	no	70	2	no
1	C003	70	71	1	YES	71	1	YES	72	2	YES	72	2	YES
1	C004	68	70	2	no	70	2	no	70	2	no	70	2	no
1	C005	70	71	1	YES	71	1	YES	71	1	YES	71	1	YES
1	C006	70	72	2	YES	72	2	YES	72	2	YES	72	2	YES
1	C007	59	61	2	no	63	4	no	63	4	no	63	4	no
1	C008	54	56	2	no	58	4	no	58	4	no	58	4	no
1	C009	52	54	2	no	55	3	no	55	3	no	55	3	no
1	C010	60	62	2	no	64	4	no	64	4	no	64	4	no
1	C011	69	71	2	YES	71	2	YES	71	2	YES	71	2	YES
1	C012	68	70	2	no	70	2	no	70	2	no	70	2	no
1	C013	70	71	1	YES	71	1	YES	71	1	YES	71	1	YES
1	C014	69	71	2	YES	71	2	YES	71	2	YES	71	2	YES
1	C015	69	70	1	no	70	1	no	70	1	no	70	1	no
1	C016	68	69	1	no	70	2	no	70	2	no	70	2	no
1	C017	58	60	2	no	61	3	no	62	4	no	62	4	no
1	C018	58	60	2	no	62	4	no	62	4	no	62	4	no
1	C019	65	66	1	no	68	3	no	68	3	no	68	3	no
1	C020	70	71	1	YES	71	1	YES	72	2	YES	72	2	YES
1	C021	70	72	2	YES	72	2	YES	72	2	YES	72	2	YES
1	C022	64	65	1	no	67	3	no	67	3	no	67	3	no

Figure	Receptor*	Existing	No Action			Alternative B			Alternative D			Alternative E		
		Level (dBA)	Level (dBA)	Change (dBA)	Impact?	Level (dBA)	Change (dBA)	Impact?	Level (dBA)	Change (dBA)	Impact?	Level (dBA)	Change (dBA)	Impact?
1	C023	64	64	0	no	66	2	no	66	2	no	66	2	no
1	C024	62	63	1	no	66	4	no	67	5	no	67	5	no
1	C025	64	65	1	no	67	3	no	68	4	no	68	4	no
1	C026	65	66	1	no	68	3	no	68	3	no	68	3	no
1	C027	63	65	2	no	68	5	no	68	5	no	68	5	no
1	C028	69	70	1	no	71	2	YES	71	2	YES	71	2	YES
1	C029	70	71	1	YES	72	2	YES	72	2	YES	72	2	YES
1	C030	64	65	1	no	68	4	no	68	4	no	68	4	no
1	C031	67	69	2	no	69	2	no	70	3	no	70	3	no
