BAKER CORRIDOR
PLANNING STUDY

APPENDIX A: Traffic Analysis

Baker Corridor Planning Study

Memorandum

Project:	Baker Corridor Planning Study
Subject:	Existing & Projected Conditions Report // Traffic Analysis
Date:	Monday, February 02, 2015
To:	Corrina Collins, MDT Project Manager
From:	Jon Schick, HDR Project Manager

Purpose:

This memo summarizes the additional traffic analyses conducted in response to Advisory Committee comments received on the Draft Existing & Projected Conditions Report. The draft report review was dated January 2015 and the comments relate to the Advisory Committee review and discussion on January 14, 2015. Additional analysis was conducted in the following areas, and results are provided below:

1. Traffic Projections
    a. Three separate growth scenarios were used to project future traffic volumes:
        i. Low: 2% growth rate for all vehicles (passenger vehicles and heavy trucks)
        ii. Medium: 5% growth rate for all vehicles
        iii. High: 5% growth rate for regular vehicles, 10% growth rate for heavy vehicles
    b. Average Daily Traffic projections were developed for 2034 based on these 3 scenarios.
2. Level of Service (LOS) Analysis
    a. Two additional intersections at MT 7 & Center Avenue and MT 7 & Gregory Road were added to the LOS analysis.
    b. LOS analyses were conducted for the 6 intersections based on the 3 growth scenarios
    c. Consideration of the at-grade railroad crossing immediately north of the US12/MT7 intersection
3. Turning Movement/Design Vehicle Analysis at US12/MT7 Intersection

Traffic Projections

Three separate traffic growth rate scenarios were used to project future traffic volumes. The three scenarios are described in 1.a. above. Table 1 presents the projected ADT values by scenario for the various traffic recorder locations.

Table 1: Projected ADT Traffic Volumes

Site ID	Corridor	Route Post	2013	2034 LOW (2% & 2%)	2034 MED (5% & 5%)	2034 HIGH (5% & 10%)
13-1-4	US 12	76.13	1230	1900	3400	4000
13-1-15	US 12	82.09	1560	2400	4300	4900
13-1-16	US 12	82.60	3790	5700	10600	11100
13-1-17	US 12	82.65	3320	5000	9200	10000
13-1-18	US 12	83.07	2350	3600	6500	7300
13-1-5	US 12	88.12	810	1200	2300	3000
13-2-2	MT 7	29.34	1030	1600	2900	3400
13-1-19	MT 7	34.32	1310	2000	3600	4200
13-1-20	MT 7	35.14	2460	3700	6900	7400
13-1-21	MT 7	35.45	3730	5700	10400	11000
13-1-22	MT 7	35.52	3580	5400	10000	10800
13-1-23	MT 7	35.76	2990	4500	8300	9100
13-1-7	MT 7	36.95	1320	2000	3700	4500
13-1-12	MT 493	1.26	270	400	800	1100

Level of Service Analysis

Two additional intersections at MT 7 & Center Avenue and MT 7 & Gregory Road were added to the LOS analysis (bold text in Table 2) based on recently obtained turning movement counts. This information (without MT 7 & Center Avenue and MT 7 & Gregory Road intersections) was previously presented in Table 7 in the draft Existing and Projected Conditions Report. Table 2 below includes the existing LOS and delay. The MT 7 & Center Avenue and MT 7 & Gregory Road intersections both operate at a LOS A.

Table 2: Existing Conditions Level of Service during Peak Hour

Intersection	Peak Hour	LOS (Delay[1])
US 12 & MT 7	5:45 – 6:45 PM	B (14.4)
US 12 & Willow Lane	5:15 – 6:15 PM	A (9.6)
US 12 & Pleisner Street	2:45 – 3:45 PM	A (9.7)
MT 7 & Shell Oil Road/S-493	7:30 – 8:30 AM	C (15.2)
MT 7 & Center Ave	**5:00 – 6:00 PM**	**A (9.7)**
MT 7 & Gregory Ave	**6:00 – 7:00 PM**	**A (8.8)**
Note: The worst-performing leg LOS is shown for each intersection. Delay is shown in seconds.		

The Peak Hour Turning Movement Counts exhibit (Figure 8 in the E&P Report) has been revised to show the existing peak turning movements at the newly added intersections, as seen below.

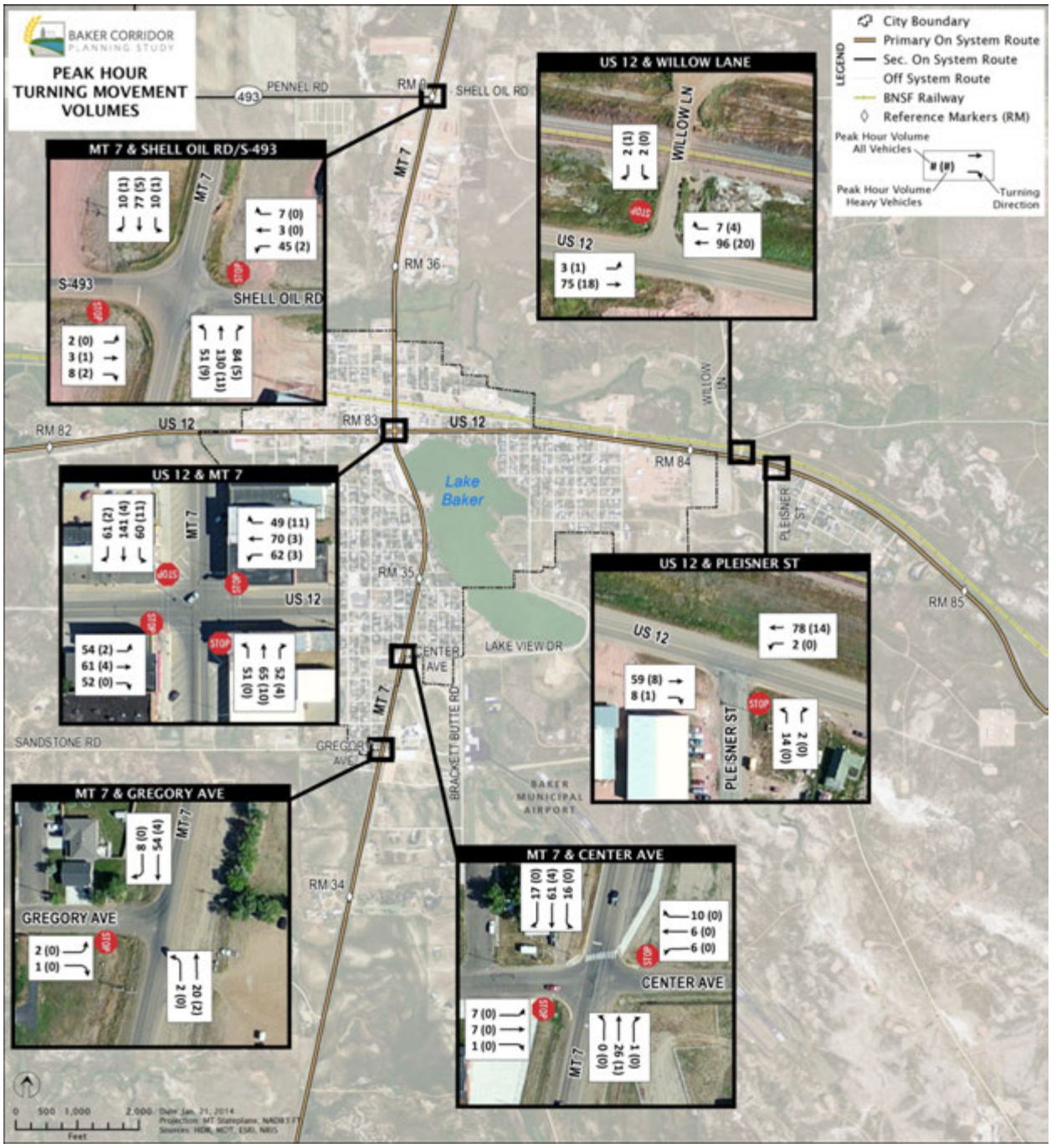


Figure 1: Peak Hour Turning Movement Counts

The Level of Service was modeled for the 6 study area intersections based on the 3 separate growth scenarios for future year 2034. Failing intersections are predicted for the US12/MT7 intersection under all three scenarios. The MT 7/Shell Oil Road intersection is predicted to fail under the medium and high growth scenarios. Preliminary results are provided in the following table.

Table 3: Level of Service Analysis for the Low, Medium, and High Growth Scenarios

Scenario Year	Yearly Growth %	Yearly HV Growth %	US 12 & MT 7		US 12 & Willow Lane		US 12 & Pleisner		Shell Oil Road & MT 7		Center Ave & MT 7		Gregory Ave & MT 7	
			LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
2014	-	-	B	14.4	A	9.6	A	9.7	C	15.2	A	9.7	A	8.8
2034	2%	2%	F	71.3	B	10.1	B	10.4	D	28.2	B	10.3	A	9.1
2034	5%	5%	F	>100	B	11.9	B	12.7	F	>100	B	12.4	A	9.6
2034	5%	10%	F	>100	B	14.1	B	14.4	F	>100	B	12.7	A	9.9

Turning Movement/Design Vehicle Analysis

The intersection of US 12 and MT 7 was analyzed to determine whether the existing geometric design layout is sufficient to accommodate proper turning movements for larger design vehicles. Three design templates were used in analyzing the intersection: a WB-40, WB-50 and WB-67. A WB-40 is the smallest truck available (typically used for local delivery for restaurants and small retail) and has a 40’ wheelbase (WB) as measured from the foremost axle to the rearmost axle. A WB-50 vehicle is an intermediate-sized semitrailer with a 50’ wheelbase (WB). A WB-67 is a standard-sized semitrailer with a 67’ wheelbase.

The analysis determined that a WB-40 can maneuver both right and left turns without conflict. For the left-turn movement of a WB-40 from US12 onto MT 7 (see Figure 3), the inside wheel path approaches the stopped vehicle, but can clear the turn without conflict. Because the intersection is a 4-way stop, the turning vehicles should have some “wiggle room” in order to maintain clearance from the stopped vehicle.

The existing layout of the US 12/MT 7 intersection is insufficient to accommodate left-turn movements of a WB-50 design vehicle. For turning movements from MT 7 onto US 12, the wheel path for the NB to WB left turn conflicts with the stopped vehicle (Figure 4). For both left-turn movements from US 12 onto MT 7, the inside wheel path conflicts with a stopped vehicle on MT 7 and requires tracking into the adjacent angled parking (Figure 5). All right-turn movements for the WB-50 can be made without conflict (Figures 6 and 7).

The WB-67 design vehicle encountered conflicts at all four right-turn movements. The inside wheel path for the right-turn movement is extremely close to the existing curb return and crosses into two or three angled parking spaces. Because the shorter WB-50 could not make left-turn movements, it was unnecessary to test for the WB-67. It appears that the angled parking on the northwest and southeast corner of the intersection on MT 7 have been striped out with pavement markings to accommodate right turning vehicles.

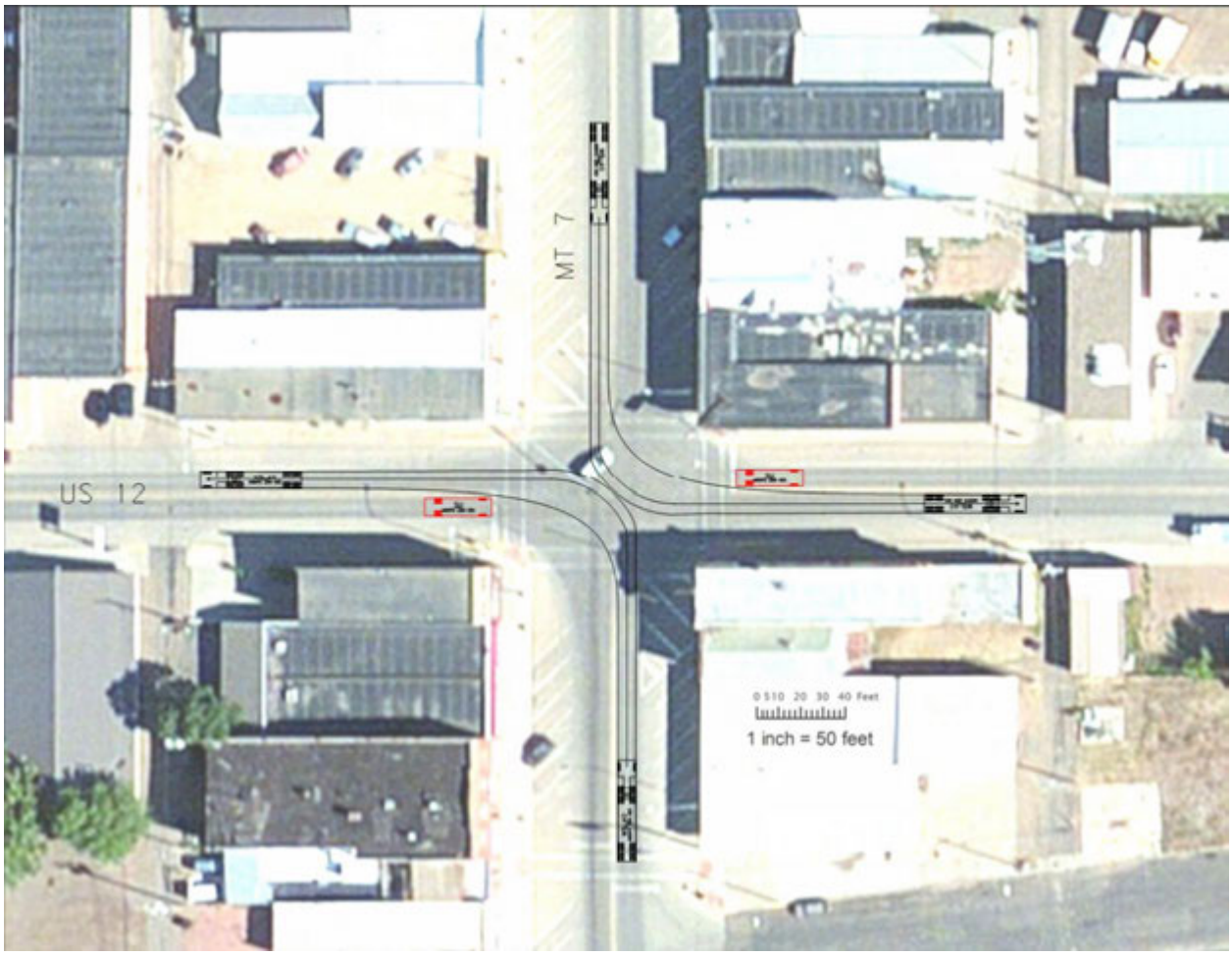


Figure 2: WB-40 left-turn movement from MT 7 onto US 12. No conflict encountered.

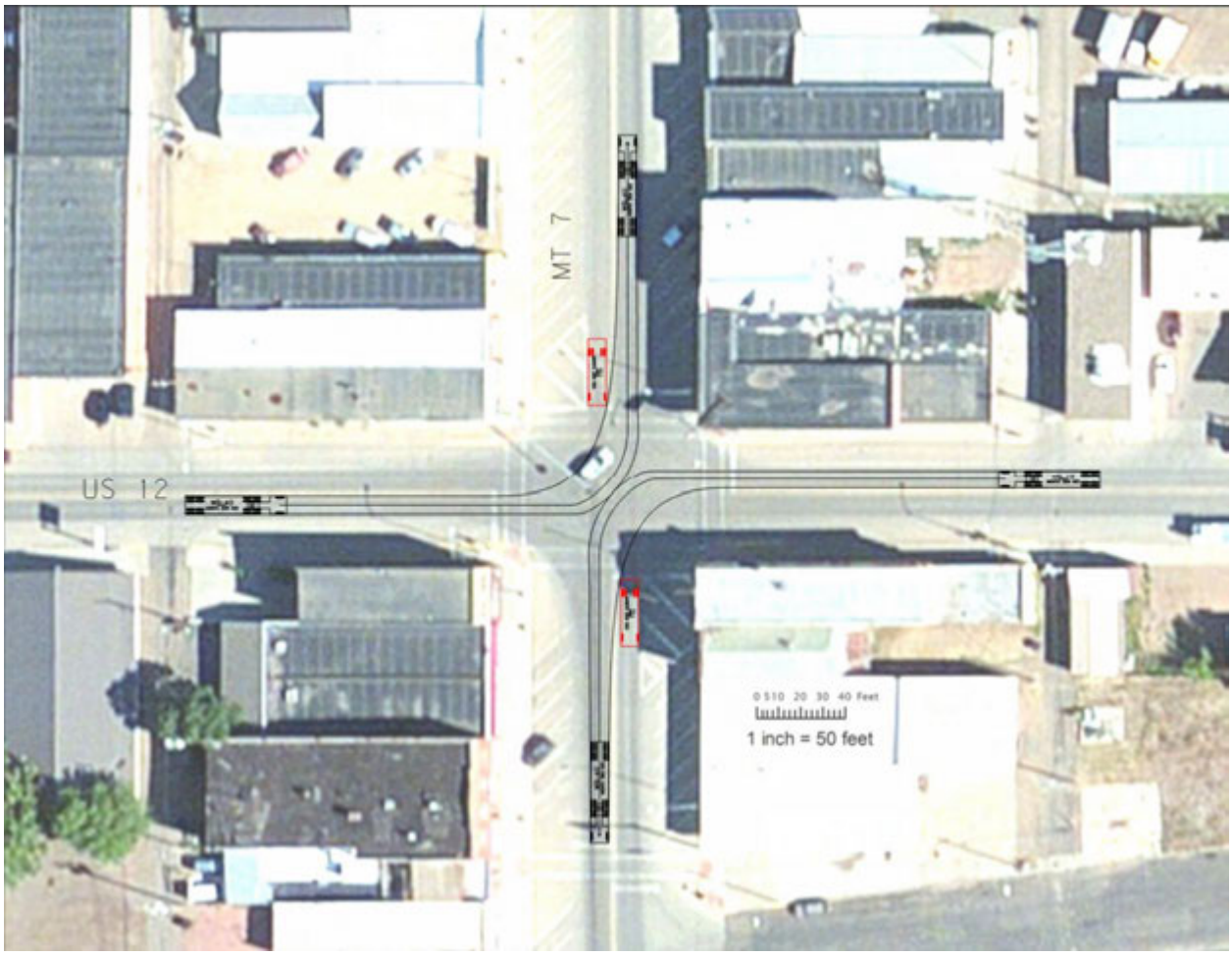


Figure 3: WB-40 left-turn movement from US12 onto MT 7. No conflict encountered. This inside wheel path approaches the stopped vehicle, but can clear the turn without conflict.

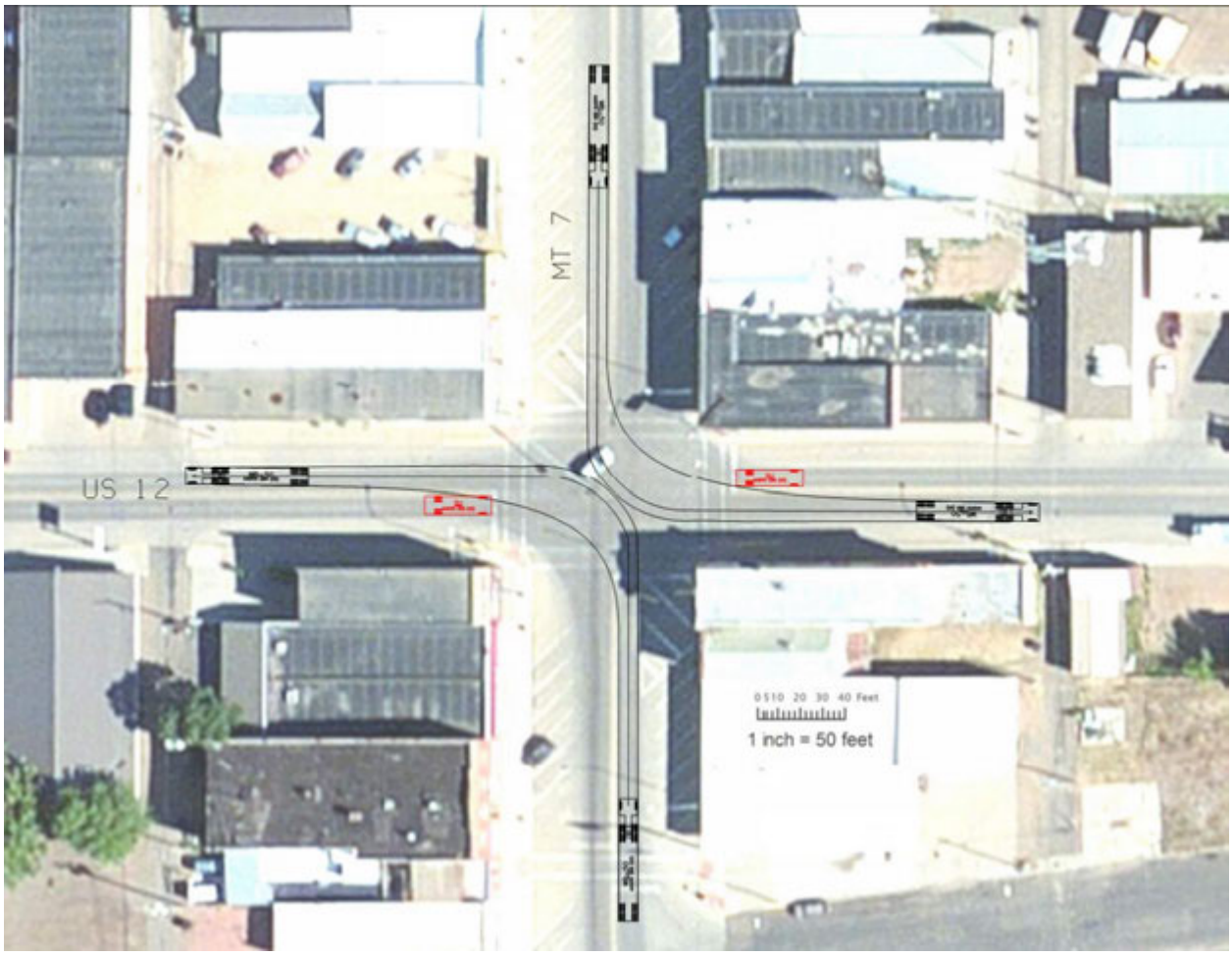


Figure 4: WB-50 left-turn movement from MT 7 onto US12. Conflict encountered: the wheel path for the NB to WB left turn conflicts with the stopped vehicle.

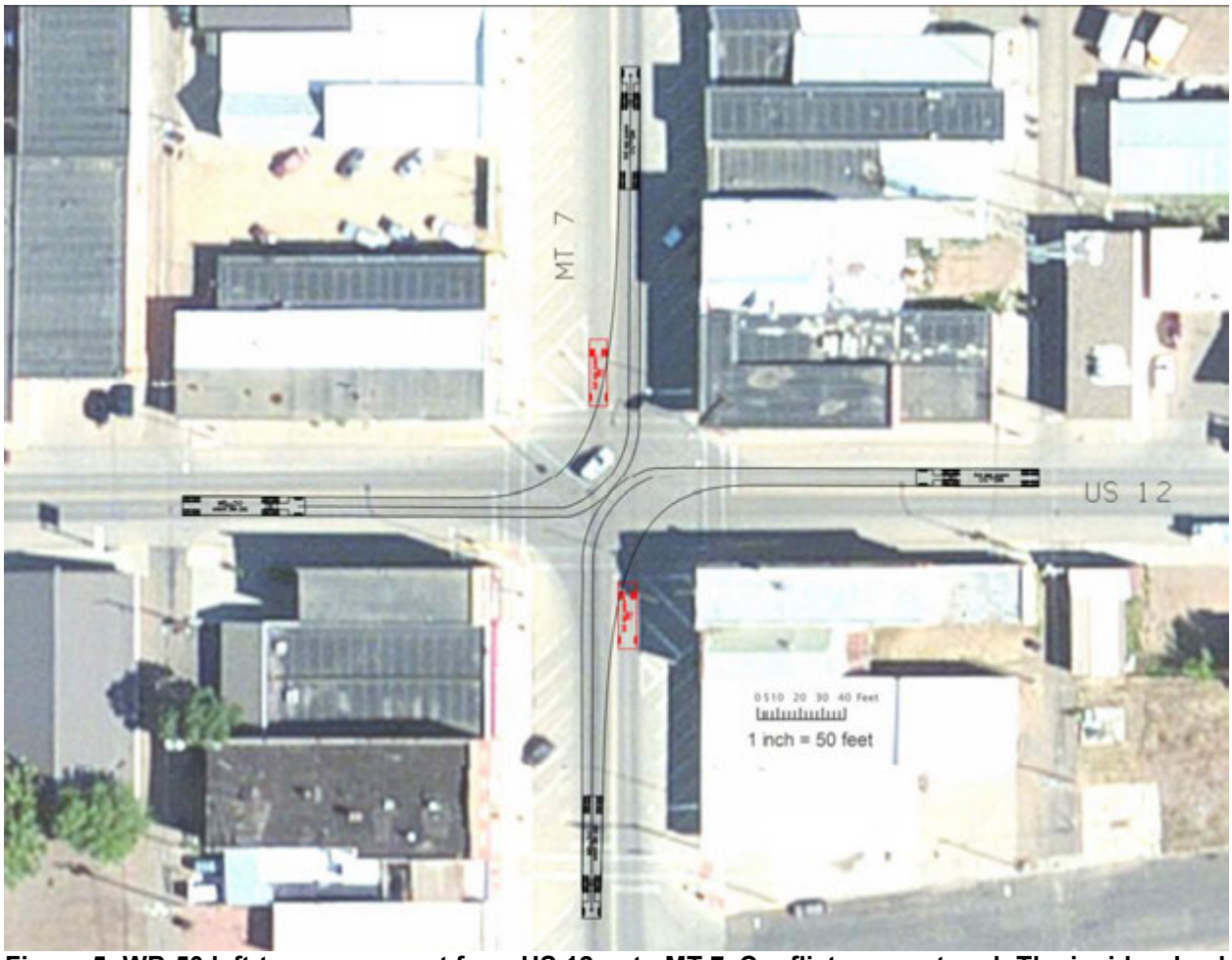


Figure 5: WB-50 left-turn movement from US 12 onto MT 7. Conflict encountered: The inside wheel path conflicts with a stopped vehicle on MT 7 and requires tracking into the adjacent angled parking.

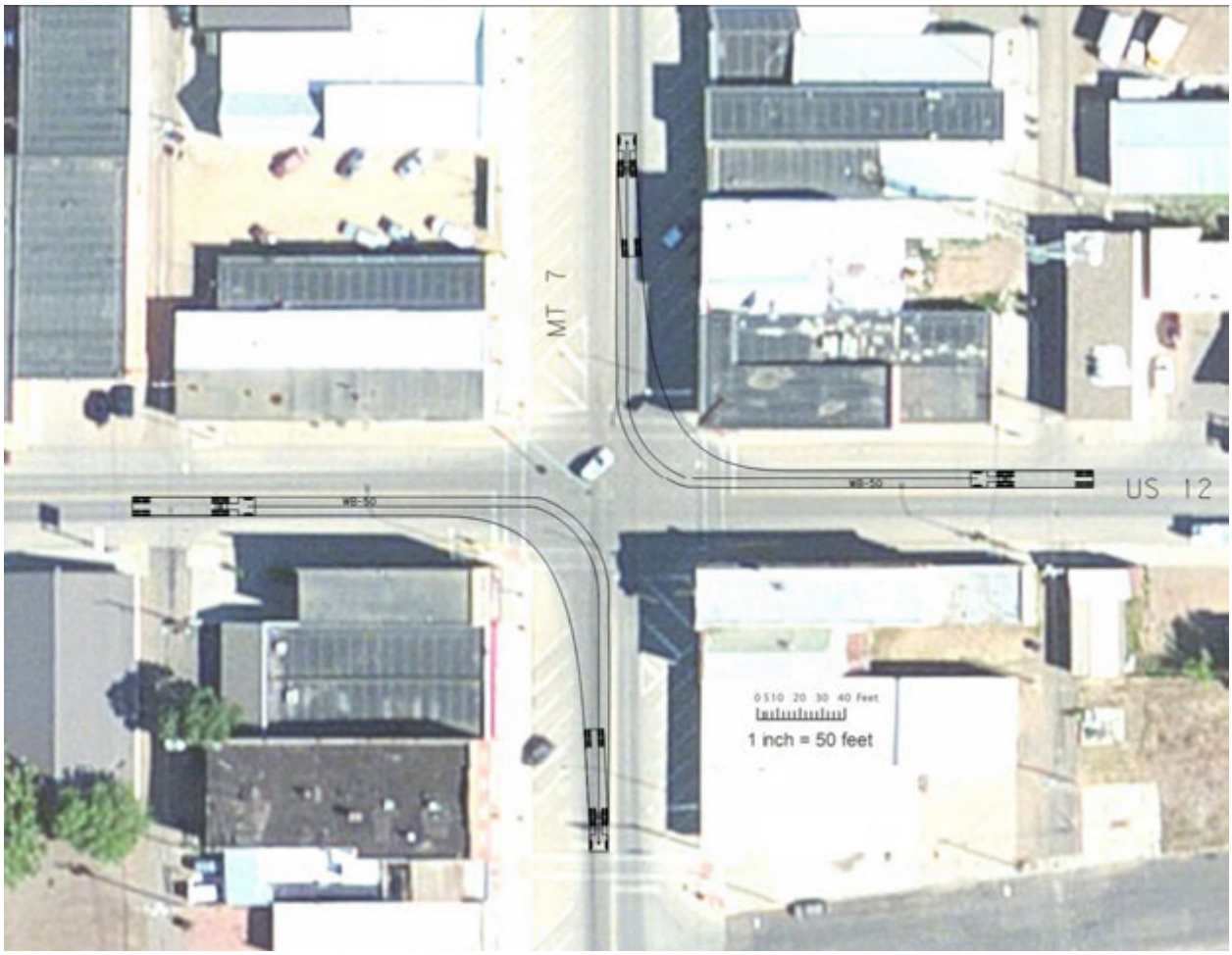


Figure 6: WB-50 right-turn movement from US 12 onto MT 7. No conflicts encountered.

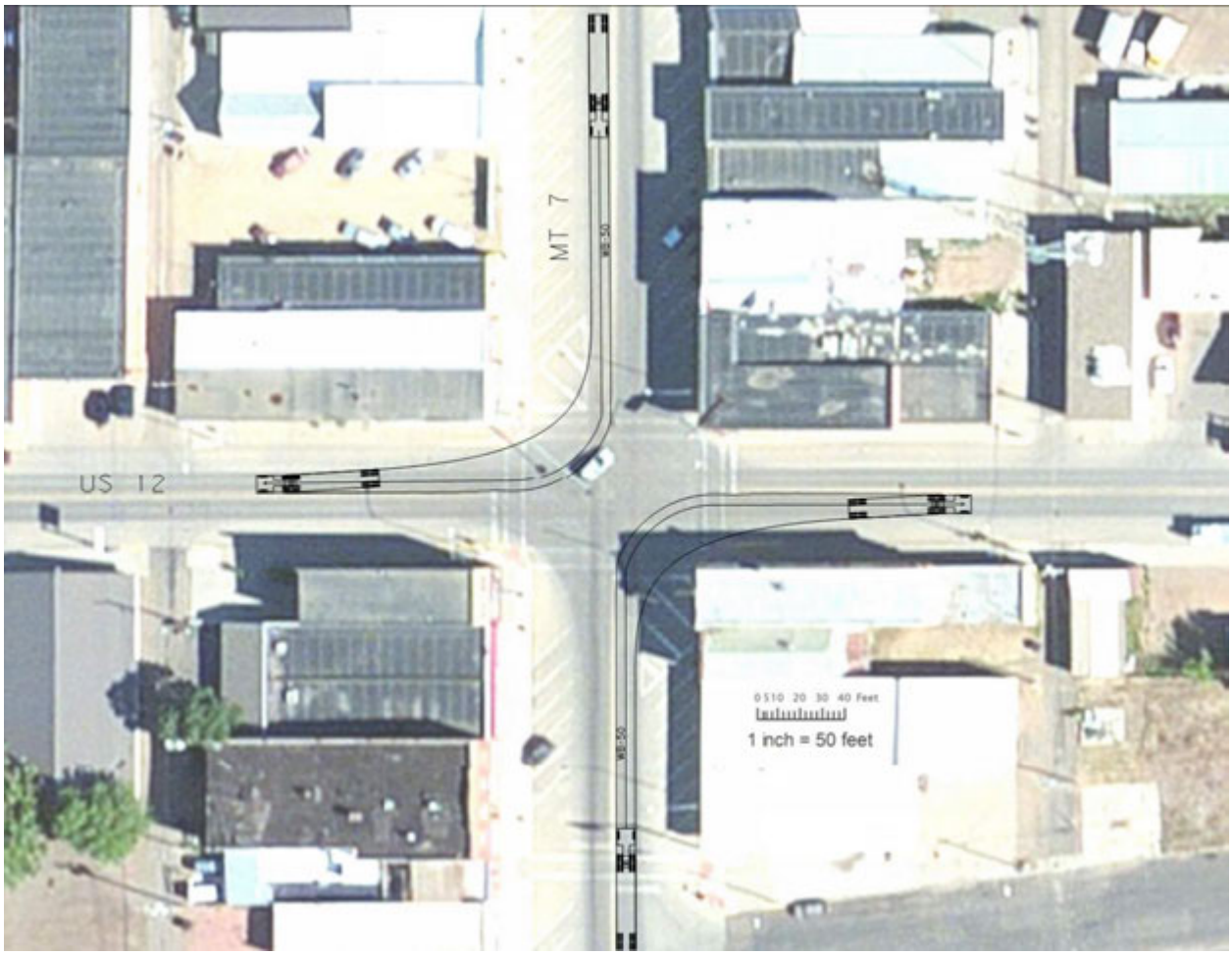


Figure 7: WB-50 right-turn movement from MT 7 onto US 12. No conflicts encountered.

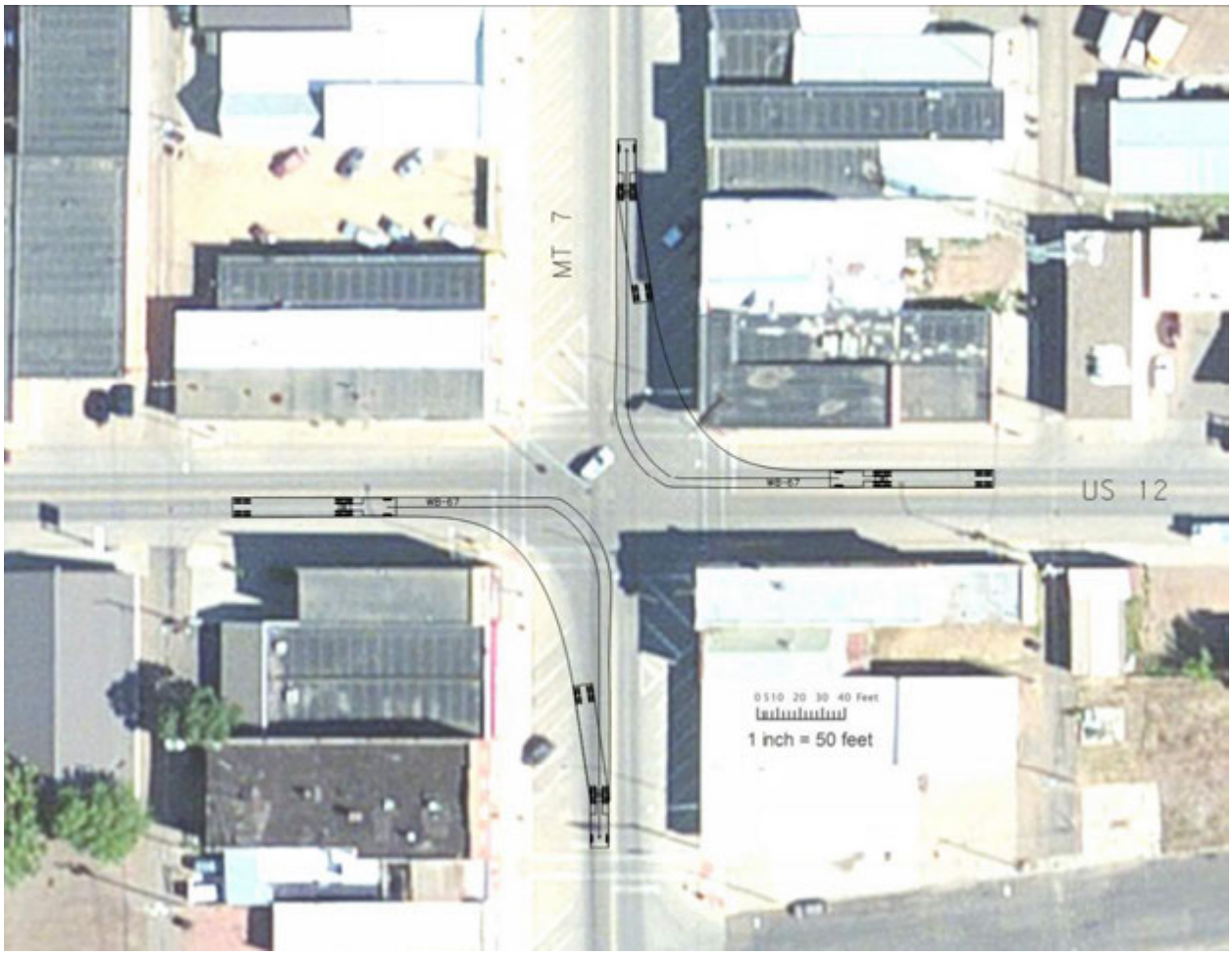


Figure 8: WB-67 right-turn movement from US 12 onto MT 7. Conflict encountered: the inside wheel path of for the right-turn movement is extremely close to the existing curb return and crosses into two or three angled parking spaces on MT 7.

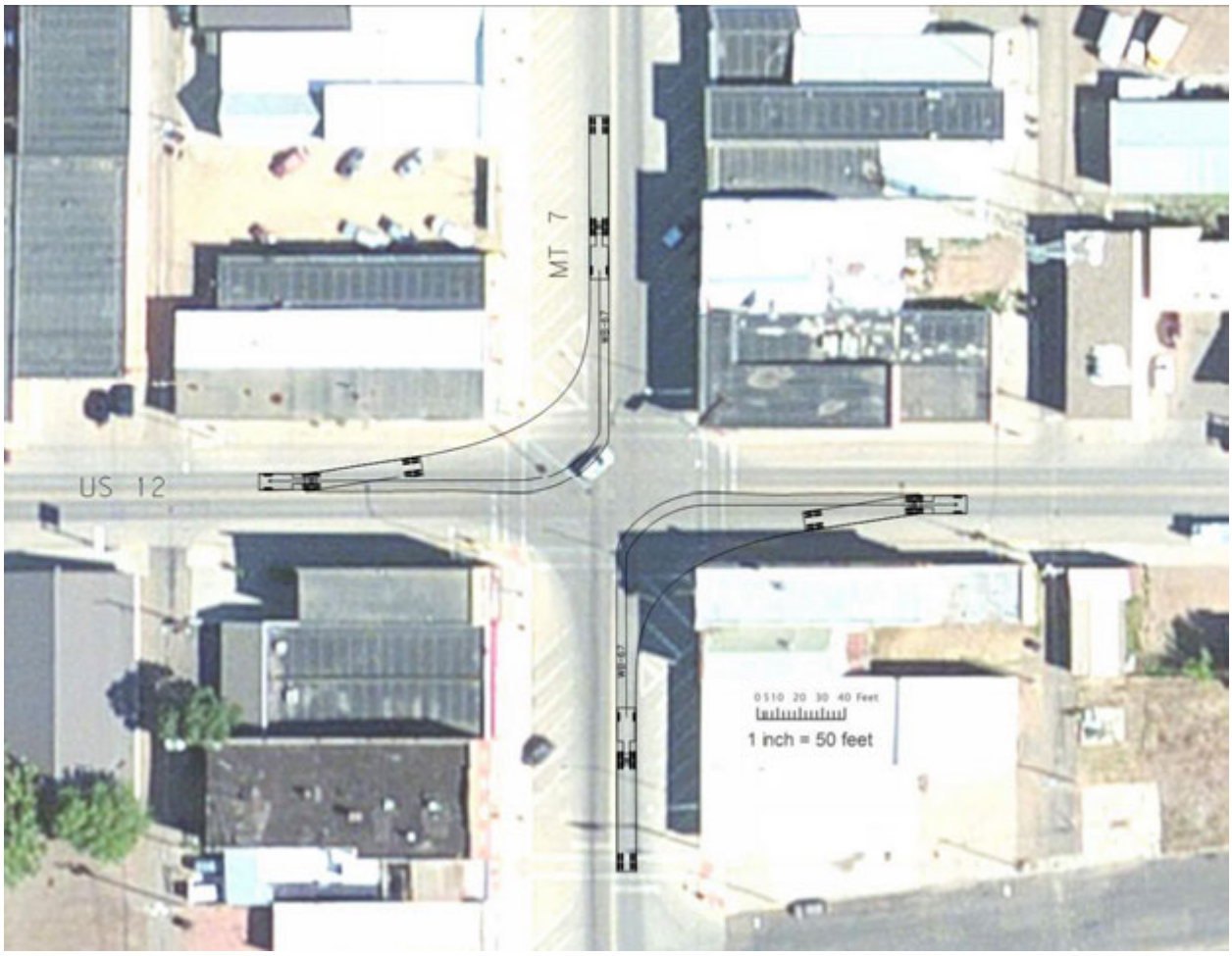


Figure 9: WB-67 right-turn movement from MT 7 onto US 12. Conflict encountered: the inside wheel path of for the right-turn movement is extremely close to the existing curb return and crosses into adjacent parallel parking spaces on US 12.

Intersection	
Intersection Delay, s/veh	12.6
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	54	61	52	0	62	70	49	0	51	65	52
Peak Hour Factor	0.92	0.64	0.76	0.87	0.92	0.86	0.88	0.88	0.92	0.75	0.86	0.72
Heavy Vehicles, %	2	4	7	0	2	5	4	22	2	0	15	8
Mvmt Flow	0	84	80	60	0	72	80	56	0	68	76	72
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	12	11.8	11.5
HCM LOS	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	30%	32%	34%	23%
Vol Thru, %	39%	37%	39%	54%
Vol Right, %	31%	31%	27%	23%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	168	167	181	262
LT Vol	51	54	62	60
Through Vol	65	61	70	141
RT Vol	52	52	49	61
Lane Flow Rate	216	224	207	311
Geometry Grp	1	1	1	1
Degree of Util (X)	0.336	0.358	0.335	0.497
Departure Headway (Hd)	5.597	5.744	5.819	5.745
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	639	622	614	623
Service Time	3.67	3.817	3.894	3.811
HCM Lane V/C Ratio	0.338	0.36	0.337	0.499
HCM Control Delay	11.5	12	11.8	14.4
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	1.5	1.6	1.5	2.8

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	60	141	61
Peak Hour Factor	0.92	0.94	0.86	0.73
Heavy Vehicles, %	2	18	3	3
Mvmt Flow	0	64	164	84
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	14.4
HCM LOS	B

Lane

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	3	75	96	7	2	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	38	85	86	35	50	25
Heavy Vehicles, %	33	24	21	57	0	50
Mvmt Flow	8	88	112	20	4	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	132	0	-	0	226	122
Stage 1	-	-	-	-	122	-
Stage 2	-	-	-	-	104	-
Critical Hdwy	4.43	-	-	-	6.4	6.7
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.497	-	-	-	3.5	3.75
Pot Cap-1 Maneuver	1283	-	-	-	767	815
Stage 1	-	-	-	-	908	-
Stage 2	-	-	-	-	925	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1283	-	-	-	762	815
Mov Cap-2 Maneuver	-	-	-	-	762	-
Stage 1	-	-	-	-	908	-
Stage 2	-	-	-	-	919	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	9.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1283	-	-	-	797
HCM Lane V/C Ratio	0.006	-	-	-	0.015
HCM Control Delay (s)	7.8	0	-	-	9.6
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	59	8	2	78	14	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	67	50	81	50	50
Heavy Vehicles, %	14	13	10	18	10	10
Mvmt Flow	76	12	4	96	28	4

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	88	0	186	82
Stage 1	-	-	-	-	82	-
Stage 2	-	-	-	-	104	-
Critical Hdwy	-	-	4.2	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	-	-	2.29	-	3.59	3.39
Pot Cap-1 Maneuver	-	-	1459	-	785	956
Stage 1	-	-	-	-	921	-
Stage 2	-	-	-	-	901	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1459	-	783	956
Mov Cap-2 Maneuver	-	-	-	-	783	-
Stage 1	-	-	-	-	921	-
Stage 2	-	-	-	-	898	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	9.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	801	-	-	1459	-
HCM Lane V/C Ratio	0.04	-	-	0.003	-
HCM Control Delay (s)	9.7	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	2	3	8	45	3	7	51	130	84	10	77	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	50	25	50	75	38	44	80	74	55	50	77	50
Heavy Vehicles, %	10	33	25	10	10	10	18	10	6	10	6	10
Mvmt Flow	4	12	16	60	8	16	64	176	153	20	100	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	541	606	110	544	540	252	120	0	0	328	0	0
Stage 1	150	150	-	380	380	-	-	-	-	-	-	-
Stage 2	391	456	-	164	160	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.83	6.45	7.2	6.6	6.3	4.28	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.83	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.83	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.297	3.525	3.59	4.09	3.39	2.362	-	-	2.29	-	-
Pot Cap-1 Maneuver	440	373	885	438	438	768	1374	-	-	1188	-	-
Stage 1	834	718	-	626	600	-	-	-	-	-	-	-
Stage 2	618	519	-	820	751	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	400	345	885	395	405	768	1374	-	-	1188	-	-
Mov Cap-2 Maneuver	400	345	-	395	405	-	-	-	-	-	-	-
Stage 1	786	705	-	590	565	-	-	-	-	-	-	-
Stage 2	562	489	-	777	737	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.5	15.2	1.3	1.2
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1374	-	-	509	436	1188	-	-
HCM Lane V/C Ratio	0.046	-	-	0.063	0.192	0.017	-	-
HCM Control Delay (s)	7.7	0	-	12.5	15.2	8.1	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.7	0.1	-	-

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	7	7	1	6	6	10	1	26	1	16	61	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	1	1	1	1	1	1	1	4	1	1	7	1
Mvmt Flow	8	8	1	7	7	11	1	28	1	17	66	18

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	150	142	76	146	151	29	85	0	0	29	0	0
Stage 1	110	110	-	31	31	-	-	-	-	-	-	-
Stage 2	40	32	-	115	120	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	820	751	988	825	742	1049	1518	-	-	1591	-	-
Stage 1	898	806	-	988	871	-	-	-	-	-	-	-
Stage 2	977	870	-	892	798	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	799	742	988	810	733	1049	1518	-	-	1591	-	-
Mov Cap-2 Maneuver	799	742	-	810	733	-	-	-	-	-	-	-
Stage 1	897	797	-	987	870	-	-	-	-	-	-	-
Stage 2	959	869	-	873	789	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.7	9.2	0.3	1.2
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1518	-	-	781	876	1591	-	-
HCM Lane V/C Ratio	0.001	-	-	0.021	0.027	0.011	-	-
HCM Control Delay (s)	7.4	0	-	9.7	9.2	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	2	1	2	20	54	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	1	1	1	10	7	1
Mvmt Flow	2	1	2	22	59	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	89	63	67	0	-	0
Stage 1	63	-	-	-	-	-
Stage 2	26	-	-	-	-	-
Critical Hdwy	6.41	6.21	4.11	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.209	-	-	-
Pot Cap-1 Maneuver	914	1004	1541	-	-	-
Stage 1	962	-	-	-	-	-
Stage 2	999	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	913	1004	1541	-	-	-
Mov Cap-2 Maneuver	913	-	-	-	-	-
Stage 1	962	-	-	-	-	-
Stage 2	998	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.8	0.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1541	-	941	-	-
HCM Lane V/C Ratio	0.001	-	0.003	-	-
HCM Control Delay (s)	7.3	0	8.8	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Intersection Delay, s/veh	43.8
Intersection LOS	E

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	80	91	77	0	92	104	73	0	76	97	77
Peak Hour Factor	0.92	0.64	0.76	0.87	0.92	0.86	0.88	0.88	0.92	0.75	0.86	0.72
Heavy Vehicles, %	2	4	7	0	2	5	4	22	2	0	15	8
Mvmt Flow	0	125	120	89	0	107	118	83	0	101	113	107
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	32.6	29.5	29.6
HCM LOS	D	D	D

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	30%	32%	34%	23%
Vol Thru, %	39%	37%	39%	54%
Vol Right, %	31%	31%	27%	23%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	250	248	269	390
LT Vol	76	80	92	89
Through Vol	97	91	104	210
RT Vol	77	77	73	91
Lane Flow Rate	321	333	308	464
Geometry Grp	1	1	1	1
Degree of Util (X)	0.723	0.758	0.713	1
Departure Headway (Hd)	8.103	8.188	8.332	8.069
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	446	443	438	454
Service Time	6.134	6.193	6.337	6.069
HCM Lane V/C Ratio	0.72	0.752	0.703	1.022
HCM Control Delay	29.6	32.6	29.5	71.3
HCM Lane LOS	D	D	D	F
HCM 95th-tile Q	5.7	6.4	5.5	12.9

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	89	210	91
Peak Hour Factor	0.92	0.94	0.86	0.73
Heavy Vehicles, %	2	18	3	3
Mvmt Flow	0	95	244	125
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	71.3
HCM LOS	F

Lane

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	4	111	143	10	3	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	38	85	86	35	50	25
Heavy Vehicles, %	33	24	21	57	0	50
Mvmt Flow	11	131	166	29	6	12

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	195	0	-	0	333	181
Stage 1	-	-	-	-	181	-
Stage 2	-	-	-	-	152	-
Critical Hdwy	4.43	-	-	-	6.4	6.7
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.497	-	-	-	3.5	3.75
Pot Cap-1 Maneuver	1213	-	-	-	666	752
Stage 1	-	-	-	-	855	-
Stage 2	-	-	-	-	881	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1213	-	-	-	659	752
Mov Cap-2 Maneuver	-	-	-	-	659	-
Stage 1	-	-	-	-	855	-
Stage 2	-	-	-	-	872	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	10.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1213	-	-	-	718
HCM Lane V/C Ratio	0.009	-	-	-	0.025
HCM Control Delay (s)	8	0	-	-	10.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	88	12	3	116	21	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	67	50	81	50	50
Heavy Vehicles, %	14	13	10	18	10	10
Mvmt Flow	113	18	6	143	42	6

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	131	0	277	122
Stage 1	-	-	-	-	122	-
Stage 2	-	-	-	-	155	-
Critical Hdwy	-	-	4.2	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	-	-	2.29	-	3.59	3.39
Pot Cap-1 Maneuver	-	-	1406	-	696	908
Stage 1	-	-	-	-	884	-
Stage 2	-	-	-	-	854	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1406	-	693	908
Mov Cap-2 Maneuver	-	-	-	-	693	-
Stage 1	-	-	-	-	884	-
Stage 2	-	-	-	-	850	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	10.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	714	-	-	1406	-
HCM Lane V/C Ratio	0.067	-	-	0.004	-
HCM Control Delay (s)	10.4	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	3	4	12	67	4	10	76	193	125	15	114	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	50	25	50	75	38	44	80	74	55	50	77	50
Heavy Vehicles, %	10	33	25	10	10	10	18	10	6	10	6	10
Mvmt Flow	6	16	24	89	11	23	95	261	227	30	148	30

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	804	901	163	807	802	374	178	0	0	488	0	0
Stage 1	223	223	-	564	564	-	-	-	-	-	-	-
Stage 2	581	678	-	243	238	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.83	6.45	7.2	6.6	6.3	4.28	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.83	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.83	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.297	3.525	3.59	4.09	3.39	2.362	-	-	2.29	-	-
Pot Cap-1 Maneuver	292	247	825	291	308	655	1307	-	-	1035	-	-
Stage 1	762	665	-	496	496	-	-	-	-	-	-	-
Stage 2	486	408	-	743	694	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	246	214	825	240	267	655	1307	-	-	1035	-	-
Mov Cap-2 Maneuver	246	214	-	240	267	-	-	-	-	-	-	-
Stage 1	684	644	-	445	445	-	-	-	-	-	-	-
Stage 2	411	366	-	681	672	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.5	28.2	1.3	1.2
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1307	-	-	359	275	1035	-	-
HCM Lane V/C Ratio	0.073	-	-	0.128	0.446	0.029	-	-
HCM Control Delay (s)	8	0	-	16.5	28.2	8.6	0	-
HCM Lane LOS	A	A	-	C	D	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.4	2.2	0.1	-	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	10	10	1	9	9	15	1	39	1	24	91	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	1	1	1	1	1	1	1	3	1	1	7	1
Mvmt Flow	11	11	1	10	10	16	1	42	1	26	99	27

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	223	211	113	216	223	43	126	0	0	43	0	0
Stage 1	165	165	-	45	45	-	-	-	-	-	-	-
Stage 2	58	46	-	171	178	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	735	688	943	743	678	1030	1467	-	-	1572	-	-
Stage 1	839	764	-	971	859	-	-	-	-	-	-	-
Stage 2	956	859	-	833	754	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	705	675	943	722	665	1030	1467	-	-	1572	-	-
Mov Cap-2 Maneuver	705	675	-	722	665	-	-	-	-	-	-	-
Stage 1	838	750	-	970	858	-	-	-	-	-	-	-
Stage 2	929	858	-	805	740	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.3	9.6	0.2	1.3
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1467	-	-	699	814	1572	-	-
HCM Lane V/C Ratio	0.001	-	-	0.033	0.044	0.017	-	-
HCM Control Delay (s)	7.5	0	-	10.3	9.6	7.3	0	-
HCM Lane LOS	A	A	-	B	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	3	1	3	30	80	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	1	1	1	10	8	1
Mvmt Flow	3	1	3	33	87	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	132	93	100	0	-	0
Stage 1	93	-	-	-	-	-
Stage 2	39	-	-	-	-	-
Critical Hdwy	6.41	6.21	4.11	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.209	-	-	-
Pot Cap-1 Maneuver	864	967	1499	-	-	-
Stage 1	933	-	-	-	-	-
Stage 2	986	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	862	967	1499	-	-	-
Mov Cap-2 Maneuver	862	-	-	-	-	-
Stage 1	933	-	-	-	-	-
Stage 2	984	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.1	0.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1499	-	886	-	-
HCM Lane V/C Ratio	0.002	-	0.005	-	-
HCM Control Delay (s)	7.4	0	9.1	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	80	91	77	92	104	73	76	97	77	89	210	91
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.98	0.99		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	0.88	1.00	1.00	0.88	1.00	1.00	0.88	1.00	1.00	0.88
Adj Sat Flow, veh/h/ln	1827	1827	1900	1810	1705	1900	1900	1703	1900	1610	1845	1900
Adj Flow Rate, veh/h	125	120	89	107	118	83	101	113	107	95	244	125
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.64	0.76	0.87	0.86	0.88	0.88	0.75	0.86	0.72	0.94	0.86	0.73
Percent Heavy Veh, %	4	7	7	5	4	4	0	15	15	18	3	3
Cap, veh/h	519	338	251	517	324	228	392	280	265	462	401	205
Arrive On Green	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Sat Flow, veh/h	1139	845	627	1120	809	569	1024	701	663	992	1003	514
Grp Volume(v), veh/h	125	0	209	107	0	201	101	0	220	95	0	369
Grp Sat Flow(s),veh/h/ln	1139	0	1473	1120	0	1378	1024	0	1364	992	0	1517
Q Serve(g_s), s	3.5	0.0	4.0	3.0	0.0	4.1	3.5	0.0	4.6	3.0	0.0	7.7
Cycle Q Clear(g_c), s	7.6	0.0	4.0	6.9	0.0	4.1	11.2	0.0	4.6	7.6	0.0	7.7
Prop In Lane	1.00		0.43	1.00		0.41	1.00		0.49	1.00		0.34
Lane Grp Cap(c), veh/h	519	0	589	517	0	551	392	0	546	462	0	607
V/C Ratio(X)	0.24	0.00	0.35	0.21	0.00	0.36	0.26	0.00	0.40	0.21	0.00	0.61
Avail Cap(c_a), veh/h	519	0	589	517	0	551	392	0	546	462	0	607
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.1	0.0	8.4	10.8	0.0	8.4	14.0	0.0	8.6	11.3	0.0	9.5
Incr Delay (d2), s/veh	1.1	0.0	1.7	0.9	0.0	1.9	1.6	0.0	2.2	1.0	0.0	4.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	1.2	0.0	1.8	1.0	0.0	1.8	1.2	0.0	2.0	0.9	0.0	3.9
LnGrp Delay(d),s/veh	12.2	0.0	10.1	11.7	0.0	10.3	15.5	0.0	10.8	12.3	0.0	14.0
LnGrp LOS	B		B	B		B	B		B	B		B
Approach Vol, veh/h		334			308			321			464	
Approach Delay, s/veh		10.9			10.8			12.3			13.7	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		20.0		20.0		20.0		20.0
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		16.0		16.0		16.0		16.0
Max Q Clear Time (g_c+I1), s		13.2		9.6		9.7		8.9
Green Ext Time (p_c), s		1.3		2.0		2.6		2.1

Intersection Summary	
HCM 2010 Ctrl Delay	12.1
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	4	111	143	10	3	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	38	85	86	35	50	25
Heavy Vehicles, %	33	24	21	57	0	50
Mvmt Flow	11	131	166	29	6	12

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	195	0	-	0	333	181
Stage 1	-	-	-	-	181	-
Stage 2	-	-	-	-	152	-
Critical Hdwy	4.43	-	-	-	6.4	6.7
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.497	-	-	-	3.5	3.75
Pot Cap-1 Maneuver	1213	-	-	-	666	752
Stage 1	-	-	-	-	855	-
Stage 2	-	-	-	-	881	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1213	-	-	-	659	752
Mov Cap-2 Maneuver	-	-	-	-	659	-
Stage 1	-	-	-	-	855	-
Stage 2	-	-	-	-	872	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	10.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1213	-	-	-	718
HCM Lane V/C Ratio	0.009	-	-	-	0.025
HCM Control Delay (s)	8	0	-	-	10.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	88	12	3	116	21	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	67	50	81	50	50
Heavy Vehicles, %	14	13	10	18	10	10
Mvmt Flow	113	18	6	143	42	6

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	131	0	277	122
Stage 1	-	-	-	-	122	-
Stage 2	-	-	-	-	155	-
Critical Hdwy	-	-	4.2	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	-	-	2.29	-	3.59	3.39
Pot Cap-1 Maneuver	-	-	1406	-	696	908
Stage 1	-	-	-	-	884	-
Stage 2	-	-	-	-	854	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1406	-	693	908
Mov Cap-2 Maneuver	-	-	-	-	693	-
Stage 1	-	-	-	-	884	-
Stage 2	-	-	-	-	850	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	10.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	714	-	-	1406	-
HCM Lane V/C Ratio	0.067	-	-	0.004	-
HCM Control Delay (s)	10.4	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	3	4	12	67	4	10	76	193	125	15	114	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	50	25	50	75	38	44	80	74	55	50	77	50
Heavy Vehicles, %	10	33	25	10	10	10	18	10	6	10	6	10
Mvmt Flow	6	16	24	89	11	23	95	261	227	30	148	30

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	804	901	163	807	802	374	178	0	0	488	0	0
Stage 1	223	223	-	564	564	-	-	-	-	-	-	-
Stage 2	581	678	-	243	238	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.83	6.45	7.2	6.6	6.3	4.28	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.83	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.83	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.297	3.525	3.59	4.09	3.39	2.362	-	-	2.29	-	-
Pot Cap-1 Maneuver	292	247	825	291	308	655	1307	-	-	1035	-	-
Stage 1	762	665	-	496	496	-	-	-	-	-	-	-
Stage 2	486	408	-	743	694	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	246	214	825	240	267	655	1307	-	-	1035	-	-
Mov Cap-2 Maneuver	246	214	-	240	267	-	-	-	-	-	-	-
Stage 1	684	644	-	445	445	-	-	-	-	-	-	-
Stage 2	411	366	-	681	672	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.5	28.2	1.3	1.2
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1307	-	-	359	275	1035	-	-
HCM Lane V/C Ratio	0.073	-	-	0.128	0.446	0.029	-	-
HCM Control Delay (s)	8	0	-	16.5	28.2	8.6	0	-
HCM Lane LOS	A	A	-	C	D	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.4	2.2	0.1	-	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	10	10	1	9	9	15	1	39	1	24	91	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	1	1	1	1	1	1	1	3	1	1	7	1
Mvmt Flow	11	11	1	10	10	16	1	42	1	26	99	27

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	223	211	113	216	223	43	126	0	0	43	0	0
Stage 1	165	165	-	45	45	-	-	-	-	-	-	-
Stage 2	58	46	-	171	178	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	735	688	943	743	678	1030	1467	-	-	1572	-	-
Stage 1	839	764	-	971	859	-	-	-	-	-	-	-
Stage 2	956	859	-	833	754	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	705	675	943	722	665	1030	1467	-	-	1572	-	-
Mov Cap-2 Maneuver	705	675	-	722	665	-	-	-	-	-	-	-
Stage 1	838	750	-	970	858	-	-	-	-	-	-	-
Stage 2	929	858	-	805	740	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.3	9.6	0.2	1.3
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1467	-	-	699	814	1572	-	-
HCM Lane V/C Ratio	0.001	-	-	0.033	0.044	0.017	-	-
HCM Control Delay (s)	7.5	0	-	10.3	9.6	7.3	0	-
HCM Lane LOS	A	A	-	B	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	3	1	3	30	80	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	1	1	1	10	8	1
Mvmt Flow	3	1	3	33	87	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	132	93	100	0	-	0
Stage 1	93	-	-	-	-	-
Stage 2	39	-	-	-	-	-
Critical Hdwy	6.41	6.21	4.11	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.209	-	-	-
Pot Cap-1 Maneuver	864	967	1499	-	-	-
Stage 1	933	-	-	-	-	-
Stage 2	986	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	862	967	1499	-	-	-
Mov Cap-2 Maneuver	862	-	-	-	-	-
Stage 1	933	-	-	-	-	-
Stage 2	984	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.1	0.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1499	-	886	-	-
HCM Lane V/C Ratio	0.002	-	0.005	-	-
HCM Control Delay (s)	7.4	0	9.1	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Intersection Delay, s/veh	78.5
Intersection LOS	F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	143	162	138	0	165	186	130	0	135	173	138
Peak Hour Factor	0.92	0.64	0.76	0.87	0.92	0.86	0.88	0.88	0.92	0.75	0.86	0.72
Heavy Vehicles, %	2	3	7	3	2	5	4	22	2	3	16	8
Mvmt Flow	0	223	213	159	0	192	211	148	0	180	201	192
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	78	78.3	78
HCM LOS	F	F	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	30%	32%	34%	23%
Vol Thru, %	39%	37%	39%	54%
Vol Right, %	31%	31%	27%	23%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	446	443	481	696
LT Vol	135	143	165	159
Through Vol	173	162	186	375
RT Vol	138	138	130	162
Lane Flow Rate	573	595	551	827
Geometry Grp	1	1	1	1
Degree of Util (X)	1	1	1	1
Departure Headway (Hd)	9.523	9.526	9.589	9.809
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	384	387	386	380
Service Time	7.523	7.526	7.589	7.809
HCM Lane V/C Ratio	1.492	1.537	1.427	2.176
HCM Control Delay	78	78	78.3	79.2
HCM Lane LOS	F	F	F	F
HCM 95th-tile Q	11.9	11.9	11.9	11.7

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	159	375	162
Peak Hour Factor	0.92	0.94	0.86	0.73
Heavy Vehicles, %	2	18	3	3
Mvmt Flow	0	169	436	222
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	79.2
HCM LOS	F

Lane

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	8	199	255	19	5	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	38	85	86	35	50	25
Heavy Vehicles, %	38	24	21	58	5	50
Mvmt Flow	21	234	297	54	10	24

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	351	0	-	0	600	324
Stage 1	-	-	-	-	324	-
Stage 2	-	-	-	-	276	-
Critical Hdwy	4.48	-	-	-	6.45	6.7
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	2.542	-	-	-	3.545	3.75
Pot Cap-1 Maneuver	1033	-	-	-	459	619
Stage 1	-	-	-	-	726	-
Stage 2	-	-	-	-	764	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1033	-	-	-	448	619
Mov Cap-2 Maneuver	-	-	-	-	448	-
Stage 1	-	-	-	-	726	-
Stage 2	-	-	-	-	746	-

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	11.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1033	-	-	-	557
HCM Lane V/C Ratio	0.02	-	-	-	0.061
HCM Control Delay (s)	8.6	0	-	-	11.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	156	22	5	207	37	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	67	50	81	50	50
Heavy Vehicles, %	13	14	5	18	5	5
Mvmt Flow	200	33	10	256	74	10

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	233	0	492	216
Stage 1	-	-	-	-	216	-
Stage 2	-	-	-	-	276	-
Critical Hdwy	-	-	4.15	-	6.45	6.25
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	-	-	2.245	-	3.545	3.345
Pot Cap-1 Maneuver	-	-	1317	-	531	816
Stage 1	-	-	-	-	813	-
Stage 2	-	-	-	-	764	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1317	-	526	816
Mov Cap-2 Maneuver	-	-	-	-	526	-
Stage 1	-	-	-	-	813	-
Stage 2	-	-	-	-	757	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	12.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	549	-	-	1317	-
HCM Lane V/C Ratio	0.153	-	-	0.008	-
HCM Control Delay (s)	12.7	-	-	7.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0	-

Intersection	
Int Delay, s/veh	219.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	5	8	21	119	8	19	135	344	223	27	204	27
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	50	25	50	75	38	44	80	74	55	50	77	50
Heavy Vehicles, %	5	38	24	5	5	5	18	10	6	11	6	11
Mvmt Flow	10	32	42	159	21	43	169	465	405	54	265	54

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1437	1608	292	1442	1432	668	319	0	0	870	0	0
Stage 1	400	400	-	1005	1005	-	-	-	-	-	-	-
Stage 2	1037	1208	-	437	427	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.88	6.44	7.15	6.55	6.25	4.28	-	-	4.21	-	-
Critical Hdwy Stg 1	6.15	5.88	-	6.15	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.88	-	6.15	5.55	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.342	3.516	3.545	4.045	3.345	2.362	-	-	2.299	-	-
Pot Cap-1 Maneuver	109	87	698	~ 108	132	453	1156	-	-	738	-	-
Stage 1	620	544	-	287	315	-	-	-	-	-	-	-
Stage 2	276	219	-	592	580	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	57	55	698	~ 40	83	453	1156	-	-	738	-	-
Mov Cap-2 Maneuver	57	55	-	~ 40	83	-	-	-	-	-	-	-
Stage 1	428	495	-	198	217	-	-	-	-	-	-	-
Stage 2	156	151	-	474	528	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	119.1	$ 1638.6	1.4	1.5
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1156	-	-	103	52	738	-	-
HCM Lane V/C Ratio	0.146	-	-	0.816	4.287	0.073	-	-
HCM Control Delay (s)	8.6	0	-	119.1	$ 1638.6	10.3	0	-
HCM Lane LOS	A	A	-	F	F	B	A	-
HCM 95th %tile Q(veh)	0.5	-	-	4.5	24.7	0.2	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	19	19	3	16	16	27	3	69	3	42	162	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	11	5
Mvmt Flow	21	21	3	17	17	29	3	75	3	46	176	49

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	399	377	201	387	399	77	225	0	0	78	0	0
Stage 1	292	292	-	83	83	-	-	-	-	-	-	-
Stage 2	107	85	-	304	316	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.55	6.25	7.15	6.55	6.25	4.15	-	-	4.15	-	-
Critical Hdwy Stg 1	6.15	5.55	-	6.15	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.55	-	6.15	5.55	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345	3.545	4.045	3.345	2.245	-	-	2.245	-	-
Pot Cap-1 Maneuver	556	550	832	566	534	976	1326	-	-	1502	-	-
Stage 1	710	666	-	918	820	-	-	-	-	-	-	-
Stage 2	891	819	-	699	650	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	511	530	832	532	514	976	1326	-	-	1502	-	-
Mov Cap-2 Maneuver	511	530	-	532	514	-	-	-	-	-	-	-
Stage 1	709	643	-	916	818	-	-	-	-	-	-	-
Stage 2	844	817	-	650	627	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.3	11	0.3	1.3
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1326	-	-	535	664	1502	-	-
HCM Lane V/C Ratio	0.002	-	-	0.083	0.097	0.03	-	-
HCM Control Delay (s)	7.7	0	-	12.3	11	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.3	0.1	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	5	3	5	53	144	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	5	5	5	11	5
Mvmt Flow	5	3	5	58	157	23

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	236	168	179	0	-	0
Stage 1	168	-	-	-	-	-
Stage 2	68	-	-	-	-	-
Critical Hdwy	6.45	6.25	4.15	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	2.245	-	-	-
Pot Cap-1 Maneuver	746	868	1379	-	-	-
Stage 1	854	-	-	-	-	-
Stage 2	947	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	743	868	1379	-	-	-
Mov Cap-2 Maneuver	743	-	-	-	-	-
Stage 1	854	-	-	-	-	-
Stage 2	943	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.6	0.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1379	-	785	-	-
HCM Lane V/C Ratio	0.004	-	0.011	-	-
HCM Control Delay (s)	7.6	0	9.6	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	143	162	138	165	186	130	135	173	138	159	375	162
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.96	0.99		0.96	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	0.88	1.00	1.00	0.88	1.00	1.00	0.88	1.00	1.00	0.88
Adj Sat Flow, veh/h/ln	1845	1805	1900	1810	1705	1900	1845	1695	1900	1610	1845	1900
Adj Flow Rate, veh/h	223	213	159	192	211	148	180	201	192	169	436	222
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.64	0.76	0.87	0.86	0.88	0.88	0.75	0.86	0.72	0.94	0.86	0.73
Percent Heavy Veh, %	3	7	7	5	4	4	3	16	16	18	3	3
Cap, veh/h	248	280	209	250	272	191	233	346	331	395	502	255
Arrive On Green	0.34	0.34	0.34	0.34	0.34	0.34	0.50	0.50	0.50	0.50	0.50	0.50
Sat Flow, veh/h	994	824	615	964	801	562	765	692	661	850	1003	511
Grp Volume(v), veh/h	223	0	372	192	0	359	180	0	393	169	0	658
Grp Sat Flow(s),veh/h/ln	994	0	1438	964	0	1363	765	0	1354	850	0	1514
Q Serve(g_s), s	5.2	0.0	11.5	5.5	0.0	11.8	5.8	0.0	10.2	8.7	0.0	19.2
Cycle Q Clear(g_c), s	17.0	0.0	11.5	17.0	0.0	11.8	25.0	0.0	10.2	19.0	0.0	19.2
Prop In Lane	1.00		0.43	1.00		0.41	1.00		0.49	1.00		0.34
Lane Grp Cap(c), veh/h	248	0	489	250	0	464	233	0	677	395	0	757
V/C Ratio(X)	0.90	0.00	0.76	0.77	0.00	0.77	0.77	0.00	0.58	0.43	0.00	0.87
Avail Cap(c_a), veh/h	248	0	489	250	0	464	233	0	677	395	0	757
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.8	0.0	14.7	23.5	0.0	14.8	23.6	0.0	8.8	15.5	0.0	11.1
Incr Delay (d2), s/veh	36.4	0.0	10.6	20.1	0.0	11.9	21.8	0.0	3.6	3.4	0.0	12.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	5.5	0.0	6.0	4.0	0.0	5.9	3.9	0.0	4.4	2.4	0.0	10.6
LnGrp Delay(d),s/veh	60.2	0.0	25.3	43.6	0.0	26.7	45.4	0.0	12.4	18.8	0.0	24.0
LnGrp LOS	E		C	D		C	D		B	B		C
Approach Vol, veh/h		595			551			573			827	
Approach Delay, s/veh		38.4			32.6			22.8			22.9	
Approach LOS		D			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		29.0		21.0		29.0		21.0
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		25.0		17.0		25.0		17.0
Max Q Clear Time (g_c+I1), s		27.0		19.0		21.2		19.0
Green Ext Time (p_c), s		0.0		0.0		2.8		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	28.6
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	8	199	255	19	5	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	38	85	86	35	50	25
Heavy Vehicles, %	38	24	21	58	5	50
Mvmt Flow	21	234	297	54	10	24

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	351	0	-	0	600	324
Stage 1	-	-	-	-	324	-
Stage 2	-	-	-	-	276	-
Critical Hdwy	4.48	-	-	-	6.45	6.7
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	2.542	-	-	-	3.545	3.75
Pot Cap-1 Maneuver	1033	-	-	-	459	619
Stage 1	-	-	-	-	726	-
Stage 2	-	-	-	-	764	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1033	-	-	-	448	619
Mov Cap-2 Maneuver	-	-	-	-	448	-
Stage 1	-	-	-	-	726	-
Stage 2	-	-	-	-	746	-

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	11.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1033	-	-	-	557
HCM Lane V/C Ratio	0.02	-	-	-	0.061
HCM Control Delay (s)	8.6	0	-	-	11.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	156	22	5	207	37	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	67	50	81	50	50
Heavy Vehicles, %	13	14	5	18	5	5
Mvmt Flow	200	33	10	256	74	10

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	233	0	492	216
Stage 1	-	-	-	-	216	-
Stage 2	-	-	-	-	276	-
Critical Hdwy	-	-	4.15	-	6.45	6.25
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	-	-	2.245	-	3.545	3.345
Pot Cap-1 Maneuver	-	-	1317	-	531	816
Stage 1	-	-	-	-	813	-
Stage 2	-	-	-	-	764	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1317	-	526	816
Mov Cap-2 Maneuver	-	-	-	-	526	-
Stage 1	-	-	-	-	813	-
Stage 2	-	-	-	-	757	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	12.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	549	-	-	1317	-
HCM Lane V/C Ratio	0.153	-	-	0.008	-
HCM Control Delay (s)	12.7	-	-	7.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	8	21	119	8	19	135	344	223	27	204	27
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1495	1900	1900	1810	1900	1610	1757	1900	1900	1768	1900
Adj Flow Rate, veh/h	10	32	42	159	21	43	169	465	405	54	265	54
Adj No. of Lanes	0	1	0	0	1	0	1	1	0	0	1	0
Peak Hour Factor	0.50	0.25	0.50	0.75	0.38	0.44	0.80	0.74	0.55	0.50	0.77	0.50
Percent Heavy Veh, %	38	38	38	5	5	5	18	10	10	6	6	6
Cap, veh/h	94	120	134	318	36	55	465	560	488	128	547	100
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.65	0.65	0.65	0.65	0.65	0.65
Sat Flow, veh/h	69	617	687	999	185	283	913	868	756	72	847	156
Grp Volume(v), veh/h	84	0	0	223	0	0	169	0	870	373	0	0
Grp Sat Flow(s),veh/h/ln	1374	0	0	1467	0	0	913	0	1624	1075	0	0
Q Serve(g_s), s	0.0	0.0	0.0	4.4	0.0	0.0	0.0	0.0	20.5	3.7	0.0	0.0
Cycle Q Clear(g_c), s	2.6	0.0	0.0	7.0	0.0	0.0	15.9	0.0	20.5	24.2	0.0	0.0
Prop In Lane	0.12		0.50	0.71		0.19	1.00		0.47	0.14		0.14
Lane Grp Cap(c), veh/h	348	0	0	409	0	0	465	0	1048	776	0	0
V/C Ratio(X)	0.24	0.00	0.00	0.55	0.00	0.00	0.36	0.00	0.83	0.48	0.00	0.00
Avail Cap(c_a), veh/h	511	0	0	578	0	0	531	0	1165	873	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	17.3	0.0	0.0	18.9	0.0	0.0	6.0	0.0	6.8	5.3	0.0	0.0
Incr Delay (d2), s/veh	0.4	0.0	0.0	1.1	0.0	0.0	0.5	0.0	4.8	0.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	1.0	0.0	0.0	3.0	0.0	0.0	1.6	0.0	10.3	2.4	0.0	0.0
LnGrp Delay(d),s/veh	17.7	0.0	0.0	20.0	0.0	0.0	6.4	0.0	11.5	5.8	0.0	0.0
LnGrp LOS	B			C			A		B	A		
Approach Vol, veh/h		84			223			1039			373	
Approach Delay, s/veh		17.7			20.0			10.7			5.8	
Approach LOS		B			C			B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		36.4		13.8		36.4		13.8
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		36.0		16.0		36.0		16.0
Max Q Clear Time (g_c+I1), s		22.5		4.6		26.2		9.0
Green Ext Time (p_c), s		7.8		1.2		6.2		0.9

Intersection Summary	
HCM 2010 Ctrl Delay	11.2
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	19	19	3	16	16	27	3	69	3	42	162	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	11	5
Mvmt Flow	21	21	3	17	17	29	3	75	3	46	176	49

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	399	377	201	387	399	77	225	0	0	78	0	0
Stage 1	292	292	-	83	83	-	-	-	-	-	-	-
Stage 2	107	85	-	304	316	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.55	6.25	7.15	6.55	6.25	4.15	-	-	4.15	-	-
Critical Hdwy Stg 1	6.15	5.55	-	6.15	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.55	-	6.15	5.55	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345	3.545	4.045	3.345	2.245	-	-	2.245	-	-
Pot Cap-1 Maneuver	556	550	832	566	534	976	1326	-	-	1502	-	-
Stage 1	710	666	-	918	820	-	-	-	-	-	-	-
Stage 2	891	819	-	699	650	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	511	530	832	532	514	976	1326	-	-	1502	-	-
Mov Cap-2 Maneuver	511	530	-	532	514	-	-	-	-	-	-	-
Stage 1	709	643	-	916	818	-	-	-	-	-	-	-
Stage 2	844	817	-	650	627	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.3	11	0.3	1.3
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1326	-	-	535	664	1502	-	-
HCM Lane V/C Ratio	0.002	-	-	0.083	0.097	0.03	-	-
HCM Control Delay (s)	7.7	0	-	12.3	11	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.3	0.1	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	5	3	5	53	144	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	5	5	5	11	5
Mvmt Flow	5	3	5	58	157	23

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	236	168	179	0	-	0
Stage 1	168	-	-	-	-	-
Stage 2	68	-	-	-	-	-
Critical Hdwy	6.45	6.25	4.15	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	2.245	-	-	-
Pot Cap-1 Maneuver	746	868	1379	-	-	-
Stage 1	854	-	-	-	-	-
Stage 2	947	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	743	868	1379	-	-	-
Mov Cap-2 Maneuver	743	-	-	-	-	-
Stage 1	854	-	-	-	-	-
Stage 2	943	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.6	0.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1379	-	785	-	-
HCM Lane V/C Ratio	0.004	-	0.011	-	-
HCM Control Delay (s)	7.6	0	9.6	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Intersection Delay, s/veh	79.1
Intersection LOS	F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	151	178	138	0	177	198	175	0	135	213	154
Peak Hour Factor	0.92	0.64	0.76	0.87	0.92	0.86	0.88	0.88	0.92	0.75	0.86	0.72
Heavy Vehicles, %	2	9	15	3	2	11	10	42	2	5	31	18
Mvmt Flow	0	236	234	159	0	206	225	199	0	180	248	214
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	78.5	78.6	78.1
HCM LOS	F	F	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	27%	32%	32%	27%
Vol Thru, %	42%	38%	36%	51%
Vol Right, %	31%	30%	32%	22%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	502	467	550	765
LT Vol	135	151	177	204
Through Vol	213	178	198	391
RT Vol	154	138	175	170
Lane Flow Rate	642	629	630	905
Geometry Grp	1	1	1	1
Degree of Util (X)	1	1	1	1
Departure Headway (Hd)	9.552	9.638	9.658	10.129
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	385	384	384	371
Service Time	7.552	7.638	7.658	8.129
HCM Lane V/C Ratio	1.668	1.638	1.641	2.439
HCM Control Delay	78.1	78.5	78.6	80.6
HCM Lane LOS	F	F	F	F
HCM 95th-tile Q	11.9	11.8	11.8	11.5

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	204	391	170
Peak Hour Factor	0.92	0.94	0.86	0.73
Heavy Vehicles, %	2	36	7	8
Mvmt Flow	0	217	455	233
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	80.6
HCM LOS	F

Lane

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	12	272	337	35	5	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	38	85	86	35	50	25
Heavy Vehicles, %	58	44	40	70	10	70
Mvmt Flow	32	320	392	100	10	40

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	492	0	-	0	825	442
Stage 1	-	-	-	-	442	-
Stage 2	-	-	-	-	383	-
Critical Hdwy	4.68	-	-	-	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	2.722	-	-	-	3.59	3.93
Pot Cap-1 Maneuver	835	-	-	-	332	495
Stage 1	-	-	-	-	631	-
Stage 2	-	-	-	-	672	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	835	-	-	-	316	495
Mov Cap-2 Maneuver	-	-	-	-	316	-
Stage 1	-	-	-	-	631	-
Stage 2	-	-	-	-	640	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	14.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	835	-	-	-	445
HCM Lane V/C Ratio	0.038	-	-	-	0.112
HCM Control Delay (s)	9.5	0	-	-	14.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4

Intersection	
Int Delay, s/veh	1.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	189	26	5	264	37	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	67	50	81	50	50
Heavy Vehicles, %	29	27	10	36	10	10
Mvmt Flow	242	39	10	326	74	10

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	281	0	608	262
Stage 1	-	-	-	-	262	-
Stage 2	-	-	-	-	346	-
Critical Hdwy	-	-	4.2	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	-	-	2.29	-	3.59	3.39
Pot Cap-1 Maneuver	-	-	1237	-	446	758
Stage 1	-	-	-	-	764	-
Stage 2	-	-	-	-	699	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1237	-	442	758
Mov Cap-2 Maneuver	-	-	-	-	442	-
Stage 1	-	-	-	-	764	-
Stage 2	-	-	-	-	692	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	14.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	465	-	-	1237	-
HCM Lane V/C Ratio	0.181	-	-	0.008	-
HCM Control Delay (s)	14.4	-	-	7.9	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.7	-	-	0	-

Intersection	
Int Delay, s/veh	56.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	5	12	29	127	8	19	172	397	244	31	225	31
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	50	25	50	75	38	44	80	74	55	50	77	50
Heavy Vehicles, %	10	58	45	10	10	10	35	22	14	23	15	23
Mvmt Flow	10	48	58	169	21	43	215	536	444	62	292	62

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1667	1857	323	1688	1666	758	354	0	0	980	0	0
Stage 1	447	447	-	1188	1188	-	-	-	-	-	-	-
Stage 2	1220	1410	-	500	478	-	-	-	-	-	-	-
Critical Hdwy	7.2	7.08	6.65	7.2	6.6	6.3	4.45	-	-	4.33	-	-
Critical Hdwy Stg 1	6.2	6.08	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	6.08	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.522	3.705	3.59	4.09	3.39	2.515	-	-	2.407	-	-
Pot Cap-1 Maneuver	73	53	629	~ 71	92	394	1043	-	-	627	-	-
Stage 1	576	489	-	221	253	-	-	-	-	-	-	-
Stage 2	212	157	-	538	542	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	22	~ 23	629	-	40	394	1043	-	-	627	-	-
Mov Cap-2 Maneuver	22	~ 23	-	-	40	-	-	-	-	-	-	-
Stage 1	284	428	-	~ 109	125	-	-	-	-	-	-	-
Stage 2	77	77	-	380	475	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 937.3		1.7	1.7
HCM LOS	F	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1043	-	-	44	-	627	-	-
HCM Lane V/C Ratio	0.206	-	-	2.636	-	0.099	-	-
HCM Control Delay (s)	9.3	0	-	$ 937.3	-	11.4	0	-
HCM Lane LOS	A	A	-	F	-	B	A	-
HCM 95th %tile Q(veh)	0.8	-	-	12.5	-	0.3	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	19	19	3	16	16	27	3	73	3	42	178	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	15	10
Mvmt Flow	21	21	3	17	17	29	3	79	3	46	193	49

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	420	398	218	409	422	81	242	0	0	83	0	0
Stage 1	309	309	-	88	88	-	-	-	-	-	-	-
Stage 2	111	89	-	321	334	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	530	527	802	539	511	957	1279	-	-	1465	-	-
Stage 1	684	645	-	900	807	-	-	-	-	-	-	-
Stage 2	875	806	-	674	629	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	485	506	802	505	491	957	1279	-	-	1465	-	-
Mov Cap-2 Maneuver	485	506	-	505	491	-	-	-	-	-	-	-
Stage 1	683	621	-	898	805	-	-	-	-	-	-	-
Stage 2	828	804	-	625	606	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.7	11.3	0.3	1.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1279	-	-	510	638	1465	-	-
HCM Lane V/C Ratio	0.003	-	-	0.087	0.101	0.031	-	-
HCM Control Delay (s)	7.8	0	-	12.7	11.3	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.3	0.1	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	5	3	5	61	160	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	10	10	10	13	27	10
Mvmt Flow	5	3	5	66	174	23

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	262	185	197	0	-	0
Stage 1	185	-	-	-	-	-
Stage 2	77	-	-	-	-	-
Critical Hdwy	6.5	6.3	4.2	-	-	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	2.29	-	-	-
Pot Cap-1 Maneuver	710	837	1329	-	-	-
Stage 1	828	-	-	-	-	-
Stage 2	926	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	707	837	1329	-	-	-
Mov Cap-2 Maneuver	707	-	-	-	-	-
Stage 1	828	-	-	-	-	-
Stage 2	922	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.9	0.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1329	-	751	-	-
HCM Lane V/C Ratio	0.004	-	0.012	-	-
HCM Control Delay (s)	7.7	0	9.9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	151	178	138	177	198	175	135	213	154	204	391	170
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	0.88	1.00	1.00	0.88	1.00	1.00	0.88	1.00	1.00	0.88
Adj Sat Flow, veh/h/ln	1743	1725	1900	1712	1520	1900	1810	1520	1900	1397	1770	1900
Adj Flow Rate, veh/h	236	234	159	206	225	199	180	248	214	217	455	233
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.64	0.76	0.87	0.86	0.88	0.88	0.75	0.86	0.72	0.94	0.86	0.73
Percent Heavy Veh, %	9	15	15	11	10	10	5	31	31	36	7	7
Cap, veh/h	149	318	216	232	246	218	139	327	282	238	480	246
Arrive On Green	0.39	0.39	0.39	0.39	0.39	0.39	0.50	0.50	0.50	0.50	0.50	0.50
Sat Flow, veh/h	898	825	560	907	639	565	730	655	565	695	961	492
Grp Volume(v), veh/h	236	0	393	206	0	424	180	0	462	217	0	688
Grp Sat Flow(s),veh/h/ln	898	0	1385	907	0	1204	730	0	1220	695	0	1453
Q Serve(g_s), s	3.6	0.0	17.0	10.0	0.0	23.4	3.5	0.0	21.3	13.7	0.0	31.5
Cycle Q Clear(g_c), s	27.0	0.0	17.0	27.0	0.0	23.4	35.0	0.0	21.3	35.0	0.0	31.5
Prop In Lane	1.00		0.40	1.00		0.47	1.00		0.46	1.00		0.34
Lane Grp Cap(c), veh/h	149	0	534	232	0	464	139	0	610	238	0	726
V/C Ratio(X)	1.58	0.00	0.74	0.89	0.00	0.91	1.29	0.00	0.76	0.91	0.00	0.95
Avail Cap(c_a), veh/h	149	0	534	232	0	464	139	0	610	238	0	726
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	34.4	0.0	18.4	31.9	0.0	20.4	34.5	0.0	14.1	30.7	0.0	16.6
Incr Delay (d2), s/veh	290.4	0.0	5.3	31.3	0.0	22.3	174.0	0.0	8.6	38.9	0.0	22.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	14.9	0.0	7.2	6.0	0.0	10.5	9.4	0.0	8.5	6.7	0.0	17.0
LnGrp Delay(d),s/veh	324.8	0.0	23.7	63.2	0.0	42.7	208.6	0.0	22.6	69.7	0.0	39.4
LnGrp LOS	F		C	E		D	F		C	E		D
Approach Vol, veh/h		629			630			642			905	
Approach Delay, s/veh		136.7			49.4			74.8			46.6	
Approach LOS		F			D			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		39.0		31.0		39.0		31.0
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		35.0		27.0		35.0		27.0
Max Q Clear Time (g_c+I1), s		37.0		29.0		37.0		29.0
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	73.9
HCM 2010 LOS	E

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	12	272	337	35	5	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	38	85	86	35	50	25
Heavy Vehicles, %	58	44	40	70	10	70
Mvmt Flow	32	320	392	100	10	40

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	492	0	-	0	825	442
Stage 1	-	-	-	-	442	-
Stage 2	-	-	-	-	383	-
Critical Hdwy	4.68	-	-	-	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	2.722	-	-	-	3.59	3.93
Pot Cap-1 Maneuver	835	-	-	-	332	495
Stage 1	-	-	-	-	631	-
Stage 2	-	-	-	-	672	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	835	-	-	-	316	495
Mov Cap-2 Maneuver	-	-	-	-	316	-
Stage 1	-	-	-	-	631	-
Stage 2	-	-	-	-	640	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	14.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	835	-	-	-	445
HCM Lane V/C Ratio	0.038	-	-	-	0.112
HCM Control Delay (s)	9.5	0	-	-	14.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4

Intersection	
Int Delay, s/veh	1.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	189	26	5	264	37	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	67	50	81	50	50
Heavy Vehicles, %	29	27	10	36	10	10
Mvmt Flow	242	39	10	326	74	10

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	281	0	608	262
Stage 1	-	-	-	-	262	-
Stage 2	-	-	-	-	346	-
Critical Hdwy	-	-	4.2	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	-	-	2.29	-	3.59	3.39
Pot Cap-1 Maneuver	-	-	1237	-	446	758
Stage 1	-	-	-	-	764	-
Stage 2	-	-	-	-	699	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1237	-	442	758
Mov Cap-2 Maneuver	-	-	-	-	442	-
Stage 1	-	-	-	-	764	-
Stage 2	-	-	-	-	692	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	14.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	465	-	-	1237	-
HCM Lane V/C Ratio	0.181	-	-	0.008	-
HCM Control Delay (s)	14.4	-	-	7.9	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.7	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	12	29	127	8	19	172	397	244	31	225	31
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1289	1900	1900	1727	1900	1407	1605	1900	1900	1619	1900
Adj Flow Rate, veh/h	10	48	58	169	21	43	215	536	444	62	292	62
Adj No. of Lanes	0	1	0	0	1	0	1	1	0	0	1	0
Peak Hour Factor	0.50	0.25	0.50	0.75	0.38	0.44	0.80	0.74	0.55	0.50	0.77	0.50
Percent Heavy Veh, %	58	58	58	10	10	10	35	22	22	15	15	15
Cap, veh/h	61	118	127	267	29	48	256	555	460	68	259	48
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.21	0.68	0.68	0.68	0.68	0.68	0.68
Sat Flow, veh/h	43	560	603	876	140	230	773	813	673	18	380	70
Grp Volume(v), veh/h	116	0	0	233	0	0	215	0	980	416	0	0
Grp Sat Flow(s),veh/h/ln	1206	0	0	1247	0	0	773	0	1486	468	0	0
Q Serve(g_s), s	0.0	0.0	0.0	7.2	0.0	0.0	0.0	0.0	45.8	5.2	0.0	0.0
Cycle Q Clear(g_c), s	6.4	0.0	0.0	13.6	0.0	0.0	51.0	0.0	45.8	51.0	0.0	0.0
Prop In Lane	0.09		0.50	0.73		0.18	1.00		0.45	0.15		0.15
Lane Grp Cap(c), veh/h	306	0	0	345	0	0	256	0	1015	375	0	0
V/C Ratio(X)	0.38	0.00	0.00	0.68	0.00	0.00	0.84	0.00	0.97	1.11	0.00	0.00
Avail Cap(c_a), veh/h	310	0	0	350	0	0	256	0	1015	375	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	25.8	0.0	0.0	28.7	0.0	0.0	18.4	0.0	11.0	20.0	0.0	0.0
Incr Delay (d2), s/veh	0.8	0.0	0.0	5.0	0.0	0.0	21.4	0.0	20.3	79.7	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(-26165%),veh/ln	2.2	0.0	0.0	5.1	0.0	0.0	5.9	0.0	24.0	13.1	0.0	0.0
LnGrp Delay(d),s/veh	26.6	0.0	0.0	33.7	0.0	0.0	39.8	0.0	31.4	99.7	0.0	0.0
LnGrp LOS	C			C			D		C	F		
Approach Vol, veh/h		116			233			1195			416	
Approach Delay, s/veh		26.6			33.7			32.9			99.7	
Approach LOS		C			C			C			F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		55.0		19.7		55.0		19.7
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		51.0		16.0		51.0		16.0
Max Q Clear Time (g_c+I1), s		53.0		8.4		53.0		15.6
Green Ext Time (p_c), s		0.0		1.2		0.0		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	46.8
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	19	19	3	16	16	27	3	73	3	42	178	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	15	10
Mvmt Flow	21	21	3	17	17	29	3	79	3	46	193	49

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	420	398	218	409	422	81	242	0	0	83	0	0
Stage 1	309	309	-	88	88	-	-	-	-	-	-	-
Stage 2	111	89	-	321	334	-	-	-	-	-	-	-
Critical Hdwy	7.2	6.6	6.3	7.2	6.6	6.3	4.2	-	-	4.2	-	-
Critical Hdwy Stg 1	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.2	5.6	-	6.2	5.6	-	-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39	3.59	4.09	3.39	2.29	-	-	2.29	-	-
Pot Cap-1 Maneuver	530	527	802	539	511	957	1279	-	-	1465	-	-
Stage 1	684	645	-	900	807	-	-	-	-	-	-	-
Stage 2	875	806	-	674	629	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	485	506	802	505	491	957	1279	-	-	1465	-	-
Mov Cap-2 Maneuver	485	506	-	505	491	-	-	-	-	-	-	-
Stage 1	683	621	-	898	805	-	-	-	-	-	-	-
Stage 2	828	804	-	625	606	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.7	11.3	0.3	1.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1279	-	-	510	638	1465	-	-
HCM Lane V/C Ratio	0.003	-	-	0.087	0.101	0.031	-	-
HCM Control Delay (s)	7.8	0	-	12.7	11.3	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.3	0.1	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	5	3	5	61	160	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	10	10	10	13	27	10
Mvmt Flow	5	3	5	66	174	23

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	262	185	197	0	-	0
Stage 1	185	-	-	-	-	-
Stage 2	77	-	-	-	-	-
Critical Hdwy	6.5	6.3	4.2	-	-	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	2.29	-	-	-
Pot Cap-1 Maneuver	710	837	1329	-	-	-
Stage 1	828	-	-	-	-	-
Stage 2	926	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	707	837	1329	-	-	-
Mov Cap-2 Maneuver	707	-	-	-	-	-
Stage 1	828	-	-	-	-	-
Stage 2	922	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.9	0.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1329	-	751	-	-
HCM Lane V/C Ratio	0.004	-	0.012	-	-
HCM Control Delay (s)	7.7	0	9.9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

BAKER CORRIDOR
PLANNING STUDY

APPENDIX B: Roadway Geometric Analysis

Baker Corridor Planning Study

SUMMARY OF MDT CONTROLLING DESIGN CRITERIA
MAIN LINE SUMMARY (UNDIVIDED)

PROJECT:	BAKER CORRIDOR PLANNING STUDY	**ROUTE:**	US 12
PROJECT LOCATION:	CITY OF BAKER, FALLON COUNTY, MT	**BEGINNING RM:**	79.00
HIGHWAY SECTION:	BAKER	**ENDING RM:**	88.00
FUNCTIONAL CLASSIFICATION:	MINOR ARTERIAL		

TRAFFIC VOLUMES AND FACTORS:

CONSTRUCTION YEAR	DESIGN YEAR	TRAFFIC FACTORS
TBD	TBD	**K=**
AADT (VPD)	**AADT (VPD)**	**D=**
SEE TRAFFIC DATA	SEE TRAFFIC DATA	**T=**

THE POSTED SPEED LIMIT IS: 70 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:**

LANE AND SHOULDER WIDTH:

	EXISTING (FT)	MDT RECOMMENDED MINIMUM (FT)
WIDTH OF TRAVELED WAY:	24	24
SHOULDER WIDTH:	2	2

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	REFERENCE MARKER BEGIN	REFERENCE MARKER END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	TYPE OF CURVE	MAX GRADE FIG. 12-4 (RURAL) FIG. 12-8 (URBAN) LEVEL=3% (RURAL) 7%(URBAN) (%)	K=L/A (EQ. 10.5-2) K-VALUE EXISTING (FT)	FIG. 12-4 (RURAL) FIG. 12-8 (URBAN) K-VALUE REQUIRED (FT)	K=S^2/658 (METRIC) K=S^2/2158 (US) FIG. 10.5A STOPPING SIGHT DISTANCE EXISTING (FT)	FIG. 12-4 (RURAL) FIG. 12-8 (URBAN) STOPPING SIGHT DISTANCE REQUIRED (FT)	DESIGN SPEED (MPH)	AS-BUILT PROJECT NUMBER	NOTES
1592+00.	78.93	79.12	-0.732	-0.200	1000	SAG	3	1879.70	136	2014.05	570	60	STPP 2-2(9)77	
1600+90.	79.00					Reference Point							STPP 2-2(9)77	
1612+00.	79.21	79.59	-0.200	-1.531	2000	CREST	3	1502.63	151	1800.74	570	60	STPP 2-2(9)77	
1628+00.	79.51	79.70	-1.531	0.250	1000	SAG	3	561.48	136	1100.76	570	60	STPP 2-2(9)77	
1640+00.	79.74	79.89	0.250	0.688	800	SAG	3	1826.48	136	1985.33	570	60	STPP 2-2(9)77	
1696+00.	80.80	81.18	0.688	-1.188	2000	CREST	3	1066.10	151	1516.79	570	60	STPP 2-2(9)77	
1712+00.	81.10	81.29	-1.188	0.200	1000	SAG	3	720.46	136	1246.90	570	60	STPP 2-2(9)77	
1739+50.	81.63	81.81	0.200	0.373	1000	SAG	3	5780.35	136	3531.85	570	60	STPP 2-2(9)77	
1765+00.	82.11	82.41	0.373	-0.824	1600	CREST	3	1336.68	151	1698.39	570	60	STPP 2-2(9)77	
1777+50.	82.34	82.50	-0.824	0.099	800	SAG	7	866.74	136	1367.63	570	60	STPP 2-2(9)77	Timber bridge beginning at 1782+11.5 63'-3 span struct.
1421+64.4	84.00					Reference Point							F-FG86	
1425+00.	84.06	84.14	0.648	1.705	400	SAG	7	378.43	51	903.69	253	35	F-FG86	Assumed 35MPH Design Speed through town starting at approx.
1429+00.	84.14	84.22	1.705	0.167	400	CREST	7	260.08	32	749.17	253	35	F-FG86	RM 82.5 and ending at RM 84.5
1435+00.	84.25	84.37	0.167	1.000	600	SAG	7	720.29	51	1246.75	253	35	F-FG86	
1443+00.	84.40	84.48	1.000	0.810	400	CREST	7	2105.26	32	2131.47	253	35	F-FG86	
1453+40.	84.60	84.68	0.810	0.112	400	CREST	7	573.07	151	1112.06	570	60	F-FG86	
1491+00.	85.31	85.39	0.112	0.386	400	SAG	3	1459.85	136	1774.93	570	60	F-FG86	
1514+00.	85.75	85.90	0.386	3.000	800	SAG	3	306.04	136	812.68	570	60	F-FG86	
1525+50.	85.97	86.16	3.000	-3.000	1000	CREST	3	166.67	151	599.72	570	60	F-FG86	213' Prestressed Concrete Structure
1537+00.	86.18	86.34	-3.000	1.047	800	SAG	3	197.68	136	653.14	570	60	F-FG86	
1576+00.	86.92	87.07	1.047	1.202	800	SAG	3	5161.29	136	3337.37	570	60	F-FG86	
1621+50.	87.79	87.97	1.202	-0.791	1000	CREST	3	501.76	151	1040.57	570	60	F-FG86	
1676+50.	88.83	88.94	-0.791	0.282	600	SAG	3	559.18	136	1098.50	570	60	F-FG86	

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	REFERENCE MARKER BEGIN	REFERENCE MARKER END	SUPERELEVATION MDT MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	TYPE OF CURVE	DESIGN SPEED (MPH)	LENGTH EXISTING (FT)	SPIRAL LENGTH EXISTING (FT)	RADIUS EXISTING (FT)	RADIUS REQUIRED (FT)	EXISTING GRADE (%)	FIG. 8.6A HORIZONTAL SSD EXISTING (FT)	FIG. 8.6A HORIZONTAL SSD REQUIRED (FT)	AS-BUILT PROJECT NUMBER	
1600+90.	79.00				Reference Point									STPP 2-2(9)77	
1639+65.65	79.73				No Curve	60	Section Corner							STPP 2-2(9)77	
1692+58.28	80.74				No Curve	60	Section Corner							STPP 2-2(9)77	
1708+83.62	80.92	81.17	0.080	0.050	SPIRAL	60	885.21	200	2864.79	1200	-1.188%	578	570	STPP 2-2(9)77	
1728+40.79	81.30	81.53	0.080	0.070	SPIRAL	60	781.30	200	1909.86	1200	-0.200%	567	570	STPP 2-2(9)77	
1777+08.2	82.28	82.39	0.080	0.050	SPIRAL	60	173.31	200	2864.79	1200	-0.824%	574	570	STPP 2-2(9)77	
1357+00.	82.60				Reference Point									F-(86)19	
1380+22.3	83.04				No Curve	35								F-(86)19	Assumed 35MPH Design Speed through town
1404+82.5	83.47	83.54	0.040	N.C.	SIMPLE	35	380.8		2865	392	0.030%	246	253	F-(86)19	starting at approx. RM 82.5 and ending at
1421+64.4	84.00				No Curve		Reference Point							F-FG86(30)	RM 84.5
1455+89.9	84.32	84.97	0.080	N.C.	SIMPLE	35	3443.2		5730	392	0.112%	246	253	F-FG86(30)	
1491+18.4	85.24	85.40	0.080	0.080	SIMPLE	60	842.2		1910	1200	0.386%	562	570	F-FG86(30)	
1512+71.4	85.51	85.94	0.080	0.080	SIMPLE	60	2256.7		1910	1200	3.000%	538	570	F-FG86(30)	