1	C032	58	59	1	no	63	5	no	63	5	no	63	5	no
1	C033	62	63	1	no	66	4	no	66	4	no	66	4	no
1	C034	63	64	1	no	67	4	no	67	4	no	67	4	no
1	C035	66	67	1	no	69	3	no	69	3	no	69	3	no
1	C036	69	71	2	YES	71	2	YES	71	2	YES	71	2	YES
1	C037	71	73	2	YES	73	2	YES	73	2	YES	73	2	YES
1	C038	70	71	1	YES	71	1	YES	71	1	YES	71	1	YES
1	C039	66	68	2	no	69	3	no	69	3	no	69	3	no
1	C040	67	68	1	no	69	2	no	69	2	no	69	2	no
1	C041	61	63	2	no	65	4	no	65	4	no	65	4	no
1	C042	67	68	1	no	69	2	no	69	2	no	69	2	no
1	C043	67	69	2	no	69	2	no	69	2	no	69	2	no
1	C044	65	66	1	no	67	2	no	67	2	no	67	2	no
1	C045	67	68	1	no	69	2	no	69	2	no	69	2	no
1	C046	66	67	1	no	68	2	no	68	2	no	68	2	no
1	C047	55	57	2	no	59	4	no	59	4	no	59	4	no
1	C048	56	58	2	no	59	3	no	59	3	no	59	3	no
1	C049	59	61	2	no	63	4	no	63	4	no	63	4	no
2	C050	63	66	3	no	69	6	no	70	7	no	70	7	no
2	C051	69	72	3	YES	73	4	YES	73	4	YES	73	4	YES
2	C052	62	63	1	no	63	1	no	63	1	no	63	1	no
3/4	C053	65	65	0	no	65	0	no	65	0	no	65	0	no
4	C054	68	68	0	no	69	1	no	69	1	no	69	1	no
4	C055	65	65	0	no	65	0	no	65	0	no	65	0	no
4	C056	64	65	1	no	67	3	no	67	3	no	67	3	no
4	C057	60	62	2	no	65	5	no	66	6	no	66	6	no
4	C058	61	63	2	no	66	5	no	67	6	no	67	6	no
4	C059	61	62	1	no	66	5	no	67	6	no	67	6	no
4	C060	62	63	1	no	66	4	no	66	4	no	66	4	no
4	C061	63	64	1	no	67	4	no	67	4	no	67	4	no
3	C062	57	58	1	no	61	4	no	59	2	no	59	2	no
3	C063	61	63	2	no	66	5	no	65	4	no	65	4	no
3	C064	66	68	2	no	71	5	YES	72	6	YES	72	6	YES
3	C065	69	71	2	YES	74	5	YES	74	5	YES	74	5	YES
4	C066	65	67	2	no	70	5	no	72	7	YES	72	7	YES

Figure	Receptor*	Existing	No Action			Alternative B			Alternative D			Alternative E		
		Level (dBA)	Level (dBA)	Change (dBA)	Impact?	Level (dBA)	Change (dBA)	Impact?	Level (dBA)	Change (dBA)	Impact?	Level (dBA)	Change (dBA)	Impact?
4	C067	66	68	2	no	71	5	YES	72	6	YES	72	6	YES
4	C068	59	61	2	no	64	5	no	63	4	no	63	4	no
4	C069	66	68	2	no	71	5	YES	72	6	YES	72	6	YES
4	C070	58	60	2	no	63	5	no	63	5	no	63	5	no
4	C071	58	60	2	no	63	5	no	62	4	no	62	4	no
4	C072	52	54	2	no	57	5	no	57	5	no	57	5	no
4	C073	52	54	2	no	57	5	no	57	5	no	57	5	no
4	C074	58	60	2	no	63	5	no	64	6	no	64	6	no
4	C075	67	69	2	no	72	5	YES	73	6	YES	73	6	YES
4	C076	63	65	2	no	68	5	no	70	7	no	70	7	no
4	C077	68	70	2	no	73	5	YES	74	6	YES	74	6	YES
4	C078	59	61	2	no	64	5	no	65	6	no	65	6	no
4	C079	57	59	2	no	63	6	no	64	7	no	64	7	no
4	C080	64	67	3	no	70	6	no	72	8	YES	72	8	YES
4	C081	59	61	2	no	64	5	no	65	6	no	65	6	no
4	C082	66	68	2	no	71	5	YES	72	6	YES	72	6	YES
4	C083	66	68	2	no	71	5	YES	72	6	YES	72	6	YES
4	C084	66	68	2	no	72	6	YES	73	7	YES	73	7	YES
4	C085	64	66	2	no	70	6	no	72	8	YES	72	8	YES
4	C086	60	62	2	no	66	6	no	68	8	no	68	8	no
4	C087	59	61	2	no	64	5	no	65	6	no	65	6	no
4	C088	57	59	2	no	63	6	no	64	7	no	64	7	no
4	C089	57	59	2	no	63	6	no	64	7	no	64	7	no
4	C090	53	55	2	no	58	5	no	59	6	no	59	6	no
4	C091	51	53	2	no	56	5	no	58	7	no	58	7	no
4	C092	51	53	2	no	56	5	no	58	7	no	58	7	no
5	C093	65	67	2	no	70	5	no	72	7	YES	72	7	YES
5	C094	67	69	2	no	72	5	YES	73	6	YES	73	6	YES
5	C095	68	70	2	no	73	5	YES	74	6	YES	74	6	YES
5	C096	68	70	2	no	73	5	YES	73	5	YES	73	5	YES
5	C097	67	69	2	no	72	5	YES	73	6	YES	73	6	YES
5	C098	63	65	2	no	69	6	no	71	8	YES	71	8	YES
5	C099	67	69	2	no	72	5	YES	73	6	YES	73	6	YES
5	C100	57	59	2	no	62	5	no	64	7	no	64	7	no
5	C101	59	61	2	no	64	5	no	66	7	no	66	7	no
5	C102	62	64	2	no	68	6	no	70	8	no	70	8	no
5	C103	61	63	2	no	67	6	no	69	8	no	69	8	no
5	C104	60	62	2	no	65	5	no	67	7	no	67	7	no
5	C105	66	68	2	no	72	6	YES	73	7	YES	73	7	YES
5	C106	60	62	2	no	65	5	no	67	7	no	67	7	no
5	C107	60	62	2	no	66	6	no	67	7	no	67	7	no
5	C108	61	63	2	no	67	6	no	69	8	no	69	8	no
5	C109	58	60	2	no	63	5	no	63	5	no	63	5	no
5	C110	55	57	2	no	60	5	no	61	6	no	61	6	no