SUMMARY OF MDT CONTROLLING DESIGN CRITERIA
MAIN LINE SUMMARY (UNDIVIDED)

PROJECT: BAKER CORRIDOR PLANNING STUDY
PROJECT LOCATION: CITY OF BAKER, FALLON COUNTY, MT
HIGHWAY SECTION: BAKER
FUNCTIONAL CLASSIFICATION MINOR ARTERIAL

ROUTE: MT 7
BEGINNING RM: 31.500
ENDING RM: 38.00

TRAFFIC VOLUMES AND FACTORS:

CONSTRUCTION YEAR	DESIGN YEAR	TRAFFIC FACTORS
TBD	TBD	K=
AADT (VPD)	AADT (VPD)	D=
SEE TRAFFIC DATA	SEE TRAFFIC DATA	T=

THE POSTED SPEED LIMIT IS: 70 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:**

LANE AND SHOULDER WIDTH:

	EXISTING (M)	RM FROM	RM TO	MDT RECOMMENDED MINIMUM (FT)	MDT RECOMMENDED MINIMUM (M)
WIDTH OF TRAVELED WAY:	*3.6*	32	35.4	24	*3.6*
SHOULDER WIDTH:	*0.6*	32	34.8	2	*0.6*
SHOULDER WIDTH:	*2.75*	34.8	35.3		
SHOULDER WIDTH:	*0.45*	35.3	35.4		

VPI STATION	REFERENCE MARKER BEGIN	REFERENCE MARKER END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)/*(M)*	TYPE OF CURVE	MAX GRADE FIG. 12-4 (RURAL) FIG. 12-8 (URBAN) LEVEL=3% (RURAL) 7%(URBAN) %	K=L/A (MDT ROAD DESIGN MANUAL EQ. 10.5-2) FIG. 12-4 (RURAL) FIG. 12-8 (URBAN) K-VALUE EXISTING (FT)/*(M)*	K-VALUE REQUIRED (FT)/*(M)*	K=S^2 / 2158 (US) K=S^2/658 (METRIC) FIG. 10.5A STOPPING SIGHT DISTANCE EXISTING (FT)/*(M)*	STOPPING SIGHT DISTANCE REQUIRED (FT)/*(M)*	EXISTING SPEED (MPH)/*(kph)*	AS-BUILT PROJECT NUMBER	NOTES
127+90.	31.00					Reference Point								
131+00.	31.19	31.25	-0.991	0.800	*300*	SAG	3	*167.50*	*45*	331.99	*185*	*90*	STPP-STPE 27-2(14)29	*Metric Job, Existing Speed*
136+50.	31.53	31.63	0.800	-2.070	*500*	CREST	3	*174.22*	*52*	338.58	*185*	*90*	STPP-STPE 27-2(14)29	*Limit based on Signing Plans in As-Builts*
142+20.	31.89	31.95	-2.070	-2.491	*300*	CREST	3	*712.59*	*52*	684.75	*185*	*90*	STPP-STPE 27-2(14)29	
147+40.	32.21	32.25	-2.491	0.732	*200*	SAG	3	*62.05*	*45*	202.07	*185*	*90*	STPP-STPE 27-2(14)29	
151+50.	32.47	32.54	0.732	-1.247	*400*	CREST	3	*202.12*	*52*	364.69	*185*	*90*	STPP-STPE 27-2(14)29	
160+80.	33.04	33.10	-1.247	1.077	*300*	SAG	3	*129.09*	*45*	291.44	*185*	*90*	STPP-STPE 27-2(14)29	
166+00.	33.37	33.41	1.077	3.975	*200*	SAG	4	*69.01*	*45*	213.10	*185*	*90*	STPP-STPE 27-2(14)29	
170+00.	33.62	33.68	3.975	-0.241	*320*	CREST	4	*75.90*	*52*	223.48	*185*	*90*	STPP-STPE 27-2(14)29	
178+30.	34.13	34.18	-0.241	-3.930	*270*	CREST	4	*73.19*	*52*	219.45	*185*	*90*	STPP-STPE 27-2(14)29	
182+60.	34.40	34.44	-3.930	-1.750	*240*	SAG	4	*110.09*	*23*	269.15	*105*	*65*	STPP-STPE 27-2(14)29	Assumed 35MPH/65KPH Design Speed
188+60.	34.77	34.81	-1.750	-1.294	*200*	SAG	7	*438.60*	*18*	537.21	*85*	*65*	STPP-STPE 27-2(14)29	through town starting at approx. RM 34.3 and ending at RM 37.0
192+00.	34.98	35.02	-1.294	0.312	*200*	SAG	7	*124.53*	*18*	286.26	*85*	*65*	STPP-STPE 27-2(14)29	
196+17.	35.24	35.26	0.312	-0.326	*100*	CREST	7	*156.74*	*11*	321.15	*85*	*65*	STPP-STPE 27-2(14)29	
7+50.	35.65	35.69	-0.60	-2.50	200	CREST	7	105.26	14	476.61	253	35	F-2(12)	US Units
11+70.	35.75	35.83	-2.50	0.09	400	SAG	7	154.44	21	577.31	253	35	F-2(12)	
18+00.	35.83		0.09	0.00		NO V.C.							F-2(12)	
26+94.	36.00					Reference Point							F-2(12)	
27+00.	36.00	36.11	0.00	1.56	600	SAG	7	384.62	51	911.04	253	35	F-2(12)	
35+00.	36.15	36.27	1.56	0.07	600	CREST	3	401.61	32	930.95	253	35	F-2(12)	
45+00.	36.34	36.38	0.07	0.50	200	SAG	3	456.62	51	992.67	253	35	F-2(12)	
59+00.	36.61	36.80	0.50	3.00	1000	SAG	4	400.64	51	929.83	253	35	F-2(12)	
73+50.	36.88	37.13	3.00	-2.55	1300	CREST	4	234.23	32	710.97	253	35	F-2(12)	
82+50.	37.05	37.15	-2.55	3.10	500	SAG	4	88.50	136	437.01	570	60	F-2(12)	
88+50.	37.17	37.26	3.10	0.60	500	CREST	4	200.00	151	656.96	570	60	F-2(12)	
97+50.	37.34	37.45	0.60	4.66	600	SAG	4	147.78	136	564.73	570	60	F-2(12)	
109+20.	37.56	37.86	4.66	-2.82	1600	CREST	4	213.90	136	679.41	570	60	F-2(12)	
120+60.	37.77	37.89	-2.82	1.50	600	SAG	4	138.89	136	547.47	570	60	F-2(12)	

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	REFERENCE MARKER BEGIN	REFERENCE MARKER END	SUPERELEVATION MDT MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	TYPE OF CURVE	DESIGN SPEED (MPH)/*(kph)*	LENGTH EXISTING (FT)/*(M)*	SPIRAL LENGTH EXISTING (FT)/*(M)*	RADIUS EXISTING (FT)/*(M)*	RADIUS REQUIRED (FT)/*(M)*	EXISTING GRADE (%)	FIG. 8.6A HORIZONTAL SSD EXISTING (FT)/*(M)*	FIG. 8.6A HORIZONTAL SSD REQUIRED (FT)/*(M)*	AS-BUILT PROJECT NUMBER	NOTES
127+90.	31.00				Reference Point									STPP-STPE 27-2(14)29	
146+07.53	31.91	32.35		N.C.	SIMPLE	*90*	*721.40*		*3500*	*305*	-2.491%	*162*	*160*	STPP-STPE 27-2(14)29	*Metric Job, Existing Speed*
166+61.8	33.37	33.44		N.C.	SIMPLE	*90*	*123.60*		*3500*	*305*	3.975%	*145*	*160*	STPP-STPE 27-2(14)29	*Limit based on Signing Plans in As-Builts*
168+89.26	33.51	33.59		N.C.	SIMPLE	*90*	*123.60*		*3500*	*305*	3.975%	*145*	*160*	STPP-STPE 27-2(14)29	
194+67.57	35.03	35.27		N.C.	SIMPLE	*65*	*381.60*		*620*	*158*	0.312%	*93*	*95*	STPP-STPE 27-2(14)29	Assumed 35MPH/65KPH Design Speed
26+94.	36.00				Reference Point									F-2(12)	through town starting at approx. RM 34.3 and
28+43.	35.90	36.16		N.C.	SIMPLE	35	1365.0		5730	253	1.560%	241	253	F-2(12)	ending at RM 37.0

SUMMARY OF MDT CONTROLLING DESIGN CRITERIA
MAIN LINE SUMMARY (UNDIVIDED)

PROJECT: BAKER CORRIDOR PLANNING STUDY
PROJECT LOCATION: CITY OF BAKER, FALLON COUNTY, MT
HIGHWAY SECTION: BAKER
FUNCTIONAL CLASSIFICATION: MAJOR COLLECTOR

ROUTE: ROUTE 493
BEGINNING RM: 0.00
ENDING RM: 2.50

TRAFFIC VOLUMES AND FACTORS:

CONSTRUCTION YEAR	DESIGN YEAR	TRAFFIC FACTORS
TBD	TBD	K=
AADT (VPD)	AADT (VPD)	D=
SEE TRAFFIC DATA	SEE TRAFFIC DATA	T=

THE POSTED SPEED LIMIT IS: 60 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:**

LANE AND SHOULDER WIDTH:

	EXISTING (FT)	MDT RECOMMENDED MINIMUM (FT)
WIDTH OF TRAVELED WAY:	24	24
SHOULDER WIDTH:	2	2

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	REFERENCE MARKER BEGIN	REFERENCE MARKER END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	TYPE OF CURVE	MAX GRADE FIGURE 12-5 LEVEL: 5% %	K=L/A (EQ. 10.5-2) K VALUE EXISTING (FT)	FIGURE 12-5 K VALUE REQUIRED (FT)	K=S^2 / 2158 (US) K=S^2/658 (METRIC) FIG. 10.5A STOPPING SIGHT DISTANCE EXISTING (FT)	FIGURE 12-5 STOPPING SIGHT DISTANCE REQUIRED (FT)	DESIGN SPEED (MPH)	AS-BUILT PROJECT NUMBER	NOTES
697+99.5	2.50					Reference Point								
720+00.	2.08	2.01	-0.300	-1.481	400	CREST	5	338.70	84	854.93	425	50	S-398(1)	Assumed 50 MPH Design Speed
730+00.	1.89	1.86	-1.481	-0.517	200	SAG	5	207.47	96	669.12	425	50	S-398(1)	
740+00.	1.70	1.67	-0.517	-0.104	200	SAG	5	484.26	96	1022.27	425	50	S-398(1)	
750+00.	1.52	1.48	-0.104	0.288	200	SAG	5	510.20	96	1049.30	425	50	S-398(1)	
759+00.	1.34	1.31	0.288	1.485	200	SAG	5	167.08	96	600.47	425	50	S-398(1)	
768+00.	1.17	1.02	1.485	-2.643	800	CREST	5	193.80	84	646.70	425	50	S-398(1)	
779+50.	0.96	0.88	-2.643	1.0886	400	SAG	5	107.19	96	480.96	425	50	S-398(1)	
790+00.	0.76	0.61	1.089	-2.453	800	CREST	5	225.89	84	698.19	425	50	S-398(1)	
802+00.	0.53	0.45	-2.453	-0.148	400	SAG	5	173.54	96	611.96	425	50	S-398(1)	
810+00.	0.38	0.34	-0.148	1.402	200	SAG	5	129.03	96	527.69	425	50	S-398(1)	
814+00.	0.30	0.19	1.402	-2.833	600	CREST	5	141.68	84	552.94	425	50	S-398(1)	
820+00.	0.19	0.08	-2.833	0.646	600	SAG	5	172.46	96	610.06	425	50	S-398(1)	

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	REFERENCE MARKER BEGIN	REFERENCE MARKER END	SUPERELEVATION MDT MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	TYPE OF CURVE	DESIGN SPEED (MPH)	LENGTH EXISTING (FT)	SPIRAL LENGTH EXISTING (FT)	RADIUS EXISTING (FT)	RADIUS REQUIRED (FT)	EXISTING GRADE (%)	FIG. 8.6A HORIZONTAL SSD EXISTING (FT)	FIG. 8.6A HORIZONTAL SSD REQUIRED (FT)	AS-BUILT PROJECT NUMBER	
697+99.5	2.50				Reference Point										
720+43.6	2.18	1.97	0.080	N.C.	SIMPLE	50	1060.0		955.0	760	-1.481%	434	425	S-398(1)	Assumed 50 MPH Design Speed
743+00.	1.75	1.55	0.080	N.C.	SIMPLE	50	1064.7		955.0	760	-0.104%	424	425	S-398(1)	
784+67.1	0.96	0.75	0.080	N.C.	SIMPLE	50	1125.0		716.3	760	-2.643%	443	425	S-398(1)	

HORIZONTAL ALIGNMENT SUMMARY			
APPROXIMATE RM OF CURVE CENTER	**LENGTH OF CURVE (FT)/*(M)***	**RADIUS (FT)/*(M)***	**HORIZ. SSD (FT)/*(M)***
MT 12 (P-2) FROM RM 79 TO RM 82.63 AS-BUILT PROJECT: STPP-2-2(9)77			
81.04	885.21	2864.79	578
81.41	781.30	1909.86	567
82.34	173.31	2864.79	574
MT 12 (P-2) FROM RM 82.63 TO RM 83.78 AS-BUILT PROJECT: F-(86)19			
83.51	380.8	2865	246
MT 12 (P-2) FROM RM 83.78 TO RM 88 AS-BUILT PROJECT: F-FG86(30)			
84.65	3443.2	5730	246
85.32	842.2	1910	562
85.72	2256.7	1910	538
MT 7 (P-27) FROM RM 32 TO RM 35 AS-BUILT PROJECT: STPP-STPE 27-2(14)29			
32.13	*721.40*	***3500***	162
33.41	*123.60*	***3500***	145
33.55	*123.60*	***3500***	145
35.15	*381.60*	***620***	93
MT 7 (P-27) FROM RM 35 TO RM 38 AS-BUILT PROJECT: F-2(12)			
36.03	1365	5730	241
ROUTE 493 (S-793) FROM RM 0 TO RM 2.5 AS-BUILT PROJECT: F-2(12)			
2.07	1060.0	955.0	434
1.65	1064.7	955.0	424
0.86	1125.0	716.3	443

METRIC

US

Design Requirements referenced from MDT Road Design Manual: Figure 12-4 "Rural Minor Arterials", Figure 12-5 "Rural Collector Roads", and Figure 12-8 Urban Minor Arterials

VERTICAL ALIGNMENT SUMMARY

APPROXIMATE RM OF CURVE CENTER	TYPE OF CURVE	LENGTH (FT)/*(M)*	GRADE IN (G1)%	GRADE OUT (G2)%	K-VALUE	STOPPING SIGHT DISTANCE (SSD) (FT)/*(M)*
MT 12 (P-2) FROM RM 79 TO RM 83 AS-BUILT PROJECT: STPP 2-2(9)77						
79.02	SAG	1000	-0.7320	-0.2000	1879.70	2014.05
79.40	CREST	2000	-0.2000	-1.5310	1502.63	1800.74
79.61	SAG	1000	-1.5310	0.2500	561.48	1100.76
79.82	SAG	800	0.2500	0.6880	1826.48	1985.33
80.99	CREST	2000	0.6880	-1.1880	1066.10	1516.79
81.20	SAG	1000	-1.1880	0.2000	720.46	1246.90
81.72	SAG	1000	0.2000	0.3730	5780.35	3531.85
82.26	CREST	1600	0.3730	-0.8240	1336.68	1698.39
82.42	SAG	800	-0.8240	0.0990	866.74	1367.63
MT 12 (P-2) FROM RM 84 TO RM 89 AS-BUILT PROJECT: F-FG86						
84.10	SAG	400	0.6480	1.7050	378.43	903.69
84.18	CREST	400	1.7050	0.1670	260.08	749.17
84.31	SAG	600	0.1670	1.0000	720.29	1246.75
84.44	CREST	400	1.0000	0.8100	2105.26	2131.47
84.64	CREST	400	0.8100	0.1120	573.07	1112.06
85.35	SAG	400	0.1120	0.3860	1459.85	1774.93
85.82	SAG	800	0.3860	3.0000	306.04	812.68
86.06	CREST	1000	3.0000	-3.0000	166.67	599.72
86.26	SAG	800	-3.0000	1.0470	197.68	653.14
87.00	SAG	800	1.0470	1.2020	5161.29	3337.37
87.88	CREST	1000	1.2020	-0.7910	501.76	1040.57
88.88	SAG	600	-0.7910	0.2820	559.18	1098.50
MT 7 (P-27) FROM RM 31 TO RM 35 AS-BUILT PROJECT: STPP-STPE 27-2(14)29						
31.22	SAG	*300*	-0.9910	0.8000	***167.50***	***331.99***
31.58	CREST	*500*	0.8000	-2.0700	***174.22***	***338.58***
31.92	CREST	*300*	-2.0700	-2.4910	***712.59***	***684.75***
32.23	SAG	*200*	-2.4910	0.7320	***62.05***	***202.07***
32.50	CREST	*400*	0.7320	-1.2470	***202.12***	***364.69***
33.07	SAG	*300*	-1.2470	1.0770	***129.09***	***291.44***
33.39	SAG	*200*	1.0770	3.9750	***69.01***	***213.10***
33.65	CREST	*320*	3.9750	-0.2410	***75.90***	***223.48***
34.16	CREST	*270*	-0.2410	-3.9300	***73.19***	***219.45***
34.42	SAG	*240*	-3.9300	-1.7500	***110.09***	***269.15***
34.79	SAG	*200*	-1.7500	-1.2940	***438.60***	***537.21***
35.00	SAG	*200*	-1.2940	0.3120	***124.53***	***286.26***
35.25	CREST	*100*	0.3120	-0.3260	***156.74***	***321.15***
MT 7 (P-27) FROM RM 35 TO RM 38 AS-BUILT PROJECT: F-2(12)						
35.67	CREST	200	-0.6000	-2.5000	105.26	476.61
35.79	SAG	400	-2.5000	0.0900	154.44	577.31
35.83	NO V.C.		0.0900	0.0000		

APPROXIMATE RM OF CURVE CENTER	TYPE OF CURVE	LENGTH (FT)/*(M)*	GRADE IN (G1)%	GRADE OUT (G2)%	K-VALUE	STOPPING SIGHT DISTANCE (SSD) (FT)/*(M)*
36.06	SAG	600	0.0000	1.5600	384.62	911.04
36.21	CREST	600	1.5600	0.0660	401.61	930.95
36.36	SAG	200	0.0660	0.5040	456.62	992.67
36.70	SAG	1000	0.5040	3.0000	400.64	929.83
37.00	CREST	1300	3.0000	-2.5500	234.23	710.97
37.10	SAG	500	-2.5500	3.1000	88.50	437.01
37.21	CREST	500	3.1000	0.6000	200.00	656.96
37.39	SAG	600	0.6000	4.6600	147.78	564.73
37.71	CREST	1600	4.6600	-2.8200	213.90	679.41
37.83	SAG	600	-2.8200	1.5000	138.89	547.47
ROUTE 493 (S-793) FROM RM 0 TO RM 2.5 AS-BUILT PROJECT: S-398(1)						
2.05	CREST	400	-0.3	-1.481	338.70	854.93
1.87	SAG	200	-1.481	-0.517	207.47	669.12
1.69	SAG	200	-0.517	-0.104	484.26	1022.27
1.50	SAG	200	-0.104	0.288	510.20	1049.30
1.33	SAG	200	0.288	1.485	167.08	600.47
1.10	CREST	800	1.485	-2.643	193.80	646.70
0.92	SAG	400	-2.643	1.0886	107.19	480.96
0.68	CREST	800	1.0886	-2.453	225.89	698.19
0.49	SAG	400	-2.453	-0.148	173.54	611.96
0.36	SAG	200	-0.148	1.402	129.03	527.69
0.25	CREST	600	1.402	-2.833	141.68	552.94
0.13	SAG	600	-2.833	0.646	172.46	610.06

METRIC

US

FAILED BASED ON MDT DESIGN REQUIREMENTS

Design Requirements referenced from MDT Road Design Manual: Figure 12-4 "Rural Minor Arterials", Figure 12-5 "Rural Collector Roads", and Figure 12-8 Urban Minor Arterials

RIGHT-OF WAY WIDTHS

MT 12 (P-2) FROM RM 79 TO RM 82.63
AS-BUILT PROJECT: STPP 2-2(9)77

RP	NORTH	SOUTH
78.88	110	100
79.29	110	100
79.30	110	80
79.48	110	80
79.50	110	110
79.76	110	110
79.77	110	100
80.08	110	100
80.10	110	80
80.39	110	80
80.41	110	110
80.47	110	110
80.48	110	100
80.66	110	100
80.67	110	110
80.92	110	110
80.96	110	100
81.11	110	100
81.13	110	120
81.16	110	120
81.20	110	80
81.26	110	80
81.27	110	110
81.37	110	110
81.39	110	130
81.45	110	130
81.46	110	110
81.79	110	110
81.80	110	100
81.87	110	100
81.88	110	110
82.01	110	110
82.03	90	110
82.05	90	110
82.07	90	90
82.15	90	90
82.16	90	70
82.26	90	70
82.26	80	70
82.27	80	70
82.28	80	80
82.44	80	80
82.46	60	80
82.62	60	80

MT 12 (P-2) FROM RM 82.63 TO RM 83.78
AS-BUILT PROJECT: F-(86)19

RP	NORTH	SOUTH
82.6	31	35
82.7	27	39
82.7	27	31

MT 12 (P-2) FROM RM 83.78 TO RM 88
AS-BUILT PROJECT: F-FG86(30)

RP	NORTH	SOUTH
84.00	30	70
84.31	40	60.5
84.97	40	50
84.97	40	80
85.08	40	80
85.09	40	50
85.23	40	50
85.24	40	70
85.35	80	70
85.37	80	100
85.47	80	100
85.48	80	80
85.73	80	80
85.92	90	90
86.08	90	90
86.09	80	80
86.16	80	80
86.16	80	100
86.22	80	100
86.22	80	80
86.34	80	80
86.34	80	90
87.35	80	90
87.35	80	65
87.60	80	65
87.60	80	80
87.68	80	80
87.70	100	80
87.72	100	80
87.74	80	80
88.00	80	80

MT 7 (P-27) FROM RM 32 TO RM 35
AS-BUILT PROJECT: STPP-STPE 27-2(14)29
(METRIC)

RP	WEST	EAST
31.90	27	26.6
31.94	33	26.6
32.03	33	26.6
32.05	26	26.6
32.37	26	26.6
32.39	30	26.6
32.55	30	35.82

32.60	30	35.82
32.62	47	35.82
32.62	47	35.82
32.63	47	41
32.67	47	41
32.70	34	41
32.72	34	31.37
32.77	34	31.37
32.78	31	31.37
33.04	31	
33.05	28	
33.21	28	31.26
33.21	28	31.26
33.27	54	31.26
33.29	54	31.26
33.34	25	31.26
33.37	25	31.26
33.44	22.7	31.15
33.75	22.7	22.99
33.78	29	25
33.84	29	25
33.85	22.73	25
34.01	22.78	25
34.03	29	25
34.13	29	25
34.14	33	25
34.18	33	25
34.20	22.84	25
34.20	22.84	25
34.21	22.91	22.81
34.46	20.52	22.76
34.46-35.11	EX. R/W	EX. R/W
35.11	EX. R/W	10.02
35.11	EX. R/W	12
35.13	EX. R/W	12
35.14	EX. R/W	14
35.16	EX. R/W	15
35.18	12	15
35.19	12	15
35.19	13.2	15
35.19	13.2	22
35.20	22.2	14
35.20	26.55	12.3
35.21	28.1	10.97
35.21	33.82	10.97
35.22	5.95	10.97
35.39	5.95	10.97

MT 7 (P-27) FROM RM 35 TO RM 38
AS-BUILT PROJECT: F-2(12)

RP	EAST	WEST
35.76	70	60
37.37	70	60
37.37	70	80
37.52	70	80

37.52	80	80
37.59	80	80
37.59	70	60
38.00	70	60

ROUTE 493 (S-793) FROM RM 0 TO RM 2.5
AS-BUILT PROJECT: F-2(12)

RP	NORTH/EAST	SOUTH/WEST
2.50	70	60
2.16	70	60
2.15	70	70
1.95	70	70
1.93	50	70
1.33	50	70
1.31	70	90
1.30	90	90
1.08	90	90
1.06	70	70
0.84	70	70
0.83	70	80
0.75	70	80
0.74	80	80
0.61	80	80
0.59	80	60
0.28	80	60
0.28	70	60
0.06	70	60
0.02	100	90
0.00	100	90

CLEAR ZONE SUMMARY

RM FROM-TO	SIDE OF ROAD	DESCRIPTION
MT 12 (P-2) FROM RM 79 TO RM 83 AS-BUILT PROJECT: STPP 2-2(9)77		
79.88	North and South	Dual 120" CSP 30' N/S from ETW. 6:1 Slopes
80.22	North and South	73" Drain 50' North 34' South From ETW 6:1 Slopes
81.15	North and South	54" Drain 80' North 60' South from ETW 4:1 Slopes
81.39	North and South	72" Drain and Stockpass 58' North 65' South from ETW 4:1 Slopes
81.88	North and South	60" Drain 60' North 50' South from ETW 4:1 Slopes
81.97	North and South	60" Drain 60' North 60' South from ETW 4:1 Slopes
82.39 - 82.44	North	Guardrail for Structure
82.42 - 82.47	South	Guardrail for Structure
MT 12 (P-2) FROM RM 83.78 TO RM 88 AS-BUILT PROJECT: F-FG86(30)		
85.78 - 86.00	South	Guardrail For Structure
85.92 - 86.02	North	Guardrail For Structure
86.18	North and South	16'5" SSPPA 34' N/S from ETW 3:1 Slopes
MT 7 (P-27) FROM RM 32 TO RM 35 AS-BUILT PROJECT: STPP-STPE 27-2(14)29		
31.02	East and West	1350 mm DR. 100' E/W Steep 3:1 Slopes
32.66	East and West	2700 mm DR. 85' E/W 3:1 Slopes
33.03	East and West	2400 mm Dr. 40' 3:1 Slopes
35.2	East and West	4800mm x 1200mm Box Culverts 13' East 20' West from ETW 3:1 Slopes
MT 7 (P-27) FROM RM 35 TO RM 38 AS-BUILT PROJECT: F-2(12)		
35.79 TO 35.84	East and West	Guardrail for Structure
ROUTE 493 (S-793) FROM RM 0 TO RM 2.5 AS-BUILT PROJECT: F-2(12)		
0.2	North and South	66" CSP 20' North 28' South 4:1 Slopes

AADT TAKEN FROM 5 YEAR CRASH SUMMARY ANALYSIS

ROUTE	AVE AADT	RM FROM	RM TO
US 12	1088	77	82
US 12	3025	82	83
US 12	2508	83	88
US 12	886	88	90
MT 7	654	31	34

*Clear Zone analyzed using the AADT from the 5 Year Crash Summary Analysis and Figure 14.2A (English and Metric) from the MDT Road Design Manual. Slopes are approximate and derived from the As-Built plan and profile.

CULVERY SUMMARY

MT 12 (P-2) FROM RM 79 TO RM 82.63
AS-BUILT PROJECT: STPP 2-2(9)77

Station	Size	Length	Remarks
79.01	48"	156'	Drain
79.36	24"	128'	Drain
79.59	36"	130'	Drain
79.61	48"	124'	Drain
79.77	120"	120'	Drain
79.78	120"	120'	Drain
80.11	28.5"x18"	100'	Drain
80.22	73"x45"	128'	Drain
80.48	28"x20"	90'	Drain
80.61	24"	108'	Drain
81.15	54"	272'	Drain
81.39	72"	180'	Drain
81.73	24"	166'	Drain
81.88	60"	176'	Drain
81.97	60"	238'	Drain
82.19	28"x20"	100'	Drain
82.24	28.5"x18"	96'	Drain

MT 12 (P-2) FROM RM 82.63 TO RM 83.78
AS-BUILT PROJECT: F-(86)19

82.67	24"	66'	Drain
82.69	18"	164'	Drain
82.74	18"	310'	Drain
82.80	15"	124'	Drain
82.80	18"x11"	138'	Drain
83.46	29"x18"	58'	Drain
83.62	29"x18"	64'	Drain

MT 12 (P-2) FROM RM 83.78 TO RM 88
AS-BUILT PROJECT: F-FG86(30)

84.01	29"X18"	51'	Drain
84.21	24"	72'	Drain
84.48	30"	59'	Drain
84.58	30"	59'	Drain
84.65	24"	59'	Drain
84.77	24"	82'	Drain
84.78	24"	82'	Drain
85.22	24"	95'	Drain
85.60	24"	88'	Drain
85.79	24"	132'	Drain
85.90	48"	188'	Drain
86.18	198"x132"	122'	Drain
86.74	24"	90'	Drain
87.37	24"	97'	Drain
87.54	36"	124'	Drain
88.05	24"	120'	Drain

MT 7 (P-27) FROM RM 32 TO RM 35 AS-BUILT PROJECT: STPP-STPE 27-2(14)29 (METRIC)			
31.02	1350mm	78m	Drain
31.27	600mm	40.4m	Drain
31.36	600mm	53.8m	Drain
31.89	1240mm x 840mm	24.6m	Drain
32.22	750mm	36m	Drain
32.27	600mm	36.8m	Drain
32.66	2700mm	70Jm	Drain
32.77	600mm	47.2m	Drain
33.03	2400mm	42Jm	Drain
33.20	900mm	32.8m	Drain
33.40	600mm	26.4m	Drain
33.69	600mm	23.4m	Drain
33.78	600mm	44Jm	Drain
33.85	600mm	33.2m	Drain
34.05	600mm	38m	Drain
34.30	600mm	21.6m	Drain
34.53	725mm x 460mm	17Jm	Drain
34.65	600mm	21.3m	Drain
35.20	4800mm x 1200mm	36.6m	Drain
MT 7 (P-27) FROM RM 35 TO RM 38 AS-BUILT PROJECT: F-2(12)			
35.95	36"	78'	Drain
36.03	24"	70'	Drain
36.85	24"	72'	Drain
37.04	18"	38'	Drain
37.17	24"	67'	Drain
37.30	24"	86'	Drain
37.55	24"	98'	Drain
37.76	24"	96'	Drain
37.86	24"	92'	Drain
38.20	24"	85'	Drain
38.31	36"	62'	Drain
ROUTE 493 (S-793) FROM RM 0 TO RM 2.5 AS-BUILT PROJECT: F-2(12)			
2.48	24"	80'	Drain
2.31	24"	100'	Drain
1.89	24"	80'	Drain
1.52	24"	72'	Drain
0.98	24"	102'	Drain
0.90	24"	102'	Drain
0.76	24"	92'	Drain
0.41	24"	72'	Drain
0.20	96"	104'	Drain

BAKER CORRIDOR
PLANNING STUDY

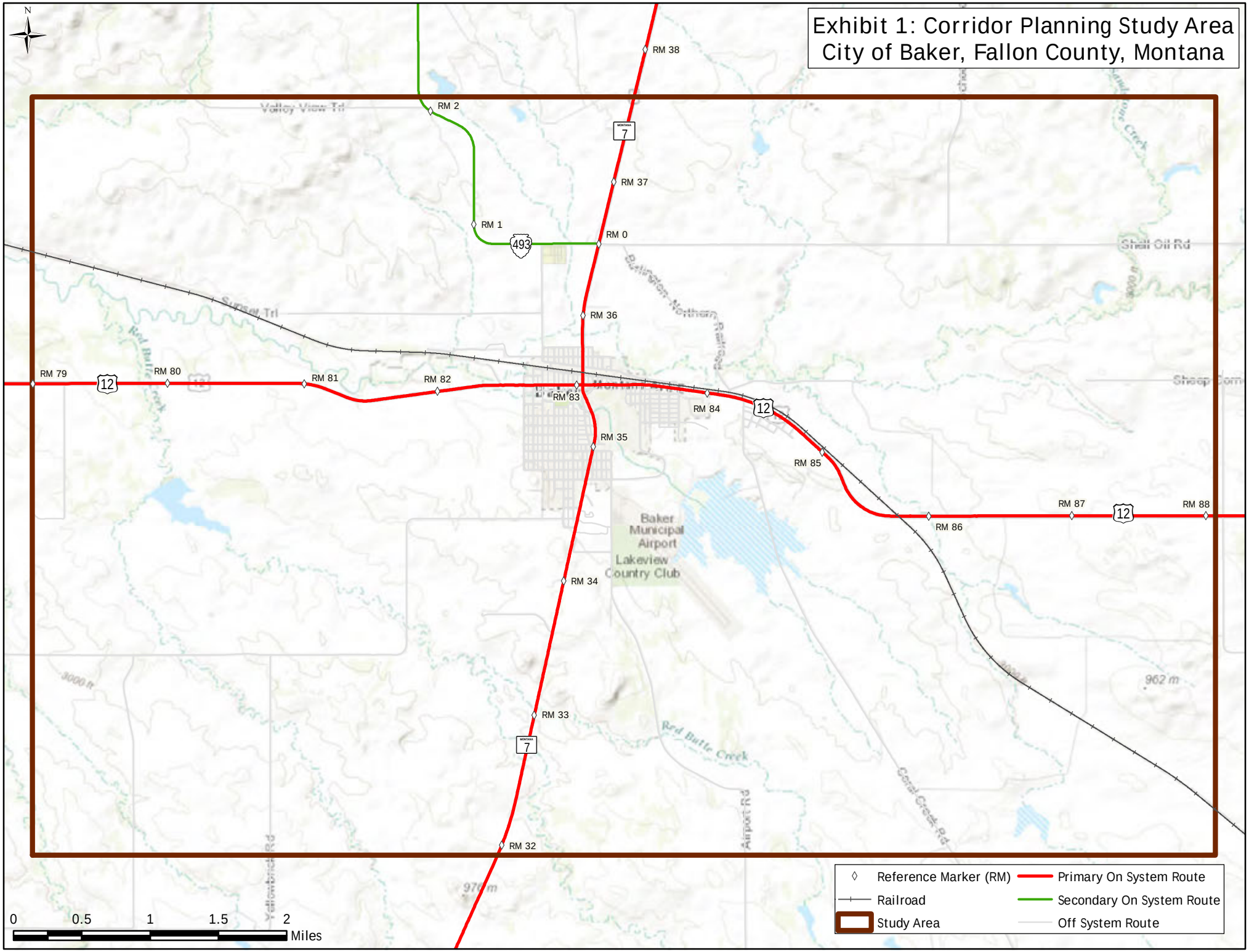
APPENDIX C: Environmental Scan Report

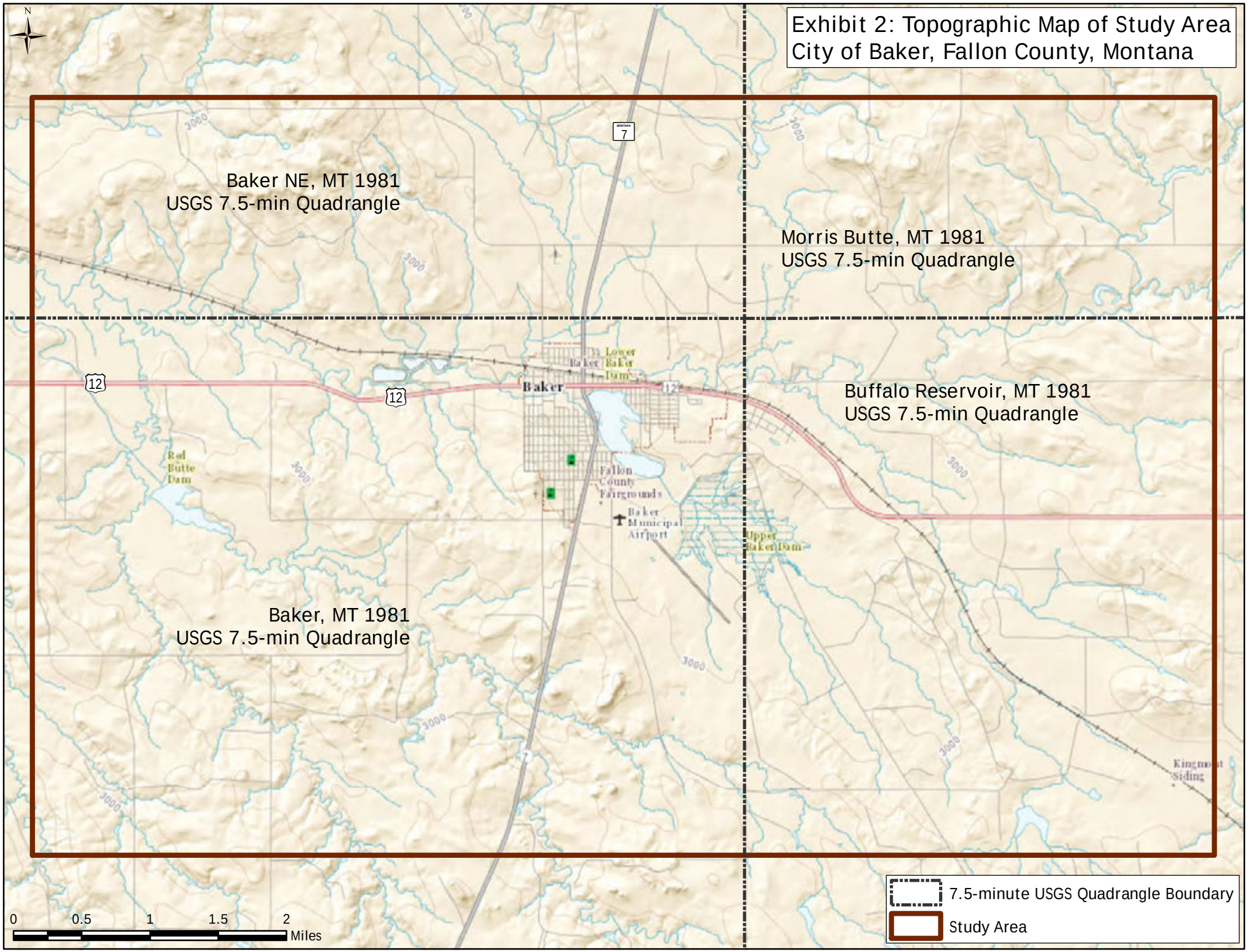
Baker Corridor Planning Study

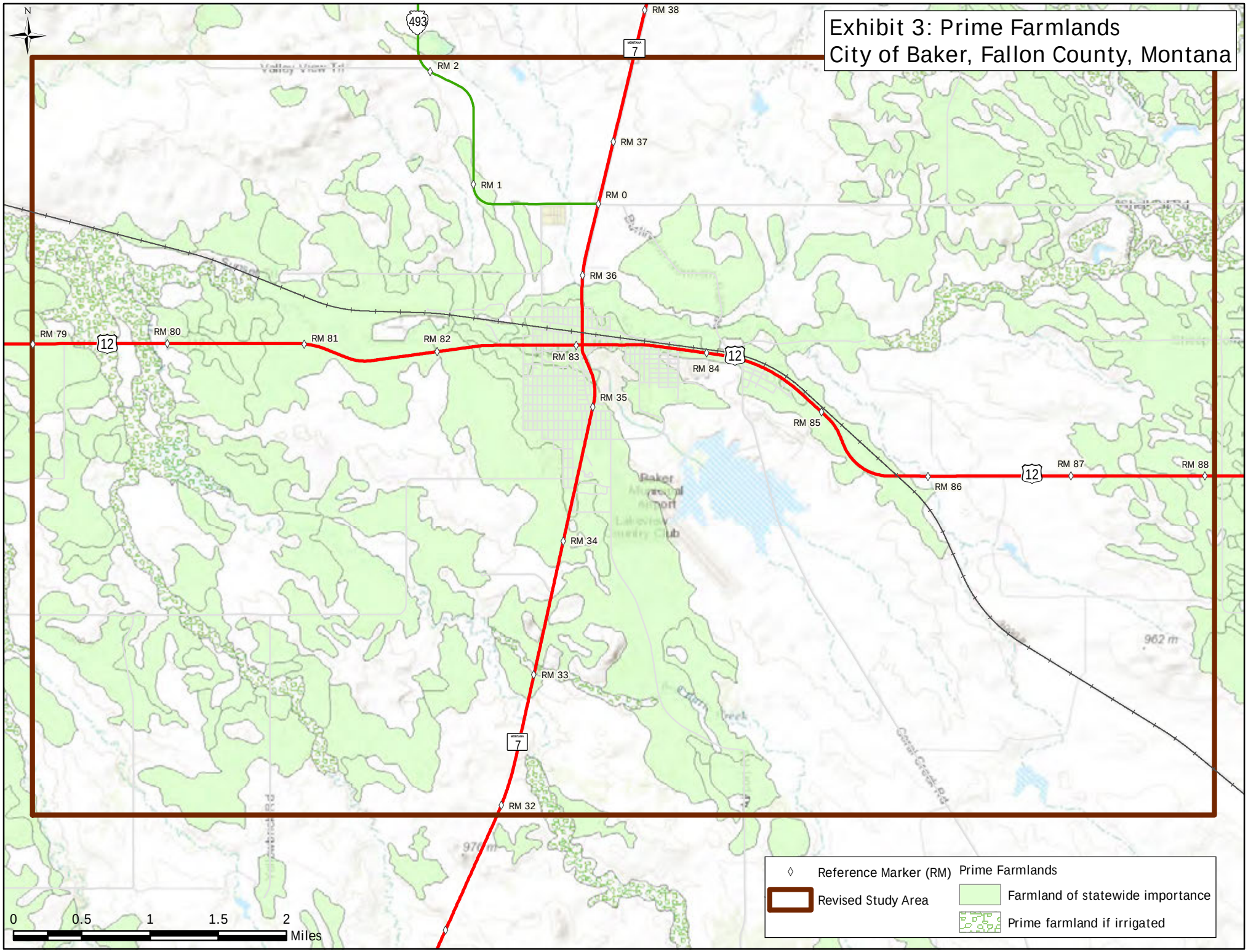
Attachment 1
Exhibits

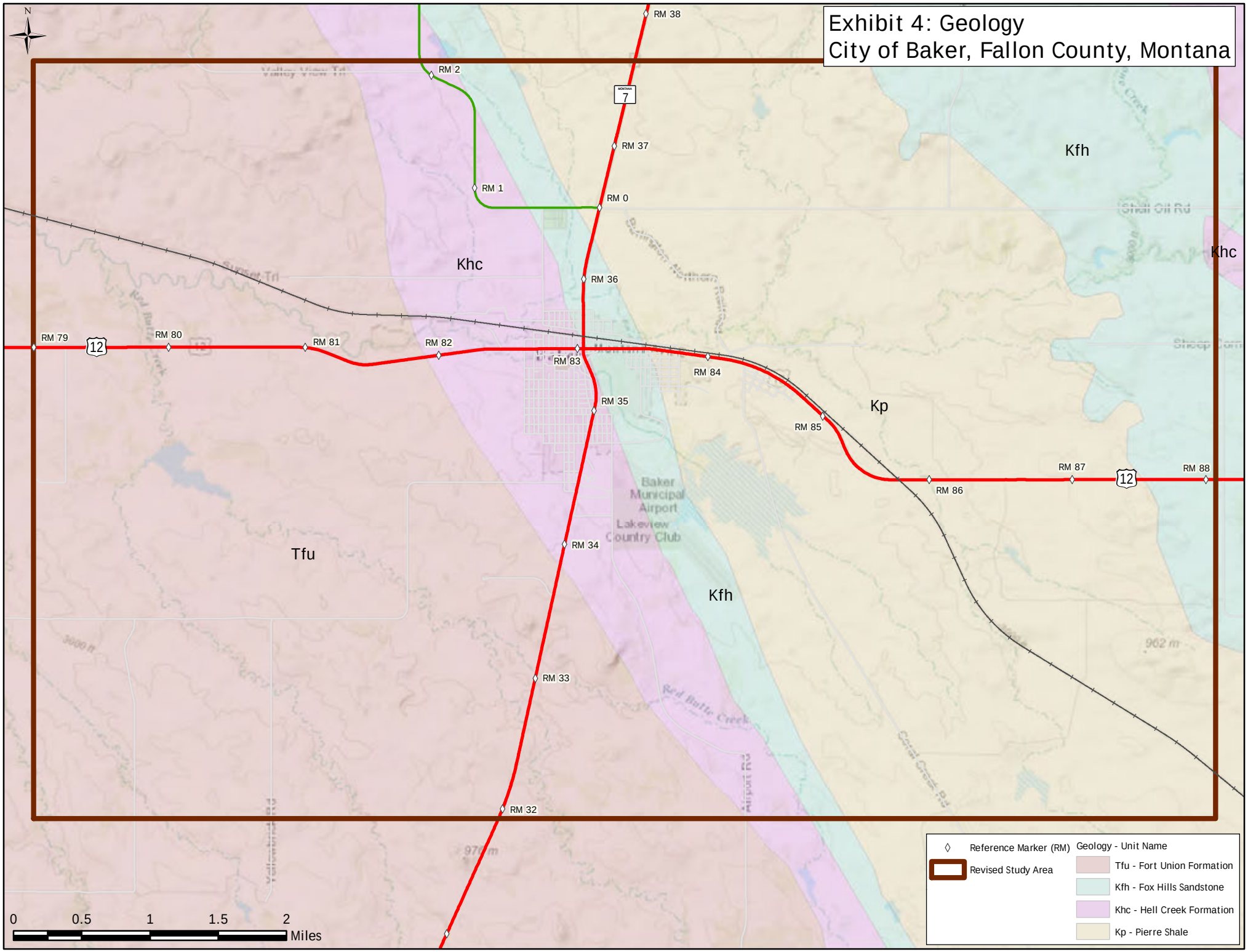
List of Exhibits

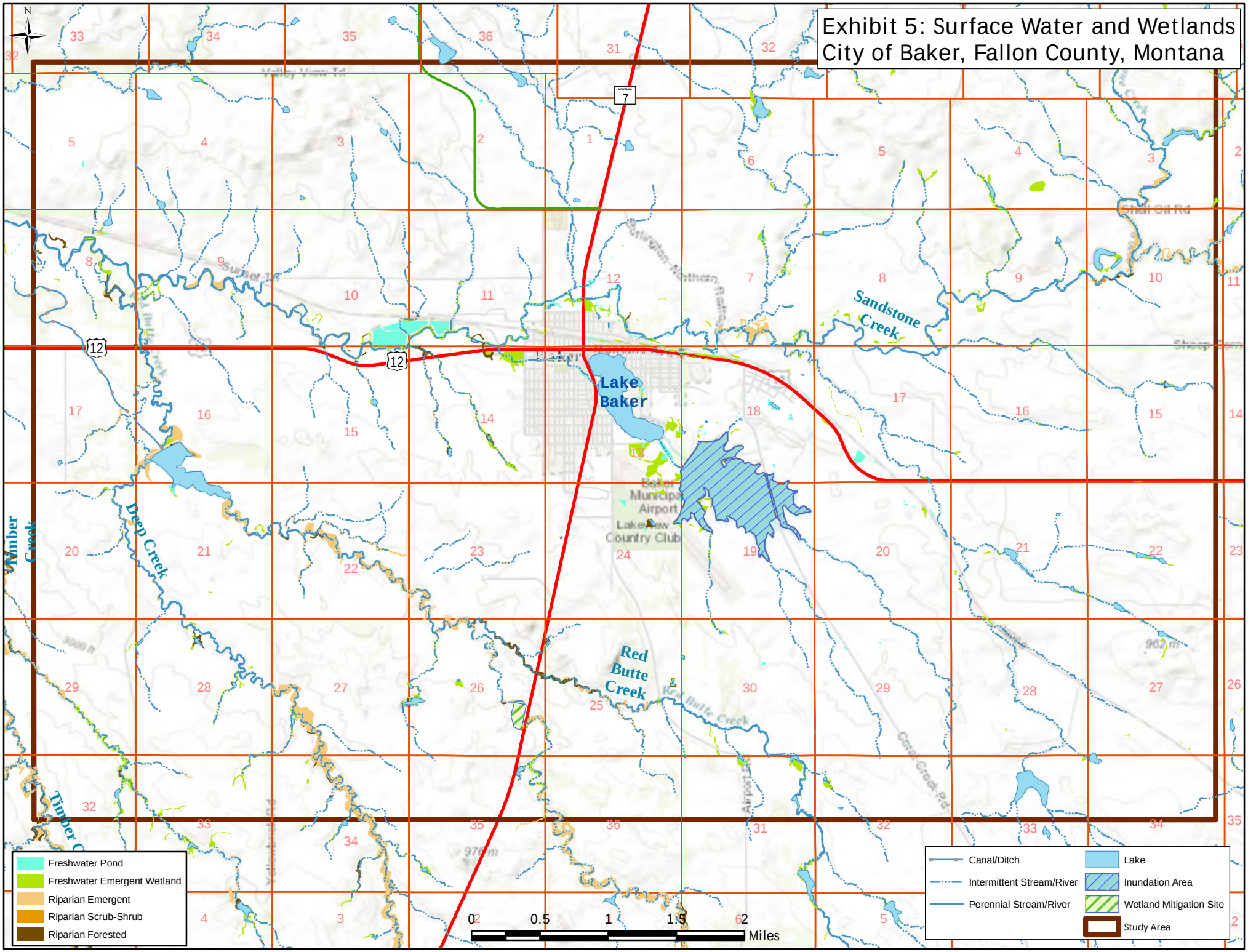
Exhibit 1	Corridor Planning Study Area
Exhibit 2	Topographic Map of Study Area
Exhibit 3	Prime Farmlands
Exhibit 4	Geology
Exhibit 5	Surface Water and Wetlands
Exhibit 6	Wells and Water Rights
Exhibit 7	Floodplains
Exhibit 8	UST and LUST Facilities
Exhibit 9	Mines, Hazardous Waste Handlers, and pipeline
Exhibit 10	Oil and Gas Wells
Exhibit 11	Land Use and Landcover
Exhibit 12	Wildlife
Exhibit 13	Species of Concern
Exhibit 14	Public Landownership
Exhibit 15	Recreational Facilities

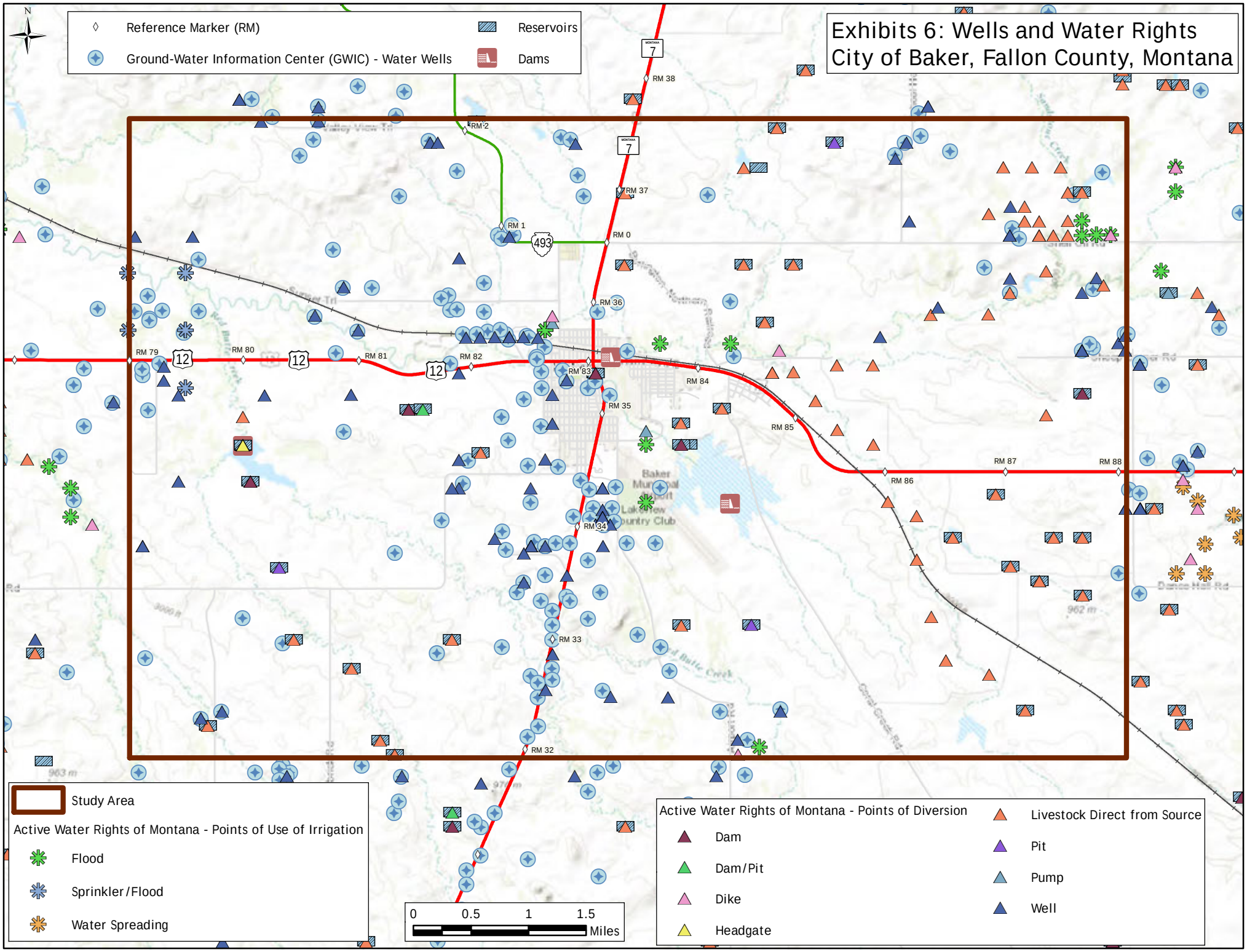

Exhibit 1: Corridor Planning Study Area
City of Baker, Fallon County, Montana
N
RM 38
RM 2
RM 37
RM 1
RM 0
RM 36
RM 79
RM 80
RM 81
RM 82
RM 83
RM 84
RM 35
RM 85
RM 87
RM 88
RM 86
RM 34
RM 33
RM 32
Valley View Trl
Sunset Trl
Red Butte Creek
Burlington Northern Railroad
Shell Oil Rd
Sheep Corn
Baker Municipal Airport
Lakeview Country Club
Airport Rd
Coral Creek Rd
Yellowbird Rd
962 m
0 0.5 1 1.5 2
Miles
Reference Marker (RM)
Railroad
Study Area
Primary On System Route
Secondary On System Route
Off System Route

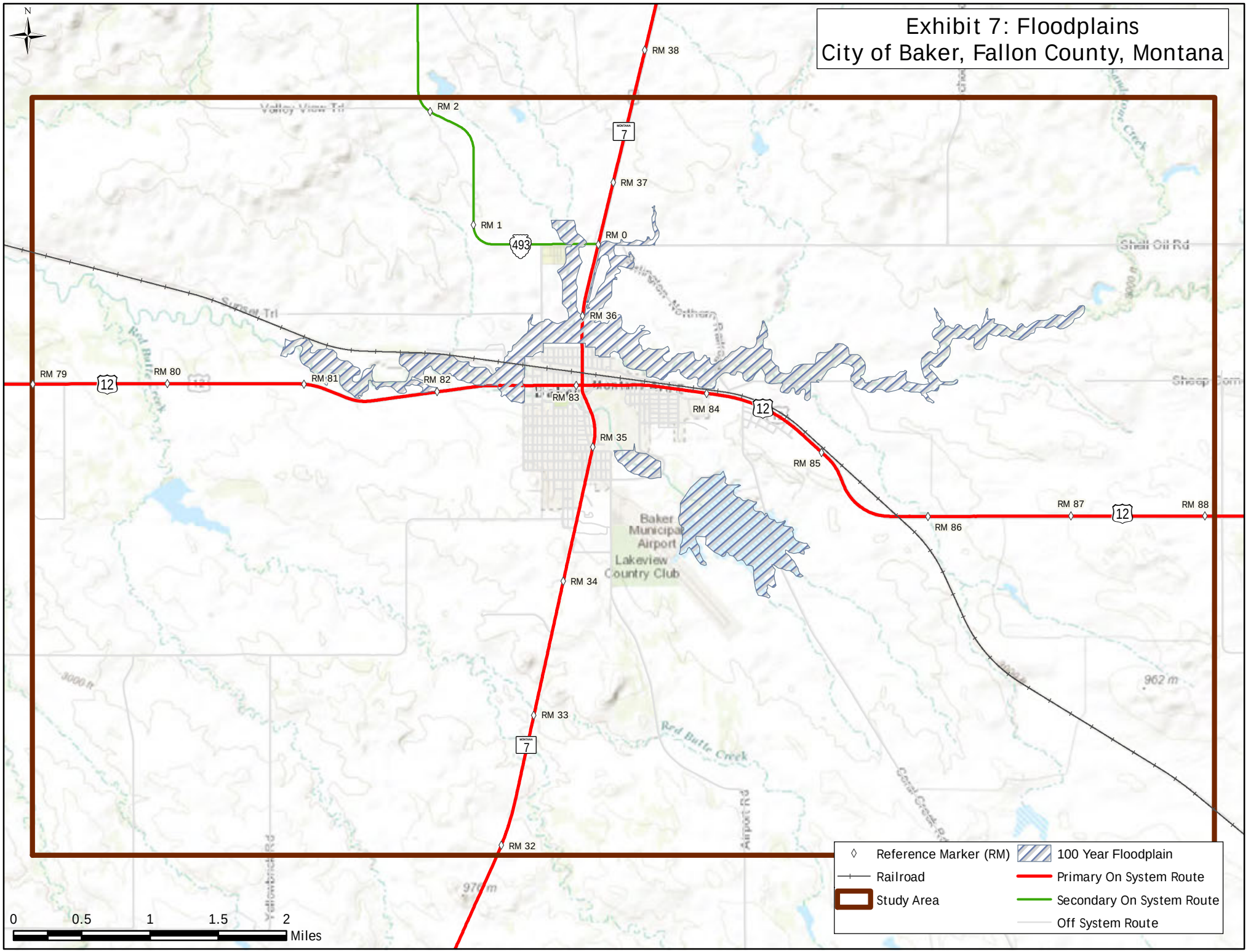

Exhibit 2: Topographic Map of Study Area
City of Baker, Fallon County, Montana
Baker NE, MT 1981
USGS 7.5-min Quadrangle
Morris Butte, MT 1981
USGS 7.5-min Quadrangle
Buffalo Reservoir, MT 1981
USGS 7.5-min Quadrangle
Baker, MT 1981
USGS 7.5-min Quadrangle
Baker
Lower Baker Dam
Upper Baker Dam
Red Butte Dam
Fallon County Fairgrounds
Baker Municipal Airport
Kingmont Siding
12
7
3000
N
0
0.5
1
1.5
2
Miles
7.5-minute USGS Quadrangle Boundary
Study Area

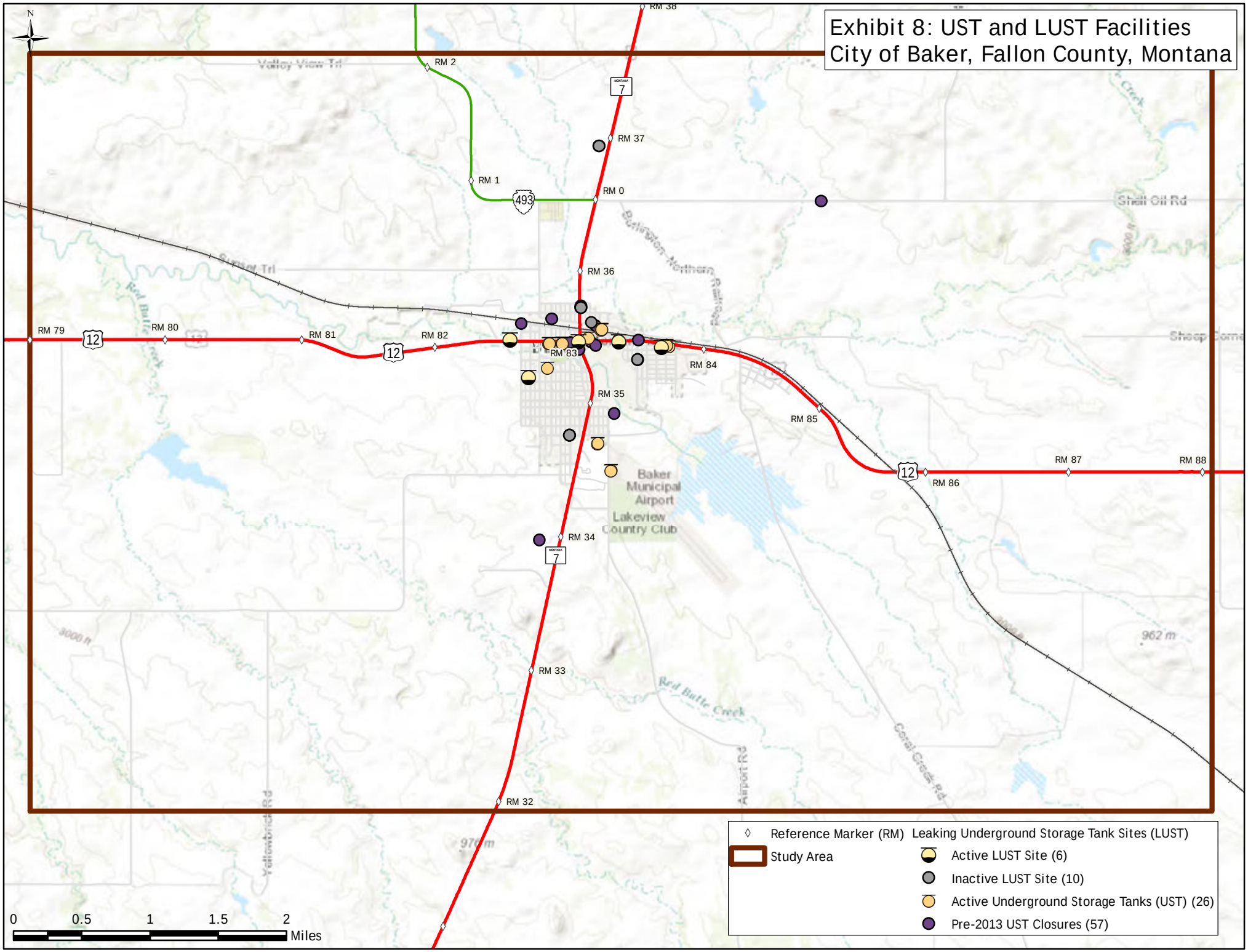

Exhibit 3: Prime Farmlands
City of Baker, Fallon County, Montana
N
493
7
12
RM 38
RM 37
RM 36
RM 35
RM 34
RM 33
RM 32
RM 2
RM 1
RM 0
RM 79
RM 80
RM 81
RM 82
RM 83
RM 84
RM 85
RM 86
RM 87
RM 88
Baker Municipal Airport
Lakeview Golf Club
962 m
Coastal Creek Rd
Reference Marker (RM)
Revised Study Area
Prime Farmlands
Farmland of statewide importance
Prime farmland if irrigated
0
0.5
1
1.5
2
Miles

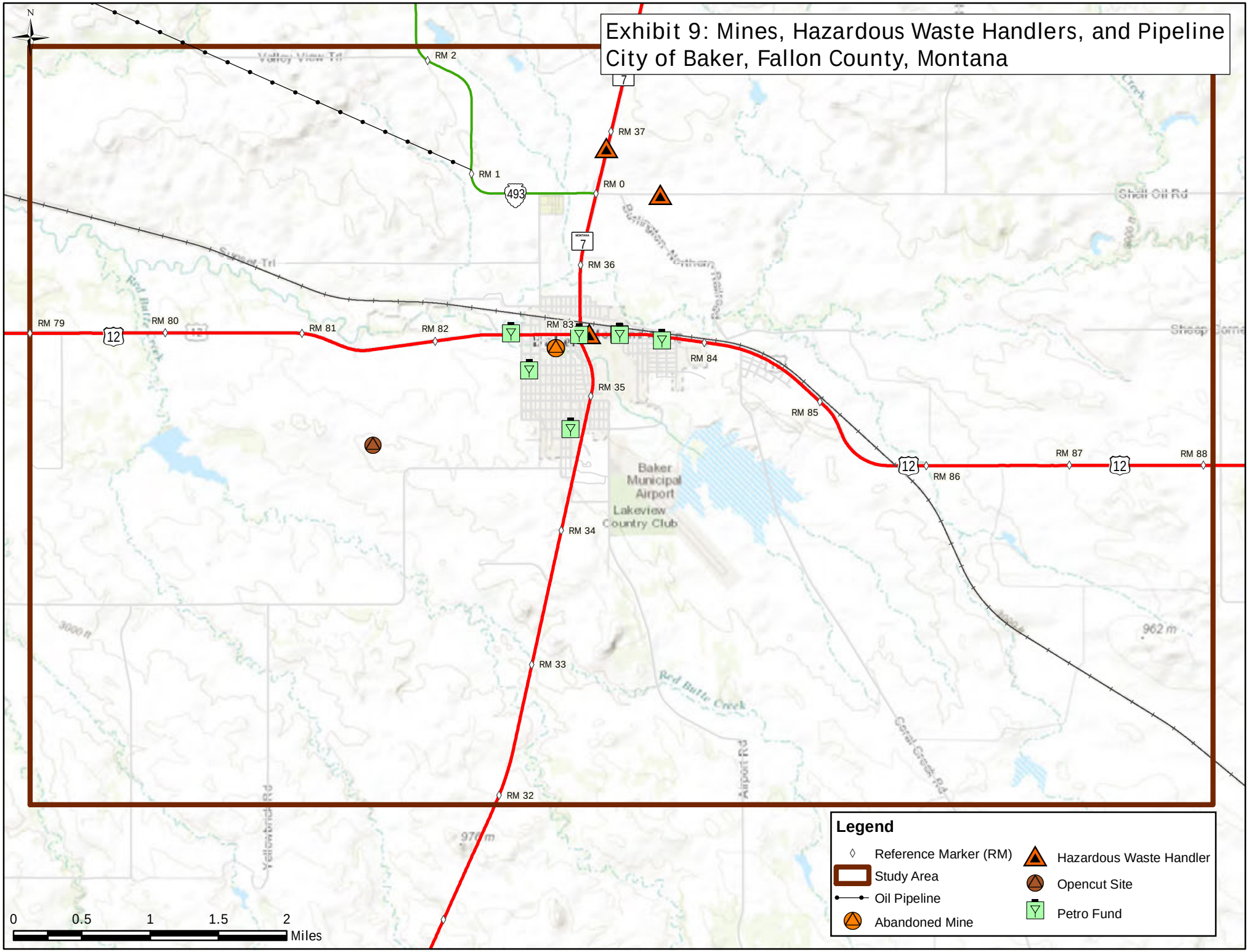

Exhibit 4: Geology
City of Baker, Fallon County, Montana
N
RM 38
RM 2
RM 37
RM 1
RM 0
RM 36
RM 79
RM 80
RM 81
RM 82
RM 83
RM 84
RM 35
RM 85
RM 86
RM 87
RM 88
RM 34
RM 33
RM 32
12
7
Kfh
Khc
Kp
Tfu
Baker Municipal Airport
Lakeview Country Club
0 0.5 1 1.5 2
Miles
Reference Marker (RM)
Revised Study Area
Geology - Unit Name
Tfu - Fort Union Formation
Kfh - Fox Hills Sandstone
Khc - Hell Creek Formation
Kp - Pierre Shale

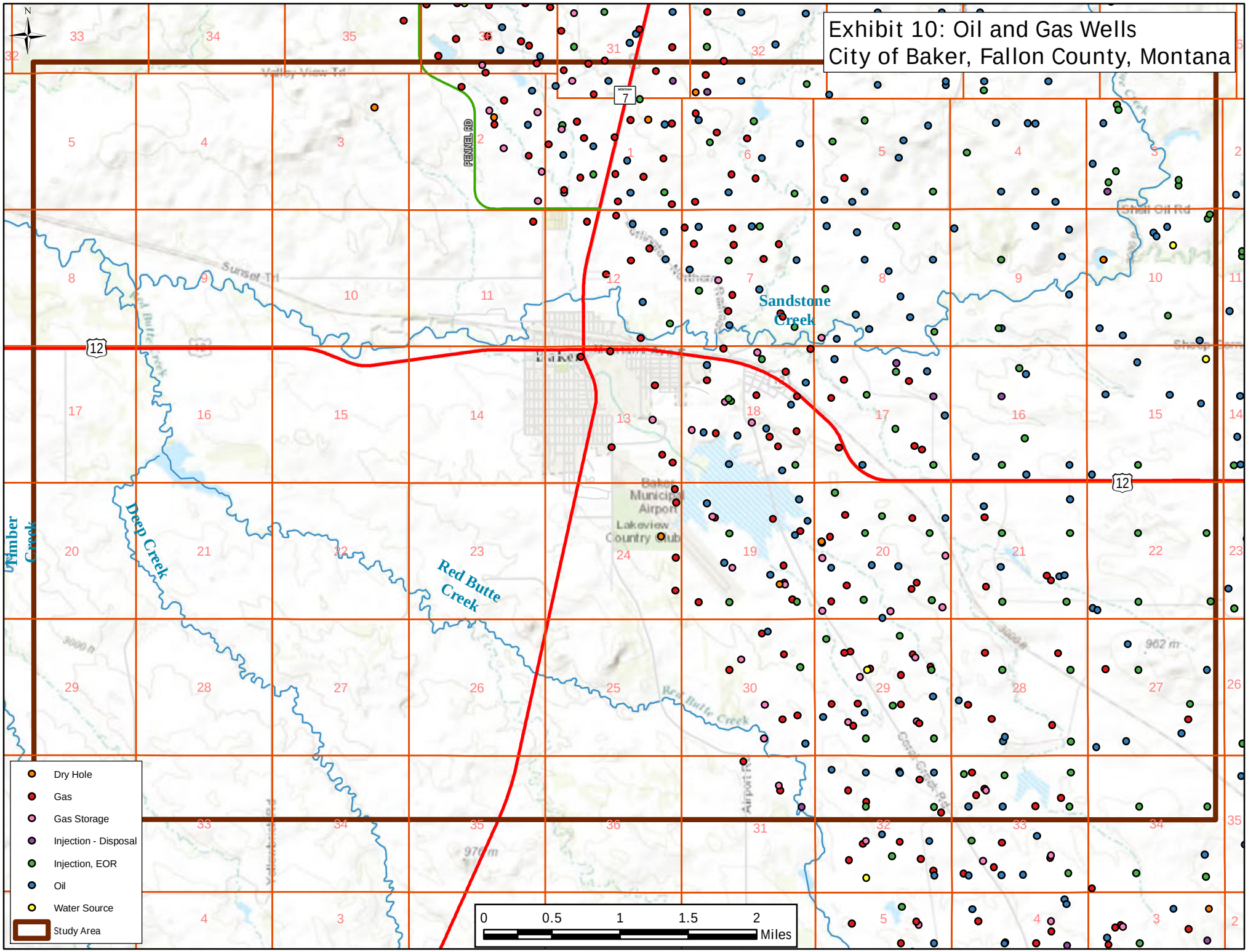

Exhibit 5: Surface Water and Wetlands
City of Baker, Fallon County, Montana
N
Lake Baker
Sandstone Creek
Deep Creek
Timber Creek
Red Butte Creek
Baker Municipal Airport
Lakeview Country Club
Freshwater Pond
Freshwater Emergent Wetland
Riparian Emergent
Riparian Scrub-Shrub
Riparian Forested
Canal/Ditch
Intermittent Stream/River
Perennial Stream/River
Lake
Inundation Area
Wetland Mitigation Site
Study Area
0 0.5 1 1.5 2
Miles

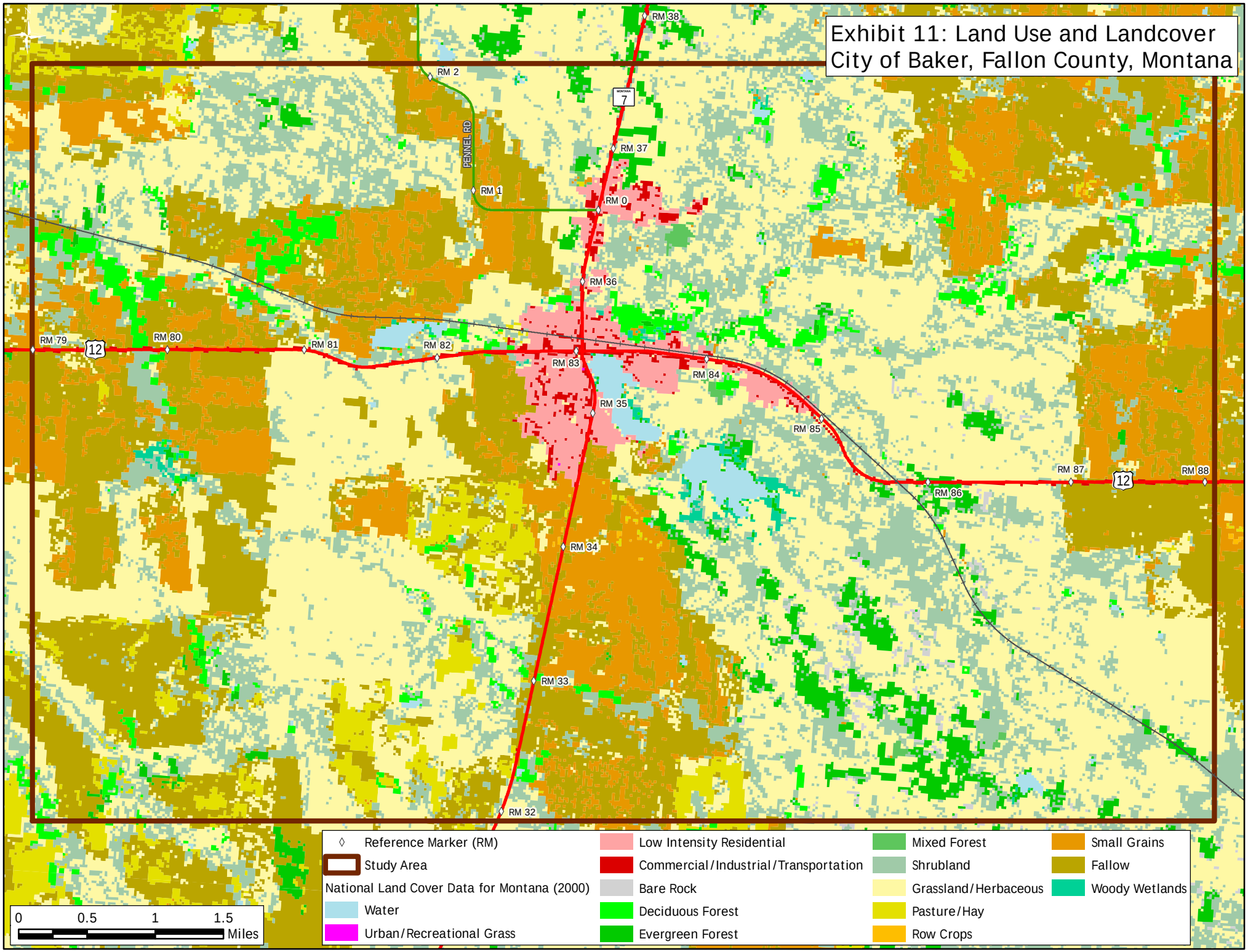

Exhibits 6: Wells and Water Rights
City of Baker, Fallon County, Montana
N
Reference Marker (RM)
Ground-Water Information Center (GWIC) - Water Wells
Reservoirs
Dams
RM 38
RM 37
RM 36
RM 35
RM 34
RM 33
RM 32
RM 2
RM 1
RM 0
RM 79
RM 80
RM 81
RM 82
RM 83
RM 84
RM 85
RM 86
RM 87
RM 88
MONTANA 7
493
12
Baker Municipal Airport
Lakeview Country Club
Study Area
Active Water Rights of Montana - Points of Use of Irrigation
Flood
Sprinkler/Flood
Water Spreading
0 0.5 1 1.5 Miles
Active Water Rights of Montana - Points of Diversion
Dam
Dam/Pit
Dike
Headgate
Livestock Direct from Source
Pit
Pump
Well

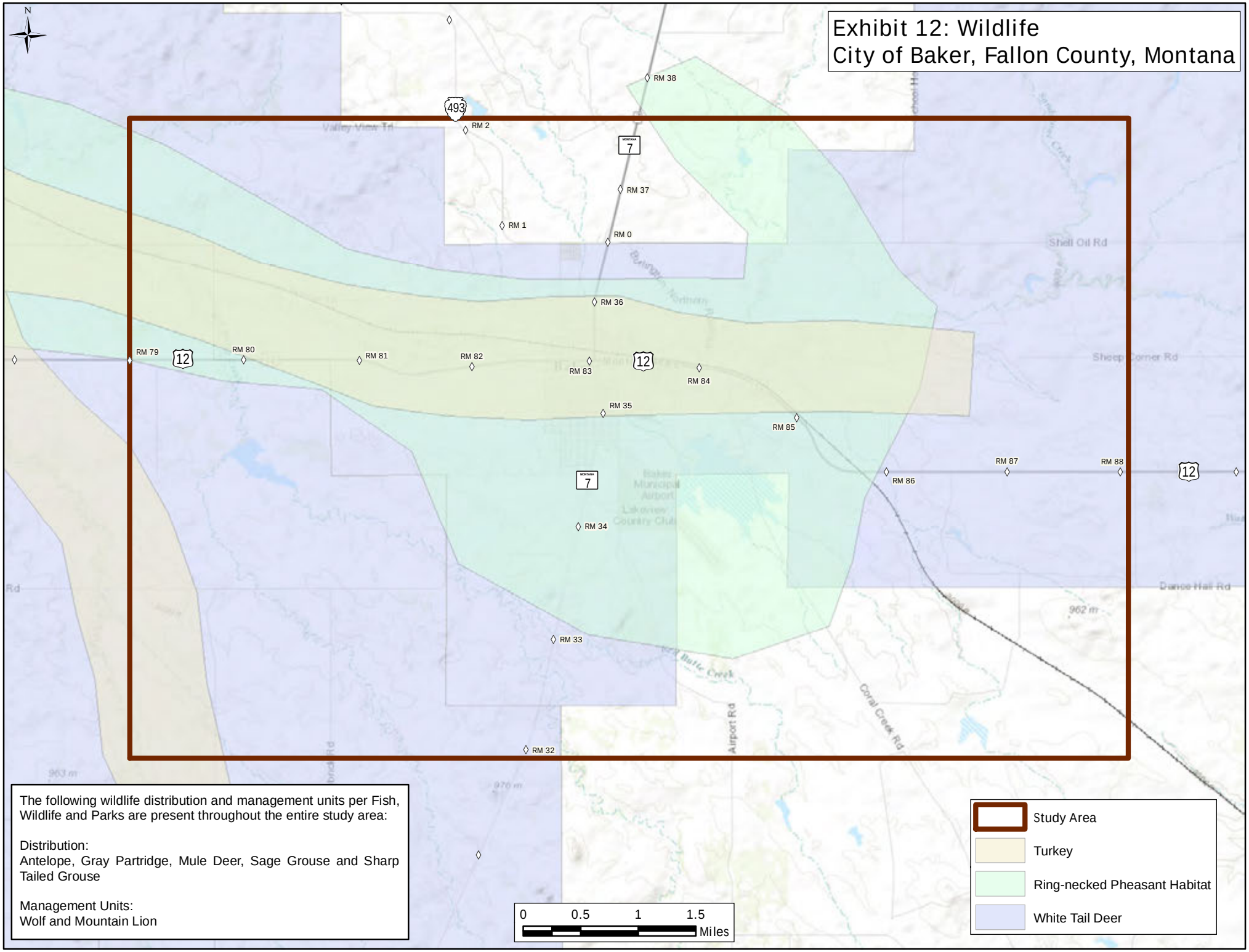

Exhibit 7: Floodplains
City of Baker, Fallon County, Montana
N
RM 38
RM 2
RM 37
RM 1
RM 0
RM 36
RM 79
RM 80
RM 81
RM 82
RM 83
RM 84
RM 35
RM 85
RM 87
RM 88
RM 86
RM 34
RM 33
RM 32
Valley View Trl
Sunset Trl
Red Butte Creek
Shell Oil Rd
Sheep Corn
Baker Municipal Airport
Lakeview Country Club
Airport Rd
Yellowbird Rd
962 m
0 0.5 1 1.5 2
Miles
Reference Marker (RM)
Railroad
Study Area
100 Year Floodplain
Primary On System Route
Secondary On System Route
Off System Route

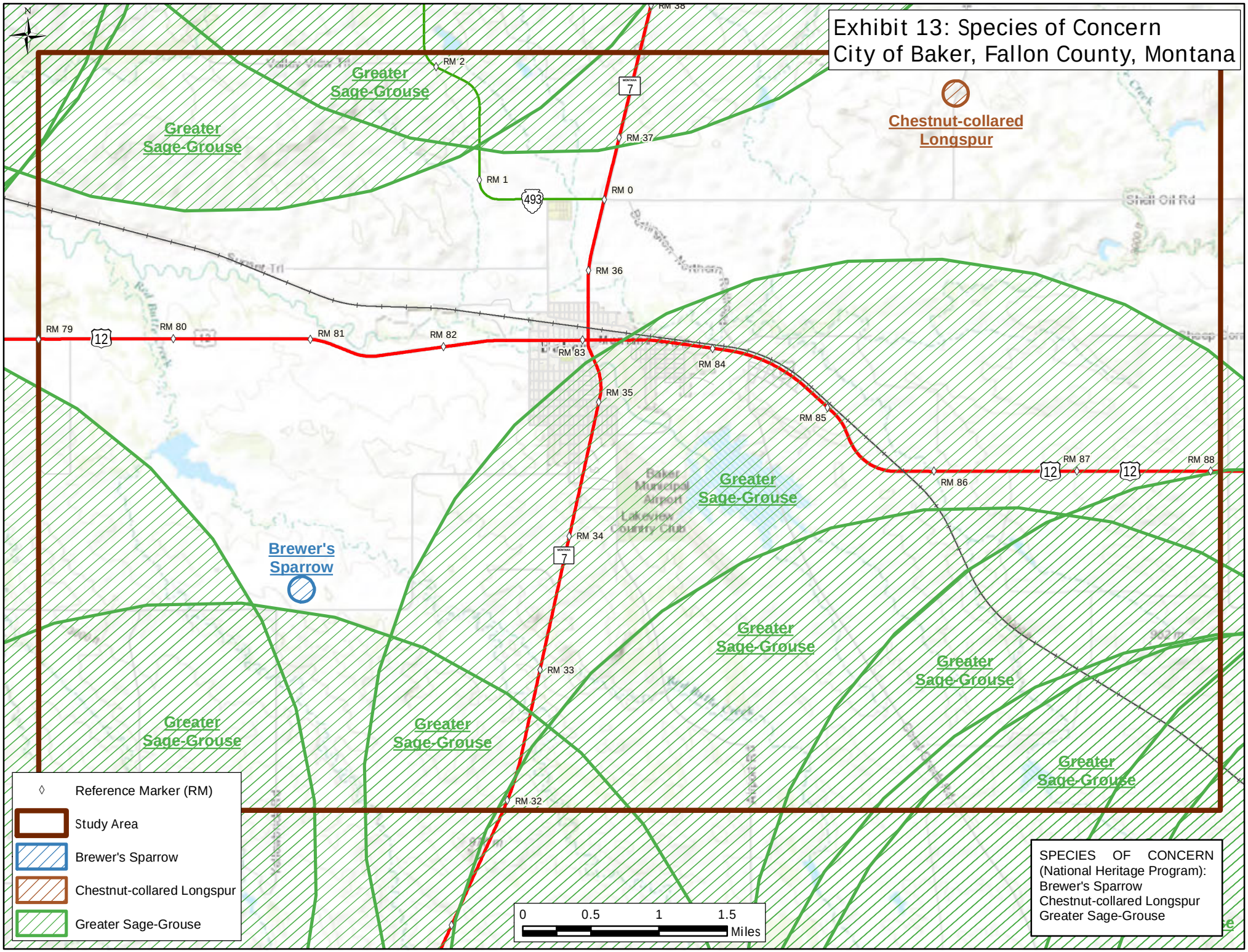

Exhibit 8: UST and LUST Facilities
City of Baker, Fallon County, Montana
N
RM 38
RM 2
RM 37
RM 1
RM 0
493
RM 36
RM 79
RM 80
RM 81
RM 82
RM 83
RM 84
RM 85
RM 86
RM 87
RM 88
RM 35
RM 34
RM 33
RM 32
12
7
Baker Municipal Airport
Lakeview Country Club
Sunset Trl
Red Butte Creek
Burlington Northern Railroad
Shell Oil Rd
Coral Creek Rd
Airport Rd
Yellowstone Rd
0 0.5 1 1.5 2 Miles
Reference Marker (RM)
Study Area
Leaking Underground Storage Tank Sites (LUST)
Active LUST Site (6)
Inactive LUST Site (10)
Active Underground Storage Tanks (UST) (26)
Pre-2013 UST Closures (57)

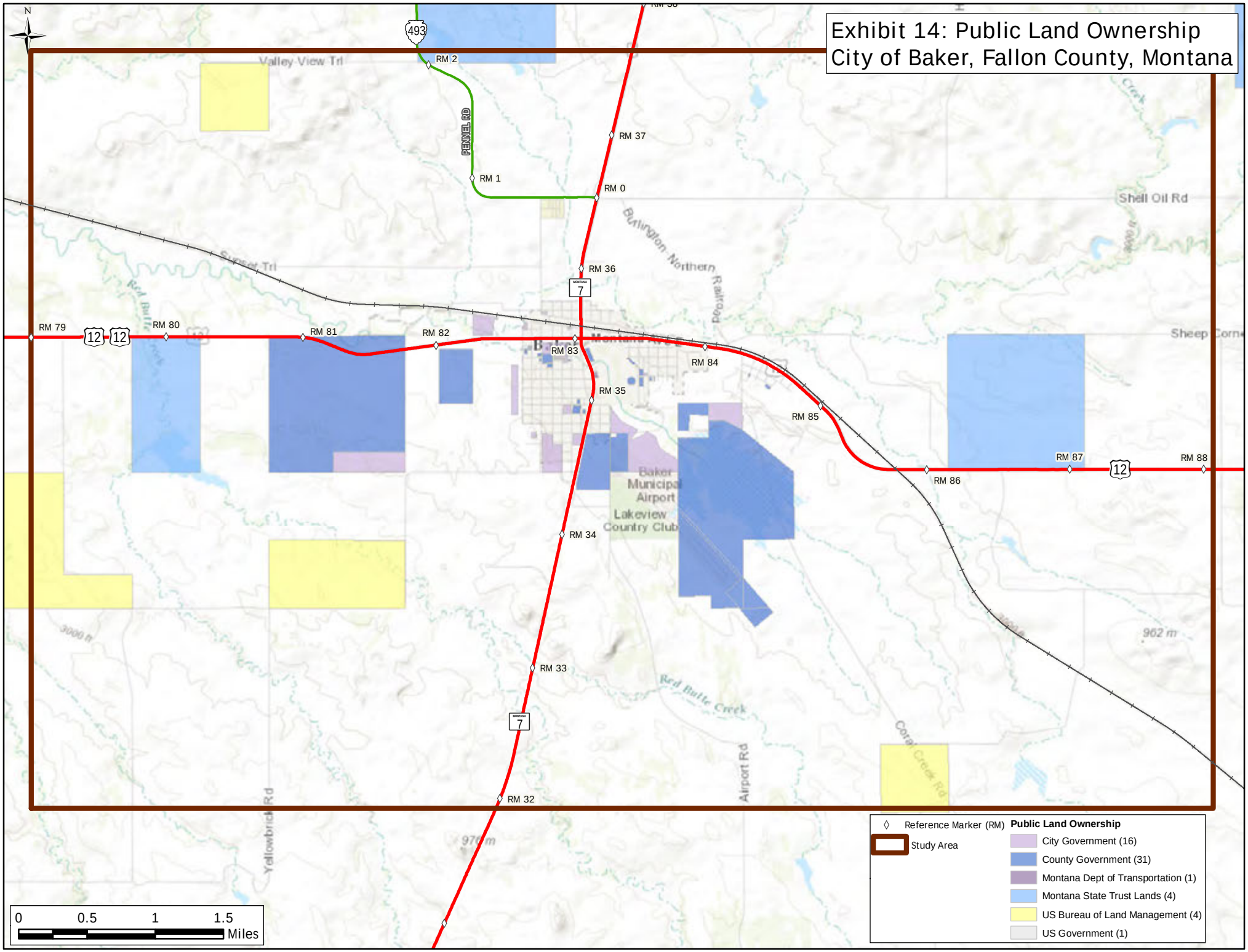

Exhibit 9: Mines, Hazardous Waste Handlers, and Pipeline
City of Baker, Fallon County, Montana
N
RM 1
RM 2
RM 0
RM 35
RM 36
RM 37
RM 32
RM 33
RM 34
RM 79
RM 80
RM 81
RM 82
RM 83
RM 84
RM 85
RM 86
RM 87
RM 88
493
7
12
Baker Municipal Airport
Lakeview Country Club
Red Butte Creek
Shell Oil Rd
Airport Rd
Yellowstone Rd
Legend
Reference Marker (RM)
Study Area
Oil Pipeline
Abandoned Mine
Hazardous Waste Handler
Opencut Site
Petro Fund
0
0.5
1
1.5
2
Miles

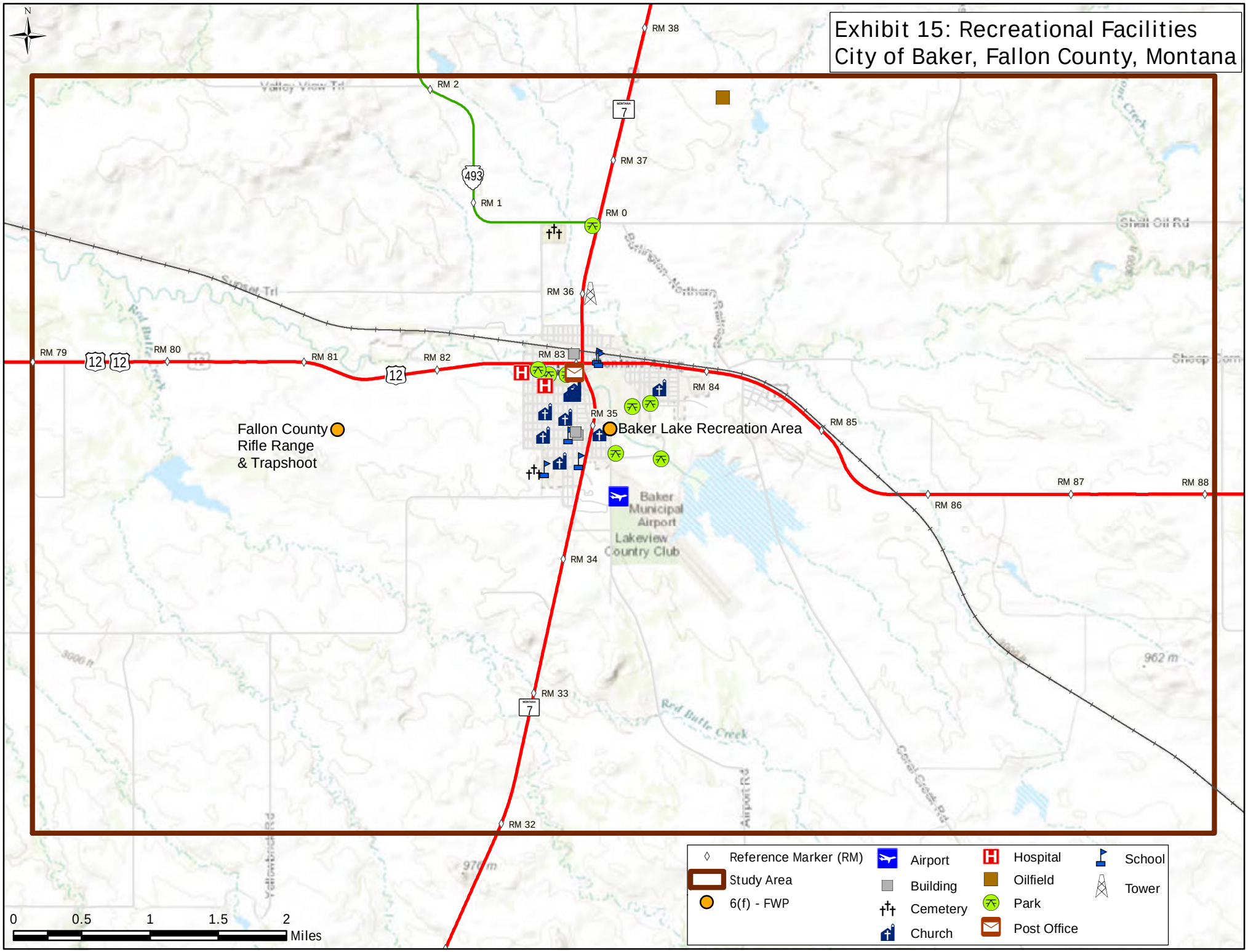

Exhibit 10: Oil and Gas Wells
City of Baker, Fallon County, Montana
Sandstone Creek
Red Butte Creek
Deep Creek
Timber Creek
Baker
Baker Municipal Airport
Lakeview Country Club
PENNEL RD
Sunset Trl
Valley View Trl
Shell Oil Rd
Dry Hole
Gas
Gas Storage
Injection - Disposal
Injection, EOR
Oil
Water Source
Study Area
0
0.5
1
1.5
2
Miles


Exhibit 11: Land Use and Landcover
City of Baker, Fallon County, Montana
RM 38
RM 2
RM 37
RM 1
RM 0
RM 36
RM 79
RM 80
RM 81
RM 82
RM 83
RM 84
RM 35
RM 85
RM 87
RM 88
RM 86
RM 34
RM 33
RM 32
PENNEL RD
7
12
12
Reference Marker (RM)
Study Area
National Land Cover Data for Montana (2000)
Water
Urban/Recreational Grass
Low Intensity Residential
Commercial/Industrial/Transportation
Bare Rock
Deciduous Forest
Evergreen Forest
Mixed Forest
Shrubland
Grassland/Herbaceous
Pasture/Hay
Row Crops
Small Grains
Fallow
Woody Wetlands
0
0.5
1
1.5
Miles


Exhibit 12: Wildlife
City of Baker, Fallon County, Montana
N
RM 38
493
RM 2
MONTANA 7
RM 37
RM 1
RM 0
RM 36
RM 79
12
RM 80
RM 81
RM 82
RM 83
12
RM 84
RM 35
RM 85
RM 87
RM 88
12
RM 86
MONTANA 7
RM 34
RM 33
RM 32
Shell Oil Rd
Sheep Corner Rd
Dance Hall Rd
Airport Rd
Coral Creek Rd
Valley View Trl
Baker Municipal Airport
Lakeview Country Club
962 m
963 m
976 m
The following wildlife distribution and management units per Fish, Wildlife and Parks are present throughout the entire study area:
Distribution:
Antelope, Gray Partridge, Mule Deer, Sage Grouse and Sharp Tailed Grouse
Management Units:
Wolf and Mountain Lion
0 0.5 1 1.5
Miles
Study Area
Turkey
Ring-necked Pheasant Habitat
White Tail Deer


Exhibit 13: Species of Concern
City of Baker, Fallon County, Montana
Greater Sage-Grouse
Chestnut-collared Longspur
Brewer's Sparrow
RM 38
RM 2
RM 37
RM 1
RM 0
RM 36
RM 79
RM 80
RM 81
RM 82
RM 83
RM 84
RM 35
RM 85
RM 86
RM 87
RM 88
RM 34
RM 33
RM 32
12
493
7
Baker Municipal Airport
Lakeview County Club
Reference Marker (RM)
Study Area
Brewer's Sparrow
Chestnut-collared Longspur
Greater Sage-Grouse
0
0.5
1
1.5
Miles
SPECIES OF CONCERN (National Heritage Program):
Brewer's Sparrow
Chestnut-collared Longspur
Greater Sage-Grouse


Exhibit 14: Public Land Ownership
City of Baker, Fallon County, Montana
N
493
Valley View Trl
RM 2
PENNEL RD
RM 1
RM 37
RM 0
Shell Oil Rd
Burlington Northern Railroad
RM 36
7
Sunset Trl
RM 79
12
12
RM 80
RM 81
RM 82
RM 83
RM 84
RM 35
RM 85
RM 86
RM 87
12
RM 88
Baker Municipal Airport
Lakeview Country Club
RM 34
RM 33
Red Butte Creek
7
Airport Rd
RM 32
Yellowbrick Rd
0
0.5
1
1.5
Miles
Reference Marker (RM)
Study Area
Public Land Ownership
City Government (16)
County Government (31)
Montana Dept of Transportation (1)
Montana State Trust Lands (4)
US Bureau of Land Management (4)
US Government (1)


Exhibit 15: Recreational Facilities
City of Baker, Fallon County, Montana
N
RM 38
RM 2
RM 37
RM 1
RM 0
RM 36
RM 79
RM 80
RM 81
RM 82
RM 83
RM 84
RM 85
RM 86
RM 87
RM 88
RM 35
RM 34
RM 33
RM 32
Fallon County
Rifle Range
& Trapshoot
Baker Lake Recreation Area
Baker
Municipal
Airport
Lakeview
Country Club
Reference Marker (RM)
Study Area
6(f) - FWP
Airport
Building
Cemetery
Church
Hospital
Oilfield
Park
Post Office
School
Tower
0
0.5
1
1.5
2
Miles

Attachment 2
Soils Report

Prime and other Important Farmlands

This table lists the map units in the survey area that are considered important farmlands. Important farmlands consist of prime farmland, unique farmland, and farmland of statewide or local importance. This list does not constitute a recommendation for a particular land use.

In an effort to identify the extent and location of important farmlands, the Natural Resources Conservation Service, in cooperation with other interested Federal, State, and local government organizations, has inventoried land that can be used for the production of the Nation's food supply.

Prime farmland is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

For some of the soils identified in the table as prime farmland, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures.

A recent trend in land use in some areas has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. It has the special combination of soil quality, growing season, moisture supply, temperature, humidity, air drainage, elevation, and aspect needed for the soil to economically produce sustainable high yields of these crops when properly managed. The water supply is dependable and of adequate quality. Nearness to markets is an additional consideration. Unique farmland is not based on national criteria. It commonly is in areas where there is a special microclimate, such as the wine country in California.

In some areas, land that does not meet the criteria for prime or unique farmland is considered to be *farmland of statewide importance* for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable. Farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

In some areas that are not identified as having national or statewide importance, land is considered to be *farmland of local importance* for the production of food, feed, fiber, forage, and oilseed crops. This farmland is identified by the appropriate local agencies. Farmland of local importance may include tracts of land that have been designated for agriculture by local ordinance.