Figure	Receptor*	Existing Level (dBA)	No Action			Alternative B			Alternative D			Alternative E			
			Level (dBA)	Change (dBA)	Impact?	Level (dBA)	Change (dBA)	Impact?	Level (dBA)	Change (dBA)	Impact?	Level (dBA)	Change (dBA)	Impact?	
5	C111	62	64	2	no	67	5	no	67	5	no	67	5	no	
5/6	C112	62	63	1	no	65	3	no	65	3	no	65	3	no	
5/6	C113	61	62	1	no	62	1	no	62	1	no	62	1	no	
5/6	C114	66	66	0	no	66	0	no	66	0	no	66	0	no	
5/6	C115	57	58	1	no	59	2	no	59	2	no	59	2	no	
5/6	C116	59	60	1	no	62	3	no	62	3	no	62	3	no	
5	C117	60	61	1	no	64	4	no	63	3	no	63	3	no	
5	C118	57	58	1	no	61	4	no	61	4	no	61	4	no	
5/6	C119	64	64	0	no	64	0	no	64	0	no	64	0	no	
5/6	C120	58	59	1	no	59	1	no	59	1	no	59	1	no	
Residential Total Impacted					14				56				56		
Commercial Total Impacted					14				29				34		

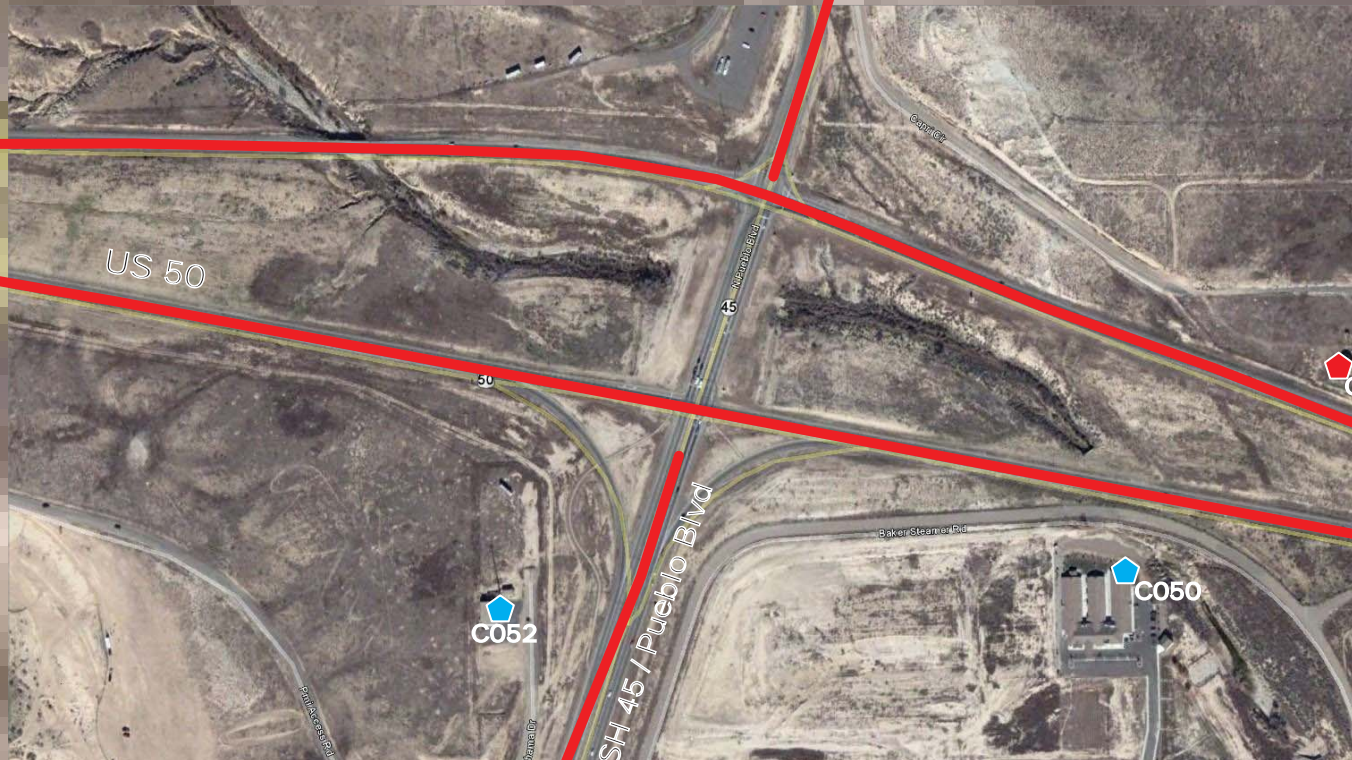


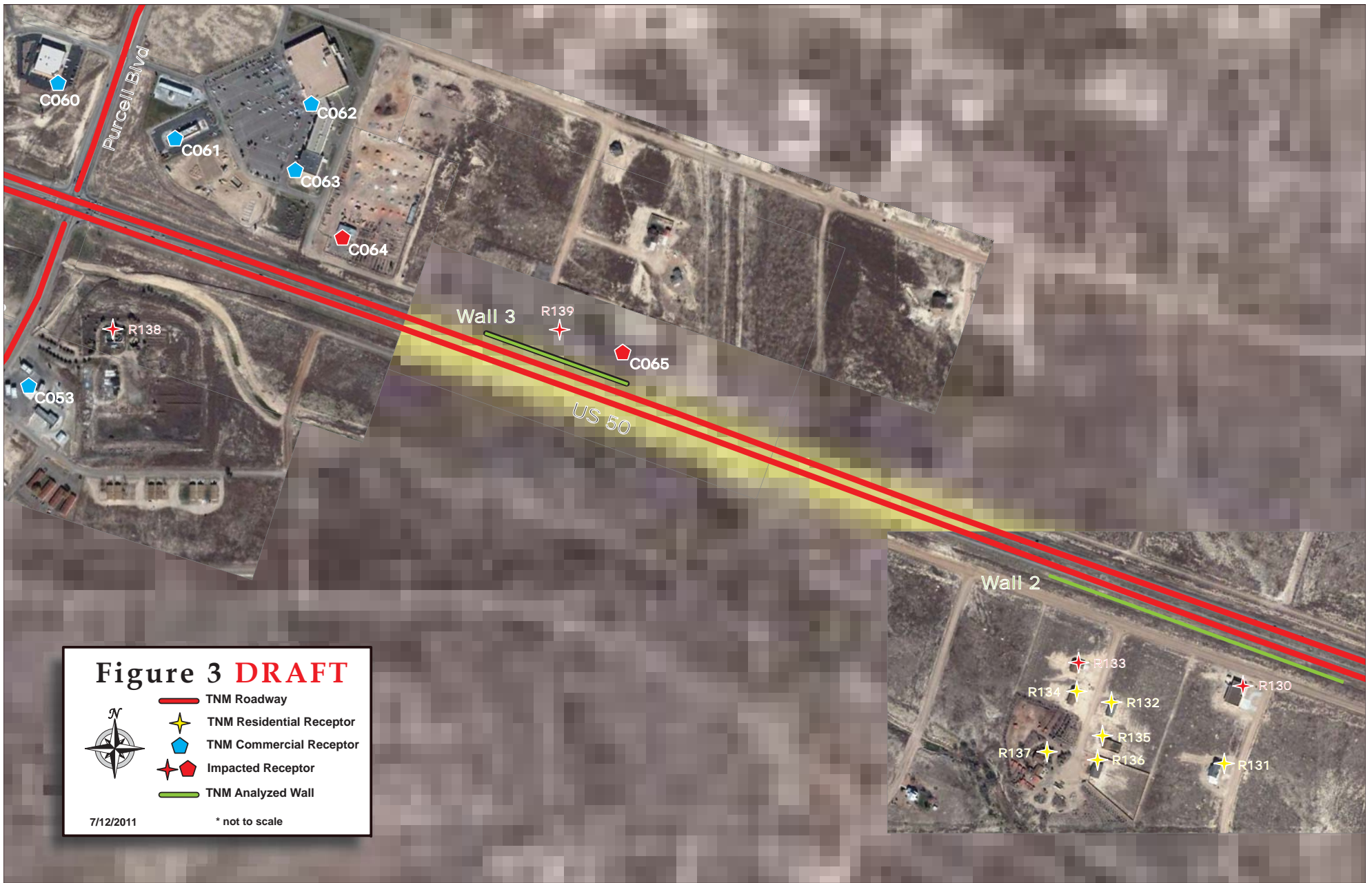
Figure 2 DRAFT



-  TNM Roadway
-  TNM Residential Receptor
-  TNM Commercial Receptor
-  Impacted Receptor
-  TNM Analyzed Wall