Report—Prime and other Important Farmlands

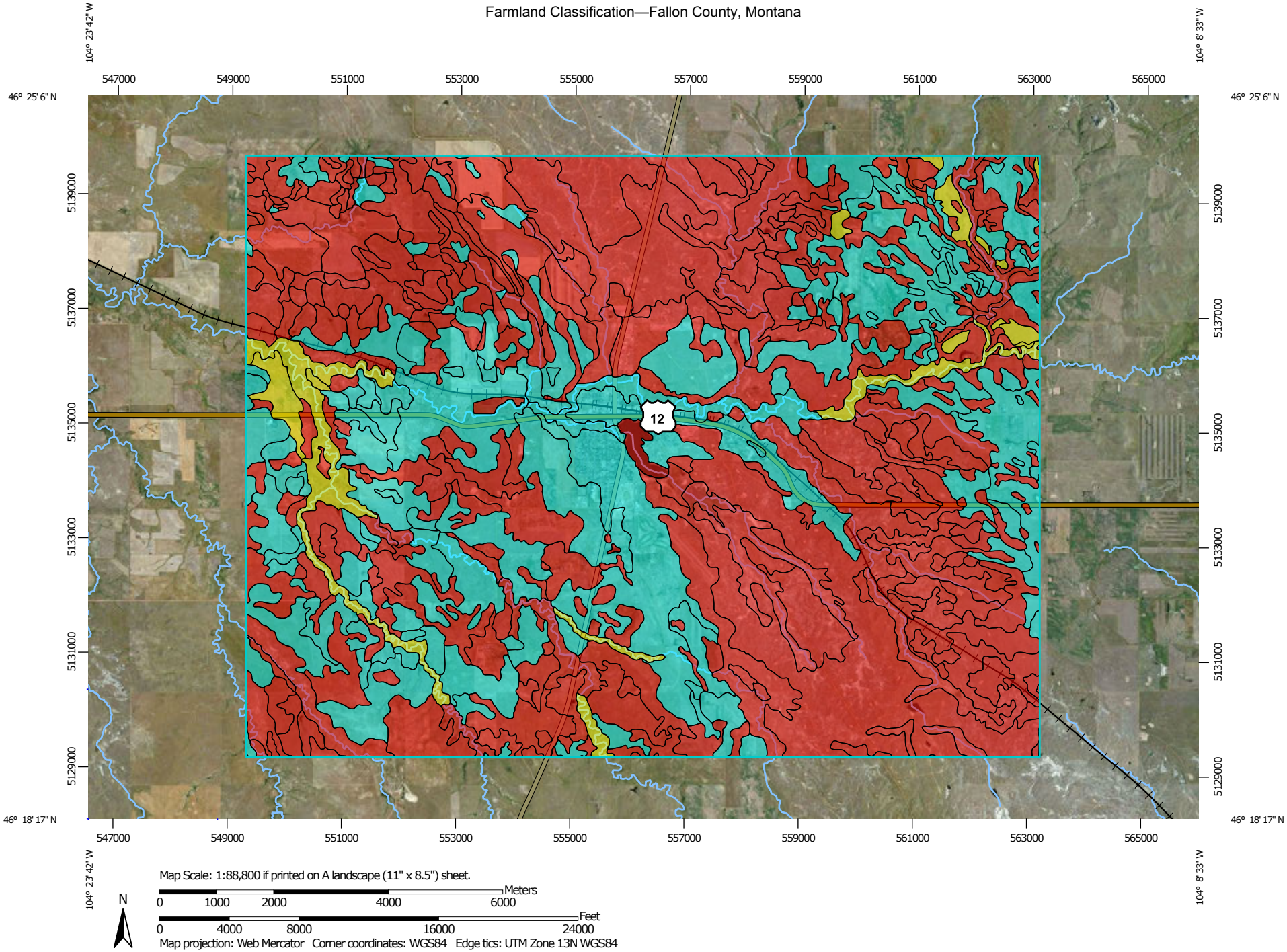
Prime and other Important Farmlands–Fallon County, Montana		
Map Symbol	**Map Unit Name**	**Farmland Classification**
15C	Weingart clay loam, 2 to 8 percent slopes	Not prime farmland
21C	Parchin fine sandy loam, 2 to 8 percent slopes	Not prime farmland
22A	Varney loam, 0 to 2 percent slopes	Prime farmland if irrigated
54A	Creed loam, 0 to 2 percent slopes	Not prime farmland
54C	Creed loam, 2 to 8 percent slopes	Not prime farmland
55D	Blacksheep-Twilight fine sandy loams, 8 to 15 percent slopes	Not prime farmland
55E	Blacksheep-Twilight fine sandy loams, 15 to 45 percent slopes	Not prime farmland
56A	Havre loam, 0 to 2 percent slopes	Prime farmland if irrigated
57A	Harlake silty clay, saline, 0 to 2 percent slopes	Not prime farmland
58D	Neldore-Rock outcrop complex, 4 to 15 percent slopes	Not prime farmland
58E	Neldore-Rock outcrop complex, 15 to 45 percent slopes	Not prime farmland
60D	Cabbart silt loam, 4 to 15 percent slopes	Not prime farmland
64C	Tanna silty clay loam, 2 to 8 percent slopes	Farmland of statewide importance
65A	Gerdrum clay loam, 0 to 2 percent slopes	Not prime farmland
65C	Gerdrum clay loam, 2 to 8 percent slopes	Not prime farmland
69C	Twilight fine sandy loam, 2 to 8 percent slopes	Farmland of statewide importance
69D	Twilight fine sandy loam, 8 to 15 percent slopes	Farmland of statewide importance
71C	Delpoint loam, 2 to 8 percent slopes	Not prime farmland
72C	Kremlin loam, 2 to 8 percent slopes	Farmland of statewide importance
74A	Assinniboine sandy clay loam, 0 to 2 percent slopes	Prime farmland if irrigated
74C	Assinniboine sandy clay loam, 2 to 8 percent slopes	Farmland of statewide importance
75C	Archin-Absher complex, 2 to 8 percent slopes	Not prime farmland
81C	Marmarth loam, 2 to 8 percent slopes	Farmland of statewide importance

Prime and other Important Farmlands–Fallon County, Montana		
Map Symbol	**Map Unit Name**	**Farmland Classification**
83A	Chinook sandy loam, 0 to 2 percent slopes	Farmland of statewide importance
83C	Chinook sandy loam, 2 to 8 percent slopes	Farmland of statewide importance
83D	Chinook sandy loam, 8 to 15 percent slopes	Farmland of statewide importance
84A	Eapa loam, 0 to 2 percent slopes	Prime farmland if irrigated
84C	Eapa loam, 2 to 8 percent slopes	Farmland of statewide importance
85A	Ethridge silty clay loam, 0 to 2 percent slopes	Prime farmland if irrigated
85C	Ethridge silty clay loam, 2 to 8 percent slopes	Farmland of statewide importance
86C	Yamacall loam, 2 to 8 percent slopes	Not prime farmland
89A	Marvan silty clay, 0 to 2 percent slopes	Not prime farmland
89C	Marvan silty clay, 2 to 8 percent slopes	Not prime farmland
90C	Bascovy clay, 2 to 8 percent slopes	Not prime farmland
91C	Bonfri loam, 2 to 8 percent slopes	Farmland of statewide importance
91D	Bonfri loam, 8 to 15 percent slopes	Not prime farmland
114C	Carfall-Assinniboine complex, 2 to 8 percent slopes	Farmland of statewide importance
114D	Carfall-Assinniboine complex, 8 to 15 percent slopes	Not prime farmland
154C	Creed-Absher complex, 2 to 8 percent slopes	Not prime farmland
155E	Blacksheep-Rock outcrop complex, 25 to 50 percent	Not prime farmland
157A	Harlake silty clay loam, 0 to 2 percent slopes	Farmland of statewide importance
158D	Neldore clay, 4 to 15 percent slopes	Not prime farmland
160E	Cabbart-Rock outcrop-Delpoint complex, 15 to 50 percent slopes	Not prime farmland
164C	Tanna-Ethridge silty clay loams, 2 to 8 percent slopes	Farmland of statewide importance
164D	Tanna-Ethridge silty clay loams, 8 to 15 percent slopes	Not prime farmland
165C	Gerdrum-Absher complex, 2 to 8 percent slopes	Not prime farmland
166C	Ethridge loam, 2 to 8 percent slopes	Not prime farmland
168B	Absher-Gerdrum complex, 0 to 4 percent slopes	Not prime farmland
170D	Busby-Blacksheep-Twilight fine sandy loams, 8 to 25 percent slopes	Not prime farmland
170E	Busby-Blacksheep-Rock outcrop complex, 8 to 25 percent slopes	Not prime farmland
171C	Delpoint-Cabbart complex, 2 to 8 percent slopes	Not prime farmland
171D	Delpoint-Cabbart complex, 8 to 15 percent slopes	Not prime farmland
172C	Kremlin-Cabbart complex, 2 to 8 percent slopes	Not prime farmland
174C	Assinniboine-Ynot complex, 2 to 8 percent slopes	Farmland of statewide importance
175A	Archin loam, 0 to 2 percent slopes	Not prime farmland
175C	Archin loam, 2 to 8 percent slopes	Not prime farmland
176D	Kirby-Cabbart complex, 8 to 25 percent slopes	Not prime farmland
186C	Yamacall-Havre loams, 2 to 8 percent slopes	Not prime farmland
191C	Bonfri-Cambeth complex, 2 to 8 percent slopes	Farmland of statewide importance
260C	Cambeth-Cabbart silt loams, 2 to 8 percent slopes	Not prime farmland

Prime and other Important Farmlands–Fallon County, Montana		
Map Symbol	**Map Unit Name**	**Farmland Classification**
260D	Cabbart-Cambeth silt loams, 8 to 15 percent slopes	Not prime farmland
269C	Twilight-Bonfri complex, 2 to 8 percent slopes	Farmland of statewide importance
269D	Twilight-Bonfri complex, 8 to 15 percent slopes	Not prime farmland
271D	Delpoint-Yamacall loams, 8 to 15 percent slopes	Not prime farmland
275D	Archin, gullied-Delpoint complex, 4 to 15 percent slopes	Not prime farmland
286C	Yamacall-Delpoint loams, 2 to 8 percent slopes	Not prime farmland
291D	Bonfri-Cabbart loams, 8 to 15 percent slopes	Not prime farmland
358D	Neldore-Bascovy clays, 4 to 15 percent slopes	Not prime farmland
369D	Twilight-Cabbart complex, 8 to 15 percent slopes	Not prime farmland
386E	Yamacall-Cabbart loams, 15 to 35 percent slopes	Not prime farmland
391C	Bonfri-Parchin complex, 2 to 8 percent slopes	Not prime farmland
M-W	Miscellaneous water	Not prime farmland
W	Water	Not prime farmland

Data Source Information

Soil Survey Area: Fallon County, Montana
Survey Area Data: Version 11, Dec 4, 2013


104° 23' 42" W
104° 8' 33" W
46° 25' 6" N
46° 18' 17" N
547000
549000
551000
553000
555000
557000
559000
561000
563000
565000
5139000
5137000
5135000
5133000
5131000
5129000
12
Map Scale: 1:88,800 if printed on A landscape (11" x 8.5") sheet.
N
Meters
0 1000 2000 4000 6000
Feet
0 4000 8000 16000 24000
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- Not prime farmland
- All areas are prime farmland
- Prime farmland if drained
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if subsoiled, completely removing the root inhibiting soil layer
- Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Prime farmland if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance
- Farmland of local importance
- Farmland of unique importance
- Not rated or not available

Soil Rating Lines

- Not prime farmland
- All areas are prime farmland
- Prime farmland if drained
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if subsoiled, completely removing the root inhibiting soil layer
- Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Prime farmland if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance
- Farmland of local importance
- Farmland of unique importance
- Not rated or not available

Soil Rating Points

- Not prime farmland
- All areas are prime farmland
- Prime farmland if drained
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if subsoiled, completely removing the root inhibiting soil layer
- Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Prime farmland if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance
- Farmland of local importance
- Farmland of unique importance
- Not rated or not available

Water Features

MAP INFORMATION

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Fallon County, Montana
Survey Area Data: Version 11, Dec 4, 2013

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 5, 2011—Sep 10, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Farmland Classification

Farmland Classification— Summary by Map Unit — Fallon County, Montana (MT025)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
15C	Weingart clay loam, 2 to 8 percent slopes	Not prime farmland	161.0	0.4%
21C	Parchin fine sandy loam, 2 to 8 percent slopes	Not prime farmland	24.1	0.1%
22A	Varney loam, 0 to 2 percent slopes	Prime farmland if irrigated	46.3	0.1%
54A	Creed loam, 0 to 2 percent slopes	Not prime farmland	45.7	0.1%
54C	Creed loam, 2 to 8 percent slopes	Not prime farmland	32.0	0.1%
55D	Blacksheep-Twilight fine sandy loams, 8 to 15 percent slopes	Not prime farmland	388.3	1.1%
55E	Blacksheep-Twilight fine sandy loams, 15 to 45 percent slopes	Not prime farmland	50.8	0.1%
56A	Havre loam, 0 to 2 percent slopes	Prime farmland if irrigated	954.1	2.6%
57A	Harlake silty clay, saline, 0 to 2 percent slopes	Not prime farmland	537.7	1.5%
58D	Neldore-Rock outcrop complex, 4 to 15 percent slopes	Not prime farmland	0.1	0.0%
58E	Neldore-Rock outcrop complex, 15 to 45 percent slopes	Not prime farmland	34.5	0.1%
60D	Cabbart silt loam, 4 to 15 percent slopes	Not prime farmland	434.4	1.2%
64C	Tanna silty clay loam, 2 to 8 percent slopes	Farmland of statewide importance	610.7	1.7%
65A	Gerdrum clay loam, 0 to 2 percent slopes	Not prime farmland	318.7	0.9%
65C	Gerdrum clay loam, 2 to 8 percent slopes	Not prime farmland	2,282.3	6.3%
69C	Twilight fine sandy loam, 2 to 8 percent slopes	Farmland of statewide importance	569.3	1.6%
69D	Twilight fine sandy loam, 8 to 15 percent slopes	Farmland of statewide importance	212.3	0.6%
71C	Delpoint loam, 2 to 8 percent slopes	Not prime farmland	118.2	0.3%
72C	Kremlin loam, 2 to 8 percent slopes	Farmland of statewide importance	78.1	0.2%

Farmland Classification— Summary by Map Unit — Fallon County, Montana (MT025)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
74A	Assinniboine sandy clay loam, 0 to 2 percent slopes	Prime farmland if irrigated	6.1	0.0%
74C	Assinniboine sandy clay loam, 2 to 8 percent slopes	Farmland of statewide importance	550.9	1.5%
75C	Archin-Absher complex, 2 to 8 percent slopes	Not prime farmland	217.5	0.6%
81C	Marmarth loam, 2 to 8 percent slopes	Farmland of statewide importance	249.9	0.7%
83A	Chinook sandy loam, 0 to 2 percent slopes	Farmland of statewide importance	16.8	0.0%
83C	Chinook sandy loam, 2 to 8 percent slopes	Farmland of statewide importance	19.8	0.1%
83D	Chinook sandy loam, 8 to 15 percent slopes	Farmland of statewide importance	71.8	0.2%
84A	Eapa loam, 0 to 2 percent slopes	Prime farmland if irrigated	344.1	1.0%
84C	Eapa loam, 2 to 8 percent slopes	Farmland of statewide importance	1,378.4	3.8%
85A	Ethridge silty clay loam, 0 to 2 percent slopes	Prime farmland if irrigated	22.4	0.1%
85C	Ethridge silty clay loam, 2 to 8 percent slopes	Farmland of statewide importance	86.9	0.2%
86C	Yamacall loam, 2 to 8 percent slopes	Not prime farmland	5.8	0.0%
89A	Marvan silty clay, 0 to 2 percent slopes	Not prime farmland	82.2	0.2%
89C	Marvan silty clay, 2 to 8 percent slopes	Not prime farmland	540.2	1.5%
90C	Bascovy clay, 2 to 8 percent slopes	Not prime farmland	969.8	2.7%
91C	Bonfri loam, 2 to 8 percent slopes	Farmland of statewide importance	1,453.4	4.0%
91D	Bonfri loam, 8 to 15 percent slopes	Not prime farmland	186.1	0.5%
114C	Carfall-Assinniboine complex, 2 to 8 percent slopes	Farmland of statewide importance	115.6	0.3%
114D	Carfall-Assinniboine complex, 8 to 15 percent slopes	Not prime farmland	93.5	0.3%
154C	Creed-Absher complex, 2 to 8 percent slopes	Not prime farmland	198.1	0.5%
155E	Blacksheep-Rock outcrop complex, 25 to 50 percent	Not prime farmland	84.9	0.2%

Farmland Classification— Summary by Map Unit — Fallon County, Montana (MT025)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
157A	Harlake silty clay loam, 0 to 2 percent slopes	Farmland of statewide importance	390.4	1.1%
158D	Neldore clay, 4 to 15 percent slopes	Not prime farmland	1,232.3	3.4%
160E	Cabbart-Rock outcrop-Delpoint complex, 15 to 50 percent slopes	Not prime farmland	291.1	0.8%
164C	Tanna-Ethridge silty clay loams, 2 to 8 percent slopes	Farmland of statewide importance	2,488.9	6.9%
164D	Tanna-Ethridge silty clay loams, 8 to 15 percent slopes	Not prime farmland	182.8	0.5%
165C	Gerdrum-Absher complex, 2 to 8 percent slopes	Not prime farmland	2,154.1	6.0%
166C	Ethridge loam, 2 to 8 percent slopes	Not prime farmland	13.4	0.0%
168B	Absher-Gerdrum complex, 0 to 4 percent slopes	Not prime farmland	698.9	1.9%
170D	Busby-Blacksheep-Twilight fine sandy loams, 8 to 25 percent slopes	Not prime farmland	171.2	0.5%
170E	Busby-Blacksheep-Rock outcrop complex, 8 to 25 percent slopes	Not prime farmland	40.3	0.1%
171C	Delpoint-Cabbart complex, 2 to 8 percent slopes	Not prime farmland	304.2	0.8%
171D	Delpoint-Cabbart complex, 8 to 15 percent slopes	Not prime farmland	889.1	2.5%
172C	Kremlin-Cabbart complex, 2 to 8 percent slopes	Not prime farmland	3.4	0.0%
174C	Assinniboine-Ynot complex, 2 to 8 percent slopes	Farmland of statewide importance	1,081.9	3.0%
175A	Archin loam, 0 to 2 percent slopes	Not prime farmland	19.3	0.1%
175C	Archin loam, 2 to 8 percent slopes	Not prime farmland	512.9	1.4%
176D	Kirby-Cabbart complex, 8 to 25 percent slopes	Not prime farmland	888.1	2.5%
186C	Yamacall-Havre loams, 2 to 8 percent slopes	Not prime farmland	60.1	0.2%

Farmland Classification— Summary by Map Unit — Fallon County, Montana (MT025)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
191C	Bonfri-Cambeth complex, 2 to 8 percent slopes	Farmland of statewide importance	2,440.6	6.8%
260C	Cambeth-Cabbart silt loams, 2 to 8 percent slopes	Not prime farmland	637.5	1.8%
260D	Cabbart-Cambeth silt loams, 8 to 15 percent slopes	Not prime farmland	1,155.6	3.2%
269C	Twilight-Bonfri complex, 2 to 8 percent slopes	Farmland of statewide importance	8.2	0.0%
269D	Twilight-Bonfri complex, 8 to 15 percent slopes	Not prime farmland	136.8	0.4%
271D	Delpoint-Yamacall loams, 8 to 15 percent slopes	Not prime farmland	9.2	0.0%
275D	Archin, gullied-Delpoint complex, 4 to 15 percent slopes	Not prime farmland	17.3	0.0%
286C	Yamacall-Delpoint loams, 2 to 8 percent slopes	Not prime farmland	62.3	0.2%
291D	Bonfri-Cabbart loams, 8 to 15 percent slopes	Not prime farmland	1,166.1	3.2%
358D	Neldore-Bascovy clays, 4 to 15 percent slopes	Not prime farmland	4,887.0	13.5%
369D	Twilight-Cabbart complex, 8 to 15 percent slopes	Not prime farmland	179.2	0.5%
386E	Yamacall-Cabbart loams, 15 to 35 percent slopes	Not prime farmland	206.2	0.6%
391C	Bonfri-Parchin complex, 2 to 8 percent slopes	Not prime farmland	31.0	0.1%
M-W	Miscellaneous water	Not prime farmland	36.4	0.1%
W	Water	Not prime farmland	164.2	0.5%
Totals for Area of Interest			**36,152.8**	**100.0%**

Description

Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. It identifies the location and extent of the soils that are best suited to food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the "Federal Register," Vol. 43, No. 21, January 31, 1978.

Rating Options

Aggregation Method: No Aggregation Necessary

Tie-break Rule: Lower

Attachment 3
Groundwater Data

Groundwater Information Center
Montana Bureau of Mines and Geology
Montana Tech of The University of Montana
1300 West Park Street - Natural Resources Building Room 329
Butte Montana 59701-8997
Ph: (406) 496-4336 Fx: (406) 496-4343

8/21/2014

Overview of FALLON county

BEAVERHEAD get data

At-A-Glance

Number of wells in County	1682
Deepest well on record (feet)	1650
Shallowest well on record (feet)	4
Most recent well on record	7/16/2014
Oldest well on record	10/7/1900
Number of water quality samples	130
Number of measured water levels	2206
Statewide Monitoring Network wells	3

Other Reports

Use By Year View this report to see the number of wells and their reported water uses by year.

Histograms for FALLON county

Wells by Year

The table below shows the breakdown of wells reportedly drilled in the county during the last 20 years. Click the "show all" link to display all data available.

2014	6
2013	22
2012	15
2011	9
2010	10
2009	17
2008	33
2007	14
2006	14
2005	33
2004	69
2003	22
2002	13
2001	7
2000	19
1999	6
1998	17
1997	1
1996	18
1995	9

Show all years

Geologic Source

The table below shows the breakdown of geologic sources for wells in this county. Note that not all wells in a county necessarily have had the geologic source code assigned.

FORT UNION FORMATION (125FRUN)	491
HELL CREEK FORMATION	

Wells by Depth

The table below shows the number of wells that fall between the depth ranges in the left hand column. All depths are listed in feet below ground surface.

0 - 99	492
100 - 199	423
200 - 299	234
300 - 399	128
400 - 499	79
500 - 599	49
600 - 699	51
700 - 799	54
800 - 899	63
900 - 999	57
> 1000	52

Reported Water Use

The table below shows the number of each type of water use that has been reported for wells in this county.

UNKNOWN	86
INDUSTRIAL	13
OTHER	3
PUBLIC WATER SUPPLY	28
TEST WELL	15
UNUSED	69
FIRE PROTECTION	1
MONITORING	37
COMMERCIAL	4
IRRIGATION	24
GEOTECH	73
STOCKWATER	1336
DOMESTIC	547
* Total	2236

* Number may differ from county total since one well may have several reported **water uses**.

(211HLCK)	270
FOX HILLS-HELL CREEK AQUIFER (211FHHC)	231
FOX HILLS FORMATION OR SANDSTONE (211FXHL)	173
ALLUVIUM (HOLOCENE) (111ALVM)	19
JUDITH RIVER FORMATION (OF MONTANA GROUP) (211JDRV)	19
ALLUVIUM (QUATERNARY) (110ALVM)	18
TONGUE RIVER MEMBER (OF FT UNION FM.) (125TGRV)	14
PIERRE SHALE (OF MONTANA GROUP) (211PIRR)	8
EAGLE SANDSTONE (211EGLE)	7
MADISON GROUP OR LIMESTONE (330MDSN)	5
MISSION CANYON LIMESTONE (OF MADISON GROUP) (337MSNC)	4
LODGEPOLE LIMESTONE OR FM. (OF MADISON GP) (337LDGP)	2
LUDLOW MEMBER (OF FT UNION FM.) (125LDLW)	2
TULLOCK MEMBER (OF FT UNION FM.) (125TLCK)	1
DAKOTA SANDSTONE FORMATION OR GROUP (217DKOT)	1
CHARLES FORMATION (OF MADISON GROUP) (331CRLS)	1
RED BIRD SILTSTONE MEMBER (OF PIERRE SHALE) (211RDBD)	1
MUDDY SANDSTONE MEMBER (OF THERMOPOLIS SHALE) (217MDDY)	1
MINNELUSA SANDSTONE OR FORMATION (320MNLS)	1
RED RIVER FORMATION (OF BIGHORN GROUP) (361RDRV)	1

Ground Water Information Center Online © 1998 - 2014
Staff | Privacy Statement

Attachment 4
Historic Irrigation Mapping

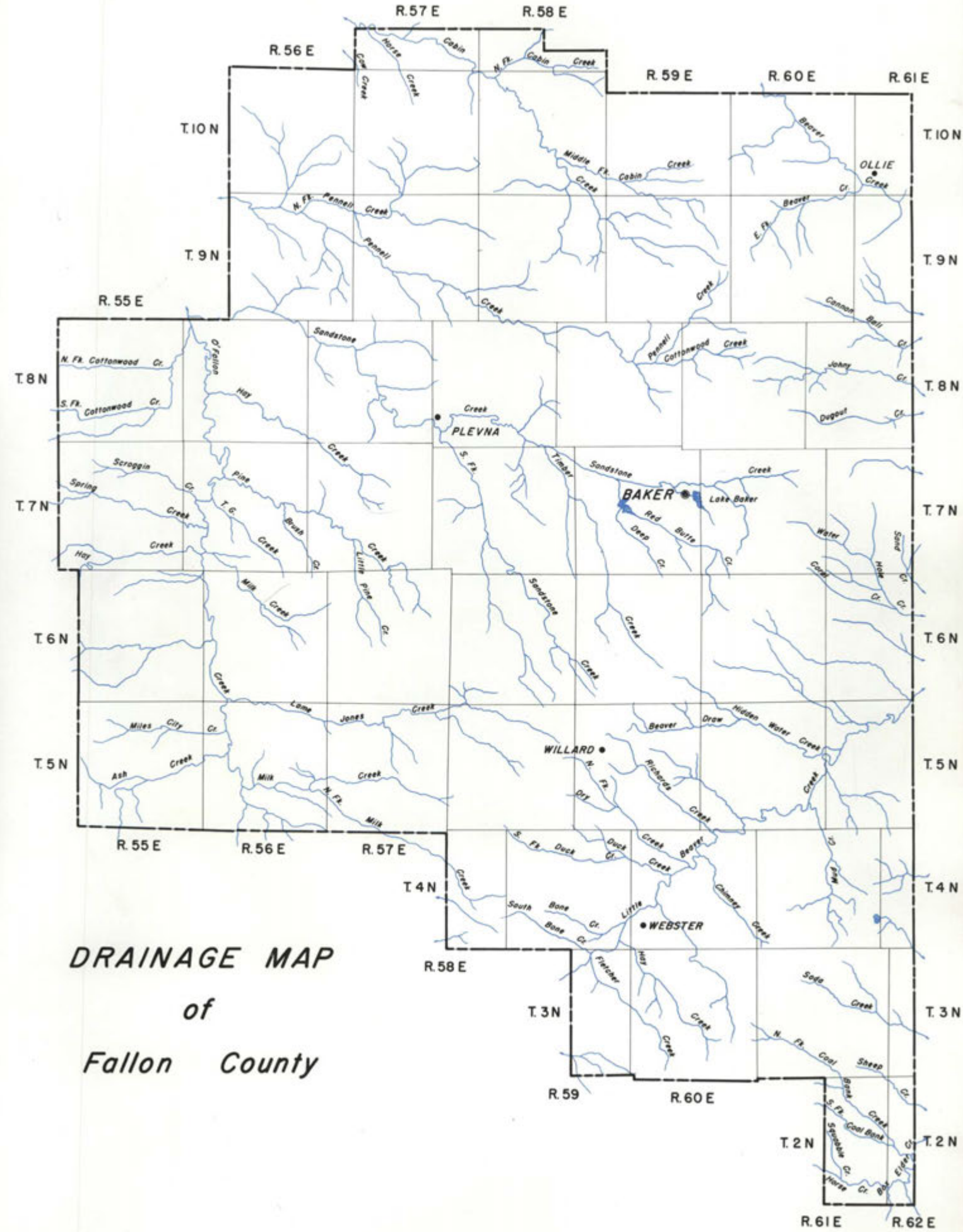
WATER RESOURCES SURVEY

FALLON COUNTY, MONTANA

PART II

MAPS SHOWING IRRIGATED AREAS

Published by
STATE ENGINEER'S OFFICE
Helena, Montana
June, 1960



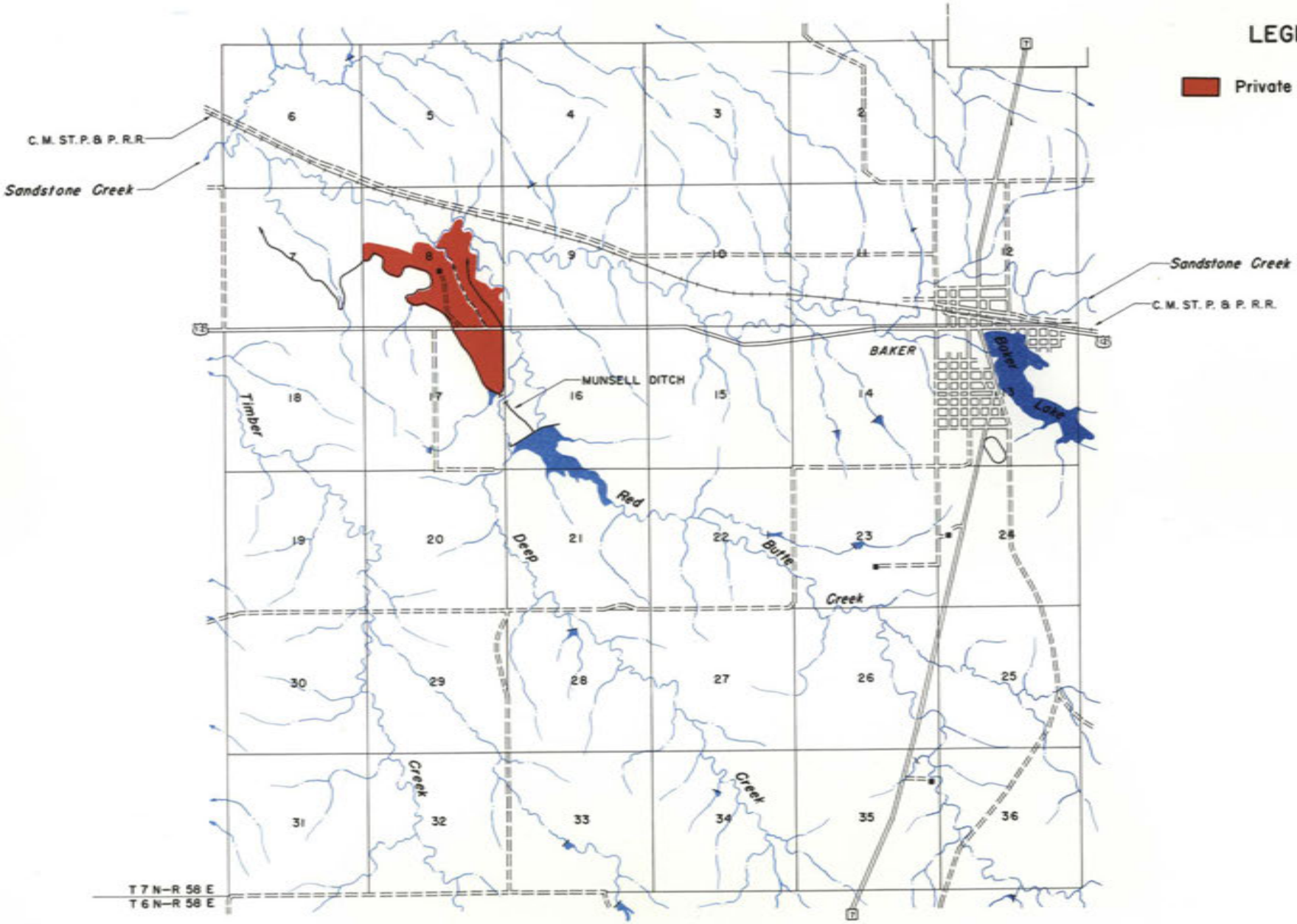
DRAINAGE MAP of Fallon County

MAP INDEX

Township	Range	Page
2 North	61 East	1
2 North	62 East	1
4 North	60 East	2
4 North	61 East	2
5 North	56 East	3
5 North	59 East	4
6 North	56 East	5
7 North	55 East	6
7 North	56 East	7
7 North	59 East	8
8 North	55 East	9
8 North	56 East	10
8 North	58 East	11
8 North	60 East	12
9 North	59 East	12
11 North	57 East	13

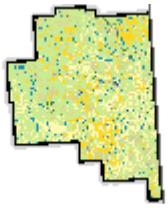
ALL MAPS HAVE BEEN MADE FROM AERIAL PHOTOGRAPHS

Twp. 7 NORTH
Rge. 59 EAST



Attachment 5
Landcover Report

MONTANA Natural Heritage Program
A program of the Montana State Library's Natural Resource Information System operated by the University of Montana.





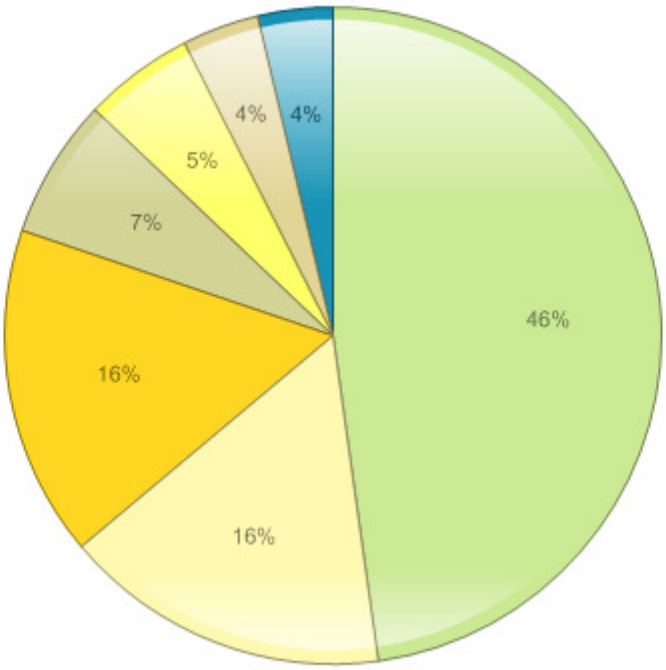
Montana Ecological Systems - Landcover Report

Report generated 8/26/2014 12:51:39 PM

Fallon County

1,037,387 Acres (1.1% of Montana)

Notes on and Appropriate Uses of Landcover



46% Great Plains Mixedgrass Prairie	16% Cultivated Crops	5% Pasture/Hay	4% Great Plains Riparian
16% Big Sagebrush Steppe	7% Great Plains Sand Prairie	4% Great Plains Badlands	

Primary Composition of Landcover



46%
(*479,415 Acres*)

Grassland Systems

Lowland/Prairie Grassland

Great Plains Mixedgrass Prairie

The system covers much of the eastern two-thirds of Montana, occurring continuously for hundreds of square kilometers, interrupted only by wetland/riparian areas or sand prairies. Soils are primarily fine and medium-textured. The growing season averages 115 days, ranging from 100 days on the Canadian border to 130 days on the Wyoming border. Climate is typical of mid-continental regions with long severe winters and hot summers. Grasses typically comprise the greatest canopy cover, and western wheatgrass (*Pascopyrum smithii*) is usually dominant. Other species include thickspike wheatgrass (*Elymus lanceolatus*), green needlegrass (*Nassella viridula*), blue grama (*Bouteloua gracilis*), and needle and thread (*Hesperostipa comata*). Near the Canadian border in north-central Montana, this system grades into rough fescue (*Festuca campestris)* and Idaho fescue (*Festuca idahoensis*) grasslands. Remnants of shortbristle needle and thread *(Hesperostipa curtiseta)* dominated vegetation are found in northernmost Montana and North Dakota, and are associated with productive sites, now mostly converted to farmland. Forb diversity is typically high. In areas of southeastern and central Montana

where sagebrush steppe borders the mixed grass prairie, common plant associations include Wyoming big sagebrush-western wheatgrass (*Artemisia tridentata* ssp. *wyomingensis*/ *Pascopyrum smithii*). Fire and grazing are the primary drivers of this system. Drought can also impact it, in general favoring the shortgrass component at the expense of the mid-height grasses. With intensive grazing, cool season exotics such as Kentucky bluegrass (*Poa pratensis*), smooth brome (*Bromus inermis*), and Japanese brome (*Bromus japonicus*) increase in dominance; both of these rhizomatous species have been shown to markedly decrease species diversity. Previously cultivated acres that have been re-vegetated with non-native plants have been transformed into associations such as Kentucky bluegrass (*Poa pratensis*)/western wheatgrass *(Pascopyrum smithii)* or into pure crested wheatgrass (*Agropyron cristatum)* stands.



16% (*161,384 Acres*)

Shrubland, Steppe and Savanna Systems

Sagebrush Steppe

Big Sagebrush Steppe

This widespread ecological system occurs throughout much of central Montana, and north and east onto the western fringe of the Great Plains. In central Montana, where this system occurs on both glaciated and non-glaciated landscapes, it differs slightly, with more summer rain than winter precipitation and more precipitation annually. Throughout its distribution, soils are typically deep and non-saline, often with a microphytic crust. This shrub-steppe is dominated by perennial grasses and forbs with greater than 25% cover. Overall shrub cover is less than 10 percent. In Montana and Wyoming, stands are more mesic, with more biomass of grass, and have less shrub diversity than stands farther to the west, and 50 to 90% of the occurrences are dominated by Wyoming big sagebrush with western wheatgrass (*Pascopyrum smithii*). Japanese brome (*Bromus japonicus*) and cheatgrass (*Bromus tectorum*) are indicators of disturbance, but cheatgrassis typically not as abundant as in the Intermountain West, possibly due to a colder climate. The natural fire regime of this ecological system maintains a patchy distribution of shrubs, preserving the steppe character. Shrubs may increase following heavy grazing and/or with fire suppression. In central and eastern Montana, complexes of prairie dog towns are common in this ecological system.



16% (*163,441 Acres*)

Human Land Use

Agriculture

Cultivated Crops

These areas used for the production of crops, such as corn, soybeans, small grains, sunflowers, vegetables, and cotton, typically on an annual cycle. Agricultural plant cover is variable depending on season and type of farming. Other areas include more stable land cover of orchards and vineyards.



7% (*69,035 Acres*)

Grassland Systems

Lowland/Prairie Grassland

Great Plains Sand Prairie

The sand prairies constitute a very unique system within the western Great Plains. The unifying and controlling feature for this system is that coarse-textured soils predominate and the dominant grasses are well-adapted to this condition. In the northwestern portion of the system's range, stand size corresponds to the area of exposed caprock sandstone, and small patches predominate, but larger patches are found embedded in the encompassing Great Plains Mixed Grass Prairie, and usually occupy higher positions in

local landscapes where former caprock formations have eroded into more subdued and planar topography. In most of eastern Montana, substrates supporting this system have weathered in place from sandstone caprock. Soils can be relatively thin or deep due to varying amounts of downslope movement of weathered sands. Needle and thread (*Hesperostipa comata*) is the dominant grass species. Other frequent species include little bluestem (*Schizachyrium scoparium*), often occurring with threadleaf sedge (*Carex filifolia*) and dominating both sandy sites and actively eroding sites. Prairie sandreed (*Calamovilfa longifolia*), sand bluestem (*Andropogon hallii*) and big bluestem (*Andropogon gerardii*) are sporadically distributed and found generally on the coarsest-textured sands. Other graminoids include bluebunch wheatgrass (*Pseudoroegneria spicata*), sun sedge (*Carex inops ssp. heliophila*), and purple threeawn (*Aristida purpurea*). Characteristic forbs differ by occurrence, but species of scurf pea (*Psoralidium* species) and Indian breadroot (*Pediomelum*) species are common. Communities of silver sage (*Artemisia cana* ssp. *cana*) or skunkbush sumac (*Rhus trilobata*) can occur within this system. Wind erosion, fire and grazing constitute the other major dynamic processes that can influence this system.



5% (*54,504 Acres*)

Human Land Use

Agriculture

Pasture/Hay

These agriculture lands typically have perennial herbaceous cover (e.g. regularly-shaped plantings) used for livestock grazing or the production of hay. There are obvious signs of management such as irrigation and haying that distinguish it from natural grasslands. Identified CRP lands are included in this land cover type.



4% (*38,016 Acres*)

Sparse and Barren Systems

Bluff, Badland and Dune

Great Plains Badlands

The Western Great Plains Badlands ecological system occurs within the mixed grass and sand prairie regions of eastern and southeastern Montana, where the land lies well above or below its local base level, shaped by the carving action of streams, erosion, and erosible parent material. It is easily recognized by its rugged, eroded, and often colorful land formations, and the relative absence of vegetative cover. In those areas with vegetation, species can include scattered individuals of many dryland shrubs or herbaceous taxa, including curlycup gumweed (*Grindelia squarrosa*), threadleaf snakeweed (*Gutierrezia sarothrae*) (especially with overuse and grazing), greasewood (*Sarcobatus vermiculatus*), Gardner's saltbush (*Atriplex gardneri*), buckwheat (*Eriogonum* species), plains muhly (*Muhlenbergia cuspidata*), bluebunch wheatgrass (*Pseudoroegneria spicata*), and Hooker's sandwort (*Arenaria hookeri*). Patches of sagebrush (*Artemisia* spp.) can also occur. Climate is typical of mid continental regions with long severe winters and warm summers. Precipitation ranges from 7 to 14 inches per year, with two-thirds of the precipitation falling during the summer, and a third falling in the spring. The sedimentary parent material of exposed rocks and the resultant eroded clay soils are derived from Cretaceous sea beds and are often fossil-rich. Dominant soil types are in the order Entisols. These mineral soils are found primarily on uplands, slopes, and creek bottoms and are easily erodible. The growing season is short, averaging 115 days, with a range from 100 days on the Canadian border to 130 days on the Wyoming border. Land use is limited, except for off-highway vehicle recreation and incidental grazing.

Wetland and Riparian Systems

Floodplain and Riparian



4% (*37,098 Acres*)

Great Plains Riparian

This system is associated with perennial to intermittent or ephemeral streams throughout the northwestern Great Plains. In Montana, it occurs along smaller tributaries of the Yellowstone and Missouri rivers, as well as tributaries to the large floodplain rivers that feed them (e.g. the Milk, Marias, Musselshell, Powder, Clark's Fork Yellowstone, Tongue, etc). In areas adjacent to the mountain ranges of central and southeastern Montana, and near the Rocky Mountain Front, it grades into Rocky Mountain Lower Montane-Foothill Riparian Woodland and Shrubland systems. This system is found on alluvial soils in highly variable landscape settings, from confined, deep cut ravines to wide, braided streambeds. Channel migration occurs in less-confined areas, but within a more narrow range than would occur in broad, alluvial floodplains. Typically, the rivers are wadeable by mid-summer.

The primary inputs of water to these systems include groundwater discharge, overland flow, and subsurface interflow from the adjacent upland. Flooding is the key ecosystem process, creating suitable sites for seed dispersal and seedling establishment, and controlling vegetation succession. Communities within this system range from riparian forests and shrublands to tallgrass wet meadows and gravel/sand flats. Dominant species are similar to those found in the Great Plains Floodplain System. In the western part of the system's range in Montana, the dominant overstory species is black cottonwood (*Populus balsamifera ssp. trichocarpa*) with narrowleaf cottonwood *(Populus angustifolia)* and Plains cottonwood (*Populus deltoides)* occurring as co-dominants in the riparian/floodplain interface near the mountains. Further east, narrowleaf cottonwood and Plains cottonwood become dominant. In wetter systems, the understory is typically willow (*Salix spp.*) and redosier dogwood (*Cornus stolonifera*) with graminoids such as western wheatgrass (*Pascopyrum smithii*) and forbs like American licorice (*Glycyrrhiza lepidota*). In areas where the channel is incised, the understory may be dominated by big sagebrush (*Artemisia tridentata*) or silver sagebrush (*Artemisia cana*). Like floodplain systems, riparian systems are often subjected to overgrazing and/or agriculture and can be heavily degraded, with salt cedar (*Tamarix ramosissima*) and Russian olive (*Eleagnus angustifolia*) replacing native woody vegetation and regrowth. Groundwater depletion and lack of fire have resulted in additional species changes.

Additional Limited Landcover

Citation for this report:
Montana Ecological Systems / Landcover Report
Fallon County
Natural Heritage Map Viewer. Montana Natural Heritage Program.
Retrieved on August 26, 2014, from http://mtnhp.org/mapviewer/LandcoverReport.aspx?x=999517.4619223964&y=250235.90079896856&v=0

Attachment 6
Noxious Weeds

The University of Montana–Missoula
Invaders Database System

Wednesday, August 20, 2014

5 Northwestern States:
- Query by Name
- Query From List
- Query by Area
- Query From Map
- Links Database

Other Services:
- INVADERS Data Entry
- Weed Alert Service
- State/Provincial Noxious Weed Lists
- Biocontrol Service
- Blackfoot Weed Management
- ID/MT Risk Assessment
- Verification System

About INVADERS:
- Statistics
- INVADERS Citation
- Purpose
- Goals
- Potential users
- Applications
- Publications
- Demonstration projects
- Comments

Query By Area

You queried the area of Fallon County in Montana from 1875 to 2014 for All Species.

Results of Query

There are 100 species for this query.

Exotic	Noxious
49	17

Database queried on: August 20, 2014 Database last updated on: July 27, 2014

Genus	Species	Common Name	Exotic	Noxious In
Artemisia	absinthium	absinth wormwood	×	WA
Astragalus	racemosus	alkali milk vetch		
Celastrus	scandens	American bittersweet		
Sonchus	oleraceus	annual sowthistle	×	
Aster	sp.	aster		
Solanum	nigrum	black nightshade	×	
Lactuca	oblongifolia	blue lettuce		
Chorispora	tenella	blue mustard	×	
Plantago	major	broadleaf plantain		
Solanum	rostratum	buffalobur		ID,OR,WA
Cirsium	vulgare	bull thistle	×	OR,WA
Quercus	macrocarpa	bur oak		
Cirsium	arvense	Canada thistle	×	ID,MT,OR,WA,WY
Draba	reptans	Carolina whitlow grass		
Smilax	herbacea	carrion flower		
Nepeta	cataria	catnip	×	
Trifolium	sp.	clover		
Cuscuta	approximata	clustered dodder	×	OR,WA
Arctium	minus	common burdock	×	WY
Proboscidea	louisianica	common devil's claw		
Oenothera	biennis	common evening primrose		
Chenopodium	album	common lambsquarters	×	
Malva	rotundifolia	common mallow	×	
Tanacetum	vulgare	common tansy	×	MT,WA,WY
Oxalis	stricta	common yellow oxalis		
Heracleum	lanatum	cow parsnip		
Vaccaria	pyramidata	cowcockle	×	
Euphorbia	cyparissias	cypress spurge	×	
Hesperis	matronalis	damesrocket	×	
Taraxacum	officinale	dandelion	×	
Centaurea	diffusa	diffuse knapweed	×	ID,MT,OR,WA,WY
Anethum	graveolens	dill	×	
Rumex	sp.	dock		
Lathyrus	tuberosus	earth nut peavine	×	
Rhamnus	cathartica	European buckthorn	×	
Kuhnia	eupatorioides	false boneset		
Thlaspi	arvense	field pennycress	×	
Artemisia	frigida	fringed sagebrush		
Silene	armeria	garden catchfly	×	
Ambrosia	trifida	giant ragweed		
Ribes	aureum	golden currant		
Oenothera	villosa	hairy evening primrose		
Solanum	sarrachoides	hairy nightshade	×	
Conringia	orientalis	hare's ear mustard	×	
Zizia	aptera	heart leaved alexanders		
Cardaria	draba	hoary cress	×	ID,MT,OR,WA,WY
Bromus	japonicus	Japanese brome	×	
Kochia	scoparia	kochia	×	OR,WA
Salvia	reflexa	lanceleaf sage		
Echinochloa	crusgalli	large barnyard grass	×	
Euphorbia	esula	leafy spurge	×	ID,MT,OR,WA,WY
Delphinium	bicolor	little larkspur		
Malva	parviflora	little mallow	×	
Lycium	halimifolium	matrimonyvine	×	

Thalictrum	sp.	meadowrue		
Penstemon	angustifolius	narrow beardtongue		
Mirabilis	linearis	narrow leaved four o'clock		
Puccinellia	nuttalliana	Nuttall's alkaligrass		
Polygonum	lapathifolium	pale smartweed	×	
Sonchus	arvensis	perennial sowthistle	×	ID,WA,WY
Lolium	persicum	Persian darnel	×	
Matricaria	matricarioides	pineapple weed	×	
Conium	maculatum	poison hemlock	×	ID,OR,WA
Potentilla	pensylvanica	prairie cinquefoil		
Apocynum	sibiricum	prairie dogbane		
Polygonum	aviculare	prostrate knotweed	×	
Verbena	bracteata	prostrate vervain		
Agropyron	repens	quackgrass	×	OR,WY
Salicornia	rubra	red glasswort		
Chenopodium	rubrum	red goosefoot		
Amaranthus	retroflexus	redroot pigweed		
Cleome	serrulata	Rocky Mountain beeplant		
Potentilla	norvegica	rough cinquefoil		
Centaurea	repens	Russian knapweed	×	ID,MT,OR,WA,WY
Salsola	iberica	Russian thistle	×	
Prunus	pumila	sand cherry		
Bouteloua	curtipendula	sideoat grama		
Festuca	octoflora	sixweeks fescue		
Cucumis	melo	smellmelon		
Erigeron	glabellus	smooth daisy		
Centaurea	maculosa	spotted knapweed	×	ID,MT,OR,WA,WY
Smilacina	stellata	starry Solomon plume		
Eragrostis	cilianensis	stinkgrass	×	
Asclepias	incarnata	swamp milkweed		
Amaranthus	caudatus	tasselflower	×	
Lonicera	tatarica	Tatarian honeysuckle	×	
Mentzelia	decapetala	tenpetal stickleaf		
Cirsium	sp.	thistle		
Aster	pansus	tufted white prairie aster		
Thalictrum	venulosum	veiny meadowrue		
Abutilon	theophrasti	velvetleaf	×	OR,WA
Hibiscus	trionum	venice mallow	×	
Ellisia	nyctelea	waterpod		
Cirsium	undulatum	wavyleaf thistle		
Puccinellia	distans	weeping alkaligrass	×	
Symphyotrichum	ascendens	western aster		
Silene	latifolia	white catchfly	×	
Oenothera	nuttallii	white evening primrose		
Populus	alba	white poplar	×	
Aster	falcatus	white prairie aster		

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INTRODUCTION

Statement of Purpose

The Fallon County Noxious Weed Management Plan is a guide for the Fallon County Weed Board, and the Fallon County Weed Coordinator to carry out a noxious weed program in said county. In addition, it serves as an understanding devise for the landowners and the taxpayers of Fallon County. It serves government officials as the support noxious weed control in the county.

This revised management plan places Fallon County in compliance with the Montana County Noxious Weed Control Act 7-22-2101 through 7-22-2153.

The Fallon County Weed Board places the primary responsibility for noxious weed control on the landowner. The board will assist within the limits of this management plan, funding and time available.

Landowners who are found to have a noxious weed infestation and do not have a Weed Management Plan acceptable to the Fallon County Weed Board will be notified by Certified Mail. The letter shall quote section 7-22-2116 ("It is unlawful to permit noxious weeds to propagate. It is unlawful for any person to permit any noxious weed to propagate or go to seed on his land, except that any person who adheres to the noxious weed management program of his district or who has entered into and is in compliance with a noxious weed agreement is considered to be in compliance with this section.") of the County Weed Management Act. Landowners so notified will be given the opportunity to develop an acceptable weed management plan with the assistance of the Fallon county Weed Board or their representatives.

The following pages outline the Fallon County Weed Board's plan.

II. Situation:

Fallon County contains 1,045,120 acres of which approximately 80 percent is range or grassland. The ownership pattern of the county is shown on the landownership map provided in this plan. The approximate ownership of the land is as follows:

Private Land	**847,257acres**	**81%**
State Lands	**68,094acres**	**7%**
B.L.M	**122,621acres**	**12%**
Fallon County	**7,148acres**	**Less than 1%**

Private land accounts for approximately 81 percent of the land in Fallon County.

The Bureau of Land Management administers about 12 percent of the land and is scattered fairly evenly throughout the county.

State lands, which make up about 7 percent, are commonly found in sections 16 and 36 of each township. These lands are normally leased to an adjacent farmer or rancher on a 10-year contract.

Major drainages (creeks): 1) **Little Beaver** in the southeast part of the county flowing generally northeast; 2) **Sandstone** flows northwest across the central area of the county; 3) **Beaver** in the north portion of the county flows generally north; 4) **Cabin and Pennel Creeks** drain the northwestern part of the county flowing northwest; and 5) **O'Fallon** draining the western area of the county flowing north.

Climate: The climate of Fallon County is best described as continental with cold winters, warm summers and marked variations in seasonal precipitation. The average annual precipitation is 13.9 inches per year at Baker. June has historically been the wettest month, followed by May and July. Summer precipitation normally occurs in the form of thunderstorms.

The average growing season is from 110-130 days, but can vary considerably from year to year. Winds are prevailing from west or northwest, and are generally most severe in late winter and early spring. When the wind blows in Fallon County it is usually enough to hinder the application of herbicide, thus shortening the spray season.

Populated areas; Major towns in the county are Baker with a population around 2,000 in the eastern side of the county and Plevna with a population around 150 found in the center of Fallon County. Fallon County's overall population is about 3,500 people. There are approximately 911 miles of county roads, 85 miles of state highways and 35 miles of railroad in Fallon County.

III. WEED PROBLEM

Noxious weeds, as found in Fallon County, originated as a man-made problem. They were introduced to the area in most cases through feed, seed and road travel. Once established, they continued to be spread in this manner, as well as by domestic animals and various forms of wildlife. It is more than likely that wind and water have also contributed to the spread.

Leafy spurge was introduced in the cabin creek area in the 1920's arriving in seed. It was introduced in the Dugout Creek area in the 1930's with imported livestock and feed. In the western part of the county it was first introduced into Custer County in the 1930's on a WPA (Work Project Administration) project. Infestations of leafy spurge at this point in Fallon County would appear to have spread from these original infestations. Great efforts have been taken to keep the spurge contained to these areas. For the most part the leafy spurge in Fallon County is spreading slowly, and vast areas of the county have not ever seen the noxious weed.

Russian Knapweed first arrived in the upper part of Fallon Creek in the 1920's in alfalfa seed. In the 1930's, it showed up in grass seed in the lower area of Fallon Creek. Spotted and Diffuse knapweeds were introduced later in the1970's and 1980's by the railroad and vehicle traffic. These infestations occur for the most part along roadways. The knapweeds in Fallon County have been contained for years. Though the occasional weed shows up in different areas, Fallon County contains less than 20 acres of knapweed. The Knapweed family is considered to be one of the county weed board's top priorities. It is the board's policy to pay for the first 200 dollars for control of knapweed.

Canada Thistle became a problem in the 1960's. Introduction is credited to vehicle traffic. Canada Thistle makes up about 50-60% of the departments summer workload. Timely rains, rapid spread, and abundance of this plant has made containing it a challenge.

As population in Fallon County grows, the threat of new invaders is always there. With the addition of Saltcedar to the state's noxious weed list in 2002, the County Weed Board; in conjunction with the Fallon County NRCS office, have discovered roughly 20 plants within the city limits of Baker, and a few others out in the country. In 2004, Yellow Toadflax was found in the city of Baker. It seemed to have escaped from an ornamental flowerbed.

IV. FALLON COUNTY NOXIOUS WEED LIST

1. **LEAFY SPURGE**
2. **RUSSIAN KNAPWEED**
3. **SPOTTED KNAPWEED**
4. **DIFFUSE KNAPWEED**
5. **CANADA THISTLE**
6. **WHITETOP**
7. **FIELD BINDWEED**
8. **DALMATION TOADFLAX**
9. **YELLOW TOADFLAX**
10. **YELLOWSTAR THISTLE**
11. **DRYERS WOAD**
12. **PURPLE LOOSESTRIFE**
13. **SULFUR CINQUEFOIL**
14. **RUSH SKELETONWEED**
15. **COMMON CRUPINA**
16. **SALTCEDAR**
17. **COMMON TANSY**
18. **OX-EYE DAISY**
19. **ST. JOHNSWORT**
20. **MEADOW HAWKWEED**
21. **ORANGE HAWKWEED**
22. **PERENNIAL PEPPER WEED**
23. **TALL BUTTERCUP**
24. **TANSY RAGWORT**
25. **YELLOW FLAG IRIS**
26. **HOUNDSTONGUE**

This list is subject to change, as the State of Montana or Fallon County adds weeds.

V. FALLON COUNTY PROBLEM AREAS

Leafy Spurge:

Dugout and Johnny Creek areas northeast of Baker.
Approximate area mapped:

a) Private Land	214 acres
b) County Land	90 acres
c) State Land	94 acres
d) B.L.M land	136 acres

Cabin Creek area northwest of Baker.
Approximate acres are mapped (1986 data) and estimated to be:

a) Private Land	2,013 acres
b) County Land	75 acres
c) State Land	517 acres
d) B.L.M. Land	194 acres

Scattered areas throughout Fallon County:

a) Approximately 50 scattered acres
b) Total estimated acreage 500 acres
c) Located on private, BLM, State and right-or-ways

Knapweeds:

Scattered areas throughout the county, approximately 15-20 areas with less than 5 acres – private land, City of Baker, City of Plevna, railroads, and right-of-ways.

Canada Thistle:

294 areas mapped, less than one acre each. They are located on private, state, BLM, county and city lands.

VI. **PURPOSE**

There are several purposes of the Fallon County Weed Program. According to state law, a program must be carried out. Additionally, it is in the best interest of the public to assist in the maintenance of a productive, valuable land resource. This land resource can only remain productive over time if it is relatively noxious weed free. By remaining in this condition, the market value of the land resource can be maintained, produces economic benefits to the ownership, and provides a productive segment of the tax base. Land will not deplete as a resource if maintained and productive. The purpose for the Fallon County Weed Program is to educate the landowners of Fallon County and to assist them in the control of the noxious weeds on their land. Furthermore the program is in place to enforce the State and County Weed laws, within the limits of those laws.

VII. GOALS AND OBJECTIVES:

SHORT TERM GOALS

1) To involve all landowners in the control of noxious weeds on their land.
2) To encourage integrated noxious weed control. (Biological, Chemical, Cultural, Etc.)
3) To organize and initiate a project area control project in and around Cabin Creek.
4) To carry out the objectives of the Tri-County Leafy Spurge Project.
5) To organize and initiate a project area in and around Dugout Creek.
6) To maintain and elevate the number of acres mapped and controlled in the country.

LONG TERM GOALS

1) To achieve a level of noxious weed control where threats of noxious weeds and their spread are diminished, and a level at which all individual landowners control weeds on their own land.
2) To educate as many landowners in the control of noxious weeds as possible. To aid in the fight against said weeds.
3) To maintain and eliminate Knapweed from the county and to keep it from coming back.

VIII. PLAN OF ACTION

1. WEED BOARD POLICIES

Sale of chemical - The weed board will make available Tordon 22K and other chemicals for the control of noxious weeds in Fallon County. Price will be based on the board's purchase price. The board may cost-share any chemical if the situation warrants such an action, and will cost-share all Tordon 22K for the control of noxious weeds. (With the exception of noxious weeds found on cropland, this includes C.R.P. lands.)

General Statement – The weed board may share the cost of controlling designated noxious weeds on privately owned land with those who have filed a management plan that is acceptable to the Fallon County Weed Board. Financial assistance is subject to the availability of funds.

The weed board will control noxious weeds in the incorporated limits of Baker and Plevna. Nuisance weeds may be controlled at the landowners expense and in the availability of time.

The board will administer grants and grant monies, as approved by the Montana Noxious Weed Trust Fund.

Target Weeds "PRIORITIES" – **Knapweeds and Whitetop** – Infestations within the county will be treated by the weed board up to a cost of $200.00 per farm/ranch. Costs above $200.00 will be cost-shared as listed above. **Leafy spurge** – Major infestations will be assisted with mapping and coordination of a total area control program. Cost-share is as written above. **Canada Thistle** – producers with large infestations will be assisted with the sale of chemical, the county may spray if necessary, but will urge the landowner to rent the county equipment or to invest in their own.

It is not this board's policy to attempt control on Field Bindweed. However the board will cost-share the chemical if landowner chooses to pursue control on their own. The department will control Bindweed and other nuisance weeds on county right-of-ways.

Custom Work – The Fallon County Weed Department will perform custom herbicide applications when time and availability of manpower allows for such an application. The application cost will be set yearly and shall reflect a competitive market price. Custom applications are a large part of the department's seasonal work. However, it is important that the landowners of Fallon County understand that the Weed Board will not be able to get all of the jobs completed from year to year. Therefore it may fall on the landowner to control their weeds. Jobs will be done by priority (Chosen by the Weed Board or the Coordinator) and then on a first come first serve basis.

Equipment Rental – The board will make available for use, spray equipment that can be rented and used by county landowners to control weed infestations for a specified rate. This rate will be set yearly. Extensive abuse to the rental equipment will be charged to the user. Equipment will be lent out on a first come first serve basis.

Chemical Bids – The board will, if possible, schedule the asking of chemical bid dates to coincide with surrounding counties in an attempt to obtain the best chemical prices available.

Weed Map – The Fallon County Weed Department will maintain a master map in the County Extension Office in the basement of the courthouse in Baker, Montana, showing all known infestations of noxious weeds excluding field bindweed.

Extension Relation – The board will work closely with the Fallon/Carter Extension Service in the education of the landowners of Fallon County. The Coordinator will be responsible for communicating with the Agent and vise versa, in preparing educational material and credited classes for the producers. The Agent will assist with grant writing. The agent will act as the secretary to the weed board, offering his opinion and advice.

Bio-Control – Though chemical control is the staple of the Fallon County Weed Department, the board will not exclude other control measures when used properly. The Department will make insects available to the landowners of Fallon County or information on where to obtain them. However, the board will urge landowners to take an integrated approach to weed control.

Department of Ag. – The board will work closely with the state weed coordinator and the Montana Department of Ag, for maintaining pesticide credits, training, financial aid and expertise when possible.

Contracts – The board will enter agreements with BLM, DOT, Fish Wildlife and Parks along with the other county department for control of weeds on their lands.

Railroad – The board will coordinate and monitor control efforts for Burlington Northern on their right-of-way, and notify the controlling party if control measures need to be taken.

Commissioners – The board will call on the Fallon County Commissioners to aid in major decisions and will make available all information and meeting minutes that the board of commissioners may call for.

Non-Compliance – The board will implement the steps lined out by the Montana Weed Control Act in a situation where non-compliance may be an issue.

(The following pages contain the process in a non-compliance case)

7-22-2123

Procedure in case of non-compliance:

(1) When a complaint has been made or the board has reason to believe that noxious weeds described in this part are present upon a person's land within the district in violation of the law, that person **must be notified by mail or telephone of the complaint** and the board may request inspection of the land. **Note:** *the complaint is kept anonymous.* The board or its authorized agent and the landowner or the landowner's representative shall inspect the land at an agreeable time, within **10 days** of notification of the landowner. If, after reasonable effort the board is unable to gain cooperation of the person, the board or its authorized agent may enter and inspect the land to determine if the complaint is valid.

(2)**If noxious weeds are found, the board or coordinator shall notify the person or the person's representative and seek voluntary compliance** with the district weed management program. **If voluntary compliance is not possible, notice of non-compliance must be sent to the person by certified mail.**

(3) **The notice must specify:**

a) The basis for the determination of non-compliance.
b) The geographic location of the area of non-compliance, by legal description or other reasonably identifiable description.
c) Measures to be undertaken in order to comply with the district's management criteria;
d) A reasonable period of time, not less than **10 days**, in which compliance measures must be initiated; and
e) The right of the person to request, within the time specified in subsection (3)(d), an administrative hearing as provided by 7-22-2110.

7-22-2110. Administrative hearing—appeals. (1) A person adversely affected by any notice, action, or order of the board may request an administrative hearing before the commissioners. The commissioners shall hold a hearing within 30 days of the request. Participants may be represented by legal counsel. The commissioners shall make a record of the proceeding and enter its order and findings within **7days** after the hearing.

(2)Within **30 days** after the commissioners render their order and findings, the person adversely affected may file a petition in district court requesting that the order and findings of the commissioners be set aside or modified. The court may affirm, modify, or set aside the order complained of, in whole or in part.

(4) **A person is considered in compliance if the person submits and the board accepts a proposal to undertake specified control measures and is in compliance as long as the person performs according to the terms of the proposal.** If the proposed measures to be taken extend beyond the current growing season, the proposal and acceptance must be in writing.

(5) In accepting or rejecting a proposal, the board shall consider the economic impact on the person and the person's neighbors, practical biological and environmental limitations, and alternative control methods to be used.

7-22-2124. Destruction of Weeds by Board. (1) If corrective action is not taken and the proposal is not made and accepted or a request for an administrative hearing is not made within the time specified in the notice, the board may enter upon the person's land and institute appropriate control measures. In that case, the board shall submit a bill to the person, itemizing hours of labor, material, and equipment time, together with a **penalty not exceeding 50%** of the total cost incurred. Labor and equipment must be valued at the current rate paid for commercial management operations in the district. The bill must specify and order payment due date of 30 days from the date the bill is sent. The board may enter into an agreement with a commercial applicator, as defined in 80-8-102, to destroy the weeds. The commercial applicator shall agree to carry any insurance required by the board. (2) **A copy of the bill must also be submitted by the board to the county clerk and recorder.** (3) If a person receiving an order to take corrective action requests an administrative hearing, **the board may not institute control measures until the matter is finally resolved, except in a case of an emergency.** In that case, the person is liable for the costs as provided in subsection (1) only to the extent determined appropriate by the board, commissioners, or court that finally resolves the matter.

IX. PRIORITIES – CONTROL AGREEMENTS

1) **COUNTY ROAD RIGHT-OF-WAY, AND OTHER COUNTY LAND**

2) **CONTRACTED CONTROL OF STATE HIGHWAY RIGHT-OF-WAYS**

3) **B.L.M. – CONTROL AS PER AGREEMENT**

4) **CONTROL NOXIOUS WEEDS IN BAKER AND PLEVNA AS PER AGREEMENTS**

5) **CONTRACTED CONTROL FOR FW&P (SOUTH SANDSTONE)**

6) **APPLY CHEMICAL FOR PRIVATE LANDOWNERS AT COST FOR CHEMICAL AND AT A RATE SET ANNUALLY PER HOUR FOR TRUCK, CREW, EQUIPMENT (NOXIOUS WEEDS ONLY)**

7) **ORGANIZE, MAP AND COORDINATE CONTROL PROJECTS IN MAJOR INFESTED AREAS**

X. WEED MANAGEMENT TECHNIQUES

FIVE GENERAL CATEGORIES

A. PREVENTION – Preventative weed control is concerned with measures taken to prevent the introduction, establishment and/or spread of specified weed species in areas not currently infested with these plant species. Prevention is largely the responsibility of individuals and groups of people with common desire to prevent the introduction and spread of one or more noxious weed species. Prevention should be practiced through "Weed Districts", county, city, and community maintenance departments, and through the efforts of individual farmers, ranchers, and landowners as well as state and federal land management agencies. Preventative measures that should be followed to prevent the spread of noxious weeds include the use of (1) WEED-FREE crop seed, (2) WEED-FREE manure and hay, (3) CLEAN (seed free) harvesting equipment, (4) the elimination of weed infestations in or near irrigation water and cultivated fields, (5) MONITORING of all lands prone to noxious weed infestation, and (6) monitoring of all road material pits for noxious weeds and use of weed-seed-free construction materials by contractors.

B. CULTURAL WEED CONTROL – Cultural techniques utilize the practice common to good land and water management.

1. CROP COMPETITION – Vigorous crop plants provide more competition to weeds.

2. GRAZING MANAGEMENT – Good grazing programs stimulate good plants to be more competitive and provide more competition to the weeds. Graze uniformly.

3. SMOTHER CROPS – Crops that are especially competitive with the weed species infesting an area for light, nutrients, and moisture are called smother crops.

4. CROP ROTATION – This practice is used as a means of weed control to prevent or reduce the build up of high populations of certain weeds common to a particular crop. When the same cultural practices are followed year after year noxious weeds may and successfully complete with the crop plants, reducing yields, quality and economic return.

C. MECHANICAL WEED CONTROL – (PHYSICAL) Any equipment used should be cleaned of noxious weed parts and seeds prior to leaving the infested site.

1. HAND PULLING – Hand pulling is an effective practice for the control of weed seedlings and young, established annual and biennial weed species. For perennial weed control, it must be practiced at intervals of two to three weeks during the growing season for two or more years. This is best adapted to small areas, low-density populations or where other practices are not possible.

2. HOEING – A practice the same as pulling.

3. MOWING – Mowing is a limited means of weed control. However, it is an effective means to reduce seed production and to restrict unsightly or rank weed growth. It is commonly used in meadows pastures, along roadsides, and in waste places.

4. WATER MANAGEMENT – Flooding is an effective means of weed control under certain conditions. It is effective only when the roots and/or shoots of the weeds are completely covered and surrounded by the water for a sufficiently long period of time.

5. SMOTHERING – (Non-living material) This is effective if the light is completely excluded from the growing weed plants, thereby preventing photosynthesis and further growth. Materials used for this purpose include hay, grazing, clippings, straw, sawdust, wood chips, rice hulls, paper, and plastic film.

6. BURNING – Burning or flaming is used in non-cropped areas, such as railroad right-of-ways, irrigation canals and ditches, drainage ditches, and roadsides. It is most effective against weed seedlings, annual, and biennial weeds.

7. MACHINE TILLAGE – Tillage or cultivation will usually provide complete contact of annual, biennial, and simple perennial weeds. Cultivation must be practiced at intervals of two to three weeks during the growing season for two or more years on rhizomatous perennials like leafy spurge, Canada thistle and filed bindweed. Tillage at the right stage of growth prevents the plant from building up food reserves, exposes the roots to hot, dry summer weather and freezing in the winter, and stops re-establishment from seed.

D. BIOLOGICAL WEED CONTROL – This involves the utilization of natural enemies for the control of certain weeds. The objectives of biological control are not eradication but rather the reduction and regulation of the weed population below the level of economic injury. To be effective, a biotic agent need not kill the weed but only reverse its competitive advantage over the other plants.

E. CHEMICAL WEED CONTROL – Herbicides are recommended for the control of the noxious weeds listed on the county weed list. Types and rate of herbicide are recommended on a case-by-case basis, gathered from current information received by the County Weed District from the chemical companies, Montana Department of Agriculture, and the product label. Herbicides should be applied exercising caution, common sense, and following product label precautions and restrictions. Spray drift problems can be significantly reduced, or eliminated by spraying when wind is negligible or when wind direction is away from sensitive crops; by decreasing sprayer pressure; by lowering boom height; by changing nozzle tips that produce large droplets; and by using nonvolatile herbicide formulations. Special care must be exercised when applying herbicide with long-term soil persistence. Rainfall, soil type, topography, the location of sensitive desirable crops and other vegetation, irrigation ditches, surface water, and ground water to the application site must be considered.

RE-VEGETATION PROGRAMS

The Fallon County Weed Board will encourage Fallon County to have a re-vegetation program conducted by the road maintenance department in cooperation with the Fallon County Weed District. All right-of-ways that are disturbed through road maintenance, improvement, or by new construction are to be seeded or re-seeded to establish grass cover to prevent erosion and the infestation of weeds. Seed sources used must be certified seed, or seed that qualifies for certification. The Fallon County Weed District requires the State Department of Transportation to re-vegetate up to the edge of the pavement. IN NO CASE shall the use of sterilant be used before resurfacing highway road tops, to eliminate vegetation on the road edges. If vegetation is to be removed, it is recommended it be removed by blading the vegetation and topsoil away so it can be replaced and re-seeded. The weed district may reserve the right to require that construction equipment be washed before being moved to a new location or before entering the county. This is to prevent the spread of noxious weeds from machinery.

ROADSIDE POLICY

The Weed Board will attempt to control noxious and nuisance weeds along county roads in cooperation with the Fallon County Road Department and County Commissioners. Landowners adjacent to county roads may request prior to June 15th that chemical not be used next to their property. However they will be responsible for control of all noxious weeds on those rights-of-way. Weed control must be completed to the satisfaction of the weed board by August 15th.

SPECFIC PROJECT AREAS

1. Dugout Creek – continue to monitor the control program and assist new ownership in developing a total weed control program.

2. Cabin Creek – Administer Tri-County Leafy Spurge Grant with Wibaux and Prairie e Counties in the Cabin Creek area.

BUDGET

1. Budget for weed board activities in Fallon County is adequate to meet planned activities.

2005-2006 BUDGET

Salaries & Wages	$ 82,396.00
Office Supplies	$ 300.00
Operating Supplies	$ 45,000.00
Fuel & Oil	$ 3,600.00
Purchased Services	$ 11,000.00
Travel	$ 3,500.00
Training	$ 200.00
Capital Outlay	$ 70,000.00
Utilities	$ 500.00

* Approximately $30,000 of this budget item is returned to the budget from sale of chemical and contract work. Actual operating budget is approximately $101,283.

1) Payment terms for bills owed the Fallon County Weed District are as follows:
   - Bills for spraying and chemical sales will be sent following the spray season.
   - Bills are due and payable 30 days after the date on the original bill notice.
   - If payment is not received within 30 days, then a second notice will be sent.
   - If the bill is overdue for 60 days or more past the date of the original notices, the cooperator will forfeit any cost-share offered by the weed district.
   - Cooperators who are unable to pay can contact the weed district for special payment arrangements.
   - The board will act on these on a case-by-case basis. If payment arrangements are made to the satisfaction of the board, then cost-share will not be forfeited.

EQUIPMENT AND MANPOWER

1) Equipment needs are adequately fulfilled. Operating equipment consists of: (2) one ton 4-wheel drive trucks with two 300 gallon tanks with sprayers on each truck, a rental slide in sprayer with a 200 gallon tank pump and handgun, (3) 4x4 ATV's with a sprayer and 25 gallon spray tanks, (5) hand held GPS units to be used by the crew for mapping and to be lent out to landowners, (2) rental backpack sprayers, and (1) ATV sprayer for rental.

2) Manpower consists of one full-time coordinator and summer part-time help that will vary from year to year.

EVALUATION

The evaluation of a weed control program ultimately lies in analyzing the infestations of noxious weeds. This analysis must be made against a starting point, and must be made against a program of "doing nothing". Fallon County has known noxious weeds mapped on a map for 1983-84, and on additional maps for each two-year period from that point.

A noxious weed program must be evaluated in relation to known weeds that are being controlled under a management plan or program. Two areas remain in Fallon County to be brought into an acceptable management plan.

Attachment 6
Noxious Weeds

The University of Montana–Missoula
Invaders Database System

Wednesday, August 20, 2014

5 Northwestern States:
- Query by Name
- Query From List
- Query by Area
- Query From Map
- Links Database

Other Services:
- INVADERS Data Entry
- Weed Alert Service
- State/Provincial Noxious Weed Lists
- Biocontrol Service
- Blackfoot Weed Management
- ID/MT Risk Assessment
- Verification System

About INVADERS:
- Statistics
- INVADERS Citation
- Purpose
- Goals
- Potential users
- Applications
- Publications
- Demonstration projects
- Comments

Query By Area

You queried the area of Fallon County in Montana from 1875 to 2014 for All Species.

Results of Query

There are 100 species for this query.

Exotic	Noxious
49	17

Database queried on: August 20, 2014 Database last updated on: July 27, 2014

Genus	Species	Common Name	Exotic	Noxious In
Artemisia	absinthium	absinth wormwood	×	WA
Astragalus	racemosus	alkali milk vetch		
Celastrus	scandens	American bittersweet		
Sonchus	oleraceus	annual sowthistle	×	
Aster	sp.	aster		
Solanum	nigrum	black nightshade	×	
Lactuca	oblongifolia	blue lettuce		
Chorispora	tenella	blue mustard	×	
Plantago	major	broadleaf plantain		
Solanum	rostratum	buffalobur		ID,OR,WA
Cirsium	vulgare	bull thistle	×	OR,WA
Quercus	macrocarpa	bur oak		
Cirsium	arvense	Canada thistle	×	ID,MT,OR,WA,WY
Draba	reptans	Carolina whitlow grass		
Smilax	herbacea	carrion flower		
Nepeta	cataria	catnip	×	
Trifolium	sp.	clover		
Cuscuta	approximata	clustered dodder	×	OR,WA
Arctium	minus	common burdock	×	WY
Proboscidea	louisianica	common devil's claw		
Oenothera	biennis	common evening primrose		
Chenopodium	album	common lambsquarters	×	
Malva	rotundifolia	common mallow	×	
Tanacetum	vulgare	common tansy	×	MT,WA,WY
Oxalis	stricta	common yellow oxalis		
Heracleum	lanatum	cow parsnip		
Vaccaria	pyramidata	cowcockle	×	
Euphorbia	cyparissias	cypress spurge	×	
Hesperis	matronalis	damesrocket	×	
Taraxacum	officinale	dandelion	×	
Centaurea	diffusa	diffuse knapweed	×	ID,MT,OR,WA,WY
Anethum	graveolens	dill	×	
Rumex	sp.	dock		
Lathyrus	tuberosus	earth nut peavine	×	
Rhamnus	cathartica	European buckthorn	×	
Kuhnia	eupatorioides	false boneset		
Thlaspi	arvense	field pennycress	×	
Artemisia	frigida	fringed sagebrush		
Silene	armeria	garden catchfly	×	
Ambrosia	trifida	giant ragweed		
Ribes	aureum	golden currant		
Oenothera	villosa	hairy evening primrose		
Solanum	sarrachoides	hairy nightshade	×	
Conringia	orientalis	hare's ear mustard	×	
Zizia	aptera	heart leaved alexanders		
Cardaria	draba	hoary cress	×	ID,MT,OR,WA,WY
Bromus	japonicus	Japanese brome	×	
Kochia	scoparia	kochia	×	OR,WA
Salvia	reflexa	lanceleaf sage		
Echinochloa	crusgalli	large barnyard grass	×	
Euphorbia	esula	leafy spurge	×	ID,MT,OR,WA,WY
Delphinium	bicolor	little larkspur		
Malva	parviflora	little mallow	×	
Lycium	halimifolium	matrimonyvine	×	

Thalictrum	sp.	meadowrue		
Penstemon	angustifolius	narrow beardtongue		
Mirabilis	linearis	narrow leaved four o'clock		
Puccinellia	nuttalliana	Nuttall's alkaligrass		
Polygonum	lapathifolium	pale smartweed	×	
Sonchus	arvensis	perennial sowthistle	×	ID,WA,WY
Lolium	persicum	Persian darnel	×	
Matricaria	matricarioides	pineapple weed	×	
Conium	maculatum	poison hemlock	×	ID,OR,WA
Potentilla	pensylvanica	prairie cinquefoil		
Apocynum	sibiricum	prairie dogbane		
Polygonum	aviculare	prostrate knotweed	×	
Verbena	bracteata	prostrate vervain		
Agropyron	repens	quackgrass	×	OR,WY
Salicornia	rubra	red glasswort		
Chenopodium	rubrum	red goosefoot		
Amaranthus	retroflexus	redroot pigweed		
Cleome	serrulata	Rocky Mountain beeplant		
Potentilla	norvegica	rough cinquefoil		
Centaurea	repens	Russian knapweed	×	ID,MT,OR,WA,WY
Salsola	iberica	Russian thistle	×	
Prunus	pumila	sand cherry		
Bouteloua	curtipendula	sideoat grama		
Festuca	octoflora	sixweeks fescue		
Cucumis	melo	smellmelon		
Erigeron	glabellus	smooth daisy		
Centaurea	maculosa	spotted knapweed	×	ID,MT,OR,WA,WY
Smilacina	stellata	starry Solomon plume		
Eragrostis	cilianensis	stinkgrass	×	
Asclepias	incarnata	swamp milkweed		
Amaranthus	caudatus	tasselflower	×	
Lonicera	tatarica	Tatarian honeysuckle	×	
Mentzelia	decapetala	tenpetal stickleaf		
Cirsium	sp.	thistle		
Aster	pansus	tufted white prairie aster		
Thalictrum	venulosum	veiny meadowrue		
Abutilon	theophrasti	velvetleaf	×	OR,WA
Hibiscus	trionum	venice mallow	×	
Ellisia	nyctelea	waterpod		
Cirsium	undulatum	wavyleaf thistle		
Puccinellia	distans	weeping alkaligrass	×	
Symphyotrichum	ascendens	western aster		
Silene	latifolia	white catchfly	×	
Oenothera	nuttallii	white evening primrose		
Populus	alba	white poplar	×	
Aster	falcatus	white prairie aster		

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Attachment 7
MFISH
Reports

Lake Baker
HUC: O'Fallon (10100005)
Tributary To: No downlink
Regions: Region 7
Counties: Fallon

Location Information

Latitude: 46.36337
Longitude: -104.2707
Elevation: 2,972 ft.
Township: 07N
Range: 59E
Section: 13
Mountain Range: Not in a Mtn Range

Ownership Information

Public Land Ownership: 0 %
National Forest: Not in a NF
Ranger District: Not in a NF
Wilderness Area: Not in Wilderness Area

Physical Information

Surface Area: 90 acres
Shore Length: 2.27 mi.
Surface Temp.: 86
Trophic Status: Eutrophic
Shore Cover: Shrub
Max. Depth: 12 ft.
Avg. Depth: N/A
Volume: N/A
Formation: Reservoir
Winter Kill: No

Access Information

Trailhead Name: N/A
Directions to Lake: AT TOWN OF BAKER
Total Distance.: N/A
Distance on Trail: N/A
Ingress: Ingress readily available by permission
Esthetics: Lake and area with fair esthetics

Fish Distribution

Download Data

Begin Mile	End Mile	Species	Abundance	Use Type	Life History	Origin	Genetic Status	Data Rating	Data Source
0	1	Black Bullhead	Abundant	Year-round resident	Resident	Unknown	Not Applicable	Extrapolated from multiple surveys/observations	FWP
0	1	Black Crappie	Rare	Unknown	Resident	Introduced	Not Applicable	Extrapolated from multiple surveys/observations	FWP
0	1	Fathead Minnow	Abundant	Year-round resident	Resident	Native	Not Applicable	No Survey, Professional judgment	FWP
0	1	Largemouth Bass	Rare	Year-round resident	Resident	Introduced	Not Applicable	No Survey, Professional judgment	FWP
0	1	Northern Pike	Rare	Year-round resident	Resident	Introduced	Not Applicable	Extrapolated from multiple surveys/observations	FWP
0	1	Yellow Perch	Common	Year-round resident	Resident	Introduced	Not Applicable	Extrapolated from multiple surveys/observations	FWP

Sandstone Creek
River Mile: 0 to 71.8
Miles: 71.8
Total Stream Miles: 71.8
HUC: O'Fallon (10100005)
Tributary To: OFallon Creek
Regions: Region 7
Counties: Custer; Fallon

Fish Distribution Download Data

Begin Mile	End Mile	Species	Abundance	Use Type	Life History	Origin	Genetic Status	Data Rating	Data Source
0	31	Black Bullhead	Rare	Year-round resident	Not applicable	Introduced	Not Applicable	Extrapolated from multiple surveys/observations	FWP
0	31	Brassy Minnow	Unknown	Year-round resident	Resident	Native	Not Applicable	Extrapolated from multiple surveys/observations	FWP
57	58	Brook Stickleback	Unknown	Year-round resident	Resident	Native	Not Applicable	Extrapolated from a single survey/observation	FWP
0	32	Channel Catfish	Rare	Year-round resident	Not applicable	Native	Not Applicable	Extrapolated from multiple surveys/observations	FWP
0	32	Common Carp	Common	Year-round resident	Not applicable	Introduced	Not Applicable	Extrapolated from multiple surveys/observations	FWP
0	16	Creek Chub	Rare	Year-round resident	Not applicable	Native	Not Applicable	Extrapolated from multiple surveys/observations	FWP
26.5	27.5	Creek Chub	Common	Unknown	Not applicable	Native	Not Applicable	Extrapolated from a single survey/observation	FWP
0	33.2	Emerald Shiner	Abundant	Year-round resident	Not applicable	Native	Not Applicable	No Survey, Professional judgment	FWP
0	58	Fathead Minnow	Abundant	Year-round resident	Not applicable	Native	Not Applicable	Extrapolated from multiple surveys/observations	FWP
0	33.2	Flathead Chub	Rare	Year-round resident	Not applicable	Native	Not Applicable	No Survey, Professional judgment	FWP
0	33.2	Goldeye	Rare	Year-round resident	Not applicable	Native	Not Applicable	No Survey, Professional judgment	FWP
0	32	Green Sunfish	Common	Year-round resident	Not applicable	Introduced	Not Applicable	Extrapolated from multiple surveys/observations	FWP
0	33.2	Lake Chub	Rare	Year-round resident	Not applicable	Native	Not Applicable	No Survey, Professional judgment	FWP
0	33.2	Longnose Dace	Rare	Year-round resident	Not applicable	Native	Not Applicable	Extrapolated from a single survey/observation	FWP

0	33.2	Northern Pike	Rare	Year-round resident	Not applicable	Introduced	Not Applicable	No Survey, Professional judgment	FWP
0	33.2	River Carpsucker	Common	Year-round resident	Not applicable	Native	Not Applicable	Extrapolated from a single survey/observation	FWP
0	33	Sand Shiner	Abundant	Year-round resident	Not applicable	Native	Not Applicable	Extrapolated from multiple surveys/observations	FWP
0	33	Shorthead Redhorse	Rare	Year-round resident	Not applicable	Native	Not Applicable	Extrapolated from a single survey/observation	FWP
0	33.2	Stonecat	Rare	Year-round resident	Not applicable	Native	Not Applicable	No Survey, Professional judgment	FWP
0	33.2	Western Silvery/Plains Minnow	Common	Year-round resident	Not applicable	Native	Not Applicable	No Survey, Professional judgment	FWP
0	30.3	White Sucker	Abundant	Year-round resident	Not applicable	Native	Not Applicable	Extrapolated from multiple surveys/observations	FWP
30.3	31.4	White Sucker	Unknown	Year-round resident	Not applicable	Native	Not Applicable	Extrapolated from a single survey/observation	SCP
0	33	Yellow Perch	Unknown	Year-round resident	Resident	Introduced	Not Applicable	Extrapolated from multiple surveys/observations	FWP

Attachment 8
Crucial Area Planning System Data

Crucial Areas Planning System (CAPS) Information

In 2008, as a part of a Western Governors' Association initiative, Montana Fish, Wildlife & Parks (FWP) took the lead in conducting a statewide Crucial Areas Assessment. The Assessment evaluated the fish, wildlife and recreational resources of Montana in order to identify crucial habitat areas and fish and wildlife corridors. Ratings vary from Class 1 to Class 4, with Class 1 being the highest and Class 4 being the lowest.

Ratings Key

Class 1	
Class 2	
Class 3	
Class 4	

This database is not at a fine enough scale for accurate assessment of potential impacts associated with MDT projects because of the section level (one mile square) scale and use of models for the output. Coordination with the FWP wildlife biologist should occur on any projects brought forward from this corridor study.

Terrestrial Layers

The **Terrestrial Conservation Species layer** represents the cumulative expected occurrence of 85 of Montana's vertebrate species. Species inclusion was based on the State Species of Concern (SOC) list. In the project corridor the ratings vary from Class 1 to Class 4.

Township 7 North, Range 59 East					
6					1
					Baker Here
30					25

Township 7 North, Range 60 East					
6					1
30					25

The **Terrestrial Species Richness layer** represents species richness of all native land-based species in Montana, including amphibians, reptiles, birds, and mammals. Species included are found year round or breed in the state. The metric presented is the average number of species associated with all cover types (habitats) in each section.

Township 7 North, Range 59 East					
6					1
					Baker Here
30					25

Township 7 North, Range 60 East					
6					1
30					25

The **Terrestrial Game Quality layer** depicts areas considered valuable to 12 native game species and their specific habitat requirements.

Township 7 North, Range 59 East					
6					1
					Baker Here
30					25

Township 7 North, Range 60 East					
6					1
30					25

Aquatic Layers

CAPS identified Sandstone Creek as the only aquatic resource for aquatic connectivity in the entire study area, Sandstone Creek is rated a Class 3 because it does not have any focal species, but it does have a stream order greater than 2 and less than 5.

The following is a summary of example General Recommendations and Recommendations Specific to Transportation Projects for both terrestrial and aquatic species and habitat provided by MFWP through the CAPS program. If improvement options are forwarded from this study, these recommendations should be evaluated for potential applicability.

Terrestrial

- Avoid or minimize the loss of winter range.
- Focus wildlife impact mitigation efforts on maintaining landscape permeability, the ability for species to move freely across the landscape.
- Conduct pre-construction and post-construction monitoring to evaluate effectiveness of impact mitigation efforts, and apply adaptive management techniques to increase effectiveness over time.
- Minimize development footprint by limiting the total area dedicated to houses, roads, and other infrastructure.
- Provide open space for animal movement, including travel between winter and summer ranges.
- A combination of methods may be necessary to provide safe and efficient wildlife passage (e.g., crossings, fences, escape ramps).
- Roadside gates: Locate gates on both sides of a highway where known migration routes occur. Leave gates open during the winter months to facilitate movements of ungulates across the highway and to minimize trapping animals between fences and next to the highway.
- Locate new roads and existing road realignments outside of important wildlife habitat.
- Wildlife Crossing Structures over or under highways. Identify the wildlife species the structure is intended to serve. Locate structure near animals' natural travel routes. One crossing may not suffice for the full suite of species moving across a large landscape. Keep in mind that the largest crossing structures are suitable for the greatest diversity of wildlife. Design structures as flat and straight as the terrain permits, so that animals can see through the structure to suitable habitat on the other side. The land adjacent to the right-of-way at a crossing location should ideally be owned and managed in a manner that is compatible with wildlife activity.
- Roadside fencing: Build fence either to hold livestock in or keep livestock out, while allowing for as much free movement by wildlife as possible, as well as easy passage for recreationists at stream crossings. Attempt to balance the needs of wildlife with the landowner's liability (81-4-101, Montana Code Annotated defines legal fences).
- Raptors: Time road construction projects to avoid spring nesting periods.
- Songbirds (Passerines): Time road construction projects to avoid spring nesting periods.

Aquatic

- Maintain or restore natural vegetative buffer from water bodies, and provide an additional building setback. Tailor to type of waterbody. For example. Rivers: 250' buffer + 50' setback = 300' total (from ordinary high-water mark); Other Perennial Streams: 150' buffer + 50' setback = 200' total (from ordinary high-water mark); Other Water Bodies, including wetlands: 100' buffer + 30' setback = 130' total (from the defined boundary of a wetland or the high-water mark of intermittent streams, lakes, ponds, and reservoirs).
- Limit the number of stream crossings.
- Locate crossings in stable reaches of streams; position them perpendicular to the direction of stream flow.

- Bridge construction: Design bridge to maintain a constant grade, avoid large drops above or below the structure, accommodate both juvenile and adult fish, maintain water depth similar to the natural stream, minimize turbulence and flow contraction, and allow upstream fish passage. Bridge should be wide enough to exceed the 100-year floodplain and allow flood flows to spread onto the floodplain. Allow for some dry ground or an artificial ledge beneath the bridge on one or both sides, to accommodate both aquatic and terrestrial wildlife passage.
- Culverts: Maintain or improve stream grade to accommodate fish movement. Consider various culvert types to accommodate passage for the weakest fish in the assemblage. Keep culvert length to the minimum needed to ensure side slope stability. Ideally, inspect culverts annually following spring runoff.

Attachment 9
USFWS Trust Resources List

U.S. Fish and Wildlife Service

Trust Resources List

This resource list is to be used for planning purposes only — it is not an official species list.

Endangered Species Act species list information for your project is available online and listed below for the following FWS Field Offices:

Montana Ecological Services Field Office
585 SHEPARD WAY, SUITE 1
HELENA, MT 59601
(406) 449-5225

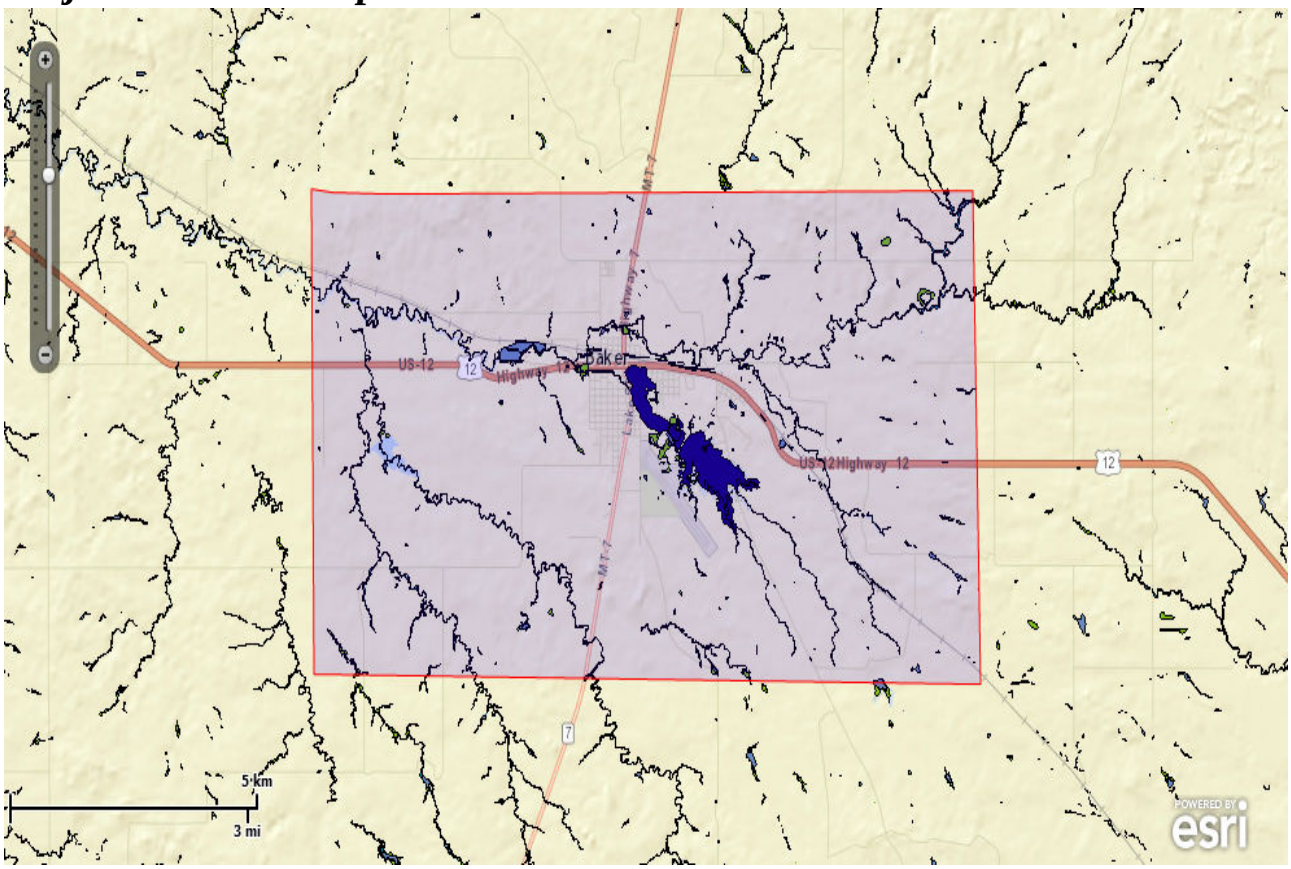
Project Name:

Baker

U.S. Fish and Wildlife Service

Trust Resources List

Project Location Map:



Project Location Measurements:

Area : 25704.0 ac.

Length : 26.4 mi.

Project Counties:

Fallon, MT

Geographic coordinates (Open Geospatial Consortium Well-Known Text, NAD83):

MULTIPOLYGON (((-104.3375257 46.3920091, -104.1827043 46.3924827, -104.1806444 46.3223465, -104.3570951 46.3237691, -104.3577989 46.3927195, -104.3523058 46.3922459, -104.3375257 46.3920091)))

U.S. Fish and Wildlife Service

Trust Resources List

Project Type:

Transportation

Endangered Species Act Species List (USFWS Endangered Species Program).

There are a total of **4** threatened, endangered, or candidate species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fishes may appear on the species list because a project could cause downstream effects on the species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section below for critical habitat that lies within your project area. Please contact the designated FWS office if you have questions.

Species that should be considered in an effects analysis for your project:

Birds	Status		Has Critical Habitat	Contact
Greater sage-grouse (*Centrocercus urophasianus*) Population: entire	Candidate	species info		Montana Ecological Services Field Office
Red Knot (*Calidris canutus rufa*)	Proposed Threatened	species info		Montana Ecological Services Field Office
Sprague's Pipit (*Anthus spragueii*)	Candidate	species info		Montana Ecological Services Field Office
Whooping crane (*Grus americana*) Population: except where EXPN	Endangered	species info	Final designated critical habitat	Montana Ecological Services Field Office

Critical habitats within your project area:

There are no critical habitats within your project area.

FWS National Wildlife Refuges (USFWS National Wildlife Refuges Program).

There are no refuges found within the vicinity of your project.

U.S. Fish and Wildlife Service

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FWS Migratory Birds (USFWS Migratory Bird Program).

The protection of birds is regulated by the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA). Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. For more information regarding these Acts see http://www.fws.gov/migratorybirds/RegulationsandPolicies.html.

All project proponents are responsible for complying with the appropriate regulations protecting birds when planning and developing a project. To meet these conservation obligations, proponents should identify potential or existing project-related impacts to migratory birds and their habitat and develop and implement conservation measures that avoid, minimize, or compensate for these impacts. The Service's Birds of Conservation Concern (2008) report identifies species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become listed under the Endangered Species Act as amended (16 U.S.C 1531 et seq.).

For information about Birds of Conservation Concern, go to http://www.fws.gov/migratorybirds/CurrentBirdIssues/Management/BCC.html.

Migratory birds of concern that may be affected by your project:

There are **10** birds on your Migratory birds of concern list. The Division of Migratory Bird Management is in the process of populating migratory bird data with an estimated completion time of Fall 2014; therefore, the list below may not include all the migratory birds of concern in your project area at this time. While this information is being populated, please contact the Field Office for information about migratory birds in your project area.

Species Name	Bird of Conservation Concern (BCC)	Species Profile	Seasonal Occurrence in Project Area
American bittern (*Botaurus lentiginosus*)	Yes	species info	Breeding
Bald eagle (*Haliaeetus leucocephalus*)	Yes	species info	Wintering
Black-billed Cuckoo (*Coccyzus erythropthalmus*)	Yes	species info	Breeding
Brewer's Sparrow (*Spizella breweri*)	Yes	species info	Breeding
Burrowing Owl (*Athene cunicularia*)	Yes	species info	Breeding

Ferruginous hawk (*Buteo regalis*)	Yes	species info	Breeding
Golden eagle (*Aquila chrysaetos*)	Yes	species info	Year-round
Grasshopper Sparrow (*Ammodramus savannarum*)	Yes	species info	Breeding
Greater sage-grouse (*Centrocercus urophasianus*)	Yes	species info	Year-round
Prairie Falcon (*Falco mexicanus*)	Yes	species info	Year-round

NWI Wetlands (USFWS National Wetlands Inventory).

The U.S. Fish and Wildlife Service is the principal Federal agency that provides information on the extent and status of wetlands in the U.S., via the National Wetlands Inventory Program (NWI). In addition to impacts to wetlands within your immediate project area, wetlands outside of your project area may need to be considered in any evaluation of project impacts, due to the hydrologic nature of wetlands (for example, project activities may affect local hydrology within, and outside of, your immediate project area). It may be helpful to refer to the USFWS National Wetland Inventory website. The designated FWS office can also assist you. Impacts to wetlands and other aquatic habitats from your project may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal Statutes. Project Proponents should discuss the relationship of these requirements to their project with the Regulatory Program of the appropriate U.S. Army Corps of Engineers District.

Data Limitations, Exclusions and Precautions
The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery and/or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Trust Resources List

Exclusions - Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Precautions - Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

The following wetland types intersect your project area in one or more locations:

Wetland Types	NWI Classification Code	Total Acres
Freshwater Emergent Wetland	PEMF	54.1187
Freshwater Emergent Wetland	PEMCx	67.6988
Freshwater Emergent Wetland	PEMA	998.9004
Freshwater Emergent Wetland	PEMC	174.8485
Freshwater Emergent Wetland	PEMCh	179.4793
Freshwater Emergent Wetland	PEMAh	515.1532
Freshwater Emergent Wetland	PEMFh	157.6471
Freshwater Pond	PABF	93.1071
Freshwater Pond	PABFh	513.4357
Freshwater Pond	PUSC	12.7381
Freshwater Pond	PUSA	18.4419
Freshwater Pond	PUSCx	18.8469
Freshwater Pond	PUSCh	398.2534
Freshwater Pond	PABGx	34.7045
Freshwater Pond	PABFx	348.8936

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Lake	L1UBHh	275.9069
Lake	L2USCh	337.5751
Lake	L2ABGh	12.4772
Lake	L2USAh	845.3237
Riverine	R3UBF	657.5551
Riverine	R4SBC	1469.4053

Attachment 10
Montana Species of Concern

Animal Species of Concern

Species List Last Updated **04/21/2014**

3 Species of Concern
4 Potential Species of Concern
Filtered by the following criteria:
Township = 7 N Range = 59 E

MONTANA Natural Heritage Program

A program of the Montana State Library's Natural Resource Information System operated by the University of Montana.

Species of Concern
3 Species
Filtered by the following criteria:
Township = 7 N Range = 59 E

BIRDS (AVES)

3 SPECIES
FILTERED BY THE FOLLOWING CRITERIA:
TOWNSHIP = 7 N RANGE = 59 E

SCIENTIFIC NAME COMMON NAME TAXA SORT	FAMILY (SCIENTIFIC) FAMILY (COMMON)	GLOBAL RANK	STATE RANK	USFWS	USFS	BLM	CFWCS TIER ID	% OF GLOBAL BREEDING RANGE IN MT	% OF MT THAT IS BREEDING RANGE	HABITAT
Ammodramus bairdii Baird's Sparrow	**Emberizidae** Sparrows	G4	S3B			SENSITIVE	2	27%	67%	Grasslands
		Species verified in these Counties: Blaine, Carter, Cascade, Chouteau, Custer, Daniels, Dawson, Fallon, Fergus, Glacier, Hill, Lewis and Clark, Liberty, McCone, Meagher, Musselshell, Petroleum, Phillips, Powder River, Prairie, Richland, Roosevelt, Rosebud, Sheridan, Stillwater, Sweet Grass, Teton, Toole, Treasure, Valley, Wheatland, Wibaux, Yellowstone **State Rank Reason:** Montana populations were declining until recently and the species is declining in most or the surrounding states and provinces.								
Centrocercus urophasianus Greater Sage-Grouse	**Phasianidae** Upland Game Birds	G3G4	S2	C	SENSITIVE	SENSITIVE	1	17%	75%	Sagebrush
		Species verified in these Counties: Beaverhead, Big Horn, Blaine, Carbon, Carter, Chouteau, Custer, Dawson, Deer Lodge, Fallon, Fergus, Gallatin, Garfield, Golden Valley, Hill, Liberty, Madison, McCone, Meagher, Musselshell, Park, Petroleum, Phillips, Powder River, Prairie, Roosevelt, Rosebud, Silver Bow, Stillwater, Sweet Grass, Treasure, Valley, Wheatland, Wibaux, Yellowstone								
Spizella breweri Brewer's Sparrow	**Emberizidae** Sparrows	G5	S3B			SENSITIVE	2	12%	100%	Sagebrush
		Species verified in these Counties: Beaverhead, Big Horn, Blaine, Broadwater, Carbon, Carter, Chouteau, Custer, Deer Lodge, Fallon, Fergus, Flathead, Gallatin, Garfield, Glacier, Golden Valley, Hill, Jefferson, Lake, Lewis and Clark, Liberty, Lincoln, Madison, McCone, Meagher, Musselshell, Park, Petroleum, Phillips, Powder River, Powell, Prairie, Ravalli, Rosebud, Sanders, Silver Bow, Stillwater, Teton, Toole, Valley, Wheatland, Yellowstone **State Rank Reason:** Species faces threats from loss of sagebrush habitats it is dependent on as a result of habitat covertype conversion for agriculture and increased frequency of fire as a result of weed encroachment and drought.								

Potential Species of Concern
4 Species
Filtered by the following criteria:
Township = 7 N Range = 59 E

FISH (ACTINOPTERYGII)

4 SPECIES
FILTERED BY THE FOLLOWING CRITERIA:
TOWNSHIP = 7 N RANGE = 59 E

SCIENTIFIC NAME COMMON NAME TAXA SORT	FAMILY (SCIENTIFIC) FAMILY (COMMON)	GLOBAL RANK	STATE RANK	USFWS	USFS	BLM	CFWCS TIER ID	% OF GLOBAL BREEDING RANGE IN MT	% OF MT THAT IS BREEDING RANGE	HABITAT
Culaea inconstans Brook Stickleback	**Gasterosteidae** Sticklebacks	G5	S4				3		27%	Small prairie rivers
		Species verified in these Counties: Big Horn, Blaine, Carbon, Carter, Cascade, Chouteau, Custer, Daniels, Dawson, Fallon, Fergus, Flathead, Garfield, Glacier, Hill, Lake, Liberty, McCone, Missoula, Park, Petroleum, Phillips, Pondera, Prairie, Richland, Roosevelt, Rosebud, Sheridan, Stillwater, Sweet Grass, Teton, Toole, Treasure, Valley, Wibaux, Yellowstone								
Hybognathus hankinsoni Brassy Minnow	**Cyprinidae** Minnows	G5	S4				3	6%	26%	Small prairie rivers
		Species verified in these Counties: Big Horn, Blaine, Carter, Cascade, Chouteau, Custer, Daniels, Dawson, Fallon, Fergus, Garfield, Glacier, Golden Valley, Hill, Judith Basin, Lewis and Clark, Liberty, McCone, Musselshell, Petroleum, Phillips, Pondera, Powder River, Prairie, Richland, Roosevelt, Rosebud, Sheridan, Stillwater, Teton, Toole, Treasure, Valley, Wheatland, Wibaux, Yellowstone								
Hybognathus placitus Plains Minnow	**Cyprinidae** Minnows	G4	S4				3	10%	8%	Small and large prairie rivers
		Species verified in these Counties: Blaine, Carter, Chouteau, Custer, Daniels, Dawson, Fallon, Fergus, Garfield, Hill, Judith Basin, Liberty, McCone, Musselshell, Petroleum, Phillips, Powder River, Prairie, Richland, Roosevelt, Rosebud, Sheridan, Teton, Toole, Treasure, Valley, Wibaux, Yellowstone								
Semotilus atromaculatus Creek Chub	**Cyprinidae** Minnows	G5	S4				3	1%	17%	Small prairie rivers
		Species verified in these Counties: Big Horn, Blaine, Carter, Custer, Daniels, Dawson, Fallon, Fergus, Garfield, McCone, Musselshell, Petroleum, Phillips, Powder River, Prairie, Richland, Rosebud, Treasure, Valley, Wibaux, Yellowstone								

Citation for data on this website:
Montana Animal Species of Concern Report. Montana Natural Heritage Program and Montana Fish, Wildlife and Parks. Retrieved on 8/21/2014, from http://mtnhp.org/SpeciesOfConcern/?AorP=a

Attachment 11

Greater Sage-Grouse Habitat Conservation Strategy

GREATER SAGE-GROUSE HABITAT CONSERVATION STRATEGY

Prepared by

Montana's Greater Sage-grouse Habitat Conservation Advisory Council

January 29, 2014

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I. INTRODUCTION

The Greater Sage-Grouse, a prairie species that depends on sagebrush habitat and open lands, has been the subject of significant discussion, litigation, collaboration and debate in the 11 western states that form its range. Montana has managed and regulated Greater Sage-Grouse (hereafter sage-grouse) for well over a century, but habitat loss and sage-grouse population declines in Montana and throughout the birds' range have prompted federal Endangered Species Act (ESA) petitions and litigation that seek to add the sage-grouse to the Endangered Species List.

These legal and procedural processes continue to move forward, and as they do they threaten Montana's ability to manage sage-grouse. The US Fish and Wildlife Service (Service) is cooperating with states – individually and collectively – on habitat conservation plans in advance of a court-ordered September 2015 decision on a potential ESA listing for this species. If the sage-grouse is added to the ESA List, the Service, a federal agency, would replace existing state authority and assume management responsibility for sage-grouse.

History shows loss of sage-grouse habitat and populations has occurred across all land management types, including federal land managed by the Service, Bureau of Land Management (BLM), and U.S. Forest Service. This plan calls on cooperation from federal, state, tribal, and private landowners and managers to conserve and protect sage-grouse.

In 2005, Montana created its first sage-grouse conservation plan, *Management Plan and Conservation Strategies for Sage-Grouse in Montana*. Since then, this plan has guided sage-grouse management in Montana. However, new research and science, coupled with new or expanded potential threats to sage-grouse habitat and populations, have combined with new court decisions to create a need for Montana to update its state sage-grouse conservation plan, policies and actions.

Early in 2013, following efforts in Wyoming and other states with sage-grouse populations, Montana Governor Steve Bullock issued Executive Order 2-2013 (Appendix A), creating a citizen-based Greater Sage-Grouse Habitat Conservation Advisory Council (Advisory Council). This Advisory Council was directed to "gather information, furnish advice, and provide to the Governor recommendations on policies and actions for a state-wide strategy to preclude the need to list the Greater Sage-Grouse under the ESA." In addition, the 2013 Montana State Legislature overwhelmingly passed HB 580 (Appendix B), legislation that funded the Governor's Advisory Council and supported its purpose to recommend policies and actions for a state wide sage-grouse strategy. Paramount in the Executive Order and the legislation was a directive to the Advisory Council to craft a strategy that will serve to preclude the need to add sage-grouse to the Endangered Species List.

In April 2013, the Governor appointed the 12-member Greater Sage-Grouse Habitat Conservation Advisory Council (Appendix C). Since then the Advisory Council has held nine comprehensive meetings. A full list of Advisory Council meeting agendas, minutes, presentations, documents, and more is available on Montana Fish, Wildlife and Parks (FWP) website at http://fwp.mt.gov/fishAndWildlife/management/sageGrouse/habitatConservation/.

Public Comment

This *Greater Sage-Grouse Habitat Conservation Strategy* forms the basis of recommendations from the Advisory Council to Governor Bullock. The Advisory Council held seven public hearings in Montana in primary sage-grouse areas, and well over 450 people attended the public hearings. During the hearings the draft

strategy was outlined by FWP personnel at the start of the hearing, copies of the strategy were available for the public, and the public had the opportunity to ask questions about the draft strategy or offer opinions on the draft strategy. The public hearings were held at the locations below:

CITY	LOCATION	TIME
Dillon	U of M – Western, Lewis & Clark Room, Mathews Hall	November 13 – 6 – 8 pm
Billings	FWP Region 5 Headquarters	November 18 – 6 – 8 pm
Baker	Senior Citizens Center	November 19 – 1 – 3 pm
Miles City	Miles Community College, James P Lucas Bldg, Rm 106	November 19 – 7 – 9 pm
Glasgow	Cottonwood Inn and Suites	November 20 – 6 – 8 pm
Malta	First State Bank	November 21 – 12 – 2 pm
Lewistown	FWP Lewistown Area Office	November 21 – 6 – 8 pm

In addition, the Advisory Council created a 34-day comment period for the public to offer written comments on the draft strategy. The Advisory Council received close to 380 comments during that period. During a December 18, 2013 video conference and during a January 14-15, 2014 meeting, the Advisory Council reviewed public comment and modified and finalized its recommendations to the Governor. Because the Advisory Council serves to advise the Governor, the Governor will accept, modify or reject the Advisory Council's recommendations. After finalizing Montana's sage-grouse strategy and developing an implementation plan, the Governor will submit Montana's sage-grouse conservation strategy to the Service for its review. After reviewing the strategy, it is anticipated that the Service will notify the Governor about the strategy's adequacy.

Throughout the Advisory Council's deliberations, the Service has made it clear that for the Service to consider Montana's *Greater Sage-Grouse Habitat Conservation Strategy* (*Montana Strategy*) as an effective mechanism for sage-grouse conservation in their final listing decision, the strategy must pass two critical tests: (1) the Service must have certainty the *Montana Strategy* will be implemented; and (2) once the *Montana Strategy* is implemented, the Service must have certainty the plan will be effective in protecting sage-grouse habitat and conserving sage-grouse populations. This document and Montana's sage-grouse conservation plan are built upon Montana's need to successfully address this two-part test.

Readers will note that the report is organized into major sections based on the primary threats facing sage-grouse. First, the main threats identified by the Service are addressed. Second, additional threats identified by the Advisory Council, are addressed. Each section contains a series of recommendations to address identified threats.

Readers will also note that this current Advisory Council ends its duties in early 2014. However, this Advisory Council is recommending that the Governor appoint a new citizen and agency-based working group to oversee sage-grouse conservation in Montana, the Montana Sage-Grouse Oversight Team. With significant amounts of emerging research and other information anticipated to be available in the near future, the Advisory Council believes it is essential that the State of Montana retain a sharp focus on the status of sage-grouse habitat, populations, threats and science. Wyoming has found the use of an established sage-grouse working group particularly effective and valuable in addressing ongoing sage-grouse issues. Montana's Advisory Council also believes creation of a new citizen and agency-based working group will be helpful in ensuring this *Greater Sage-Grouse Habitat Conservation Strategy* is successfully and effectively implemented now and into the future.

II. PERFORMANCE STANDARD

As of January 31, 2014, the State of Montana shall adopt a sage-grouse population target based on the number of displaying males. Displaying males are an index to sage-grouse abundance and distribution trends over time. This index to sage-grouse populations will be estimated regularly using a consistent protocol and will serve as a primary metric for quantifying the success or failure of this *Greater Sage-Grouse Habitat Conservation Strategy*. Sage-grouse populations vary naturally over time and across regions, which means numbers of birds counted in a given year or a given area could be higher or lower than average but are still within a sustainable range for the species. Between 2004 and 2013, the average number of displaying males in a given year in Montana ranged from 6.98 – 18.71 males/lek (NOTE: these numbers may change based on an ongoing evaluation of lek monitoring data by FWP). This range shall serve as the baseline for future regular population monitoring and will serve to determine sage-grouse population growth or loss as determined by a statistically-valid analysis over a 10-year period, and will also serve to guide future modifications of the *Montana Strategy* by the Montana Sage-Grouse Oversight Team and other state and federal entities. Deviations from historical or statewide trends in a given region of the state will also be taken into account when evaluating modifications to the *Montana Strategy*.

III. GENERAL PROVISIONS

Governor Bullock's Greater Sage-Grouse Habitat Conservation Advisory Council recommends the following *Montana Strategy* to address threats to the sage-grouse in Montana. The goal of the *Montana Strategy* is to conserve sage-grouse populations and habitats and to preclude the need to list the bird under the Endangered Species Act. To achieve this goal, the following stipulations were developed to conserve sage-grouse populations and habitats while concurrently achieving substantive economic and social growth. Primary threats that led to the Service's warranted but precluded finding in 2010 include fragmentation and alteration of sagebrush systems, and a lack of regulatory mechanisms to conserve sage-grouse habitat. Specific threats identified by the Service include wildfire, non-native plant species, energy development, sagebrush removal, improper grazing, range management structures, pinyon-juniper expansion, agricultural conversion, mining, recreation, ex-urban development, infrastructure, and fences. Predation and hunting were also identified by the Advisory Council as threats to sage-grouse and are included in this strategy. In its final form, the *Montana Strategy* will be presented to Governor Bullock for consideration as the primary regulatory mechanism to conserve sage-grouse and preclude the need for listing the bird as a threatened or endangered species pursuant to the Endangered Species Act of 1973. The following are general overarching provisions intended to convey how this strategy will be implemented and how agencies will work in concert to achieve effective conservation of sage-grouse in Montana:

1. Management by all Montana state agencies should focus on the maintenance and enhancement of sage-grouse habitats, populations and connectivity areas, including inter-state and international Connectivity Areas, identified in Section IV. Core Areas play a critical role and General Habitat plays an important role in sage-grouse conservation. Because regulatory certainty is important, it is important that scientifically defensible, mapped Core Areas be retained unless substantial and compelling information indicates that boundaries may need to be changed.
2. All valid and existing land uses and rights in sage-grouse Core Areas, Connectivity Areas and General Habitat should be recognized and respected. State trust lands have valid and existing rights and responsibilities under the Enabling Act at Statehood, November 8, 1889.
3. A Montana Stewardship and Conservation Fund will be established to create and fund voluntary and incentive-based non-regulatory conservation programs designed to conserve sagebrush habitat and

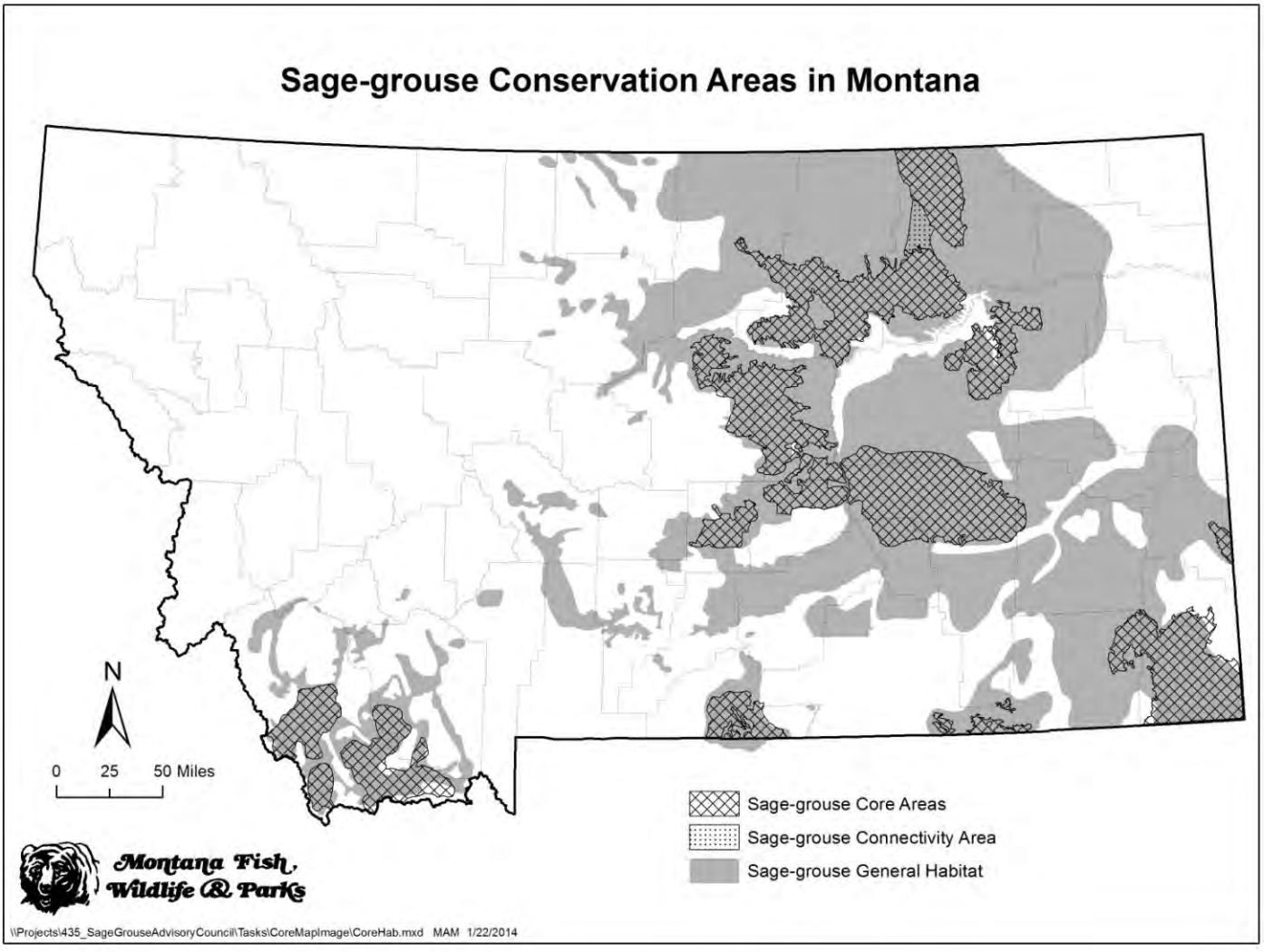
grazing lands within identified sage-grouse Core Areas, Connectivity Areas, and General Habitat areas on private lands (Section V).

4. The Governor shall direct and prioritize an appropriate amount of all state funds available for conservation of habitats for protection, enhancement, and restoration of sage-grouse habitat in Core Areas, Connectivity Areas, and General Habitat.
5. Activities conducted pursuant to a permit or permit application prior to January 31, 2014 will not be managed under the stipulations found in this strategy. Examples of existing activities include oil and gas, mining, agriculture, overhead power lines, processing facilities, housing and other uses that were in place prior to the development of this policy. Provided these activities are within a defined project boundary (such as a recognized state or federal oil and gas unit, drilling and spacing unit, mine plan, subdivision plat, etc.) they should be allowed to continue within the existing boundary, even if the use exceeds recommended stipulations (see Section VI), recognizing that all applicable state and federal actions shall continue. New development associated with existing activities may be subject to these stipulations (Section VI).
6. This strategy in no way adds or expands the review or approval authority of any state agency. Section VIII contains a list of land uses and landowner activities that do not require review for consistency.
7. New development or land uses requiring a permit or other authorizations within sage-grouse Core Areas should be authorized or conducted only when it can be reasonably demonstrated that the activity (factoring in mitigation) will not cause declines in sage-grouse populations. Activities that exceed recommended stipulations may require compensatory mitigation (Section VIII).
8. Development consistent with the stipulations set forth in Section VI shall be deemed sufficient to demonstrate that the activity will not cause declines in sage-grouse populations.
9. Core and Connectivity Areas and General Habitat will receive priority by state agencies for all sage-grouse funding, land management agreements (including Candidate Conservation Agreements and Candidate Conservation Agreements with Assurances), habitat enhancement projects, reclamation efforts, mapping projects, and other associated proactive efforts designed to assure viability of sage-grouse in Montana.
10. Incentives to accelerate or enhance reclamation in habitats in and adjacent to Core and Connectivity Areas and General Habitat should be developed, including but not limited to stipulation waivers, funding for enhanced reclamation, and other strategies. Any incentives developed will result in net benefit to and not cause declines in sage-grouse populations.
11. Immediate suppression of wildfire in Core and Connectivity Areas and General Habitat will be prioritized by all fire-fighting units under the jurisdiction of the state, recognizing that other local, regional, and national suppression priorities may take precedent. Coordination among all fire-fighting units, including federal, state, regional, and local units, is necessary to implement fire prevention, suppression, and rehabilitation management as detailed in Section X. However, public and firefighter safety remains the number one priority for all fire management activities. Reclamation and restoration of sage-grouse habitat burned by wildfire will be a primary mitigation opportunity under this plan.
12. State agencies shall work collaboratively and in cooperation with federal and local governments and private landowners to ensure a uniform and consistent application of this strategy to maintain and enhance sage-grouse habitats and populations.
13. A Montana Sage-grouse Oversight Team (MSGOT) will be established (Section XI). This body will be responsible for providing oversight for the implementation of Montana's *Greater Sage-grouse Habitat Conservation Strategy*.
14. State agencies shall strive to maintain consistency with the items outlined in this strategy, but it should be recognized that adjustments to the stipulations may be necessary based upon local conditions and limitations. Any adjustments to these stipulations must be recommended for approval by the MSGOT

and subsequently approved by the appropriate agency. The goal is to minimize future disturbance by co-locating proposed disturbances within areas already disturbed or naturally unsuitable.

15. The protective stipulations outlined in this Strategy should be reevaluated on a continuous basis and at a minimum annually, as new science, information, and data emerge regarding the habitats and behaviors of sage-grouse.
16. The State of Montana will implement a policy of yearly surveys of sage-grouse and leks statewide using biologists, wardens, and applicable public.
17. The State of Montana shall commit funding for the implementation of this Strategy as described in Section XI). This Strategy supersedes the 2005 *Management Plan and Conservation Strategies for Sage-grouse in Montana – Final*.
18. State agencies shall report to the Office of the Governor, Montana Environmental Quality Council, State Land Board, and Montana Fish and Wildlife Commission detailing their actions to comply with this Strategy.

IV. SAGE-GROUSE CONSERVATION AREAS



Geographic Information System layers of Montana's Greater Sage-Grouse Conservation Areas are available from Montana Fish, Wildlife and Parks upon request.

A. **Core Areas –** areas of highest conservation value for sage-grouse. Core Areas were delineated by Montana Fish, Wildlife and Parks (FWP) in cooperation with federal and non-governmental partners to encompass the areas with the greatest number of displaying males and associated habitat. FWP estimates the Core Areas include approximately 76% of the displaying males in Montana, as of 2013. Male counts at lek sites are assumed to represent the overall sage-grouse population.
B. **General Habitat –** areas that provide habitat for sage-grouse in Montana but are not considered Core Areas.
C. **Connectivity Areas –**areas that provide important linkages among populations of sage-grouse, particularly between Core Areas or priority populations in adjacent states and across international borders. Additional Connectivity Areas may be mapped when more information becomes available.

V. MONTANA STEWARDSHIP AND CONSERVATION FUND

Approximately 64% of sage-grouse habitat in Montana is in private ownership. The ongoing stewardship of private landowners is critical to successful conservation of sage-grouse habitat and providing additional opportunities to support land stewardship is fundamental to this strategy. The Advisory Council recommends the creation of the Montana Stewardship and Conservation Fund (Fund) to provide immediate and ongoing annual funding to:

1) Conserve sage-grouse habitat and populations until sage-grouse populations are stable and the sage-grouse is no longer vulnerable to an Endangered Species Act listing.
2) Create and fund voluntary and incentive-based non-regulatory conservation programs on private land.
3) Conserve key wildlife connectivity areas to help diminish potential future ESA listings of other species.
4) Target appropriate funding to conserve riparian and wetland areas to help diminish potential future ESA listings.
5) Improve habitat health to reduce threat of catastrophic fire, including projects designed to address conifer encroachment and invasive species.
6) Promote and support mitigation and conservation plans and measures. Funds cannot be used directly for compensatory mitigation but can be used to leverage existing compensatory mitigation projects to maximize sage-grouse conservation benefit.

In addition, this Fund would:

1) Be housed in the Montana Department of Natural Resources and Conservation.
2) Be managed by a citizen's board (with legislative representation) that would have authority to award funding through a competitive grant process to entities based on Fund guidelines, legislative intent, rule-making, and other specific provisions.
3) Allow entities such as watershed groups, conservation districts, nonprofit organizations, state agencies, and others to be eligible for grant funding.
4) Be used as a matching source of funds to ensure that Fund dollars are maximized for on-the-ground projects. The Fund could be used as match for mitigation programs, federal programs, private donations, other state programs, and more.
5) Be part of the governor's budget submission in late 2014 with a defined and identified dollar amount contained within the budget. The Advisory Council recommends funding for the *Montana Strategy* in the Governor's budget. To ensure transparency, the Fund would regularly report to the

Legislature, the Governor, the Montana Environmental Quality Council, and the Montana Fish and Wildlife Commission.

VI. STIPULATIONS FOR DEVELOPMENT

The goal of this Strategy is to conserve sage-grouse populations and habitats and to preclude the need to list the bird under the Endangered Species Act. To achieve this goal, the following stipulations were developed to conserve sage-grouse populations and habitats while concurrently achieving substantive economic and social growth. New development projects in sage-grouse Core Areas that require any state or federal permits will be required to follow the permitting process and stipulations outlined below. Development projects in sage-grouse Connectivity Areas and General Habitat may also be required to follow certain stipulations (see below). Activities exempt from these stipulations can be found in Section VIII. The permitting entity (e.g., Bureau of Land Management, Department of Environmental Quality) will have ultimate responsibility for compliance with these stipulations.

a) Core Area Stipulations

i. Core Area – Basic Stipulations

The stipulations in this section apply to all new activities in Core Areas with the exception of exempt activities defined in Section VIII. Additional stipulations that apply to specific industries and activities are described in Section VI.a.ii. Where there is a conflict between the basic and the specific stipulations for any given activity, the more specific will apply.

Sage-grouse Core Areas have been designated as areas of highest conservation priority. These stipulations are designed to maintain existing suitable sage-grouse habitat by regulating activities in Core Areas to ensure the maintenance of sage-grouse abundance and distribution in Montana.

1. **Sequence of Decisions for Surface Disturbance Activities:** State-approved projects that result in more than minimal adverse impacts to sage-grouse and/or their habitat will follow the following sequence of decisions:
    a. **Avoid Impacts**. The best way to protect sage-grouse habitat is to avoid impacts that fragment or otherwise damage or destroy sage-grouse habitat. To accomplish this, project developers should consider alternative locations for their project located outside sage-grouse habitat (i.e., consider locations outside Core Areas, outside suitable habitat, and/or in areas already considered disturbed). To meet this provision, the project developer needs to show authorizing agencies rationale as to why a given proposed surface disturbance in sage-grouse habitat is unavoidable.
    b. **Minimize the Size of the Impact**. If impacts to sagebrush habitat cannot be avoided, they should be minimized by limiting the magnitude of the proposed surface disturbance. Reducing impacts can preserve at least portions of the habitats' important functions, including limiting fragmentation. Impacts can be minimized by reducing the project footprint, constructing fewer structures, clustering features, shifting the development pattern to use topographical screening, timing restrictions, or similar measures. In order to meet this requirement, the project developer should be able to show that the project minimizes the impact to sage-grouse habitat, while continuing to meet the purpose of the development.

c. **Compensation for Impacts**. If project impacts are unavoidable and Core Area stipulations cannot be met, mitigation measures shall be required, following the Mitigation Framework outlined in Section IX.[1] Mitigation can include enhanced reclamation.

2. **Surface Occupancy Active Leks:** There will be a No Surface Occupancy (NSO) buffer within 1.0 mile of active sage-grouse leks within Core Areas. NSO, as used in these recommendations, means no surface facilities, including roads, shall be placed within the NSO area. Other activities may be authorized with the application of appropriate seasonal stipulations, provided the resources protected by the NSO are not adversely affected. For example, underground utilities may be permissible if installation is completed outside applicable seasonal stipulation periods and significant resource damage does not occur. Similarly, geophysical exploration may be permissible in accordance with seasonal stipulations. See Appendix D for the definition of an active lek.
3. **Surface Disturbance**: Surface disturbance will be limited to an average of 5% of suitable sage-grouse habitat within the Density and Disturbance Calculation Tool (DDCT) examination area (or other suitable term for Montana's density and disturbance analysis process; see Appendix E). The calculation method for this disturbance density will follow Wyoming's DDCT process that is described in Appendix E. The calculation of total percent disturbance will include:
    a. All existing disturbance (anthropogenic);
    b. Authorized but yet to be implemented activities; and
    c. Proposed activities;

    but will not include areas that are naturally unsuitable for sage-grouse (e.g., bodies of water). A definition of unsuitable habitat is provided in Appendix D. Distribution of proposed disturbance may be considered and approved on a case-by-case basis with a goal of consolidating disturbance. Unsuitable and disturbed habitat should be identified in a seasonal and landscape context, on a case-by-case basis, outside the NSO buffer around leks. This will incentivize proponents to locate projects, where technically feasible, in unsuitable and disturbed habitat to avoid creating additional disturbance acres. Acres of development in unsuitable habitat are not considered disturbance acres. The primary focus should be on protection of undisturbed suitable habitats and protection from habitat fragmentation. See Appendix D for a description of suitable habitat and surface disturbance.
4. **Seasonal Use**: As authorized by permitting agency or agencies, activities (production, maintenance, and emergency activity exempted) will typically be prohibited from March 15 – July 15 outside of the NSO perimeter of an active lek in Core Areas where breeding, nesting, and early brood-rearing habitat is present. Allowed maintenance and production activity will not occur between the hours of 4:00 - 8:00 am and 7:00 - 10:00 pm between March 15 – July 15. In areas used as winter concentration areas, exploration and development activity will be prohibited December 1 – March 15. Activities may be allowed during seasonal closure periods as determined on a case-by-case basis. Activities in unsuitable habitat also may be approved year round on a case-by-case basis.
5. **Noise**: New noise levels, at the perimeter of a lek, should not exceed 40 dBA above ambient noise (existing activity included) from 6:00 pm - 8:00 am during the breeding season (March 15 – July 15) with the exception of those sites identified under Special Management Core Areas.[2] Ambient noise levels should be determined by measurements taken at the perimeter of a lek at sunrise. The MSGOT should follow Wyoming's review and litigation discussion of this stipulation and amend the strategy accordingly.

[1] A Minority Committee Report has been written for the Compensation for Impacts stipulation, see Appendix H.

[2] A Minority Committee Report has been written for the Noise stipulation, see Appendix H.

6. **Vegetation Removal:** Vegetation removal as part of permitted activities will be limited to the minimum disturbance required by the project. All topsoil stripping and vegetation removal in suitable habitat will occur between July 16 – March 14 in areas that are within 4.0 miles of an active lek. Disturbance in unsuitable habitat between March 15 and July 15 may be approved on a case-by-case basis.
7. **Reclamation**: Reclamation should re-establish native grasses, forbs, and shrubs during interim and final reclamation. The goal of reclamation is to achieve cover, species composition, and life form diversity commensurate with the surrounding plant community or desired ecological condition to benefit sage-grouse and replace or enhance sage-grouse habitat to the degree that environmental conditions allow. Seed mixes should include at least two native forbs and two native grasses with at least one native bunchgrass species. Where sagebrush establishment is prescribed, establishment is defined as meeting the standard prescribed in the individual reclamation plan. Landowners should be consulted on the desired plant mix on private lands. The operator is required to control noxious and invasive plant species, especially cheatgrass (*Bromus tectorum*) and Japanese brome (*Bromus japonicus*).
8. **Existing Activities**: Areas already disturbed or approved for development within Core Areas prior to January 31, 2014 are not subject to new sage-grouse stipulations with the exception that existing operations may not initiate activities resulting in new surface occupancy within 1.0 mile of an active sage-grouse lek. Any existing disturbance will be counted toward the calculated disturbance cap for a new proposed activity. The level of disturbance for existing activities may exceed 5%.

ii. Core Area - Specific Stipulations

The stipulations in this section apply to specific activities and/or industries. They should be followed in addition to the basic stipulations described above. Where there is a conflict between the basic and the specific stipulations for any given activity, the more specific will apply.

1. **Transportation***:* Locate main roads used to transport production and/or waste products a minimum of 2.0 miles from the perimeter of active sage-grouse leks. Locate other roads used to provide facility site access and maintenance a minimum of 1.0 mile from the perimeter of active sage-grouse leks. Construct roads to minimum design standards needed for production activities.
2. **Pipelines**: Bury pipelines and restore disturbed area with native plant species that are compatible with the surrounding ecological site conditions. Co-locate pipelines with roads, transmission lines, and other linear features when possible. Compensatory mitigation for temporary loss of habitat will be required by the applicable permitting agency.
3. **Overhead Power lines and Communication Towers**: Locate new overhead power lines and communication towers a minimum of 1.0 mile from the perimeter of active sage-grouse leks. Use topographic screening and bury lower voltage transmission lines where economically feasible. Follow the Service's Best Management Practices for tall structures when erecting new communication towers. Burying of local distribution lines should be encouraged where economically feasible. Co-locate all new power lines with roads, existing power lines, or other linear features, when possible. Burying existing overhead lines that have been identified as contributing to a decline in sage-grouse populations will be considered as a mitigation option. Anti-collision measures should be installed within 1.0 mile of the perimeter of known sage-grouse concentration areas such as leks, winter ranges, etc. where icing conditions are unlikely to occur. Raptor-proofing poles is encouraged when proven effective. Industry and their suppliers are encouraged to continue efforts to develop effective perch preventers. If effective perch preventers are identified, they should be installed within 1.0 mile of known concentration areas such as leks, winter ranges, etc. Electric utilities, including electric cooperatives, are working with the Avian Power Line Interaction Committee (APLIC), which includes

federal agencies (including the Service and BLM), and state wildlife agencies (including FWP) to develop a set of Best Management Practices (BMPs) to guide construction, operation, and maintenance activities in sage-grouse habitats. This document will not be completed until after the Advisory Council submits their recommendations to the Governor. Until the BMP document is reviewed and approved by the Service, BLM, and other appropriate state and federal agencies, it will be referenced as "Best Management Practices for Electric Utilities in Sage-Grouse Habitat**".** It will be added to the Montana *Greater Sage-grouse Habitat Conservation Strategy* when the BMP document is finalized.

4. **Oil and Gas Development**: Well pad densities are not to exceed an average of one pad per square mile (640 acres) within the DDCT examination area (or other suitable term for Montana's density and disturbance analysis process; see Appendix E). As an example, the number of well pads within a 2.0 mile radius of the perimeter of an active sage-grouse lek should not exceed 11, distributed preferably in a clumped pattern in one general direction from the lek.
5. **Coal Mining**: Conservation measures will be developed for and imposed on coal mining operations on a case-by-case basis via the terms and conditions included in permits issued by the Montana Department of Environmental Quality (MDEQ) under the authority of the Montana Strip and Underground Mine Reclamation Act (MSUMRA), and in compliance with the federal Surface Mining Control and Reclamation Act (SMCRA). The Administrative Rule components of the MSUMRA can be accessed at http://www.deq.mt.gov/wqinfo/Laws/StripMiningReclamatio.mcpx. The associated coal permitting rules and standard of the Montana Department of Environmental Quality can be accessed at http://.deq.mt.gov/CoalUranium/Coalpermitting.mcpx. Links to SMCRA and the enabling components of the Code of the Federal Regulations can be found at http://www.osmre.gov/lrg.shtm.

    a. Coal mining will first try to avoid operating in sage-grouse habitat.
    b. To avoid potentially significant impacts to sage-grouse, coal companies will delineate the area that will be disturbed. They will report baseline vegetation surveys of the permit area, four season sage-grouse baseline surveys of the permit area and periphery, along with population density and habitat delineations. They will show pre-mine land use conditions, capacity, productivity, and history (per ARM 17.24.304). The sage-grouse plan (per ARM 17.24.312) will include:
        i. An operations plan (per ARM 17.24.308) that includes a plan to prevent the establishment of, or to effect the control of, noxious weeds (including cheatgrass and Japanese brome) in the proposed permit/amendment area.
        ii. A sage-grouse plan (per ARM 17.24.312) will include:
            1. A plan to minimize disturbances and impacts on sage-grouse and related environmental values during mining and reclamation;
            2. Details on how enhancement of sage-grouse values will be achieved;
            3. Descriptions of sage-grouse enhancement features to be established; and
            4. Statements of impact control measures, management techniques, and annual monitoring methods to protect or enhance sage-grouse or habitats identified through the consultation process as important and/or high value.
        iii. A reclamation plan to reclaim mined area back to suitable habitat (per ARM 17.24.313) will include:

            1. The proposed post-mining land use;
            2. A timetable for each reclamation step;
            3. A map of the proposed post-mining topography;

4. Demonstration that the post-mining topography can be achieved;
5. Details on reestablishment of hydrologic balance;
6. Details on topsoil salvage, protection, and replacement methods;
7. A narrative on the details of the revegetation methods to be applied;
8. Details on the reclaimed vegetation monitoring to be conducted; and
9. Mine and reclamation plan reviews by the Service relative to threatened, endangered, and candidate species through Section 7 consultation processes.

iv. The establishment of vegetation to protect sage-grouse (per ARM 17.24.711) will require that:

1. Vegetation must be reestablished on the disturbed areas and it must be diverse, effective, and permanent;
2. Vegetation cover must be comprised of native species or approved alternatives and be compatible with post-mine land uses;
3. Reclamation vegetation must be equivalent in cover to natural vegetation and be capable of self-regeneration and plant succession;
4. There is compliance with noxious weed restrictions; and
5. For sage-grouse habitat, shrubs must be established to achieve cover and stocking rates as approved by MDEQ after consultation and approval by FWP.

v. Shrub species (per ARM 17.24.717) must be adapted to local conditions and meet the post-mining land use.

vi. Monitoring (per ARM 17.24.723) requirements include:

1. Periodic vegetation, soils, and wildlife monitoring with coverage and frequency as approved by MDEQ; and
2. Submittal of detailed monitoring reports to MDEQ.

If monitoring data indicates corrective measures are needed, then adaptive management practices need to be applied.

The requirements for monitoring shall terminate at the same time that the MDEQ has determined that phase III reclamation, as defined in ARM 17.24.1116(6)(c), has been completed

vii. Revegetation success criteria (per ARM 1724.724) requirements include:

1. Determination of success will be via comparison to un-mined reference areas or through approved technical standards.

viii. Vegetation measurement (per ARM 17.24.726) requirements include:

1. Use of MDEQ-approved methods;
2. Demonstration of equivalent production, cover, and density per MDEQ-approved standards;
3. Minimum shrub density standards; and

4. Demonstration of compliance with noxious weed restrictions.

6. **Bentonite, Scoria, Peat, and Sand and Gravel Mining**[3]: Conservation measures will be developed for and imposed on opencut mining operations on a case-by-case basis via the terms and conditions included in permits issued by the Montana DEQ under the authority of the Montana Opencut Mining Act (83-4-401, Montana Code Annotated (MCA)), which can be accessed at http://deq.mt.gov/opencut/forms/2013-Title82Chapter4Part4.pdf .

    a. Opencut mining operations will first try to avoid operating in sage-grouse habitat.
    b. To avoid potentially significant impacts to sage-grouse, opencut mining companies will delineate the area that will be disturbed. They will report baseline vegetation surveys of the permit area, four season sage-grouse baseline surveys of the permit area and periphery, along with population density and habitat delineations (Per ARM 17.24.222). They will show pre-mine land use conditions, capacity, productivity, and history (per ARM 17.24.217). The sage-grouse plan will include:
        i. An operations plan (per ARM 17.24.218 and 219) that includes a plan to prevent the establishment of, or to effect the control of, noxious weeds (including cheatgrass and Japanese brome) in the proposed permit/amendment area.
        ii. A sage-grouse plan (per ARM 17.24.219) will include:

            1. A plan to minimize disturbances and impacts on sage-grouse and related environmental values during mining and reclamation;
            2. Details on how enhancement of sage-grouse values will be achieved;
            3. Descriptions of sage-grouse enhancement features that will be established; and
            4. Statements of impact control measures, management techniques, and annual monitoring methods to protect or enhance sage-grouse or habitats identified through the consultation process as important and/or high value

        iii. A reclamation plan (per ARM 17.24.219) to reclaim mined area back to suitable habitat will include:

            1. The proposed post-mining land use;
            2. Timetable for each reclamation step;
            3. A map of the proposed post-mining topography;
            4. Demonstration that the post-mining topography can be achieved;
            5. Details on reestablishment of hydrologic balance;
            6. Details on topsoil salvage, protection, and replacement methods;
            7. A narrative on the details of the revegetation methods to be applied;
            8. Details on the reclaimed vegetation monitoring to be conducted; and
            9. Mine and reclamation plan reviews by the Service relative to threatened, endangered, and candidate species through Section 7 consultation processes.

        iv. The establishment of vegetation to protect sage-grouse (per ARM 17.24.219) will require that:

[3] A Minority Committee Report has been written for the Bentonite, Scoria, Peat, and Sand and Gravel Mining stipulation, see Appendix H.

1. Vegetation must be reestablished on the disturbed areas and it must be diverse, effective and permanent;
2. Vegetation cover must be comprised of native species or approved alternatives and be compatible with post-mine land uses;
3. Reclamation vegetation to be equivalent in cover to natural vegetation and be capable of self-regeneration and plant succession;
4. There is compliance with noxious weed restrictions; and
5. For sage-grouse habitat, shrubs must be established to achieve cover and stocking rates as approved by MDEQ after consultation and approval by FWP.

v. Shrub species (per ARM 17.24.219) must be adapted to local conditions and meet the post-mining land use.

vi. Monitoring (per ARM 17.24.219) requirements include:

1. Periodic vegetation, soils, and wildlife monitoring with coverage and frequency as approved by MDEQ; and
2. Submittal of detailed monitoring reports to MDEQ

If monitoring data indicates corrective measures are needed, then adaptive management practices need to be applied.

The requirements for monitoring shall terminate upon bond release (per ARM 17.24.203)

vii. Revegetation success criteria (per ARM 1724.219) requirements will include:

1. Success to be determined via comparison to un-mined reference areas or through approved technical standards.

viii. Vegetation measurements (per ARM17.24.219) requirements include:

1. Use of MDEQ-approved methods;
2. Demonstration of equivalent production, cover, and density per MDEQ-approved standards;
3. Minimum shrub density standards; and
4. Demonstration of compliance with noxious weed restrictions.

7. **Other Mining**:

a. For development drilling or ore body delineation drilling on tight centers (approximately 50’ x 50’), the disturbance area will be delineated by the external limits of the development area. Assuming a more widely-spaced disturbance pattern, the actual footprint will be considered the disturbance area.
b. Sage-grouse monitoring results will be reported in the mine permit annual report. This document will be given to FWP and the regulating body. Pre-disturbance surveys will be conducted as required by the appropriate regulatory agency.
c. The number of active mining development areas (e.g., operating equipment and significant human activity) is not to exceed an average of one project per square mile (640 acres).

d. Surface disturbance and surface occupancy stipulations will be waived within the Core Area when implementing underground mining practices that are necessary to protect the health, welfare, and safety of miners, mine employees, contractors, and the general public. The mining practices include but are not limited to bore holes or shafts necessary to: 1) provide adequate oxygen to an underground mine; 2) supply inert gases or other substances to prevent, treat, or suppress combustion or mine fires; 3) inject mine roof stabilizing substances; and 4) remove methane from mining areas. Any surface disturbance or surface occupancy necessary to access the sites to implement these mining practices will also be exempt from any stipulation.
e. Mining permits will include requirements for mitigation that enhances or promotes genetic diversity, critical habitat, connectivity, and population viability.

8. **Wind Energy**: Wind energy development will be excluded from sage-grouse Core Areas. This provision will be reevaluated on a continuous basis as new science, information, and data emerges.
9. **Sagebrush Treatments**: Sagebrush eradication and treatment programs aimed at reducing or eliminating sagebrush will be prohibited on state and discouraged on private lands unless those treatments are approved by MSGOT and can be satisfactorily shown to result in no loss of habitat or be beneficial to sage-grouse habitat. Sagebrush treatments are considered disturbance and will contribute to the 5% disturbance factor. Sagebrush treatments that have been approved by MSGOT will not contribute to the 5% disturbance factor. Sagebrush canopy cover should be maintained at present levels. Treatments to enhance sagebrush-grassland will be evaluated based upon the existing habitat quality and the functional level post-treatment. Restored sagebrush grassland habitats that provide effective cover and food for sage-grouse should be recognized as part of the habitat base; this provision serves as an incentive for restoring and protecting converted habitats. For government agencies managing sagebrush in Core Areas, there should be a "no net conifer expansion" policy adopted, with criteria for approve waivers. This policy can be enacted through management plans and their implementation; stipulations in permits, leases, and licenses; and similar mechanisms. Conifer removal in sage-grouse Core Areas should be done manually, unless other methods can be shown to remove conifers without significantly impacting sagebrush. Where conifer encroachment is an issue near leks, land managers should ensure that all conifers are removed within at least 0.6 miles (1,000 meters) of leks.
10. **Conversion to Cropland Agriculture**: The Advisory Council recommends that the Montana Board of Land Commissioners enact a prohibition of conversion of native range to cropland on state land in Core Areas, with criteria for approved waivers. If enacted, prohibition details and criteria for approved waivers will be incorporated in to the *Montana Strategy* as an Addendum. The Advisory Council also requests that federal agencies prohibit the conversion of native range to cropland on lands that they control surface rights. State and federal agencies are also encouraged to work cooperatively with Tribal governments to adopt policies that prevent conversion of sage-grouse habitat to agricultural cropland.
11. **Range Management**: Rangelands on state lands will be managed in accordance with the recommendations in Section X.a, whenever possible, taking into consideration the existing management practices of the lessee on surrounding non-state lands. State agencies are encouraged to collaborate with federal agencies and private landowners to craft grazing management plans that adhere to the concepts included in this document.
12. **Wildfire and Prescribed Fire**: Immediate suppression of wildfire in Core Areas will be prioritized by all fire-fighting units under the jurisdiction of the state. Prescribed burns will be prohibited in sagebrush habitat in Core Areas unless those prescribed burns are approved by MSGOT and can be satisfactorily shown to result in no loss of habitat or be beneficial to sage-grouse habitat. Although lands burned by

wildfire are excluded from the disturbance cap, these lands require a management plan resulting in a trend to reestablish functional sage-grouse habitat as soon as possible. Burnouts, backfires, and all other public safety measures are appropriate for fighting wildfires.

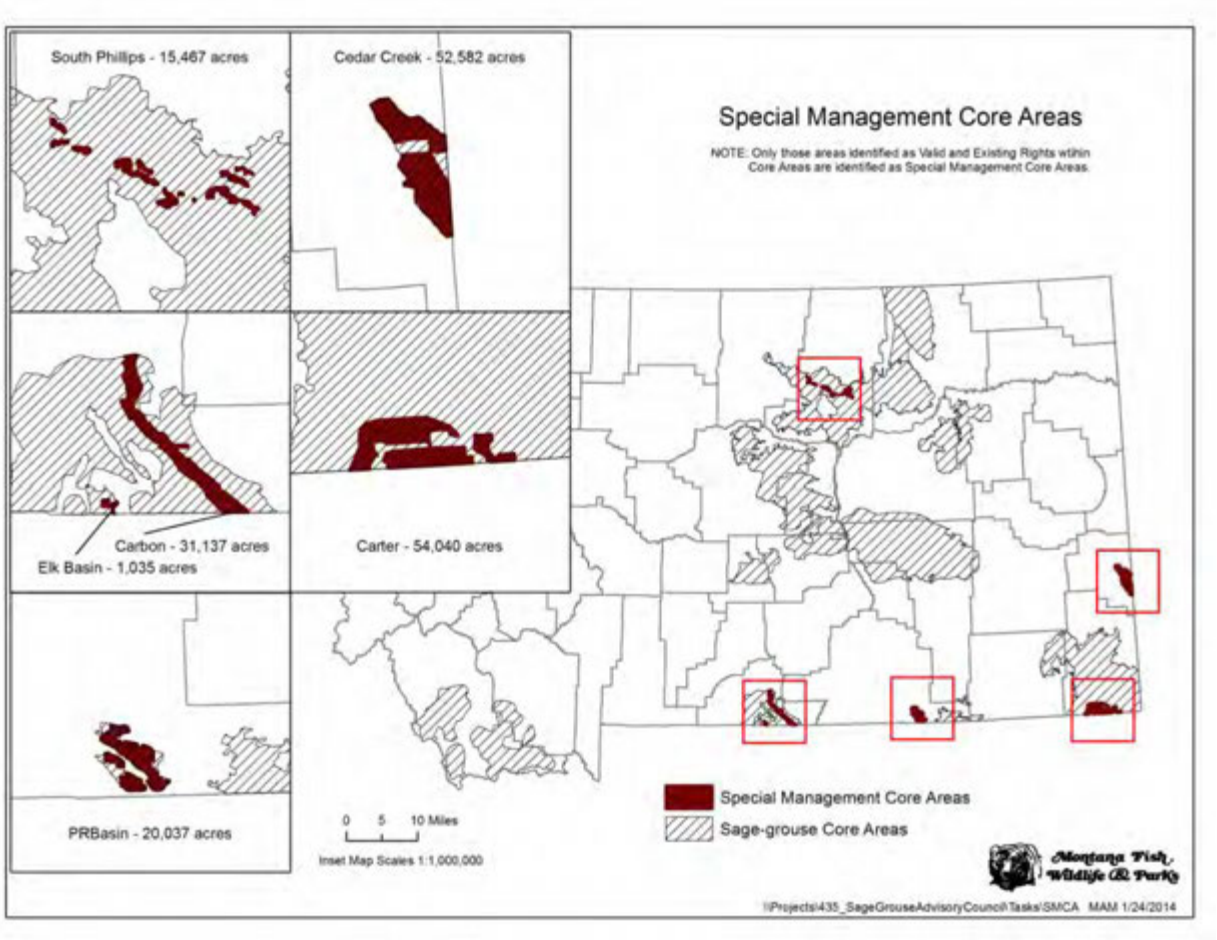
13. **Monitoring/Adaptive Response**: For all activities allowed in Core Areas, sage-grouse monitoring will be conducted to evaluate the response of active leks within 4.0 miles of the project footprint to permitted activity, excluding underground utilities such as pipelines and buried utility lines. Monitoring plans submitted by project proponents will be coordinated and modified by the permitting agency with input from FWP. Monitoring will include the evaluation of affected leks and at least three reference leks (one control area) located a minimum of more than 4 miles from the disturbance. If declines in affected leks (using a three-year running average during any five-year period relative to trends on reference leks) are determined to be caused by the project, the operator will propose adaptive management responses to increase the number of sage-grouse. If the operator cannot demonstrate a restoration of sage-grouse numbers to baseline levels (established by pre-disturbance surveys, reference surveys, and taking into account regional and statewide trends) within three years, operations will cease until such numbers are achieved. However, in the interim, the operator, permitting agency, FWP, and the MSGOT will create additional adaptive management efforts to restore sage-grouse population numbers and baseline numbers, as well as restore project operations. Natural occurrences and their effects on sage-grouse and sagebrush habitat will be considered in all cases.
14. **Exceptions**: Any exceptions to these stipulations will be considered on a case-by-case basis and must show that the exceptions are not expected to cause declines in sage-grouse populations. Operations necessary to provide essential services like delivery of electricity will be excluded from requirements to cease activity if it is shown to have caused a decline in sage-grouse after three years. Any departures from these stipulations must be recommended for approval by MSGOT and subsequently approved by the appropriate agency.

b) Special Management Core Areas

Special Management Core Areas (SMCA) are defined as a subset of Core Areas in which special consideration has been given to valid existing rights and the fact that it is recognized that existing and planned development in these areas cannot be implemented within the constraints outlined in this document. SMCAs are as follows:

Location	Resource[4]	Acres
Cedar Creek Anticline	Oil and gas, wind	62,857
Carter County	Bentonite	54,039
Powder River Basin	Coal	20,653
Carbon County	Bentonite	31,110
Elk Basin	Oil and gas	1,035
South Phillips County	Bentonite	15,466

[4] Documentation of valid existing rights for these SMCAs will be provided to the Governor's office.



Each developer (those with the valid, existing rights) in a SMCA shall develop a conservation plan in cooperation with FWP. All applicable Core Area stipulations will apply to the SMCA until the conservation plan has been recommended for approval by MSGOT and subsequently approved by the appropriate agency. The conservation plan will follow the mitigation framework outlined in Section IX that will include a noise abatement stipulation, and will also include a strategy for restoration/reclamation within the Core Area, which results in a long-term reduction in surface disturbance. In addition, conservation plans must have a monitoring component using peer-reviewed scientific methods that is designed to monitor sage-grouse populations, the impact of development, and restoration efforts on sage-grouse populations, and provide feedback if adjustments are needed in the conservation plan to reduce impacts on sage-grouse populations. The mitigation plan will also include plans for off-set mitigation. The conservation goal of these areas is to maintain and restore seasonal sage-grouse habitats that support viable sage-grouse populations. As industrial activities subside, these populations are expected to expand into vacant functional habitats.

1. Petitions may be submitted to MSGOT to create a new SMCA. The petition shall contain a geographic description of the area proposed to be created and a detailed description of the number and location of the sage-grouse lek(s) within the area. The petition must also contain an evaluation of how the creation of the proposed SMCA would impact the Core Area function relative to the sage-grouse. The petition must also contain an explanation of the rationale for the creation of the SMCA. In evaluating whether to recommend approval of the creation of the new SMCA, the MSGOT shall consider how the creation of a SMCA will impact the habitat and population of sage-grouse both within the Core Area and on a statewide basis. The petition must include a proposal for off-set mitigation.
2. Petitions may be made to MSGOT for additional SMCA designation, but in no case will SMCA total acreage encapsulate more than 3% of the state's sage-grouse Core Areas. In addition, the Advisory

Council recommends that the MSGOT develop a population threshold that cannot be exceeded within SMCAs (i.e., the population of sage-grouse impacted by all SMCAs may not exceed a specific population, measured by the number and size of leks impacted or a similar population metric).

3. The MSGOT must develop a process where designated SMCAs can be reclassified as Core Areas. This process should be based on metrics measuring the quantity and quality of sage-grouse habitat restored and/or reclaimed, as well as the documented use of that habitat by sage-grouse.

c) General Habitat Stipulations

General sage-grouse habitats are areas that provide sage-grouse nesting, brood-rearing and wintering habitat but are not identified as Core Areas. General Habitat was mapped by FWP biologists using lek locations, telemetry, and other available data. The health of General Habitat areas is a critical element in the effort to maintain the abundance and distribution of sage-grouse in Montana. Development scenarios in General Habitat are more flexible than in Core Areas, but should still be designed and managed to maintain populations, habitats, and essential migration routes. The goal in General Habitat is to maintain habitat conditions by implementing appropriate management practices that minimize sagebrush loss and disturbance. Applicable standard and sage-grouse management practices should be applied to development within both Core Areas and General Habitat to achieve the goals of this conservation strategy (Section X). In all General Habitat areas, the following stipulations apply:

1. **Sequence of Decisions for Surface Disturbance Activities:** State-approved projects that result in more than minimal adverse impacts to sage-grouse and/or their habitat will follow the following sequence of decisions:
    a. **Avoid Impacts**. The best way to protect sage-grouse habitat is to avoid impacts that fragment or otherwise damage or destroy sage-grouse habitat. To accomplish this, project developers should consider alternative locations for their project located outside sage-grouse habitat (i.e., consider locations outside General Habitat, outside suitable habitat, and/or in areas already considered disturbed). To meet this provision, the project developer needs to show authorizing agencies rationale as to why a given proposed surface disturbance in sage-grouse habitat is unavoidable.
    b. **Minimize the Size of the Impact**. If impacts to sagebrush habitat cannot be avoided, they should be minimized by limiting the magnitude of the proposed surface disturbance. Reducing impacts can preserve at least portions of the habitats' important functions, including limiting fragmentation. Impacts can be minimized by reducing the project footprint, constructing fewer structures, clustering features, shifting the development pattern to use topographical screening, timing restrictions, or similar measures. In order to meet this requirement, the project developer should be able to show that the project minimizes the impact to sage-grouse habitat, while continuing to meet the purpose of the development.
    c. **Compensation for Impacts**. If project impacts are unavoidable and General Habitat stipulations cannot be met, mitigation measures may be required, following the Mitigation Framework outlined in Section IX.[5]
2. **Surface Occupancy**: Within 0.25 miles of the perimeter of an active sage-grouse lek there will be no surface occupancy (NSO).[6]

[5] A Minority Committee Report has been written for the Compensation for Impacts stipulation, see Appendix H.

[6] A Minority Committee Report has been written for the No Surface Occupancy stipulation for General Habitat, see Appendix H.

3. **Surface Disturbance**: There are no specific surface disturbance limits in General Habitat. However, standard management practices will be required to minimize surface disturbance, such as co-locating new and existing structures. Structures and associated infrastructure will be removed and areas reclaimed to the standards found in item #16 (below) when a project is completed.
4. **Seasonal Use**: As authorized by the permitting agency or agencies, activities (production and maintenance activity exempted) will be prohibited from March 15 – July 15 within 2.0 miles of an active lek where breeding, nesting, and early brood-rearing habitat is present. Allowed maintenance and production activity will not occur between the hours of 4:00 - 8:00 am and 7:00 - 10:00 pm between March 15 – July 15. In areas used as winter concentration areas, exploration and development activity will be prohibited December 1 – March 15. Activities may be allowed during seasonal closure periods as determined on a case-by-case basis. This stipulation may be modified or waived for areas of unsuitable habitat. Any deviations from this stipulation for unsuitable habitat will be determined by the applicable permitting agency in coordination with FWP and the MSGOT.
5. **Noise**: New noise levels, at the perimeter of a lek, should not exceed 40 dBA above ambient noise (existing activity included) from 6:00 pm to 8:00 am during the breeding season (March 15 – July 15). [7] Ambient noise levels should be determined by measurements taken at the perimeter of a lek at sunrise. The MSGOT should follow Wyoming's review and litigation discussion of this stipulation and amend the strategy accordingly.
6. **Pipelines**: Bury pipelines and restore disturbed area with native plant species that are compatible with the surrounding ecological site conditions. Co-locate pipelines with roads, transmission lines, and other linear features when possible.
7. **Overhead Power Lines and Communication Towers**: New overhead power lines and communication towers will be located outside sage-grouse habitat whenever possible. Where avoidance of General Habitat is not possible, develop a route or siting location – with agencies, utilities, and landowners cooperating – that uses topography, vegetative cover, site distance, etc. to effectively protect identified sage-grouse habitat in a cost efficient manner. If siting of overhead power lines is required within 2 miles of important breeding, brood-rearing, and winter habitat, follow the most current version of the Avian Power Line Interaction Committee guidelines to minimize collision potential and raptor perch sites or bury a portion of the line. Site new lines in existing corridors wherever practicable. The pending "Best Management Practices for Electric Utilities in Sage-Grouse Habitat**"** will be added to this Strategy when it is finalized (see Section VI.a.ii.3).
8. **Oil and Gas, Mining**: Encourage development in incremental stages to stagger disturbance and design schedules that include long-term strategies to localize disturbance and recovery within established zones over a staggered time frame. Use off-set mitigation as described in Section IX. Remove facilities and infrastructure and reclaim to the standards found in item #16 (below) when use is completed, including for exploration activities.
9. **Coal Mining**: Conservation measures will be developed for and imposed on coal mining operations on a case-by-case basis via the terms and conditions included in permits issued by MDEQ under the authority of the Montana Strip and Underground Mine Reclamation Act (MSUMRA) and in compliance with the federal Surface Mining Control and Reclamation Act (SMCRA). The Administrative Rule components of the MSUMRA can be accessed at http://www.deq.mt.gov/wqinfo/Laws/StripMiningReclamatio.mcpx. The associated coal permitting rules and standard of the Montana Department of Environmental Quality can be accessed at http://.deq.mt.gov/CoalUranium/Coalpermitting.mcpx. Links to SMCRA and the enabling components of the Code of the Federal Regulations can be found at http://www.osmre.gov/lrg.shtm.

[7] A Minority Committee Report has been written for the Noise stipulation, see Appendix H.

a. Coal mining will first try to avoid operating in sage-grouse habitat.
b. To avoid potentially significant impacts to sage-grouse, coal companies will delineate the area that will be disturbed. They will report baseline vegetation surveys of the permit area, four season sage-grouse baseline surveys of the permit area and periphery along with population density and habitat delineations. They will show pre-mine land use conditions, capacity, productivity, and history (per ARM 17.24.304). The sage-grouse plan (per ARM 17.24.312) will include:
    i. An operations plan (per ARM 17.24.308) that includes a plan to prevent the establishment of, or to effect the control of, noxious weeds (including cheatgrass and Japanese brome) in the proposed permit/amendment area.
    ii. A sage-grouse plan (per ARM 17.24.312) will include:
        1. A plan to minimize disturbances and impacts on sage-grouse and related environmental values during mining and reclamation;
        2. Details on how enhancement of sage-grouse values will be achieved;
        3. Descriptions of sage-grouse enhancement features to be established; and
        4. Statements of impact control measures, management techniques and annual monitoring methods to protect or enhance sage-grouse or habitats identified through the consultation process as important and/or high value.
    iii. A reclamation plan to reclaim mined area back to suitable habitat including (per ARM 17.24.313) will include:

        1. The proposed post-mining land use;
        2. A timetable for each reclamation step;
        3. A map of the proposed post-mining topography;
        4. Demonstration that the post-mining topography can be achieved;
        5. Details on reestablishment of hydrologic balance;
        6. Details on topsoil salvage, protection and replacement methods;
        7. A narrative on the details of the revegetation methods to be applied;
        8. Details on the reclaimed vegetation monitoring to be conducted; and
        9. Mine and reclamation plan reviews by the Service relative to threatened, endangered, and candidate species through Section 7 consultation processes.

    iv. The establishment of vegetation to protect sage-grouse (per 17.24.711) will require that:

        1. Vegetation must be reestablished on the disturbed areas and it must be diverse, effective and permanent;
        2. Vegetation cover must be comprised of native species or approved alternatives and be compatible with post-mine land uses;
        3. Reclamation vegetation must be equivalent in cover to natural vegetation and be capable of self-regeneration and plant succession;
        4. There is compliance with noxious weed restrictions; and
        5. For sage-grouse habitat, shrubs must be established to achieve cover and stocking rates as approved by MDEQ after consultation and approval by MFWP.

    v. Shrub species (per ARM 17.24.717) must be adapted to local conditions and meet the post-mining land use.

vi. Monitoring (per ARM17.24.723) requirements include:

1. Periodic vegetation, soils, and wildlife monitoring with coverage and frequency as approved by MDEQ; and
2. Submittal of detailed monitoring reports to MDEQ.

If monitoring data indicates corrective measures are needed, then adaptive management practices needs to be applied.

The requirements for monitoring shall terminate at the same time that the MDEQ has determined that phase III reclamation, as defined in ARM 17.24.1116(6)(c), has been completed.

vii. Revegetation success criteria (per ARM1724.724) requirements include:

1. Determination of success will be via comparison to un-mined reference areas or through approved technical standards

viii. Vegetation measurements (per ARM17.24.726) requirements include:

1. Use of MDEQ-approved methods;
2. Demonstration of equivalent production, cover and density per MDEQ-approved standards;
3. Minimum shrub density standards; and
4. Demonstration of compliance with noxious weed restrictions.

9. **Bentonite, Scoria, Peat, and Sand and Gravel Mining**[8]: Conservation measures will be developed for and imposed on opencut mining operations on a case-by-case basis via the terms and conditions included in permits issued by MDEQ under the authority of the Montana Opencut Mining Act (83-4-401, MCA) which can be accessed at http://deq.mt.gov/opencut/forms/2013-Title82Chapter4Part4.pdf .

a. Opencut mining operations will first try to avoid operating in sage-grouse habitat.
b. To avoid potentially significant impacts to sage-grouse, opencut mining companies will delineate what area will be disturbed. They will report baseline vegetation surveys of the permit area, four season sage-grouse baseline surveys of the permit area and periphery along with population density and habitat delineations (Per ARM 17.24.222). They will show pre-mine land use conditions, capacity, productivity, and history (per ARM 17.24.217). The sage-grouse plan will include:
   i. An operations plan (per ARM 17.24.218 and 219) that includes a plan to prevent the establishment of, or to effect the control of, noxious weeds (including cheatgrass and Japanese brome) in the proposed permit/amendment area.
   ii. A sage-grouse plan (per ARM 17.24.219) will include:

1. A plan to minimize disturbances and impacts on sage-grouse and related environmental values during mining and reclamation;

[8] A Minority Committee Report has been written for the Bentonite, Scoria, Peat, and Sand and Gravel Mining stipulation, see Appendix H.

2. Details on how enhancement of sage-grouse values will be achieved;
3. Descriptions of sage-grouse enhancement features to be established; and
4. Statements of impact control measures, management techniques and annual monitoring methods to protect or enhance sage-grouse or habitats identified through the consultation process as important and/or high value.

iii. A reclamation plan (per 17.24.219) to reclaim mined area back to suitable habitat will include:

1. The proposed post-mining land use;
2. A timetable for each reclamation step;
3. A map of the proposed post-mining topography;
4. Demonstration that the post-mining topography can be achieved;
5. Details on reestablishment of hydrologic balance;
6. Details on topsoil salvage, protection, and replacement methods;
7. A narrative on the details of the revegetation methods to be applied;
8. Details on the reclaimed vegetation monitoring to be conducted; and
9. Mine and reclamation plan reviews by the Service relative to threatened, endangered, and candidate species through Section 7 consultation processes.

iv. The establishment of vegetation to protect sage-grouse (per 17.24.219) will require that:

1. Vegetation must be reestablished on the disturbed areas and it must be diverse, effective and permanent;
2. Vegetation cover must be comprised of native species or approved alternatives and be compatible with post-mine land uses;
3. Reclamation vegetation must be equivalent in cover to natural vegetation and be capable of self-regeneration and plant succession;
4. There is compliance with noxious weed restrictions; and
5. For sage-grouse habitat, shrubs must be established to achieve cover and stocking rates as approved by MDEQ after consultation and approval by FWP.

v. Shrub species (per ARM 17.24.219) must be adapted to local conditions and meet the post-mining land use.

vi. Monitoring (per ARM17.24.219) requirements include:

1. Periodic vegetation, soils and wildlife monitoring with coverage and frequency as approved by MDEQ; and
2. Submittal of detailed monitoring reports to MDEQ.

If monitoring data indicates corrective measures are needed, then adaptive management practices needs to be applied.

These requirements for monitoring shall terminate upon bond release (per ARM 17.24.203).

vii. Revegetation success criteria (per ARM1724.219) requirements include:

1. Determination of success will be via comparison to un-mined reference areas or through approved technical standards

viii. Vegetation measurements (per ARM17.24.219) requirements include:

1. Use of MDEQ-approved methods;
2. Demonstration of equivalent production, cover and density per MDEQ-approved standards;
3. Minimum shrub density standards; and
4. Demonstration of compliance with noxious weed restrictions.

10. **Other Mining**:
    a. For development drilling or ore body delineation drilling on tight centers, (approximately 50' x 50') the disturbance area will be delineated by the external limits of the development area. Assuming a more widely-spaced disturbance pattern, the actual footprint will be considered the disturbance areas.
    b. Sage-grouse monitoring results will be reported in the mine permit annual report. This document will be given to FWP and the regulating body. Pre-disturbance surveys will be conducted as required by the appropriate regulatory agency.
    c. The number of active mining development areas (e.g., operating equipment and significant human activity) is not to exceed an average of one project per square mile (640 acres).
    d. Surface disturbance and surface occupancy stipulations will be waived within the Core Area when implementing underground mining practices that are necessary to protect the health, welfare, and safety of miners, mine employees, contractors and the general public. The mining practices include but are not limited to bore holes or shafts necessary to: 1) provide adequate oxygen to an underground mine; 2) supply inert gases or other substances to prevent, treat, or suppress combustion or mine fires; 3) inject mine roof stabilizing substances; and 4) remove methane from mining areas. Any surface disturbance or surface occupancy necessary to access the sites to implement these mining practices will also be exempt from any stipulation.
    e. Mining permits will include requirements for mitigation that enhances or promotes genetic diversity, critical habitat, connectivity, and population viability.
11. **Wind Energy**: New wind energy facilities are not recommended within 4.0 miles of the perimeter of active sage-grouse leks. Work cooperatively with agencies, utilities, and landowners to use topography, vegetative cover, site distance, etc. to effectively protect identified sage-grouse habitat. Wind energy projects in sage-grouse habitat will adhere to the *U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines*.
12. **Vegetation Removal**: Vegetation removal as part of permitted activities will be limited to the minimum disturbance required by the project.
13. **Sagebrush Treatments**: Sagebrush eradication and treatment programs aimed at reducing or eliminating sagebrush will be prohibited on state lands, and discouraged on private lands unless those treatments are approved by MSGOT and can be satisfactorily shown to result in no loss of habitat or be beneficial to sage-grouse habitat. The MSGOT should develop specification as to how case-by-case exceptions will be determined, including how a risk assessment will be conducted. The Advisory Council also requests federal agencies prohibit sagebrush eradication and treatment programs aimed at reducing or eliminating sagebrush on lands that they control surface rights. Sagebrush canopy cover should be maintained at optimum levels, as described above. Treatments to enhance sagebrush-grassland will be evaluated based upon the existing habitat quality and the functional level post-

treatment. Restored sagebrush grassland habitats that provide effective cover and food for sage-grouse should be recognized as part of the habitat base; this provision serves as an incentive for restoring and protecting converted habitats.

For government agencies managing sagebrush in General Habitat where conifer encroachment is an issue near leks, land managers should ensure that encroaching conifers are removed within at least 0.6 miles (1,000 meters) of leks. Conifer removal in sage-grouse General Habitat should be done manually, unless other methods can be shown to remove conifers without significantly impacting sagebrush.

14. **Conversion to Agricultural Cropland**: The sage-grouse Advisory Council recommends that the Montana Board of Land Commissioners enact a prohibition of conversion of suitable sage-grouse native range to cropland on state lands, while providing for approved waivers. The State will develop criteria describing when it is appropriate to break unsuitable sage-grouse native range in General Habitat. The Advisory Council also requests that federal agencies prohibit the conversion of native range to cropland on land where they hold surface rights. State and federal agencies are encouraged to work cooperatively with Tribal governments to adopt policies that prevent conversion of sage-grouse habitat to agricultural cropland.
15. **Range Management**: Rangelands on state lands will be managed in accordance with the recommendations in Section X.a, whenever possible, taking into consideration the existing management practices of the lessee on surrounding non-state lands. State agencies are encouraged to collaborate with federal agencies and private landowners to craft grazing management plans that adhere to the concepts included in this document.
16. **Reclamation**: Reclamation should re-establish native grasses, forbs, and shrubs during interim and final reclamation. The goal of reclamation is to achieve cover, species composition, and life form diversity commensurate with the surrounding plant community or desired ecological condition to benefit sage-grouse and replace or enhance sage-grouse habitat to the degree that environmental conditions allow. Seed mixes should include at least two native forbs and two native grasses with at least one native bunchgrass species. Where sagebrush establishment is prescribed, establishment is defined as meeting the standard prescribed in the individual reclamation plan. Landowners should be consulted on the desired plant mix on private lands. The operator is required to control noxious and invasive plant species, including cheatgrass (*Bromus tectorum*) and Japanese brome (*Bromus japonicus*).
17. **Wildfire and Prescribed Burns**: Immediate suppression of wildfire in General Habitat will be prioritized by all fire-fighting units under the jurisdiction of the state. Federal agencies are also strongly encouraged to comply. Prescribed burns should be prohibited in General Habitat unless those prescribed burns are approved by MSGOT and can be satisfactorily shown to result in no loss of habitat or be beneficial to sage-grouse habitat. Burnouts, backfires, and all other public safety measures are appropriate for fighting wildfires.

d) Connectivity Area Stipulations

Connectivity habitat includes those areas that provide important linkages among populations of sage-grouse, particularly between Core Areas or priority populations in adjacent states and across international borders. Within the context of this report, only one sage-grouse connectivity area has been scientifically identified and mapped (see Sage-grouse Conservation Areas map, Section IV). This Montana-Saskatchewan Connectivity Area represents the largest known Greater Sage-Grouse annual migration and is an historic pathway for this important international population of sage-grouse, as well as an important link between two critical sage-grouse Core Areas.

Research continues, based on genetics work, to help better define the composition of priority Connectivity Areas. Connectivity Areas will be identified and additional stipulations may be established by the MSGOT when more informed science becomes available. A public review process on proposed stipulations for Connectivity Areas is required before the stipulations can be adopted by the State. The goal of conserving Connectivity Areas is to maintain those areas that are critical for facilitating movement and genetic exchange among individuals and populations.

Stipulations within this section of the *Montana Strategy* for the Montana-Saskatchewan Connectivity Area, as indicated on the Conservation Area map (Section IV), shall be identical to Core Area stipulations contained within this document. The connectivity stipulations within this strategy apply only to the Montana-Saskatchewan Connectivity Area and future stipulations for additional Connectivity Areas will be determined on a case-by-case basis by MSGOT with technical assistance from FWP.

VII. PERMITTING PROCESS

During the application process to any state agency, project proponents (proponents) must provide a thorough description of their project as it relates to sage-grouse (details such as draft project area, habitat maps, and any other information will help to expedite the project). FWP has a role of consultation, recommendation, and facilitation.

Maximum Density and Surface Disturbance Process: All activities will be evaluated within the context of maximum allowable density (e.g., location and number of well pads) and surface disturbance (disturbance percentages). The maximum density and surface disturbance allowed (see Section VI.A – VI.C) will be analyzed via a standardized mapping tool process conducted by the land management agency on federal land and the project proponent on non-federal (private, state) land. The MSGOT will oversee the implementation of a standardized density and disturbance analysis that follows Wyoming's Density and Disturbance Calculation Tool (DDCT; Appendix E).

Process Deviation: Master development plans proposing alternatives to the Core Area, Connectivity Area, and General Habitat stipulations and corresponding plans for offset mitigation should be evaluated by the MSGOT and approving agency on a case-by-case basis. Development that is not covered by these stipulations may be considered depending on site-specific circumstances. Any proposals for deviations from these stipulations or undefined activities must reasonably demonstrate that the proposed activities will not cause declines in sage-grouse populations in Core Areas.

Exempt Activities: A list of land uses and landowner activities that do not require state agency review or federal oversight is provided in Section VIII.

VIII. EXEMPT ACTIVITIES

The following existing land uses and landowner activities are exempt from compliance with this strategy:

A. Existing animal husbandry practices (including branding, docking, herding, trailing, etc.).
B. Existing farming practices (excluding conversion of sagebrush/grassland to cropland agriculture).

C. Existing grazing operations that meet rangeland health standards or utilize recognized rangeland management practices (for example, allotment management plans, Natural Resource and Conservation Service (NRCS) grazing plans, prescribed grazing plans, etc.).
D. Construction of agricultural reservoirs and **aquatic** habitat improvements less than 10 surface acres and drilling of agriculture and residential water wells (including installation of tanks, water windmills, and solar water pumps) more than 1.0 mile from the perimeter of a lek in Core and Connectivity Areas and more than 0.25 miles from a lek in General Habitat. Within 1.0 mile of a lek in Core and Connectivity Areas and within 0.25 miles of a lek in General Habitat, no review is required if construction does not occur March 15 – July 15 and construction does not occur on the lek. All water tanks shall have bird escape ramps.
E. Agricultural and residential electrical distribution lines more than 1.0 mile from leks in Core and Connectivity Areas and 0.25 miles from leks in General Habitat. Within 1.0 mile of a lek in Core and Connectivity Areas and within 0.25 miles of a lek in General Habitat, no review is required if construction does not occur between March 15 – July 15 and construction does not occur on the lek. Raptor perching deterrents shall be installed on all poles within 1.0 or 0.25 miles, respectively, from leks, if they are proven to be effective according to Avian Power Line Interaction Committee guidance. Other management practices, such as vegetation screening and anti-collision measures, should be applied to the extent possible. Routine maintenance of existing power lines conducted between July 16 – March 14 is also an exempt activity.
F. Pole fences. Wire fences if fitted with visibility markers where high potential for sage-grouse collisions has been documented.
G. Irrigation (excluding the conversion of sagebrush/grassland to new irrigated lands). Tribal lands under existing and future state water compacts.
H. Spring development if the spring is protected with fencing and enough water remains at the site to provide mesic (wet) vegetation.
I. Herbicide and pesticide use except for in the control of sagebrush and associated native forbs. Grasshopper/Mormon cricket control following Reduced Agent-Area Treatments (RAATS) protocol.
J. Existing county road maintenance.
K. Production and maintenance activities associated with existing oil, gas, communication towers, and power line facilities in compliance with approved authorizations.
L. Cultural resource pedestrian surveys.
M. Emergency response.

IX. MITIGATION FRAMEWORK

In Core Areas and General Habitat, the Service's hierarchy shall be adopted as the mitigation framework for implementation of this strategy. In General Habitat, reclamation and off-set mitigation (steps 3 and 4 below) will only be required under specified circumstances. The MSGOT or designated working group will define a mitigation strategy for adoption under this strategy and will reference the forthcoming Service's Compensatory Mitigation Guidance, BLM Mitigation Guidance, and other viable approaches, such as Oregon's Mitigation Framework, the Lesser Prairie Chicken Business Plan, or Habitat Exchanges (see Appendix D). Elements of the framework will include (in order):

1. **Avoid**: Avoid new disturbance to habitat (e.g., exclude wind development from Core Areas).
2. **Minimize**: If avoidance is not possible, minimize the extent of the disturbance to reduce or eliminate negative impacts to sage-grouse and their habitat (e.g., surface disturbance limits, timing stipulations, lek buffers, etc.).
3. **Reclamation**: Reclaim, restore and enhance habitat that is disturbed (e.g., reclamation after mining activities or pipeline construction). Typically, on-site reclamation is implemented by the entity responsible for the impact.
4. **Off-set mitigation**: When temporary or permanent impacts will occur, protect, restore, and enhance important sage-grouse habitat within a defined service area. Off-set mitigation can be used to reduce the existing human footprint that will allow for additional development activities in the future, especially in those areas already heavily impacted by development. Mitigation ratios will be developed by the MSGOT; those ratios will differ depending on the nature and location of a disturbance. A variety of tools may be used for off-set mitigation such as conservation banks, habitat exchanges, and approved conservation plans. Mitigation will occur prior to the impacts that are being mitigated. The standards that successful mitigation must meet (functionality demonstrated by sage-grouse use) will be defined by the MSGOT. Off-set mitigation would be implemented within a service area and prioritized as:
    a. Within impacted Core Area;
    b. Within Core Areas predicted to be at high risk of conversion from grazing to farming or non-native grasses or forbs;
    c. Within Connectivity Areas; then
    d. Within Core Areas or General Habitat adjacent to Core Areas with good restoration potential.

X. MANAGEMENT RECOMMENDATIONS (non-development activities)

The following recommendations outline voluntary management practices designed on private lands and regulatory practices on state lands to maintain or enhance sage-grouse populations and habitats for non-development activities. Some of these practices may be required as part of a conservation plan and/or serve as mitigation tools. Whenever possible, adherence to these recommendations is encouraged.

The Advisory Council encourages the Governor to direct the Montana Department of Natural Resources and Conservation to develop additional lease evaluation criteria to be used for school trust grazing lands in Core Areas and the Montana-Saskatchewan Connectivity Area. The criteria should establish rangeland characteristics that should be considered and evaluated, with a goal of ensuring responsible grazing management practices that are consistent with maintaining and improving habitat for sage-grouse, while still providing for working rangelands.

a) Range Management

Livestock grazing is the most widespread type of land use across the sagebrush biome. Although improper livestock management, as determined by local ecological conditions, may have negative impacts on sage-grouse seasonal habitats, proper livestock management is a critical tool for providing and maintaining high quality sage-grouse habitat. Range management structures and fences necessary for proper grazing management can also be placed or designed to be neutral or beneficial to sage-grouse. The following recommendations are intended to support grazing management as a tool for providing quality sage-grouse habitat.

a. Grazing management: The State of Montana will collaborate with relevant federal agencies on appropriate site-based action to achieve sage-grouse conservation objectives outlined herein.
    i. On private lands, landowners in sage-grouse Core, General and Connectivity Areas are encouraged to adopt the Sage-Grouse Initiative grazing practices and range management recommendations, including:
        1. Rotating livestock to different pastures, while resting others to establish a diversity of habitat types.
        2. Changing seasons of use within pastures to ensure all plants have the ability to reproduce.
        3. Leaving residual cover (grass from the past season) to increase hiding and nesting cover for sage-grouse.
        4. Managing the frequency and intensity of grazing to sustain native grasses, wildflowers, and shrubs.
        5. Managing livestock access to water to ensure healthy livestock and healthy watersheds.
    ii. The State of Montana will collaborate with appropriate federal agencies in defining a framework for evaluating situations to determine if a causal relationship exists between improper grazing (by wildlife or livestock) and Greater Sage-Grouse conservation objectives where conservation objectives are not being achieved on federal land.
    iii. On state lands, the Advisory Council recommends that DNRC work cooperatively with lessees to maintain healthy sagebrush shrub, native grass, and forb communities on state grazing lands in Core and Connectivity Areas. For leases that fail to meet DNRC standards, staff should consider corrective alternatives such as: development and implementation of grazing or weed management plans; adjustment or rotating season of use; requiring annual reporting of livestock numbers and period of use; or shorter lease terms. Follow-up monitoring should be conducted as determined necessary and as workloads allow. If a lessee fails to implement or follow required corrective actions, lease non-renewal or cancellation should be considered.
    iv. Given limited agency resources, priority should be given to Core Areas and then sage-grouse habitats adjacent to Core Areas.
b. Range structures:
    i. Range management structures should be designed and placed to be neutral or beneficial to sage-grouse.
    ii. Structures that are currently contributing to negative impacts to either sage-grouse or their habitats should be removed or modified to remove the threat.
c. Fences:
    i. Mark fences that are in high risk areas for collision with permanent flagging or other suitable device to reduce sage-grouse collisions.
    ii. Identify and remove unnecessary fences.
    iii. Placement of new fences and livestock management facilities (including corrals, loading facilities, water tanks, and windmills) should consider their impact on sage-grouse and, to the extent practicable, be placed at least 0.6 miles from active leks.

b) Wildfire Response

Wildfire temporarily or permanently eradicates sagebrush habitat. Fire, both lightning-caused and human-caused, is a primary risk to sage-grouse, not only by deteriorating and often eliminating habitat, but also by

increasing future fire frequencies through the promotion of fire-prone vegetation, especially invasive grasses. The replacement of native perennial bunchgrass communities by invasive annuals is a primary contributing factor to increasing fire frequencies in the sagebrush ecosystem. The following recommendations are designed to reduce the potential for fire in sagebrush systems, suppress fires that do ignite, and (re)establish sagebrush and native species in areas that do burn. State agencies should be directed to adopt these recommendations to the maximum extent possible:

a. Prevention (Pre-fire):
    i. Broaden DNRC, Volunteer Fire Departments, and all fire-fighting unit awareness by providing maps of sage-grouse habitat and copies of the *Montana Strategy*.
    ii. Place sage-grouse habitat maps in every county fire-fighting office.
    iii. Prioritize eradication of cheatgrass and Japanese brome and/or address management practices, acquire funding for appropriate herbicide treatments, and explore biological controls.
    iv. Examine feasibility of establishing fire breaks outside Core Areas if possible.
    v. During high-risk fire seasons, reduce risk of human caused fires as authorized in 7-33-2212 MCA, 77-1-804 MCA and other applicable statutes.
b. Suppression (Fire):
    i. Prioritize initial attack with the goal of immediate suppression in Core Areas, and secondarily in Connectivity Areas and General Habitat, including use of fire retardants and other appropriate tools.
        1. Improve coordination between state agencies (e.g., DNRC) and Montana Association of Counties on all fire suppression activities.
        2. Request federal partners mirror the initial attack program of DNRC.
    ii. Prioritize outreach from DNRC to private operators regarding initial attack in sagebrush areas.
    iii. Review liability of Good Samaritan role of private operators/private landowners.
    iv. Carefully consider the use of backfires within Core and Connectivity Areas and General Habitat to minimize the potential for escape and further damage to sage-grouse and sagebrush habitats (tactical decision).
    v. Identify and establish defensible fire lines in areas where: (i) effectiveness is high, (ii) fire risk is likely, and (iii) negative impacts from these efforts (e.g., fragmentation) are minimized. Avoid use of any vegetative stripping in healthy, unfragmented habitats, unless fire conditions and local ecological conditions so warrant.
c. Rehabilitation (Post-fire):

    i. The State of Montana will request cooperation and collaboration from federal agencies on rehabilitation projects after wildfire.
    ii. Use available tools to prevent (re)establishment of cheatgrass and Japanese brome, as necessary.
    iii. Ensure most successful restoration strategies are being implemented that (re)establish native sage-grouse habitat; develop handbook of methods for most appropriate restoration strategies.
    iv. Identify funding options for restoration implementation.
    v. Use locally available seeds where it is most likely to be effective and in areas of high need.
    vi. Prioritize Core Areas over sagebrush areas outside of Core Areas for restoration efforts.

vii. Verify that all seeding in Core Areas is certified by an independent contractor as weed-free and free of cheatgrass and Japanese brome.
viii. Establish a seed bank managed by state, if viability of seeds can be maintained; evaluate use of local seed sources (i.e., seed orchards).
ix. Ensure post-fire monitoring for successful reestablishment of sagebrush communities.

c) Invasive Plant Species

Exotic annual grasses and other invasive plants alter habitat suitability for sage-grouse by reducing or eliminating native forbs and grasses essential for food and cover. Non-native annual grasses also facilitate an increase in mean fire frequency. The following management recommendations are designed to control the spread of invasive species and reduce or eliminate established non-natives to provide better quality habitat for sage-grouse. State agencies should be directed to adopt these recommendations to the maximum extent possible.

a. Retain all remaining large intact sagebrush patches, particularly at low elevations.
b. Reduce or eliminate disturbances that promote the spread of invasive plant species, such as reducing fires to a "normal range" of fire activity for the local ecosystem, employing grazing management that maintains the perennial native grass and shrub community appropriate to the local site, reducing impacts from any source that allows for the invasion by these species into undisturbed sagebrush habitats, and precluding the use of treatments intended to remove sagebrush.
c. Restore altered ecosystems by reducing non-native invasive plants to levels that do not put the area at risk of conversion if a catastrophic event were to occur.
d. Recommend to Montana Department of Agriculture that Japanese brome (*Bromus japonicus*) be listed as a regulated species (priority #3) in Montana.
e. Prioritize eradication of cheatgrass and Japanese brome and/or address management practices, acquire funding for Plateau treatments, and explore biological controls.

d) Predators

The Advisory Council believes predators can be a threat to sage-grouse conservation. Although predation is one of five specific ESA listing criteria, the Service did not identify predation as a significant threat to sage-grouse populations in their 2010 decision to list the species as warranted for protection under the Endangered Species Act, but precluded by higher priorities. Predators are part of the ecosystem and they have always preyed upon sage-grouse. Habitat fragmentation, infrastructure, weather, urban development, and improper grazing can increase predation pressure on sage-grouse. The Advisory Council believes anthropogenic actions have, in places, altered the historic predator-prey relationship with sage-grouse and that this alteration is at least partially responsible for diminishment of some local sage-grouse populations. The Advisory Council also believes good quality and quantity of habitat reduces predation pressure and that quality habitat is essential for sage-grouse population stability. While predator control may not be a long-term solution to a general range-wide decline in populations of sage-grouse, it can be an effective tool to gain increased survival of specific populations. Predator management can provide important and beneficial short-term relief to localized decreases in sage-grouse populations. While federal laws, such as the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act, restrict options for managing avian predators, the Advisory Council recommends predator control be managed cooperatively by Animal and Plant Health Inspection Service (U.S. Department of Agriculture) Wildlife Service, FWP, and the Service.

Actions the Advisory Council believes should be taken within this strategy include:

a. Eliminate or minimize external food sources for ravens and small mammals, particularly dumps, landfills, waste transfer facilities, and road kill.
b. Remove abandoned farmhouses, barns, building debris piles, and other structures that harbor mammalian predators.
c. Provide adequate buffers (4.0 miles from leks) between placement of new tall structures and nesting and brood-rearing habitat to minimize influence of predators. Bury power lines, when feasible.
d. Remove abandoned tall structures, such as fence posts, power line poles, and cell towers that can serve as perching structures for aerial predators.
e. Apply habitat management practices (e.g., grazing management and vegetation treatments) that improve sage-grouse nesting habitat thus decreasing the effectiveness of predators.
f. Develop strategies for specific, selective, and if needed, assertive short-term predator control based on biological assessments appropriate to local conditions, especially in instances where a sage-grouse population has declined from exotic conditions, such as West Nile Virus.
g. Request the State use localized predator control when permanent anthropogenic features are documented to contribute to unnatural numbers of predators that are reducing local sage-grouse populations, and where the impacts from these permanent features will not be eliminated or minimized enough to stabilize the local sage-grouse population.
h. Research and monitor the effects of predator control to determine causal connections with Greater Sage-Grouse survival; modify control strategies accordingly.
i. When research on sage-grouse population dynamics confirms that a local sage-grouse population is declining and predators may be a cause for the decline, undertake a public-private cooperative research project, under the direction of FWP and MSGOT. This research project should measure the level of predation and its impact on local sage-grouse population stability and include a public outreach/involvement component to landowners, hunters, bird recreationists, local government, and other interested parties. The research should examine sage-grouse population dynamics, anthropogenic changes, conifer encroachment and predator populations and impacts, and determine if creation of and implementation of a predator plan would assist in long-term stability of specific and localized sage-grouse populations.
j. Encourage local government to help with small mammal predator control during sage-grouse breeding, nesting, and brood-rearing season.

e) Disease (West Nile virus)

West Nile virus was a new source of mortality for sage-grouse, particularly in low and mid-elevation populations, from 2003 – 2007. Elimination of anthropogenic-created habitat for the mosquito vectors of West Nile virus is an important conservation measure for sage-grouse.

a. Construct ponds to reduce prevalence of mosquitoes that transmit West Nile virus per BLM guidance (Appendix F).
b. Manage ponds to reduce prevalence of mosquitoes that transmit West Nile virus.
c. Other management actions to reduce prevalence of mosquitoes that transmit West Nile virus include erection of bat houses, and managing containers, wood piles, and tire storage facilities that harbor breeding or overwintering mosquitoes and/or larvae.

d. If there is a West Nile virus outbreak that significantly reduces sage-grouse populations, the MSGOT should look at a local site-specific strategy for enhancing the sage-grouse population.

f) Hunting

Hunting sage-grouse in Montana is a regulated activity that involves scientific population monitoring and the ability to adjust seasons as appropriate, including season dates, season length, bag limit, and area restrictions.

a. Hunting will continue to be managed by FWP through the Montana Fish and Wildlife Commission.
b. A framework of hunting bag limits and area closures was originally outlined in the *Management Plan and Conservation Strategies for the Greater Sage-Grouse in Montana – Final.* FWP will continue to annually monitor sage-grouse population fluctuations and work with the Commission to adopt appropriate hunting season regulations.
c. FWP will re-evaluate and further adapt this season-setting approach including re-examining closure (and opening) criteria, hunting districts, season length, and season dates. Establishment of hunting districts/zones will be considered during the annual season setting process.

XI. IMPLEMENTATION

a) **Authority of Executive Order**: It is the Advisory Council's recommendation that the Governor of the State of Montana issue an Executive Order that requires full compliance with this strategy by all state agencies. This includes actions conducted by the Montana Department of Environmental Quality, Montana Department of Transportation, Department of Natural Resource and Conservation and associated governing boards, Montana Fish, Wildlife and Parks, and other state agencies. The Advisory Council's goal is this strategy can be coordinated with federal land managers.
b) **Existing Regulatory Mechanisms**: The stipulations in this strategy apply to all activities within sage-grouse habitat that require a state permit or lease. Permits affected might include, but are not limited to, those issued under the Major Facilities Siting Act, Board of Oil and Gas Conservation, Water Quality Discharge Permits, and State Trust Land leases. All new development projects in Core Areas will be required to work through the standardized disturbance analysis process that will be developed by the MSGOT.
c) **Non-regulated activities**: State agencies shall adhere to the stipulations and management recommendations outlined in this strategy when providing consultation, technical, financial, or other assistance for non-regulated activities (e.g., livestock grazing, wind development).
d) **Montana Sage-grouse Oversight Team (MSGOT):** A Montana Sage-grouse Oversight Team (MSGOT) shall be appointed by Governor Bullock within 60 days of issuance of an Executive Order. The MSGOT will be responsible for providing oversight for the implementation of the *Montana Strategy*. MSGOT duties will include, but are not limited to, developing the surface disturbance analysis process and overseeing its implementation, identifying additional connectivity areas based on emerging science, approving deviations from this strategy, addressing policy questions that arise from implementation, identifying adequate mitigation strategies, and integrating new science and other information into the strategy. MSGOT shall consist, at a minimum, of executive level representatives from state and federal agencies, tribes, conservation groups, and local government; and from the oil and gas, coal mining, mining (non-coal), electrical distribution and transmission, and agriculture industries. The Advisory Council recommends that the MSGOT meet at least on a quarterly basis. The MSGOT shall provide all

permit-related recommendations to agencies and issue all permit-related decisions within 120 days of receiving completed applications.

e) Compliance Monitoring and Reporting: State agencies issuing permits or leases shall be responsible for ensuring compliance with the stipulations in this strategy. The MSGOT will establish a compliance monitoring framework to track projects. This framework will allow for annual reporting to the Service and will correspond with their forthcoming conservation metrics database.

f) **Staffing Required for Implementation:** The State of Montana shall commit to providing funding to support at least 6 new Full-Time Equivalent (FTE) positions as outlined below. These positions will be located in a state agency or academic institution, to be determined. The State of Montana shall also commit to fund travel and other related expenses incurred by representatives to the MSGOT.

i) Mapping application development – 0.5 FTE (new, temporary).
ii) Database development and analysis tool; database administration – 2 FTE (new, permanent).
iii) Disturbance calculation and compliance; project review – 2.5 FTE (new, permanent). Capacity needs may vary depending on the number and complexity of projects proposed.
iv) MSGOT and Policy Review; supervision of project reviews – 1 FTE (new, permanent) to serve as MSCOT coordinator.
v) Compliance Monitoring and Reporting – fulfilled by MSGOT coordinator.

g) **Population Monitoring and Additional Science Needs:** The Council recognizes that the MSGOT may identify additional monitoring and research projects necessary for the conservation of sage-grouse and ongoing implementation of this strategy. Staff and funding required for newly identified needs will likely exceed existing staff capacity and will require additional funding support from the State of Montana. This support will be in addition to the 6 FTE request in Section XI.f.

APPENDIX A: Governor Bullock's Executive Order 2-2013

STATE OF MONTANA
OFFICE OF THE GOVERNOR
EXECUTIVE ORDER No. 2-2013

Establishing a Greater Sage-grouse Habitat Conservation Advisory Council

WHEREAS, the Greater Sage-grouse (*Centrocercus urophasianus*) is an iconic species that inhabits much of the sagebrush-grassland habitats in Montana;

WHEREAS, the State of Montana currently enjoys viable and widespread populations of the species, the second largest abundance of Greater Sage-grouse among western states;

WHEREAS, the United States Fish and Wildlife Service (USFWS) has determined that the Greater Sage-grouse species is warranted for listing as a threatened or endangered species under the Endangered Species Act (ESA), but is precluded by other higher priority species;

WHEREAS, the United States District Court for the District of Idaho ruled on February 2, 2012 that the USFWS must re-evaluate the status of the Greater Sage-grouse by September 30, 2015;

WHEREAS, the United States Secretary of the Interior has invited Montana and other western states impacted by the potential listing of the Greater Sage-grouse to develop state-specific regulatory mechanisms to conserve the species and preclude the need to list under the ESA;

WHEREAS, the development of a state-specific strategy in Montana will be critical in demonstrating to the USFWS that the species does not warrant federal protection under the ESA;

WHEREAS, the Bureau of Land Management (BLM) and U.S. Forest Service (USFS) are currently implementing national Instruction Memoranda to guide interim management of public lands and to develop Greater Sage-grouse conservation measures for incorporation into the agencies' respective land use plans;

WHEREAS, the development of a state-specific strategy will enable the BLM and USFS to incorporate relevant elements from the strategy into their land use plans and environmental analyses;

WHEREAS, approximately half of Greater Sage-grouse habitat in Montana involves private property, and maintaining the species will require effective conservation strategies across property ownerships;

WHEREAS, the State of Montana has management authority over Greater Sage-grouse populations in Montana;

WHEREAS, the State of Montana in collaboration with stakeholders developed and adopted a state Greater Sage-grouse plan in 2004, pertaining to sage-grouse population responses to large-scale changes in habitat;

WHEREAS, the State of Montana has identified and will update, as appropriate, Greater Sage-grouse Core Areas, which include priority habitats for conservation;

WHEREAS, it is in the interest of this State to bring stakeholders and experts together to recommend a course of action that will provide for conservation measures sufficient to preclude the need to list the Greater Sage-grouse;

WHEREAS, the listing of the Greater Sage-grouse could have a significant adverse effect on the economy of the State of Montana; and

WHEREAS, it is appropriate and beneficial to establish the Governor's Greater Sage-grouse Habitat Conservation Advisory Council ("Council").

PURPOSE

1. The purpose of the Council is to gather information, furnish advice, and provide to the Governor recommendations on policies and actions for a state-wide strategy to preclude the need to list the Greater Sage-grouse under the ESA, by no later than January 31, 2014.

DUTIES

2. In preparing its recommendations, the Council shall review the 2004 Montana Sage-grouse Conservation Plan, BLM Interim Memorandum Guidance, National Technical Team Report, relevant scientific information, and other existing strategies and information.
3. The recommendations of the Council must be based on the following objectives and/or criteria:

    a. Conserve the species and its habitat based on the most current scientific information, with input from a variety of stakeholders, and maintaining public trust management of Greater Sage-grouse and predictable and multiple uses of private, state, and public lands;
    b. Tailor the management recommendations to the importance of the habitat, considering the interests of the State;
    c. Address the following primary threats to the species as identified by the USFWS:

        i. Habitat fragmentation caused by energy development and mineral extraction;
        ii. Conversion of habitat for agriculture and urbanization; and
        iii. Lack of effective regulatory mechanisms to conserve Greater Sage-grouse habitats.

d. Address the secondary threats to the species as identified by the USFWS, as appropriate:

   i. Disease/West Nile virus;
   ii. Management issues related to livestock grazing;
   iii. Collisions with fences and power lines;
   iv. Prescribed fire and range treatments; and
   iv. Conifer expansion.

e. Identify opportunities for pro-active Greater Sage-grouse habitat conservation projects;

f. Recognize, encourage, and incentivize land use practices that are actively maintaining or improving Greater Sage-grouse habitat as evidenced by improvements in habitat quality and quantity, and monitoring which indicates stable/increasing populations of the species; and

g. Identify a long-term adaptive management structure that engages landowners and local working groups, and ensures the effective implementation of these recommendations.

4. The duties of the Council are solely advisory.

5. The Council will provide its recommendations to the Governor no later than January 31, 2014.

COMPOSITION AND ORGANIZATION

6. The Council members shall be appointed by and serve at the pleasure of the Governor until January 31, 2014.

7. The Council shall be comprised of 8-12 members, representing the various geographic areas, non-governmental organizations, and industries of the State within the range of the species.

8. The Office of the Governor will assist in staffing this Council. My office may rely on the services of other Governors or any member of my Cabinet in staffing this Committee.

9. The Council members shall be appointed from the following categories:

   a. Agriculture and Ranching;
   b. Conservation and Sportsmen;
   c. Energy, Mining, and Power Transmission;
   d. Tribal;
   e. Local Government; and

f. Legislature.

10. The Council may establish procedural bylaws to aid it in the performance of its duties.

11. The Council may establish subcommittees comprised of members of the Committee to aid it in the performance of its duties.

12. The Council is attached to the Department of Fish, Wildlife and Parks for administrative purposes. The Director of the Montana Department of Fish, Wildlife and Parks shall retain an independent contractor to provide assistance to the Council.

13. Local Greater Sage-grouse working groups are encouraged to continue in their efforts to conserve the sage-grouse in the State of Montana and are advised to participate in the development of the recommendations here ordered.

OTHER

14. The Council may request consultation, information, and technical expertise from Directors or their designees of state agencies, including but not limited to, the members of the Montana Legislature, the Montana Department of Fish, Wildlife, and Parks, the Montana Department of Natural Resources and Conservation, the Montana Department of Agriculture, the Montana Department of Environmental Quality, and the Montana Board of Oil and Gas, regarding: the biological needs of the species; activities on state, federal and private lands potentially impacted by the status of the species; and, requirements of the ESA and other relevant statutory requirements.

15. The Council may request comments, information, and technical expertise from such other sources as it deems necessary, including the university system, federal agencies, and members of the public including members of existing local sage-grouse working groups.

COMPENSATION

16. Council members eligible for compensation under section 2-15-122(5) MCA, shall be compensated in an amount to be determined by the Director of the Department of Fish, Wildlife and Parks, not to exceed $50 for each day in which the member is actually and necessarily engaged in the performance of Council duties. All Council members shall be reimbursed for travel expenses pursuant to section 2-15-122(5), MCA.

DURATION

17. The Council shall cease to exist on January 31, 2014.

NOW, THEREFORE, I, STEVE BULLOCK, Governor of the State of Montana, by the authority vested in me by under the laws and Constitution of the State of Montana, do hereby establish the Governor's Greater Sage-grouse Habitat Conservation Advisory Council.

This Order is effective immediately.

Given under my hand and the Great Seal of the State of Montana, this 20th day of February, 2013.

STEVE BULLOCK, Governor

ATTESTED:

LINDA McCULLOCH, Secretary of State

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APPENDIX B: House Bill 580

AN ACT PROVIDING AN APPROPRIATION FOR THE GREATER SAGE-GROUSE HABITAT CONSERVATION ADVISORY COUNCIL ESTABLISHED BY THE GOVERNOR; AND PROVIDING AN IMMEDIATE EFFECTIVE DATE.

WHEREAS, the greater sage-grouse (Centrocercus urophasianus) is an iconic species that inhabits much of the sagebrush-grassland habitats in Montana; and

WHEREAS, the State of Montana currently enjoys viable and widespread populations of the species, the second largest abundance of greater sage-grouse among western states; and

WHEREAS, the United States Fish and Wildlife Service (USFWS) has determined that the greater sage-grouse species is warranted for listing as a threatened or endangered species under the Endangered Species Act (ESA) but is precluded by other higher priority species; and

WHEREAS, the United States District Court for the District of Idaho ruled on February 2, 2012, that the USFWS must reevaluate the status of the greater sage-grouse by September 30, 2015; and

WHEREAS, the United States Secretary of the Interior has invited Montana and other western states impacted by the potential listing of the greater sage-grouse to develop state-specific regulatory mechanisms to conserve the species and preclude the need to list it under the ESA; and

WHEREAS, the development of a state-specific strategy in Montana will be critical in demonstrating to the USFWS that the species does not warrant federal protection under the ESA; and

WHEREAS, the United States Bureau of Land Management (BLM) and the United States Forest Service (USFS) are currently implementing national instruction memoranda to guide interim management of public lands and to develop greater sage-grouse conservation measures for incorporation into the agencies' respective land use plans; and

WHEREAS, the development of a state-specific strategy will enable the BLM and USFS to incorporate relevant elements from the strategy into their land use plans and environmental analyses; and

WHEREAS, approximately half of greater sage-grouse habitat in Montana involves private property, and maintaining the species will require effective conservation strategies across property ownerships; and

WHEREAS, the State of Montana has management authority over greater sage-grouse populations in Montana; and

WHEREAS, the State of Montana in collaboration with stakeholders developed and adopted a state greater sage-grouse plan in 2004, pertaining to sage-grouse population responses to large scale changes in habitat; and

WHEREAS, the State of Montana has identified and will update, as appropriate, greater sage-grouse core areas, which include priority habitats for conservation; and

WHEREAS, it is in the interest of this state to bring stakeholders and experts together to recommend a course of action that will provide for conservation measures sufficient to preclude the need to list the greater sage-grouse; and

WHEREAS, the listing of the greater sage-grouse could have a significant adverse effect on the economy of the state of Montana; and

WHEREAS, it is appropriate and beneficial to fund the Greater Sage-Grouse Habitat Conservation Advisory Council established by Governor Steve Bullock in Executive Order No. 2-2013.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF MONTANA:

Section 1. Appropriation. (1) There is appropriated a total of $75,000 from the state special revenue fund oil and gas ERA account to the governor's office for the bienniums beginning July 1, 2011, and July 1, 2013, for the purpose of funding the greater sage-grouse habitat conservation advisory council established by the governor in Executive Order No. 2-2013.

(2) The legislature recommends that the greater sage-grouse habitat conservation advisory council develop its proposed recommendations on policies and actions for a statewide strategy to preclude the need to list the greater sage-grouse under the Endangered Species Act of 1973 by October 31, 2013, so that the public may review and comment on the proposed recommendations and the council may make any necessary changes prior to the recommendations being delivered to the governor by the established deadline of January 31, 2014.

Section 2. Effective date. [This act] is effective on passage and approval.