7/12/2011

* not to scale



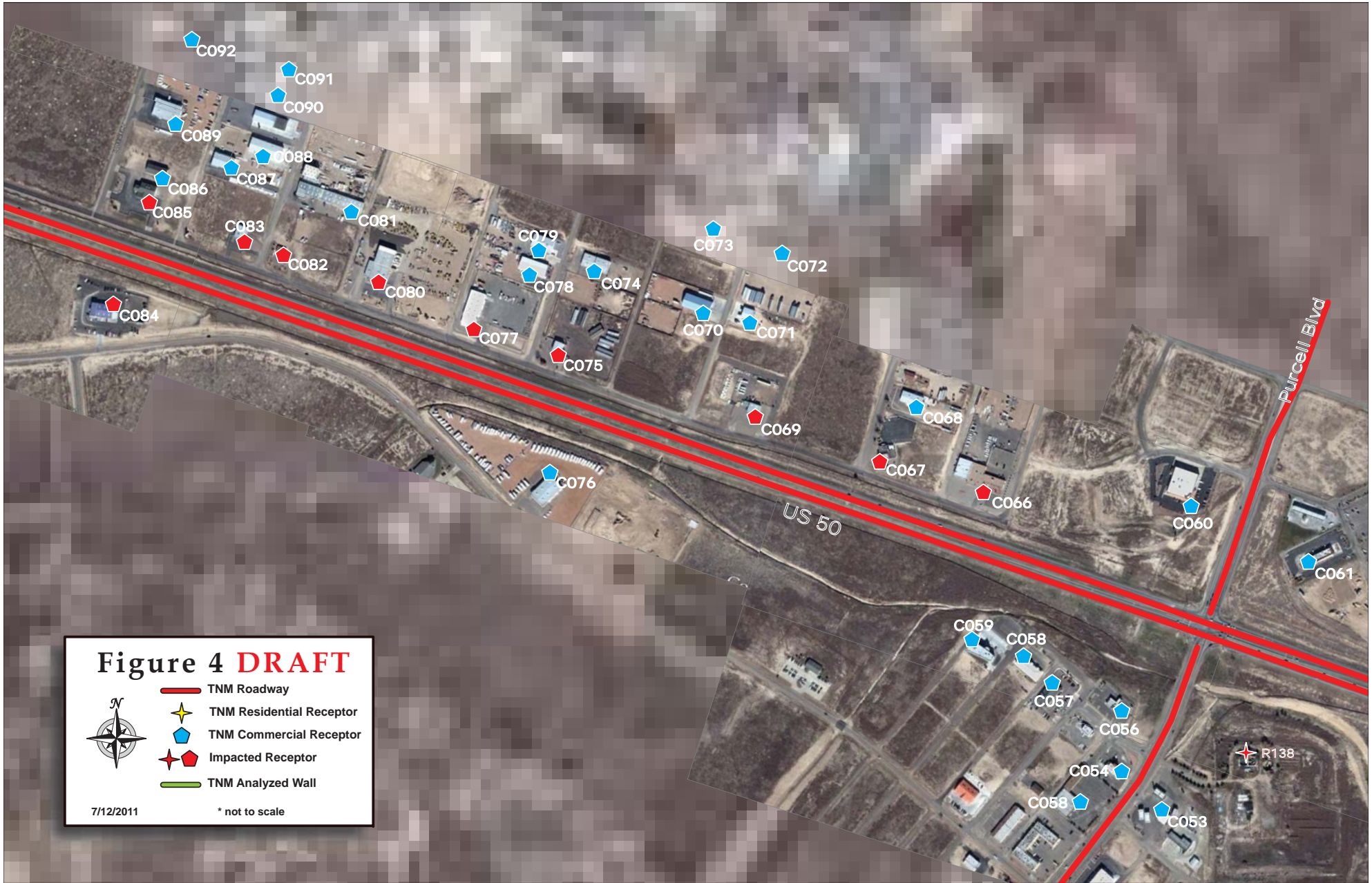


Figure 4 DRAFT

- TNM Roadway
- ★ TNM Residential Receptor
- ⬠ TNM Commercial Receptor
- ★ Impacted Receptor
- TNM Analyzed Wall