- END -

APPENDIX C: Sage-grouse Habitat Advisory Council representatives

Name	Street/PO Box	City	Zip	Email
Mr. Paul Callahan	3015 Martinwood	Missoula	59802	pcallahan@swca.com
Rep. Pat Connell	567 Tiffany Lane	Hamilton	59840	connell4HD87@yahoo.com
Ms. Janet Ellis	703 Breckenridge St	Helena	59601	jellis@mtaudubon.org
Mr. Gary Forrester	2527 Gardiner	Billings	59101	Gary.forrester@mduresources.com
Mr. Jay Gore	127 Crestview	Missoula	59803	tealdux@hotmail.com
Sen. Brad Hamlett	PO Box 49	Cascade	59421	senatorhamlett@gmail.com
Mr. Robert Lee	P O Box 1123	Forsyth	59327	rlee@rosebudcountymt.com
Mr. Glenn Marx	P O Box 892	Helena	59624	montanamalt@q.com
Rep. Bill McChesney	316 Missouri Ave	Miles City	59301	macwilly66@hotmail.com
Curtis Monteau, Jr.	5627 Lower Box Elder Rd	Box Elder	59521	curtismonteau@yahoo.com
Rep. Ray Shaw	251 Bivens Creek Road	Sheridan	59749	shaw@3rivers.net
Mr. Carl Wambolt	3300 Graf #86	Bozeman	59715	cwambolt@montana.edu

APPENDIX D: Definitions

Suitable Habitat – is within the mapped occupied range of sage-grouse, and:

1) Generally has 5% or greater canopy cover of sagebrush, where "sagebrush" includes all species and sub-species of the genus *Artemisia*. This excludes mat-forming sub-shrub species such as *A. frigida* (fringed sagewort) and *A. pedatifida* (birdfoot sage). Sagebrush canopy cover may be less than 5% when complimented by other shrubs suitable for sage-grouse cover requirements; OR
2) Is moist meadow containing forbs suitable for brood-rearing within 300 yards of suitable sagebrush cover (as defined above). Introduced species such as alfalfa may be very important on these sites where native forbs are not available.

Vegetation monitoring to determine habitat suitability will follow the Habitat Assessment Framework, available at http://www.blm.gov/pgdata/etc/medialib/blm/wo/Communications_Directorate/public_affairs/sage-grouse_planning/documents.Par.23916.File.dat/SG_HABITATASESSMENT0000669.pdf

Unsuitable Habitat – is land within the historic range of sage-grouse that did not, does not, nor will not provide sage-grouse habitat due to natural ecological conditions such as badlands or canyons.

Surface Disturbance – includes any conversion of formerly suitable habitat to grasslands, croplands, mining, well pads, roads, or other physical disturbance that renders the habitat unusable for sage-grouse.

Lek Status -

- Active - Data supports existence of lek. Supporting data defined as 1 year with 2 or more males lekking on site followed by evidence of lekking within 10 years of that observation.
- Inactive - A confirmed active lek with no evidence of lekking for the last 10 years. Requires a minimum of 3 survey years with no evidence of lekking during a 10 year period.
- Extirpated - Habitat changes have caused birds to permanently abandon a lek as determined by the biologists monitoring the lek.
- Unconfirmed - Possible lek. Sage-grouse activity documented. Data insufficient to classify as active status.

Valid Existing Right(s) – legal "rights" or interest that are associated with land or mineral estate and that cannot be divested from the estate until that interest expires, is relinquished, or acquired.

Habitat Exchange - an efficient, effective approach to wildlife conservation in America, developed in partnership by private landowners, industry, environmental groups, academics and government. In a Habitat Exchange, landowners and industry are given financial incentives to conserve wildlife habitat. Landowners benefit by earning revenue from credit sales and developers benefit by meeting conservation objectives or regulatory requirements with less red tape.

APPENDIX E: Wyoming's Density and Disturbance Calculation Tool Process

The Montana Sage-grouse Oversight Team will oversee the implementation of a standardized disturbance analysis in Montana that follows Wyoming's Density and Disturbance Calculation Tool (described below).

All activities will be evaluated within the context of maximum allowable disturbance (disturbance percentages, location and number of disturbances) of suitable sage-grouse habitat within the area affected by the project. The maximum disturbance allowed will be analyzed via a Density/Disturbance Calculation Tool (DDCT) process conducted by the Federal Land Management Agency on federal Land and the project proponent on non-federal (private, state) land. Unsuitable habitat occurring within the project area will not be included in the disturbance cap calculations.

1. Density/Disturbance Calculation Tool (DDCT): Determine all occupied leks within a core population area that may be affected by the project by placing a 4 mile boundary around the project boundary (as defined by the proposed area of disturbance related to the project). All occupied leks located within the 4 mile boundary and within a core population area will be considered affected by the project.

   A four-mile boundary will then he placed around the perimeter of each affected lek. The core population area within the boundary of affected leks and the 4 mile boundary around the project boundary creates the DDC'I' for each individual project. Disturbance will be analyzed for the DDCT as a whole and for each individual affected lek within the DDCT. Any portion of the DDCT occurring outside of Core Area will be removed from the analysis.

   If there are no affected leks within the 4 mile boundary around the project boundary, the DDCT area will be that portion of the 4 mile project boundary within the core population area.

2. Disturbance analysis: Total disturbance acres within the DDCT will he determined through an evaluation of:
   i. Existing disturbance (sage-grouse habitat that is disturbed due to existing anthropogenic activity and wildfire).
   ii. Approved permits (that have approval for on the ground activity) not yet implemented.

3. Habitat Assessment:
   a. A habitat assessment is not needed for the initial DDCT area provided that the entire DDCT area is considered suitable.
   b. A habitat assessment should be conducted when the initial DDCT indicates proposed project will cause density/disturbance thresholds to be exceeded, to see whether siting opportunities exist within unsuitable or disturbed areas that would reduce density/disturbance effects.
   c. When a habitat assessment is conducted it should create a baseline survey identifying:
      i. Suitable and unsuitable habitat within the DDCT area
      ii. Disturbed habitat within the DDCT area
      iii. Sage-grouse use of suitable habitat (seasonal, densities, etc.)
      iv. Priority restoration areas (which could reduce the 5% cap)
         A. Areas where plug and abandon activities will eliminate disturbance
         B. Areas where old reclamation has not produced suitable habitat
      v. Areas of invasive species
      vi. Other assurances in place (CCAA, easements, habitat, contracts, etc.)

4. Determination of existing and allowable suitable habitat disturbance: Acres of disturbance within suitable habitat divided by the total suitable habitat within the DDCT area times 100 equals the percent of disturbed suitable habitat within the DDCT area. Subtracting the percentage of existing disturbed suitable habitat from 5% equals new allowable suitable habitat disturbance until plant regeneration or reclamation reduces acres of disturbed habitat within the DDCT area.

APPENDIX F: BLM guidance for pond construction

The following guidance is copied from A Report on National Sage-grouse Conservation Measures, Appendix C: BMPs for how to make a pond that won't produce mosquitoes that transmit West Nile virus (from Doherty (2007)). The entire report is available at http://sagemap.wr.usgs.gov/docs/rs/GrSG%20Tech%20Team%20Report.pdf.

The following are seven distinct site modifications that if adhered to, would minimize exploitation of Coal Bed Natural Gas ponds by *Culex tarsalis*:

1. Increase the size of ponds to accommodate a greater volume of water than is discharged. This will result in un-vegetated and muddy shorelines that breeding *Cx. tarsalis* avoid (De Szalay and Resh 2000). This modification may reduce *Cx. tarsalis* habitat but could create larval habitat for *Culicoides sonorensis*, a vector of blue tongue disease, and should be used sparingly (Schmidtmann et al. 2000). Steep shorelines should be used in combination with this technique whenever possible (Knight et al. 2003).
2. Build steep shorelines to reduce shallow water (>60 cm) and aquatic vegetation around the perimeter of impoundments (Knight et al. 2003). Construction of steep shorelines also will create more permanent ponds that are a deterrent to colonizing mosquito species like *Cx. tarsalis* which prefer newly flooded sites with high primary productivity (Knight et al. 2003).
3. Maintain the water level below that of rooted vegetation for a muddy shoreline that is unfavorable habitat for mosquito larvae. Rooted vegetation includes both aquatic and upland vegetative types. Avoid flooding terrestrial vegetation in flat terrain or low lying areas. Aquatic habitats with a vegetated inflow and outflow separated by open water produce 5-10 fold fewer Culex mosquitoes than completely vegetated wetlands (Walton and Workman 1998). Wetlands with open water also had significantly fewer stage III and IV instars which may be attributed to increased predator abundances in open water habitats (Walton and Workman 1998).
4. Construct dams or impoundments that restrict down slope seepage or overflow by digging ponds in flat areas rather than damming natural draws for effluent water storage, or lining constructed ponds in areas where seepage is anticipated (Knight et al. 2003).
5. Line the channel where discharge water flows into the pond with crushed rock, or use a horizontal pipe to discharge inflow directly into existing open water, thus precluding shallow surface inflow and accumulation of sediment that promotes aquatic vegetation.
6. Line the overflow spillway with crushed rock, and construct the spillway with steep sides to preclude the accumulation of shallow water and vegetation.
7. Fence pond site to restrict access by livestock and other wild ungulates that trample and disturb shorelines, enrich sediments with manure and create hoof print pockets of water that are attractive to breeding mosquitoes.

Literature Cited:

De Szalay, F.A. and V.H. Resh. 2000. Factors influencing macroinvertebrate colonization of seasonal wetlands: responses to emergent plant cover. Freshwater Biology. 45: 295-308.

Doherty, M.K. 2007. Mosquito populations in the Powder River Basin, Wyoming: a comparison of natural, agricultural and effluent coal bed natural gas aquatic habitats. M.S. Thesis. Montana State University, Bozeman, U.S.A.

Knight, R.L., W.E. Walton, G.F. Meara, W.K. Riesen and R. Wass. 2003. Strategies for effective mosquito control in constructed treatment wetlands. Ecological Engineering. 21: 211-232.

Schmidtmann, E.T., R.J. Bobian, R.P. Beldin. 2000. Soil chemistries define aquatic habitats with immature populations of the *Culicoides variipennis* complex (Diptera: *Ceratopogonidae*). Journal of Medical Entomology. 37: 38-64.

Walton, W.E., and P.D. Workman. 1998. Effect of marsh design on the abundance of mosquitoes in experimental constructed wetlands in Southern California. Journal of the American mosquito control Association 14:95-107.

APPENDIX G: Summary of Relevant Science Considered by Council

The following summary briefly details the published literature that was presented to and considered by the Sage-grouse Advisory Council during the crafting of this Strategy. It is not an exhaustive list of sage-grouse related research. Specific presentations and handouts provided to Council throughout the process are available for download at http://fwp.mt.gov/fishAndWildlife/management/sageGrouse/habitatConservation/

Sage-grouse General Ecology and Habitat Use

Connelly et al. 2011 – sage-grouse population characteristics, range-wide summary

- General dependence on big and silver sagebrush species; can use other shrub species at times but they are not critical for sage-grouse persistence
- Three seasonal habitats – breeding, summer, winter
- Male displaying grounds (leks) are usually traditional locations but temporary satellite leks can form in years of relatively high abundance
- Average nest distance from lek is 3.2 – 5 km (2 – 3.1 miles)
- Nestlings fed primarily invertebrates; juveniles change to eating forbs in late summer; sagebrush dominates diet in winter
- Highest mortality for juveniles is probably hatching to brood break up
- Adult survival tends to be relatively high over winter
- Some populations migratory (move >10 km [6.2 miles] among 2 or more seasons); other populations non-migratory
- Birds disperse ~4 – 5.5 miles from place of hatch to place of breeding
- Large, interconnected expanses of sagebrush are required by sage-grouse;
- Range-wide habitat loss and degradation is threatening populations

Taylor et al. 2012 – vital rates of sage-grouse

- Three rates were important for population growth, in order: female survival, chick survival and nest success.

Sika 2006 – central Montana

- 97% of nests were within 3 miles of an active lek

Holloran and Anderson 2005, Holloran 2005 - western WY:

- Sage-grouse nest locations are spatially related to lek locations and a 5 km (3.1 mi.) buffer included 64% of known nests. Moynahan's (2004) work in north central MT supports this finding.
- The substantial number of females nesting > 5 km (3.1 mi.) from a lek could be important for population viability.
- Observed lek to nest distances was not related to lek size.
- Successful nests were generally located further from leks than destroyed nests.
- Nests located $\leq$ 1 km (0.6 mi.) from another known nest tended to have lower success probabilities.

Tack 2009 – northern Valley County and southern Saskatchewan

- Average distance from lek of capture to nest site was 5.3 km (3.3. mi.). Seventy-five and 95% of nests were within 6.8 and 12.3 km (4.3 and 7.7 mi.) of lek of capture, respectively.
- All radio-collared individuals moved >20km in consecutive years to winter habitat

Smith 2013 – long-distance migration in sage-grouse

- Sage-grouse moved as far as 240-km (149 mi.) from breeding habitat in north-central Montana/southern Saskatchewan to winter habitat north of the Missouri River.
- Grouse migrated through gently rolling sagebrush flats (<5% slope), using native sagebrush rangeland in proportion to its availability, and avoiding cropland and badlands where food was scarce.

Montana Sage Grouse Working Group 2005 – state management plan

- Sage-grouse populations demonstrate annual and cyclic fluctuations
- Montana populations appear to cycle over approximately a 10-year period under existing habitat conditions and the current combination of weather and predators.

Table 1. Range-wide and Montana-specific vital rates for sage-grouse compiled by Fish, Wildlife and Parks.

Vital Rate	Range-wide rates[1]	Montana rates	Years of MT study	Location	Reference
Nest success	15 – 86%	64%	1969 - 1972	Petroleum Co.	Wallestad and Pyrah 1974
		28 - 43%	2004 - 2005	Musselshell and Golden Valley Co.	Sika 2006
		35 – 61%	2001 - 2003	S. Phillips Co.	Moynahan et al. 2007
		53 – 61%	2007 - 2008	Milk River Basin	Tack 2009
		59%	2011 - 2012	Musselshell and Golden Valley Co.	Berkeley, unpubl. data[2]
Chick survival	12 – 50%	33 – 38%	2007 - 2008	Milk River Basin	Tack 2009
		12%	2011 - 2012	Musselshell and Golden Valley Co.	Berkeley, unpubl. data[2]
Hen survival	37 – 78%	25 – 96%[3]	2001 – 2003	S. Phillips Co, Montana	Moynahan et al. 2006
		94% (nesting season) 84 – 93% (late summer)	2004 - 2005	Musselshell and Golden Valley Co.	Sika 2006
		55 – 91% (spring/summer) 84 – 92% (over winter)	2007 - 2008	Milk River Basin	Tack 2009
		59%	2011 - 2012	Musselshell and Golden Valley Co.	Berkeley, unpubl. data

[1] Range-wide stimates from Connelly et al. 2011.

[2] Spring and early summer weather during 2011 and 2012 were subject to historic extremes of high precipitation in 2011 and severe drought in 2012, which likely affected nest and chick survival rates.

[3] 25% annual survival in 2003 was attributed to a WNv outbreak and severe winter conditions; annual survival in 2001-2002 averaged 96%.

Coates et al. 2013 – Seasonal Space Use, Bi-state population (California & Nevada border)

- 5% of sage-grouse seasonal use area encompassed within a 0.25 mile buffer around leks
- 28% of sage-grouse seasonal use area encompassed within a 0.60 mile buffer around leks
- 90% of sage-grouse seasonal use area encompassed within a 3 mile buffer around leks
- Buffers up to 7.5 km (4.7 miles) around leks will encompass most seasonal space use; managers should consider buffers between 5.0 and 7.5 km (3.1 – 4.7 miles)

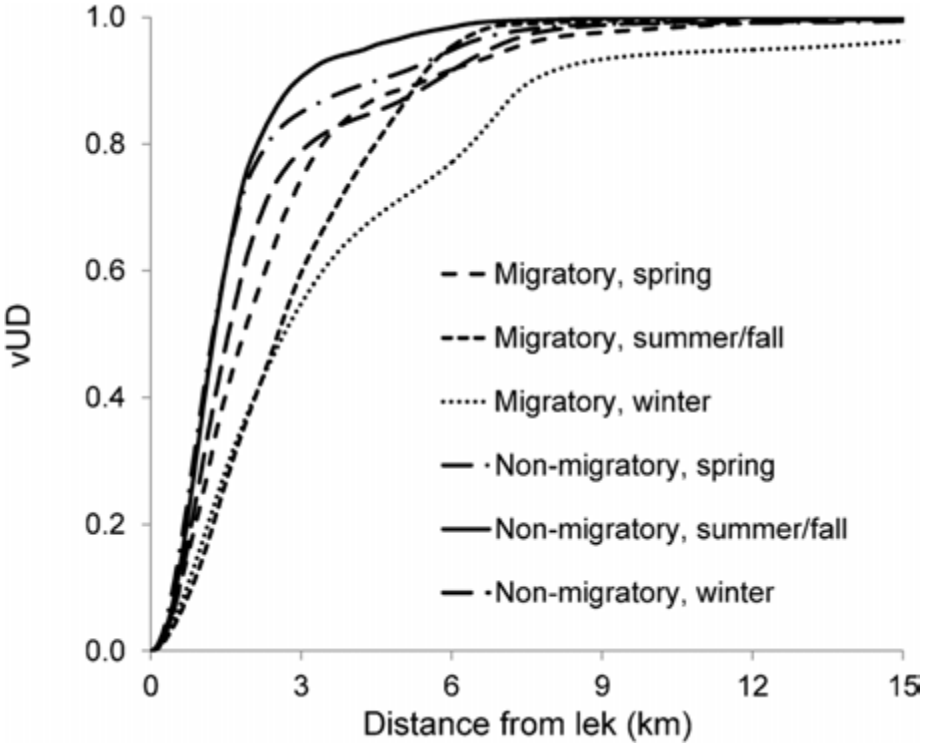


Figure 1. Response curves of volume of utilization distribution (vUD) for sage-grouse grouped by migratory status and season as a function of distance to leks. We collected these data in the Bi-State Distinct Population Segment in Mono County, California, during 2002–2009. *Copied directly from Coates et al. (2013).*

FWP note: This graphical representation from the Coates et al. research shows the percentage of estimated animal use area (vUD) encompassed by increasing distances from the lek. The vUD can be loosely interpreted as the total area used by sage-grouse in this population. The authors report that at 0.25, 0.60, and 3 mile distances from the lek, approximately 5%, 28%, and 90%, of the total area used by sage-grouse was encompassed, respectively. The graph suggests that at 1 mile (1.6 km) from the lek, approximately 50-60% of the total area used by sage-grouse was encompassed.

Summary: On a range wide scale, occurrence of sage-grouse is largely defined by sagebrush distribution. Sage-grouse require a landscape that meets different habitat requirements for breeding, brood-rearing, and winter seasons. A 5 mile buffer around active leks will typically capture most seasonal habitat with the exception of winter habitat for migratory populations. The three vital rates that tend to drive sage-grouse population dynamics are nest success, chick survival, and hen survival. In Montana, these vital rates appear to be within range-wide estimates suggesting Montana populations are relatively secure overall (Table 1). Recent declines in male lek attendance documented by Fish, Wildlife and Parks are likely representative of natural fluctuations that are influenced, in part, by weather.

Importance of Sagebrush Habitats to Sage-grouse

Johnson et al. 2011 - evaluation of anthropogenic and landscape feature influence on lek trends

- Lek trends increased modestly but steadily with the cover of all sagebrush at both 5-km and 18-km radius around leks.

Wisdom et al. 2011 – factors associated with sage-grouse extirpations

- Compared historical locations in occupied (n=239) vs extirpated (n=136) range for sage-grouse

- Historical locations in occupied range contained almost twice as much area in sagebrush as those in extirpated range (46% vs. 24% area).
- Mean patch size of sagebrush was >9 times larger, and mean core area >11 times larger, in occupied versus extirpated range. Sagebrush patches also were substantially closer to one another in occupied range.

Knick et al. 2013 – ecological similarities in sage-grouse lek characteristics

- Lek locations had approximately twice the average large-scale sagebrush cover for the study area and three times that of historic locations. 79% of area within 5km of lek was in sagebrush cover at active leks, 28% at historic but no longer occupied leks, and 35% for the study area.
- Active leks were surrounded by >40% landscape cover of sagebrush on average.

Martin 1970. Sagebrush control related to habitat and sage grouse occurrence.

- Only 4% of 415 sage grouse observations were made on sprayed strips. Sprayed strips were ~9x the area of unsprayed habitat.
- Study area in southwest Montana

Wallestad and Pyrah. 1974. Movement and nesting of sage grouse hens in central Montana

- Radio-collared 31 sage-grouse hens and located 22 nests in central Montana.
- All nests occurred in sagebrush stands with a canopy coverage that exceeded 15% and sagebrush formed the nesting cover over all of the 41 nests located.
- Successful nests had significantly greater sagebrush cover within 24 inches of nest, within a 100 ft^2 plot around nest and were located in stands of sagebrush with a higher average canopy coverage than those of unsuccessful nests.
- Wintering and nesting areas are dominated by dense stands of sagebrush and should be considered together as a wintering-nesting complex. No sagebrush control should be considered on these wintering–nesting complexes.

Baker et al. 1976. Conservation Committee report on effects of alteration of sagebrush communities on the associated avifauna.

- "…control of sagebrush in large blocks (larger than 16 ha) appears to be detrimental [to sage-grouse]."

Braun et al. 1977. Guidelines for maintenance of sage grouse habitats.

- "[Patterson] affirmed that sage grouse have not adjusted, and doubtlessly will not adjust their life processes to fit a pattern of land use that eliminates or seriously disturbs large tracts of the sagebrush-grassland types on any of their seasonal ranges."
- The authors summarized research documenting the dependence of sage-grouse on sagebrush ecosystems.
- Recommended control of vegetation be avoided on all lands within a 3km radius of occupied leks and any areas known to have supported important wintering concentrations of sage grouse within the past 10 years.

Wambolt and Sherwood. 1999. Sagebrush response to ungulate browsing in Yellowstone.

- "Ultimately, many organisms are sacrificed with the loss of quality big sagebrush habitat."

Wambolt et al. 2001. Recovery of sagebrush after burning, south-western Montana

- Big sagebrush canopy cover, density and production of winter forage were significantly greater in unburned than burned portions of a paired comparison.
- Total perennial grass cover did not differ between burned and unburned areas.
- "Managers considering prescribed burning of big sagebrush communities should be aware that herbaceous plant responses may be minimal while shrub values will likely be lost for many years."

Sowell et al. 2011. Northern, central and southern Montana and northern Wyoming

- There was little association (1% of the variation) between herbaceous vegetation cover and Wyoming big sagebrush cover
- "Removing Wyoming big sagebrush cover to increase herbaceous vegetation for any purpose, including enhancing sage-grouse brood survival, does not appear to be biologically sound."

Summary: Sage-grouse are dependent on large, intact landscapes of good quality sagebrush habitat. Removal or degradation of sagebrush is clearly detrimental to sage-grouse lek persistence and trends, nesting success, and over-winter survival.

Impacts of cropland agriculture on sage-grouse populations

Swenson et al. 1987. Decrease of sage grouse *Centrocerus urophasianus* after ploughing of sagebrush steppe.

- Number of males on leks declined by 73% in Shields River Valley (Park Co.) between 1973 and 1984. 16% of the winter habitat area was plowed by 1984. No similar trend in nearby area where plowing did not occur.
- With 84% of total area in sagebrush steppe, the population index for sage grouse declined from 241 to 65 males on leks. This equated to halving the population every seven years.
- Sagebrush loss was on a relatively small area but a relatively large portion of winter habitat (30%).

Tack 2009. Sage-grouse and the human footprint

- Large leks are 4.5 times less likely to occur than small leks when agricultural tillage fragments 21% of land within 1.0km of breeding sites.

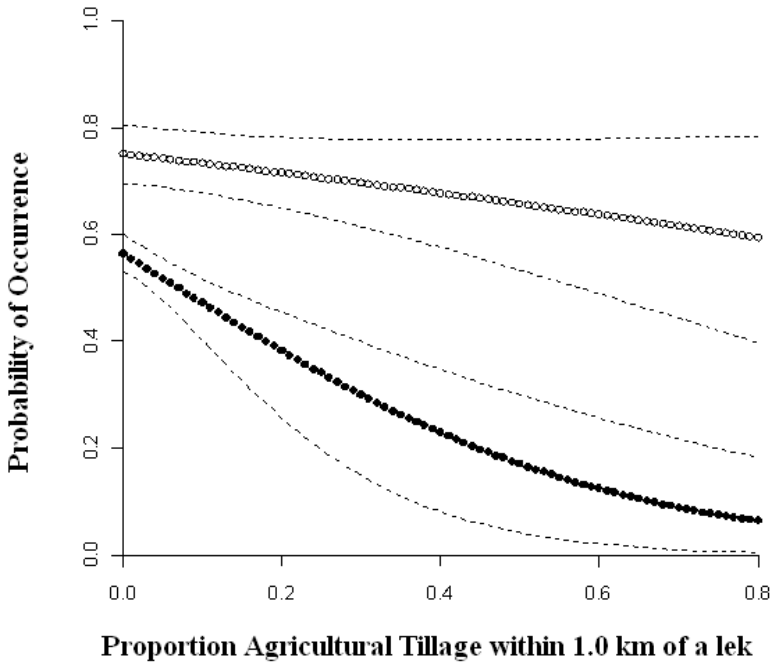


Figure 2. Probability of active lek occurrence of leks with < 25 males (open circles), and leks >25 males (closed circles) and agricultural tillage within 1.0km of a lek, values predicted for leks in big sagebrush habitat. *Copied from Tack 2009*

Knick et al. 2011. Ecological influence and pathways of land use in sagebrush.

- Agriculture, mostly mapped croplands, currently covers >230,000 km^2 (11%) of sage-grouse habitat.
- In the Great Plains (MZI), agriculture covers 18.7% and area influenced by agriculture ranges from 68.1 to 90.7% of the landscape.

Knick et al. 2013. – ecological similarities in sage-grouse lek characteristics

- <2% of leks were in areas surrounded by >25% agriculture within a 5-km radius
- 93% of leks were in areas surrounded by <10% agriculture within a 5-km radius.

Copeland et al. 2013. Measuring the effectiveness of the WY strategy

- "Targeted easements [$250 mil] averted an additional 9-11% of expected declines compared to that of the core area policy alone." In Wyoming.
- "…random placement of easements within core areas has much lower potential for benefiting sage-grouse populations."

Summary: Conversion of native range to cropland effectively removes sage-grouse habitat from the landscape. Even relatively low levels of tillage, 21-25% of the landscape, can lead to lek abandonment, especially by larger leks.

Predators and Sage-grouse

Howe et al. 2014. Nesting habitat selection by common ravens in sagebrush habitats

- "ravens were most likely to nest near edges of adjoining big sagebrush (*Artemisia tridentata*) and land cover types that were associated with direct human disturbance or fire."
- Odds of raven nesting declined by 31% for every 1km (0.6 mi) increase in distance away from a transmission line.
- For every 100-m increase in distance from the edge of big sagebrush habitat with another cover type, the odds of a raven nest decreased by 20%
- "An increase in the amount of edge by 1 km [0.6 mi] within an area of 102.1 ha [252 ac] across the study area increased the odds of nesting by 49%"

Hagen 2011 – range-wide summary

- Sage-grouse are adapted to predation and in unaltered systems will persist indefinitely with predation pressure
- Predators in altered systems can lead to decreased annual recruitment of sage-grouse
- Predators of sage-grouse tend to be generalists that take prey opportunistically
- Common predators are coyote, red fox, American Badger, bobcat, golden eagles and other raptors. Common ravens and black-billed magpies will depredate nests.
- Anthropogenic, landscape level changes have increased abundance of some predators, notably red fox and common raven, within the sage-grouse range
- Predator control programs can have localized, short-term effects, but the sustainability of predator control as a long-term management tool has not been demonstrated.

Taylor et al. 2012 – sage-grouse vital rates

- The influence of predation on sage-grouse population dynamics typically only becomes problematic when vital rates, especially nest, chick and hen survival, are consistently reduced below naturally-occurring levels. (See Table 1 for FWP's compilation of sage-grouse vital rates range-wide and in Montana).
- Recommend increasing survival and nest success rates by restoring large, intact sagebrush-steppe landscapes, reducing human-caused mortality, and eliminating anthropogenic habitat features that subsidize predators.

Baxter et al. 2007 – Strawberry Valley, Utah

- Low sage-grouse survival was attributed to unusually high density of red fox that were attracted to the area by anthropogenic activity
- Adult survival appeared to increase with fox removal; however, demographic rates were concomitantly increasing across the region during the study period, limiting inference on the success of the fox removal program.

Holloran 2005 – western Wyoming

- Increased nest predation rates were attributed to high corvid abundance; corvid abundance was influenced by anthropogenic structures associated with natural gas development

Bui 2009, Bui et al. 2010 – ravens in western Wyoming

- Ravens used road networks, fences, power lines, and other infrastructure associated with development.
- Found a negative association between raven presence and sage-grouse nest and brood fate.
- Predation was attributed primarily to territorial pairs, not groups of juveniles, sub-adults, or non-breeding birds.

Coates 2007 – nest predation in northeastern Nevada

- Raven removal resulted in short-term reductions in raven populations; however, other individuals re-populated the vacated habitat within a year
- Badger predation may have compensated somewhat for decreases in raven populations

Slater 2003 – coyote control in southwestern Wyoming

- Coyote control had no effect on nest success or chick survival

Mezquida et al. 2006 – implications of coyote control

- Removal of coyotes can lead to a release of otherwise suppressed medium-sized predators, such as red fox, which tend to be more effective predators of sage-grouse nests and individuals

Summary: Populations of some predators have increased, in large part because of anthropogenic subsidies. The ability of sage-grouse to withstand increased predation pressure is enhanced in unaltered landscapes, especially those that have been managed to provide good quality habitat for sage-grouse. Reported vital rates for sage-grouse in Montana are within range-wide estimates, suggesting Montana's populations overall are not experiencing excessive predation. However, predators could be suppressing sage-grouse populations in localized areas. Reducing the human footprint and associated anthropogenic subsidies that support predator populations, such as landfills, tall structures, abandoned buildings and other infrastructure, and road net works can help control predator populations (Leu and Hanser 2011). Predator control through lethal means is difficult to sustain, e.g., ravens re-populate vacated territories quickly after removal, and can have unintended consequences, e.g., coyote control can release numbers of medium-sized predators. Predator control options need to be evaluated on a case-by-case basis and at a local, not statewide, scale.

Sage-Grouse Breeding Activities Related to Development

Holloran 2005 – western WY radio-marking study.

- Male lek attendance declined as distance from leks to drilling rigs, producing wells and haul roads decreased and as densities of those infrastructure facilities increased. Effects were detectable out to various distances (3.0 – 6.2 km; 1.9-3.9 mi.) depending on the disturbance variable. These observations were similar to that reported for sage-grouse associated with energy development in Alberta (Aldridge and Brigham 2003) and Colorado (Remington and Braun 1991).
- Well densities exceeding 1 producing well every 283 ha (1 well/699 acres) appeared to negatively influence male lek attendance.
- Main haul roads within 3 km (1.9 mi.) of leks negatively influenced male lek attendance largely through increased traffic volume. Investigators reported a prominent drop in lek attendance when daily traffic exceeded 50 axles per day.
- Male attendance decreased with traffic volume of < 12 vehicles per day and leks became inactive when volume exceeded 75 vehicles per day.
- To maintain continued nesting for future sage-grouse generations the author recommended, at a minimum, all potential nesting habitat within 5km (3.1 miles) of an active lek be protected from development.

Walker et al. 2007a - northeast WY and southeast MT radio-marking study.

- From 2001-2005, the number of males counted on leks in coal bed natural gas (CBNG) fields declined more quickly than counts on leks outside of CBNG fields.
- By 2005, active leks within CBNG had 46% fewer males than leks outside of CBNG fields. Leks with energy development within 6.2 km experienced decreased male attendance.
- Of those leks considered active in 1997, only 38% remained active within CBNG fields by 2004-2005, compared to 84% of leks outside CBNG fields.
- CBNG development as distant as 6.4 km from a lek had a detectable impact on lek persistence.
- From 2000-2005, leks in CBNG fields had 11-55% fewer males per active lek than leks outside CBNG development. All known remaining leks with ≥25 males occurred outside CBNG fields in 2005.
- Findings showed that CBNG development is having negative effects on lek persistence over and above other habitat effects including power lines, preexisting roads, West Nile Virus mortality, or tillage agriculture, even after controlling for availability of sagebrush habitat.
- Research findings show a lag effect, with leks predicted to disappear, on average, within 4 years of CBNG development.
- Leks typically remained active when well spacing was ≥ 500 acres (1.3 wells per section), whereas leks typically were lost when spacing exceeded 4.2 wells per section.

Tack 2009 – lek analysis within eastern Montana, southwest North Dakota, northwest South Dakota, southwest Saskatchewan, and southeast Alberta.

- Showed steep decline in probability of occurrence of larger leks (> 25 males) associated with oil or gas development, even at levels of less than 1 well/640 acres within a 12.3 km (7.8 mile) radius of leks.
- Showed probability of occurrence of leks with >25 males dropped off as density of roads within 3.2 km of a lek increased.

Doherty et al. 2010 – Wyoming statewide lek survival and male attendance retrospective analysis relative to oil and gas development.

- Developed research-based matrix revealing how increases in well density within 3.2 km (2 mi) of a lek affects lek attendance and lek survival.
- The authors did not detect any impacts to male counts or lek survival with well densities of up to 1 well/640 acres.
- For Management Zone I, Well densities spanning 1.03-3.1 wells/640 acres experienced an 11.5% decline in the number of active leks and a 31.4% decline in number of males on remaining leks.
- For Management Zone II, well densities spanning 1.03-3.1 wells/640 acres experienced a 12.1% decline in the number of active leks and a 55.5% decline in number of males on remaining leks.

Harju et al. 2010 – Seven study areas in different parts of Wyoming involving a retrospective lek attendance and oil and gas development analysis.

- Leks with at least one well within a 0.4 km (0.25-mile) radius had 35-91% fewer attending males compared to leks that lacked any wells within that radius.
- In two of five project areas, negative effects of well surface occupancy was detectable out to 4.8 km (3 miles), which was the largest buffer tested.
- Analysis showed a general trend of declining male numbers with an increase in well pad densities.
- Negative impacts on male counts were first detectable at well pad densities as low as 2/640 acres on one project area, 1 /640 acres on one project area, and 0 to 1 well pad/640 acres on two project areas.
- Well pad densities of 4 /640 acres experienced male attendance that was 13-74% lower than leks that lacked well pads within 8.5. km. For those areas with a well pad density of 8/640 acres, male attendance at leks was 74-79% lower than leks that lacked well pads within 8.5 km (5.3 mi.).
- A time lag effect between the time of development and when it was detectable via male counts on leks ranged from 2-10 years.

Holloran et al. 2010 – Southwest Wyoming, investigated behavior of yearling male and female sage-grouse associated with natural gas development.

- Found leks that recruited more than the expected number of males were 2.1-2.9 times further from drilling rigs, producing wells, and main haul roads compared with leks that recruited fewer males than expected.
- Radiomarked males were 4.6 times more likely to establish on leks outside of developed areas.
- Treatment yearling males (with natal brooding areas—a radius of 1.65 km of nest site of origin—that had greater than 1 producing well pad or greater than 1 km of main haul road) were 50% less likely to establish a breeding territory compared to control yearling males.
- Annual survival of treatment yearling males associated with development areas (54%) was significantly lower than survival of yearling males that were reared outside of development (100%). In similar fashion, annual survival of treatment yearling females associated with development areas (69.4%) was significantly lower than survival of yearling females that were reared outside of development (100%).
- Concluded that yearling dispersal distances suggest the need to "manage landscapes where sagebrush-dominated regions within those landscapes remain undeveloped for sage-grouse."

Johnson et al 2011 – range-wide analysis of leks associated with a variety of anthropogenic features.

- Measured lek trends at 3 scales and found that trends of leks within 5 km (3.1 mi.) of a producing oil or natural gas well were depressed. Trends were also lower on leks with more than 10 producing wells within 5 km (3.1 mi) or more than 160 wells within 18 km (11.2 mi.) of the lek.
- Found that a density of more than one producing well/6.4 km^2 (1 well/2.5mi^2) within 18 km (11.2 mi) of leks negatively influences lek count trends.
- Declines in lek trends occurred across a Management Zones if the median human footprint score >3 regardless of the activities that contributed to the score.
- Found length of pipeline within 5-km of lek negatively influences lek count trends
- Effect of power lines on lek trends not detected

Knick et al. 2013 – minimum requirements for distribution of greater sage-grouse leks

- Found that sagebrush land cover within 5 km of the lek averaged 79% at currently occupied leks, 28% at historic but no longer occupied leks, and 35% throughout study area
- Found <2% of the leks were in areas surrounded by >25% agriculture within a 5-km radius, and 93% by <10% agriculture.
- 99% of active leks were in landscapes with <3% developed; all lands surround leks were <14% developed.
- 93% of active leks fell below 0.01 km/km^2 densities of interstate highways
- Highest habitat suitability had pipeline densities <0.01 km/km^2 and power line densities <0.06 km/km^2
- Leks were absent from areas where power lines densities exceeded 0.20km/km^2, pipeline densities exceeded 0.47 km/km^2 or communication towers exceeded 0.08 km/km^2.

Copeland et al. 2013 – measuring efficacy of sage-grouse conservation in Wyoming

- Predict WY's core area strategy plus $250 mil in targeted conservation easements reduces sage-grouse population declines from 14-29% (no conservation measures) to 9-15% (with conservation measures). This cuts anticipated losses by roughly 1/2 statewide and nearly 2/3 within sage-grouse core breeding areas.

LeBeau 2012 – wind energy in Wyoming

- Nest and brood survival negatively affected within 3 miles of wind turbines
- No effect of wind energy on female survival
- Sage-grouse selected brood habitat closer to wind facilities

Hagen et al. 2011 – lesser prairie chickens, southwestern Kansas

- Avoided power lines up to 0.45 miles
- Documented prairie chicken collisions with power lines

Ellis 1985

- Power lines influenced increased predation and sage-grouse dispersal to 0.75 miles

Summary: Impacts of anthropogenic activities on sage-grouse can vary depending on activity and local habitat conditions but cumulative impacts of multiple activities can have significant, negative impacts on sage-grouse populations. Oil and gas well densities commonly permitted in Montana and Wyoming can severely impact sage-grouse breeding populations (Naugle et al. 2011). A number of studies involving both radio-equipped birds and regional and range-wide lek analyses report declining trends of male counts where leks are associated with oil and gas developments. These associations varied by density and nearness of lek. Densities as low as 1 well/6.4 km^2 (1 well/2.5 $mi.^2$) showed negative impacts on male counts. Four studies reported declines in lek male counts associated with oil and gas development that were detectable at development distances of more than 6 km (3.8 mi.) from the lek. As development densities increase and encroach closer to leks, the impact in population trends is more severe. Drilling rigs, haul roads, and producing wells were all found to have impacts on male attendance and lek persistence. Lag times between onset of development and population response averaged 4 years but extended out to 10 years. This lag time is explained in large part by annually returning adult males (as long as they survive) but yearling males associated with gas development experienced lower survival and moved to leks outside of development areas to establish a breeding territory. Yearling females raised in the vicinity of producing wells or main haul roads also showed significantly lower survival, directly affecting annual population recruitment and trends. Current well pad placement restrictions that allow development as close as 0.4 km (0.25 mi.) of a lek are wholly inadequate for effectively conserving sage-grouse. Landscape scale set asides or incremental development that leaves large habitat expanses undeveloped may be most appropriate for assuring long term sage-grouse viability.

Sage-Grouse Nesting and Brood Rearing

Holloran and Anderson 2005, Holloran 2005 - western WY:

- Sage-grouse nest locations are spatially related to lek locations and a 5 km (3.1 mi.) buffer included 64% of known nests. Moynahan's (2004) work in north central MT supports this finding.
- The substantial number of females nesting > 5 km (3.1 mi.) from a lek could be important for population viability.
- Observed lek to nest distances was not related to lek size.
- Successful nests were generally located further from leks than destroyed nests.
- Nests located $\leq$ 1 km (0.6 mi.) from another known nest tended to have lower success probabilities.
- Nesting females strongly avoided areas with high well densities but adult females can exhibit strong nest site fidelity. Mean annual survival rates for females suggest that 5 to 9 years may be required to realize ultimate nesting population response to development activities.
- Nest and brood survival probabilities were found to be higher within developed areas but those benefits were overridden by lower hen survival rates within developed areas.
- Sage-grouse population decline in developed areas were best explained when comparing nest success and hen survival pre and post-development, which revealed lower nest survival and lower annual survival of female sage-grouse post-development.

Lyon and Anderson 2003 – western WY

- Female sage-grouse disturbed by natural gas development during the breeding season had lower nest initiation rates.

Schroeder and Robb 2003 – north central WA

- Nest distribution patterns may change as a result of habitat alteration and fragmentation and the 5 km (3.1 mi.) buffer should be considered relevant only for contiguous sagebrush habitats.

Aldridge and Boyce 2007 - southeast AB

- Sage-grouse chick survival decreased as well densities increased within 1 km (0.6 mi.) of brooding locations. These brood-rearing areas acted as habitat sinks where recruitment was poor.
- Low nest success (39%) and low brood survival (12%) characterized sage-grouse vital rates in habitat fragmented by energy development in southern Alberta.

Tack 2009 – northern Valley County and southern Saskatchewan

- Average distance from lek of capture to nest site was 5.3 km. Seventy-five and 95% of nests were within 6.8 and 12.3 km (4.3 and 7.7 mi.) of lek of capture, respectively.

Holloran et al. 2010 – Southwest Wyoming, investigated behavior of yearling male and female sage-grouse associated with natural gas development.

- Yearling females avoided nesting within 950m (0.6 mi.) of infrastructure, regardless of whether they were reared in the vicinity of development or not.

Summary: Female sage-grouse are spatially grouped around a lek or lek complex during the nesting season. Females tend to move away from leks in selecting nest locations and to an extent, those movements appear to improve their rates of nest success. However, females in developed habitat moved twice as far as females in undisturbed habitat and exhibited lower rates of nest initiation. Females also select nest locations that segregate their nests from those of adjacent hens and the probability of successfully hatching those nests increases when that distance is $\geq$ 1 km. When females have suitable and contiguous nesting habitat to select from, slightly over 60% of nests occur within 5 km (3.1 mi.) of the lek. This strategy of mutual avoidance reduces nest densities and therefore reduces probability of detection by nest predators. However, land use practices that fragment sagebrush habitat and reduce the amount of suitable nesting cover may lead to increased densities of nesting birds and lower rates of nest success. Even if 5 km (3.1 mi.) buffers are employed around existing leks, increased development and production activity in the zone beyond that buffer will impact the remaining 40% of nesting hens and potentially compromise the success of those birds nesting within that 5 km buffer based on the density dependent factors noted above. Population declines associated with development are attributable to lower hen survival. Seasonal surface use restrictions within 2 miles (3.2 km) of an active lek during the breeding and nesting period (1 March – 15 June) are inadequate to maintain sage-grouse populations within developed habitat.

Sage-Grouse Winter Habitat Use

Doherty et al. 2008 – Powder River Basin (PRB) in Montana and Wyoming

- Researchers established a predictive winter habitat use model based on key habitat features that was strongly correlated with observed sage-grouse locations ($R^2 = 0.984$).
- Sage-grouse select for large intact and relatively flat expanses of sagebrush as winter habitat and avoid more rugged terrain and conifer habitat. Given that severe winter conditions (deep snow, low temperatures) could force birds into more rugged terrain, topographic variables should be considered in regions outside the PRB.
- After controlling for vegetation and topography, the addition of a variable quantifying the extent of energy development showed that sage-grouse avoid energy development in otherwise suitable habitat. Probabilities of use decrease by ≈30% at a 32 ha well spacing (80 acre spacing). Sage-grouse were 1.3 times more likely to use winter habitat if CBNG development were not present.
- The model classified only 13% of study area as high quality winter habitat (D.E. Naugle, University of Montana, unpublished data).
- Authors concluded that breeding season timing restrictions and quarter mile no surface development around leks are insufficient for preventing infrastructure and ongoing human activity associated with producing wells from displacing sage-grouse in winter.

Tack 2009 – northern Valley County and southern Saskatchewan

- All radio-collared individuals moved >20km in consecutive years to winter habitat

Smith 2013 – long-distance migration in sage-grouse

- Sage-grouse moved 240-km from breeding habitat in north-central Montana/southern Saskatchewan to winter habitat north of the Missouri River.
- Grouse migrated through gently rolling sagebrush flats (<5% slope), using native sagebrush rangeland in proportion to its availability, and avoiding cropland and badlands where food was scarce.

Summary: Sage-grouse use connected patches of relatively flat sagebrush for migration and winter habitat. Sage-grouse are sensitive to energy development associated with winter habitat. Recent advances in modeling efficiencies provide a tool to assess important winter habitat and the spatial relationship between known leks and potential winter habitat. Sage-grouse in this region can be nonmigratory when suitable seasonal habitats occur in reasonable juxtaposition while other population segments do migrate to more distant winter habitat. In some cases, these dissimilar distribution patterns may involve birds using the same lek complex or a shared winter range. Winter habitat should be conserved at an appropriate scale and with some knowledge of sage-grouse distribution patterns. Seasonal restrictions will not be effective at mitigating infrastructure development if the level of development is moderate to intense and overlays important winter habitat.

West Nile Virus

Zou et al. 2006; Walker et al. 2007b; Walker and Naugle 2011; Doherty 2007

- West Nile Virus (WNV) was documented as an important new source of mortality in lower and mid elevation populations across the range of sage-grouse from 2003-2007, affecting all sex and age classes.
- Local and regional population declines have been attributed to WNV outbreaks.
- Research shows that CBNG ponds pose a threat to sage-grouse because they provide habitat for mosquitoes that spread WNV. Larval *Cx. Tarsalis,* the species of mosquito that spreads the disease, were produced at similar rates in CBNG and natural sites, whereas CBNG ponds produced *Cx. tarsalis* over a longer time period compared to both agricultural and natural sites.
- CBNG ponds resulted in a 75% increase in potential breeding habitat for *Cx. Tarsalis*.

Summary: West Nile Virus should be considered endemic across the northern Great Plains portion of the range of greater sage-grouse. The presence of this disease has added another stressor to sage-grouse population dynamics. The prevalence of the disease and associated level of mortality in sage-grouse appears to vary considerably from year to year based on environmental conditions. However, CBNG ponds do provide a much more consistent set of conditions favorable to the spread of WNV even in years of low natural precipitation. Conservation actions need to consider the relationship between CBNG and WNV and attempt to mitigate those conditions favorable to WNV.

SYNTHESIS

- Recent research using different techniques across many representative parts of the eastern range of sage-grouse has reached similar conclusions about the sensitivity of sage-grouse to anthropogenic disturbances, including conversion to cropland agriculture and oil and gas development. Sage-grouse avoid energy development during both breeding and wintering seasons and do so at scales that render current protective stipulations (e.g., 0.25 mile no surface occupancy buffers) ineffective. A new conservation strategy will be necessary to balance effective sage-grouse conservation with anthropogenic stressors.
- A conservation strategy that focuses on maintaining and enhancing existing sagebrush habitat and minimizing new disturbance will likely be the most effective for sage-grouse.
- A common theme among recent research is the level of impact to sage-grouse relative to placement of developments, density of developments, extent of developments, and level of activity associated with developments.
- Research on wind energy is currently inconclusive. The recent development of wind energy in sage-grouse habitats and lag effect of possible population responses may mask longer term population impacts (Knick et al 2011).

However, human activity, roads, traffic, power lines, visual obstruction, noises, and other factors may result in responses by sage-grouse similar to that found with oil and gas developments.

- Effective sage-grouse habitat conservation must be implemented in a landscape context (Doherty et al. 2011).
- Naugle et al. (2011) characterized different approaches for achieving conservation and energy development based on biological and energy values. Those areas of high biological value but low energy value should be immediately conserved. Those areas of high biological value and high energy value will need to reform policies to reduce threats. And, those areas of lower biological value but high energy potential can emphasize development as the higher priority over conservation.
- Significant fragmentation of habitat and associated loss of populations within the Powder River Basin and other areas in Management Zones 1 and 2, could have status implications to the species within the Great Plains portion of the species' range.
- Implementation of Wyoming's Core Area policy and targeted conservation easements are predicted to reduce sage-grouse population losses but are not expected not to stop population declines completely (Copeland et al. 2013).

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APPENDIX H: Minority Committee Reports

Minority Committee Report for
MITIGATION STANDARD
Greater Sage-Grouse Habitat Conservation Strategy

This Minority Committee Report on the Mitigation Standards found in the *Montana Greater Sage-Grouse Habitat Conservation Strategy* (*Montana Strategy*) was written because the final standard adopted was adopted "on the fly," and it may have unintended consequences for sage-grouse conservation.

As background, on December 18, 2013, the Council established a subcommittee to address how disturbances to sage-grouse habitat should be handled in terms of avoidance, minimization, and mitigation issues. The subcommittee was asked to review related public comments on the Draft *Montana Strategy*, including extensive comments by the U.S. Fish and Wildlife Service (Service), and make recommendations to the Governor's Greater Sage-Grouse Habitat Advisory Council (Council) on how these provisions should be modified. This subcommittee presented its recommendations to the Council on January 14, 2014, one of the last days the Council met. In discussions regarding the subcommittee recommendations, the Council revised the mitigation provisions. After further review of this section, it appears that the Council may have weakened the mitigation provisions, perhaps unintentionally.

A recommended change to the Mitigation Standard, with justification, is provided below.

APPROVED LANGUAGE. The Council included the following recommendation for mitigation in the *Montana Strategy*:

> General Provisions, Page 9, Item 7:
> New development or land uses requiring a permit or other authorizations within sage-grouse Core Areas should be authorized or conducted only when it can be reasonably demonstrated that the activity (factoring in mitigation) will not cause declines in Greater Sage-Grouse populations. Activities that exceed recommended stipulations may require compensatory mitigation (Section VIII).
>
> Core Areas, Page 15, Item 1.c.:
> Compensation for Impacts. If project impacts are unavoidable and core area stipulations cannot be met, mitigation measures shall be required, following the Mitigation Framework outlined in Section IX. Mitigation can include enhanced reclamation.
>
> General Habitat, Page 33, Item 1.c.:
> Compensation for Impacts. If project impacts are unavoidable and general stipulations cannot be met, mitigation measures may be required, following the Mitigation Framework outlined in Section IX.

RECOMMENDED CHANGE. A minority of the Council recommends the following changes to the *Montana Strategy*'s mitigation standard:

> General Provisions, Page 9, Item 7:
> New development or land uses requiring a permit or other authorizations within sage-grouse Core Areas should be authorized or conducted only when it can be reasonably demonstrated that the activity (factoring in mitigation) will not cause declines in Greater Sage-Grouse populations. Activities in Core Areas that ~~exceed~~ do not meet recommended stipulations ~~may~~ shall require compensatory mitigation (Section VIII).
>
> Core Areas, Page 15, Item 1.c.:
> Compensation for Impacts. If project impacts are unavoidable and core area stipulations cannot be met, mitigation measures shall be required, following the Mitigation Framework outlined in Section IX. In addition, if project impacts are unavoidable, their size has been minimized, Core Area stipulations have been followed, and

project impacts remain after reclamation, mitigation shall also be required following the Mitigation Framework outlined in Section IX. ~~Mitigation can include enhanced reclamation.~~

General Habitat, Page 33, Item 1.c.:
Compensation for Impacts. If project impacts are unavoidable and general stipulations cannot be met, mitigation measures may be required, following the Mitigation Framework outlined in Section IX. In addition, if project impacts are unavoidable and their size has been minimized, mitigation may also be required following the Mitigation Framework outlined in Section IX.

RATIONALE FOR RECOMMENDED CHANGE:

1. Based on comments on the Draft *Montana Strategy*, it was made clear that the Service wanted to see changes to the mitigation standard. They also specifically recommended that mitigation be required after avoidance, minimization, and reclamation. The Minority Committee's recommended change to the mitigation standard specifically addresses these issues. The Service made their request in December 9, 2013 comments on the Draft *Montana Strategy*:

Page 3: "The Strategy provides a mitigation section, but currently does not provide clear direction as to when compensatory mitigation for proposed surface disturbance activities would be required. We recommend that compensatory mitigation be required for all such projects that would result in direct, indirect, temporary, and permanent impacts to GSG [Greater Sage-Grouse] that would remain following application of avoidance, minimization, and reclamation / rectification such that neutral or positive GSG population trends and habitats would be maintained; particularly in core areas." (Service 2013b, page 3)

Page C4: "19). VI. Stipulations for Development, a) Core Area Stipulations, ii. Core Area – Specific Stipulations, p. 15: We recommend that the following overall concepts should apply to subsections 1-7:
1) Clear statement / enactment of an "avoidance first" approach to proposed surface disturbance activities to GSG habitat in core areas. The COT Report [Service 2013a] conservation objective for infrastructure, a widespread threat to most Montana GSG populations, is to avoid development of infrastructure within PACS (core areas). We recommend that such an "avoidance first" approach be enacted, and rationale be required by authorizing agencies as to why a given proposed surface disturbance to GSG habitat in core habitat is unavoidable. Clear, mandatory direction to adhere to (and document adherence to) the mitigation sequence in Section IX (avoid, minimize, reclaim, offset) should be provided.

2) Clear direction as to when compensatory mitigation for proposed surface disturbance activities would be required. We recommend that compensatory mitigation be required for all such projects that would result in direct, indirect, temporary, and permanent impacts to GSG that would remain following application of avoidance, minimization, and reclamation / rectification such that neutral or positive GSG population trends and habitats would be maintained. In the absence of a project-level effects analysis, approved projects that do not comply with Strategy stipulations should be subject to compensatory mitigation. We generally recommend mitigation implementation in advance of impacts; advance (functionality demonstrated by GSG use) compensatory mitigation to offset any approved proposed disturbance to suitable habitat in core areas that would exceed the 5% disturbance threshold should be required in all cases. All proposed compensatory mitigation should be subject to MSGOT review. Please also see Comments 55 and 56 regarding mitigation." (Service 2013b, page C4)

2. The Service specifically recommended no mitigation requirement when Core Area/ general habitat stipulations were not being met; instead, the Service recommended that permits should be denied when stipulations are not met. Subsequently, changes made on January 14, 2014 to the *Montana Strategy* appear to run contrary to the Service recommendation. Because the Council did not specifically discuss this issue while they were making conceptual amendments to the document on January 14, this result may have been done unintentionally. That said, the intentions of the Service were clear in their letter on the Draft *Montana Strategy*:

The Service commented about the stipulation found in Item #7, page 8 of the Draft *Montana Strategy* that stated, "*Activities that exceed recommended stipulations may require compensatory mitigation.*" The Service wrote about this stipulation: "This implies that proposed activities are not necessarily required to comply with the stipulations, and in that case compensatory mitigation only "may" be required. The Strategy should clearly convey that activities proposing to exceed the stipulations should, in the normal course of business, first be modified such that they meet the stipulations, or disallowed. Compensatory mitigation should be required for impacts remaining following application of avoidance, minimization, and rectification/reclamation measures. For projects that may be allowed to exceed stipulations on a case-by-case, site-specific basis, compensatory mitigation commensurate with the impacts should be required and subject to review by the MSGOT." (Service 2013b, page C2)

3. If mitigation is only required when Core Area/ general habitat stipulations are not met, then project sponsors may be able to develop mitigation projects that allow them to build whatever they want, wherever they want to build it, even in critical sage-grouse habitat. The stipulations found in the *Montana Strategy* were designed to minimize habitat fragmentation. If these stipulations can be avoided, as the current mitigation standard suggests, sage-grouse habitat is more likely to become fragmented. Once lost, sage-grouse habitat is difficult—if not impossible—to recover: The following studies and professional opinions support this statement:

- "…Braun (1998) reported recovery of populations in Montana, Wyoming, and Colorado may occur after initial development and subsequent reclamation of mine sites, ***although populations do not recover to pre-development sizes*** [emphasis added]. Additionally, population re-establishment may take as long as 30 years (Braun, 1998)." (Manier et al. 2013)

- "Sage-grouse populations can be significantly reduced, and in some cases locally extirpated, by non-renewable energy development activities, even when mitigative measures are implemented (Walker et al. 2007)." (Service 2013a)

- "Success is not guaranteed when conducting Greater Sage-Grouse habitat restoration projects in semiarid environments. The only guarantee is that annual weather conditions can vary widely and these often dictate success of restoration projects" (Pyke 2011, p. 544).

- "Grasses and forbs may respond within 1 to 3 years if soils and seed sources permit recovery or restoration, but return to a shrub-dominated community often requires > 20–30 years, and landscape restoration may require centuries or longer (Hemstrom et al. 2002). Even longer periods may be required for sage-grouse to use recovered or restored landscapes." (Knick et al. 2011, p. 251)

- "Due to the long period of time (years to decades) required to restore sagebrush habitat upon which sage-grouse depend and because of the uncertainty involved in the successful in-kind mitigation for any loss of sage-grouse habitat within Core Areas, both in quantity and quality, sage-grouse habitat within Core Areas with few exceptions will be considered irreplaceable (per ODFW Mitigation Policy." (Oregon Department of Fish and Wildlife 2012)

4. Sage-grouse exhibit high site fidelity, using the same leks and general breeding areas year-after-year. Colonization rates of new areas, even if suitable habitat exists, are relatively low. Therefore, it is more important to conserve existing sage-grouse habitat than to attempt to replace losses elsewhere through off-set mitigation. A strategy that allowed for off-site mitigation without first maximizing conservation on-site would not conserve sage-grouse populations adequately. The following studies and professional opinions support this statement:
"Sage-grouse exhibit strong site fidelity (loyalty to a particular area) to seasonal habitats (i.e., breeding, nesting, brood rearing, and wintering areas) (Connelly et al. 2004; Connelly et al. 2011a). Adult sage-grouse rarely switch from these habitats once they have been selected, limiting their ability to respond to changes in their local environments (Schroeder et al. 1999)." (Service 2013a)

- "Importantly, sage-grouse have demonstrated strong site fidelity suggesting resistance of individuals to adjust to changing habitat conditions (Berry and Eng, 1985; Fischer and others, 1993; Schroeder and Robb, 2003; Holloran and Anderson, 2005; Moynahan and others, 2007; Baxter and others, 2008; Doherty and others, 2010a; Holloran and others, 2010)." (Manier et al. 2013)

- "High site fidelity but low survival of adult sage-grouse combined with lek avoidance by yearlings [11] resulted in a time-lag of 3–4 years between the onset of energy development and lek loss [30]. The time-lag observed by Holloran [30] in conventional gas fields in southwest Wyoming matched that for leks that became inactive 3–4 years following coal-bed natural gas development in northeast Wyoming [19]." (Doherty et al. 2010)

- "Maintaining a local population of birds may increase the chance for a successful restoration because strong site fidelity hinders re-colonization from more distant sites and past precedence shows that translocations, while problematic, are more apt to succeed in areas with resident populations (Reese and Connelly 1997, Baxter et al. 2008)." (Taylor et al. 2012)

5. And finally, because the Montana Strategy has a 5% cap on anthropogenic disturbances within Core Areas, development projects should utilize the tools of avoidance, minimization, restoration, and mitigation to keep disturbances below this threshold. If this process is successfully done, economic development projects and sage-grouse conservation should be able to co-exist for the long-term.

MINORITY REPORT SUBMITTED BY:
Janet Ellis, Jay Gore, and Carl Wambolt

DATE: 1-24-2014

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U.S. Fish & Wildlife Service. 2013b. Montana Draft Greater Sage-Grouse Habitat Conservation Strategy Comments. Letter to Montana Fish, Wildlife & Parks Director Jeff Hagener, December 9, 2013. 27 pp.

Minority Committee Report for
NOISE STANDARD
Greater Sage-Grouse Habitat Conservation Strategy

This Minority Committee Report on the Noise Standard found in the *Montana Greater Sage-Grouse Habitat Conservation Strategy* (*Montana Strategy*) for Core Areas and General Habitat was written because the final standard adopted is not science-based.

As background, between August 2013 and January 14, 2014, the noise standard found in the Draft *Montana Strategy* was similar to that found in other states (10 decibels above ambient noise), including Wyoming (State of Wyoming 2012). However, after learning that Wyoming is currently re-examining its noise standard because they have had problems implementing their current standard, and in response to some public comment, a majority of the Governor's Greater Sage-Grouse Habitat Council (Council) voted on January 15, 2014 to change the Montana standard to one that is not based in science—and is likely detrimental to this species. Because the objective of the *Montana Strategy* is to show the U.S. Fish & Wildlife Service (Service) that Montana has a science-based plan that will lead to sage-grouse conservation, several committee members believe that it is important for the Governor to change this standard.

A recommended change to the Noise Standard, with justification, is provided below.

APPROVED LANGUAGE. The Council included the following recommendation for managing noise in the *Montana Strategy*:

Core Area Basic Stipulations, Page 16, Item 5:
Noise: New noise levels, at the perimeter of a lek, should not exceed 40 dBA above ambient noise (existing activity included) from 6:00 pm to 8:00 am during the breeding season (March 15 – July 15) with the exception of those sites identified under Special Management Core Areas. Ambient noise levels should be determined by measurements taken at the perimeter of a lek at sunrise. The MSGOT should follow Wyoming's review and litigation discussion of this stipulation and amend the strategy accordingly.

General Habitat Stipulations, Page 34, Item 5:
Noise: New noise levels, at the perimeter of a lek, should not exceed 40 dBA above ambient noise (existing activity included) from 6:00 pm to 8:00 am during the breeding season (March 15 – July 15). Ambient noise levels should be determined by measurements taken at the perimeter of a lek at sunrise. The MSGOT should follow Wyoming's review and litigation discussion of this stipulation and amend the strategy accordingly.

RECOMMENDED CHANGE. A minority of the Council recommends the following changes to the *Montana Strategy*'s noise standard, which has a basis in science:

Core Area Basic Stipulations, Page 16, Item 5:
Noise: New noise levels, at the perimeter of a lek, should not exceed 40 dBA ~~above ambient noise~~ (existing activity included) from 6:00 pm to 8:00 am during the breeding season (March 15 – July 15) with the exception of those sites identified under Special Management Core Areas. ~~Ambient noise levels should be determined by measurements taken at the perimeter of a lek at sunrise.~~ The MSGOT should follow Wyoming's review and litigation discussion of this stipulation and amend the strategy accordingly.

General Habitat Stipulations, Page 34, Item 5:
Noise: New noise levels, at the perimeter of a lek, should not exceed 40 dBA ~~above ambient noise~~ (existing activity included) from 6:00 pm to 8:00 am during the breeding season (March 15 – July 15). ~~Ambient noise levels should be determined by measurements taken at the perimeter of a lek at sunrise.~~ The MSGOT should follow Wyoming's review and litigation discussion of this stipulation and amend the strategy accordingly.

RATIONALE FOR RECOMMENDED CHANGE:

1. It is recommended that the reference to ambient noise be removed. This portion of the standard is difficult and expensive to measure. It also appears to be problematic for agencies trying to base their management on this measurement. The following professional opinions support these statements:

- "In addition, collecting measurements of ambient noise levels in quiet areas is extremely challenging and requires expensive, specialized equipment; this makes the requirement to collect ambient values at each lek difficult to implement. Unfortunately, non-ideal weather (especially wind, even at low levels) and almost all errors by the person deploying the noise meter (e.g. poor placement of the meter for long-term deployment, rustling from clothing, crunching leaves underfoot and even breathing close to the meter when handheld) will inflate ambient measures." (Patricelli et al. 2012)

- '…[W]e suggest that it is not feasible or practical to establish baseline noise levels by having agency personnel or consultants with little specialized training measure ambient at each lek prior to development." (Patricelli et al. 2012)

2. The noise standard currently found in the *Montana Strategy* is 60 (+) decibels (dBA). This number is estimated based on ambient noise levels predicted to be approximately 20 - 22 dBA in rural sagebrush habitats, and the *Montana Strategy's* recommendation of "40 dBA above ambient noise" (40 dBA + 20 dBA for ambient noise = 60 (+) dBA). This standard is not scientifically defensible. The following studies and professional opinions support these statements:

- "Based on our review of reports and empirical measurements collected in Wyoming, we estimate that true ambient values pre-development in nights and calm morning in sagebrush habitat are closer to 20-22 dBA…" (Patricelli et al, 2012)

- "Indeed, results from our experiments indicate that 49 dBA is too loud to avoid significant impacts on sage-grouse [*emphasis added*]. Our noise-playback leks (described above, Blickley et al. 2012) experienced levels that were in compliance these recommendations, i.e. less than 49 dBA across most of the lek area, except the area within ~20 meters of the speakers. Yet we found large declines in attendance, increases in stress levels and altered display behaviors across the lek (Blickley et al. in review, in prep)." (Patricelli et al, 2012)

- "Male attendance at leks would be expected to be reduced when subjected to the current standard noise limitation of 50 decibels at the lek site. Despite the protective measures used to prevent impacts from projects in sage-grouse habitat, there would be no restrictions on the total amount of habitat that could be disturbed and declines in abundance and lek losses would be expected." (BLM 2013)

- Even the State of Montana's 2005 *Management Plan and Conservation Strategies for Sage Grouse in Montana* recommended not exceeding 49 dBA:
  "Noise can disrupt breeding rituals and cause abandonment of leks.
  1) Restrict noise levels from production facilities to 49 decibels (10 dba above background noise at the lek)[1]
  2) Restrict use of heavy equipment that exceeds 49 decibels[1] within 2 miles of a lek from 4 a.m.-8 a.m. and 7 p.m. - 10 p.m. during March 1-June 15…" (Montana Sage Grouse Working Group 2005)

  [1]When the 2005 Montana Plan was written, ambient noise levels were estimated to be 39 dBA; studies done recently show that ambient noise in rural sagebrush habitat is 20 – 22 dBA.

2. Although the science is changing, 40 decibel (dBA) can be defended by at least some scientific studies. The following studies and professional opinions support these statements:

- "However, there is recent science that demonstrates the effects of noise on sage-grouse breeding behavior (Crompton and Dean 2005, Holloran 2005, Blickley and Patricelli *in press*). In brief, sound levels >40 decibels (dbA) reduced breeding activity and increased stress levels (as measured by hormone levels) in sage-grouse (Blickley and Patricelli in press)." (Oregon Department of Fish and Wildlife 2012)

4. It is important to change this standard and make it science-based because it has been well established that Greater Sage-Grouse are negatively impacted by noise, avoiding areas where anthropogenic noise from roads, oil and gas development and infrastructure, compressor stations, and more, exist on the landscape. Noise, therefore, is considered a type of habitat fragmentation for these birds. The following studies and professional opinions support these statements:

- "Functional habitat loss also contributes to habitat fragmentation, as greater sage-grouse avoid areas due to human activities, including noise, even though sagebrush remains intact (Blickley et al. 2012)." (Service 2013)

- "…[C]hanges in the number of males occupying leks situated downwind of drilling rigs were more negative than those witnessed on leks upwind of drilling rigs, supporting evidence that increased noise intensity negatively influences male lek attendance (Holloran, 2005)." (Manier et al. 2013)

- "Noise can disrupt breeding rituals and cause abandonment of leks." (Montana Sage Grouse Working Group 2005)

- "Our results suggest that males and possibly females avoid leks exposed to anthropogenic noise." (Blickley et al. 2012a)

- "Taken together, results from Blickley et al. [43] and this study suggest that noise alone can cause greater sage-grouse to avoid otherwise suitable habitat and increase the stress responses of birds that remain in noisy areas. Thus, noise mitigation may be a fruitful conservation measure for this species of concern." (Blickley et al. 2012b)

MINORITY REPORT SUBMITTED BY:
Janet Ellis, Jay Gore, and Carl Wambolt

DATE: 1-24-2014

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Minority Committee Report for
BENTONITE, PEAT, SOCRIA, AND SAND & GRAVEL STANDARD
Greater Sage-Grouse Habitat Conservation Strategy

This Minority Committee Report on the Bentonite, Peat, Scoria, and Sand & Gravel Standard found in the *Montana Greater Sage-Grouse Habitat Conservation Strategy* (*Montana Strategy*) was written because the Governor's Greater Sage-Grouse Habitat Advisory Council (Council) adopted this 2-1/2 page standard—all new material that the Council had not reviewed—late on its last meeting day. This new standard was developed and promoted by industry, with no ability for Council members to ask questions of regulators to confirm statements being made. The specifics of the standard may add conservation protection to sage-grouse habitat—or it may just solidify "business as usual," with no new requirements being placed on these industries. Because of the last minute and expedited way this standard was adopted, the Council members writing this Minority Committee Report were not able to ascertain the ramifications of the standard. Therefore, we decided to write this Minority Committee Report to the Governor, essentially "flagging" this item for increased scrutiny.

As background, on December 18, 2013, the Council established a coal subcommittee to review coal-related public comments on the Draft *Montana Strategy* and make recommendations to the Council on how these standards could be improved. This subcommittee worked hard with industry representatives and agency personnel to determine what provisions of state and federal law relating to coal should be added to the *Montana Strategy*. After a thorough review of the coal standards within the *Montana Strategy*, including a presentation by the Montana Department of Environmental Quality overseeing this program, the Council adopted the new coal standards found in the plan. Then, on the last day of our Council's meetings, late in the afternoon, the Council received a new proposal from the bentonite industry, which also applied to peat, scoria, and sand & gravel mining. This proposal closely paralleled the coal provisions already adopted, applying similar standards to these other mining sectors.

APPROVED LANGUAGE: The Bentonite, Scoria, Peat, Sand and Gravel Mining standards can be found in the *Montana Strategy* in the following locations:

- For Core Areas: pages 23 – 26, Item 6
- For General Habitat: pages 38 – 42, Item 10

RATIONALE FOR ADDITIONAL SCRUTINY OF THIS STANDARD:
Although the Council was assured that the regulatory framework that applies to the coal industry was nearly identical to the regulatory framework for the bentonite, peat, scoria, and sand & gravel industries, there were no agency personnel available to confirm this statement. In addition, one fundamental difference exists between the regulatory framework for coal and the framework for these other mining industries: coal has a significant federal law, the Surface Mining Control and Reclamation Act (SMCRA), that sets minimum standards that the state's Montana Strip and Underground Mine Reclamation Act (MSUMRA) cannot go below. There is no federal minimum standard set for bentonite, peat, scoria, and sand & gravel. Therefore, there is less assurance that strong standards that are in rule and statute today will be there long-term.

Although the Montana Strategy's stipulations for bentonite, peat, scoria, and sand & gravel might be acceptable, we have no way to confirm that. Therefore, we wanted to request that the Governor's office review this new section and make sure that it adequately protects sage-grouse.

This request is not made lightly. At least for the bentonite and sand & gravel sectors, agencies are aware of their potential impacts to sage-grouse:

> "Other forms of mining (for example, bentonite, gravel, potash, and trona) can also influence sage-grouse habitats. The magnitude of the impacts of mining activities on sage-grouse and sagebrush habitats is largely unknown (Braun, 1998), but mining of various Federal mineral resources (locatable and saleable) currently affects approximately 3.6 percent of potential sage-grouse habitat directly (across all MZs [Management Zones]) with indirect effects potentially affecting large portions (5–32 percent) of some MZs (table 17A). In addition, existing leases for

development of non-energy, leasable minerals represent a relatively small threat (spatially) but may ultimately be developed to their full, spatial extent based on existing agreements (table 17B).

Development of surface mines and associated infrastructure (such as, roads and power lines), noise, and human activity may negatively impact sage-grouse numbers in the short term (Braun, 1998), and a variety of mineral claims could result in industrial activities that would disrupt the habitat and life-cycle of sage-grouse (fig. 24). The number of displaying sage-grouse on 2 leks within 2 km (1.25 mi) of active mines in northern Colorado declined by approximately 94 percent during a 5-year period following an increase in mining activity (Remington and Braun, 1991). However, Braun (1998) reported recovery of populations in Montana, Wyoming, and Colorado may occur after initial development and subsequent reclamation of mine sites, ***although populations do not recover to pre-development sizes*** [emphasis added]. Additionally, population re-establishment may take as long as 30 years (Braun, 1998)." (Manier et al. 2013)

MINORITY REPORT SUBMITTED BY:
Janet Ellis, Jay Gore and Carl Wambolt

DATE: 1-24-2014

REFERENCE:

Manier, D.J., Wood, D.J.A., Bowen, Z.H., Donovan, R.M., Holloran, M.J., Juliusson, L.M., Mayne, K.S., Oyler- McCance, S.J., Quamen, F.R., Saher, D.J., and Titolo, A.J., 2013, Summary of science, activities, programs, and policies that influence the rangewide conservation of Greater Sage-Grouse (*Centrocercus urophasianus*): U.S. Geological Survey Open-File Report 2013–1098, 170 pp., http://pubs.usgs.gov/of/2013/1098/.

Minority Committee Report for
NO SURFACE OCCUPANCY STANDARD IN GENERAL HABITAT
Greater Sage-Grouse Habitat Conservation Strategy

This Minority Committee Report on the general habitat No Surface Occupancy (NSO) standard found in the *Montana Greater Sage-Grouse Habitat Conservation Strategy* (*Montana Strategy*) was written because the final standard adopted is not science-based.

As background, the U.S. Fish & Wildlife Service (Service) first pointed out the inadequacies of the general habitat NSO standard in informal comments submitted to the Governor's Greater Sage-Grouse Habitat Advisory Council (Council) on September 24, 2013. Previous to that, Montana Fish, Wildlife & Parks (FWP) had given the Council a handout summarizing the scientific literature behind various standards, including the NSO, dated July 29, 2013; that handout specifically concluded that, "development[s] as close as 0.4 km (0.25 mi.) of a lek are wholly inadequate for effectively conserving sage-grouse" (FWP 2013). Despite this information, the Council voted to retain the 0.25-mile standard at its January 15, 2014 meeting.

It is particularly important to change the general habitat NSO standard found in the Draft *Montana Strategy* because of the differences between the sage-grouse strategies in Montana and Wyoming. The 0.25-mile standard is nearly identical to that found in Wyoming (State of Wyoming 2012). However, Wyoming has the ability to deliver more conservation protections to sage-grouse from its Core Area stipulations (relying less on general habitat) for the reasons described below. In contrast, the *Montana Strategy* must depend more significantly on general habitat for conservation of sage-grouse populations.

Because the objective of the *Montana Strategy* is to show the U.S. Fish & Wildlife Service (SERVICE) that Montana has a science-based plan that will lead to sage-grouse conservation, several committee members believe that it is important for the Governor to change this standard.

A recommended change to the general habitat NSO Standard, with justification, is provided below.

APPROVED LANGUAGE. The Council included the following recommendation for managing NSO in the *Montana Strategy*:

> General Habitat Stipulations, Page 32, Item 2:
> Surface Occupancy: Within 0.25 miles of the perimeter of an active sage-grouse lek there will be no surface occupancy (NSO).

RECOMMENDED CHANGE. A minority of the Council recommends the following changes to the *Montana Strategy*'s NSO standard, which has a basis in science:

> General Habitat Stipulations, Page 32, Item 2:
> Surface Occupancy: Within ~~0.25~~ 1.0 miles of the perimeter of an active sage-grouse lek there will be no surface occupancy (NSO).

RATIONALE FOR RECOMMENDED CHANGE:

1. The general habitat No Surface Occupancy (NSO) standard for Greater Sage-Grouse (GSG) leks currently found in the *Montana Strategy* is 0.25 miles. This standard is not scientifically defensible. The following studies and professional opinions support these statements:

- "Current well pad placement restrictions that allow development as close as 0.4 km (0.25 mi.) of a lek are wholly inadequate for effectively conserving sage-grouse. (FWP 2013)

- "In the context of this [Montana] Strategy, the proposed 0.25-mile NSO from active GSG leks in general habitat is inadequate to achieve GSG lek protection. This measure was decreased from the originally proposed 0.6 mile NSO in the pre-draft Strategy. Studies demonstrating the inadequacy of this measure include Holloran (2005), who found that development stipulations including a 0.25-mile NSO were inadequate to maintain GSG breeding populations in natural gas fields. Walker et al. (2007) found that lease stipulations that prohibit development within 0.4 km (0.25 mi) of GSG leks on federal lands were inadequate to ensure lek persistence and may result in impacts to breeding populations over larger areas. Harju et al. (2010) found that leks with ≥1 oil or gas well within a 0.4-km (0.25-mile) radius encircling the lek had 35–91% fewer attending males than leks with no well within this radius." (SERVICE 2013b, page C10)

- "Government imposed stipulations often restricted surface occupancy within 0.4 km (0.25 mi) of a lek during the time most studies were conducted, and leks that had ≥1 pad within this radius had 35 to 92 percent fewer attending males than did leks with zero wells within this distance (Harju and others, 2010; Naugle and others, 2011)." (Manier et al. 2013)

- "Surface occupancy of oil or gas wells adjacent to leks was negatively associated with male lek attendance in 5 of 7 study areas. For example, leks that had ≥1 oil or gas well within a 0.4-km (0.25-mile) radius encircling the lek had 35–91% fewer attending males than leks with no well within this radius." (Harju et al. 2010)

2. Although the science indicates a 4.0-mile NSO would have little to no impact on sage-grouse, an NSO of 1.0 mile for general habitat can be defended by at least some research. The following studies and professional opinions support this statement:

- "As we conveyed in our September 24, 2013 informal written comments, numerous recent studies (please again refer to the July 29, 2013 technical literature summary handout provided to the Council by FWP) document a large percent of nesting, as well as adverse effects of development, out to approximately 4 miles from leks. We recommend that the general habitat NSO be increased from 0.25 mile to the extent possible to minimize potential impacts to nesting habitat and breeding activities in general habitat and add conservation benefit to the Strategy. We recommend that the general habitat NSO match the core habitat NSO of 1 mile, but at a minimum extend to 0.6 mile in order to have any discernible effect. The increased NSO should apply consistently throughout the plan where referenced." (SERVICE 2013b, page C10)

- "…Coates et al. [2013] research shows the percentage of estimated animal use area (vUD) encompassed by increasing distances from the lek. The vUD can be loosely interpreted as the total area used by sage-grouse in this population. The authors report that at 0.25, 0.60, and 3 mile distances from lek, approximately 5%, 28%, and 90%, of the total area used by sage-grouse is encompassed, respectively. The graph suggests that at 1 mile from the lek, approximately 50-60% of the total area used by sage-grouse is encompassed." (MFWP 2014)

3. It is important to change this standard and make it science-based because it has been well established that sage-grouse are significantly impacted by disturbances. The following professional opinion supports this statement:

- "The loss and fragmentation of sagebrush habitats is a primary cause of the decline of sage-grouse populations (Patterson 1952; Connelly and Braun 1997; Braun 1998; Johnson and Braun 1999; Connelly et al. 2000; Miller and Eddleman 2000; Schroeder and Baydack 2001; Johnsgard 2002; Aldridge and Brigham 2003; Beck et al. 2003; Pedersen et al. 2003; Connelly et al. 2004; Schroeder et al. 2004; Leu and Hanser 2011; 75 FR 13910). Habitat fragmentation, largely a result of human activities, can result in reductions in lek persistence, lek attendance, population recruitment, yearling and adult annual survival, female nest site selection, nest initiation, and complete loss of leks and winter habitat (Holloran 2005; Aldridge and Boyce 2007; Walker et al. 2007; Doherty et al. 2008). Functional habitat loss also contributes to habitat fragmentation, as greater sage-grouse avoid areas due to human activities, including noise, even though sagebrush remains intact (Blickley et al. 2012)." (SERVICE 2013a)

4. This standard should be changed because in Montana general habitat plays a larger role in sage-grouse conservation than in Wyoming because of the proportion of sage-grouse population occurring in Core Areas. The

following information in support of this statement was obtained from presentations given to the Governor's Greater Sage-Grouse Habitat Advisory Council:

- In Montana, Core Areas only contain approximately 76% of the state's sage-grouse population; while Core Areas in Wyoming protect 84% of the sage-grouse population. Because Core Area stipulations are much more protective of sage-grouse than general habitat stipulations, Wyoming protects a higher percentage of its sage-grouse population through Core Area stipulations than Montana.

- In Montana, approximately 9.6 million acres are designated as Cores Areas and 24 million acres are designated as general habitat (34 million acres total). in Wyoming, about 15 million acres are designated as Core Areas, with 28 million acres designated as general habitat (43 million acres total). Again, because Core Area stipulations are much more protective of sage-grouse than general habitat stipulations, Wyoming protects significantly more sage-grouse habitat with Core Area stipulations than Montana.

- In Montana, public lands (state and federal) make up approximately 29% of the Core Areas and private lands make up 64% of the Core Areas. In Wyoming, this scenario is almost reversed: public ownership makes up about 61% of Core Areas, and private land is about 37% of Core Areas. It is more effective for government agencies to protect sage-grouse on public land, than on private land, because of the limited regulations that can be applied to private land. Consequently, because of land ownership patterns, Wyoming is able to ensure that more sage-grouse habitat is protected than Montana.

- The *Montana Strategy* allows up to 3% of Core Areas to become Special Management Core Areas (SMCA) (about 290,000 acres total). These SMCAs are areas identified within Core Areas where stipulations can be relaxed in the short-term, economic development opportunities can be realized in the near-term, and conservation benefits will hopefully be realized in the long-term. In Wyoming, there is no ability to designate SMCAs. Because SMCAs can be designated in Montana, and these areas may or may not produce long-term conservation benefits to sage-grouse, the *Montana Strategy* has set up a state-specific stipulation that may be a barrier in achieving sage-grouse conservation goals. In addition to delivering long-term rather than short-term conservation, concerns have been raised about Montana's SMCAs causing significant fragmentation of large sagebrush landscapes (see SERVICE 2013b, page C9).

- Given the above-outlined factors, the conservation measures in Core Areas in Montana need to be bolstered by more substantial conservation stipulations in general habitat in order for Montana to potentially reach the overall protections in the current Wyoming strategy. A 1.0-mile NSO in general habitat would qualify as a substantial conservation stipulation for sage-grouse. This statement is backed up by the following comment from the SERVICE on the *Montana Strategy*:

  "We [the SERVICE] agree that the health of general habitat areas is a critical element in the effort to maintain the abundance and distribution of GSG in Montana. Again, discussion on Page 2 of our comment letter provides support for the currently larger proposed NSOs in core habitat and highlights the importance of and requirement for general habitat protection, including NSOs, in the Montana Strategy." (SERVICE 2013b, page C10)

5. And finally, it makes sense to change the general habitat NSO stipulation to a standard that is supported by scientific studies, because it is a stand-alone stipulation: unlike Core Area stipulations, there are no associated density standards or disturbance caps that accompany the general habitat NSO. Therefore, it is important that the general habitat NSO provides defensible conservation protection to sage-grouse as a stand-along stipulation.

MINORITY REPORT SUBMITTED BY:
Janet Ellis, Jay Gore and Carl Wambolt

DATE: 1-24-2014

REFERENCES:

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U.S. Fish & Wildlife Service. 2013b. Montana Draft Greater Sage-Grouse Habitat Conservation Strategy Comments. Letter to Montana Fish, Wildlife & Parks Director Jeff Hagener, December 9, 2013. 27 pp.

Attachment 12
SHPO CRIS
and CRABS
Reports

Big Sky. Big Land. Big History.
Montana
Historical Society

STATE HISTORIC PRESERVATION OFFICE

Cultural Resource Information Systems

CRIS Township, Range, Section Report

Report Date: 07/30/2014

Site #	Twp	Rng	Sec	Qs	Site Type1	Site Type 2	Time Period	Owner	NR Status
24FA0423	7 N	59E	1	NE	Historic Trash Dump	Null	Historic Period	Private	undetermined
24FA0609	7 N	59E	1	NE	Lithic Material Concentration	Null	No Indication of Time	Private	Unresolved
24FA0609	7 N	59E	2	NE	Lithic Material Concentration	Null	No Indication of Time	Private	Unresolved
24FA0691	7 N	59E	2	NE	Historic Homestead/Farmstead	Historic Dug-Out	Historic More Than One Decade	Private	Unresolved
24FA0692	7 N	59E	2	SE	Historic Trash Dump	Null	Historic Period	Private	Unresolved
24FA0382	7 N	59E	5	SW	Historic Railroad	Null	Historic More Than One Decade	Private	CD
24FA0382	7 N	59E	6	comb	Historic Railroad	Null	Historic More Than One Decade	Private	CD
24FA0382	7 N	59E	8	comb	Historic Railroad	Null	Historic More Than One Decade	Private	CD
24FA0223	7 N	59E	9	NW	Historic Vehicular/Foot Bridge	Null	1930-1939	No Data	undetermined
24FA0382	7 N	59E	9	comb	Historic Railroad	Null	Historic More Than One Decade	Private	CD
24FA0237	7 N	59E	10	Comb	Lithic Material Concentration	Firehearths or Roasting Pits, FCR	No Indication of Time	Private	undetermined
24FA0251	7 N	59E	10	SW	Lithic Material Concentration	Firehearths or Roasting Pits, FCR	Prehistoric Late Period	Private	undetermined
24FA0382	7 N	59E	10	comb	Historic Railroad	Null	Historic More Than One Decade	Private	CD
24FA0382	7 N	59E	11	comb	Historic Railroad	Null	Historic More Than One Decade	Private	CD
24FA0718	7 N	59E	12	SW	Historic Hotel/Motel	Null	Historic More Than One Decade	Other	NR Listed
24FA0382	7 N	59E	12	comb	Historic Railroad	Null	Historic More Than One Decade	Private	CD
24FA0382	7 N	59E	13	NE	Historic Railroad	Null	Historic More Than One Decade	Private	CD
24FA0230	7 N	59E	13	NW	Historic Vehicular/Foot Bridge	Null	1930-1939	No Data	Unresolved
24FA1501	7 N	59E	13	SW	Historic Political/Government	Historic Architecture	Historic More Than One Decade	State Owned	NR Listed
24FA0224	7 N	59E	14	NE	Historic Vehicular/Foot Bridge	Null	1930-1939	No Data	undetermined
24FA0316	7 N	59E	14	NW	Lithic Material Concentration	Null	No Indication of Time	Private	undetermined
24FA0317	7 N	59E	15	NE	Lithic Material Concentration	Firehearths or Roasting Pits, FCR	No Indication of Time	Other	undetermined
24FA0339	7 N	59E	15	NE	Firehearths or Roasting Pits, FCR	Lithic Material Concentration	No Indication of Time	No Data	Unresolved
24FA0084	7 N	59E	15	NW	Lithic Material Concentration	Lithic Material Concentration	Prehistoric Middle Period	BLM	undetermined
24FA0251	7 N	59E	15	NW	Lithic Material Concentration	Firehearths or Roasting Pits, FCR	Prehistoric Late Period	Private	undetermined
24FA0760	7 N	59E	16	NE	Historic Irrigation System	Null	Historic Period	Private	Ineligible
24FA0223	7 N	59E	16		Historic Vehicular/Foot Bridge	Null	1930-1939	No Data	undetermined
24FA0250	7 N	59E	21	Comb	Tipi Ring	Surface Stone Quarry	No Indication of Time	Private	undetermined
24FA0361	7 N	59E	24		Historic Homestead/Farmstead	Null	1910-1919	Private	Ineligible
24FA0319	7 N	59E	26	NE	Lithic Material Concentration	Null	No Indication of Time	Private	Ineligible
24FA0318	7 N	59E	26	NE	Historic Homestead/Farmstead	Historic Dug-Out	Historic More Than One Decade	Private	Ineligible
24FA0382	7 N	60E	17	comb	Historic Railroad	Null	Historic More Than One Decade	Private	CD
24FA0382	7 N	60E	18	comb	Historic Railroad	Null	Historic More Than One Decade	Private	CD
24FA0382	7 N	60E	20	NE	Historic Railroad	Null	Historic More Than One Decade	Private	CD
24FA0382	7 N	60E	21	SW	Historic Railroad	Null	Historic More Than One Decade	Private	CD
24FA0382	7 N	60E	27	comb	Historic Railroad	Null	Historic More Than One Decade	Private	CD
24FA0382	7 N	60E	28	comb	Historic Railroad	Null	Historic More Than One Decade	Private	CD
24FA0163	7 N	60E	32	NE	Historic Site	Null	Historic Period	No Data	undetermined
24FA0166	7 N	60E	32	SW	Historic Site	Null	Historic Period	Private	undetermined
24FA0382	7 N	60E	34	NE	Historic Railroad	Null	Historic More Than One Decade	Private	CD
24FA0382	7 N	60E	35	comb	Historic Railroad	Null	Historic More Than One Decade	Private	CD

Township: 7 N Range:59E Section:1

GREER **MAVIS AND JOHN W. GREER**

3 / /2004 ***AN INTENSIVE CULTURAL RESOURCE SURVERY OF THE WILLISTON BASIN INTERSTATE PIPELINE COMPANY, BAKER BOOSTER EXPANSION AREA, FALLON COUNTY MONTANA***

CRABS Document Number: FA 6 26921 Agency Document Number:

Township: 7 N Range:59E Section:1

AABERG **STEPHEN A. AND CHRIS CROFUTT**

12 /1 /1997 ***MID-RIVERS TELEPHONE COOPERATIVE 1997 BAKER AND EKALAKA LINE UPGRADE PROJECT: CLASS III CULTURAL RESOURCE INVENTORY RESULTS, FALLON AND CARTER COUNTIES, MONTANA***

CRABS Document Number: CT 6 19585 Agency Document Number:

Township: 7 N Range:59E Section:1

HOPE **SHANE S**

4 / /2012 ***TRILEAF: VISUAL IMPACT ASSESSMENT FOR A CELLULAR COMMUNICATION TOWER NEAR BAKER, FALLON COUNTY, MONTANA***

CRABS Document Number: FA 6 33597 Agency Document Number: 600562

Township: 7 N Range:59E Section:2

CAMPBELL **JEFF, ET AL.**

1 / /1987 ***FINAL REPORT ON THE CLASS III CULTURAL RESOURCES INVENTORY AND SITE EVALUATION PROGRAM FOR THE PROPOSED, EXXON BAIROIL/DAKOTA CARBON DIOXIDE PIPELINE IN CARTER, FALLON, AND POWDER RIVER COUNTIES, MONTANA (WITH APPENDICES) & HISTORICAL INVESTIGATIONS FOR THE EXXON BAIROIL TO NORTH DAKOTA CO2 PIPELINE IN MONTANA, FINAL REPORT***

CRABS Document Number: CT 2 1798 Agency Document Number:

Township: 7 N Range:59E Section:2

WERMERS **GREG L.**

10 /14 /2003 ***WILLISTON BASIN INTERSTATE PIPELINE CO, EKALAKA, RANCH CREEK, AND GOLVA COMPRESSOR STATIONS AND BAKER LATERAL PIPELINE/RECEIPT STATION, VALVE SET, CLASS III CULTURAL RESOURCES INVENTORY IN MONTANA***

CRABS Document Number: ZZ 6 26382 Agency Document Number: MT-020-03-334

Township: 7 N Range:59E Section:2

GREER **MAVIS AND JOHN W. GREER**

3 / /2004 ***AN INTENSIVE CULTURAL RESOURCE SURVERY OF THE WILLISTON BASIN INTERSTATE PIPELINE COMPANY, BAKER BOOSTER EXPANSION AREA, FALLON COUNTY MONTANA***

CRABS Document Number: FA 6 26921 Agency Document Number:

Township: 7 N Range:59E Section:2

HOPE **SHANE S**

4 / /2012 ***TRILEAF: VISUAL IMPACT ASSESSMENT FOR A CELLULAR COMMUNICATION TOWER NEAR BAKER, FALLON COUNTY, MONTANA***

CRABS Document Number: FA 6 33597 Agency Document Number: 600562

Township: 7 N Range:59E Section:3

WERMERS GREG L.

10 /14/2003 ***WILLISTON BASIN INTERSTATE PIPELINE CO, EKALAKA, RANCH CREEK, AND GOLVA COMPRESSOR STATIONS AND BAKER LATERAL PIPELINE/RECEIPT STATION, VALVE SET, CLASS III CULTURAL RESOURCES INVENTORY IN MONTANA***

CRABS Document Number: ZZ 6 26382 Agency Document Number: MT-020-03-334

Township: 7 N Range:59E Section:4

WERMERS GREG L.

10 /14/2003 ***WILLISTON BASIN INTERSTATE PIPELINE CO, EKALAKA, RANCH CREEK, AND GOLVA COMPRESSOR STATIONS AND BAKER LATERAL PIPELINE/RECEIPT STATION, VALVE SET, CLASS III CULTURAL RESOURCES INVENTORY IN MONTANA***

CRABS Document Number: ZZ 6 26382 Agency Document Number: MT-020-03-334

Township: 7 N Range:59E Section:4

MELTON DOUG

6 /24/2004 ***CULTURAL RESOURCES INVENTORY OF THE VARNER GASLINE IN FALLON COUNTY, MONTANA***

CRABS Document Number: FA 2 27280 Agency Document Number: MT-020-04-384

Township: 7 N Range:59E Section:4

HERBEL BRIAN C. ET. AL.

10 / /2011 ***CLASS III CULTURAL RESOURCE INVENTORY FOR THE MONTANA PORTION OF THE PROPOSED BAKKEN PIPELINE PROJECT, RICHLAND, WIBAUX, FALLON AND CARTER COUNTIES, MONTANA***

CRABS Document Number: ZZ 6 33447 Agency Document Number:

Township: 7 N Range:59E Section:4

HERBEL BRIAN ET. AL.

1 / /2012 ***CLASS III CULTURAL RESOURCE INVENTORY ADDENDUM FOR THE MONTANA PORTION OF THE PROPOSED BAKKEN PIPELINE PROJECT, RICHLAND, WIBAUX, FALLON, AND CARTER COUNTIES, MONTANA***

CRABS Document Number: ZZ 6 33611 Agency Document Number:

Township: 7 N Range:59E Section:4

HERBEL BRIAN ET. AL.

5 /1 /2012 ***CLASS III CULTURAL RESOURCE INVENTORY ADDENDUM 2 FOR THE MONTANA PORTION OF THE PROPOSED BAKKEN PIPELINE PROJECT, RICHLAND, WIBAUX, FALLON AND CARTER COUNTIES, MONTANA***

CRABS Document Number: ZZ 6 33771 Agency Document Number:

Township: 7 N Range:59E Section:5

LAHREN LARRY A., ET AL.

8 / /1989 ***CLASS III INTENSIVE CULTURAL RESOURCE EVALUATION OF VARIOUS BURIED TELEPHONE LINE CORRIDORS IN THE COUNTIES OF CARTER, CUSTER, FALLON, AND PRAIRIE IN SOUTHEASTERN MONTANA (WITH SEP 22, 1989 ADDENDUM 1; OCT 23, 1989 ADDENDUM 2 ATTACHED; AND REVISED NOVEMBER 1989 ADDENDUM 1)***

CRABS Document Number: ZZ 6 10822 Agency Document Number:

Township: 7 N Range: 59E Section: 5

BERG CARYN M., ET AL

11 /7 /2008 ***CLASS III CULTURAL RESOURCES SURVEY FOR THE STEELE CITY SEGMENT IN MONTANA OF THE KEYSTONE XL PROJECT, DAWSON, FALLON, MC CONE, PHILLIPS, PRAIRIE AND VALLEY COUNTY, MONTANA***

CRABS Document Number: ZZ 6 31897 Agency Document Number:

Township: 7 N Range: 59E Section: 5

HERBEL BRIAN C. ET. AL.

10 / /2011 ***CLASS III CULTURAL RESOURCE INVENTORY FOR THE MONTANA PORTION OF THE PROPOSED BAKKEN PIPELINE PROJECT, RICHLAND, WIBAUX, FALLON AND CARTER COUNTIES, MONTANA***

CRABS Document Number: ZZ 6 33447 Agency Document Number:

Township: 7 N Range: 59E Section: 6

BERG CARYN M., ET AL

11 /7 /2008 ***CLASS III CULTURAL RESOURCES SURVEY FOR THE STEELE CITY SEGMENT IN MONTANA OF THE KEYSTONE XL PROJECT, DAWSON, FALLON, MC CONE, PHILLIPS, PRAIRIE AND VALLEY COUNTY, MONTANA***

CRABS Document Number: ZZ 6 31897 Agency Document Number:

Township: 7 N Range: 59E Section: 7

LAHREN LARRY A., ET AL.

8 / /1989 ***CLASS III INTENSIVE CULTURAL RESOURCE EVALUATION OF VARIOUS BURIED TELEPHONE LINE CORRIDORS IN THE COUNTIES OF CARTER, CUSTER, FALLON, AND PRAIRIE IN SOUTHEASTERN MONTANA (WITH SEP 22, 1989 ADDENDUM 1; OCT 23, 1989 ADDENDUM 2 ATTACHED; AND REVISED NOVEMBER 1989 ADDENDUM 1)***

CRABS Document Number: ZZ 6 10822 Agency Document Number:

Township: 7 N Range: 59E Section: 7

NEWBERRY GREGORY S.

9 /3 /1991 ***PLEVNA - BAKER PROJECT***

CRABS Document Number: FA 4 12807 Agency Document Number: F 2-2(4)70

Township: 7 N Range: 59E Section: 8

NEWBERRY GREGORY S.

9 /3 /1991 ***PLEVNA - BAKER PROJECT***

CRABS Document Number: FA 4 12807 Agency Document Number: F 2-2(4)70

Township: 7 N Range: 59E Section: 8

LAHREN LARRY A., ET AL.

8 / /1989 ***CLASS III INTENSIVE CULTURAL RESOURCE EVALUATION OF VARIOUS BURIED TELEPHONE LINE CORRIDORS IN THE COUNTIES OF CARTER, CUSTER, FALLON, AND PRAIRIE IN SOUTHEASTERN MONTANA (WITH SEP 22, 1989 ADDENDUM 1; OCT 23, 1989 ADDENDUM 2 ATTACHED; AND REVISED NOVEMBER 1989 ADDENDUM 1)***

CRABS Document Number: ZZ 6 10822 Agency Document Number:

Township: 7 N Range: 59E Section: 8

BERG CARYN M., ET AL

11 /7 /2008 ***CLASS III CULTURAL RESOURCES SURVEY FOR THE STEELE CITY SEGMENT IN MONTANA OF THE KEYSTONE XL PROJECT, DAWSON, FALLON, MC CONE, PHILLIPS, PRAIRIE AND VALLEY COUNTY, MONTANA***

CRABS Document Number: ZZ 6 31897 Agency Document Number:

Township: 7 N Range: 59E Section: 8

POLLOCK KATHERINE H.

4 /18 /1997 ***BECKER BORROW SOURCE BOHER WEST***

CRABS Document Number: FA 4 18834 Agency Document Number:

Township: 7 N Range: 59E Section: 8

HERBEL BRIAN C. ET. AL.

10 / /2011 ***CLASS III CULTURAL RESOURCE INVENTORY FOR THE MONTANA PORTION OF THE PROPOSED BAKKEN PIPELINE PROJECT, RICHLAND, WIBAUX, FALLON AND CARTER COUNTIES, MONTANA***

CRABS Document Number: ZZ 6 33447 Agency Document Number:

Township: 7 N Range: 59E Section: 9

LAHREN LARRY A., ET AL.

8 / /1989 ***CLASS III INTENSIVE CULTURAL RESOURCE EVALUATION OF VARIOUS BURIED TELEPHONE LINE CORRIDORS IN THE COUNTIES OF CARTER, CUSTER, FALLON, AND PRAIRIE IN SOUTHEASTERN MONTANA (WITH SEP 22, 1989 ADDENDUM 1; OCT 23, 1989 ADDENDUM 2 ATTACHED; AND REVISED NOVEMBER 1989 ADDENDUM 1)***

CRABS Document Number: ZZ 6 10822 Agency Document Number:

Township: 7 N Range: 59E Section: 9

LAHREN LARRY A., ET AL.

8 / /1989 ***CLASS III INTENSIVE CULTURAL RESOURCE EVALUATION OF VARIOUS BURIED TELEPHONE LINE CORRIDORS IN THE COUNTIES OF CARTER, CUSTER, FALLON, AND PRAIRIE IN SOUTHEASTERN MONTANA (WITH SEP 22, 1989 ADDENDUM 1; OCT 23, 1989 ADDENDUM 2 ATTACHED; AND REVISED NOVEMBER 1989 ADDENDUM 1)***

CRABS Document Number: ZZ 6 10822 Agency Document Number:

Township: 7 N Range: 59E Section: 9

NEWBERRY GREGORY S.

9 /3 /1991 ***PLEVNA - BAKER PROJECT***

CRABS Document Number: FA 4 12807 Agency Document Number: F 2-2(4)70

Township: 7 N Range: 59E Section: 9

BERG CARYN M., ET AL

11 /7 /2008 ***CLASS III CULTURAL RESOURCES SURVEY FOR THE STEELE CITY SEGMENT IN MONTANA OF THE KEYSTONE XL PROJECT, DAWSON, FALLON, MC CONE, PHILLIPS, PRAIRIE AND VALLEY COUNTY, MONTANA***

CRABS Document Number: ZZ 6 31897 Agency Document Number:

Township: 7 N Range:59E Section:9

BERG CARYN M., ET AL

11 /7 /2008 *CLASS III CULTURAL RESOURCES SURVEY FOR THE STEELE CITY SEGMENT IN MONTANA OF THE KEYSTONE XL PROJECT, DAWSON, FALLON, MC CONE, PHILLIPS, PRAIRIE AND VALLEY COUNTY, MONTANA*

CRABS Document Number: ZZ 6 31897 Agency Document Number:

Township: 7 N Range:59E Section:9

BAER SARAH, ET. AL.

4 /23/2010 *CLASS III CULTURAL RESOURCE SURVEY FOR THE STEELE CITY SEGMENT IN MONTANA OF THE KEYSTONE XL PROJECT, DAWSON, FALLON, MCCONE, PHILLIPS, PRAIRIE AND VALLEY COUNTIES, MONTANA - ADDENDUM 3: ADDITIONAL FIELD WORK*

CRABS Document Number: ZZ 6 32535 Agency Document Number:

Township: 7 N Range:59E Section:9

HERBEL BRIAN C. ET. AL.

10 / /2011 *CLASS III CULTURAL RESOURCE INVENTORY FOR THE MONTANA PORTION OF THE PROPOSED BAKKEN PIPELINE PROJECT, RICHLAND, WIBAUX, FALLON AND CARTER COUNTIES, MONTANA*

CRABS Document Number: ZZ 6 33447 Agency Document Number:

Township: 7 N Range:59E Section:10

CAMPBELL JEFF, ET AL.

1 / /1987 *FINAL REPORT ON THE CLASS III CULTURAL RESOURCES INVENTORY AND SITE EVALUATION PROGRAM FOR THE PROPOSED, EXXON BAIROIL/DAKOTA CARBON DIOXIDE PIPELINE IN CARTER, FALLON, AND POWDER RIVER COUNTIES, MONTANA (WITH APPENDICES) & HISTORICAL INVESTIGATIONS FOR THE EXXON BAIROIL TO NORTH DAKOTA CO2 PIPELINE IN MONTANA, FINAL REPORT*

CRABS Document Number: CT 2 1798 Agency Document Number:

Township: 7 N Range:59E Section:10

LAHREN LARRY A., ET AL.

8 / /1989 *CLASS III INTENSIVE CULTURAL RESOURCE EVALUATION OF VARIOUS BURIED TELEPHONE LINE CORRIDORS IN THE COUNTIES OF CARTER, CUSTER, FALLON, AND PRAIRIE IN SOUTHEASTERN MONTANA (WITH SEP 22, 1989 ADDENDUM 1; OCT 23, 1989 ADDENDUM 2 ATTACHED; AND REVISED NOVEMBER 1989 ADDENDUM 1)*

CRABS Document Number: ZZ 6 10822 Agency Document Number:

Township: 7 N Range:59E Section:10

NEWBERRY GREGORY S.

9 /3 /1991 *PLEVNA - BAKER PROJECT*

CRABS Document Number: FA 4 12807 Agency Document Number: F 2-2(4)70

Township: 7 N Range:59E Section:10

BERG CARYN M., ET AL

11 /7 /2008 *CLASS III CULTURAL RESOURCES SURVEY FOR THE STEELE CITY SEGMENT IN MONTANA OF THE KEYSTONE XL PROJECT, DAWSON, FALLON, MC CONE, PHILLIPS, PRAIRIE AND VALLEY COUNTY, MONTANA*

CRABS Document Number: ZZ 6 31897 Agency Document Number:

Township: 7 N Range:59E Section:10

HERBEL BRIAN C. ET. AL.

10 / /2011 ***CLASS III CULTURAL RESOURCE INVENTORY FOR THE MONTANA PORTION OF THE PROPOSED BAKKEN PIPELINE PROJECT, RICHLAND, WIBAUX, FALLON AND CARTER COUNTIES, MONTANA***

CRABS Document Number: ZZ 6 33447 Agency Document Number:

Township: 7 N Range:59E Section:11

CAMPBELL JEFF, ET AL.

1 / /1987 ***FINAL REPORT ON THE CLASS III CULTURAL RESOURCES INVENTORY AND SITE EVALUATION PROGRAM FOR THE PROPOSED, EXXON BAIROIL/DAKOTA CARBON DIOXIDE PIPELINE IN CARTER, FALLON, AND POWDER RIVER COUNTIES, MONTANA (WITH APPENDICES) & HISTORICAL INVESTIGATIONS FOR THE EXXON BAIROIL TO NORTH DAKOTA CO2 PIPELINE IN MONTANA, FINAL REPORT***

CRABS Document Number: CT 2 1798 Agency Document Number:

Township: 7 N Range:59E Section:11

LAHREN LARRY A., ET AL.

8 / /1989 ***CLASS III INTENSIVE CULTURAL RESOURCE EVALUATION OF VARIOUS BURIED TELEPHONE LINE CORRIDORS IN THE COUNTIES OF CARTER, CUSTER, FALLON, AND PRAIRIE IN SOUTHEASTERN MONTANA (WITH SEP 22, 1989 ADDENDUM 1; OCT 23, 1989 ADDENDUM 2 ATTACHED; AND REVISED NOVEMBER 1989 ADDENDUM 1)***

CRABS Document Number: ZZ 6 10822 Agency Document Number:

Township: 7 N Range:59E Section:11

BERG CARYN M., ET AL

11 /7 /2008 ***CLASS III CULTURAL RESOURCES SURVEY FOR THE STEELE CITY SEGMENT IN MONTANA OF THE KEYSTONE XL PROJECT, DAWSON, FALLON, MC CONE, PHILLIPS, PRAIRIE AND VALLEY COUNTY, MONTANA***

CRABS Document Number: ZZ 6 31897 Agency Document Number:

Township: 7 N Range:59E Section:11

HOPE SHANE S

4 / /2012 ***TRILEAF: VISUAL IMPACT ASSESSMENT FOR A CELLULAR COMMUNICATION TOWER NEAR BAKER, FALLON COUNTY, MONTANA***

CRABS Document Number: FA 6 33597 Agency Document Number: 600562

Township: 7 N Range:59E Section:12

AABERG STEPHEN A. AND CHRIS CROFUTT

12 /1 /1997 ***MID-RIVERS TELEPHONE COOPERATIVE 1997 BAKER AND EKALAKA LINE UPGRADE PROJECT: CLASS III CULTURAL RESOURCE INVENTORY RESULTS, FALLON AND CARTER COUNTIES, MONTANA***

CRABS Document Number: CT 6 19585 Agency Document Number:

Township: 7 N Range:59E Section:12

HOPE SHANE S

4 / /2012 ***TRILEAF: VISUAL IMPACT ASSESSMENT FOR A CELLULAR COMMUNICATION TOWER NEAR BAKER, FALLON COUNTY, MONTANA***

CRABS Document Number: FA 6 33597 Agency Document Number: 600562

Township: 7 N Range:59E Section:12

HOFFECKER JOHN F.

1 /21/2014 ***CLASS III CULTURAL RESOURCES INVENTORY OF THE MT001 BAKER MT WIRELESS ANTENNA TOWER, FALLON COUNTY, MONTANA***

CRABS Document Number: FA 6 36652 Agency Document Number:

Township: 7 N Range:59E Section:13

CAYWOOD JANENE M., ET AL.

6 / /2002 ***REPORT OF A PHASE III CULTURAL RESOURCES INVENTORY OF THE BAKER-SOUTH PROJECT CORRIDOR ALONG A POSTION OF US HIGHWAY 7 IN FALLON COUNTY MONTANA***

CRABS Document Number: FA 4 25095 Agency Document Number: STPP 27-2(13)27 CONTROL NO.4052

Township: 7 N Range:59E Section:13

MORRISON JOHN G

5 /20/2003 ***BAKER AIRPORT IMPROVEMENTS: A CLASS III CULTURAL RESOURCE INVENTORY, FALLON COUNTY, MONTANA***

CRABS Document Number: FA 6 26057 Agency Document Number:

Township: 7 N Range:59E Section:13

AABERG STEPHEN A. AND CHRIS CROFUTT

12 /1 /1997 ***MID-RIVERS TELEPHONE COOPERATIVE 1997 BAKER AND EKALAKA LINE UPGRADE PROJECT: CLASS III CULTURAL RESOURCE INVENTORY RESULTS, FALLON AND CARTER COUNTIES, MONTANA***

CRABS Document Number: CT 6 19585 Agency Document Number:

Township: 7 N Range:59E Section:14

LAHREN LARRY A., ET AL.

8 / /1989 ***CLASS III INTENSIVE CULTURAL RESOURCE EVALUATION OF VARIOUS BURIED TELEPHONE LINE CORRIDORS IN THE COUNTIES OF CARTER, CUSTER, FALLON, AND PRAIRIE IN SOUTHEASTERN MONTANA (WITH SEP 22, 1989 ADDENDUM 1; OCT 23, 1989 ADDENDUM 2 ATTACHED; AND REVISED NOVEMBER 1989 ADDENDUM 1)***

CRABS Document Number: ZZ 6 10822 Agency Document Number:

Township: 7 N Range:59E Section:14

LAHREN LARRY A., ET AL.

8 / /1989 ***CLASS III INTENSIVE CULTURAL RESOURCE EVALUATION OF VARIOUS BURIED TELEPHONE LINE CORRIDORS IN THE COUNTIES OF CARTER, CUSTER, FALLON, AND PRAIRIE IN SOUTHEASTERN MONTANA (WITH SEP 22, 1989 ADDENDUM 1; OCT 23, 1989 ADDENDUM 2 ATTACHED; AND REVISED NOVEMBER 1989 ADDENDUM 1)***

CRABS Document Number: ZZ 6 10822 Agency Document Number:

Township: 7 N Range:59E Section:14

NEWBERRY GREGORY S.

9 /3 /1991 ***PLEVNA - BAKER PROJECT***

CRABS Document Number: FA 4 12807 Agency Document Number: F 2-2(4)70

Township: 7 N Range:59E Section:14

BAER SARAH, ET. AL.

4 /23/2010 *CLASS III CULTURAL RESOURCE SURVEY FOR THE STEELE CITY SEGMENT IN MONTANA OF THE KEYSTONE XL PROJECT, DAWSON, FALLON, MCCONE, PHILLIPS, PRAIRIE AND VALLEY COUNTIES, MONTANA - ADDENDUM 3: ADDITIONAL FIELD WORK*

CRABS Document Number: ZZ 6 32535 Agency Document Number:

Township: 7 N Range:59E Section:15

CAMPBELL JEFF, ET AL.

1 / /1987 *FINAL REPORT ON THE CLASS III CULTURAL RESOURCES INVENTORY AND SITE EVALUATION PROGRAM FOR THE PROPOSED, EXXON BAIROIL/DAKOTA CARBON DIOXIDE PIPELINE IN CARTER, FALLON, AND POWDER RIVER COUNTIES, MONTANA (WITH APPENDICES) & HISTORICAL INVESTIGATIONS FOR THE EXXON BAIROIL TO NORTH DAKOTA CO2 PIPELINE IN MONTANA, FINAL REPORT*

CRABS Document Number: CT 2 1798 Agency Document Number:

Township: 7 N Range:59E Section:15

FRALEY DAVID

5 /11/1982 *BAKER SECTION LAND SALE*

CRABS Document Number: FA 2 2529 Agency Document Number: 724

Township: 7 N Range:59E Section:15

LAHREN LARRY A., ET AL.

8 / /1989 *CLASS III INTENSIVE CULTURAL RESOURCE EVALUATION OF VARIOUS BURIED TELEPHONE LINE CORRIDORS IN THE COUNTIES OF CARTER, CUSTER, FALLON, AND PRAIRIE IN SOUTHEASTERN MONTANA (WITH SEP 22, 1989 ADDENDUM 1; OCT 23, 1989 ADDENDUM 2 ATTACHED; AND REVISED NOVEMBER 1989 ADDENDUM 1)*

CRABS Document Number: ZZ 6 10822 Agency Document Number:

Township: 7 N Range:59E Section:15

LAHREN LARRY A., ET AL.

8 / /1989 *CLASS III INTENSIVE CULTURAL RESOURCE EVALUATION OF VARIOUS BURIED TELEPHONE LINE CORRIDORS IN THE COUNTIES OF CARTER, CUSTER, FALLON, AND PRAIRIE IN SOUTHEASTERN MONTANA (WITH SEP 22, 1989 ADDENDUM 1; OCT 23, 1989 ADDENDUM 2 ATTACHED; AND REVISED NOVEMBER 1989 ADDENDUM 1)*

CRABS Document Number: ZZ 6 10822 Agency Document Number:

Township: 7 N Range:59E Section:15

NEWBERRY GREGORY S.

9 /3 /1991 *PLEVNA - BAKER PROJECT*

CRABS Document Number: FA 4 12807 Agency Document Number: F 2-2(4)70

Township: 7 N Range:59E Section:15

VANDER STEEN KENNETH F., ET AL.

9 /27/1993 *EVALUATION OF 24FA339 FALLON COUNTY MONTANA*

CRABS Document Number: FA 4 15487 Agency Document Number:

Township: 7 N Range: 59E Section: 15

BERG CARYN M., ET AL

11 /7 /2008 ***CLASS III CULTURAL RESOURCES SURVEY FOR THE STEELE CITY SEGMENT IN MONTANA OF THE KEYSTONE XL PROJECT, DAWSON, FALLON, MC CONE, PHILLIPS, PRAIRIE AND VALLEY COUNTY, MONTANA***

CRABS Document Number: ZZ 6 31897 Agency Document Number:

Township: 7 N Range: 59E Section: 15

BAER SARAH, ET. AL.

4 /23 /2010 ***CLASS III CULTURAL RESOURCE SURVEY FOR THE STEELE CITY SEGMENT IN MONTANA OF THE KEYSTONE XL PROJECT, DAWSON, FALLON, MCCONE, PHILLIPS, PRAIRIE AND VALLEY COUNTIES, MONTANA - ADDENDUM 3: ADDITIONAL FIELD WORK***

CRABS Document Number: ZZ 6 32535 Agency Document Number:

Township: 7 N Range: 59E Section: 16

NEWBERRY GREGORY S.

9 /3 /1991 ***PLEVNA - BAKER PROJECT***

CRABS Document Number: FA 4 12807 Agency Document Number: F 2-2(4)70

Township: 7 N Range: 59E Section: 16

LAHREN LARRY A., ET AL.

8 / /1989 ***CLASS III INTENSIVE CULTURAL RESOURCE EVALUATION OF VARIOUS BURIED TELEPHONE LINE CORRIDORS IN THE COUNTIES OF CARTER, CUSTER, FALLON, AND PRAIRIE IN SOUTHEASTERN MONTANA (WITH SEP 22, 1989 ADDENDUM 1; OCT 23, 1989 ADDENDUM 2 ATTACHED; AND REVISED NOVEMBER 1989 ADDENDUM 1)***

CRABS Document Number: ZZ 6 10822 Agency Document Number:

Township: 7 N Range: 59E Section: 16

BERG CARYN M., ET AL

11 /7 /2008 ***CLASS III CULTURAL RESOURCES SURVEY FOR THE STEELE CITY SEGMENT IN MONTANA OF THE KEYSTONE XL PROJECT, DAWSON, FALLON, MC CONE, PHILLIPS, PRAIRIE AND VALLEY COUNTY, MONTANA***

CRABS Document Number: ZZ 6 31897 Agency Document Number:

Township: 7 N Range: 59E Section: 16

BAER SARAH, ET. AL.

4 /23 /2010 ***CLASS III CULTURAL RESOURCE SURVEY FOR THE STEELE CITY SEGMENT IN MONTANA OF THE KEYSTONE XL PROJECT, DAWSON, FALLON, MCCONE, PHILLIPS, PRAIRIE AND VALLEY COUNTIES, MONTANA - ADDENDUM 3: ADDITIONAL FIELD WORK***

CRABS Document Number: ZZ 6 32535 Agency Document Number:

Township: 7 N Range: 59E Section: 17

PETERSEN LYNELLE, ET AL.

9 / /2002 ***CLASS III CULTURAL RESOURCE SURVERY IN 2001 AND 2002 FOR THE PROPOSED GRASSLANDS PIPELINE IN MONTANA VOLUME I TECHNICAL REPORT IN CARTER, FALLON AND WIBAUX COUNTIES***

CRABS Document Number: CT 6 25189 Agency Document Number:

Township: 7 N Range: 59E Section: 17

NEWBERRY GREGORY S.

9 /3 /1991 ***PLEVNA - BAKER PROJECT***

CRABS Document Number: FA 4 12807 Agency Document Number: F 2-2(4)70

Township: 7 N Range: 59E Section: 17

BALES JENNIFER, R

11 /19 /2004 ***A CLASS III CULTURAL RESOURCE INVENTORY OF THE BRIDGER PIPELINE, LLC, IN FALLON COUNTY, MONTANA***

CRABS Document Number: FA 2 27756 Agency Document Number: MT-020-05-55

Township: 7 N Range: 59E Section: 17

HERBEL BRIAN C. ET. AL.

10 / /2011 ***CLASS III CULTURAL RESOURCE INVENTORY FOR THE MONTANA PORTION OF THE PROPOSED BAKKEN PIPELINE PROJECT, RICHLAND, WIBAUX, FALLON AND CARTER COUNTIES, MONTANA***

CRABS Document Number: ZZ 6 33447 Agency Document Number:

Township: 7 N Range: 59E Section: 18

NEWBERRY GREGORY S.

9 /3 /1991 ***PLEVNA - BAKER PROJECT***

CRABS Document Number: FA 4 12807 Agency Document Number: F 2-2(4)70

Township: 7 N Range: 59E Section: 18

PETERSEN LYNELLE, ET AL.

9 / /2002 ***CLASS III CULTURAL RESOURCE SURVERY IN 2001 AND 2002 FOR THE PROPOSED GRASSLANDS PIPELINE IN MONTANA VOLUME I TECHNICAL REPORT IN CARTER, FALLON AND WIBAUX COUNTIES***

CRABS Document Number: CT 6 25189 Agency Document Number:

Township: 7 N Range: 59E Section: 18

MCGINNIS TIMOTHY P.

10 /4 /1979 ***BAKER MUNICIPAL AIRPORT***

CRABS Document Number: FA 6 14060 Agency Document Number:

Township: 7 N Range: 59E Section: 19

MCGINNIS TIMOTHY P.

10 /4 /1979 ***BAKER MUNICIPAL AIRPORT***

CRABS Document Number: FA 6 14060 Agency Document Number:

Township: 7 N Range: 59E Section: 20

PETERSEN LYNELLE, ET AL.

9 / /2002 ***CLASS III CULTURAL RESOURCE SURVERY IN 2001 AND 2002 FOR THE PROPOSED GRASSLANDS PIPELINE IN MONTANA VOLUME I TECHNICAL REPORT IN CARTER, FALLON AND WIBAUX COUNTIES***

CRABS Document Number: CT 6 25189 Agency Document Number:

Township: 7 N Range: 59E Section: 20

BALES JENNIFER, R

11 /19/2004 ***A CLASS III CULTURAL RESOURCE INVENTORY OF THE BRIDGER PIPELINE, LLC, IN FALLON COUNTY, MONTANA***

CRABS Document Number: FA 2 27756 Agency Document Number: MT-020-05-55

Township: 7 N Range: 59E Section: 20

HERBEL BRIAN C. ET. AL.

10 / /2011 ***CLASS III CULTURAL RESOURCE INVENTORY FOR THE MONTANA PORTION OF THE PROPOSED BAKKEN PIPELINE PROJECT, RICHLAND, WIBAUX, FALLON AND CARTER COUNTIES, MONTANA***

CRABS Document Number: ZZ 6 33447 Agency Document Number:

Township: 7 N Range: 59E Section: 21

PETERSEN LYNELLE, ET AL.

9 / /2002 ***CLASS III CULTURAL RESOURCE SURVERY IN 2001 AND 2002 FOR THE PROPOSED GRASSLANDS PIPELINE IN MONTANA VOLUME I TECHNICAL REPORT IN CARTER, FALLON AND WIBAUX COUNTIES***

CRABS Document Number: CT 6 25189 Agency Document Number:

Township: 7 N Range: 59E Section: 21

BERG CARYN M., ET AL

11 /7 /2008 ***CLASS III CULTURAL RESOURCES SURVEY FOR THE STEELE CITY SEGMENT IN MONTANA OF THE KEYSTONE XL PROJECT, DAWSON, FALLON, MC CONE, PHILLIPS, PRAIRIE AND VALLEY COUNTY, MONTANA***

CRABS Document Number: ZZ 6 31897 Agency Document Number:

Township: 7 N Range: 59E Section: 21

HERBEL BRIAN C. ET. AL.

10 / /2011 ***CLASS III CULTURAL RESOURCE INVENTORY FOR THE MONTANA PORTION OF THE PROPOSED BAKKEN PIPELINE PROJECT, RICHLAND, WIBAUX, FALLON AND CARTER COUNTIES, MONTANA***

CRABS Document Number: ZZ 6 33447 Agency Document Number:

Township: 7 N Range: 59E Section: 22

CAMPBELL JEFF, ET AL.

1 / /1987 ***FINAL REPORT ON THE CLASS III CULTURAL RESOURCES INVENTORY AND SITE EVALUATION PROGRAM FOR THE PROPOSED, EXXON BAIROIL/DAKOTA CARBON DIOXIDE PIPELINE IN CARTER, FALLON, AND POWDER RIVER COUNTIES, MONTANA (WITH APPENDICES) & HISTORICAL INVESTIGATIONS FOR THE EXXON BAIROIL TO NORTH DAKOTA CO2 PIPELINE IN MONTANA, FINAL REPORT***

CRABS Document Number: CT 2 1798 Agency Document Number:

Township: 7 N Range: 59E Section: 22

BOLSTAD ANN E.

6 /21/1990 ***FALLON COUNTY ROAD IMPROVEMENT***

CRABS Document Number: FA 2 11103 Agency Document Number: MT-024-90-45

Township: 7 N Range: 59E Section: 22

BERG CARYN M., ET AL

11 /7 /2008 *CLASS III CULTURAL RESOURCES SURVEY FOR THE STEELE CITY SEGMENT IN MONTANA OF THE KEYSTONE XL PROJECT, DAWSON, FALLON, MC CONE, PHILLIPS, PRAIRIE AND VALLEY COUNTY, MONTANA*

CRABS Document Number: ZZ 6 31897 Agency Document Number:

Township: 7 N Range: 59E Section: 22

HERBEL BRIAN C. ET. AL.

10 / /2011 *CLASS III CULTURAL RESOURCE INVENTORY FOR THE MONTANA PORTION OF THE PROPOSED BAKKEN PIPELINE PROJECT, RICHLAND, WIBAUX, FALLON AND CARTER COUNTIES, MONTANA*

CRABS Document Number: ZZ 6 33447 Agency Document Number:

Township: 7 N Range: 59E Section: 22

KNAUSS GEORGIA E. & LORI S. BROWNE

10 /1 /2008 *PALEONTOLOGICAL ASSESSMENT FOR BLM LANDS ON THE STEELE CITY SEGMENT IN MONTANA OF THE KEYSTONE XL PIPELINE PROJECT*

CRABS Document Number: ZZ 2 34046 Agency Document Number: 97961

Township: 7 N Range: 59E Section: 23

LAHREN LARRY A., ET AL.

8 / /1989 *CLASS III INTENSIVE CULTURAL RESOURCE EVALUATION OF VARIOUS BURIED TELEPHONE LINE CORRIDORS IN THE COUNTIES OF CARTER, CUSTER, FALLON, AND PRAIRIE IN SOUTHEASTERN MONTANA (WITH SEP 22, 1989 ADDENDUM 1; OCT 23, 1989 ADDENDUM 2 ATTACHED; AND REVISED NOVEMBER 1989 ADDENDUM 1)*

CRABS Document Number: ZZ 6 10822 Agency Document Number:

Township: 7 N Range: 59E Section: 24

CAYWOOD JANENE M., ET AL.

6 / /2002 *REPORT OF A PHASE III CULTURAL RESOURCES INVENTORY OF THE BAKER-SOUTH PROJECT CORRIDOR ALONG A POSTION OF US HIGHWAY 7 IN FALLON COUNTY MONTANA*

CRABS Document Number: FA 4 25095 Agency Document Number: STPP 27-2(13)27 CONTROL NO.4052

Township: 7 N Range: 59E Section: 24

LAHREN LARRY A., ET AL.

8 / /1989 *CLASS III INTENSIVE CULTURAL RESOURCE EVALUATION OF VARIOUS BURIED TELEPHONE LINE CORRIDORS IN THE COUNTIES OF CARTER, CUSTER, FALLON, AND PRAIRIE IN SOUTHEASTERN MONTANA (WITH SEP 22, 1989 ADDENDUM 1; OCT 23, 1989 ADDENDUM 2 ATTACHED; AND REVISED NOVEMBER 1989 ADDENDUM 1)*

CRABS Document Number: ZZ 6 10822 Agency Document Number:

Township: 7 N Range: 59E Section: 24

MORRISON JOHN G

5 /20 /2003 *BAKER AIRPORT IMPROVEMENTS: A CLASS III CULTURAL RESOURCE INVENTORY, FALLON COUNTY, MONTANA*

CRABS Document Number: FA 6 26057 Agency Document Number:

Township: 7 N Range: 59E Section: 25

CAYWOOD JANENE M., ET AL.

6 / /2002 *REPORT OF A PHASE III CULTURAL RESOURCES INVENTORY OF THE BAKER-SOUTH PROJECT CORRIDOR ALONG A POSTION OF US HIGHWAY 7 IN FALLON COUNTY MONTANA*

CRABS Document Number: FA 4 25095 Agency Document Number: STPP 27-2(13)27 CONTROL NO.4052

Township: 7 N Range: 59E Section: 26

CROSSLAND NICOLE, ET. AL.

9 /23/2010 *A CLASS III CULTURAL RESOURCE SURVEY FOR THE STEELE CITY SEGMENT IN MONTANA OF THE KEYSTONE XL PROJECT, DAWSON, FALLON, MCCONE, PHILLIPS, PRAIRIE, AND VALLEY COUNTIES, MONTANA - ADDENDUM 5: ADDITIONAL FIELD WORK*

CRABS Document Number: ZZ 6 32536 Agency Document Number:

Township: 7 N Range: 59E Section: 26

BERG CARYN M., ET AL

11 /7 /2008 *CLASS III CULTURAL RESOURCES SURVEY FOR THE STEELE CITY SEGMENT IN MONTANA OF THE KEYSTONE XL PROJECT, DAWSON, FALLON, MC CONE, PHILLIPS, PRAIRIE AND VALLEY COUNTY, MONTANA*

CRABS Document Number: ZZ 6 31897 Agency Document Number:

Township: 7 N Range: 59E Section: 26

CAYWOOD JANENE M., ET AL.

6 / /2002 *REPORT OF A PHASE III CULTURAL RESOURCES INVENTORY OF THE BAKER-SOUTH PROJECT CORRIDOR ALONG A POSTION OF US HIGHWAY 7 IN FALLON COUNTY MONTANA*

CRABS Document Number: FA 4 25095 Agency Document Number: STPP 27-2(13)27 CONTROL NO.4052

Township: 7 N Range: 59E Section: 26

LAHREN LARRY A., ET AL.

8 / /1989 *CLASS III INTENSIVE CULTURAL RESOURCE EVALUATION OF VARIOUS BURIED TELEPHONE LINE CORRIDORS IN THE COUNTIES OF CARTER, CUSTER, FALLON, AND PRAIRIE IN SOUTHEASTERN MONTANA (WITH SEP 22, 1989 ADDENDUM 1; OCT 23, 1989 ADDENDUM 2 ATTACHED; AND REVISED NOVEMBER 1989 ADDENDUM 1)*

CRABS Document Number: ZZ 6 10822 Agency Document Number:

Township: 7 N Range: 59E Section: 27

HERBEL BRIAN C. ET. AL.

10 / /2011 *CLASS III CULTURAL RESOURCE INVENTORY FOR THE MONTANA PORTION OF THE PROPOSED BAKKEN PIPELINE PROJECT, RICHLAND, WIBAUX, FALLON AND CARTER COUNTIES, MONTANA*

CRABS Document Number: ZZ 6 33447 Agency Document Number:

Township: 7 N Range: 59E Section: 27

CAMPBELL JEFF, ET AL.

1 / /1987 *FINAL REPORT ON THE CLASS III CULTURAL RESOURCES INVENTORY AND SITE EVALUATION PROGRAM FOR THE PROPOSED, EXXON BAIROIL/DAKOTA CARBON DIOXIDE PIPELINE IN CARTER, FALLON, AND POWDER RIVER COUNTIES, MONTANA (WITH APPENDICES) & HISTORICAL INVESTIGATIONS FOR THE EXXON BAIROIL TO NORTH DAKOTA CO2 PIPELINE IN MONTANA, FINAL REPORT*

CRABS Document Number: CT 2 1798 Agency Document Number:

Township: 7 N Range: 59E Section: 27

PETERSEN LYNELLE, ET AL.

9 / /2002 *CLASS III CULTURAL RESOURCE SURVERY IN 2001 AND 2002 FOR THE PROPOSED GRASSLANDS PIPELINE IN MONTANA VOLUME I TECHNICAL REPORT IN CARTER, FALLON AND WIBAUX COUNTIES*

CRABS Document Number: CT 6 25189 Agency Document Number:

Township: 7 N Range: 59E Section: 28

HERBEL BRIAN C. ET. AL.

10 / /2011 *CLASS III CULTURAL RESOURCE INVENTORY FOR THE MONTANA PORTION OF THE PROPOSED BAKKEN PIPELINE PROJECT, RICHLAND, WIBAUX, FALLON AND CARTER COUNTIES, MONTANA*

CRABS Document Number: ZZ 6 33447 Agency Document Number:

Township: 7 N Range: 59E Section: 28

PETERSEN LYNELLE, ET AL.

9 / /2002 *CLASS III CULTURAL RESOURCE SURVERY IN 2001 AND 2002 FOR THE PROPOSED GRASSLANDS PIPELINE IN MONTANA VOLUME I TECHNICAL REPORT IN CARTER, FALLON AND WIBAUX COUNTIES*

CRABS Document Number: CT 6 25189 Agency Document Number:

Township: 7 N Range: 59E Section: 33

HERBEL BRIAN C. ET. AL.

10 / /2011 *CLASS III CULTURAL RESOURCE INVENTORY FOR THE MONTANA PORTION OF THE PROPOSED BAKKEN PIPELINE PROJECT, RICHLAND, WIBAUX, FALLON AND CARTER COUNTIES, MONTANA*

CRABS Document Number: ZZ 6 33447 Agency Document Number:

Township: 7 N Range: 59E Section: 34

HERBEL BRIAN C. ET. AL.

10 / /2011 *CLASS III CULTURAL RESOURCE INVENTORY FOR THE MONTANA PORTION OF THE PROPOSED BAKKEN PIPELINE PROJECT, RICHLAND, WIBAUX, FALLON AND CARTER COUNTIES, MONTANA*

CRABS Document Number: ZZ 6 33447 Agency Document Number:

Township: 7 N Range: 59E Section: 34

HERBEL BRIAN ET. AL.

1 / /2012 *CLASS III CULTURAL RESOURCE INVENTORY ADDENDUM FOR THE MONTANA PORTION OF THE PROPOSED BAKKEN PIPELINE PROJECT, RICHLAND, WIBAUX, FALLON, AND CARTER COUNTIES, MONTANA*

CRABS Document Number: ZZ 6 33611 Agency Document Number:

Township: 7 N Range: 59E Section: 34

CAMPBELL JEFF, ET AL.

1 / /1987 *FINAL REPORT ON THE CLASS III CULTURAL RESOURCES INVENTORY AND SITE EVALUATION PROGRAM FOR THE PROPOSED, EXXON BAIROIL/DAKOTA CARBON DIOXIDE PIPELINE IN CARTER, FALLON, AND POWDER RIVER COUNTIES, MONTANA (WITH APPENDICES) & HISTORICAL INVESTIGATIONS FOR THE EXXON BAIROIL TO NORTH DAKOTA CO2 PIPELINE IN MONTANA, FINAL REPORT*

CRABS Document Number: CT 2 1798 Agency Document Number:

Township: 7 N Range: 59E Section: 34

PETERSEN LYNELLE, ET AL.

9 / /2002 *CLASS III CULTURAL RESOURCE SURVERY IN 2001 AND 2002 FOR THE PROPOSED GRASSLANDS PIPELINE IN MONTANA VOLUME I TECHNICAL REPORT IN CARTER, FALLON AND WIBAUX COUNTIES*

CRABS Document Number: CT 6 25189 Agency Document Number:

Township: 7 N Range: 59E Section: 35

CAMPBELL JEFF, ET AL.

1 / /1987 *FINAL REPORT ON THE CLASS III CULTURAL RESOURCES INVENTORY AND SITE EVALUATION PROGRAM FOR THE PROPOSED, EXXON BAIROIL/DAKOTA CARBON DIOXIDE PIPELINE IN CARTER, FALLON, AND POWDER RIVER COUNTIES, MONTANA (WITH APPENDICES) & HISTORICAL INVESTIGATIONS FOR THE EXXON BAIROIL TO NORTH DAKOTA CO2 PIPELINE IN MONTANA, FINAL REPORT*

CRABS Document Number: CT 2 1798 Agency Document Number:

Township: 7 N Range: 59E Section: 35

CAYWOOD JANENE M., ET AL.

6 / /2002 *REPORT OF A PHASE III CULTURAL RESOURCES INVENTORY OF THE BAKER-SOUTH PROJECT CORRIDOR ALONG A POSTION OF US HIGHWAY 7 IN FALLON COUNTY MONTANA*

CRABS Document Number: FA 4 25095 Agency Document Number: STPP 27-2(13)27 CONTROL NO.4052

Township: 7 N Range: 59E Section: 35

LAHREN LARRY A., ET AL.

8 / /1989 *CLASS III INTENSIVE CULTURAL RESOURCE EVALUATION OF VARIOUS BURIED TELEPHONE LINE CORRIDORS IN THE COUNTIES OF CARTER, CUSTER, FALLON, AND PRAIRIE IN SOUTHEASTERN MONTANA (WITH SEP 22, 1989 ADDENDUM 1; OCT 23, 1989 ADDENDUM 2 ATTACHED; AND REVISED NOVEMBER 1989 ADDENDUM 1)*

CRABS Document Number: ZZ 6 10822 Agency Document Number:

Township: 7 N Range: 59E Section: 35

PETERSEN LYNELLE, ET AL.

9 / /2002 *CLASS III CULTURAL RESOURCE SURVERY IN 2001 AND 2002 FOR THE PROPOSED GRASSLANDS PIPELINE IN MONTANA VOLUME I TECHNICAL REPORT IN CARTER, FALLON AND WIBAUX COUNTIES*

CRABS Document Number: CT 6 25189 Agency Document Number:

Township: 7 N Range: 59E Section: 35

CROSSLAND NICOLE, ET. AL.

9 /23/2010 *A CLASS III CULTURAL RESOURCE SURVEY FOR THE STEELE CITY SEGMENT IN MONTANA OF THE KEYSTONE XL PROJECT, DAWSON, FALLON, MCCONE, PHILLIPS, PRAIRIE, AND VALLEY COUNTIES, MONTANA - ADDENDUM 5: ADDITIONAL FIELD WORK*

CRABS Document Number: ZZ 6 32536 Agency Document Number:

Township: 7 N Range: 59E Section: 36

CROSSLAND NICOLE, ET. AL.

9 /23/2010 *A CLASS III CULTURAL RESOURCE SURVEY FOR THE STEELE CITY SEGMENT IN MONTANA OF THE KEYSTONE XL PROJECT, DAWSON, FALLON, MCCONE, PHILLIPS, PRAIRIE, AND VALLEY COUNTIES, MONTANA - ADDENDUM 5: ADDITIONAL FIELD WORK*

CRABS Document Number: ZZ 6 32536 Agency Document Number:

Township: 7 N Range: 60E Section: 1

PETERSEN LYNELLE, ET AL.

9 / /2002 *CLASS III CULTURAL RESOURCE SURVERY IN 2001 AND 2002 FOR THE PROPOSED GRASSLANDS PIPELINE IN MONTANA VOLUME I TECHNICAL REPORT IN CARTER, FALLON AND WIBAUX COUNTIES*

CRABS Document Number: CT 6 25189 Agency Document Number:

Township: 7 N Range: 60E Section: 2

PETERSEN LYNELLE, ET AL.

9 / /2002 *CLASS III CULTURAL RESOURCE SURVERY IN 2001 AND 2002 FOR THE PROPOSED GRASSLANDS PIPELINE IN MONTANA VOLUME I TECHNICAL REPORT IN CARTER, FALLON AND WIBAUX COUNTIES*

CRABS Document Number: CT 6 25189 Agency Document Number:

Township: 7 N Range: 60E Section: 3

WERMERS GREG L.

11 /10/1998 *BURLINGTON RESOURCES ELOB 34-3NH WELL PAD AND ACCESS ROAD IN FALLON COUNTY, MONTANA WITH ADDENDUM FROM APRIL 1999*

CRABS Document Number: FA 2 21676 Agency Document Number: MT-022-99-17

Township: 7 N Range: 60E Section: 6

HOPE SHANE S

4 / /2012 *TRILEAF: VISUAL IMPACT ASSESSMENT FOR A CELLULAR COMMUNICATION TOWER NEAR BAKER, FALLON COUNTY, MONTANA*

CRABS Document Number: FA 6 33597 Agency Document Number: 600562

Township: 7 N Range: 60E Section: 7

HOPE SHANE S

4 / /2012 *TRILEAF: VISUAL IMPACT ASSESSMENT FOR A CELLULAR COMMUNICATION TOWER NEAR BAKER, FALLON COUNTY, MONTANA*

CRABS Document Number: FA 6 33597 Agency Document Number: 600562

Township: 7 N Range: 60E Section: 9

BLUEMLE WILLIAM J.

10 /18/2004 *A CULTURAL RESOURCE INVENTORY OF ELOB 42B-9NH 760 PROPOSED WELL PAD AND ASSOCIATED ACCESS ROAD IN FALLON COUNTY, MONTANA*

CRABS Document Number: FA 2 27791 Agency Document Number: MT-020-04-611 /MT-020-05-011

Township: 7 N Range: 60E Section: 12

PETERSEN LYNELLE, ET AL.

9 / /2002 *CLASS III CULTURAL RESOURCE SURVERY IN 2001 AND 2002 FOR THE PROPOSED GRASSLANDS PIPELINE IN MONTANA VOLUME I TECHNICAL REPORT IN CARTER, FALLON AND WIBAUX COUNTIES*

CRABS Document Number: CT 6 25189 Agency Document Number:

Township: 7 N Range: 60E Section: 13

GREER JOHN W. AND MAVIS GREER

5 / /2004 *AN INTENSIVE CULTURAL RESOURCE SURVEY OF THE ENCORE ACQUISITION COMPANY TRANSMISSION LINE AND SUBSTATION, FALLON COUNTY, MONTANA*

CRABS Document Number: FA 2 27251 Agency Document Number: MT-020-04-282

Township: 7 N Range: 60E Section: 19

KORDECKI CYNTHIA

5 /9 /2005 *CULTURAL RESOURCES INVENTORY OF THE WBI PIPELINE COMPANY WELL ABANDONMENTS IN FALLON COUNTY, MONTANA*

CRABS Document Number: FA 6 27830 Agency Document Number:

Township: 7 N Range: 60E Section: 19

BORCHERT JEANI

5 /8 /1984 *MDU NO. 423 BN DRILL PAD AND PIPELINE*

CRABS Document Number: FA 2 2576 Agency Document Number:

Township: 7 N Range: 60E Section: 19

KLINNER DUANE G.

5 /9 /2006 *A CLASS III CULTURAL RESOURCE INVENTORY OF THE BAKER MUNICIPAL AIRPORT IMPROVEMENTS IN FALLON COUNTY, MONTANA*

CRABS Document Number: FA 6 28411 Agency Document Number:

Township: 7 N Range: 60E Section: 20

KORDECKI CYNTHIA

5 /9 /2005 *CULTURAL RESOURCES INVENTORY OF THE WBI PIPELINE COMPANY WELL ABANDONMENTS IN FALLON COUNTY, MONTANA*

CRABS Document Number: FA 6 27830 Agency Document Number:

Township: 7 N Range: 60E Section: 21

GREER MAVIS AND JOHN

1 / /2003 *AN INTENSIVE CULTURAL RESOURCE SURVEY OF THE ENCORE OPERATING 43X-21BH PIPELINE 40-ACRE BLOCK*

CRABS Document Number: FA 2 25772 Agency Document Number: MT-020-03-54A

Township: 7 N Range: 60E Section: 21

GREER MAVIS AND JOHN

12 / /2002 *AN INTENSIVE CULTURAL RESOURCE SURVEY OF THE ENCORE OPERATING PENNEL OILFIELD, FALLON COUNTY, MONTANA*

CRABS Document Number: FA 2 25776 Agency Document Number: MT-020-03-54

Township: 7 N Range: 60E Section: 22

GREER MAVIS AND JOHN

12 / /2002 *AN INTENSIVE CULTURAL RESOURCE SURVEY OF THE ENCORE OPERATING PENNEL OILFIELD, FALLON COUNTY, MONTANA*

CRABS Document Number: FA 2 25776 Agency Document Number: MT-020-03-54

Township: 7 N Range: 60E Section: 29

KIELY HOFF CARRIE

11 /26 /1996 *SWEPI FLOWLINE FROM PENNEL STATION 29 TO CORAL CREEK S.O*

CRABS Document Number: FA 2 18553 Agency Document Number: MT-024-97-22

Township: 7 N Range: 60E Section: 29

BORCHERT JEANI

5 /8 /1984 *MDU NO.425 BN DRILL PAD AND PIPELINE*

CRABS Document Number: FA 2 2573 Agency Document Number:

Township: 7 N Range: 60E Section: 29

BORCHERT JEANI

5 /8 /1984 *MDU NO. 424 BN DRILL PAD AND PIPELINE*

CRABS Document Number: FA 2 2575 Agency Document Number:

Township: 7 N Range: 60E Section: 30

KLINNER DUANE G.

5 /9 /2006 *A CLASS III CULTURAL RESOURCE INVENTORY OF THE BAKER MUNICIPAL AIRPORT IMPROVEMENTS IN FALLON COUNTY, MONTANA*

CRABS Document Number: FA 6 28411 Agency Document Number:

Township: 7 N Range: 60E Section: 32

TRAVIS LAURI

6 / /2009 *FIDELITY'S FEDERAL 4017: A CULTURAL RESOURCE INVENTORY IN FALLON COUNTY, MONTANA*

CRABS Document Number: FA 2 31335 Agency Document Number: MT-020-09-249

Township: 7 N Range: 60E Section: 32

TRAVIS LAURI

5 / /2009 *FIDELITY'S FEDERAL 4018: A CULTURAL RESOURCE INVENTORY IN FALLON COUNTY, MONTANA*

CRABS Document Number: FA 2 31346 Agency Document Number: MT-020-09-250

Township: 7 N Range: 60E Section: 32

WERMERS GREG L.

6 /19 /1998 *WILLISTON BASIN INTERSTATE PIPELINE COMPANY BAKER WELL/LINE #2034 AND BAKER WELL/LINE #2087 IN FALLON COUNTY, MONTANA*

CRABS Document Number: FA 2 20722 Agency Document Number: MT-024-98-52

Township: 7 N Range: 60E Section: 32

GREER JOHN W., ET AL.

5 /24 /1985 *SHELL WESTERN E&P, INC., CORAL CREEK EXPANSION.*

CRABS Document Number: FA 2 2618 Agency Document Number: 1254

Township: 7 N Range: 60E Section: 32

TRAVIS LAURI

6 / /2009 *FIDELITY'S FEDERAL 4016: A CULTURAL RESOURCE INVENTORY IN FALLON COUNTY, MONTANA*

CRABS Document Number: FA 2 31336 Agency Document Number: MT-020-09-248

Township: 7 N Range: 60E Section: 32

KIELY HOFF CARRIE

11 /26/1996 ***SWEPI FLOWLINE FROM PENNEL STATION 29 TO CORAL CREEK S.O***

CRABS Document Number: FA 2 18553 Agency Document Number: MT-024-97-22

Township: 7 N Range: 60E Section: 32

BLUEMLE WILLIAM

8 / /2009 ***FIDELITY'S FEDERAL 4017 RESURVEY: A CULTURAL RESOURCE INVENTORY IN FALLON COUNTY, MONTANA***

CRABS Document Number: FA 2 31332 Agency Document Number: MT-020-09-483

Township: 7 N Range: 60E Section: 32

BLUEMLE WILLIAM

8 / /2009 ***FIDELITY'S FEDERAL 4016 RESURVEY: A CULTURAL RESOURCES INVENTORY IN FALLON COUNTY, MONTANA***

CRABS Document Number: FA 2 31330 Agency Document Number: MT-020-09-482

Township: 7 N Range: 60E Section: 33

BORCHERT JEANI

5 /8 /1984 ***MDU NO.426 BN DRILL PAD AND PIPELINE***

CRABS Document Number: FA 2 2574 Agency Document Number:

Township: 7 N Range: 60E Section: 33

TRAVIS LAURI

6 / /2009 ***FIDELITY'S FEDERAL 4016: A CULTURAL RESOURCE INVENTORY IN FALLON COUNTY, MONTANA***

CRABS Document Number: FA 2 31336 Agency Document Number: MT-020-09-248

Township: 7 N Range: 60E Section: 33

KEIM KELLY M.

5 /10/1984 ***MDU WELL 427 BN AND PIPELINE***

CRABS Document Number: FA 2 2582 Agency Document Number:

Township: 7 N Range: 60E Section: 33

KIELY HOFF CARRIE

11 /26/1996 ***SWEPI FLOWLINE FROM PENNEL STATION 29 TO CORAL CREEK S.O***

CRABS Document Number: FA 2 18553 Agency Document Number: MT-024-97-22

Township: 7 N Range: 60E Section: 34

BROOKS BRITTANY A.

4 /23/2014 ***CORRAL CREEK 13-35H WELL PAD, ACCESS ROAD, AND FLOWLINE: A CLASS III INTENSIVE CULTURAL RESOURCE INVENTORY IN FALLON COUNTY, MONTANA.***

CRABS Document Number: FA 2 37043 Agency Document Number: M10311-MT-020-14-78

Township: 7 N Range: 60E Section: 35

BROOKS BRITTANY A.

4 /23/2014 ***CORRAL CREEK 13-35H WELL PAD, ACCESS ROAD, AND FLOWLINE: A CLASS III INTENSIVE CULTURAL RESOURCE INVENTORY IN FALLON COUNTY, MONTANA.***

CRABS Document Number: FA 2 37043 Agency Document Number: M10311-MT-020-14-78

Township: 7 N Range: 60E Section: 36

CHRISTENSEN ROBERT C., ET AL.

10 /17/1985 ***A CULTURAL RESOURCE INVENTORY OF THE PROPOSED 12.5 KV ELECTRIC LINE TO THE MERIDIAN OIL NO. 12-38 STATE WELL***

CRABS Document Number: FA 5 2684 Agency Document Number:

Township: 7 N Range: 60E Section: 36

CHRISTENSEN ROBERT C., ET AL.

10 /14/1985 ***A CULTURAL RESOURCE INVENTORY OF PROPOSED ELECTRIC LINE TO MERIDIAN OIL NO. 12-36 STATE WELL***

CRABS Document Number: FA 5 2683 Agency Document Number:

Township: 7 N Range: 60E Section: 36

MORRISON JOHN G

7 / /2003 ***SEGMENT #2 WATER INJECTION PIPELINE: A CLASS III CULTURAL RESOURCES INVENTORY, FALLON COUNTY MONTANA***

CRABS Document Number: FA 2 26540 Agency Document Number: MT-020-03-309

Township: 7 N Range: 60E Section: 36

HOFF CARRIE S.

2 /1 /1996 ***MERIDIAN OIL WELL: 14-36SH***

CRABS Document Number: FA 2 18130 Agency Document Number: MT-024-96-21

Township: 7 N Range: 60E Section: 36

HOFF CARRIE S.

1 /31/1996 ***MERIDIAN OIL WELL: 41-36NH***

CRABS Document Number: FA 2 18131 Agency Document Number: MT-024-96-22

Attachment 13
MDEQ CWAIC Water Quality Reports

Montana Department of Environmental Quality — Data Search Tools

Clean Water Act Information Center

Data Last Updated: 2014

Search Criteria: Year=2014; County=FALLON CO

Results Found: 6

Data for each report is taken from the Water Quality Planning Bureau's Water Quality Analysis, Reporting, & Documentation system (WARD). This dataset contains information provided to EPA as part of the biennial Water Quality Integrated Report. This data is maintained and updated by the bureau's Information Management and Technical Services Section and should only be used for planning purposes. More detailed, hardcopy reports and information are available by clicking on the "Detailed Assessment Report" link. Data found in these reports are updated biennially in spring of even-numbered years.

AUID	Waterbody Name	Watershed	HUC8	County	WQ Category	Use Class	Map
MT39G001_010	Beaver Creek	Little Missouri	10110204	FALLON CO	1	C-3	Map
MT39E001_032	Boxelder Creek	Little Missouri	10110202	FALLON CO	3	C-3	Map
MT42M002_150	Cabin Creek	Lower Yellowstone	10100004	FALLON CO	5	C-3	Map
MT42L001_032	O'Fallon Creek	Lower Yellowstone	10100005	FALLON CO	2	C-3	Map
MT42L001_010	Pennel Creek	Lower Yellowstone	10100005	FALLON CO	5	C-3	Map
MT42L001_020	Sandstone Creek	Lower Yellowstone	10100005	FALLON CO	5	C-3	Map

Montana Department of Environmental Quality — Data Search Tools

2014 Water Quality Information

Water Information

AUID	MT42L001_020	**Water Type**	RIVER
Waterbody Name	Sandstone Creek	**Hydro Unit**	10100005
Size (Miles / Acres)	72.78	**Basin**	Yellowstone
Ecoregion	Northwestern Great Plains	**Watershed**	Lower Yellowstone
County	CUSTER CO, FALLON CO	**Use Class**	C-3
TMDL Planning Area	O` Fallon	**Trophic Status and Trend**	
Location	SANDSTONE CREEK, headwaters to mouth (O'Fallon Creek)		
Water Quality Category	5		

Beneficial Use Support Information

Use Name	Fully Supporting	Not Supporting	Threatened	Insufficient Information	Not Assessed
Primary Contact Recreation	✓				
Aquatic Life		✓			

Impairment Information

Probable Cause	Probable Sources	Associated Uses	TMDL Completed
Nitrate/Nitrite (Nitrite + Nitrate as N)	Agriculture, Municipal Point Source Discharges	Aquatic Life	No

Nitrogen (Total)	Municipal Point Source Discharges, Agriculture	Aquatic Life	No

Observed Effects

Observed Effect **Associated Uses**

Report Explanation

Water Information

- *AUID* - A unique code assigned to each assessed waterbody to facilitate identification and tracking. A stream waterbody may be segmented into more than one assessment unit or may be the entire stream length.
- *Waterbody Name* - The current name of the waterbody
- *Size (Miles/Acres)* - The size of the assessment unit; rivers and streams are measured in miles; lakes in acres
- *Ecoregion* - An ecoregion is a large unit of land containing a geographically distinct assemblage of species, natural communities, and environmental conditions
- *County* - The county or counties within which the waterbody (assessment unit) is situated
- *TMDL Planning Area* - DEQ has divided the state in multiple planning areas to facilitate a 'watershed approach' to developing TMDLs
- *Water Type* - Lake or river
- *Hydro Unit* - The code used by USGS to identify hydrologic units, DEQ uses 4th code (eight digit) HUCs
- *Basin* - Montana DEQ divides the state into four major (administrative) basins; Columbia, Upper Missouri, Lower Missouri (including Saskatchewan) & Yellowstone.
- *Watershed* - Each major basin is divided into sub-major basins, or watersheds, that identify the major waterbodies that smaller streams drain into. Montana has 16 sub-major basins.
- *Use Class* - Montana's Water Quality Act establishes a systematic classification of waters in accordance to their "present and future most beneficial uses" (75-5-701 MCA). Beneficial uses include drinking water; aquatic life, fishes, and fur-bearers; recreation; agriculture; and industry. Uses are assigned to "use classes" and each "use class" has associated standards necessary for the water to support its designated uses.
- *Trophic Status and Trend* - Applies to lakes only and identifies the degree of biological production occurring, i.e., the mass of plants and animals.
- *Location* - A description of the waterbody the assessment relates to including upstream and downstream points.
- *Water Quality Category* - Each waterbody is assigned a unique assessment category as listed below.
    - **1** - Waters for which all applicable beneficial uses have been assessed and all uses are determined to be fully supported.
    - **2** - Available data and/or information indicate that some, but not all of the beneficial uses are supported.

- **2A** - Dropped in 2014 cycle. All 2A assessment units are now listed in EPA category 2.
- **2B** - Changed in 2014 cycle to category 5N. All 2B assessment units are now listed in state defined category 5N. The category definition is unchanged from the 2B definition.
- **3** - Waters for which there is insufficient data to assess the use-support of any applicable beneficial use; no use-support determinations have been made.
- **4A** - All TMDLs needed to rectify all identified threats or impairments have been completed and approved.
- **4B** - Waterbodies are on lands where "other pollution control requirements required by local, state, or federal authority" [see 40 CFR 130.7(b)(1)(iii)] are in place, are expected to address all waterbody-pollutant combinations, and attain all WQS in a reasonable period of time. These control requirements act "in lieu of" a TMDL, thus no actual TMDLs are required.
- **4C** - Identified threats or impairments result from pollution categories such as dewatering or habitat modification and, thus, a TMDL is not required.
- **5** - Waters where one or more applicable beneficial uses are impaired or threatened, and a TMDL is required to address the factors causing the impairment or threat.
- **5N** - Available data and/or information indicate that a water quality standard is exceeded due to an apparent natural source in the absence of any identified manmade sources.

Beneficial Use Support Information

- *Use Name* - All surface waters have designated beneficial uses that may include: agriculture, drinking water, primary contact recreation, aquatic life, and industry.
- *Support Status* - Three options indicate the beneficial use support based on water quality standards when sufficient information is available for an assessment; "insufficient information" means there is not enough data/information for an assessment; and "not assessed" indicates that the waterbody has not been assessed for use support.

Impairment Information

- *Probable Causes* - The list of probable causes of pollution
- *Probable Sources* - The probable source or sources related to the cause of impairment
- *Associated Uses* - The use this cause is impairing (not all causes impair the same uses)
- *TMDL Completed* - If the TMDL is completed for the cause there will be a "yes" button. Click the button to be redirected to the TMDL document. An N/A identifies the cause as a non-pollutant and no TMDL is required.

Observed Effects Information

- *Observed Effect* - Indications of pollution may be observed and documented (e.g., excess algal growth) which are a response to environmental conditions and potentially excessive pollutant loading. These are termed "observed effects."

- *Associated Uses* - The uses that may be impaired due to the observed effect.

Montana Department of Environmental Quality — Data Search Tools

2014 Water Quality Information

Water Information

AUID	MT42L001_010	**Water Type**	RIVER
Waterbody Name	Pennel Creek	**Hydro Unit**	10100005
Size (Miles / Acres)	65.97	**Basin**	Yellowstone
Ecoregion	Northwestern Great Plains	**Watershed**	Lower Yellowstone
County	CUSTER CO, FALLON CO	**Use Class**	C-3
TMDL Planning Area	O` Fallon	**Trophic Status and Trend**	
Location	PENNEL CREEK, headwaters to mouth (O'Fallon Creek)		
Water Quality Category	5		

Beneficial Use Support Information

Use Name	Fully Supporting	Not Supporting	Threatened	Insufficient Information	Not Assessed
Primary Contact Recreation	✓				
Aquatic Life		✓			

Impairment Information

Probable Cause	Probable Sources	Associated Uses	TMDL Completed
Total Dissolved Solids	Source Unknown	Aquatic Life	No

Observed Effects

Observed Effect	Associated Uses

Report Explanation

Water Information

- *AUID* - A unique code assigned to each assessed waterbody to facilitate identification and tracking. A stream waterbody may be segmented into more than one assessment unit or may be the entire stream length.
- *Waterbody Name* - The current name of the waterbody
- *Size (Miles/Acres)* - The size of the assessment unit; rivers and streams are measured in miles; lakes in acres
- *Ecoregion* - An ecoregion is a large unit of land containing a geographically distinct assemblage of species, natural communities, and environmental conditions
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- *Water Type* - Lake or river
- *Hydro Unit* - The code used by USGS to identify hydrologic units, DEQ uses 4th code (eight digit) HUCs
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- *Trophic Status and Trend* - Applies to lakes only and identifies the degree of biological production occurring, i.e., the mass of plants and animals.
- *Location* - A description of the waterbody the assessment relates to including upstream and downstream points.
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- **5** - Waters where one or more applicable beneficial uses are impaired or threatened, and a TMDL is required to address the factors causing the impairment or threat.
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Beneficial Use Support Information

- *Use Name* - All surface waters have designated beneficial uses that may include: agriculture, drinking water, primary contact recreation, aquatic life, and industry.
- *Support Status* - Three options indicate the beneficial use support based on water quality standards when sufficient information is available for an assessment; "insufficient information" means there is not enough data/information for an assessment; and "not assessed" indicates that the waterbody has not been assessed for use support.

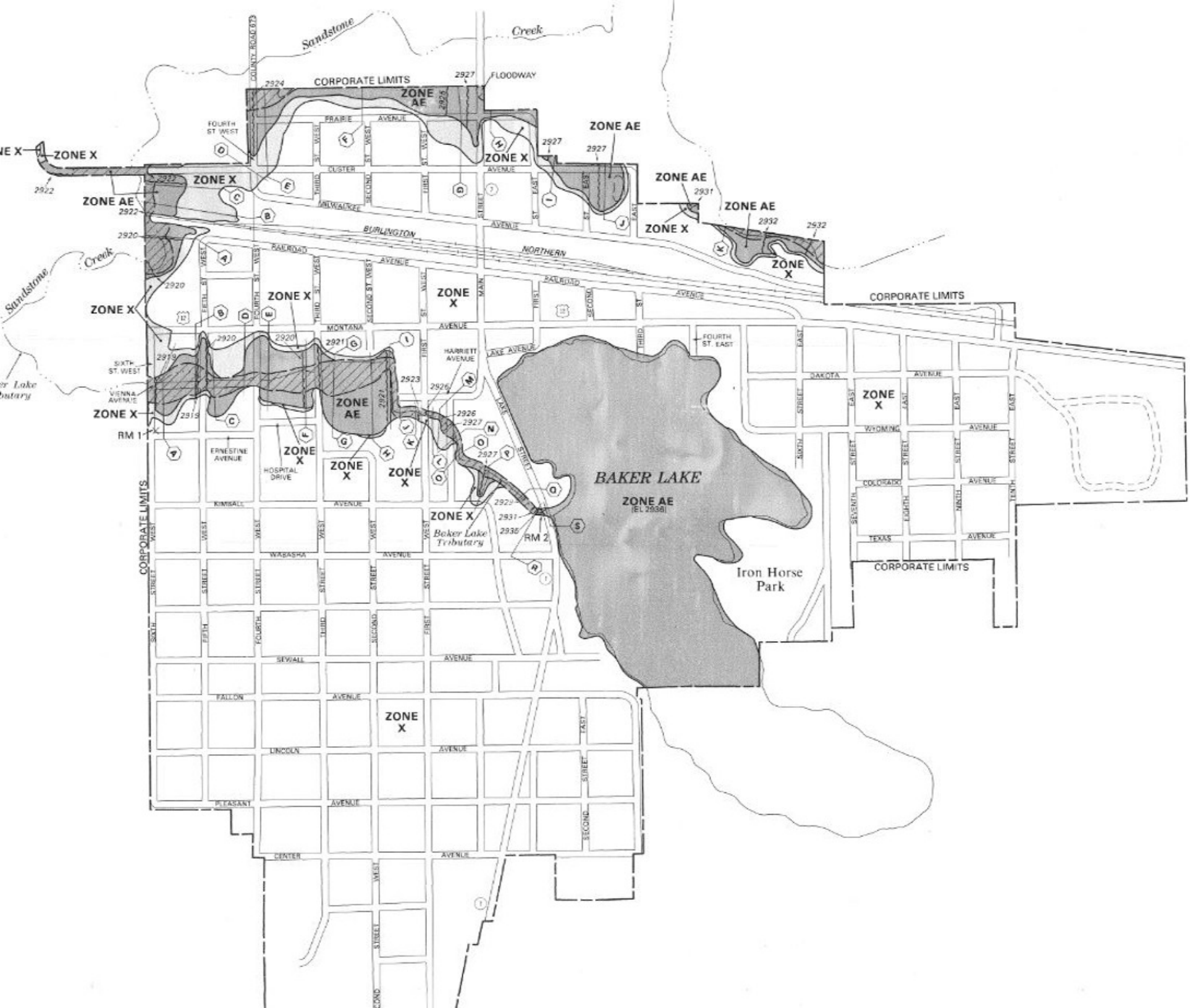
Impairment Information

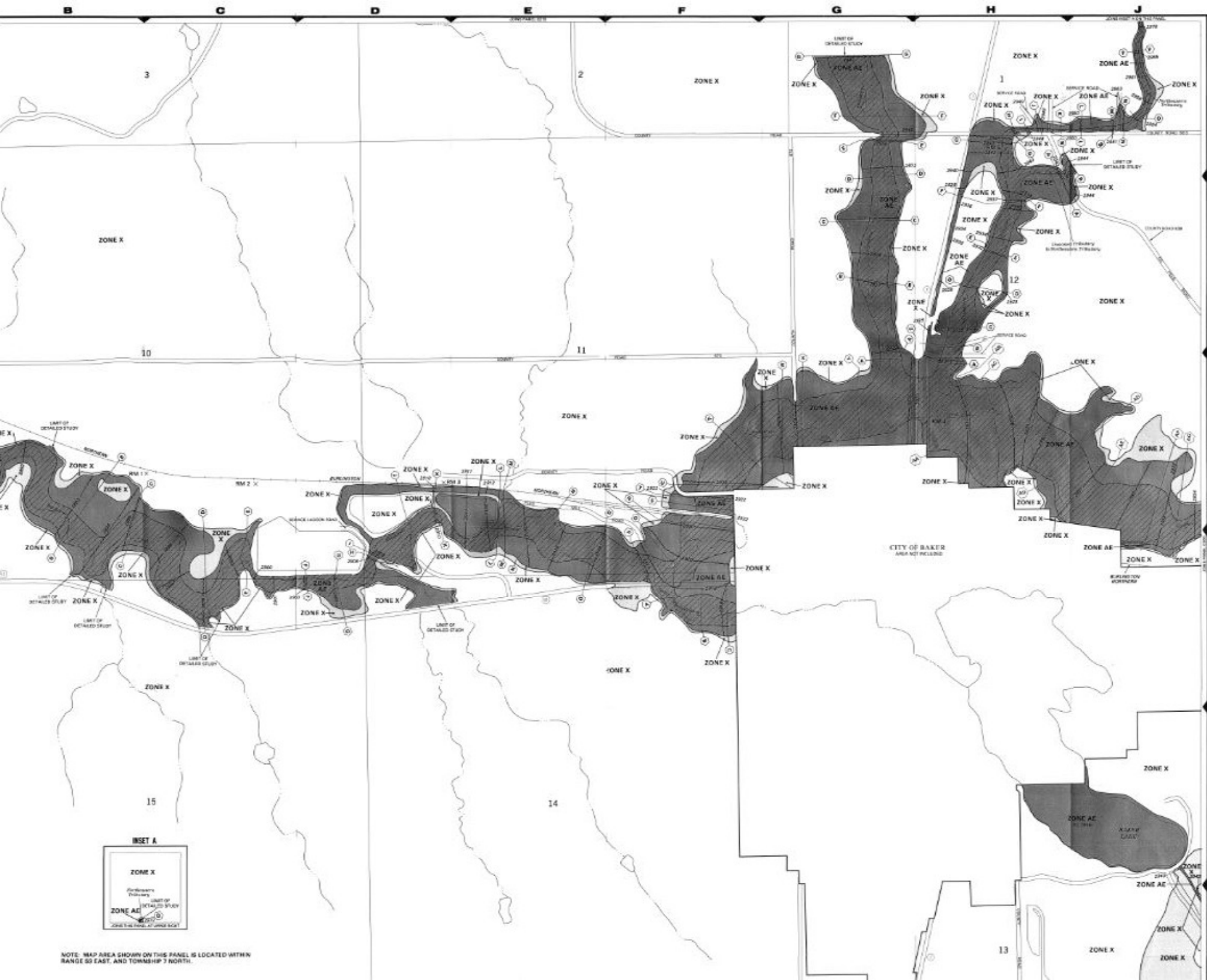
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- *Probable Sources* - The probable source or sources related to the cause of impairment
- *Associated Uses* - The use this cause is impairing (not all causes impair the same uses)
- *TMDL Completed* - If the TMDL is completed for the cause there will be a "yes" button. Click the button to be redirected to the TMDL document. An N/A identifies the cause as a non-pollutant and no TMDL is required.

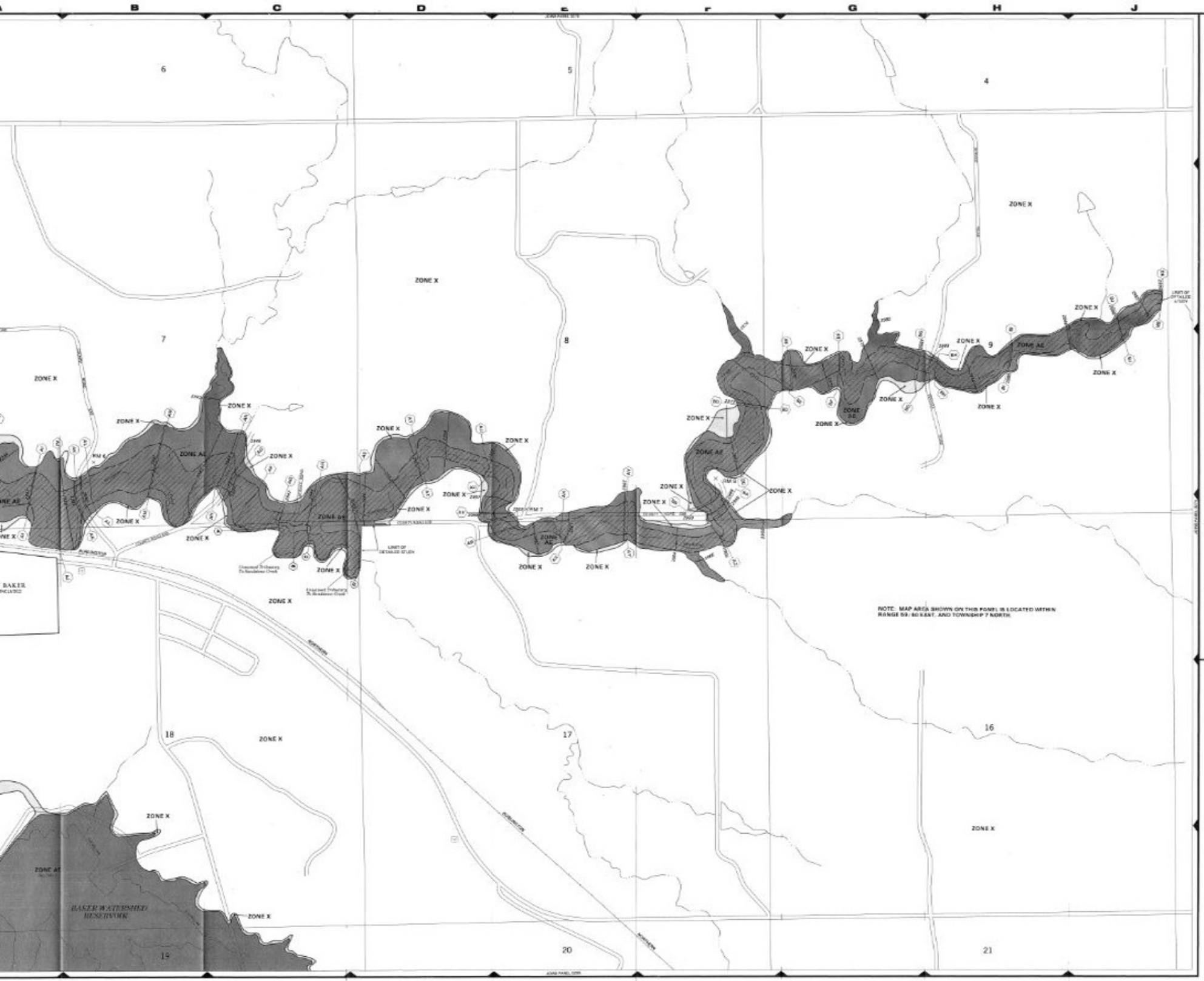
Observed Effects Information

- *Observed Effect* - Indications of pollution may be observed and documented (e.g., excess algal growth) which are a response to environmental conditions and potentially excessive pollutant loading. These are termed "observed effects."
- *Associated Uses* - The uses that may be impaired due to the observed effect.

Attachment 14
FEMA Floodplain Mapping


Sandstone Creek
CORPORATE LIMITS
FLOODWAY
ZONE AE
ZONE X
2924
2927
2922
2920
2921
2923
2926
2931
2932
2935
BURLINGTON NORTHERN RAILROAD
PRAIRIE AVENUE
CUSTER AVENUE
MILWAUKEE AVENUE
MONTANA AVENUE
LAKE AVENUE
DAKOTA AVENUE
WYOMING AVENUE
COLORADO AVENUE
TEXAS AVENUE
WABASHA AVENUE
KIMBALL AVENUE
SEVIER AVENUE
FALLON AVENUE
LINCOLN AVENUE
PLEASANT AVENUE
CENTER AVENUE
FOURTH ST WEST
FIFTH ST WEST
SIXTH ST WEST
SECOND ST WEST
THIRD ST WEST
FIRST ST WEST
MAIN STREET
FIRST STREET EAST
SECOND STREET EAST
THIRD STREET EAST
FOURTH ST EAST
SIXTH STREET
SEVENTH STREET
EIGHTH STREET
NINTH STREET
TENTH STREET
VIENNA AVENUE
HARRIETT AVENUE
ERNESTINE AVENUE
HOSPITAL DRIVE
COUNTY ROAD 63
BAKER LAKE
ZONE AE
(EL 2938)
Baker Lake Tributary
Iron Horse Park
RM 1
RM 2


B
C
D
E
F
G
H
J
ZONE X
ZONE AE
CITY OF BAKER
AREA NOT INCLUDED
UNIT OF DETAILED STUDY
INSET A
NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN RANGE 50 EAST, AND TOWNSHIP 7 NORTH.



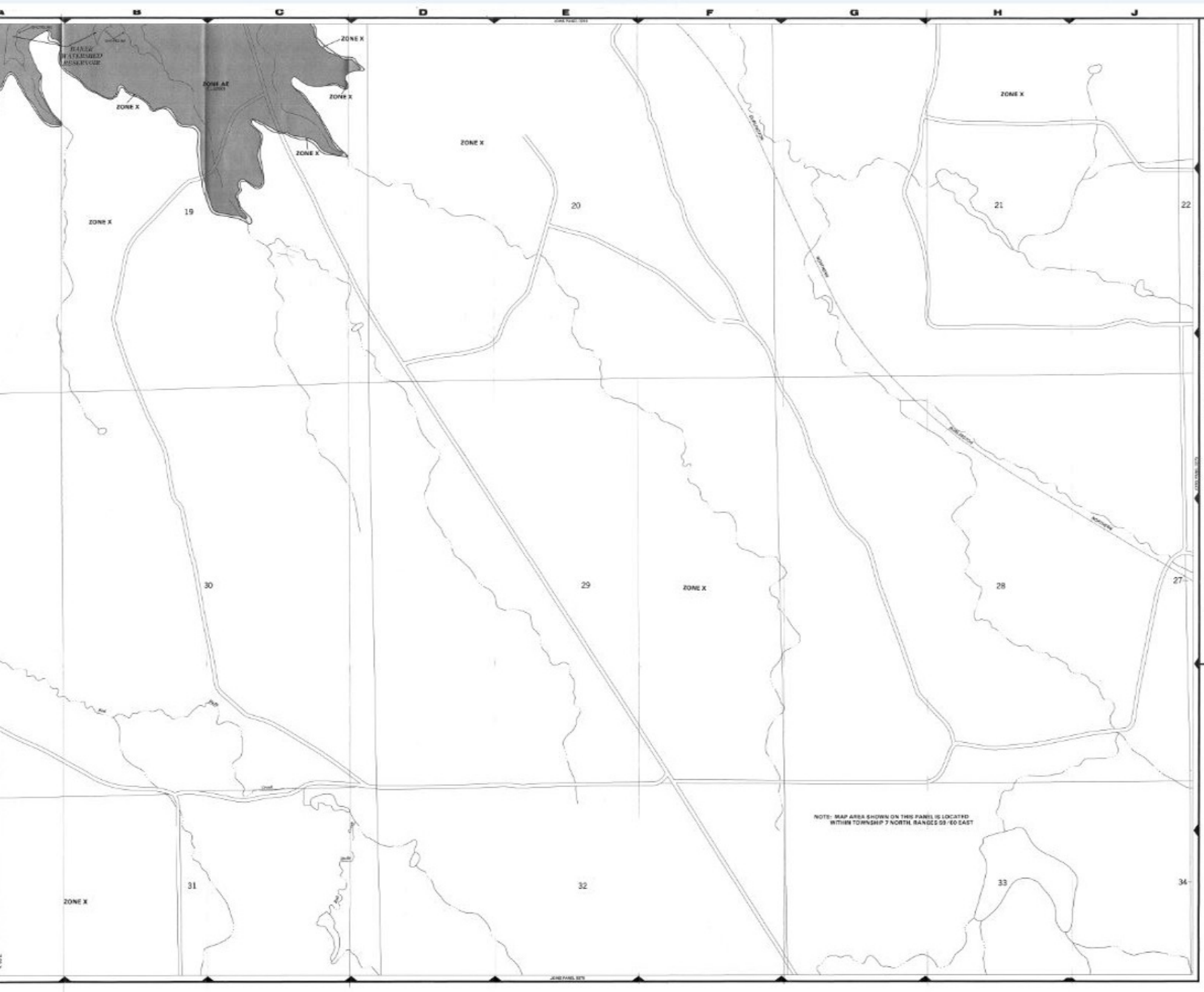
LEGEN

NOTES

FIRM
FLOOD INSUR
FALLON
MONTA
(UNINCORP

PANEL 265 OF

COMMUNI


ZONE X
ZONE AE
ZONE X
ZONE X
ZONE X
ZONE X
ZONE X
ZONE X
ZONE X
ZONE X
19
20
21
22
30
29
28
27
31
32
33
34
NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 7 NORTH, RANGES 59 -60 EAST
LEGEND
NOTES
FIRM
FLOOD INSUR
FALLON
MONTA
(UNINCORP
PANEL 260 OF
COMMUNI
Federal Emergency

Attachment 15

Growth Policy Update, Fallon County, MT

Fallon
county, MT



Growth Policy Update
Fallon County, MT

Prepared by: KLJ

July 29, 2013

KLJ

RESOLUTION ADOPTING GROWTH POLICY
RESOLUTION # 7-29-2013 (1)

WHEREAS, on March 5, 2013, the Board of Fallon County Commission adopted the Fallon County Growth Policy;

WHEREAS, pursuant to Section 76-2-601(3)(f)(iii), M.C.A., the Growth Policy needs to be updated every five years;

WHEREAS, on January 28, 2013, the Fallon County Planning Board held a public hearing, pursuant to Section 76-1-602, M.C.A., on the proposed updates to the Growth Policy and of which there was no public comment pertaining to the Growth Policy;

WHEREAS, on February 24, 2013, the Planning Board adopted a Resolution, pursuant to Section 76-1-603, M.C.A., which recommended the Board of Commissioners adopt the updated Growth Policy forwarded to the Board of Commissioners by the Planning Board;

WHEREAS, on March 5, 2013, the Board of Commissioners determined the updated Growth Policy recommended by the Planning Board should be adopted for the jurisdictional area of the Planning Board, passed Resolution 3-5-2013(1) adopting the Planning Board Resolution;

NOW, THEREFORE, IT IS HEREBY RESOLVED, the Board of Commissioners of Fallon County, Montana pursuant to Section 76-1-604, M.C.A., hereby adopts the updated Fallon County Growth Policy recommended by the Fallon County Planning Board;

ALSO, BE IT RESOLVED, by the Board of Commissioners of Fallon County, recommendations made by the Planning Board may be implemented at such time as the Planning Board finalizes and adopts same and submits same to the Board of Commissioners.

PASSED and APPROVED this 29th day of July, 2013. 3 **Ayes** 0 **Nays**

CLERK & RECORDER OF FALLON COUNTY SEAL MONTANA

ATTEST:

Brenda J. Wood

Brenda J. Wood, Clerk and Recorder

BOARD OF FALLON COUNTY COMMISSION
Fallon County, Montana

Deb Ranum

Deb Ranum, Chairperson

William L. Randash

William L. Randash, Member

Steve Baldwin

Steve Baldwin, Member

RESOLUTION NO. 610

Baker City Council

A resolution of intent by the City Council of the City of Baker, Montana to adopt the 2013 City of Baker Growth Policy Jointly with Fallon County and Town of Plèvna.

WHEREAS: The Baker City Council tasked the Planning Board with the preparation of a Growth Policy for the City and a reasonable planning jurisdiction outside of the City limits, AND;

WHEREAS: The City- County Planning Board approved an action plan incorporating public input and an approximate time line for the adoption of a new Growth Policy for the City of Baker, AND;

WHEREAS: The proposed Growth Policy addresses all of the statutory components of a Growth Policy to the extent acceptable to the Planning Board, AND;

WHEREAS: The City County Planning Board did conduct a public hearing of the Growth Policy on January 28, 2013, AND:

WHEREAS: The City of Baker through its City Council has and continues to work cooperatively with the Fallon County Board of County Commissioners on planning and land use related issues, AND:

WHEREAS: The City Council of the City of Baker is desirous of establishing and maintaining up to date growth management regulations including but not limited to Zoning, Subdivision, Annexation, and Floodplain Regulations, AND;

WHEREAS 76-1-604 of the Montana Code Annotated provides the process for the adoption, revision, or rejection of a growth policy by the City Council.

NOW THEREFORE BE IT RESOLVED, by the City Council of the City of Baker, Montana to adopt Resolution of Intent No. 610.

This 20th Day of March 2013.

Clayton Hornung

City of Baker
Clayton Hornung, Mayor

Kevin J. Dukart, City Clerk

RESOLUTION NO. 142

Plevna Town Council

A resolution of intent by the Town Council of the Town of Plevna, Montana to adopt the 2013 Town of Plevna Growth Policy jointly with Fallon County and the City of Baker.

WHEREAS: The Town of Plevna Council tasked the Planning Board with the preparation of the Growth Policy for the Town and a reasonable planning jurisdiction outside of the Town limits, AND;

WHEREAS: The City County Planning Board approved an action plan incorporating public input and an approximate time line for the adoption of the New Growth Policy for the Town of Plevna, AND;

WHEREAS: The proposed Growth Policy addresses all of the statutory components of the Growth Policy to the extent acceptable to the Planning Board, AND;

WHEREAS: The City County Planning Board did conduct a public hearing of the Growth Policy on January 28, 2013, AND;

WHEREAS: The Town of Plevna through its Town Council has and continues to work cooperatively with the Fallon County Board of County Commissioners on planning and land use related issues, AND;

WHEREAS: The Town Council of the Town of Plevna is desirous of establishing and maintaining up to date growth management regulations including but not limited to Zoning, Subdivision, Annexation, and Floodplain Regulations, AND;

WHEREAS: 76-1-604 of the Montana Code Annotated provides the process for the adoption, revision, or rejection of growth policy by the City Council.

NOW THEREFORE BE IT RESOLVED, by the Town Council of the Town of Plevna, Montana to adopt Resolution of Intent No. 142.

This 13 Day of May 2013.

William F Bonner

Town of Plevna
Mayor

City Clerk

Table of Contents

Acknowledgments

1. Introduction
2. Public Involvement
3. Community Goals and Objectives
4. Community Profile
5. Population and Employment Forecasts
6. Land Use
7. Housing
8. Infrastructure
9. Transportation
10. Economic Development
11. Public Services and Facilities
12. Recreation
13. Natural Resources
14. Implementation

Appendix A – Community Stakeholder Interviews

Appendix B – Community Survey and Results

Appendix C – Agricultural Statistics

Acknowledgements

Special acknowledgement and thanks are extended to these persons and organizations for their contributions in the preparation of the 2012 Fallon County Growth Policy:

Don Rieger, Chairman, Fallon County Commission

Deb Ranum, Fallon County Commission

Bill Randash, Fallon County Commission

Randy Hoenke, President, Fallon County Planning Board

Roy Rost, Vice-President, Fallon County Planning Board

Steve Zachmann, Fallon County Planning Board

Pat Hanley, Fallon County Planning Board

Mary Lee Dietz, Fallon County Planning Board

Kodie Olson, Fallon County Planning Board

Gary Irgens, Fallon County Planning Board

Tom Bechtold, Fallon County Planning Board

Andy Hepperle, Fallon County Planning Board

Clayton Hornung, Mayor of the City of Baker

Willie Benner, Mayor of the Town of Plevna

Mona Madler, Director of the Eastern Montana Economic Development Authority and SMART

Jessica Dinardi, Fallon County Planner

Kevin Durkart, City of Baker Clerk

Brenda Wood, Fallon County Clerk

All the community stakeholders who gave their time to be interviewed

The Fallon County citizens who participated in the public meetings and community survey

Chapter 1: Introduction and Purpose

A Growth Policy assists a community in embracing a vision for the future and planning for future growth and offers an opportunity to evaluate nearly all facets of a community and document successes and challenges. During the preparation of a Growth Policy the members of a community are given the opportunity to be involved in the process of planning for a better future. An update of a Growth Policy allows a community to evaluate existing conditions and issues, as well as formulate goals, objectives and policies to address the existing conditions and issues.

The 2012 Fallon County Growth Policy is an update of the 2006 Growth Policy. The 2006 Growth Policy provided a profile of the community and addressed all content areas of a growth policy. However, it lacked goals, objectives and policies to guide or provide direction for the community and did not specify implementation measures to achieve community goals and objectives. The purpose of the 2012 Growth Policy is to provide community leaders with a working plan that will facilitate decision making on the wide range of topics contained in the growth policy. This is accomplished by establishing broad goals, measureable objectives, specific policies to promote the achievement of objectives, and strategies to implement the growth policy.

Community Vision

The 2012 Growth Policy is a vision-based planning document. The community vision statement provides an overall expression of the community's values and interests and provides the framework from which all content in the 2012 Growth Policy is based. One of the first efforts in the preparation of the growth policy was to engage the community in the exercise of formulating an over-arching vision for the future. The following statement is the result of the community visioning effort:

> **"Fallon County's vision is to retain existing residents, provide amenities that improve quality of life, promote sustainable growth, diversify the local economy to minimize impacts during economic downturns, and mitigate impacts of rapid growth."**

Regulatory Requirements

The 2012 Growth Policy was prepared consistent with the growth policy content requirements contained in Section 76-1-601, Montana Code Annotated (MCA) and is intended to apply to and be adopted by Fallon County, the City of Baker and the Town of Plevna. As specified in Section 76-1-605, MCA, after adoption of the growth policy, the governing bodies subject to the growth policy are to be guided by, and give consideration to, the general policy and pattern of development set out in the growth policy in the 1) authorization, construction, alteration or abandonment of public ways, public

places, public structures or public utilities, 2) authorization, acceptance or construction of water mains, sewers, connections, facilities or utilities, and 3) adoption of zoning ordinances or resolutions.

It is important to note the MCA also specifies that a growth policy is not a regulatory document and does not confer any authority to regulate that which is not otherwise authorized by law or regulations adopted pursuant to the law. Furthermore, a governing body may not withhold, deny or impose conditions on any land use approval or other authority to act based solely on compliance with an adopted growth policy.

Chapter 2: Public Involvement

Overview

Public involvement was essential in preparing the 2012 Growth Policy. In large part, the Growth Policy was derived from the active involvement by community members in developing a community vision and goals and planning strategies to realize the vision. Members of the community were also instrumental in the identification of existing community concerns and issues. Many of the goals, objectives and policies contained in the Growth Policy are a direct response to concerns and issues that were raised by members of the community.

To maximize public involvement in the planning process, several approaches were used obtain comments, feedback from the general public, community stakeholders and appointed and elected officials.

Prior Efforts

The Eastern Montana Economic Development Authority, Southeast Montana Area Revitalization Team (SMART) and the Montana Organizing Project initiated a community visioning effort prior to the early stages of preparing the Growth Policy. They held a Fallon County Vision Dinner in the City of Baker in September 2011 that identified five common themes for community betterment and organized participants into working groups for each theme. A Vision Follow-up meeting was held in October 2011 where each working group formulated goals and objectives for their respective community theme or topic. The community input from these meetings provided valuable information on community concerns and issues, as well as potential strategies to address the concerns and issues.

Community Meetings

A visioning public meeting was held in the Town of Plevna in December 2011. Residents of the Town of Plevna and residents in the rural portion of the county were invited. The visioning meeting provided information specific to the Town of Plevna and also the county as a whole. Participants shared community concerns and issues, and goals and strategies to address them. In February 2012, public meetings were held in the City of Baker and the Town of Plevna to identify and review preliminary planning strategies for each topic of the Growth Policy. A community vision statement and a comprehensive list of goals, objectives and planning strategies was prepared from community input at the visioning and planning strategies public meetings.

Stakeholder Interviews

The Fallon County Planning Board prepared an extensive list of community stakeholders to be interviewed by the planning consultant. A total of 36 community stakeholders were identified. The stakeholders included City of Baker and Fallon County staff, school district officials, the mayor of the City of Baker and Town of Plevna, representatives of several private service providers and representatives from financial, real estate and energy businesses. A majority of the stakeholders were interviewed in person and remaining interviews were conducted by telephone. Reports summarizing the input provided by each interviewed community stakeholder can be found in the appendix of the Growth Policy.

The community stakeholder interviews provided crucial information on community services and other facets of the community. Information from the interviews generated numerous planning strategies that supplemented the planning strategies developed from community input at the public meetings.

Project Website

A Growth Policy project website was created and a link to the website was provided on the Fallon County home webpage. The project website provided information on the purpose of the Growth Policy Update, project schedule, maps and public meeting materials. The project website also contained a link for the public to e-mail comments directly to the planning consultant and a community survey that asked questions on many of the Growth Policy topics. A total of 228 members of the community responded to the survey, representing eight percent of the 2010 Fallon County population. The survey results were used to validate or justify revisions to the draft Growth Policy goals, objectives and planning strategies. The findings from the community survey can be found in the appendix of the Growth Policy.

County Commission and Planning Board Meetings and Public Hearings

Input from the Fallon County Board of Commissioners and the Fallon County Planning Board provided valuable direction for the Growth Policy Update. Their working knowledge on planning issues that needed to be addressed ensured that all existing issues in the community were addressed by the Growth Policy. Initial input was provided at a joint Board of County Commissioners/Planning Board project scoping meeting in November 2011. The Planning Board provided input on the draft Growth Policy goals, objectives and planning strategies at their March 2012 regular meeting.

At a June 25, 2012 public hearing, the Fallon County Planning Board formally reviewed and recommended adoption of the 2012 Growth Policy. At August 13, 2012 public hearings, the Fallon County Board of Commissioners and the Plevna Town Council adopted the 2012 Growth Policy. At an August 15, 2012 public hearing, the Baker City Council adopted the 2012 Growth Policy.

Chapter 3: Community Goals and Objectives

Overview

The 2012 Fallon County Growth Policy is intended to serve as a guide to assist local officials and members of the community in making decisions to move the community nearer to its vision for the future. In effect, the Growth Policy is a road map providing direction on how to move forward to achieve a sustainable future for the community. The Growth Policy goals and objectives provide a planning framework that further defines the community vision and provides a more refined path forward to realize the community vision. Through adoption of the 2012 Fallon County Growth Policy, the community has an agreed-upon means to determine if it is moving in the appropriate direction and, make decisions that support, and are consistent with, the community's goal and objectives.

Goals are overarching statements expressing the values and interests of the community describing desired community conditions and characteristics. Objectives describe desired outcomes of a goal's achievement, enabling the community to evaluate whether goals have been achieved.

The goals and objectives are intended to provide local officials a reference that can be used to evaluate alternative decisions or courses of action. They provide a community compass to assist in determining if a specific decision or action is in the community's best interest. Due to the general nature of the term "public interest", what is in the best interest of a community can be interpreted in a number of different ways, often depending on the perspective of the decision maker. The Growth Policy goals and objectives provide more specific meaning to the term "public interest." When a decision or action is contrary to or in conflict with Growth Policy goals and objectives, local officials and the community have a valid basis to conclude the decision is not in the public interest. Conversely, when a decision or action is clearly consistent with stated Growth Policy goals and objectives, local officials and the community can take comfort in making a decision that has the overall support of the community.

At times making decisions consistent with Growth Policy stated goals and objectives may be challenging. A specific decision may support or be consistent with some goals and objectives and be contrary to others. In such situations, whenever possible, the aspects of the decision that are contrary to goals and objectives should be addressed or mitigated to make the decision more aligned with the Growth Policy. Finally, there may be situations where it is not possible or practical to make a decision consistent with all applicable goals and objectives. In such cases, local officials and the community need to make an informed determination regarding those goals and objectives that outweigh or carry more significance than others and make the decision accordingly.

The Growth Policy is a planning tool that should be used in daily decision making. In regularly using the tool, elected and appointed officials will come to realize it reduces the burden of governance.

Community support for a decision or action will no longer need to be gauged on a case-by-case basis. The Growth Policy clearly expresses the interests of the community and the decisions and actions they will support.

Finally, the goals and objectives should be referenced in making all decisions that apply to the content of the Growth Policy. Reference to the goals and objectives should not be reserved for only major decisions that have community-wide implications; they should be referenced on all matters of policy.

In summary, the Growth Policy goals and objectives provide the means to evaluate alternative courses of action and monitor the community's expressed interests and values in achieving a sustainable future. It will serve the community only to the extent which it is used to facilitate decision making.

Community Goals and Objectives

As discussed in Chapter 2, Public Involvement, the community goals and objectives listed below were established directly from public and community stakeholder input obtained from a variety of means. The extensive interaction with members of the community gave the planning consultant an opportunity to learn from the community. The community shared their values and concerns over existing conditions and goals for the future of the community. The input was the substantive basis for the following Growth Policy goals and objectives.

Land Use

Goals

- Promote orderly development that meets the needs of current and future residents and businesses.
- Plan for sustainable population growth in Fallon County.
- Provide necessary infrastructure to support development in planned future growth areas.
- Protect agricultural land, which is a valuable county resource.
- Enhance the community's aesthetic quality and preserve county landmarks.

Objectives

- Ensure developable land is available to accommodate anticipated population increases.
- Accommodate future growth in areas that can be efficiently served by public services.
- Implement land use policies and strategies to promote investment in downtown Baker and development of commercial uses in the Town of Plevna.
- Establish land use compatibility policy in planned future growth areas, including policy to limit incompatible development in existing agricultural areas.
- Establish an annexation policy for Baker and Plevna encouraging coordination with the County.

- Improve the physical appearance of existing neighborhoods and high visible properties to retain a clean and safe sense of place.

Housing

Goals

- Strive to create affordable housing options for households in all income ranges.
- Provide housing for the community's special needs population.
- Improve the quality of housing in existing neighborhoods.
- Provide sufficient housing opportunity for temporary energy sector workers.

Objectives

- Increase availability of housing choices for all people, including low- and fixed-income residents, senior citizens, homeless and persons with disabilities.
- Increase available housing in the community, with special emphasis on increasing the supply of affordable and workforce housing.
- Reduce the number of substandard housing units by securing outside funding for repair and rehabilitation.
- Make targeted public investments in neighborhoods to stimulate private investment.
- Establish minimum standards for temporary worker housing.

Transportation

Goals

- Reduce truck traffic levels in the City of Baker.
- Maintain safe streets and roads.
- Minimize disruption of traffic circulation caused by barriers such as the railroad.
- Plan for street and road extensions and preserve adequate right-of-way for such extensions.
- Protect Baker Municipal Airport's air space.

Objectives

- Improve traffic safety and maintain existing streets and roads.
- Reduce disruptions to traffic circulation resulting from railroad operations.

- Identify and secure sand and gravel resources for future maintenance of county roads.
- Plan for new streets and roads in future growth areas by preserving right-of-way for street and road extensions.
- Maintain existing and future operations at the Baker Municipal Airport.

Infrastructure

Goals

- Maintain existing water, sewer and storm water infrastructure.
- Plan infrastructure improvements to support future growth.
- Pursue all available outside funding sources for infrastructure projects.

Objectives

- Maximize the functional life of existing water, sewer, storm water and solid waste facilities.
- Coordinate infrastructure planning with future land use policy and future growth areas.
- Establish policies that clearly define financial responsibilities for infrastructure improvements associated with existing and new development.

Economic Development

Goals

- Increase overall economic activity in the County.
- Enhance the quality of life in the County to attract new households and businesses.
- Promote a diversified local economy that is not overly reliant on the energy sector.
- Coordinate multi-faceted economic development efforts that promote small business start-ups and business recruitment, retention and expansion.
- Increase the median annual income of households and develop a highly-skilled labor force.
- Support the development of secondary value-adding industry.

Objectives

- Develop economic development strategies that create a diverse local economy with employment opportunities for all ages.
- Enhance the quality of life in the community as a way to stimulate private investment.
- Maximize the use of outside economic development funding opportunities.
- Ensure existing job training services provide skills needed by existing and targeted businesses.

- Support the development of agriculture in the community.
- Explore financing strategies such as tax increment financing (TIF) to spur economic development in the City of Baker.

Public Facilities

Goals

- Maintain adequate public facilities to protect lives and property in the community.
- Create equitable community program opportunities and services for all County residents.
- Maintain sanitary and safe conditions for public and private property.

Objectives

- Maintain acceptable levels of service in developed areas as the City of Baker and Town of Plevna grow.
- Improve effectiveness and efficiency of government programs and services.
- Provide responsive public services that improve the health, welfare and safety of County residents.
- Enhance public involvement and timely/accurate notification of City, Town and County projects.

Recreation

Goals

- Meet the recreational needs of all Fallon County residents, including the provision of adequate open space in the City of Baker for active and leisure recreational activities.
- Provide year-round recreational opportunities.
- Maintain and enhance Baker Lake as a valued recreational resource.

Objectives

- Identify unmet recreational and cultural needs of Fallon County residents of all ages, including youth, and provide solutions to meet needs.
- Maintain and enhance existing parks and recreational facilities.
- Maintain and enhance the water quality of Baker Lake and its shoreline to encourage continued recreation activities associated with the lake.

Natural Resources

Goals

- Protect water resources to maintain a sustainable, clean water supply.
- Preserve native vegetation and wildlife habitat.
- Protect urban areas from wildfires.
- Encourage cleanup of brownfield properties and other potential contaminated sites.

Objectives

- Improve the quality of all water resources in the county and ensure construction activities implement measures to protect water quality and minimize erosion.
- Effectively control weed populations to improve agricultural productivity, preserve native vegetation and reduce wildfire risks and soil erosion.
- Enhance the community's ability to suppress wildfires from spreading to urban areas.
- Encourage and facilitate cleanup of environmental contaminated sites in the county.

Intergovernmental Coordination

Goals

- Improve communication and level of coordination between Fallon County, Baker and Plevna elected officials.
- Increase the level of coordination between Fallon County, Baker and Plevna and regional, state and federal agencies.

Objectives

- Increase collaboration between Fallon County, the City of Baker and Town of Plevna on matters of mutual interest and maintain open lines of communications to effectively manage conflict when disagreements arise.
- Proactively inform regional, state and federal agencies and the State Legislature funding needs that arise as a result of growth pressures.

Implementation

Goals

- Use the Growth Policy goals and objectives as a guide for decision making.
- Provide and obtain funding to implement Growth Policy policies and strategies.

Objectives

- Use the Growth Policy as a guide for decisions concerning land development applications, capital improvements and establishing/implementing community programs.
- Monitor the Growth Policy on an annual basis to evaluate the success of meeting goals and objectives and revise objectives and policies based on changes in priorities or circumstances.
- Establish a Capital Improvement Program to fund projects identified in the Growth Policy.
- Annually budget funds to implement Growth Policy policies and strategies.
- Dedicate staff resources to identify and apply for outside funding sources to implement Growth Policy policies and strategies.

Chapter 4: Community Profile

The profile for Fallon County includes several aspects that determine where the county, and two towns within, are regarding current trends, economic growth, housing, cultural opportunities and several other planning-related topics. One of the most important current trends is the existing population and economic health of the county. These trends provide a basis for other aspects of the plan including future land use, traffic generation, housing needs and numerous city services.

Fallon County

According to the US Census Bureau, the county has a total area of 1,623 square miles.

Population Trends

Fallon County has experienced a fluid pattern of growth and decline in population from 1920-2010. The county has experienced an increase of 1.9 percent in population within the most recent decade from 2000 to 2010. Table 4.1 displays the change in population ranging from 1920 to 2010.

Table 4.1: Population from 1920-2010, Montana, Fallon County

Year and Population									
1920	**1930**	**1940**	**1950**	**1960**	**1970**	**1980**	**1990**	**2000**	**2010**
4,548	4,568	3,719	3,660	3,997	4,050	3,763	3,103	2,837	2,890

Source: US Census Bureau, 2010 Census

Table 4.2 displays data from both the State of Montana as well as Fallon County. The table displays growth within the most recent population trends in the last decade as well as the age distribution in Fallon County and the percentage relation to the overall population. In addition, Table 4.2 depicts Fallon County's median household income in comparison with Montana's median household income. Fallon County's median household income is higher than the state average according to the 2010 census data.

Table 4.2: Population Quick Facts, Montana, Fallon County, 2000-2010

	Fallon County	Montana
Population, 2011 estimate	NA	998,199
Population, 2010	2,890	989,415
Population, percent change, 2000 to 2010	1.9%	9.7%
Population, 2000	2,837	902,195
Persons under 5 years, 2010	7.5%	6.3%
Persons under 18 years, 2010	23.5%	22.6%
Persons 65 years and over, 2010	17.4%	14.8%
Female persons, 2010	49.3%	49.8%

Source: US Census Bureau, 2000 and 2010 Census

Ethnic Characteristics

Of the people living in Fallon County in 2010, 97.4 percent were white, 0.1 percent African American, 0.4 percent American Indian and 0.6 percent Asian. In Table 4.3 below, the percentage of the population each segment represents in Fallon County is compared to the percent it represents in the State of Montana.

Table 4.3: Ethnic Characteristics, Fallon County, MT, 2010

	Fallon County	State of Montana
White persons	97.4%	89.4%
Black persons	0.1%	0.4%
American Indian and Alaska Native persons	0.4%	6.3%
Asian persons	0.6%	0.6%
Native Hawaiian and Other Pacific Islander	--	0.1%
Persons reporting two or more races	1.3%	2.5%
Persons of Hispanic or Latino origin	1.2%	2.9%
White persons not Hispanic	96.6%	87.8%

Source: US Census Bureau, 2010 Census

Households and Families

Composition of the 1,193 households residing in Fallon County is shown in Table 4.4, as well as data pertaining to housing types, tenure and value. Households refer to the person or group of people living in any one housing unit. Families, for purposes of the table, are groups of related people who live together. Generally, households that do not contain a family are made up of unrelated people living together (i.e. roommates) or people living alone. The table displays that homeownership rate is high with 76.2 percent, which is significantly higher than the homeownership rate in the State of Montana from 2006-2010.

Table 4.4: Housing Data, Montana, Fallon County, 2006-2010

	Fallon County	State of Montana
Housing units, 2010	1,461	482,825
Homeownership rate, 2006-2010	76.2%	69.0%
Housing units in multi-unit structures, 2006-2010	5.1%	16.3%
Median value of owner-occupied housing units, 2006-2010	$86,700	$173,300
Households, 2006-2010	1,193	401,328
Persons per household, 2006-2010	2.36	2.36
Per capita money income in past 12 months (2010 dollars) 2006-2010	$26,819	$23,836
Median household income 2006-2010	$52,529	$43,872

Source: US Census Bureau, 2010 Census

Table 4.5 shows a 3.6 percent increase in the number of total housing units for Fallon County from 2000-2010, as well as an increase in occupied housing units. Vacant housing units decreased indicating a demand for housing throughout the county.

Table 4.5: Housing Occupancy, Fallon County, MT, 2000-2010

	2000		2010	
	Number	Percent	Number	Percent
Total housing units	1,410	100%	1,461	100%
Occupied housing units	1,140	80.9%	1,193	81.7%
Vacant housing units	270	19.1%	268	18.3%

Source: US Census Bureau, 2000 and 2010 Census

The data in Table 4.6 shows that 30 percent of those housing units became occupied in 2005 or later. This housing trend reveals the increase in development in Fallon County from 2000-2010 especially within the most recent years from 2006-2010. Understanding the current housing stock such as occupancy rates, home values and rental rates and types of housing units will enable the County to move forward in a manner that protects property values while simultaneously providing affordable units for fixed- and low-income wage earners.

Table 4.6: Year Householder Moved into Unit, Fallon County, MT, 1969-2010

	Number	Percent
Occupied housing units	1,193	100%
Moved in 2005 or later	358	30.0%
Moved in 2000 to 2004	143	12.0%
Moved in 1990 to 1999	268	22.5%
Moved in 1980 to 1989	113	9.5%
Moved in 1970 to 1979	141	11.8%
Moved in 1969 or earlier	170	14.2%

Source: US Census Bureau 2010

Education

Below, Table 4.7 depicts the education rate in Fallon County in comparison to that of the State of Montana. Of all Fallon County residents, 88.1 percent of all persons age 25 and older have a high school diploma. This closely mirrors the State of Montana's percentage of high school graduates which is 91 percent. Those who have earned a Bachelor's degree or higher make up 15.7 percent of the Fallon County population, and the State of Montana 27.9 percent. There was an increase of 1.3 percent in the category of adults ages 25+, which is likely a result of the second most populated age group being ages 25-29; the most likely age group to have completed college degrees. The attraction of this age group contributes greatly to the percentage of workers with post high school education.

Table 4.7: High School Degree and Further Education, Montana, Fallon County, 2006-2010

	Fallon County		State of Montana	
	2000	**2010**	**2000**	**2010**
High school graduates, percent of persons age 25+, 2006-2010	91.7%	88.1%	94.2%	91.0%
Bachelor's degree or higher, percent of persons age 25+, 2006-2010	14.4%	15.7%	24.4%	27.9%

Source: US Census Bureau, 2010 Census 2000 and 2010 Census

Employment

Table 4.8 shows the number of people who are employed, unemployed, in the labor force, and the unemployment rate for Fallon County. Fallon County has a low unemployment rate of 2.3 percent. These numbers indicate that economic conditions in Fallon County are flourishing.

Table 4.8: Employment Status, Fallon County, MT, 2010

	Number	Percentage
Population 16 years and over	2,269	
In labor force	1,670	73.6%
Civilian labor force	1,670	73.6%
Employed	1,618	71.3%
Unemployed	52	2.3%
Armed Forces	0	0.0%
Not in labor force	599	26.4%

Source: US Census Bureau, 2010 Census

Industry

The employment by industry in Fallon County is detailed below in Table 4.9. The largest industry sectors which include agriculture, forestry, fishing and hunting, mining; and educational services, health care, and social assistance indicate a widespread variety of jobs requiring higher education, jobs requiring specialized skills and jobs for people without post-secondary education. As compared to the overall employment distribution, people working in manufacturing, information and professional, scientific, and management, and administrative and waste management services sectors hold relatively fewer jobs in Fallon County.

Table 4.9: Industry in Fallon County, MT, 2010

	Number	Percent
Agriculture, forestry, fishing and hunting, mining	398	24.6%
Construction	142	8.8%
Manufacturing	45	2.8%
Wholesale trade	20	1.2%
Retail trade	131	8.1%
Transportation and warehousing, and utilities	161	10.0%
Information	42	2.6%
Finance and insurance, and real estate and rental and leasing	85	5.3%
Professional, scientific, and management, and administrative and waste management services	57	3.5%
Educational services, and health care and social assistance	284	17.6%
Arts, entertainment, and recreation, and accommodation and food services	125	7.7%
Other services, except public administration	56	3.5%
Public administration	72	4.4%

Source: US Census Bureau, 2010 Census

Work Commute

As shown in Table 4.10, of the 1,568 employed individuals, 75.6 percent travel alone by car, truck or van and nearly six percent of the population commuting to places of employment carpooled. Currently, there is no public transportation activity according to the most recent Census data from 2010.