7/12/2011 * not to scale



Figure 5 DRAFT

7/12/2011 * not to scale

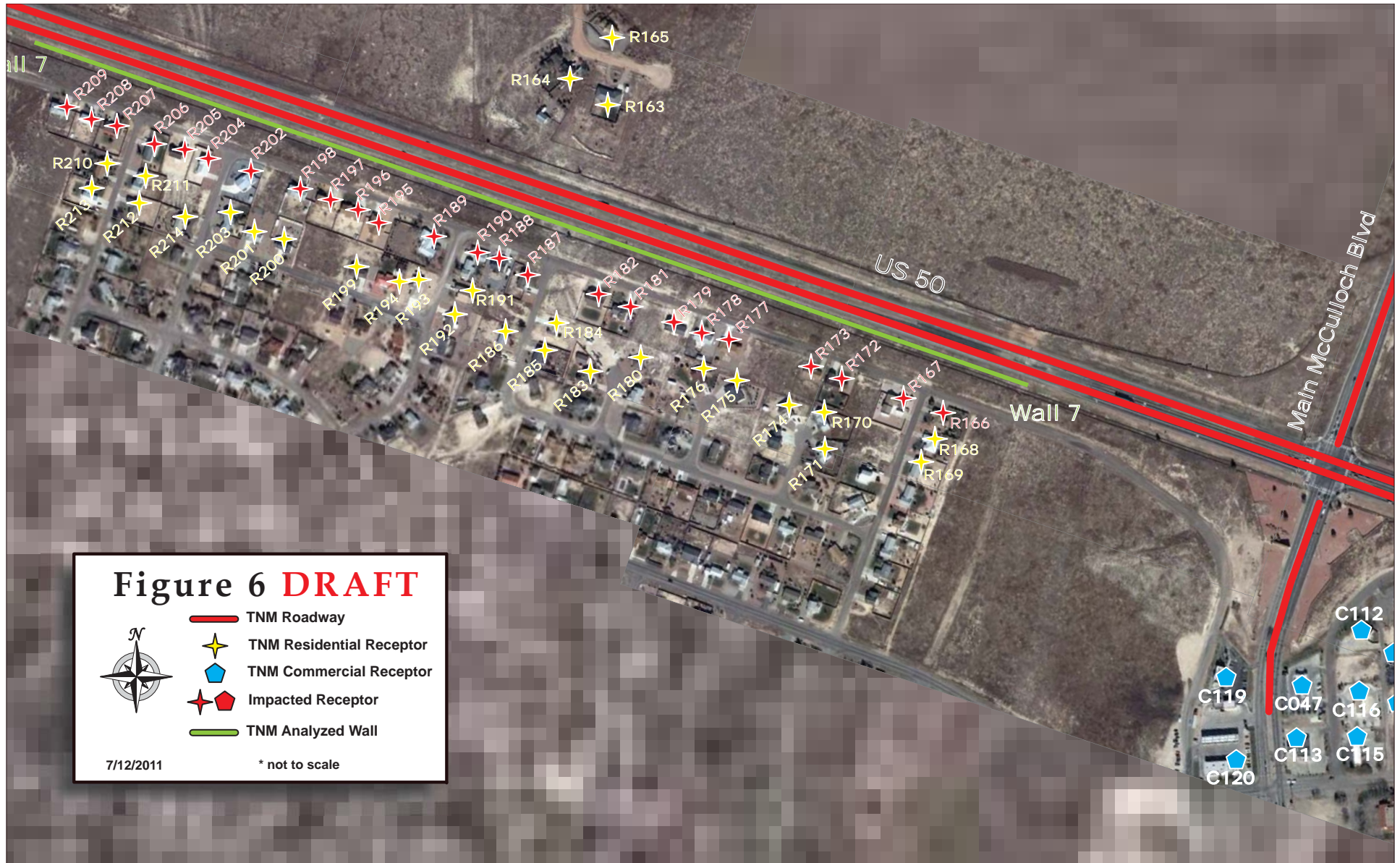




Figure 7 DRAFT



- TNM Roadway
- ★ TNM Residential Receptor
- ⬠ TNM Commercial Receptor
- ★ ⬠ Impacted Receptor
- TNM Analyzed Wall

7/12/2011

* not to scale





Figure 9 DRAFT



-  TNM Roadway
-  TNM Residential Receptor
-  TNM Commercial Receptor
-  Impacted Receptor
-  TNM Analyzed Wall

7/12/2011

* not to scale

Noise Impact Analysis Results - Interchanges

- **Baltimore Avenue Intersection**
 - The closest residences are located in the northeast quadrant of the intersection, and the closest homes are located approximately 250 feet from US50.
 - Presently, the Baltimore Avenue intersection is signalized, and that will not change under any of the proposed alternatives.

- **Wills Boulevard Intersection**
 - The closest residences are located approximately 500 feet to the north.
 - Presently, the Wills Blvd. intersection is signalized, and that will not change under any of the proposed alternatives.

- **Pueblo Boulevard Interchange**
 - Presently, there are no residences located within over 2,000 feet of this interchange.
 - The land to the north is zoned residential by Pueblo County. Land in all other directions is zoned industrial.
 - Under Alternatives B, D, and E a Diverging Diamond interchange would be built. This design has the potential to decrease noise levels by 10 dBA in the area, because the ramps and retaining wall required to bring Pueblo Blvd. over US50 would shield noise from mainline US50.

- **Purcell Boulevard Interchange**
 - The closest, and only, residential receptor is located approximately 500 feet south-southeast of the existing intersection. Land use is commercial otherwise.
 - Under Alternatives B and E, a Diamond Interchange would be constructed. Under Alternative D, a Four-Leg Continuous Flow Intersection would be constructed.
 - The Diamond is better from a noise perspective, as it routes US50 under Purcell, and thus the ramps have the possibility of shielding US50.
 - Both of these designs have similar footprints.

- **Main McCulloch Boulevard Interchange**
 - The closest residences are located in the southwest quadrant, approximately 1,400 feet west of the existing intersection.
 - In the southwest quadrant there is a large undeveloped parcel that is zoned Residential.
 - Under Alternative B and E, a Diamond Interchange would be constructed. Under Alternative D, a Two-Leg Continuous Flow Intersection would be constructed.
 - The Diamond is better from a noise perspective, as it routes US50 under Main McCulloch, and thus the ramps have the possibility of shielding US50.
 - The primary issue is to the southwest, so widening away from this direction is advantageous, as is shielding this direction from US50 using ramps.

- **West McCulloch Boulevard**
 - The closest residences are located approximately 600 feet southeast and southwest of the intersection.
 - The land both north and south of US 50 is currently zoned Agricultural, but there are many residences in the area south of the intersection.
 - Presently, there is a stop sign on West McCulloch Blvd. at US50. Under the proposed alternatives, the intersection will be signalized.

- **Swallows Road**
 - There are two isolated residences in the area. One is located in the southeast quadrant (1,200 feet away) and one in the southwest quadrant (1,000 feet away).
 - The area north of US50 is zoned agricultural and could include residential receptors in the future.
 - The area south of US 50 is zoned Agricultural and PUD/Rural Land Use and is expected to include residential receptors in the future.
 - Presently, there is a stop sign on Swallows Road at US50. Under the proposed alternatives, the intersection will be signalized.

Noise Mitigation Analysis Results

- Noise walls were analyzed at seven (7) locations
- The noise reduction of walls was predicted using TNM 2.5
- Google Earth was used to estimate elevation differences between US50 and residences
- Walls were placed along the edge of US50, and extended beyond each residence/neighborhood by approximately 200 feet
- Walls were modeled for heights ranging from 12 to 24 feet
- The following table shows the results of the cost-benefit analysis using CDOT's 2011 guidelines:

Alt.	Wall No.	Length (ft)	Height (ft)	Area (sq ft)	Max Decrease (dBA)	Cost (\$)	# Benefitted	Reduction @ Ben	CBI (/dB/rec)	Reasonable?
B	1	570	12	6,840	5	\$ 307,800	2	5	\$ 30,780	no
	2	1,780	12	21,360	9	\$ 961,200	5	7	\$ 29,127	no
	3	330	12	3,960	5	\$ 178,200	1	5	\$ 35,640	no
	4	800	12	9,600	10	\$ 432,000	5	8	\$ 11,368	no
	5	640	12	7,680	6	\$ 345,600	5	6	\$ 11,917	no
	6	710	12	8,520	6	\$ 383,400	2	6	\$ 34,855	no
	7	3,970	12	47,640	10	\$ 2,143,800	48	8	\$ 5,702	YES

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