Table 4.10: Commuting to Work, Fallon County, MT, 2010

	Number	Percent
Workers 16 years and over	1,568	
Car, truck or van -- drove alone	1,185	75.6%
Car, truck or van -- carpooled	90	5.7%
Public transportation (excluding taxicab)	0	0.0%
Walked	129	8.2%
Other means	11	0.7%
Worked at home	153	9.8%
Mean travel time to work (minutes)	11.3	

Source: US Census Bureau, 2010 Census

Table 4.11: 2010 Employment, December 2011 Employment Estimates and 2020 Expected Employment Region 5 and Fallon County

	Eastern Job Service Region 5	Fallon County
2010 Employment	34,786	1,618
Expected Annual Job Growth, 2011-2020	3,350	156
Total Expected 2020 Employment	38,136	1,774
December 2011 Employment	37,696	2,052
December 2011 as a percent of Expected 2020 employment	98.8%	115.7%

Sources: Montana Department of Labor and Industry, Research and Analysis Bureau, Montana Employment Projection 2010-2020; and Preliminary, Non-Seasonally Adjusted Preliminary December, 2011 County Labor Force Statistics

The expected job growth for Fallon County was derived by applying Fallon County's percentage of 2010 employment for Region 5 to the expected job growth in Region 5. Region 5 includes Valley, Daniels, Sheridan, Roosevelt, Garfield, McCone, Richland, Dawson, Prairie, Wibaux, Treasure, Rosebud, Custer, Fallon, Powder River and Carter Counties.

Table 4.12 Top Ten Industries Projected 2010-2020 Employment Growth for Region 5

Industry	Number of Projected Job Growth	Percent of Total Projected Job Growth
Trade, Transportation and Utilities	6,239	16.8%
Health Services	4,870	13.1%
Educational Services	3,683	9.9%
Leisure and Hospitality	3,349	9.0%
Retail Trade	3,092	8.3%
Mining	2,035	5.5%
Construction	1,896	5.1%
Wholesale Trade	1,404	3.8%
Professional and Business Services	1,197	3.2%
Financial Activities	1,187	3.2%

Source: Montana Department of Labor and Industry, Research and Analysis Bureau, 10-Year, Long-term Employment Projection by Industry

Note: Projected self-employment and government employment excluded.

The top 10 industries in the above table account for more than 78 percent of the projected 2010-2020 employment growth in Region 5.

Table 4.13 Occupations Requiring Higher Education and the Top Five Highest Projected Worker Needs State of Montana, 2010-2020

Occupation	2010 Average Wage	Job Change 2007-2010	2010-2020 Projections		
			Annual Growth	Annual Replacements	Total Amount Worker Needs
Registered Nurses	$57,860	571	110	155	266
General and Operations Managers	$80,846	547	30	148	178
Elementary School Teachers	$37,710	285	37	109	146
Secondary School Teachers	$37,710	135	5	118	122
Accountants and Auditors	$54,263	65	65	55	120

Source: Montana Department of Labor and Industry, Research and Analysis Bureau, Montana Employment Projection 2010-2020

Note: Higher education means an Associate degree or higher.

Table 4.14 Hardest to Fill Health Care Positions with the Greatest Projected Job Growth State of Montana, 2010-2020 Projections

Occupation Title	2010 Average Wage	Minimum Education Required	Job Change 2007-2010	Annual Job Growth 2011-2012	Annual Replacement Needs	Annual Job Growth 2013-2020	Annual Replacement Needs 2012-2020
Registered Nurses	$57,860	Associate	571	72	127	120	162
Licensed Practical and Licensed Vocational Nurses	$35,662	Post-Secondary Vocational Training	189	22	95	37	97
Home Health Aides	$20,506	Short on the Job Training	330	96	33	121	42
Nursing Aides, Orderlies and Attendants	$23,653	Post-Secondary Vocational Training	330	46	54	76	67

Source: Montana Department of Labor and Industry, Research and Analysis Bureau, Montana Employment Projection 2010-2020

Baker, Montana, Fallon County

The City of Baker is one of the two communities in Fallon County. According to the United States Census Bureau, the city has a total area of 0.9 square miles.

Population Trends

The Census data in Table 4.15 displays the age composition of the City of Baker. The total population in 2010 was 1,741. The most populated age group with nine percent of the population in Baker is ages 50-54 with 156 individuals. With 135 individuals, the age group from 25-29 is the second most populated age group within the population. Attraction of the 25-29 age range is vital to the economic viability of communities such as Baker. As a community like Baker grows and continues to attract this age range, it is important the community has ample job opportunities and industry activity to retain this age group. In addition to focusing on young professionals as an economic driver in the community, it is essential for the City of Baker to adequately prepare and ensure plans for its aging population taking items into consideration such as transportation and affordable housing.

Table 4.15: Total Population and Division by Age, Baker, MT, 2010

Age Cohort	Number	Percent
Total population	1,741	100%
Under 5 years	132	7.6%
5 to 9 years	117	6.7%
10 to 14 years	93	5.3%
15 to 19 years	100	5.7%
20 to 24 years	97	5.6%
25 to 29 years	135	7.8%
30 to 34 years	120	6.9%
35 to 39 years	92	5.3%
40 to 44 years	77	4.4%
45 to 49 years	118	6.8%
50 to 54 years	156	9.0%
55 to 59 years	125	7.2%
60 to 64 years	84	4.8%
65 to 69 years	59	3.4%
70 to 74 years	59	3.4%
75 to 79 years	61	3.5%
80 to 84 years	58	3.3%
85 years and over	58	3.3%

Source: US Census Bureau, 2010 Census

Households and Families

Composition of the 763 households residing in Baker is shown in Table 4.16. Also included is Census data relating to the occupants in each household type.

Table 4.16: Households by Type, Baker, MT, 2010

	Number
Total households	763
Family households (families)	459
With own children under 18 years	197
Husband-wife family	372
With own children under 18 years	143
Male householder, no wife present	34
With own children under 18 years	20
Female householder, no husband present	53
With own children under 18 years	34
Nonfamily households	304
Householder living alone	262
Average household size	2.24
Average family size	2.89

Source: US Census Bureau, 2010 Census

Table 4.17 shows the number and percent of families belonging to each income range category. In Baker, the most populated income range is from $50,000 to $74,999 with 198 households existing in that range, which is 25.5 percent of the population of Baker.

Table 4.17: Household Income per Family, Fallon County, MT, 2010

	Number	Percent
Families	776	100%
Less than $10,000	16	2.1%
$10,000 to $14,999	22	2.8%
$15,000 to $24,999	71	9.1%
$25,000 to $34,999	99	12.8%
$35,000 to $49,999	73	9.4%
$50,000 to $74,999	198	25.5%
$75,000 to $99,999	119	15.3%
$100,000 to $149,999	146	18.8%
$150,000 to $199,999	9	1.2%
$200,000 or more	23	3.0%

Source: US Census Bureau, 2010 Census

The data in Table 4.18 provides a snapshot of the economic conditions in Baker. The data shows the percentage of families and people whose income in the year 2009-2010 was below poverty level.

Table 4.18: Percentage of Families and People Whose Income in the Past 12 Months is Below Poverty Level, Fallon County, MT, 2010

Poverty Status	Percent
All families	5.7%
With related children under 18 years	11.2%
Married couple families	4.5%
With related children under 18 years	8.3%
Families with female householder, no husband present	19.7%
With related children under 18 years	26.0%
All people	8.5%
Under 18 years	16.3%

Source: US Census Bureau, 2010 Census

Housing

Baker has 884 total housing units, 763 of which are occupied. Tables 4.19 and 4.20 contain data pertaining to the occupancy and type of housing in Baker.

Table 4.19: Housing Data, Baker, MT, 2010

	Number
Total housing units	884
Occupied housing units	763
Vacant housing units	121
For rent	32
Rented, not occupied	5
For sale only	10
Sold, not occupied	1
For seasonal, recreational or occasional use	26
All other vacants	47
Homeowner vacancy rate	1.9%
Rental vacancy rate	11.6%

Source: US Census Bureau, 2010 Census

Table 4.20: Housing Occupancy, Baker, MT, 2010

	Number
Occupied housing units	763
Owner-occupied housing units	525
Population in owner-occupied housing units	1,258
Average household size of owner-occupied units	2.4
Renter-occupied housing units	238
Population in renter-occupied housing units	449
Average household size of renter-occupied units	1.89

Source: US Census Bureau, 2010 Census

Plevna, Montana, Fallon County

Plevna is located in Fallon County. According to the United States Census Bureau, the town has a total area of 0.5 square miles.

Population Trends

The population of Plevna is 162. The most populated age bracket is ages 35-39 and contains 9.3 percent of the population of Plevna. Table 4.21 displays the distribution of ages throughout Plevna.

Table 4.21: Total Population and Division by Age, Plevna, MT, 2010

Age	Number	Percent
Total population	162	100%
Under 5 years	14	8.6%
5 to 9 years	14	8.6%
10 to 14 years	11	6.8%
15 to 19 years	13	8.0%
20 to 24 years	4	2.5%
25 to 29 years	12	7.4%
30 to 34 years	5	3.1%
35 to 39 years	15	9.3%
40 to 44 years	5	3.1%
45 to 49 years	14	8.6%
50 to 54 years	9	5.6%
55 to 59 years	8	4.9%
60 to 64 years	8	4.9%
65 to 69 years	7	4.3%
70 to 74 years	6	3.7%
75 to 79 years	7	4.3%
80 to 84 years	8	4.9%
85 years and over	2	1.2%

Source: US Census Bureau, 2010 Census

Households and Families

Plevna has 65 households, of which, 41 are family households. Table 4.22 displays data outlining the types of households in Plevna.

Table 4.22: Households by Type, Plevna, MT, 2010

	Number
Total households	65
Family households (families)	41
With own children under 18 years	21
Husband-wife family	39
With own children under 18 years	21
Male householder, no wife present	1
With own children under 18 years	0
Female householder, no husband present	1
With own children under 18 years	0
Nonfamily households	24
Householder living alone	21
Average household size	2.49
Average family size	3.24

Source: US Census Bureau, 2010 Census

Housing

According to the Census data in Table 4.23, there are 77 total housing units in Plevna. Of those, 65 are occupied, leaving 12 units vacant. This vacancy allows for some growth in Plevna.

Table 4.23: Housing Data, Plevna, MT, 2010

	Number
Total housing units	77
Occupied housing units	65
Vacant housing units	12
For rent	0
Rented, not occupied	0
For sale only	0
Sold, not occupied	0
For seasonal, recreational or occasional use	2
All other vacant	10
Homeowner vacancy rate	0%
Rental vacancy rate	0%

Source: US Census Bureau, 2010 Census

Table 4.24 displays information on housing occupancy in Plevna.

Table 4.24: Housing Occupancy, Plevna, MT, 2010

	Number
Occupied housing units	65
Owner-occupied housing units	48
Population in owner-occupied housing units	120
Average household size of owner-occupied units	2.5
Renter-occupied housing units	17
Population in renter-occupied housing units	42
Average household size of renter-occupied units	2.47

Source: US Census Bureau, 2010 Census

Chapter 5: Employment and Population Forecasts

Employment Forecasts

Employment growth in communities is a primary contributor for population growth. The most likely source of significant job growth in Fallon County will be derived from the energy sector, specifically oil and gas development and production. Fallon County has maintained its position as a leading oil and gas producing county in the state. Based on data contained in the 2006 through 2010 Annual Reports prepared by the Department of Natural Resources and Conservation, Oil and Gas Conservation Division, Fallon County was the top natural gas producing county in the state during the five-year period and the second highest producing county of associated gases and oil. Nearly all of the natural gas production came from the Cedar Creek gas field, the most productive gas field in the state.

Nearly all of the gas is produced by Fidelity Exploration and Production Company (Fidelity) which is a subsidiary of Montana-Dakota Utility Company (MDU). In addition, new wells are continuing to be drilled in the county. Nearly all of the new wells are gas wells. Between 2006 and 2010 Fallon County was either first or second in the state in terms of the number of new gas wells drilled.

Table 5.1: Oil and Gas Wells Drilled in Fallon County, 2006-2010

Year	Oil Wells	Gas Wells
2006	7	88
2007	2	116
2008	3	79
2009	2	20
2010	1	66

Source: 2006-2010 Annual Reports, Department of Natural Resources and Conservation, Oil and Gas Conservation Division

The stable growth in gas development and production will likely support modest employment growth in the county and at the very least maintain current levels of employment. Based on stakeholder interviews with representatives of oil production and oil service companies in the county, local energy companies are performing well but are reluctant to hire new employees until energy development activity increases in the region. These companies are active in the Cedar Creek gas field as well as the Bakken/Three Forks formation in North Dakota. Future growth of activity in these areas will likely generate new employment.

The greatest potential for future job growth could come from the Denbury Company's extension of the CO_2 pipeline from the Bell Creek oilfield to the Cedar Creek oilfield. Construction of the Greenscore CO_2

pipeline from Wyoming to southern Montana is nearly completed and CO_2 injection of Bell Creek oil wells is expected to commence this year.

In 2010 Denbury purchased Encore and its Cedar Creek oilfield holdings. According to Denbury's 2011 Annual Report the Cedar Creek oilfield has estimated oil reserves of 197 million gallons. In comparison, the total estimated oil reserves in the Bell Creek oilfield is 30 million gallons of oil. The company is enhancing its CO_2 production and has plans to extend the CO_2 pipeline to enhance oil production in the Cedar Creek oilfield. The timeline for the pipeline extension is uncertain but it is reasonable to expect Denbury would like to enhance the productivity of its Cedar Creek oilfields in the near future. When that occurs, the county can expect to experience a significant number of jobs as the nearly 950 oil wells are reworked to accommodate CO_2 injection.

As noted in Table 10.21 of the Economic Development Chapter, the county has experienced better than expected job growth in the past few years. In 2010, there were a total of 1,618 jobs in the county.

Housing

Table 5.2 shows the number of new housing units between 2000 and 2010 based on data obtained from the Fallon County Assessor's Office.

Table 5.2: Fallon County, New Housing Units, 2000-2010

Year	New Housing Units Excluding Mobile Homes	New Mobile Homes
2000	1	2
2001	3	3
2002	3	8
2003	10	10
2004	4	7
2005	5	4
2006	10	4
2007	2	3
2008	10	11
2009	7	2
2010	5	4
Total	60	58

Source: Fallon County Assessor's Office

The above data shows a total of 118 new housing units were constructed between 2000 and 2010. This does not account for the number of housing units that were demolished or became uninhabitable during the 10-year period. Conservatively assuming that for every 10 new housing units, one housing unit was demolished or became uninhabitable, there was still a net increase of 106 housing units that provided accommodation for 255 new persons.

Census Bureau figures show that 76.7% of Fallon County housing units are single family detached and 74.9% are owner-occupied. Countywide, the average household size of owner occupied units is 2.42 and the average household size for renter-occupied units is 1.99.

Table 5.3 Fallon County Housing

Units in Structure			Housing Tenure		
1-unit, detached	1,133	76.7%	Occupied units	1,216	1,216
1-unit, attached	9	0.6%	Owner-occupied	911	74.9%
2 units	13	0.9%	Renter-occupied	305	25.1%
3 to 4 units	49	3.3%			
5 to 9 units	0	0.0%			
10 to 19 units	19	1.3%	**Average Household Size**		
20 or more units	13	0.9%	Average household size of owner-occupied unit		2.42
Mobile home	242	16.4%	Average household size of renter-occupied unit		1.99

Source: U.S. Census Bureau, 2007-2011 American Community Survey

Population Forecasts

In April 2013, the Census & Economic Information Center, MT Department of Commerce released a series of population projections for a sixteen-county area that included Fallon County.

Table 5.4 Population Projections for Fallon County

	2010 Census	2015	2020	Projected Growth 2010-2020		2025	2030	2035
				Additional Population	Percentage Growth			
eREMI[1]	2,890	3,548	3,992	1,102	38.1%	4,228	4,312	4,273
Medium High Oil Production[2]	2,890	3,672	4,484	1,594	55.2%	4,995	5,129	4,977
High Oil Production	2,890	3,694	4,521	1,631	56.4%	5,110	5,286	5,127

Source: Montana Department of Commerce

[1] eREMI figures are a product of Regional Economic Models, Inc. (www.remi.com) and provide estimates of total projected population, at the county level, that coincide with MDTs estimates of projected population at low to moderate potential future oil production for the entire eastern Montana 16 county region.

[2] Medium High Oil Production and High Oil Production figures were produced using the Montana Department of Transportation's total population projections for the entire 16 county region in eastern Montana based on analytical scenario analysis of potential future oil production in Montana and eREMI county level total population levels and growth trends over the period. In short, the figures represent the estimated projected population based on heightened levels of oil production in eastern Montana.

For the Fallon County 2020 planning horizon, these population projections show growth ranging from 38.1 percent and 56.4 percent. The extent of future development in Fallon County, as shown in Chapter 6, is based on the state's mid-range projections, the Medium High Oil Production's projection of 55.2% population growth by 2020.

Population distribution between the City of Baker, the Town of Plevna and unincorporated Fallon County changed significantly since the 1920 Census. Table 5.5 shows that change. Since 1970 the population distribution has averaged 61.0 percent of the Fallon County population in the City of Baker, 4.9 percent in the Town of Plevna and the remaining 34.1 percent outside Baker and Plevna.

Table 5.5 Population Distribution 1920-2010

Location	Percent of Total County Population										
	1920	1930	1940	1950	1960	1970	1980	1990	2000	2010	Avg 1970-2010
Baker	23.5%	26.5%	35.1%	48.4%	59.2%	63.8%	62.6%	58.6%	59.7%	60.2%	61.0%
Plevna	5.3%	5.6%	7.8%	6.7%	6.6%	4.7%	5.1%	4.5%	4.9%	5.6%	4.9%
Unincorporated	71.2%	67.8%	57.1%	44.8%	34.3%	31.5%	32.4%	36.9%	35.4%	34.2%	34.1%

Source: US Census Bureau 1920 - 2010

The population forecasts for the City of Baker and the Town of Plevna presented in Table 5.6 were established by applying the average 1970-2010 population distribution percentages between the City of Baker, Town of Plevna and unincorporated Fallon County to future years.

Table 5.6 Population Projections for Fallon County

	2010 Census	2015	2020	2025	2030	2035
Medium High Oil Production[3] Projections	2,890	3,672	4,484	4,995	5,129	4,977
Estimated Fallon County Population Distribution						
Baker	1,741	2,240	2,735	3,047	3,129	3,036
Plevna	162	180	220	245	251	244
Unincorporated Fallon County	987	1,252	1,529	1,703	1,749	1,697

Source: Montana Department of Commerce and Kadrmas, Lee & Jackson

Based on the Table 5.6 projections, it is expected that the City of Baker will grow by approximately 994 between 2010 and 2020, the Town of Plevna will grow by approximately 58 and unincorporated Fallon County will grow by approximately 542 in the same time period. Countywide housing needs for this

[3] See Table 5.4

additional population were estimated through 2020 by applying the most recent Census ratio between population and housing units[4] to the information presented in Table 5.6.

Table 5.7 Projected Total Housing Needs for Fallon County

	Census		Additional Housing Needed		
	Population	**Housing Units**	**2010 - 2015**	**2015 - 2020**	**Total 2010-2020**
Baker	2,890	1,478	244 units	253 units	497 units
Plevna			20 units	20 units	40 units
Unincorporated Fallon County			136 units	142 units	278 units
Total Fallon County			400 units	415 units	815 units

Sources: U.S. Census Bureau, 2010 Census, 2007-2011 American Community Survey, Montana Department of Commerce and Kadrmas, Lee & Jackson

[4] See Table 5.3

Chapter 6: Land Use

Overview

The Fallon County Land Use Plan was prepared in coordination with the Growth Policy Update as required by Montana State code. The Land Use Plan is an update from the 2004 Land Use Plan and addresses existing land use conditions and development constraints. Moreover, future land use designations and recommendations are included to assist County Commissioners, officials, staff and residents on how the County can grow. Although this is a five-year plan, a 2020 planning horizon has been used for the future land use maps to support future development within the five-year planning period and to achieve compatible land uses. This will help achieve consistency between future updates of this plan, while allowing each entity the flexibility to respond to dynamic circumstances.

The Plan is intended to be used as a positive guide for growth and development. The nature and intent of the Land Use Plan is to protect the customs and cultures of Fallon citizens through protection of private property rights while supporting economic ventures. In addition, the Plan stresses proactive development measures, such as minimizing incompatible uses while maximizing efficient placement of infrastructure, transportation and other public services, to mitigate growth impacts that may occur within the County.

An example is the new crew camp being placed west of Baker along Highway 12. By locating uses along this corridor, future land uses can be planned to use existing infrastructure, are compatible with each other and have high-quality design elements that support growth policy goals and objectives.

Trends

As noted in the Population and Employment Chapter (Chapter 5), population is expected to increase because of recent growth in the energy extraction sector as well as with the expanding and diversifying local economy. The development of the Bakken oil region has placed pressures on surrounding Montana communities, including Fallon County, to respond to a growing demand for housing. The County's aging population will need to be accounted for when preparing future land uses so as to encourage easy travel and amenities for senior citizens.

In addition, supporting youth activities and spaces as well as preserving Fallon County's natural resources need to be balanced with economic development as future land uses are designated.

Existing Land Uses

Existing land uses were analyzed throughout the entire County and were tabulated to show the percentages and locations of uses throughout Fallon County, Baker and Plevna. Table 6.1 shows the distribution of land uses by category for each jurisdiction.

Table 6.1: Existing Land Use Distribution

	Fallon County		City of Baker		Town of Plevna	
Land Use	**Acres**	**Percent of Total Land**	**Acres**	**Percent of Total Land**	**Acres**	**Percent of Total Land**
Agricultural	838,881	81.0%	--	--	143	46.7%
Commercial	106	<0.1%	45	10.6%	6	2.0%
Industrial	149	<0.1%	39	9.1%	--	--
Parks	82	<0.1%	19	4.4%	--	--
Public/Civic	193,218	18.6%	68	16.0%	43	14.1%
Residential	--	<0.1%	183	42.8%	40	13.2%
Rural Residential	2,386	0.2%	--	--	34	11.0%
Vacant	1,313	0.1%	73	17%	40	13.0%
Total	1,036,135	100.0%	427	100%	307	100.0%

Source: Montana Natural Resource Information System, 2012

Fallon County

The dominant land use is agriculture, which includes farmsteads, ranches and public owned land that is also farmed or ranched. Approximately 840,000 acres or 81 percent of the total land is agriculture. Public lands account for more than 190,000 acres of land or 19 percent of the total land in the County. However, some public lands are also used for agricultural and ranching purposes with farmers and ranchers adopting the multi-use concept for publicly owned lands. The other land uses shown in Table 6.1 identify the remaining acreage spread across Fallon County, Baker and Plevna. Figure 6.1 shows the existing land uses for the County.

Agriculture

Farming, ranching and other agricultural uses are a staple to the local economy for Fallon County residents. As noted in Table 6.1, agricultural land uses account for the vast majority of land throughout the county. According to the 2007 Census for Agriculture, 978,818 acres were used for farmland and ranching, which is a five percent increase from 932,211 acres in 2002. The distribution of farmland is shown in Figure 6.2. The average farm size in 2007 was 3,307 acres, a 16 percent increase from 2002; however, the number of farms dropped nine percent from 327 in year 2002 to 296 in year 2007.

Figure 6.1: Fallon County – Existing Land Use Map

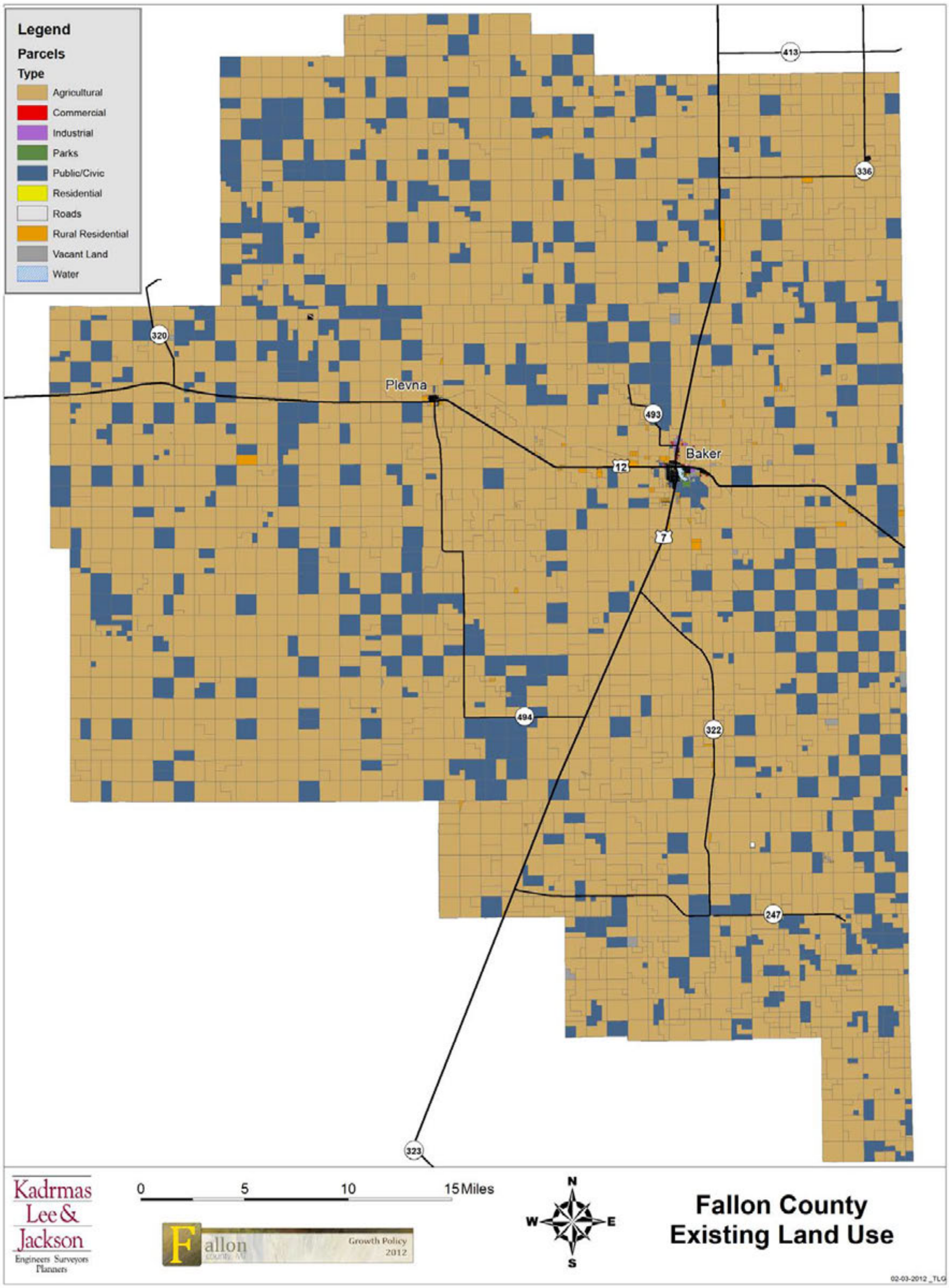
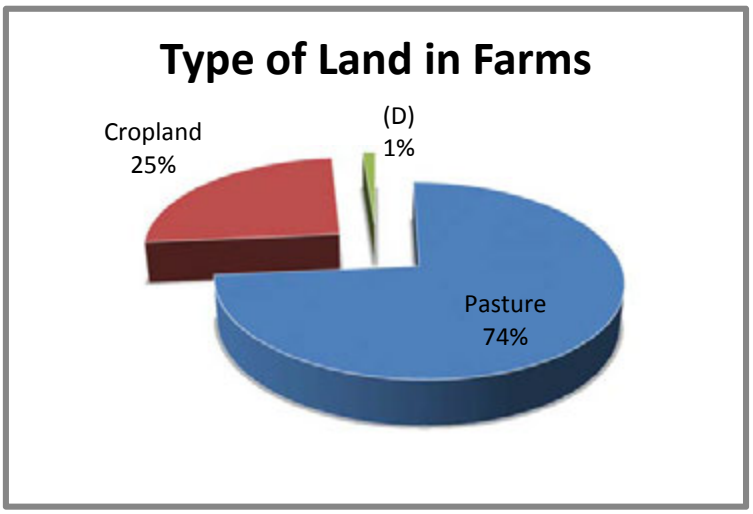


Figure 6.2: Farmland Distribution for Fallon County



Source: 2007 US Agriculture Census

Forage – land used for all hay and hayage, grass silage and greenchop – was the top crop item with Fallon County ranking as the sixth highest producing county in the state. Wheat was the dominant grain produced, although the county did rank higher with both safflower and corn than with wheat. Table 6.2 shows the 2007 quantities produced and state rankings for selected agricultural items. Livestock inventory was dominated by cattle and calves, with Fallon County ranking 21st among counties within the state.

Table 6.2: Crop and Livestock Production for Fallon County

	Quantity	State Rank
TOP CROP ITEMS (acres)		
Forage	90,897	6
Wheat for grain, all	38,505	26
Barley for grain	3,022	32
Safflower	2,460	7
Corn for grain	1,221	10
TOP LIVESTOCK INVENTORY ITEMS (number)		
Cattle and calves	49,192	21
Sheep and lambs	2,338	32
Colonies of bees	(D)	20
Horses and ponies	827	43
Layers	297	44

Source: 2007 US Agriculture Census

Commercial

Commercial uses make up less than one percent of total land for the entire county, yet commercial land uses play a critical role for a majority of residents. Businesses such as retail and grocery stores, pharmacies, banks, restaurants, hotels and a myriad of other small businesses are classified as commercial uses. These services are vital to many community residents, and developers should strive to expand commercial uses in Baker and Plevna to take advantage of existing infrastructure.

Rural commercial uses, which are defined as uses located outside an incorporated town, are just as important as urban areas are to the overall economic health of the county. However, since the majority of commercial uses are within Baker or Plevna as are most of the residents, commercial expansion should be targeted in both Baker and Plevna. The City of Baker and the Town of Plevna have existing and potential commercial properties that could be rehabilitated or expanded to accommodate future growth. Planning for adequate commercial land allows urban and rural towns to attract shovel-ready businesses. The County, Baker and Plevna should continue to work together and coordinate with SMART and EPEDC to attract businesses that benefit all residents by ensuring adequate commercial land is available.

Parks

The County owns three parks including Triangle Park, Mangold Sports Complex and Iron Horse Park. The public golf course is considered a public use because it requires a fee to participate and thus is not classified as a traditional park where anyone can use the facility without paying a fee.

Public

More than 19 percent of Fallon County land is classified as public/civic. Public and civic uses include land owned by federal, state, county and city government as well as land uses for public purposes such as parks, airfields, religious institutions and schools. The Bureau of Land Management, US Department of Interior, US Forest Service and US Department of Agriculture own a majority of the public land throughout the County as does the State of Montana. The State's public land includes school trust land that has been leased to oil and gas companies for drilling. The County receives royalties from the arrangement and should continue to pursue such agreements into the future.

While the federal government owns a majority of the public land, the agencies do allow local residents to lease land for ranching and farming purposes, which is known as the multi-use concept. The arrangement should continue into the future as it allows Fallon County residents to generate income and maintain the land. If an opportunity arises in which local residents or the County is able to acquire federally-owned land, the County should establish a plan for the property to achieve highest and best use. The plan does not need to be complex, but it should address future uses and who will be responsible for maintaining the property.

Residential and Rural Residential

Residential land is classified into two different categories, residential and rural residential. Rural residential land comprises less than one percent of all property throughout the county and contains all residential properties not included within Baker or Plevna boundaries. While a significant amount of residential land is rural, a majority of county residents live in incorporated towns including the City of Baker and the Town of Plevna.

Zoning guidelines may need to be updated to limit incompatible land uses and to ensure compatible land uses surround residential land. An example of incompatible land uses would be constructing a residential subdivision next to a chemical processing plant or heavy industrial businesses. The County, Baker and Plevna should coordinate planning efforts for future residential needs where town boundaries abut County property. While farming and ranching are compatible with both rural and residential properties, people moving into new subdivisions located adjacent to farming or rangeland properties should understand that agricultural and ranching uses have certain attributes associated with them including dust, loud machinery, animals, smells and other items that are intrinsic to farm and ranch uses. It is important to note this trend because future residential development is likely to occur on the fringes of Baker where open land exists.

Vacant Land

Vacant or undeveloped land is scattered throughout the County and comprises less than one percent or 1,313 acres. Vacant land within Baker is critical for planning purposes because these are areas located within town and will be ready for immediate development as infrastructure likely exists. Moreover, the vacant lands can be targeted for future infill development, thus reducing the need to expand infrastructure and infringe upon farmstead and agricultural lands.

City of Baker

A vast majority of county residents (60.2 percent in 2010) live in the City of Baker and as such, the dominant use is residential. Public/civic uses and vacant land are the second and third most common use (in terms of acreage). Current development patterns suggest that the City has adequate land for industrial and public uses, but lacks residential space for new homes and commercial space needed for businesses to start up or expand. Figure 6.3 shows the existing land use map for Baker.

Agriculture

Baker has no agricultural land uses within city boundaries.

Commercial

Currently, the City has 45 acres of land (11 percent) dedicated to commercial uses. The allocation of commercial uses are centered along Highway 7 and Highway 12, which are both major thoroughfares and ideal locations for commercial businesses because they attract high amounts of foot and vehicular

traffic. Several commercial uses are located north of Baker along Highway 7 and while not physically in Baker, they do contribute to the local economy by serving the oil and gas sector.

Industrial

Industrial uses account for nine percent of total land within Baker and are located along the railroad and Highway 12. The greatest numbers of industrial uses are located north of Baker along Highway 7 and similar to the commercial businesses, these uses cater toward the energy extraction industry.

Parks

Baker has 19 acres dedicated toward parks, which includes Eastside Park, Senior Citizen's Centennial Park, Steve McClain Memorial Park and Coldwell Field. The golf course is not included in the parks acreage because users must pay a fee for usage, thus it is included in the public/civic category. Parks are located around and near Lake Baker making them a natural and compatible use along the lake. However, no park is located north of the railroad or in southwest Baker for residents to use.

Public/Civic

Public and civic uses include all land owned by the City or County as well as land owned by schools, religious institutions and not-for-profit entities like museums, hospitals and libraries. The Baker Municipal Airport is considered a public use and has the single largest public/civic acreage. The rodeo grounds are the second largest public use with the golf course ranking third. This is important because the airport, rodeo and golf course are situated next to each other and present unique challenges for expanding the airport while preserving rodeo grounds and the golf course.

Other public and civic uses include Baker Public Schools, City Hall/Fallon County Courthouse, Baker Rural Fire Department, Fallon Medical Complex and Lake Baker.

Residential and Rural Residential

As noted earlier, residential uses account for the majority of land within Baker (43 percent of land); rural residential uses are not included in Baker as these uses are limited to residences outside municipal and town boundaries. Single-family homes account for the largest residential use and apartment complexes account for the least amount of residential use.

Vacant Land

Vacant land accounts for 17 percent of land within Baker and is classified as having no associated land use. Most of the parcels either have no building on the lot, but are privately owned. They may also have a dwelling unit that is uninhabitable making it a nonviable residential use. The areas identified in gray (vacant lots) in Figure 6.3 show the most potential for infill development and new housing construction.

Figure 6.3: City of Baker – Existing Land Use Map

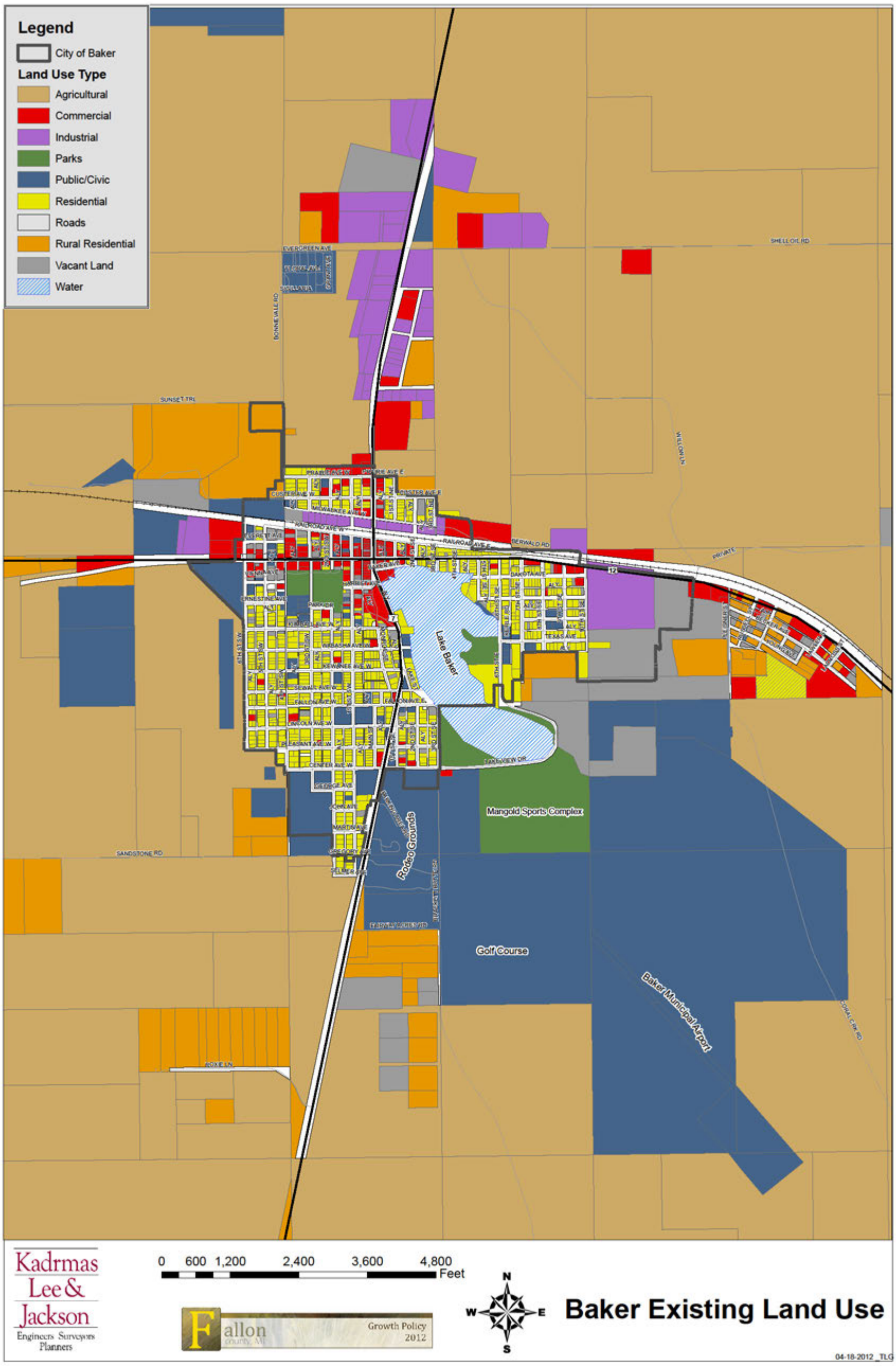
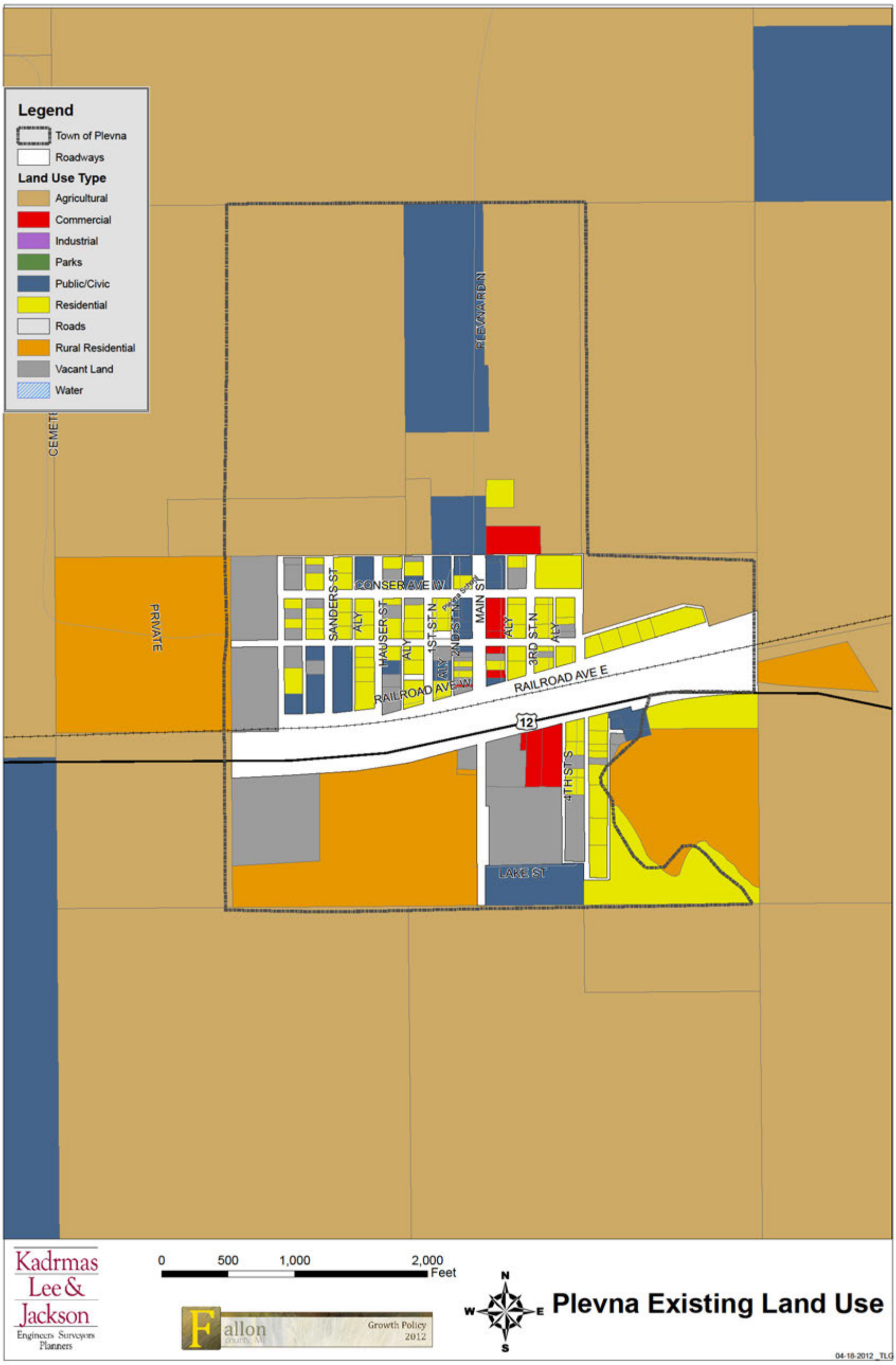


Figure 6.4: Town of Plevna – Existing Land Use Map



Town of Plevna

Figure 6.4 shows the existing land use for Plevna. The town has no industrial lands and its commercial businesses are located along major roads, thus providing adequate traffic and access management. Plevna has no glaring land use incompatibilities and if the town plans for future growth, it can continue to avoid land uses that do not complement each other.

Agriculture

Plevna, unlike Baker which has no agricultural land within city boundaries, includes approximately 143 acres of agriculture or 47 percent of total land.

Commercial

Approximately six acres of land is dedicated to commercial uses in Town. The allocation of commercial uses is clustered near the intersection of Main Street and Highway 12. An abandoned automotive garage currently occupies the southeast corner of the intersection, which has potential to become the central economic hub for the town.

Industrial

Plevna has no identified industrial uses.

Parks

Plevna has one park located east of Main Street and north of the railroad; however, land east of town and north of Callin Street offers residents a place to recreate although the land is privately owned. The only other public areas for people to recreate are the Plevna school and rodeo grounds.

Public/Civic

Public and civic uses include all land owned by the Town or County as well as land owned by schools and religious institutions. The school and several churches account for the majority of public/civic land in town.

Residential and Rural Residential

Residential uses account for nearly 13 percent of land in Plevna. The vast majority of structures are single family homes while mobile homes or manufactured homes account for the remaining housing units. Plevna lacks an apartment complex or multifamily housing.

Vacant Land

Vacant land accounts for 13 percent of land within Plevna and is classified as having no associated land use. Most of the parcels either have no building on the lot, but are privately owned. They may also have a dwelling unit that is uninhabitable, making it a nonviable residential use.

Future Land Use

The Future Land Use Plan is a planning document to help guide growth within the County, Baker and Plevna as well as to assist county and city staff, developers and builders on where to locate uses for potential future development. A future land use map was not created for the County; instead, guidelines presented below and policies outlined in the Implementation Chapter will guide growth within the County. The housing and population projections presented in Chapter 5 were used by the planning consultant to evaluate the need for developable land to accommodate the forecasted growth in housing units and population. For the 2020 horizon, these population projections show county-wide growth of approximately 56.4 percent.

Fallon County

The ability for the County to accommodate future population increases depends upon the availability of land for constructing new housing and creating new businesses. While the County does own acreage and has recently leased some of its land for a crew camp west of Baker, future land swaps or sales should be approved only where infrastructure currently exists or is planned in the near future.

Agricultural

Since ranching and farming are an important economic benefit and way of life for many County residents, preserving open land suited for agricultural purposes should be a high priority. To ensure existing uses are preserved, people moving into new residential subdivisions located adjacent to farming or rangeland properties need to understand that agricultural and ranching uses have certain attributes associated with them. The attributes include dust, loud machinery, animals, smells and other items that are intrinsic to farm and ranch uses. As such, new residential property owners, who move next to an established agricultural use, could sign a statement recognizing the presence and impacts of adjacent agricultural uses.

The County should continue to encourage and promote the “multiple use” concept of allowing farmers and ranchers to use federal, state and county land for farming, ranching and agricultural activities. In addition, no changes in federal or state land use should be allowed without the County receiving adequate notice, having the opportunity to comment on any proposed plan or land use activity.

Commercial and Industrial

The County should continue encouraging businesses to expand in Baker and Plevna, where existing infrastructure such as roads, water and sewer can provide immediate services to a business.

Recent developments north of Baker along Highway 7 have begun to place constraints on north Baker’s sewer district. Moreover, as future development occurs along this corridor, the County should work with Baker to establish standards for development so that businesses are not inversely impacted by either building in Baker or in the County. Such standards include similar setbacks, lot coverage, building height,

subdivision regulations, landscaping and access requirements. By having agreed upon standards, it removes confusion from businesses and developers about where it is best to develop.

As noted in the community survey, several residents wanted to improve the gateway corridors into Baker and Plevna. The area specifically north of Baker was identified as not attractive. The County should work with existing commercial land owners to develop and implement a landscaping program whereby businesses can apply for a grant or low-interest loan to improve building facades and screen outdoor storage. The County, in conjunction with Baker, could establish a landscape improvement program that both entities fund with taxes or grant monies. The planned North Baker Drainage project may provide an opportunity to install landscaping improvements along SR 7.

Future development should also be encouraged where infrastructure currently exists or can be easily extended without significant costs to the County. If a developer wants to extend infrastructure by paying for the improvements, the County should analyze the capacity of existing systems to accommodate the new improvements.

Parks

While the County has three established parks, residents have noted they would like additional parks in Baker and in Plevna. The County should coordinate with future developers about the potential for dedicating park land to either the County or Baker/Plevna as well as what options exist for land swap for future park lands.

Public/Civic

Public and civic land uses should be preserved, especially the rodeo grounds and airport facilities south of Baker. Planning for future uses around these two landmarks should be a top priority so as not to disturb air-traffic operations. Other community landmarks including the museum, library and schools should be planned for future expansion as the community grows. While not all public/civic facilities may require expansion, planning for compatible land uses around these facilities should be incorporated.

County facilities including the landfill and maintenance shops may need to be expanded with potential population increases. While the landfill currently has capacity to accommodate more than 25 years of waste, planning for future expansion should be identified so as not to design residential subdivisions near potential expansion areas.

Residential and Rural Residential

Rural residential development should be encouraged when septic systems can be developed to adequately handle the size of development; however, planning for rural residential uses on the fringe of Baker should be discouraged as these developments may cause issues when the City needs to expand its boundaries and public services. Transitioning from septic systems to sewer systems is the biggest challenge for both the homeowner and City. The County and Baker need to coordinate future residential

developments near Baker to ensure if residential uses are planned, they either tie into Baker's existing water and sewer system (when capacity and pressure are feasible) or are developed in such a way that they can be easily linked to City services when capacity and pressure are available.

Crew camps should continue to be planned within the County and outside Baker and Plevna boundaries. An overwhelming number of survey respondents (58 percent) preferred locating the proposed crew camp west of Baker. Furthermore, future crew camp facilities should be located near the proposed facility to share infrastructure and policing costs. As these facilities begin to transition from crew quarters to other potential uses, having them clustered makes redevelopment easier because it allows for large-scale development or section-by-section development, both of which are advantageous to developers and investors. The County should also continue to request that infrastructure be left in place after the crew camp facility leaves so future uses can quickly and cost-effectively reuse the land and make it an attractive use whether it be multifamily housing, office buildings, restaurants or industrial development.

Vacant Land

Vacant land located near Baker and Plevna offers the best opportunity for the County to coordinate future growth with these communities. The future land use maps for each community show that all vacant land is assigned a new use, even land that is near Baker and Plevna boundaries. However, not all vacant land in the County has been assigned a new use. Some vacant parcels cannot be developed because of terrain, lack of infrastructure or other issues. As such, only parcels near Baker and Plevna have been assigned future uses.

City of Baker

Baker's growth has been generated mostly from the oil and gas extraction business and with the recent oil boom in the Bakken oil formation, the City could experience another population increase. As noted in the Population and Employment Chapter, the County is expected to add 156 jobs per year through year 2020. Table 5.6 shows that the City is expected to add approximately 994 new residents between 2010 and 2020 based on the state's Medium High Oil Production Projections[1]. Figure 6.6 shows the future land use plan for Baker.

Future growth will be directed toward north and west Baker where land and infrastructure can accommodate development. A recent crew camp approval will bring infrastructure approximately two miles west of Baker's boundary allowing development to occur along Highway 12. In addition, the development of industrial uses north of Baker should continue; however, the City and County should develop landscaping and screening standards to improve the aesthetic appearance of the corridor. Developing south of Baker presents some difficulties as water pressure becomes low and sewer requires

[1] This projection for the City of Baker assumes that the City will capture 61% of the Fallon County population growth (See Tables 5.5 and 5.6).

lift stations to move effluent. As such, rural residential and low-density residential are the best options for planning future uses south of Baker. East of Baker presents possible opportunities for commercial and residential development, although the airport, Lake Baker and several oil and gas wells limit significant development.

The use of Tax Increment Financing (TIF) presents a funding source for improvement projects within the City. To utilize TIF, it is necessary to determine specific bounded districts that will be subject to the funding mechanism. The future land use map in Figure 6.5 can be used to guide the location of TIF boundaries and other general economic redevelopment areas. More information regarding the use of TIF can be found in the Implementation Chapter (Chapter 14).

Agricultural

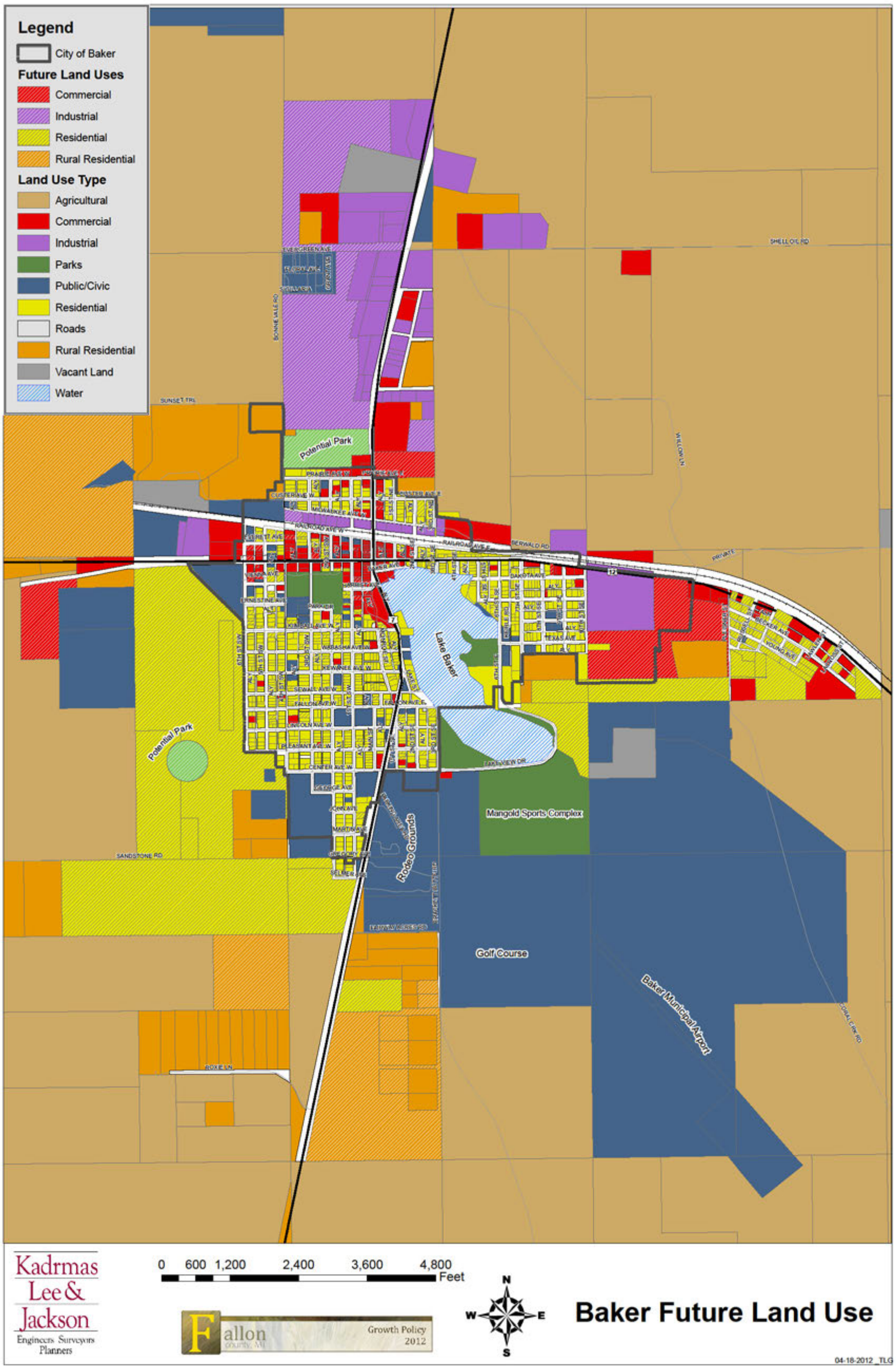
When planning for future uses, Baker needs to coordinate with the County on bringing in existing agricultural land into City boundaries. No agricultural land should be annexed unless the land will be developed into a higher use such as residential, commercial or industrial. Avoiding such large tract of open land saves the existing property owner tax money and helps eliminate land speculation. Moreover, because agricultural land is highly valued and residents wish to preserve prime agricultural parcels, agricultural land on the periphery should be acquired first to avoid large swaths of agricultural land between more intense uses.

Commercial

Future commercial development should occur along Highway 7 and Highway 12 to maximize access onto the transportation corridors including downtown Baker. While development will likely occur north of Baker along Highway 7, future opportunities exist to expand commercial businesses in downtown Baker as well as east and west along Highway 12. Vacant land east of 10th Street E, west of Pleisner Street and south of Highway 12 has the potential to be a new commercial development with a restaurant, hotel, office buildings and a small industrial site to the south.

Because of the crew camp site being constructed west of Baker, future infrastructure will be placed along the highway providing an opportunity for future businesses and developers to construct commercial businesses and affordable housing units. As such, a commercial site could be developed west of Baker along Highway 12 to maximize the newly planned infrastructure. These two significant commercial developments allow the City and its residents to plan and build attractive businesses that welcome visitors into Baker. The Highway 12 corridor has the potential to set an example of what the community values in terms of building design and landscaping, whereas Highway 7 has some difficulties in creating new design elements along an established corridor. However, Highway 7 south of town can be developed to look better than the northern section by encouraging commercial uses along the highway frontage with industrial uses behind the commercial properties.

Figure 6.5: City of Baker – Future Land Use Map



Several different businesses can be accommodated in commercial sites including offices, retail, restaurants, professional services (dentists, doctors, attorneys, insurance and engineers), hotels and other small businesses that drive Baker's local economy. As such, downtown also offers new and existing businesses the ability to expand or rehabilitate their buildings. The City and County should coordinate with SMART and the EPEDC in securing grants for improving downtown facades as well as for bringing in new businesses into abandoned store fronts.

Industrial

The area north of Baker along Highway 7 has become the City's industrial park and a major economic hub for the County. The City and County should continue to encourage future industrial developments to locate in this area as it could be developed into an attractive yet functional industrial park.

The City already has a large industrial use on the east side of town and it would be beneficial to encourage commercial or light industrial (storage buildings) next to the site instead of heavy commercial, which would be incompatible with the Stanhope Addition. Planning for future industrial uses south of Baker presents some challenges with water pressure and compatibility issues.

In general, industrial uses should be clustered near each other so as to share access. If industrial development does occur along Highway 12 west of Baker, the City and County should coordinate and develop standards for having commercial uses front the corridor and having industrial uses behind commercial business. The buffer will create an attractive and inviting corridor; however, if a developer or builder wants to construct an industrial use along the Highway it should be allowed albeit with significant landscaping and buffer standards.

Parks

Future park land is needed north of the railroad as it presents a barrier for many residents to get to existing parks south of Highway 12. A neighborhood park could be established south along the Sandstone Stream that would serve residents north of the railroad. As future growth occurs west of Baker, a new park should be planned to accommodate future residents in this area as well as those in southwest Baker. A future park should be planned for people on the west side of Baker, although a specific location has not been identified as developers and the City and County should coordinate where the park could be located.

Public/Civic

Public and civic uses should be encourage throughout the City and not focused in one general area. Libraries and religious institutions are generally located in residential areas where people can walk. City and County buildings may need to expand to accommodate staff increases and the County and City should coordinate their efforts to expand buildings and facilities on land they already own.

Residential and Rural Residential

As mentioned above, the City is expected to add approximately 994 new residents between 2010 and 2020 based on the state's Medium High Oil Production Projections. Residential land is the key for accommodating growth and ensuring Baker can create affordable housing. Not planning for enough residential land can raise land prices as housing becomes a premium, while too much land can drive down home and land values.

Baker has more than 73 acres of vacant land within the City and the majority of this is suitable for residential development. Unsuitable parcels either have land use compatibility issues or are not viable options for development based on lot size.

New residential developments should incorporate more housing choices for people including multifamily units such as apartments and townhomes. The land identified on the future land use map for Baker shows new residential land west along 6th Street SW from Kimball Avenue W south to the school. This area should be developed with single family urban-style lots with a mix of housing choices including single family, multifamily apartments and townhomes. RV units and similar travel trailers should not be included in this development. RV and similar travel trailer units could be planned for the southwest corner of the residential area described above, yet design standards and landscape buffer requirements would be needed to ensure property values and community aesthetics are maintained.

Rural residential uses should be planned for the area south of the residential development described above. Rural residences are currently located to the east of the potential new rural development and should continue along Sandstone Road until it reaches the potential RV park.

East Baker presents a unique opportunity to develop residential units that could be intermixed with the potential commercial site described earlier. Residential uses could be extended southward along 8th Street SE and 10th Street SE and carried eastward to the Stanhope subdivision. Single family homes would be best suited for the area, although multifamily units might also serve as a buffer between the commercial and industrial development. Rural residential uses would also be suited for the southeastern section of this development.

A small section of residential land has been planned for the area north of Sandstone Stream. This area would encompass multifamily units and small urban lots. The residential uses in this area should have landscaping and setback buffers from the industrial development directly to the north. In addition, the residential uses along the northwestern corner of Bonnievale Road should have landscaping and setback buffers as this road may serve as a truck by-pass. However, the by-pass would end at the intersection of Bonnievale Road and Sunset Trail and move west.

Residential development in northeast and southeast Baker is limited because of oil and gas wells and the Baker Municipal Airport. Therefore, the City needs to keep the west and southwest open to residential

development opportunities. Baker and Fallon County should continue to work together to plan future uses for this area so the City can avoid becoming landlocked and extending infrastructure in an inefficient manner.

Vacant Land

The vacant parcels within Baker offer several existing residents the ability to make a profit by selling the current land or developing it into rental properties. By encouraging infill development – development within Baker city limits – the city can maximize its infrastructure capabilities while decreasing the need for future extensions. As shown on the future land use map, all vacant parcels are eliminated as they have a better use rather than sitting idle with no development.

Town of Plevna

As shown in Table 5.6, the Town of Plevna is expected to grow by approximately 58 residents between 2010 and 2020. Figure 6.6 shows the future land use plan for Plevna.

Agricultural

While agricultural uses are important to the County and Plevna residents, agricultural land within Plevna's boundary can be developed to accommodate new residents and businesses that wish to begin operating in Town. Agricultural land on the periphery of the town should be preserved for such uses, while land closer to existing homes and buildings should be developed first.

Commercial

Future commercial development should occur at the intersection of Highway 12 and Main Street and along both corridors. The abandoned automotive repair shop at the southeast corner of Highway 12 and Main Street presents a prime opportunity for redevelopment. The site could be renovated into a gas station and convenience store. However, the perception is that the site is contaminated and may require significant funds to clean up. As such, the County should pursue brownfield redevelopment grants from Montana's Department of Environmental Quality (DEQ) and the Environmental Protection Agency (EPA). Both DEQ and EPA offer site assessment grants to determine the level of, if any, contamination on site as well as clean-up funds.

Other potential commercial sites include the parcels on the southwest corner of Highway 12 and Main Street. This area could capture other businesses that require highway access such as a grocery store or farm implement store.

Industrial

Industrial development should be located along Highway 12 or north of the rodeo grounds on Main Street. These areas have access to major transportation corridors, which are usually essential for industrial businesses. Future industries that want to locate in Plevna will have access to an upgraded

water system as well, making the town an attractive location for future development. Industrial land has been identified for future development south of Highway 12.

Parks

While no additional parks are currently needed, park facility upgrades should be planned and coordinated with the County. The school will likely need new playground equipment within the next five years and the park along the railroad could be improved with better amenities. However, if population increases beyond the forecasted estimate, new park space may be required. Two areas offer inviting areas that could be transformed into a quality park. The area east of town and north of Callin Avenue offers a stream that could have a trail built next to it as well as areas of lush green space for passive recreation. The other area is located west of Sanders Street. Currently two vacant parcels are located north and south of Callin Avenue. This land could be transformed into a park and residential lots, with the terrain surrounding the small stream serving as a linear park.

Residential and Rural Residential

The Town of Plevna is expected to add approximately 40 new residential units by the year 2020 based on the state's Medium High Oil Production Projections[2]. The Town has capacity to accommodate additional residents as the water system is receiving an upgrade and the sewer lagoons have capacity. Moreover, another lagoon cell could be designed if population warrants it.

Currently, single family homes and mobile homes are the only housing units in Plevna. An apartment complex or multifamily housing units such as townhomes or duplexes would offer potential residents with an affordable housing option. Not all residents can afford single family homes and some residents may not prefer mobile or manufactured homes. As such, townhome and/or apartment style developments offer a mix of autonomy with affordability. Multifamily housing should be constructed near the school or on the west side of Plevna as these two areas offer amenities for multifamily units with the school nearby and a potential linear park on the west end.

Rural residential development can accommodate families as well; however, the Town should consider limiting large lot developments with town boundaries as it is not an efficient use of existing infrastructure. Large lot subdivisions would be favorable south of town as they could be developed with septic systems, whereas traditional town lots are better suited north of the railroad to take advantage of gravity sewer flows.

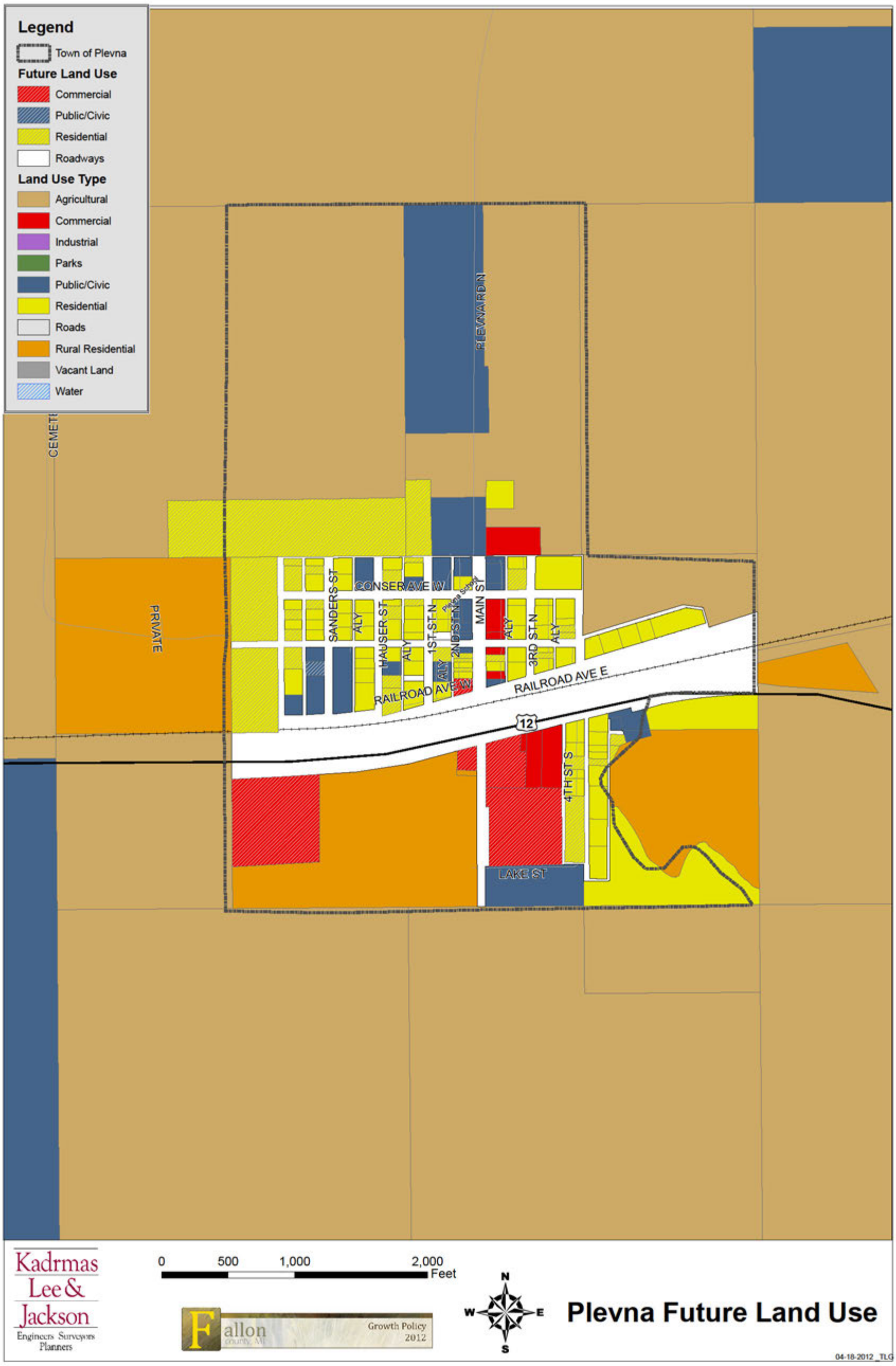
Vacant Land

The vacant parcels within town offer several existing residents the ability to make a profit by selling the current land or developing it into rental properties. By encouraging infill development – development

[2] See Table 5.7.

within Plevna town limits – the town can maximize its infrastructure capabilities while decreasing the need for future extensions.

Figure 6.6: Town of Plevna - Future Land Use Map



General Provisions

General guidelines and provisions to help the County, Baker and Plevna manage growth that suits each entity's development goals and achieves compatible land uses.

Annexation

Fallon County and the City of Baker need to establish annexation guidelines that outline development standards for buildings located on the fringe of Baker's boundaries. By adopting an agreed upon policy, both entities can ensure compatible development leads to efficient uses of infrastructure and avoids costly improvements through retrofitting septic and well water systems. Moreover, annexation policy that is fair helps developers and land owners know when and where future rural areas will be brought into the city, thus allowing developers and land owners to make informed decisions regarding their property.

Development Standards

Compatible development standards will make annexations more palatable and allows Baker and the County to plan for transition areas between urban and rural boundaries. Examples of compatible development standards include setbacks, building height, lot coverage, density, zoning, landscaping and buffer requirements. Implementing landscape and buffer requirements along the gateway corridors (Highway 7 and 12) will greatly enhance aesthetics along these roadways and will make Baker a more inviting town. In addition, implementing similar standards in Baker's downtown area will improve businesses and may help spur further economic development as future business owners will recognize the investment current businesses and residents have in improving downtown Baker.

Extraterritorial Zoning

The County and City of Baker should incorporate extraterritorial zoning, which assists with implementing development standards and streamlines annexation policy. Extraterritorial zoning (ETZ) is defined as a municipality having jurisdictional control to enforce its zoning regulations beyond the current municipal boundary. Current Montana State Code allows the City of Baker to adopt a one-mile extraterritorial zone boundary in which the City can enforce its zoning regulations. However, the County must agree to the extraterritorial zone before it can be adopted.

The benefits of an ETZ are that it gives all developers the same opportunities as they only need to abide by one set of development regulations. It also makes land uses along the urban fringe compatible with development on either side of Baker's boundary, thus reducing future costs of retrofitting infrastructure. Lastly, it allows both the County and City to plan for future uses outside Baker's existing boundary while giving developers insight into what uses will be allowed and where they can be built, thus reducing confusion among all parties involved.

Infrastructure Extension

Through adopting the above recommendations, the County and City of Baker can effectively plan where new infrastructure will be needed and where it is cost prohibitive to develop. It also informs developers and investors about the direction the community wants to go and where certain uses may be permitted and where they are prohibited based on available infrastructure capacity. In addition, all parties involved can efficiently extend infrastructure while avoiding inconsistent development or incompatible connections (changing from a septic system to city sewer service). Residents and tax payer monies are also spent more efficiently and effectively by extending services gradually and avoiding costly extensions for a single use.

Chapter 7: Housing

Overview

Housing in Fallon County, particularly in populated areas including the City of Baker and the Town of Plevna, is a major concern for citizens, as evidenced in the community survey. Affordability and housing choices are the two largest issues facing Fallon County residents. More than 77 percent of respondents noted that increasing the availability of affordable and workforce housing was the most important housing objective. Another 47 percent responded that creating more housing choices for low- and fixed-income residents was important to the community.

The goals established through the public input process along with the implementation strategies will help address these needs for community residents; however, understanding the current situation allows civic leaders and residents to respond in a manner that best achieves the goals.

Households and Housing Units

In 2010, Fallon County had 1,193 households, an increase of five percent from 2000, which had 1,140 households. However, the City of Baker witnessed an increase of nearly 14 percent in household growth while the Town of Plevna received more than a 17 percent increase in the number of households from 2000-2010 as shown in Table 7.1. The increase in households signifies a growing community with a need for additional housing units. Moreover, recent growth in the energy sector in eastern Montana and western North Dakota have started to impact Fallon County with increased demand for housing units. As such, the demand for affordable and available housing units may increase with employment and expansion in oil and gas industries.

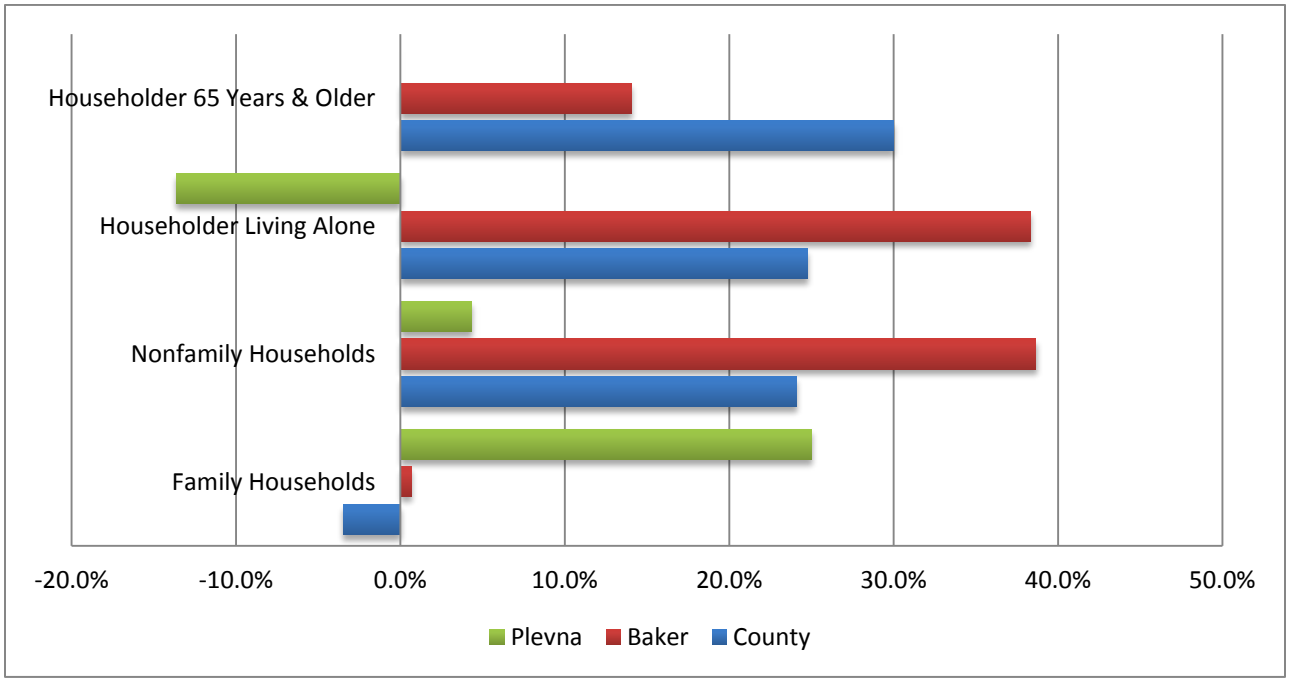
Table 7.1: Household Distribution for Fallon County, City of Baker and Town of Plevna

	Fallon County				City of Baker				Town of Plevna			
	200		2010		2000		2010		2000		2010	
	#	%	#	%	#	%	#	%	#	%	#	%
HOUSEHOLDS BY TYPE												
Total households	1,140	100	1,193	100	694	100	789	100	63	100	74	100
Family households	804	70.5	776	65.0	456	65.7	459	58.2	40	63.5	50	67.6
Married-couple family	690	60.5	690	57.8	373	53.7	387	49.0	34	54.0	50	67.6
Male householder	–	–	20	1.7	–	–	12	1.5	–	–	0	0.0
Female householder	68	6.0	66	5.5	54	7.8	60	7.6	2	3.2	0	0.0
Nonfamily households	336	29.5	417	35.0	238	34.3	330	41.8	23	36.5	24	32.4
Householder living alone	303	26.6	378	31.7	214	30.8	296	37.5	22	34.9	19	25.7
65 years and over	150	13.2	195	16.3	114	16.4	130	16.5	9	14.3	9	12.2
Average household size	2.45	–	2.36	–	2.38	–	2.35	–	2.19	–	2.42	–

Source: US Census 2000 and 2010

While the number of family households slightly increased in Baker and Plevna and even decreased across the County, nonfamily households – people living alone or with nonrelatives only – increased substantially for both householders living alone and those 65 years and over. It is important to note that people 65 years and over may also be classified as a household living alone. The increases in nonfamily households for Fallon County and the City of Baker indicate a need to construct multiunit structures that are affordable for single residents and people on fixed incomes. Figure 7.1 shows the percent increase of households from 2000-2010.

Figure 7.1: Percent Change of Householders by Type, 2000-2010

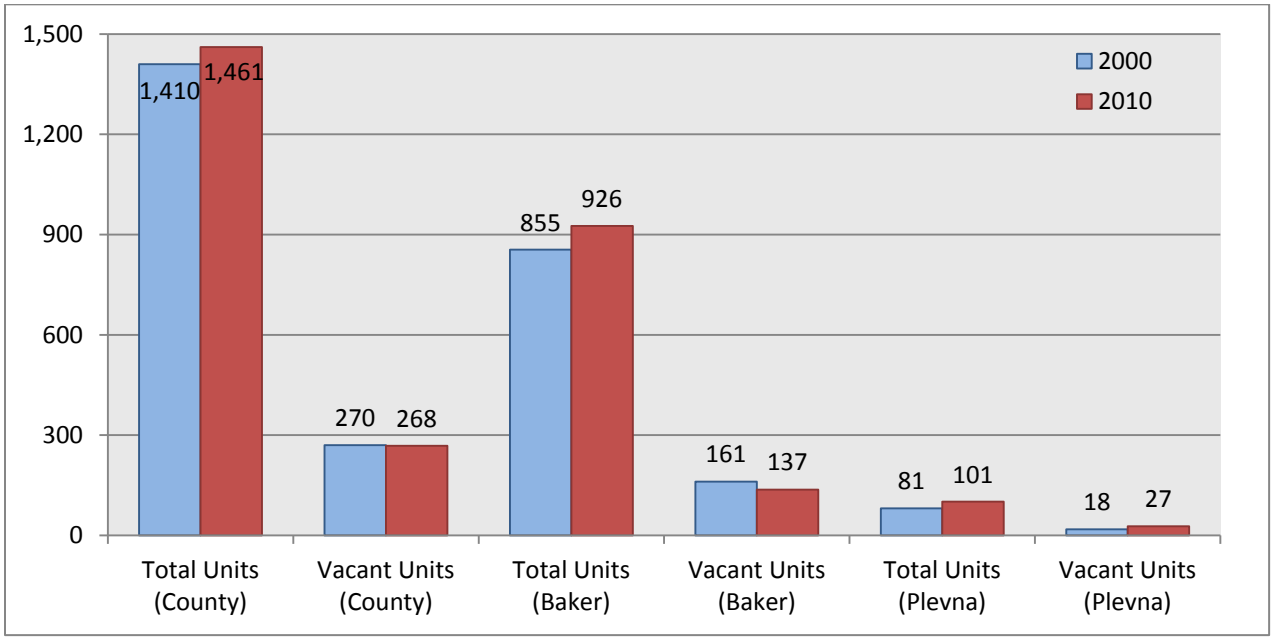


Source: US Census 2000 and 2010

Figures 7.2, 7.3 and Table 7.2 also show the number and type of housing units in Fallon County and outlines the mix of housing choices for residents. The overall number of structures increased from 2000-2010 with 51 new units constructed in Fallon County, 71 units constructed in Baker and 20 new units in Plevna. However, the number of multi-unit residential structures throughout the county declined for almost all categories with the exception of 10-19 housing unit projects.

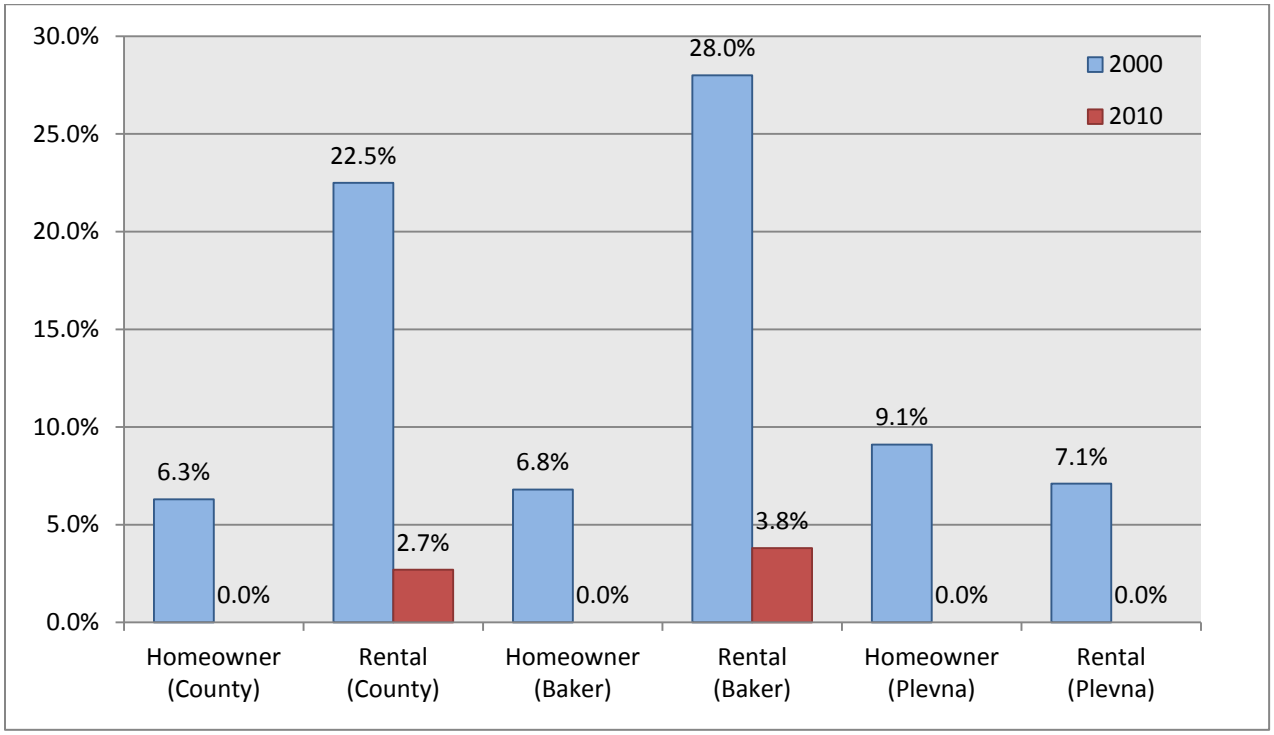
Nearly 75 percent of two-unit structures disappeared during the past decade. The significant decrease of two-unit structures indicates these structures were either reconfigured to single-unit or multiunit structures, or that the two-unit structures were demolished. As a result, demand for this type of housing and other multi-unit residential structures has been increasing as evidenced in multiple stakeholder interviews and the decrease in both homeowner and rental vacancy rate as shown in Figure 7.3. The low vacancy rates, zero percent for all three communities in 2010, indicate a significant demand for housing units.

Figure 7.2: Total and Vacant Housing Units for Fallon County, City of Baker and Town of Plevna



Source: US Census 2000 and 2010

Figure 7.3: Homeowner and Rental Vacancy Rates for Fallon County, City of Baker and Town of Plevna



Source: US Census 2000 and 2010

Table 7.2: Vacancy Rates for Fallon County, City of Baker and Town of Plevna

	Fallon County				City of Baker				Town of Plevna			
	2000		2010		2000		2010		2000		2010	
	#	%	#	%	#	%	#	%	#	%	#	%
HOUSING UNITS												
Total housing units	1,410	100	1,461	100	855	100	926	926	81	100	101	100
Occupied housing units	1,140	80.9	1,193	81.7	694	81.2	789	85.2	63	77.8	74	73.3
Vacant housing units	270	19.1	268	18.3	161	18.8	137	14.8	18	22.2	27	26.7
Homeowner vacancy rate	6.3	–	0.0	–	6.8	–	0.0	–	9.1	–	0.0	_
Rental vacancy rate	22.5	–	2.7	–	28.0	–	3.8	–	7.1	–	0.0	_

Source: US Census 2000 and 2010

While multiunit structures have declined over the past decade, the number of one-unit detached homes and mobile homes both increased from 2000-2010 indicating new households that moved into the County (53) were able to find housing as 51 new units were constructed during the past decade. While the majority (75 percent) of new units constructed was one-unit detached (single-family) homes, the decrease in multifamily housing has begun to place a strain on existing home affordability for certain workers.

Table 7.3: Type of Housing Units for Fallon County, City of Baker and Town of Plevna

	Fallon County				City of Baker				Town of Plevna			
	2000		2010		2000		2010		2000		2010	
	#	%	#	%	#	%	#	%	#	%	#	%
HOUSING STRUCTURE BY TYPE												
Total Housing Units	1,410	100	1,461	100	855	100	926	100	81	100	101	100
1-unit, detached	1,024	72.6	1,099	75.2	616	72.0	661	71.4	79	92.9	85	84.2
1-unit, attached	8	0.6	10	0.7	4	0.5	5	0.5	0	0.0	0	0.0
2 units	31	2.2	8	0.5	31	3.6	8	0.9	0	0.0	0	0.0
3 or 4 units	36	2.6	32	2.2	36	4.2	32	3.5	0	0.0	0	0.0
5 to 9 units	18	1.3	14	1.0	18	2.1	14	1.5	0	0.0	0	0.0
10 to 19 units	14	1.0	21	1.4	14	1.6	21	2.3	0	0.0	0	0.0
20 or more units	3	0.2	0	0.0	3	0.4	0	0.0	0	0.0	0	0.0
Mobile home	276	19.6	277	19.0	133	15.6	185	20.0	6	7.1	16	15.8
Boat, RV, van, etc.	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0

Source: US Census 2000 and 2010

Housing Affordability

Housing affordability was the most important issue to community members. Housing affordability is generally defined as spending no more than 30 percent of gross income on housing and basic utility costs. Without affordable homes, the County and residing businesses may have difficulty keeping existing residents and attracting new workers. While housing availability was not as big of an issue for residents, housing affordability is partly affected by the number of housing units within the community. As previously shown, the number of housing units did keep pace with new households, but the number of new units added to the community did not account for the recent growth in the oil and gas industry.

While homes throughout the County in 2008 were affordable, affordability issues for certain service sector workers and senior citizens were identified before the recent growth in the energy sector as shown in Table 7.4. Retail salespeople, individuals with a disability and social security, seniors on a fixed-income all exceed the housing affordability threshold, which is defined as spending no more than 30 percent of income on housing costs.

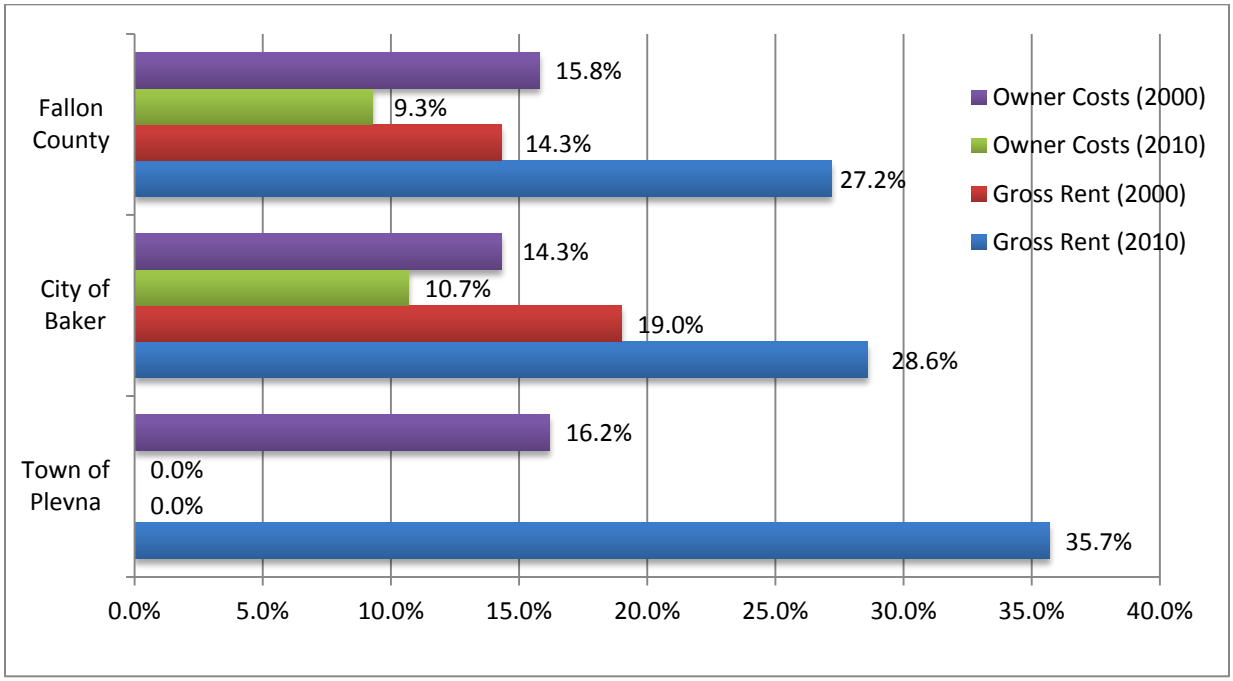
Table 7.4: Housing Affordability per Select Occupation for Fallon County

Select Occupations	2000				2008			
	Average Annual Pay	Median Home Cost	Home Affordability Excess or Shortfall	% of Income to Rent 2-Bedroom Apartment	Average Annual Pay	Median Home Cost	Home Affordability Excess or Shortfall	% of Income to Rent 2-Bedroom Apartment
All single-income Wage Earners	$29,187	$56,767	$43,156	21.5%	$32,460	$68,000	$46,464	23.6%
Licensed Practical Nurse	$37,740	$59,767	$73,316	16.6%	$51,770	$68,000	$114,558	14.8%
Police Officer	$30,980	$59,767	$49,478	20.2%	$33,630	$68,000	$50,590	22.8%
Elementary School Teacher	$31,510	$59,767	$51,347	19.9%	$34,130	$68,000	$52,353	22.4%
Retail Salesperson	$17,980	$59,767	$3,636	34.8%	$20,820	$68,000	$5,418	36.8%
Individual with Disability, sole income = SSD + SSI	$13,364	$59,767	($12,641)	46.9%	$16,500	$68,000	($9,816)	46.4%
Senior on fixed-income	$10,426	$59,767	($23,001)	60.1%	$12,950	$68,000	($22,334)	59.1%
Police Officer and Licensed Practical Nurse	$68,720	$59,767	$182,562	9.1%	$85,400	$68,000	$233,148	9.0%
Two incomes: Two Teachers	$63,020	$59,767	$162,462	9.9%	$68,260	$68,000	$172,707	11.2%

Source: Montana Department of Commerce, Housing Coordinating Team, White Paper, June 2010; red indicates a buyer/rental shortfall that exceeds 30% of income

While select occupations were able to afford housing based on respective incomes in 2008, the recent census data indicates that more rental households were paying above 30 percent of income toward housing as compared to 2000 as shown in Figure 7.4. If this trend continues, additional residents who rent may be "priced-out" of housing and will continue to pay too much for housing or be forced to move. Even if residents stay within the community and pay high housing costs, the disposable income that would otherwise be spent in the community will likely be used for the increase in housing costs.

Figure 7.4: Residents Paying 30 Percent or more of Housing Cost as a Percent of Income



Source: US Census 2000 and 2010

However, Figure 7.4 does show a positive trend for all three communities. The number of homeowners who paid more than 30 percent of their income toward housing decreased throughout the past decade. The number of Fallon County homeowners decreased more than six percent with a reduction of four percent of City of Baker homeowners and more than a 16 percent reduction for Town of Plevna homeowners. This trend indicates that more households were able to afford the costs of owning a home, although both Fallon County (9.3 percent) and the City of Baker (10.7 percent) still have residents who pay more than the affordable standard.

Housing Quality and Special Needs Population

Housing quality is equally important as affordability for many community residents. A recent study conducted by the Montana Department of Commerce suggests Fallon County will need to add an additional 948 new housing units by 2025 to accommodate for the increase in population. The additional units also account for those units that will be lost because of poor housing conditions.

As noted in Table 7.5, several options exist to meet the future housing need. Units in poor condition could be rehabilitated and upgraded, thus reducing the need for additional new units. Another option is to create attractive and affordable multifamily units as well as high-quality, affordable single-family homes that are priced for service sector workers such as retail salespersons, public service workers (police, government, etc.), teachers and nurses. Affordable units can be constructed with high-quality

design and the layout of housing structures should encourage people to live in the units regardless of income.

Additionally, special needs housing will be required to meet the need of an aging population. Table 7.5 also shows that more than one-quarter of Fallon County's population will be aged 65 years and over in year 2025. To accommodate the elderly population, affordable units will either need to be constructed or reserved for senior citizens on a fixed-income. As noted earlier in Table 7.4, in 2008 senior citizens were spending more than 59 percent of their income on housing costs. This trend cannot continue if Fallon County, the City of Baker and the Town of Plevna want to accommodate and keep elderly residents in the community.

The study from the Montana Department of Commerce does not identify the specific number of units to be constructed for each category (single-family, multifamily and mobile home). The breakdown of housing units to be constructed will vary depending upon the needs of Fallon County residents. However, to maximize land, infrastructure and transportation costs, multifamily and urban-style single family homes are recommended to meet the needs of future residents.

Table 7.5: Housing Quality and Units Needed by 2025

Housing Units and Structure				
Homeownership rate in 2000 = 77.3%				
Households in 2000 = 1,140				
Households in 2008 = 1,126				
Percent change in population, 2008 to 2025 = 4.6%				
Percent change in households, 2008 to 2025 = 9.9%				
Percent of population aged 65+ in 2025 = 26.4%				
Estimated housing units needed by 2025				
Housing Units	**Units in Poor Condition Lost by 2025**	**Units in Good Condition Available in 2025**	**Total Housing Units Needed by 2025**	**New Housing Units that must be created by 2025**
Total	895	526	1,474	948
Single-family	652	374		?
Multi-family	7	53		?
Mobile Home	236	99		?
The data in the table provides an estimate of housing needs and suggested options for the county in meeting those needs in the future. One option is to focus on rehabilitating the units in poor condition. This will reduce the number of new units needed. The type of new units will be determined entirely by whether they will be owned or rented. The higher the housing costs relative to incomes, the more expensive both rental and homeownership housing will be and the fewer new homeowners will be created between the years 2008 and 2025.				

Other special needs housing to be considered are housing homeless persons and those with physical and mental disabilities. While homelessness was not identified as a pressing issue facing Fallon County residents, efforts should be made to accommodate and house the individuals. Moreover, the Montana Board of Housing (MBH) provides assistance in the development of housing for persons with special needs. The apartments can be owned and operated by private owners, local government or private non-profit organizations.

Assisted Living Facilities

Fallon County does not have any hospice care facilities but the County does have an assisted living center. Quality Personal Care (QPC) is the local assisted living center and has been operating in the county since 1999. The facility can accommodate up to 21 residents with the majority of residents being senior citizens. QPC can serve people with minor dementia or mental health issues as long as the person does not pose a threat to themselves or others. QPC does not have an official waiting list, but it does recognize that expansion could help accommodate an aging population within the County. Preliminary expansion plans would need to serve at least an additional six residents. QPC does not have capital improvement funds set aside to assist with the expansion so grant funding would be the primary financial incentive.



Figure 7.5: The Quality Personal Care (QPC) Assisted Living Facility in Baker

Low Income Housing Facilities

Fallon County has one low-income housing facility, which is located in Baker. Prairie Manor is an apartment complex that has one and two-bedroom units available for people who qualify for Section 8 housing assistance. No other facilities are located within the County, although additional low-income housing units may be needed if housing demand continues to escalate.

Temporary Housing

The recent growth of natural resource extraction and energy development in eastern Montana and western North Dakota has begun to impact Fallon County. Affordability and availability have been impacted by the recent energy-sector employees moving into the community. While growth is generally encouraged throughout the community, the growing concern of residents is that the energy boom has placed unnecessary hardships on existing residents and the availability and affordability of finding places to live. As such, housing has become a premium throughout the County.

To help alleviate the housing demand and reduce the likelihood of overbuilding housing, temporary crew camps should be encouraged and built in the County. In 2011, Fallon County approved a temporary crew camp location three miles west of Baker that should help reduce demand for housing once the facility is operational. Future crew camp sites should be placed near the existing site so as to maximize on infrastructure efficiencies and transportation-related costs.

There are many benefits of temporary crew camp facilities, including alleviating some of the demand for permanent housing units, saving on infrastructure costs when clustered together and having land and/or facilities that can be renovated or used as an alternative use once the energy-sector growth subsides. Below are some general guidelines that can be used to help plan for future temporary housing facilities.

Crew Camp Guidelines

- Cluster facilities near each other to save costs on infrastructure, transportation and emergency services.
- Develop zoning and/or subdivision guidelines that require facility owners to install infrastructure that can be altered for different future uses.
- Encourage existing residents to welcome temporary workers into the community and plan for amenities temporary workers need and want, including laundry facilities, restaurants and bars, entertainment establishments such as movie theaters, pool halls, bowling alleys, and golf courses, and outdoor activities such as archery ranges, parks and trails, and horseshoe pits.
- Grant temporary or special use permits annually or every five years to help predict demand for future housing needs and to help manage unwanted facility owners.

Housing Programs and Incentives

Housing will continue to be a major concern for many residents as the energy sector continues to grow, thus bringing new people and businesses into the community. To help accommodate the new growth and increase housing affordability, housing programs and incentives have been analyzed. The following incentives are discussed in greater detail in the implementation chapter, but the general descriptions should help familiarize residents with different approaches to addressing housing issues.

Community Land Trust

The National Community Land Trust Network is a nationwide organization that helps promote community land trusts (CLT) as well as assists communities in establishing such land trusts. A typical CLT is defined as a non-profit entity that owns land and leases it for a nominal fee to people who own buildings on the land. Residents get the benefits of owning a home while being able to afford the purchase because the land belongs to the CLT, thus removing a large portion of owning a home-purchasing the land. A provision is established in the resale of the home limiting the amount of profit the current owner can make while ensuring the next buyer is a low- to moderate-income earner.

The goal of CLT as defined by the National Community Land Trust Network is to provide access to land and housing to people who are otherwise denied access, to increase long-term community control of neighborhood resources, to empower residents through involvement and participation in the organization, and to preserve the affordability of housing permanently. CLTs are perfect for communities with housing affordability issues because CLTs do not need additional subsidies each time the house resells; the permanent affordability is built into the lease for perpetuity.

For more information on CLTs visit: http://www.cltnetwork.org//index.php.

Resident Owned Communities

Resident owned communities (ROC) are a growing phenomenon, especially in Montana. A ROC is essentially a manufactured home park, mobile home park or trailer park whereby residents purchase the land from the private owner and establish a not-for-profit organization similar to a homeowners association. The key to successfully implementing a ROC is having buy-in from all homeowners to work together and buy the land. Several organizations exist to help mobile home park residents pursue becoming a ROC including ROC USA, a national organization, and NeighborWorks Montana, a statewide housing organization to help create sustainable homeownership.

Figure 7.6: A House in a NeighborWorks Montana Community in Great Falls, MT



Source: NeighborWorks Montana

NeighborWorks Montana is currently located in Great Falls, but does provide assistance to communities across the state including delivering pre- and post-purchase technical assistance, training and financing assistance to help homeowners buy their communities and secure their economic futures through resident ownership. The Montana Cooperative Development Center also provides assistance to manufactured housing community homeowners on the process of forming a cooperative, while NeighborWorks Montana helps with board development and to secure financing.

For more information on ROCs visit: http://www.nwmt.org/roc.html or http://rocusa.org/.

Funding Incentives

Low income housing tax credits (LIHTC) provide developers the ability to construct affordable housing units while receiving a tax credit for doing so. LIHTCs are given on a national basis and funded through the US Department of Housing and Urban Development (HUD). However, local housing programs can assist home builders and developers in applying for LIHTC and obtaining funding for the credits. The Miles City Housing Authority would be the closest partner to help assist local builders.

Property tax incentives are another avenue that Fallon County can help promote affordable housing units. The County and the City of Baker can combine property tax incentives with development agreements that establish criteria such as targeted tenants, spacing between units, site and building

design and facility amenities. The development agreement is not a rent control contract because it does not specify the amount of rent to be charged; rather, it provides criteria for developing affordable units and if the criteria are met, a property tax incentive can be given to the developer or landowner.

Various grant programs exist throughout the State of Montana and the United States. The Montana Department of Commerce awards HOME Program grants on an annual basis that can be used to construct and/or rehabilitate owner and renter affordable units. The grants are awarded on a competitive process and are usually due in the first quarter of the year. More information can be obtained by visiting: http://housing.mt.gov/HM/default.mcpx.

The US Department of Agriculture-Rural Development has grants and low-interest loans specifically targeted for constructing affordable housing units. Rental assistance and housing preservation grants are also offered to ensure low-income housing units stay within a community and are not removed in favor of market-rate units. Visit http://www.rurdev.usda.gov/HMF_MFH.html for more information.

Land Development Incentives

Fallon County and the City of Baker can implement several land development strategies to incentivize affordable units. Incentives may include providing density bonuses for subdivisions that have affordable housing units, revising zoning guidelines to encourage smaller lot sizes and infill development, and providing infrastructure for developments that have affordable homes.

Chapter 8: Infrastructure

City of Baker Wastewater System

The City of Baker wastewater system facilities are shown on Figure 8.1. The map shows the location of the wastewater treatment lagoons, the irrigation water holding pond, the lift station at the treatment facility and the wastewater collection lines in the city.

Wastewater Treatment System

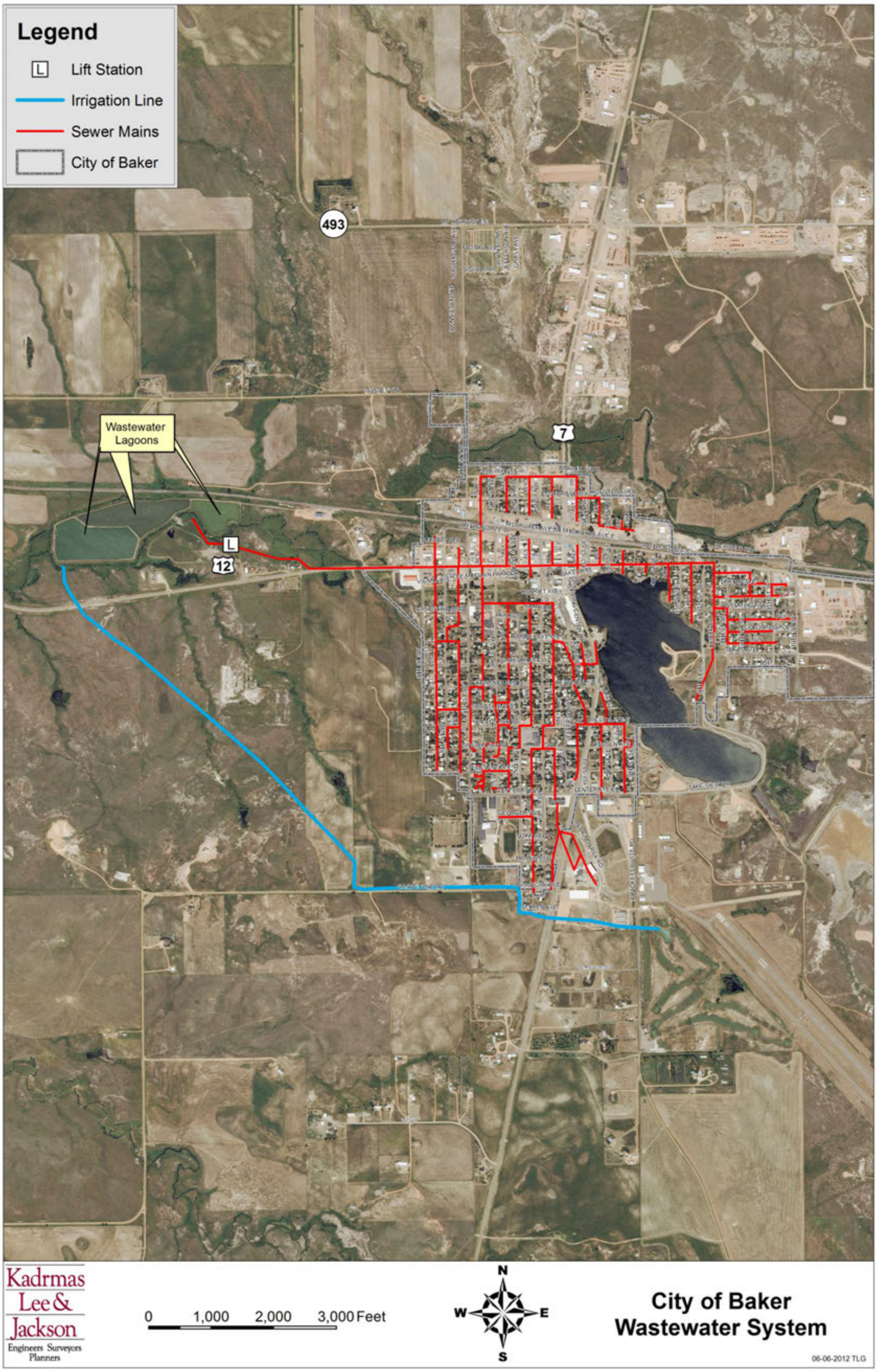
The City of Baker wastewater treatment system is designed for flows from a population of approximately 2,600 people. Based on the 2010 US Census, the city population was 1,741. Assuming a modest population increase since the 2010 census, the wastewater treatment system should have capacity to accommodate a future population increase of approximately 800 persons. However, wastewater flow from the North Baker Sewer and Water District north of the city along Highway 7 is treated by the wastewater system. The peak flow from the North Baker Sewer and Water District should be determined to provide a more accurate estimate of the remaining capacity of the wastewater treatment system.

The remaining capacity of the wastewater treatment facility will also be impacted by new high water use businesses. Finally, the proposed crew camp for the Keystone Pipeline project will temporarily impact system capacity. The crew camp is expected to be at peak occupancy of 800 workers during the 2013 and 2014 construction seasons. At its peak occupancy the crew camp will generate approximately 60,000 gallons of wastewater per day, flow equivalent to 600 city residents. The wastewater flow from the crew camp plus the flow from the North Baker Sewer and Water District may consume the remaining capacity at the wastewater treatment facility.

The City is currently in negotiations with representatives of the Keystone Pipeline. The City is attempting to secure funds from the company to offset infrastructure impacts generated by the crew camp. The City is seeking $2.5 million to fund the following infrastructure improvements:

- A new water well approximately 2,000 yards west of 6th Street.
- A new 250,000-gallon water tank on the east side of the city at the top of a hill.
- A fourth cell at the wastewater treatment facility that would function as an evaporation cell.
- A two-mile extension of an eight-inch sewer main to the crew camp site.
- A two-mile extension of a six-inch water main to the crew camp site.

Figure 8.1: City of Baker Wastewater System



If the City is successful in securing funds for a fourth cell, there should be sufficient capacity to treat existing wastewater and the temporary flow of wastewater from the crew camp and have remaining capacity to accommodate future growth.

The City of Baker sewer system has a facultative lagoon treatment system comprised of three cells. Two of the cells provide primary treatment and the third cell is a polishing cell. The first cell in the system is approximately 10 acres and two other cells are seven acres each. There is a lift station at the lagoon site to pump water up into the clay lined lagoons. Sodium hypochlorite is added to disinfect the wastewater as it enters the third cell. Contact time is provided in the third cell. Effluent from the third cell is pumped into a one-million gallon pond at the golf course and then used as irrigation water for the golf course. The City charges no fee for the use of the irrigation water on the county-owned golf course.

The DEQ has recently expressed concerns over the irrigation of the golf course. The agency is requesting regular reports on the flow rate, saturation rate and quality of irrigated water. To satisfy these requirements a flow meter will need to be installed and saturation rate data and water sample data will need to be collected. The county has been successful in negotiating a temporary continuation of irrigation, but DEQ monitoring requirement will need to be satisfied to secure the long-term use of the irrigation water.

The City has an administrative permit from DEQ for the operation of the permit. The DEQ did not issue a permit for the City's last permit application. Instead, DEQ effectively renewed the terms of the existing permit that allows the City to discharge treated water into the Sandstone Creek. In years with typical amounts of snow melt and spring rains, the City had needed to discharge treated wastewater one or two times per year. Prior to DEQ authorization of a wastewater discharge the City is required to demonstrate the treated wastewater contains no more than 100 mg/L TSS and 30 mg/L BOD.

The DEQ is in the process of revising its wastewater discharge standards. The new standards will make the discharge of wastewater prohibitively expensive. As a result, the City is developing a wastewater treatment plan that will not require the discharge of treated wastewater. Currently there are two strategies the City is considering to eliminate the need for wastewater discharge.

The first is construction of a four evaporation cell. If the evaporation cell is of sufficient size and designed appropriately the city would no longer need to discharge wastewater. Ideally, Keystone Pipeline funds would support construction of the evaporation cell. If not, the City should aggressively pursue state funding for the project. An evaporation cell would address the wastewater discharge issue and add needed capacity to the wastewater treatment system.

The other strategy is to increase the amount of irrigation of treated wastewater. Nearby farmers would be the recipients of the irrigation water. If this strategy is employed, the City should irrigate cropland

that has the capacity of absorb the nitrogen contained in the irrigation water. The City will also need to plan to satisfy the DEQ monitoring requirement for land application of treated wastewater.

Wastewater Collection System

A Preliminary Engineering Report (PER) of Baker's wastewater collection system was completed in 2004. The report identified the need to replace or repair all of the old, existing clay tile sewer mains in the city. Fallon County recently contributed $2 million to fund infrastructure projects in the city, most of which was dedicated for repair or replacement of sewer mains. The City retained an engineering company to evaluate project cost. The most recent cost estimate is $3.4 million to slip-line existing sewer lines that are greater than six inches in diameter and replace clay tile sewer lines that are undersized or six or less inches in diameter. The project is expected to commence in late summer 2012 and if additional funds are secured the project will be completed in spring 2013.

Once these improvements are completed, the collections system is expected to be in relatively good condition, with very little infiltration into the system. The minimal infiltration will measurably reduce the volume of wastewater flow into the treatment facility.

As noted above, an eight-inch sewer main (and a six-inch water main) is planned to be extended two miles west of the city limits to provide sewer service to the Keystone Pipeline crew camp facility. The availability of city water and sewer along the two-mile section of Highway 12 will open up development opportunities. The planning consultant recommends the county conduct a corridor study to quantify the availability of water and sewer service and plan for future growth along the corridor. Since the corridor has the potential of becoming a new gateway to the community, the study should also include development design and access management issues.

City of Baker Potable Water System

Water Supply and Storage

Figure 8.2 shows the location of the City of Baker potable water system facilities. The map shows the location of the five city wells, three underground storage tanks and the water distribution lines in the city. City of Baker potable water is supplied by five wells. Table 8.1 shows the date each well was drilled and the depth of each well. Overall, sufficient water is available to all parts of the city to provide an adequate supply of water for all water users and an adequate flow and storage for fire suppression.

Figure 8.2: City of Baker Potable Water System

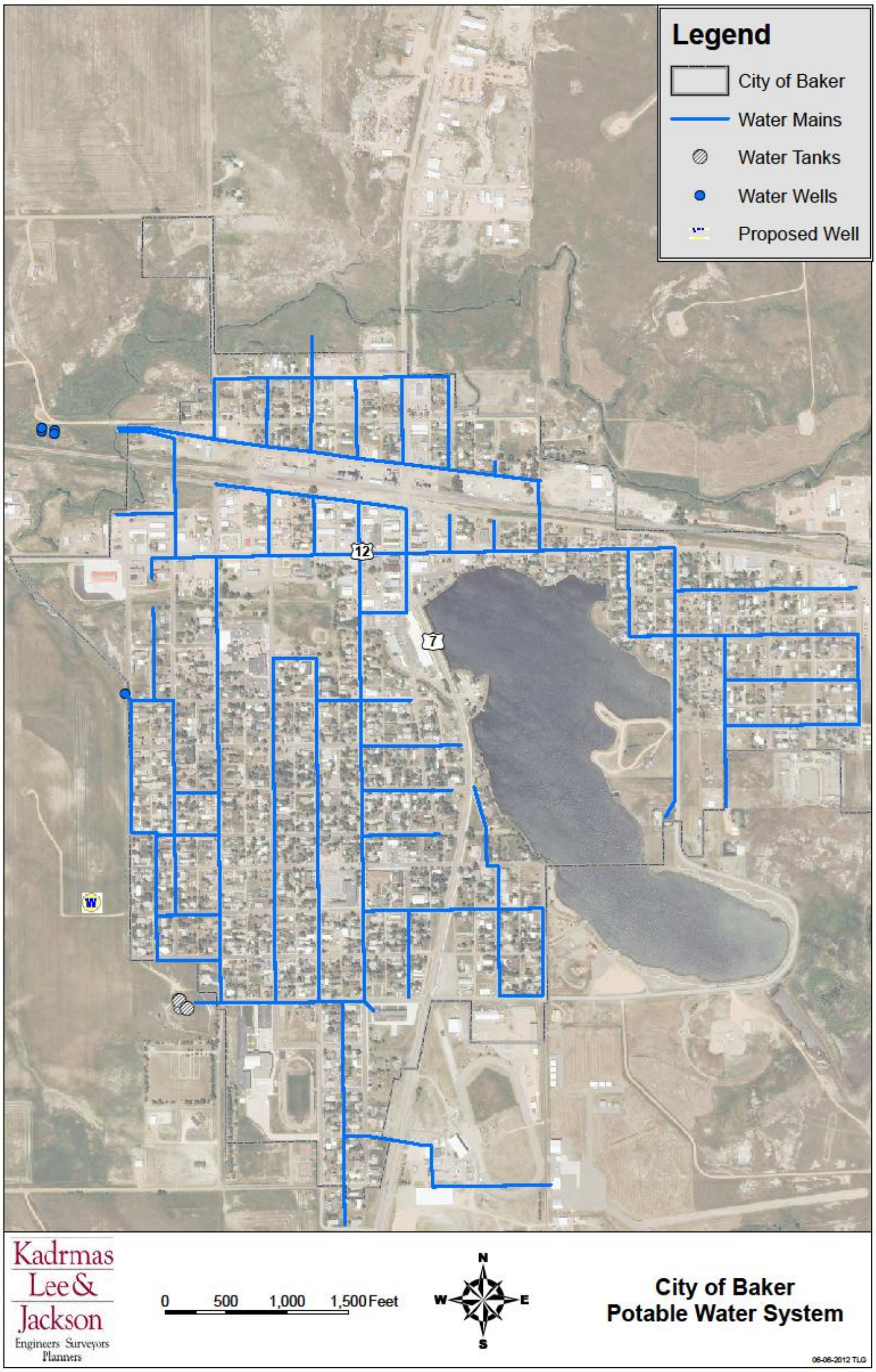


Table 8.1: Date Drilled and Depth of City of Baker Wells

Well Number	Date Drilled	Depth of Well
Well #1	1918	613 feet
Well #2	1925	680 feet
Well #3	1934	650 feet
Well #4	1952	650 feet
Well #5	1956	650 feet

Source: Groundwater Information Center, Montana Bureau of Mines and Geology, May 2012

All the wells pump water directly into the distribution system. The water in each well is treated by injecting sodium hypochlorite directly into the well. The wells pump an average of 140 gallons per minute. One of the wells stopped operating approximately one year ago. The pump failed due to the presence of sand inside the pump. The well was inspected and it was silted with sand. The inspector reported that the well can probably be put back into production but the yield from the well will likely be reduced. With the one well out of service, the city's production capacity is 560 gallons per minute. Operating the wells 18 hours per day yields a water production of 604,800 gallons per day.

Assuming a water use of 100 gallons per day, the maximum population that could be served by the wells is 6,048. This figure should be refined to account for commercial water users. Absent that information, it clearly appears that the city has sufficient water production to accommodate growth in the foreseeable future. In addition, as part of the negotiation with the Keystone Pipeline representatives, the City has received tentative approval of funds to develop a new water well west of the city limits, approximately 2,000 yards west of 6th Street. If this well is developed the city will have even more productive capacity and an additional source of water in the event of well pump failure.

Potable water is stored in three buried concrete tanks on an elevated site on the east side of the city. One of the tanks stores 100,000 gallons of water. It was built in 1930 and is in poor condition. The two other tanks store 200,000 gallons are in satisfactory condition. All of the tanks were inspected and cleaned in 2011. As part of the negotiation with the Keystone Pipeline representative, the City has received tentative approval of funds to construct a 250,000-gallon water tank at the far east side of the city on an elevated site. The new water tank will ensure the City's continued compliance with state water storage requirements for fire suppression.

Water Distribution System

The existing distribution system is primarily comprised of mostly six to eight-inch Asbestos-cement pipe installed in the late 1950s with some four-inch pipe. The city is experiencing an increased number of water main breaks and service saddle "popping" due to pipe age. Other than main breaks, leakage in the system is within acceptable limits. Given the age and condition of the distribution system, the City should consider planning for a major system update in the next 10 years.

Water pressure in the city averages 45-55 psi. Some isolated areas near the storage tanks and other higher elevation areas have somewhat lower water pressures. There are no booster pumps in the system to increase water flow and pressure.

An Annual Drinking Water Quality Report dated April 13, 2012 states the city's water supply is safe to drink and contaminant concentrations are all within acceptable levels established by the EPA. The report also states the system has had no violations of applicable state and federal drinking water standards.

The proposed crew camp west of the city represents the majority of potential future growth for the city. Construction of the crew camp would increase water demand. The City's water production is sufficient to handle the growth, but additional infrastructure would be necessary. If the demand from the crew camp exceeds the treatment or storage capacity, either one or both would need to be expanded to accommodate the growth.

Town of Plevna Wastewater System

The Town of Plevna wastewater system facilities are shown on Figure 8.3. The map shows the location of wastewater treatment lagoons and wastewater collection lines in the city.

Wastewater Treatment System

The existing treatment system is a two-cell clay lined lagoon. The system relies exclusively on evaporation for the disposal of wastewater. As such, the town does not discharge wastewater and a DEQ discharge permit is not required. Wastewater flows to the treatment facility by gravity; the system has no lift stations.

The Town's current population is approximately 162, and the current system has sufficient capacity to treat the wastewater flows. The wastewater treatment facility had sufficient capacity to accommodate its peak population of 291 persons in 1940. Therefore, it is assumed the facility has sufficient capacity to accommodate more than 100 new residents, which is a population increase greater than expected in the foreseeable future.

Figure 8.3: Town of Plevna Sewer Mains



Wastewater Collection System

The sewer collection system consists of eight-inch clay tile pipe. There does not seem to be a problem with infiltration. It is believed some basement sump pumps discharge into the sewer system.

Given the age and type of sewer lines, the town should coordinate with the City of Baker Public Works Department to view the condition of the lines with the city camera truck. The town should also measure the volume of wastewater entering the treatment facility and compare the volume against metered water consumption during the same period to determine the extent of infiltration. The town should use the infiltration estimate and the results of the visual sewer line inspections to formally evaluate the condition of the wastewater collection system. If it is determined the collection system is in poor condition, the town should begin efforts to plan for a sewer line repair/replacement project.

Town of Plevna Potable Water System

Figure 8.4 shows the location of the Town of Plevna potable water system facilities. The map shows the location of the three town wells, the underground storage tank and the water distribution lines in the town.

Water Supply and Storage

The Town's water is supplied by three wells. Compared to the City of Baker wells, the Town wells were drilled more recently and at much greater depths. The Town wells were drilled between 1960 and 1974 at a depth ranging from 1,000 feet to nearly 1,200 feet. Well No. 1 is used primarily as a backup well. Well No. 2 is the Town's primary well and can produce 80 gallons per minute. Well No. 3 was damaged by accidental long-term operation. It can produce 165 gallons per minute but the water produced contains much silt. The water produced by well No. 1 is not disinfected. The water produced by well Nos. 2 and 3 is pumped into a 10,000-gallon underground concrete cistern where it is chlorinated with sodium hypochlorite. The cistern is the only water storage facility for the Town.

Figure 8.4: Town of Plevna Water Mains



Water Distribution System

Water is pumped from the cistern into pneumatic tanks that provide water pressure for the community. Water pressure at the pump house is between 60 to 80 psi. The distribution system is entirely comprised of two-inch poly pipe. Because of the size of the water lines, there are marginal water pressures in portions of the town.

Due to the limited water storage, the size of the water lines and the absence of fire hydrants, the Town's water system does not provide fire protection. Tanker trucks are needed to suppress a fire. Water can also be drawn from an abandoned swimming pool to provide some additional water for fire suppression.

Proposed Water System Improvements

There is a preliminary engineering report being prepared on the water system. The report is recommending the following improvements to the water system that will in large part be funded by Fallon County.

- Construction of a new well or reconstruction of well No. 1 and connection of the produced water to chlorination system.
- A 150,000-gallon elevated water tank.
- Replacing all water lines with six-inch PVC lines.

If sufficient funding is secured, it is anticipated the above improvements would be in place in 2014 or 2015.

Ground Water Wells in Fallon County

Water is provided in the unincorporated areas of the county by individual ground water wells. Based on data from the Montana Bureau of Mines and Geology, Groundwater Information Center there is currently a total of 2,870 water wells in the county. The use of the wells is shown in Table 8.2.

Table 8.2: Use of Wells in Fallon County, May 2012

Use of Well	Number of Wells	Percent of Total Wells
Test Wells	11	0.4%
Commercial and Industrial Use	12	0.4%
Public Water Supply	24	0.8%
Irrigation	32	1.1%
Unused	54	1.9%
Geotechnical	72	2.5%
Domestic Use	530	18.5%
Stock Water	914	31.8%
Unknown or Undocumented	1221	42.5%
Total	2870	100.0%

Source: Montana Bureau of Mines and Geology, Groundwater Information Center

The most common known or documented use of ground water wells in the county is domestic use and stock water in unincorporated areas of the county.

Chapter 9: Transportation

Overview

Transportation is a key element for the economic success and well-being of Fallon County. The closest interstate is I-94, which runs through Wibaux County to the north. However, two state highways bisect Fallon County. Highway 7 runs north-south through Baker and links county residents with I-94, the town of Wibaux to the north and Ekalaka to the south. Highway 12 runs east-west and bisects both Baker and Plevna. BNSF operates the rail line that passes through Baker and Plevna, although the train does not offer loading/unloading access in Baker or Plevna. The County has no public transportation system, but it does have dial-a-ride that can be accessed by local residents.

The County road department has workers that provide year-round service. The department has excellent equipment and has no current needs for equipment and storage. Currently, the department owns three snow plow trucks and six blades for snow plowing. Other department equipment includes six belly dump trucks, three end dump trucks, two crawlers and one large scraper.

The County leases three gravel pits and four scoria pits, which are permitted by the County and subject to DEQ review.

Functional Classification

Functional road classifications are a hierarchy of streets and roads that help County officials and residents plan routes for moving vehicles. In addition, the functional class of roads also provides guidance on limiting access for arterial roads while local roads generally have full access to land.

The Federal Highway Administration (FHWA) also defines functional classification as the process by which streets and highways are grouped into classes, or systems, according to the character of service they are intended to provide. Basic to this process is the recognition that individual roads and streets do not serve travel independently in any major way. Rather, most travel involves movement through a network of roads. For more information regarding functional classification system definitions and planning principles, visit http://www.fhwa.dot.gov/planning/fcsec2_1.htm. Figure 9.1, 9.2 and 9.3 show the existing functional classification system for the County, Baker and Plevna.

Figure 9.1: Fallon County Road Functional Classification

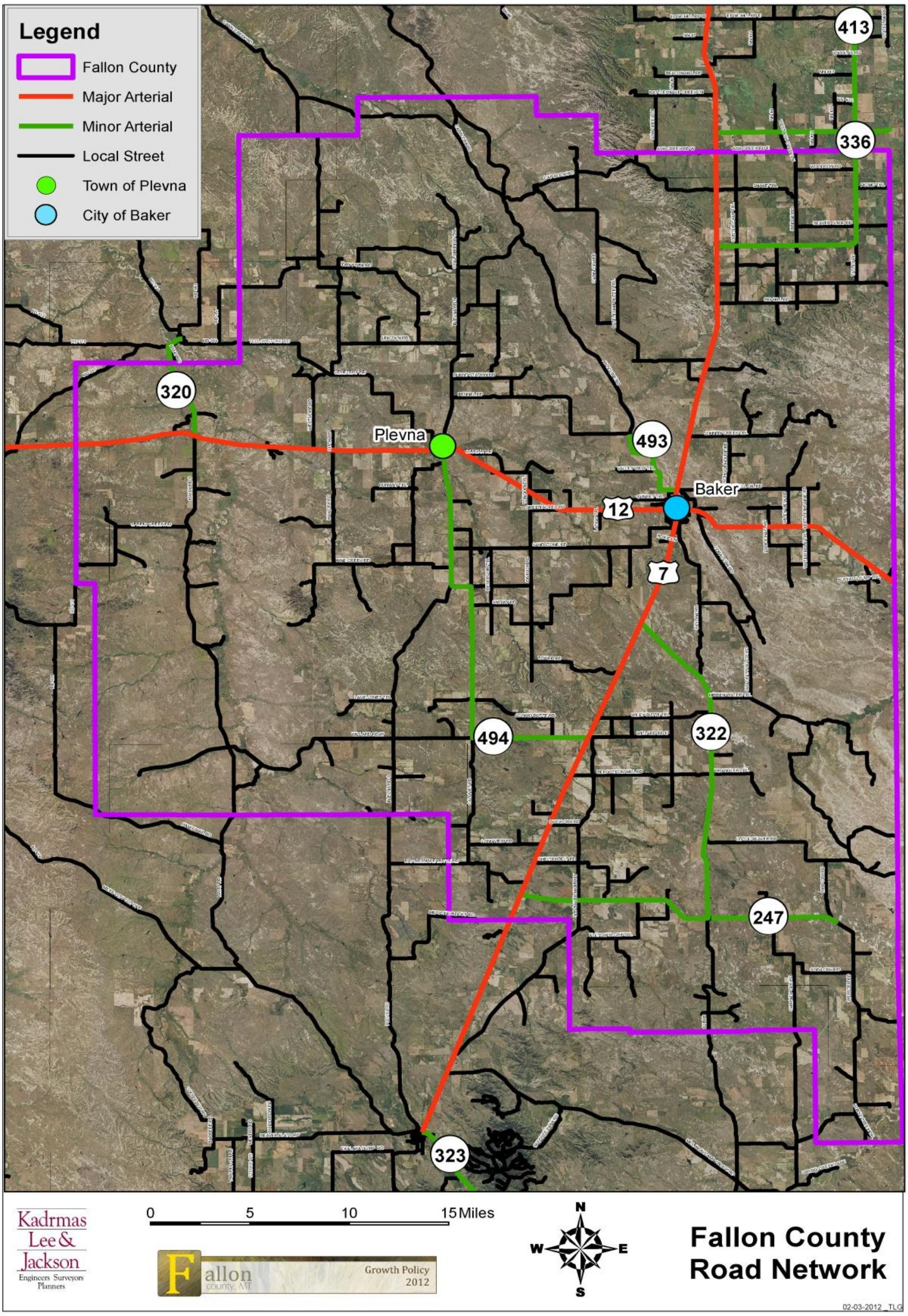


Figure 9.2: Baker Existing Street Functional Classification

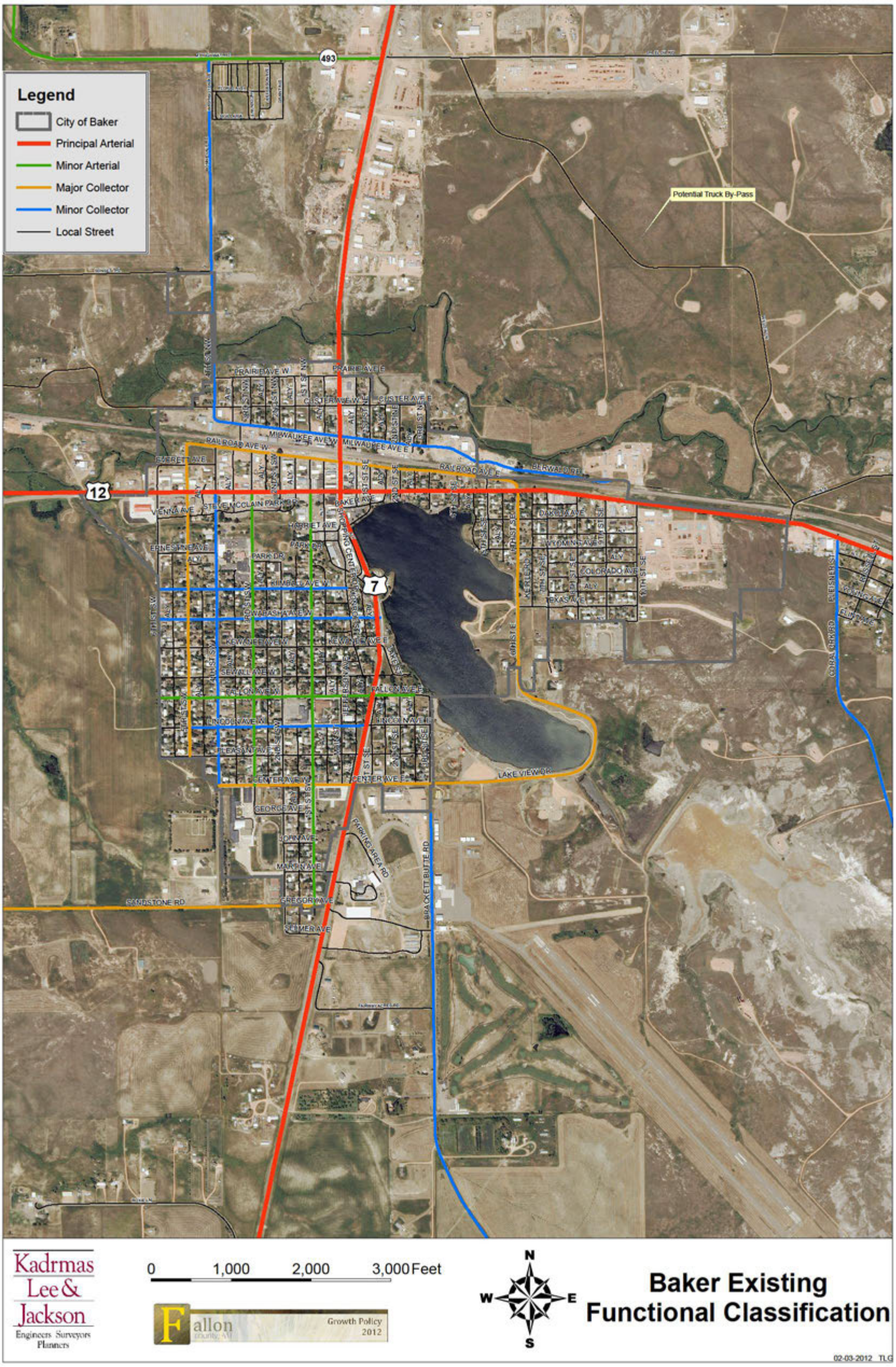
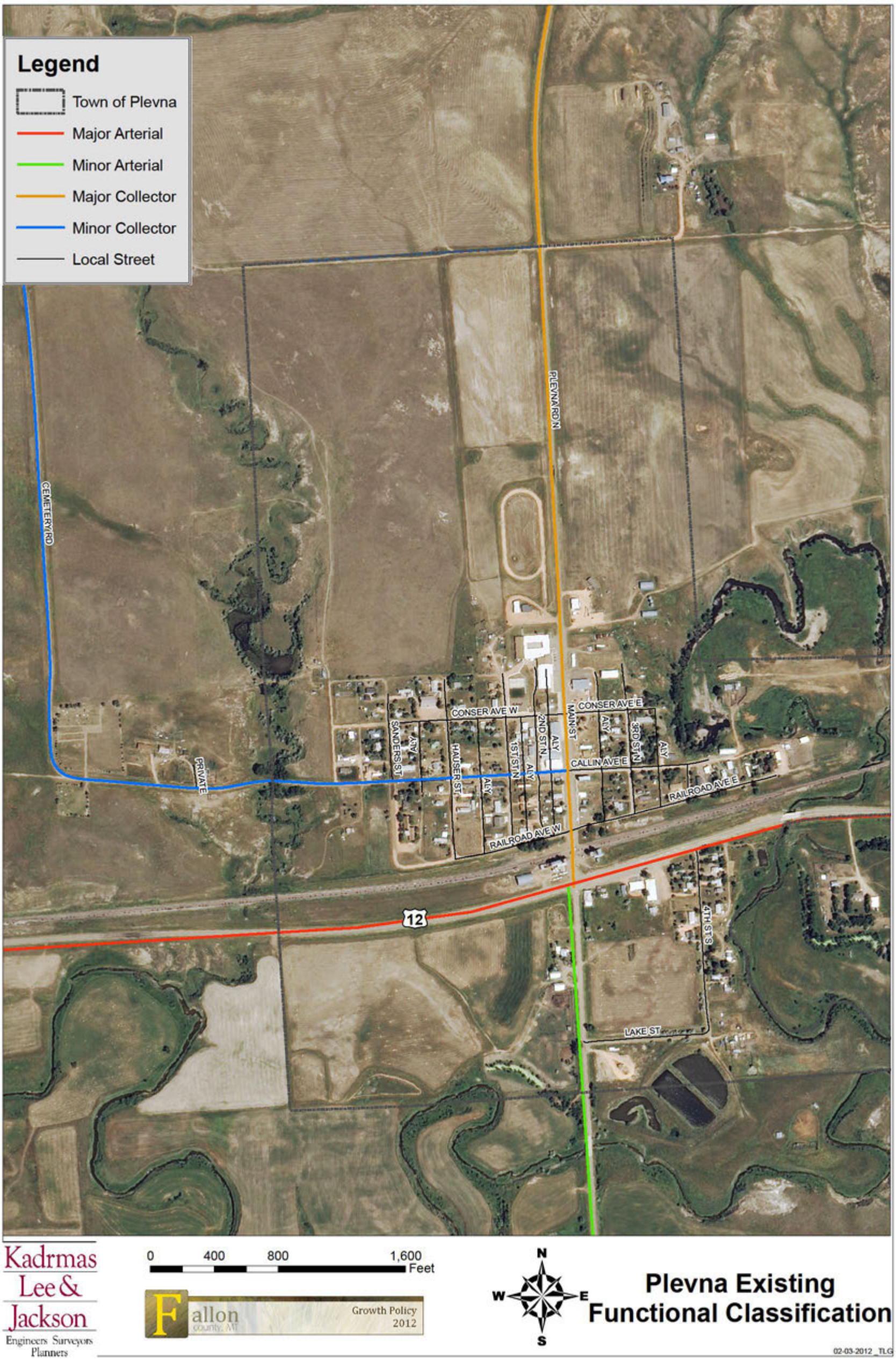


Figure 9.3: Plevna Existing Street Functional Classification System



Arterial Roads

Arterials are at the highest level of the hierarchy and provide limited access to land. They are designed to move traffic at high speeds and have few access points. Arterials also have sub-categories consisting of major and minor arterials. Major arterials are designed to move large volumes of intrastate and interstate traffic across long distances at speeds up to 75 mph. An example is I-94. Minor arterials are designed to supplement major arterials by moving traffic intrastate and between large geographic areas at speeds ranging from 25 – 65 mph. An example is State Highway 7.

Collector Roads

Collector roads provide more access to land than arterials while balancing movements at moderate speeds ranging from 25 – 45 mph. Collectors in essence collect traffic from local roads and distribute the vehicles to other collectors, arterial or local roads. Similar to arterials, collectors are categorized into major and minor. Major collectors gather and distribute higher volumes of traffic than do minor collectors, which have more access to local streets and adjacent lands. Collectors include 1st and 3rd Streets SW as well as Kewanee and Fallon Avenues.

Local Roads

Local roads provide full access to adjacent lands and are designed to handle slow speeds up to 25 mph. Most city streets are local roads, and examples include Colorado Avenue and 2nd Street SE.

County and Local Roads

The County has approximately 900 miles of county roads it must maintain. As noted in the Natural Resources chapter, Fallon County has sand and gravel resources that can be used on county and local roads; however, because of the low quality of the resources, the sand and gravel cannot be used to repair state roads and highways. Few roads are paved and are maintained with chip and seal. The vast majority of county roads are gravel or scoria (red clay-like material), with scoria being used for only low volume roads. Maintaining county roads is essential for local residents as well as to businesses, oil and gas companies for transporting energy products, and farmers and ranchers. The County should continue to pursue finding adequate sand and gravel resources to supplement the existing stockpile of road maintenance materials. Moreover, where feasible, the County, Baker and the Montana Department of Transportation (MDT) should work together to implement cost-sharing and cost-saving strategies to enhance county, state and local road maintenance.

Baker and Plevna Roads

Truck traffic along Highway 7 and Highway 12 is a growing concern for many residents as evidenced in the community survey. More than 40 percent of survey respondents ranked truck traffic as the highest transportation issue in Baker. Moreover, the increase in truck traffic has placed added delays along Main Street and Highway 7, although recent vehicle counts note only a small increase in the number of vehicles. Additional road counts may be needed to justify additional funding from the State or a potential need for traffic lights/stop signs to better manage traffic during peak times. Load limits and

enforcement may also help reduce the amount of truck traffic on main streets in Baker, although future planning should address where trucks can navigate as not all roads can accommodate heavy loads.

Planning for future road extensions will also help Baker and Plevna make targeted infrastructure investments. Figure 9.4 and 9.5 show the future road extensions for Baker and Plevna. When planning future uses and road extensions, the County, Baker and Plevna should reference these maps to help ensure adequate right-of-way is preserved. Moreover, the maps will assist developers and builders in knowing where potential extensions may occur and thus reducing potential dead-end and narrow streets.

Farm to Market Roads

Farm to market road maintenance is a growing concern for farmers and ranchers because of the energy boom in western North Dakota and eastern Montana. Some roads are beginning to see overuse from the constant truck traffic. The increase in daily traffic not only disrupts local traffic, but increases maintenance costs and may lead to road-sharing concerns with farmers and ranchers. Priority should be given to farmers and ranchers transporting crops and livestock from local farms to marketplaces, especially during harvesting (fall) and calving (spring) seasons.

Maintenance

The cost of gravel has increased significantly in recent years, from approximately $0.40 per yard to $1.00 per yard as noted by Bobby Weidmer, the Fallon County road foreman. Because of the high prices and demand in part from oil and gas well pads, the County does not build roads but will maintain roads that are built by a land owner and are approved by the County. However, the department has no formal road maintenance program. Roads with heavy traffic are maintained more frequently and remaining roads are maintained based on current conditions, although a top priority is to maintain access to the hospital and the route from the hospital to the airport. During winter months, the department utilizes a state bulk tank of calcium chloride, which is an alternative to salt and sand that is applied on County roads during snow/ice storm events.

As pipeline and oil well development increases, county roads will deteriorate faster, adding costs and deferring maintenance of other roads. The County has an agreement regarding the Keystone Pipeline where a company will contribute a fixed amount of money per county-road mile. The funds will be used for road maintenance. Other joint agreements with companies like Keystone should be explored to help fund county road maintenance.

Figure 9.4: Baker Future Street Extensions

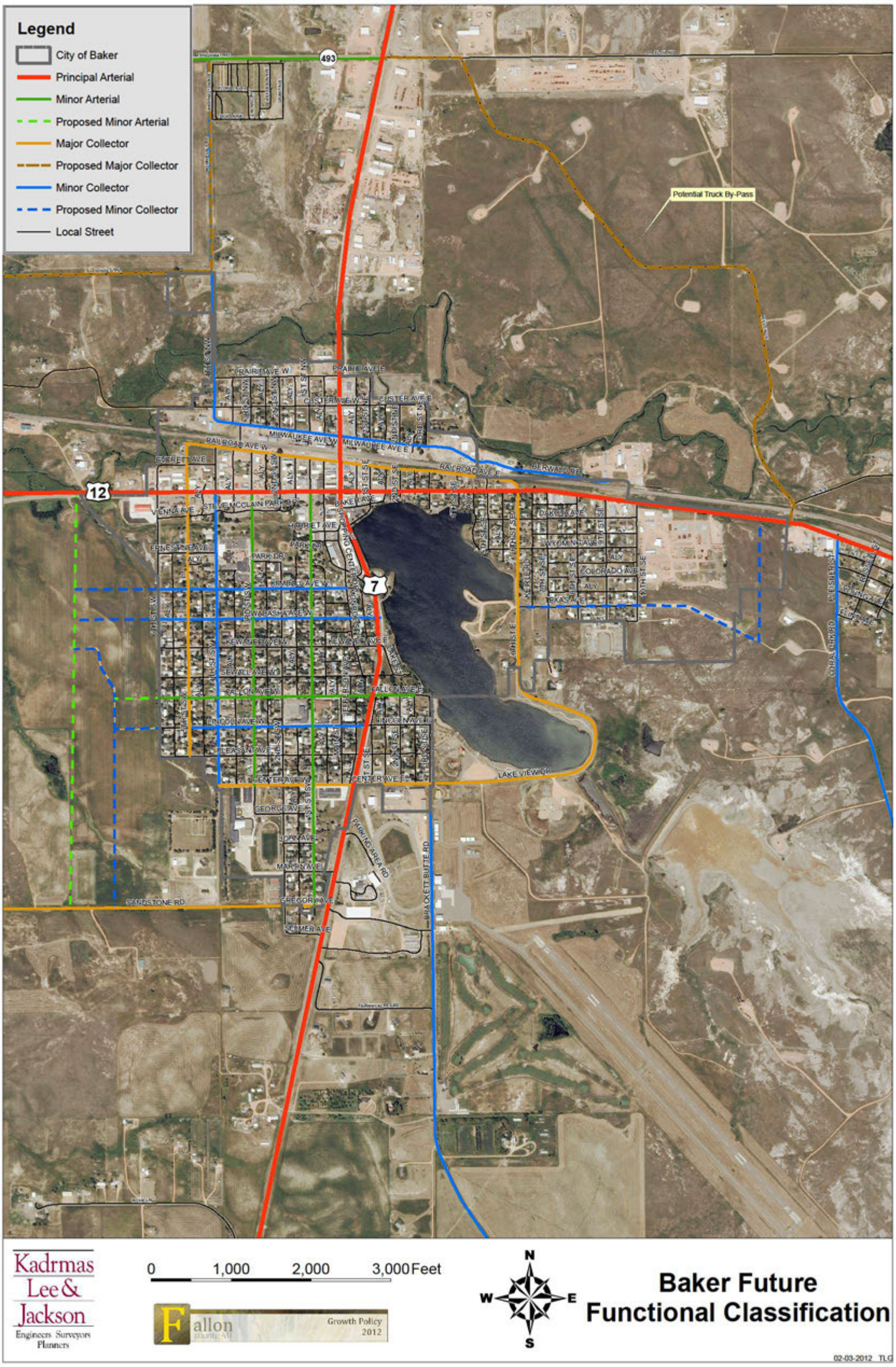
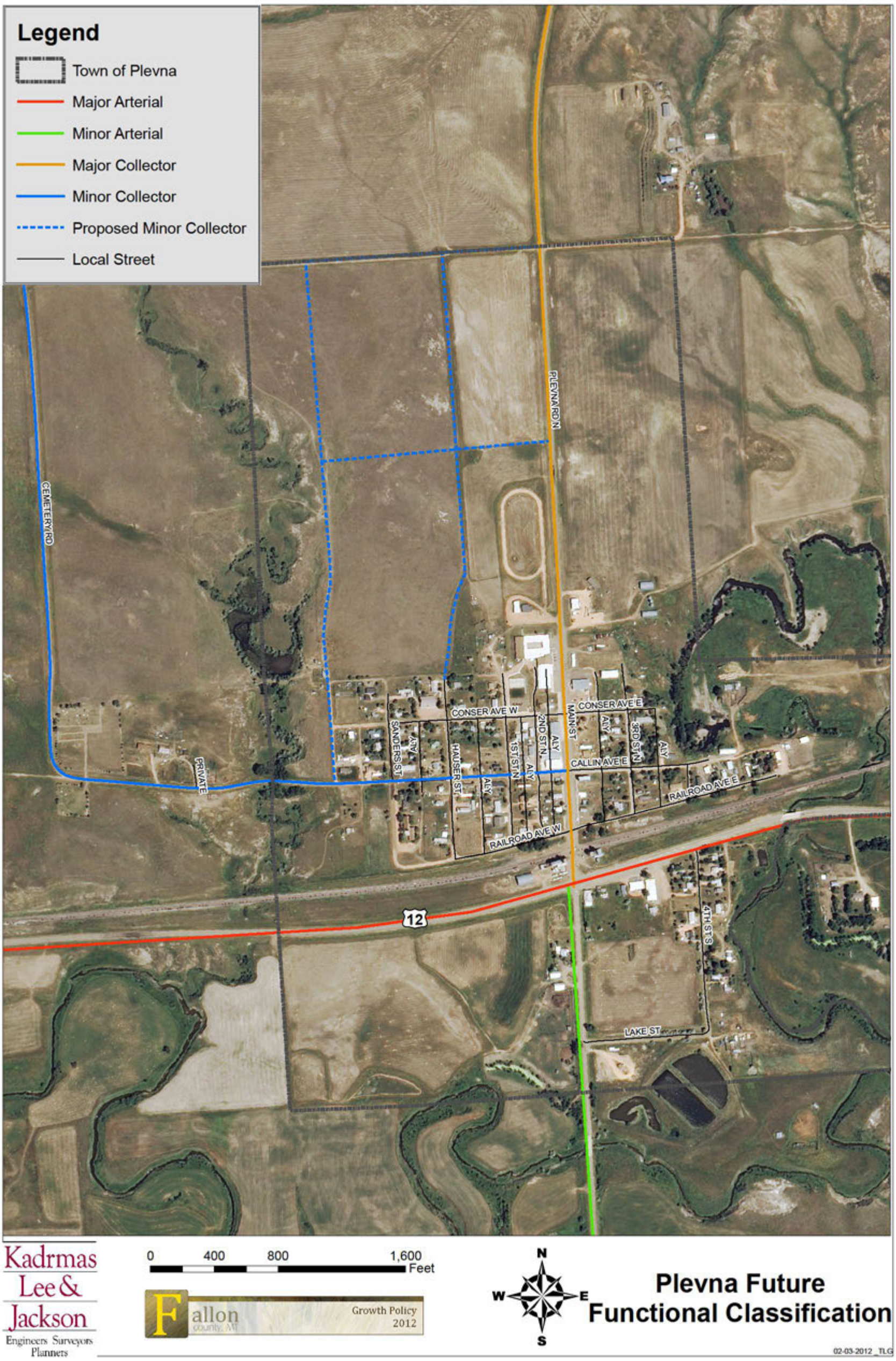


Figure 9.5: Plevna Future Street Extensions



Programmed Improvements

Fallon County, the City of Baker and the Town of Plevna should all take steps to prepare a capital improvement program (CIP) that contains a pavement management program and a county road maintenance program. The pavement management and county road programs outline the life expectancy of roadways and provide a schedule for resurfacing and replacing pavement/gravel as needed. The benefit of a CIP is that residents and County officials can strategically program and fund improvements on a set schedule rather than improving a road that could have waited for improvement. Moreover, the maintenance programs streamline capital spending by prioritizing improvements and helps plan projects in succession, thus reducing disturbances to residents. The programs would also assist the County road department in maintaining roads as well as planning for new equipment.

As noted in the survey, a truck bypass around Baker would help alleviate some of the traffic issues, weight load limits and delays from stopped trains. However, the bypass could also impact the City of Baker because it would reduce the amount of traffic into downtown and may limit people from stopping in town to partake in local businesses such as restaurants, convenience stores and shops. Figure 9.4 shows the potential truck bypass route along with future road extensions.

Funding Sources

Fallon County and City of Baker have funding options available to implement programmed road extensions and a potential truck bypass. The community recently discussed appointing a local administrator to the Community Transportation Enhancement Program (CTEP). The program has approximately $52,000 available for future funding. While this money could be used to fund road improvement projects, the small amount of money would not be sufficient for major repairs. As such, the money could be used for other transportation projects such as funding new historical-style lights along Main Street in Baker.

Other grant funding opportunities exist and are outlined in the Implementation chapter.

State Highways

Eight state highways run through Fallon County. Highway 7 and 12 are primary highways while Highways 247, 320, 322, 336, 493, and 494 are secondary highways that connect to the primary highways as well as county and local roads. MDT maintains more than 85 miles of state roads and highways throughout the county.

Level of Service

Service levels on state highways are well within acceptable levels. Service is calculated by counting average daily traffic (ADT) and is measured on a scale of A (free flow) to F (gridlock) as well as by capacity. Capacity below 80 percent is acceptable, 80-100 percent indicates a need to begin managing traffic with stop signs, stop lights or create additional lanes. Capacity over 100 percent, which is

achieved when more vehicles are using the road than what the road was designed to handle, indicates an immediate need to manage traffic.

According to MDT's most recent ADT data, all state highways throughout Fallon County are operating well within their designed capacity. Highway 7 and 12 were both designed to handle approximately 14,000 ADT depending upon speed limit and grades. However, traffic on Highway 7 south of Baker did increase over 82 percent from 390 vehicles in 2009 to 710 vehicles in 2011 as shown in Table 9.1.

Table 9.1: Annual Average Daily Traffic for State Highways in Fallon County

Location	Year	(AADT)	% Change
MT 7, 0.5 mi N of S-493			
North of Baker	2008	1240(E)	
	2009	1120(A)	-9.7%
	2010	1120(E)	0.0%
	2011	930 (A)	-17.0%
Overall % Change from 2008 to 2011			-25.0%

Location	Year	(AADT)	% Change
MT 7, 0.5 mi N of S-322			
South of Baker	2008	820(E)	
	2009	390(A)	-52.4%
	2010	390(E)	+0.0%
	2011	710(A)	+82.1%
Overall % Change from 2008 to 2011			-13.4%

Location	Year	(AADT)	% Change
US 12, 6 mi SE of S-494 Plevna			
West of Baker	2008	930(E)	
	2009	1210(A)	+30.1%
	2010	1220(E)	+0.8%
	2011	790(A)	-35.3%
Overall % Change from 2008 to 2011			-15.1%

Location	Year	(AADT)	% Change
US 12, Between 6th and 7th E Baker			
East of Baker	2008	2650(E)	
	2009	2600(A)	-1.9%
	2010	2610(E)	+0.4%
	2011	2700(A)	+3.5%
Overall % Change from 2008 to 2011			+1.9%

Location	Year	(AADT)	% Change
S-494, 1 mi W of MT 7			
	2008	100(E)	
	2009	100(E)	0.0%
	2010	100(E)	0.0%
	2011	110(A)	+10.0%
Overall % Change from 2008 to 2011			+10.0%

Location	Year	(AADT)	% Change
S-322, 0.5 mi SE of MT 7			
	2008	380(E)	
	2009	370(E)	-2.6%
	2010	370(E)	0.0%
	2011	340(A)	-8.1%
Overall % Change from 2008 to 2011			-10.5%

Notes: (A) – Actual Value
(E) – Projected Estimated Value

An interesting trend should be noted for traffic north of Baker on Highway 7. MDT data indicates traffic actually decreased by 17 percent from 2009 to 2011. One possible explanation is the time of year the count was performed, although MDT replicates traffic counts during the same season. Because the data does not appear to verify what is actually occurring north of Baker, the County may want to request a recount to either confirm the decreased traffic levels or verify the counts did not accurately reflect the current conditions.

Table also lists the traffic counts for other state highways throughout Fallon County. The data is displayed in both actual (A) data and estimated (E) data; however, when comparing data from year to year, readers should use the actual numbers as these can be substantiated.

Programmed Improvements

MDT has two programmed improvements to state highways. The junction of Highway 7 and S-336 is planned to have improvements east on S-336 from mile posting (MP) 0 – MP 7.9 with a tentative letting during fiscal year 2015. Junction Highway 7 and S-494 is planned to have improvements north and south on Highway 7 from MP 15.4 to MP 23.4 with a tentative letting during fiscal year 2015 as well. No other improvements are currently planned.

Corridor Preservation

Transportation corridors are major roads that lead in and out of towns and cities. They often provide visitor and residents alike the first views of a community, and if planned well can be an attractive and inviting landscape. However, if poorly planned, they can be a detriment to a community causing access and spacing issues as well as offering visitors a misinformed first impression of the community.

As such, corridor preservation should strive to create attractive spaces leading into a community and be designed to promote shared access points, especially if the corridor is a state highway.

More than 81 percent of survey respondents were in favor of implementing open space and landscaping standards along gateway corridors (Highway 7 and Highway 12) and in commercial areas throughout Baker.

Highway 7 Corridor

Highway 7 is well designed for residents coming into Baker from the south. Most access points are consolidated to local streets and the rodeo grounds offer visitors an attractive and accurate depiction of community values. However, the north end of Baker along Highway 7 has some drawbacks. The recent growth, while great for economic development, has impacted the overall community design. Visitors are greeted with industrial buildings, open lot storage areas and a non-screened junkyard. Moreover, access management may cause future problems and accidents because access points for the industrial uses on both sides of Highway 7 are not aligned. The County should begin working with existing businesses to consolidate access points and think about implementing landscaping buffers for storage lots.

Highway 12 Corridor

The eastern and western entrances along Highway 12 are better designed and offer appealing entrances into the community. Access spacing is not an issue as local streets funnel traffic onto the corridor. However, access and community design should be considered as new development occurs along Highway 12. A potential new commercial center with a hotel, restaurant and offices along with industrial space may be constructed east of downtown along the highway. This would be a great opportunity to enhance the Highway 12 corridor with proper planning and attractive design elements.

In addition, the recent crew camp facility that was approved west of Baker along Highway 12 offers another chance to extend and preserve the corridor for attractive uses with consolidated access points. The future corridor extension should ensure adequate ROW is preserved and compatible uses with attractive building fronts and landscaping buffers are employed. If planned properly, this corridor could serve as a prime example of what the community values and wants to see as future development occurs.

Public Transportation

Fallon County does not have a public transportation system, although the Fallon County Council On Aging provides a dial-a-ride service to Miles City, MT. Dial-a-ride service is an on-call service that elderly people, who do not have access to a vehicle, can use to make errands and go to appointments. While the service only provides limited access mostly during weekdays, the County should consider expanding dial-a-ride services and/or begin funding a public transportation system. As the County's population continues to age as a result of aging baby-boomers, transportation for elderly residents will be a challenge.

Moreover, if the County, Baker and Plevna want to accommodate and retain elderly residents, providing accessible transportation services to grocery stores, medical appointments and entertainment venues should be a priority.

Railroad

BNSF currently owns and operates the railroad that passes through Plevna and Baker, although it does not provide loading or unloading services at either location. A railroad loading/unloading facility would be a significant benefit if oil development and growth continue in the region. Oil companies will need a place to unload pipe, but currently there is not enough demand to warrant a stop in Baker. As a result, trucking is the only way to get pipe into the County and this leads to increased traffic and impacts to county and local roads.

Regulations Regarding Delay Times

The Federal Railroad Administration (FRA) does not regulate the length of time a train may block a grade crossing. However, FRA rail safety rules do address standing (idling) trains that unnecessarily activate grade crossing warning devices such as flashing lights and gate arms. The federal rule specifically prohibits standing trains, locomotives or other rail equipment from activating warning devices unless it is part of normal train movements or switching operations. If the FRA were to file a violation against a railroad it would be through the railroad's own rules. The General Code of Operating Rules (GCOR) item 6.32.6 Blocking Public Crossings states: when practical, a standing train or switching movement must avoid blocking a public crossing longer than 10 minutes.

While BNSF does not offer services in Baker, the train does periodically stop along the tracks in Baker to either wait for passing trains or to switch cars. Current state regulations allow up to 15 minutes for a train delay at railroad intersections for unincorporated towns (MCA 69-14-626); however, public input and stakeholder interviews suggest that the train sits idle for longer than 15 minutes at the Highway 7 intersection. The delays do cause issues with respect to firefighting and medical emergencies as the hospital does not allow doctors to live north of the tracks. Moreover, the Baker Fire Department must store equipment north of the tracks in the event a fire breaks out when the train is blocking the highway.

Documentation

The County and City of Baker could document the locomotive number, date and time, and duration of blockage (actual stop time, rolling train doesn't constitute time), and any other observations that may be helpful (i.e. second train approached 5 or 30 minutes later, crew member ran over to do a quick stop, track crew working, etc.). The documentation along with pictures and video could help the FRA, BNSF and MDT assess the issue and determine if an overpass or bypass may solve the problem.

In addition, the County and City of Baker could pass an ordinance prohibiting extended blocking of crossing to show it is an important issue to the community.

Baker Municipal Airport

The Baker Municipal Airport (BHK) had 7,050 operations during 2010; local operations (aircraft that take-off and remain within 20 miles of the airport) accounted for 5,300 operations while itinerant (all operations that are not local) accounted for 1,400 operations. Air taxi and military aircraft accounted for the remaining operations in 2010. According to the BHK Master Plan, operations are forecasted to increase 12 percent (7,890 operations) by 2019; moreover, by 2024 operations are expected to increase 22 percent (8,650 operations).

As operations are expected to increase over the next 7-12 years, the County and City of Baker should continue to work together to expand the facilities at the airport to ensure air travel is a viable transportation option for businesses. The airport recently updated its master plan, which includes physical improvements as outlined in the airport layout plan. The Baker Municipal Airport Master Plan identifies more than 11 projects in the CIP to be completed over the next 18 years.

To help ensure the airport can achieve its future development potential, the County should continue to use the zoning regulations surrounding the airport. Regulations limit the height and location of buildings and other objects that may interfere and cause harm to aircraft, pilots and passengers. Moreover, the County should support and plan to preserve land surrounding the airport for future expansions. Proper planning will help eliminate future land use incompatibilities and interruptions with air service.

Figure 9.6: Hangar at Baker Municipal Airport



The Powder River Military Operating Airspace (MOA) may expand its boundaries and regulations, which would severely impact the airport. The MOA expansions would not only limit the time non-military aircraft could fly into and out of BHK, but it would also limit the altitude at which certain planes could fly, including spray/crop dusting aircraft. The County should support the MOA if it does not severely impact aircraft and growth opportunities at BHK; otherwise, the MOA expansion has the potential to restrict future air travel to Baker and the County.

Chapter 10: Economic Development

Overview

The economy plays a crucial role in determining the quality of life in a community. A strong economy provides opportunities for the members of the community. The benefits of a strong community are numerous; a healthy and vibrant local economy stimulates the generation of jobs, which in turn draws new residents to the community and increases the retention of young adults and families. The increased population sustains existing and new businesses which leads to additional job creation. This is commonly known as the "virtuous cycle" of a growing economy.

A growing local economy can have a profound positive effect on a community's perception of itself. A sense of optimism and well-being is created when a growing economy generates wealth, increased incomes and a diversity of employment opportunities.

A strong local economy also reduces the risk of investment. Investment in a community can be made in a variety of ways. Businesses can invest in plant and equipment to expand operations. Entrepreneurs start new businesses. Younger residents purchase their first home and existing homeowners make improvements to their property. Young families feel financially stable and decide to have another child. And as noted above, younger adults choose to remain in their community because there are opportunities to start a career or vocation.

Local governments also benefit from a growing economy. New or expanded businesses and homes increase property tax revenue. Increased economic activity drives up sales tax revenue. With the increased revenue and decreased investment risk, local government is able and willing to expend public funds on a variety of community investments. Those investments can fund needed improvements to existing facilities as well as fund new programs and facilities. These types of investments directly impact and enhance the quality of life in a community.

This chapter will provide a profile of the existing local economy with an emphasis on the two major sectors of the economy – agriculture and energy. Tourism, a much less significant sector of the local economy, is discussed because of its potential contribution to the local economy. A variety of information related to employment and income in the county, as well as workforce characteristics, will be identified and analyzed. Data on forecasted growth occupations and employment will be provided to focus workforce training and economic development efforts. Finally, recommended policies and strategies will be provided for each economic development objective.

The Local Economy

Energy Development

For nearly 30 years the development of energy resources has contributed significantly to the county's local economy. The economic contribution has taken several forms. First, the energy sector has generated a significant number of jobs directly related to exploration, development and transport of oil and natural gas. These activities provided jobs in the drilling of oil and natural gas wells and also the construction of numerous transmission or pipelines. In addition, numerous oil and gas well servicing companies have been established that provided material, equipment and staff to service wells.

Finally, the county and school districts receive substantial revenue from Oil and Gas Production Tax (OGPT) distributions. Fallon County receives second highest OGPT revenues in the state. In 2011, the county received approximately $22.4 million dollars in OGPT distribution revenue. Approximately one-half of the revenue goes directly to county government and remaining funds support public school retirement and county-wide transportation. In addition, the Baker and Plevna school districts received approximately $5.2 million in OGPT revenue.

Table 10.1 provides data on oil and gas production in the county from 1986 to the present. Overall production has steadily increased in Fallon County. The total days of production have increased more than 250 percent between 1986 and 2011. Total annual oil production has remained relatively stable during this period but the total annual production of natural gas and other associated gas has substantially increased during the period.

Figure 10.1: Oil Well in Fallon County



Table 10.1: Oil, Natural Gas and Associated Gas Production, Fallon County 1986 to 2012

Year	Total Oil Production	Total Natural Gas Production	Total Associated Gas Production	Total Days of Production
1986	6,410,247	159,855	1,538,765	143,505
1987	5,955,715	135,071	1,521,037	139,843
1988	5,889,978	483,197	1,444,186	153,821
1989	5,657,819	460,029	1,478,984	152,172
1990	5,429,768	275,428	1,492,761	145,667
1991	5,402,094	312,751	1,415,947	147,543
1992	5,300,256	939,170	1,349,488	160,154
1993	5,135,488	1,271,678	1,236,532	162,309
1994	5,119,555	1,286,174	1,225,791	166,961
1995	5,431,298	1,575,368	1,228,340	174,124
1996	5,445,962	2,028,776	1,494,994	184,393
1997	5,108,461	3,056,913	1,604,264	192,501
1998	5,747,973	4,048,396	1,402,580	200,044
1999	5,791,732	5,440,684	1,609,600	223,628
2000	5,710,097	6,149,215	1,693,107	238,786
2001	5,984,632	7,416,961	1,640,630	254,743
2002	6,396,025	10,834,681	1,771,191	284,087
2003	6,877,676	13,607,526	1,742,097	317,034
2004	7,282,272	17,064,292	1,880,839	349,404
2005	7,547,096	21,514,611	2,127,517	385,329
2006	7,868,360	22,633,729	2,690,888	422,515
2007	7,251,298	21,888,506	4,957,640	447,234
2008	6,619,702	21,184,764	8,001,854	480,319
2009	6,064,627	18,260,172	7,985,768	497,189
2010	5,338,956	15,862,682	6,487,990	503,863
2011	4,834,169	14,061,246	3,537,390	519,976
2012	378,167	1,050,604	228,054	43,420

Source: Montana Board of Oil and Gas Conservation Production Records

The next two tables show how oil and gas production has evolved between 1980 to the present. As shown in Table 10.2, more than one-half of all oil wells in the county began production between 1980 and 1989 and that only four new oil wells went into production between 2010 to the present. However, it is important to note that 60 percent of all oil wells in the county had peak production years in either 2011 or 2012.

More than 70 percent of all oil wells in the county are operated by Denbury Onshore, LLC. More than 63 percent of all oil wells are producing from the Ordovician-Silurian geologic formation, but over the last three years there has been a modest increase in the number of oil wells producing from the Upper Ordovician geologic formation.

Table 10.2: Oil Wells in Fallon County By Decade Production Began

Decade	Number	Percent of Total
1980-89	495	52.5%
1990-99	251	26.6%
2000-09	192	20.4%
2010 to present	4	0.4%
Total	942	100.0%

Source: Montana Board of Oil and Gas Conservation Production Records

Table 10.3 clearly shows recent development of gas wells in the county. Nearly two-thirds of all gas wells in the county began production between 2000 and 2009. Nearly 95 percent of all gas wells are operated by Fidelity Exploration & Production Co., which is a subsidiary of Williston Basin Interstate Pipeline Company. All of the gas wells are producing from the Upper Cretaceous geologic region. More than 91 percent of all gas wells had peak production years in either 2011 or 2012. With 74 new gas wells developed in the county between 2010 and the present it appears the significant increase of gas production in recent years is likely to continue. However, with the current overabundance in the nation's supply of natural gas and corresponding low natural gas prices, the Fidelity Exploration & Production Co. may decide to reduce gas production until prices recover.

Table 10.3: Gas Wells in Fallon County By Decade Production Began

Decade	Number	Percent of Total
1980-89	96	8.0%
1990-99	233	19.5%
2000-09	793	66.3%
2010 to present	74	6.2%
Total	1,196	100.0%

Source: Montana Board of Oil and Gas Conservation Production Records

Agriculture

Agriculture has historically been a significant part of the Fallon County economy both in terms of land area devoted to agriculture and the value and income of agricultural operations. Agricultural productivity is heavily influenced by the length of the growth season and the amount of precipitation. Table 10.4 provides data on annual precipitation and the number of frost free days in 2009 and 2010. During 2009 and 2010, growing conditions both in terms of precipitation and the number of frost-free days have been very favorable.

Table 10.4: Climatological Data Annual and Growing Season Precipitation and Frost-Free Days, Fallon County 2009-2010

PRECIPITATION in Inches						FROST-FREE DAYS 1/		
Annual			April – September			Growing Season		
2009	2010	Normal 2/	2009	2010	Normal 2/	2009	2010	Average 3/
16.42	18.61	14.69	12.47	14.95	10.67	--	133	114

Footnotes:
1/ The number of days between the last frost in spring and the first frost after June 30.
2/ Normal for period 1971-2000.
3/ Average frost-free days for the period 1991-2000.
-- Not available
Source: National Climatic Data Center, NOAA, Asheville, North Carolina

The significance of agriculture is also observed by the amount of land in the county that is put into agricultural production. In 2007, more than 94 percent of the total land area of the county was used for agricultural.

The economic value of agriculture in the county is very significant. As can be seen in Table 10.5, the total value of farm and ranch assets in 2011 was $42 billion and the average value per farm or ranch was $1,428,683 with most the value derived from real estate value.

Table 10.5: Economic Profile of Fallon County Farms and Ranches, 2011

Economic Measurement	Economic Value
Total Farm and Ranch Assets 1/, 2/	$42.0 Billion
Average Value Per Farm or Ranch 2/	$1,428,683
Real Estate Value of Farm or Ranch 2/	$1,181,889
Average Value Per Acre 3/	$710
Farm and Ranch Debt Per Operation 2/	$119,616

Footnotes:
1/ Excludes farm operators' household assets and debt.

2/ Source: Economic Indicators of the Farm Sector, State Income and Balance Sheet Statistics, USDA Economic Research Service. Figures are for 2008.
3/ Per acre, land and buildings, January 1, 2011.
Source: USDA 2011 Annual Statistical Bulletin for Montana

The market value of agricultural production has increased during the past decade. This is attributed to two factors: favorable commodity prices and more land being put into production. Table 10.6 provides data on the value of agricultural production in 2002 and 2007. Between 2002 and 2007 the market value of products sold increased by 60 percent. The data also shows the dominance of ranching in the county, with 81 percent of the total market value of products sold in 2007 being derived from livestock sales. Another measure of the strong agricultural economy is found in the average per farm value of sales. Between 2002 and 2007 the average per farm value of sales increased by 77 percent.

Table 10.6: Fallon County, Market Value of Products, 2002 and 2007

Measure of Agricultural Sales	2002	2007	2002 – 2007 Percent Change
Market Value of Products Sold	$22,439,000	$35,938,000	60%
Crop Sales (19%)	--	$6,981,000	--
Livestock Sales (81%)	--	$28,957,000	--
Average Per Farm	$68,622	$121,412	77%

Source: 2007 Census of Agriculture, US Department of Agriculture, National Agricultural Statistics Services

Table 10.7 provides more detailed information on the economic performance of Fallon County farms. First, in 2009 the total market value of products sold was $32,966,000, an eight percent decrease from 2007. While this is still a relatively high level of total sales, farmers and ranchers in the county are struggling financially to maintain their operations. Total farm production expenses nearly equaled gross farm income in 2009, resulting in nearly no realized net farm income. However, it is important to note that of the seven counties in the Southeast District (Carter, Custer, Fallon, Powder River, Prairie, Rosebud and Wibaux), Fallon County was only one of two counties where, as a whole, farms had a positive realized net farm income.

Table 10.7: Fallon County Farm Income and Expenses, October, 2009 (in $1,000 dollars)

Cash Receipts				Government Payments	Other Farm Income	Gross Farm Income	Farm Production Expenses	Realized Net Farm Income
Livestock and Products	Rank	Crops	Rank					
$23,808	20	$9,188	39	$3,537	$5,288	$38,284	$38,184	$100

Source: Bureau of Economic Analysis, US Department of Commerce, 2011 Montana Agricultural Statistics

One of the sources of financial stress is attributed to relatively low cash rent for agricultural land. Rent from non-irrigated land in the county is below average rents in the Southeast District and the state. While rent values of pasture in the county were strong in 2010, the average rent of pasture in 2011 dropped below the district and state averages in 2011.

Table 10.8: Cash Rent Dollars per Acre for Fallon County and Montana, 2010-2011

Location	Non-Irrigated Dollars per Acre		Pasture Dollars per Acre	
	2010	2011	2010	2011
Fallon County	13.00	--	6.20	4.10
Southeast District	15.50		4.30	4.10
Montana	22.00	23.50	4.80	5.60

Source: USDA, NASS Montana Field Office, Montana Agricultural Statistics, October, 2011

A very important measurement of the viability of family farms is the total number of farms in the county. In just five years between 2002 and 2007, the number of farms dropped from 327 farms in 2002 to 296 farms in 2007. During the same period, the average farm size increased 2,851 acres in 2002 to 3,303 in 2007. Interviews with agricultural stakeholders suggest the process of consolidating agricultural operations has continued since 2007. In 2007 the average age of the principal farm or ranch operator was 58.7 years, and based on stakeholder interviews the average age has likely increased since then. The data suggests family farms are struggling financially. As shown in Table 10.9, the average debt of farmers and ranchers is $119,616. Agricultural stakeholders informed the planning consultant that nearly all farmers and ranchers derive income from wage employment to make ends meet. In addition, many of the children of farmers and ranchers are choosing not to stay on the farm or ranch. Consequently, more family farms will likely be sold, resulting in fewer family farms and increased size of farm operations.

Table 10.9: Fallon County Farm Characteristics, 2002 and 2007

Location	2002			2007		
	Number of Farms	Land in Farms (acres)	Average Farm Size (acres)	Number of Farms	Land in Farms (acres)	Average Farm Size (acres)
Fallon County	327	932,211	2,851	296	978,818	3,303
Southeast Dist.			4,562			4,742
Montana	--	--	2,139	--	--	2,079

Footnote: Farms are places that had or would have had annual sales of agricultural products of $1,000 or more.
Source: 2007 US Census of Agriculture, US Department of Agriculture, National Agricultural Statistics Service

Tourism

Tourism is a source for personal income, employment and tax revenue. Based on an Institute for Tourism and Recreation Research 2010 Biennial Report titled, The Economic Review of the Travel Industry in Montana, in 2009, travel expenditure by non-resident (out of state) visitors totaled more than $2.27 billion, which generated $2.33 billion in total economic impact. In addition, nearly $153 million in state and local tax revenue was generated in 2009 from nonresident travel in Montana. The state ranks 42nd in the nation for tourism spending, but ranks 5th in the nation in per capita tourism spending. In 2009, nonresident visitor spending directly generated more than 19,000 travel jobs in the state, and contributed to a total of almost 22,500 jobs, leading to more than $660 million in total personal income for Montana residents.

The primary reasons for nonresident trips in the state were vacation/recreation/pleasure and just passing through. Scenic driving, visiting other historic sites, nature photography, day hiking, recreational shopping, wildlife watching, car/RV camping and visiting museums were the most common nonresident activities.

Looking more closely at the Southeast Montana Region comprised of Big Horn, Musselshell, Yellowstone, Golden Valley, Treasure, Rosebud, Custer, Powder River, Dawson, Prairie, Carter, Wibaux and Fallon County, 2010 nonresident expenditures for the region totaled $445 million. The majority of the expenditures were for gas (30.7 percent), retail (25.0 percent), restaurant and bar (18.8 percent) and lodging (13.6 percent). A total of 227,704 persons visited state parks in the region in 2009, up 39 percent from the prior year.

For Fallon County, the nonresident expenditure data is less reliable than the state or regional data due to the limited number of travelers interviewed. In 2010 the total nonresident expenditures in Fallon County was just $66,000, representing less than 0.01 percent of the expenditures in the Southeast Montana Region. Even if the data undercounted nonresident expenditure by a factor of 1,000, Fallon County would still account for less than one percent of the regional expenditures. Based on the available data, it appears Fallon County has the potential to capture a much greater percentage of the region's nonresident expenditures, and strategies have been recommended to realize that potential.

Two planning or marketing strategies are recommended. The first is to place a greater emphasis on marketing the natural and cultural amenities in the county. The second is to increase the number of pass through visits of tourists in route to one of the several major regional attractions (e.g. Custer National Forest, Yellowstone National Park, Fort Union Trading Post National Historic Site, Theodore Roosevelt National Park and the numerous attractions in the Badlands).

Income

Evaluating and measuring the local economy is useful to examine change over time and to compare the local economy to a large economy. Table 10.10 provides a profile of county income from a variety of sources from 1970 to 2010, and compares county income to income in the State of Montana, expressed as a percent of the state economy. There are many observations that can be made from the data contained in Table 10.10. By most measures, relative to the state economy, the Fallon County economy was stronger in 1970 and 1980 than in later years. Overall income in the county was at its weakest in 1990 and 2000 and has strengthened in 2005 and 2010. As a percentage of the state economy, in 2010 the county economy outperformed the state economy in per capita personal income, per capita net earnings, average earnings per job, average wage and salary disbursements, and average nonfarm proprietors' income. Overall, these positive wage and earnings data indicates the county has a relatively strong labor market that is driving up wages and salaries.

Table 10.10: Fallon County Economic Profile, Percent of State of Montana, 1970 to 2010

Description	1970	1980	1990	2000	2005	2010
Personal income	0.53	0.58	0.35	0.28	0.31	0.34
Net earnings 1/	0.57	0.63	0.36	0.27	0.35	0.40
Personal current transfer receipts	0.43	0.43	0.34	0.33	0.31	0.25
Income maintenance 2/	0.32	0.26	0.22	0.18	0.15	0.15
Unemployment insurance compensation	(L)	(L)	0.15	0.22	0.19	0.15
Retirement and other	0.44	0.47	0.35	0.34	0.33	0.27
Dividends, interest, and rent	0.43	0.47	0.33	0.27	0.20	0.24
Per capita incomes (dollars)						
Per capita personal income 3/	92	121	91	90	108	116
Per capita net earnings 3/	97	133	94	88	120	137
Per capita personal current transfer receipts 3/	73	90	88	106	108	86
Per capita retirement and other 3/	77	98	91	111	113	92
Per capita dividends, interest, and rent 3/	75	98	85	86	70	84
Earnings by place of work	0.58	0.62	0.37	0.28	0.37	0.45
Wage and salary disbursements	0.47	0.58	0.33	0.26	0.35	0.48
Proprietors' income	0.93	0.91	0.56	0.42	0.52	0.44
Nonfarm proprietors' income	0.93	0.85	0.51	0.30	0.28	0.52
Farm proprietors' income	0.94	(NM)	0.73	3.27	2.49	(NM)
Total full-time and part-time employment (jobs)	0.60	0.55	0.43	0.34	0.33	0.39
Wage and salary jobs	0.50	0.51	0.35	0.28	0.30	0.35
Number of proprietors	0.93	0.67	0.66	0.50	0.41	0.50
Number of nonfarm proprietors 4/	0.63	0.46	0.48	0.34	0.29	0.42
Number of farm proprietors	1.45	1.26	1.35	1.23	1.07	0.99
Average earnings per job (dollars)	96	113	86	84	113	115
Average wage and salary disbursements	93	113	95	93	116	136
Average nonfarm proprietors' income	148	185	107	89	97	122

Footnotes:

1/ Total earnings less contributions for government social insurance adjusted to place of residence.

2/ Consists largely of supplemental security income payments, family assistance, general assistance payments, food stamp payments and other assistance payments, including emergency assistance.

3/ Type of income divided by population yields a per capita measure for that type of income.

4/ Excludes limited partners.

All state and local area dollar estimates are in current dollars (not adjusted for inflation).

(NM) Not meaningful.

Last updated: April 25, 2012 - new estimates for 2010; revised estimates for 2000-2009.

Source: 1969-2010; Bureau of Economic Analysis, Regional Economic Data, Local Area Personal Income, Table CA30.

There is no cost of living data produced by a public agency for Fallon County or the City of Baker. However, the planning consultant did obtain cost of living data from commercial sources. The website www.city-data.com reported the January 2011 cost of living index in Fallon County was 81.0 compared to the US average of 100. Another commercial website (www.bestplaces.net) reported the 2012 cost of living index for the City of Baker was 83 compared to Billings, MT and the US that both had a cost of living index of 100.

Based on the data available it appears the cost of living is not significantly increasing in the county and with recent income gains from wages and salaries a combination of increased savings or increased discretionary spending may be occurring. Either activity would strengthen the local economy.

Table 10.11 provides more additional historical and comparative wage and salary data. The table shows Fallon County wage and salary data from 1970 to 2010, as a percentage of wages and salaries for the State of Montana. The information once again shows a weakening of the Fallon County economy relative to the state economy between 1985 and 2000 in terms of wages and salaries, number of jobs and average wage per job. However, between 2005 and 2010 the county experienced steady gains in comparison to the state in wages and salaries, and number of jobs and the average wage per job was significantly higher than the state average.

Table 10.11: Fallon County Wage and Salary, Percent of State of Montana, 1970 to 2010

Year	Wage and Salary Disbursements 1/	Wage and Salary Employment 2/	Average Wage Per Job 3/
1970	0.47	0.50	92.54
1975	0.46	0.49	93.58
1980	0.58	0.51	113.30
1985	0.41	0.43	95.30
1990	0.33	0.35	94.93
1995	0.27	0.31	88.92
2000	0.26	0.28	92.50
2005	0.35	0.30	115.50
2006	0.39	0.32	121.68
2007	0.39	0.31	126.73
2008	0.41	0.31	128.72
2009	0.45	0.34	132.25
2010	0.48	0.35	135.73

Footnotes:

1/ In thousands of dollars

2/ Number of jobs

3/ In dollars. The employment estimates used to compute the average wage are a job, not person, count. People holding more than one job are counted in the employment estimates for each job they hold. All state and local area dollar estimates are in current dollars (not adjusted for inflation).

Last updated: December 14, 2011 - new estimates for 2010; revised estimates for 2008-2009.

Source: 1970-2010; Bureau of Economic Analysis, Regional Economic Data, Local Area Personal Income, Table CA34. http://www.bea.gov/bea/regional/reis/

Table 10.12 provides a closer examination of the same wage and salary data for just the county between 2004 and 2010. It shows year to year percentage change for wages and salaries, number of jobs and average wage per job. Between 2004 and 2006 the county experienced exceptionally strong gains in all three measures, and between 2006 and 2010 the county had lower yet still significant annual increases in wages and salaries, number of jobs and average wage per job.

Table 10.12: Fallon County Wage and Salary, Percent Change from Preceding Period, 2004 to 2010

Year	Wage and Salary Disbursements 1/	Wage and Salary Employment 2/	Average Wage Per Job 3/
2004 - 2005	21.71	5.57	15.29
2005 - 2006	21.25	9.66	10.57
2006 - 2007	7.45	-2.10	9.76
2007 - 2008	6.93	2.08	4.76
2008 - 2009	8.73	4.20	4.35
2009 - 2010	8.53	3.12	5.24

Footnotes:

1/ In thousands of dollars

2/ Number of jobs

3/ In dollars. The employment estimates used to compute the average wage are a job, not person, count. People holding more than one job are counted in the employment estimates for each job they hold. All state and local area dollar estimates are in current dollars (not adjusted for inflation).

Last updated: December 14, 2011 - new estimates for 2010; revised estimates for 2008-2009.

Source: 1969-2010; Bureau of Economic Analysis, Regional Economic Data, Local Area Personal Income, Table CA34. http://www.bea.gov/bea/regional/reis/

Table 10.13 provides another measure of income in the county from the 2010 US Census that affirms the prior data provided from the US Department of Commerce, Bureau of Economic Analysis. In terms of per capita money income and median household income, 2010 incomes in the county exceeded those for the State of Montana. In fact, in 2010 the Fallon County median household income was nearly 20 percent greater than the median household income for the state, and the county median family household income was nearly 16 percent greater than the state. However, nonfamily households have not fared as well. In 2010, nonfamily households comprised 35 percent of all households and their median income was actually lower than the state median income.

Table 10.13: Per Capita and Median Household Income in the Past 12 Months, 2010, Montana and Fallon County

Measure of Income	Number of County Households	Fallon	Montana
Per capita money income	--	$26,819	$23,836
Median household income	1,193	$52,529	$43,872
Median family household income	776	$64,500	$55,725
Median nonfamily income	417	$24,673	$25,972

Source: US Census Bureau, 2010 Census

Table 10.14 provides the same income data for the City of Baker and Town of Plevna. Data for the city and town is comparable with the county-level data with one exception. The median nonfamily income in the Town of Plevna is significantly lower compared with the county and city.

Table 10.14: Per Capita and Median Household Income in the Past 12 Months, 2010, City of Baker and Town of Plevna

Measure of Income	Number of Households	City of Baker	Number of Households	Town of Plevna
Per capita money income	--	$27,159	--	$24,598
Median household income	1,032	$53,023	161	$55,413
Median family household income	660	$65,119	116	$63,797
Median nonfamily income	372	$24,923	45	$16,339

Source: US Census Bureau, 2010 Census

Tables 10.15 and 10.16 provide more detailed county household income data. Table 10.15 provides household income data and Table 10.16 provides family household income data. Household incomes are distributed more evenly in the $15,000 to $149,999 income range with approximately 36 percent of the household with incomes of $50,000 or more. In contrast, the majority of family households are in the $50,000 to $144,999 income range with nearly one-half of the family households with incomes of $50,000 or more. These differences are attributed to the much lower income of nonfamily households that are included in the household income data.

Table 10.15: Household Income, Fallon County, MT, 2010

Household Income	Number of Households	Percent of Total Households
Less than $10,000	33	2.8
$10,000 to $14,999	35	2.9
$15,000 to $24,999	242	20.3
$25,000 to $34,999	151	12.7
$35,000 to $49,999	132	11.1
$50,000 to $74,999	279	23.4
$75,000 to $99,999	124	10.4
$100,000 to $149,999	155	13.0
$150,000 to $199,999	19	1.6
$200,000 or more	23	1.9
Total	1,193	100.0

Source: US Census Bureau, 2010 Census

Table 10.16: Family Household Income, Fallon County, MT, 2010

Family Household Income	Number of Families	Percent of Total Families
Less than $10,000	16	2.1
$10,000 to $14,999	22	2.8
$15,000 to $24,999	71	9.1
$25,000 to $34,999	99	12.8
$35,000 to $49,999	73	9.4
$50,000 to $74,999	198	25.5
$75,000 to $99,999	119	15.3
$100,000 to $149,999	146	18.8
$150,000 to $199,999	9	1.2
$200,000 or more	23	3.0
Total	776	100.0

Source: US Census Bureau, 2010 Census

It is clear from the income data that overall incomes in Fallon County are at a relatively high level and that nonfamily income is significantly less than family income. Table 10.17 provides data on families and persons whose income was below the poverty level in the past 12 months. Overall, the poverty statistics for all families and all people are comparable for the county, city and town. However, there are significant differences between the jurisdictions in some of the measures of poverty. The Town of Plevna had much higher rates of poverty among families and married couple families with related children under 18 years of age. In the unincorporated portion of the county there was a significantly greater incidence of poverty for unrelated individuals 15 years and older. Positive results in comparing the jurisdictions include a much lower level of poverty in the City of Baker for persons 65 years and older and no families with a female householder with no husband present were in poverty in the Town of Plevna. The latter finding may be due to the small sample size in the town.

The information contained in Table 10.17 should be used by local government and social service providers to focus efforts to assist families and individuals.

Table 10.17: Percentage of Families and People Whose Income in the Past 12 months was Below Poverty Level, Fallon County, MT, 2010

Types of Families and Individuals	Fallon County	City of Baker	Town of Plevna
All families	5.7	5.8	5.2
With related children under 18 years	11.2	10.5	16.7
Married couple families	4.5	4.3	5.6
With related children under 18 years	8.3	6.9	18.5
Families with female householder, no husband present	19.7	21.7	0.0
With related children under 18 years	26.0	27.7	0.0
All people	8.5	8.6	7.5
Under 18 years	16.3	16.2	17.2
18 to 64 years	7.1	7.5	5.0
65 years and over	8.9	2.9	8.0
Unrelated individuals 15 years and over	27.5	12.6	7.1

Source: US Census Bureau, 2010 Census

Employment

This section examines from where income was derived from those in the county who were employed in 2010. Table 10.18 indicates the local economy was successful in weathering effects of the 2008-09 national recession. In April 2010, the unemployment rate in Fallon County was only 2.3 percent, compared to unemployment rates in Montana and the US which were 3.7 percent and 10.8 percent respectively. More than one-fourth of the persons 16 years and older were not in the labor force. Those not in the labor force largely consist of students, housewives, retired workers, seasonal workers interviewed in an off-season who were not looking for work, institutionalized people and people doing only incidental unpaid family work (less than 15 hours per week). At first glance, the significant number of people not participating in the labor force raises questions about employment rates in the county. However, when compared to Montana and the US, labor force participation in 2010 was relatively high. The percentage of persons not in the labor force in Montana and the US was 34.7 percent and 35.6 percent respectively.

Table 10.18: Employment Status, Fallon County, MT, 2010

Employment Status	Number	Percentage
Population 16 years and over	2,269	--
In labor force	1,670	73.6%
Not in labor force	599	26.4%
Civilian labor force	1,670	73.6%
Employed	1,618	71.3%
Unemployed	52	2.3%
Armed Forces	0	0.0%

Source: US Census Bureau, 2010 Census

The employment by industry in Fallon County and Montana is detailed below in Table 10.19. The table shows the percentage of total employment for each type of industry. Compared to the State of Montana, the county had lower or comparable percentages of employments in all industries but two – agriculture, forestry, fishing and hunting, and mining; and transportation and warehousing, and utilities. Expressed as a percentage of total employment, the county employment in the agriculture, forestry, fishing and hunting, and mining industries was more than three times greater than the State of Montana, and county employment in the transportation and warehousing, and utilities industries were nearly two times greater than the state. Local economic development efforts should focus on securing jobs in several of the industries that compared to the state are under-represented in the local economy. The efforts should focus on higher paying industries such as manufacturing and professional, scientific, and management, and administrative and waste management services.

Table 10.19: Employment by Type of Industry in Fallon County and Montana, Percent of Total Employment 2010

Type of Industry	Fallon County	Montana
Agriculture, forestry, fishing and hunting, and mining	24.6%	7.1%
Construction	8.8%	8.9%
Manufacturing	2.8%	5.0%
Wholesale trade	1.2%	2.8%
Retail trade	8.1%	12.1%
Transportation and warehousing, and utilities	10.0%	5.1%
Information	2.6%	1.9%
Finance and insurance, and real estate and rental and leasing	5.3%	5.6%
Professional, scientific, and management, and administrative and waste management services	3.5%	8.0%
Educational services, and health care and social assistance	17.6%	22.3%
Arts, entertainment, and recreation, and accommodation and food services	7.7%	10.2%
Other services, except public administration	3.5%	4.6%
Public administration	4.4%	6.1%

Source: US Census Bureau, 2010 Census

Table 10.20 provides data on the annual percentage change in employment from a variety of sources of employment. The data shows steady growth in county employment in most sources of employment. Overall, the local economy was steady gains in total employment from 2001 to 2010 and even stronger gains in wage and salary employment during the same period. It is noteworthy that the county experienced strong increases in the employment during and after the national employment. This shows that the local economy is quite resilient to non-energy induced downturns in the national economy. The data shows one worrisome trend in employment. Farm proprietors' employment during the period steadily eroded between 2001 and 2006 and then more or less stabilized between 2006 and 2010. This is another indication of the financial stress experienced by the county's farmers and ranchers.

Table 10.20: Fallon County Full-Time and Part-Time Employment by NAICS Industry, Percentage Change From Prior Year, 2001 to 2010 1/

Description	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010
Total employment	3.6	-1.4	1.6	4.3	6.5	-0.8	10.6	3.1	2.1
By type									
Wage & salary employment	4.0	-1.1	6.7	5.6	9.7	-2.1	2.1	4.2	3.1
Proprietors employment	3.1	-2.0	-7.3	1.7	-0.2	2.3	29.3	1.2	0.4
Farm proprietors employment	-3.1	-7.8	-6.3	-4.1	-6.3	-0.4	0.0	0.8	-1.3
Nonfarm proprietors employment 2/	8.5	2.5	-7.9	5.9	3.8	3.9	45.7	1.3	1.0
By industry									
Farm employment	-3.8	-7.1	-4.9	-3.5	-5.0	-0.4	0.7	-0.4	-0.7
Nonfarm employment	5.5	-0.1	3.0	5.8	8.5	-0.8	12.2	3.6	2.5
Private employment	5.9	-0.2	3.6	8.5	9.4	-0.3	13.9	4.5	2.4
Mining	(D)	(D)	(D)	(D)	(D)	(D)	(D)	-0.8	3.9
Construction	5.1	(D)	(D)	(D)	(D)	(D)	(D)	5.8	11.4
Manufacturing	9.1	(D)	(D)	(D)	(D)	(D)	(D)	4.0	3.9
Retail trade	18.1	-4.2	-12.1	-3.3	-6.3	2.4	22.6	3.9	-0.5
Transportation and warehousing	-3.8	0.0	8.8	10.8	10.6	3.7	12.8	20.1	-1.1
Information	6.9	-9.7	-3.6	-3.7	0.0	-11.5	4.4	0.0	-8.3
Finance and insurance	-9.4	18.8	0.0	0.0	5.3	1.7	57.4	(D)	(D)
Real estate, rental and leasing	-5.0	15.8	0.0	0.0	0.0	0.0	100.0	(D)	(D)
Professional, scientific, and technical services	(D)	(D)	(D)	(D)	(D)	(D)	(D)	0.0	4.1
Administrative & waste management services	(D)	(D)	(D)	(D)	(D)	(D)	(D)	21.1	6.5
Health care and social assistance	1.3	1.3	1.3	-1.3	-1.3	1.3	5.1	0.0	-1.8
Other services, except Public administration	2.6	0.0	5.0	12.0	-2.9	-6.6	14.2	9.0	-1.3
Government and government enterprises	3.9	0.0	0.3	-6.2	3.7	-3.9	2.2	-2.2	3.3

Footnotes:

1/ The estimates of employment for 2001-2006 are based on the 2002 North American Industry Classification System (NAICS). The estimates for 2007 forward are based on the 2007 NAICS.

2/ Excludes limited partners.

(D) Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.

Last updated: April 25, 2012 - new estimates for 2010; revised estimates for 2008-2009.

Source: 2001-2010; Bureau of Economic Analysis, Regional Economic Data, Local Area Personal Income, Table CA25N.

Employment Forecasts

This section looks forward and provides forecasts of employment growth as well as projected job growth by industry and occupation. The information provided in this section is intended to assist with the targeting of economic development and workforce development efforts in the county so that these efforts can align with industries and occupations that are expected to experience significant job growth during the remainder of the decade.

The planning consultant was unable to find employment projection data at the county level. However, the Montana Department of Labor and Industry, Research and Analysis Bureau (RAB), does prepare employment projections for the five Job Service regions in the state. Fallon County is in Region 5 which includes the following Montana counties: Valley, Daniels, Sheridan, Roosevelt, Garfield, McCone, Richland, Dawson, Prairie, Wibaux, Treasure, Rosebud, Custer, Fallon, Powder River and Carter.

Table 10.21 shows that Region 5 was expected to have an annual growth of 3,350 jobs between 2011 and 2020 resulting in a total of 38,136 new jobs by 2020. A significant portion of the expected job growth will be from jobs that replace job losses in the region during the recession. Expected job growth in Fallon County was estimated by applying the county's percentage of Region 5 employment in 2010 employment to the expected job growth in Region 5. In other words, it was assumed that the county's expected job growth would be directly proportional to the county's share of 2010 employment in Region 5. Based on the results of the estimation, the county was expected to have an annual growth of 156 jobs between 2011 and 2020 and a total of 1,560 new jobs by 2020. Based on the preliminary, non-seasonally adjusted December, 2011 RAB labor force statistics, between 2010 and December 2011, Region 5 has added 2,910 new jobs and 434 new jobs have been created in Fallon County. The 434 new jobs in county represents 15 percent of the total number of new jobs in Region 5 as opposed to the 4.7 percent share of the region's new jobs that was based on the assumption that the expected county rate of employment growth would be proportional to the county's share of 2010 employment in Region 5. In summary, it appears new job growth in the county is outpacing the region's job growth rate.

Table 10.21 2010 Employment, December 2011Employment Estimates and 2020 Expected Employment, Region 5 and Fallon County

Employment	Eastern Job Service Region 5	Fallon County
2010 Employment	34,786	1,618
Expected Annual Job Growth, 2011-2020	3,350	156
Total Expected 2020 Employment	68,286	3,178
December 2011 Employment	37,696	2,052
New Job Created, 2010 to Dec. 2011	2,910	434

Sources: Montana Department of Labor and Industry, Research and Analysis Bureau, Montana Employment Projection 2010-2020; and Preliminary, Non-Seasonally Adjusted Preliminary, December, 2011 County Labor Force Statistics

The next series of tables provides information on the type of new jobs that are expected in the region. Table 10.22 shows the top 10 industries in terms of project employment growth between 2010 and 2010. The industries listed in the table account for more than 78 percent of the total projected job in the region between 2010 and 2020. Trade, transportation and utility industries are expected to generate 6,239 new jobs during the decade, representing one of every six new jobs in the region. The health services industry is expected to generate 4,870 new jobs during the decade, or roughly one of every eight new jobs in the region.

Table 10.22: Top Ten Industries Projected 2010-2020 Employment Growth for Region 5

Industry	Number of Projected Job Growth	Percent of Total Projected Job Growth
Trade, Transportation, and Utilities	6,239	16.8%
Health Services	4,870	13.1%
Educational Services	3,683	9.9%
Leisure and Hospitality	3,349	9.0%
Retail Trade	3,092	8.3%
Mining	2,035	5.5%
Construction	1,896	5.1%
Wholesale Trade	1,404	3.8%
Professional and Business Services	1,197	3.2%
Financial Activities	1,187	3.2%

Source: Montana Department of Labor and Industry, Research and Analysis, Bureau, 10-Year, Long-term Employment Projection by Industry
Note: Projected self-employment and government employment excluded.

Table 10.23 provides 2010 to 2020 job projections for the state for the five occupations with the highest projected need for workers. For each occupation the 2010 average wage is shown. Each of the five occupations has average wages that far exceeds the average 2010 per capita income. In all but one case, most of the occupation job growth is due to the need to replace existing workers, most of which are expected to retire during the decade. Each of the five occupations require at least an Associate Degree and most require a Bachelor's Degree.

Table 10.23: Occupations Requiring Higher Education and the Top Five Highest Projected Worker Needs, State of Montana, 2010-2020

Occupation	2010 Average Wage	Job Change, 2007-2010	2010-2020 Projections		
			Annual Growth	Annual Replacements	Total 2020 Workers Needed
Registered Nurses	$57,860	571	110	155	2,650
General & Operations Managers	$80,846	547	30	148	1,780
Elementary School Teachers	$37,710	285	37	109	1,460
Secondary School Teachers	$37,710	135	5	118	1,230
Accountants and Auditors	$54,263	65	65	55	1,200

Note: Higher education means an Associate Degree or higher.
Source: Montana Department of Labor and Industry, Research and Analysis Bureau, Montana Employment Projection 2010-20

As noted above, the health services industry is expected to generate approximately one of every eight new jobs in Region 5 during the decade, and state-wide registered nurses represent the occupation with the greatest demand for new workers during the decade. Table 10.24 provides more detailed employment projections for jobs in the health services industry. Due to job growth of the selected occupations and the need to replace existing workers, it appears that significant job opportunities will exist for the occupations through the end of the decade.

Table 10.24: Hardest to Fill Healthcare Positions with the Greatest Projected Job Growth, State of Montana, 2010-2020 Projections

Occupation Title	2010 Average Wage	Minimum Education Required	Job Growth, 2007 to 2010	Annual Job Growth 2011 and 2012	Annual Replace-ment Needs	Annual Job Growth 2013 to 2020	Annual Replacement Needs 2012-2020
Registered Nurses	$57,860	Associate	571	72	127	120	162
Licensed Practical & Licensed Vocational Nurses	$35,662	Post-Secondary Vocational Training	189	22	95	37	97
Home Health Aides	$20,506	Short on the Job Training	330	96	33	121	42
Nursing Aides, Orderlies and Attendants	$23,653	Post-Secondary Vocational Training	330	46	54	76	67

Source: Montana Department of Labor and Industry, Research and Analysis Bureau, Montana Employment Projection 2010-20

Education

It is widely recognized that the level of educational attainment has a very strong positive relationship to expected income. The limited sample of average wage and minimum education required for the selected occupation shown in Table 10.25 reinforces the relationship between level of education and income potential. Table 10.25 compares the level of educational attainment for persons in Fallon County and Montana for 2000 and 2010. The percentage of persons aged 25 years or more in Fallon County with a Bachelor's Degree or higher was significantly lower than the percentage of persons in the state with the same educational attainment. If this trend continues, businesses that require workers to have higher educational degrees will tend not to locate in Fallon County because they will not be able to recruit the type of employees their businesses require. In addition, continued low levels of higher educational attainment will likely create a ceiling or limit the income potential of the overall community.

Table 10.25: High School Degree and Further Education, Fallon County and Montana, 2000 and 2010

Educational Attainment	2000 Fallon	2000 Montana	2010 Fallon	2010 Montana
High school graduates, percent of persons aged 25 years or more	91.7%	94.2%	88.1%	91.0%
Bachelor's degree or higher, percent of persons aged 25 years or more	14.4%	24.4%	15.7%	27.9%

Source: US Census Bureau, 2010 Census 2000 and 2010 Census

Economic Development Organizations

There are four organizations whose mission is to promote economic development in Fallon County.

Eastern Montana Economic Development Authority

The Eastern Montana Economic Development Authority (EMEDA) was established in 2005 as the County of Fallon Port Authority. EMEDA is funded by a two mill levy on the county property tax. The purpose of EMEDA/Port Authority is consistent with the purposes enumerated in Section 7-14-1104(1), MCA. Among its several powers authorized by MCA, EMEDA/Port Authority has the power to execute contracts and other legal instruments, provide financial and other support to businesses including the creation, modernization, retention and relocation of new and existing businesses and industry, issue bonds, and purchase, develop and sell property.

The organization's current priorities are the development of housing to address the housing shortage in the community and main street beautification. The organization recently completed development of an apartment housing project (Frontier Apartments) and sold the project to a private investor in January 2012. EMEDA/Port Authority currently owns four residential lots in the City of Baker and is marketing the property for development of apartments/workforce housing.

Southeast Montana Area Revitalization Team

The Southeastern Montana Area Revitalization Team (SMART) was officially established in 2002. It is a 501C3 non-profit organization that receives funding from the Baker Chamber of Commerce and Agriculture, the City of Baker and Fallon County. SMART's mission is to promote and enhance a healthy economic environment with an improved and more diversified economic base. It envisions the future of Fallon County as a stable, local hub for business and social functions by providing existing businesses with incentives to remain in the community and encourage new enterprise to develop for continued economic growth to provide a stable economy.

SMART facilitates community development and housing and economic development projects. An example of SMART's community development efforts was the development of a veterans' memorial in the City of Baker. Major renovation of a downtown building in Baker that provided much needed office space, including space for SMART and the EMCDA, is an example of the organization's economic development efforts.

SMART also provides assistance with start-up business. One of its services includes preparing business plans. The organization has a $16,000 revolving loan fund that was established in 2006 to provide gap finance for business development. To date, no businesses in the community have taken advantage of the revolving loan fund. SMART provides relocation and travel information to people who are considering moving or traveling to the community. Finally, SMART is an active member of the Baker Chamber of Commerce and Agriculture.

SMART provided valuable assistance with preparation of the Growth Policy. It conducted two community visioning meetings in the City of Baker and greatly assisted in the identification of community goals and issues.

Baker Chamber of Commerce and Agriculture

The Baker Chamber of Commerce and Agriculture (Chamber) has 90 members largely comprised of local businesses. Members also include the City of Baker, Fallon County and several churches in the community. The Chamber's primary function is the sponsorship of a variety of community events throughout the year. Other services include business promotion and referral and social networking among members.

Eastern Plains Economic Development Corporation

The Eastern Plains Economic Development Corporation (EPCDC) was established in 2006. It is a private nonprofit regional economic development corporation. EPEDC serves Carter, Dawson, Fallon, Prairie and Wibaux County as well as the incorporated communities of Baker, Ekalaka, Glendive, Richey, Terry and Wibaux. The overall purpose of the organization is to encourage, stimulate and promote economic development in the region.

DPEDC prepared a Comprehensive Economic Development Strategy (CEDS) in October 2006. The CEDS, which included implementation components, was designed to increase new jobs and tax base, foster a more stable and diverse economy, improve the standard of living and provide a vehicle to help the region focus on their communities' future needs and responsibilities. The CEDS focused on five main topics – economy, housing, infrastructure, natural resources and tourism.

The CEDS included a 2006/2007 Action Plan that identified goals, objectives and implementation projects for each topic. The lead agency, time frame/prioritization, partners and type of EPCDC assistance was identified for each project. The planning consultant recommends that the county review the status of Fallon County projects and encourage the EPCDC and identified partners to facilitate the implementation of high priority projects.

Economic Development Objectives and Policies and Strategies

Economic development objectives and policies and strategies were developed from input and comments provided at public meetings, responses to the community survey, interviews with community stakeholders who were informed on the subject of recreation, and analysis of the economic data contained in this chapter. The planning consultant organized the input into a planning framework and enhanced concepts and strategies to provide actionable recommendations. The economic development objectives and policies and strategies can be found in the Implementation Chapter of the Growth Policy.

Chapter 11: Public Services and Facilities

Overview

Public services and associated facilities are an important factor that defines the quality of life in a community. Public services address the needs of a community in many ways. Education, public safety, public health and the operation and maintenance of public infrastructure are just a few of the important public services a community provides.

Some other public services are provided by the state and federal government, such as the State Highway Patrol and US Postal Service. In addition, there are several private utility companies providing energy and telecommunication services essential for modern life. However, because a local community has little influence on the provision of state, federal and private utility services, the Growth Policy focuses on those services the community can directly control.

Each service will be described in terms of the type and scope of services that are provided, the facilities and in some cases the equipment that supports the delivery of the service, and staffing level for each service provider. Issues will be identified that either limit or constrain the provision of a service, which in some cases result in underserved members of the community. In other cases, issues will be identified that relate more to how a service is provided or the facility needs of a service provider.

Public Education

Public education in the community is provided by two school districts. The first is the Baker School District, a Class B school district providing education for grades kindergarten through grade 12. The Baker School District is designated by the state as District 12. The second is the Plevna School District, a Class C school district that also provides education for grades kindergarten through grade 12. The Plevna School District is designated by the state as District 55.

Baker School District

The district has four schools and organizes school grades as follows:

Table 11.1: Baker School District Grade Organization

School	Grades	Year Constructed
Lincoln School	K-3	1956
Longfellow School	4-6	1968
Baker School	7-8	1968
Baker High School	9-12	1961

Source: Baker School District

All of the schools were constructed between 44 and 56 years ago. The school district expended funds to maintain and upgrade the schools and will need to continue to budget adequate funds to maintain the relatively old school facilities.

Table 11.2 shows the school enrollment in the 2005-06 school year when the previous growth policy was prepared and during the current 2011-12 school year.

Table 11.2: 2005-2006 and 2011-2012 School Enrollment

Grades	2005-06 School Year		2011-12 School Year	
	Fall	Spring	Fall	Spring
K-6	183	182	237	234
7-8	56	56	64	64
9-12	149	149	125	122
District Total	388	387	426	420

Source: Baker School District

Total school enrollment in the district has increased approximately nine percent between the 2005-06 and 2011-12 school years. During the period high school enrollment has dropped, middle school enrollment has increased slightly and the enrollment in the K-6th grades has increased by approximately 28 percent. If the trend of increased enrollment in grades K-6 continues, the district will likely experience future increases in total district enrollment.

Figure 11.1: Longfellow Elementary School in Baker



School bus service is provided for students who reside outside the City of Baker. Currently, a total of 80 students utilize the bus service. A number of high school students utilize the bus from the Plevna School District area due to the Baker School District's Class B athletic program. Based on information provided by the Baker School District Superintendent, the district's schools have adequate capacity for the foreseeable future (the next five years). Based on state educational standards, the district currently has moderate classroom sizes. The district currently does not own land for the construction of a new school.

The district employs 41 teachers, six administrative staff and 29 classified staff (custodians, cooks, bus drivers, etc.). With very little teacher turnover, the district teaching staff retention has not been an issue for the district. However, several teachers are approaching retirement and the superintendent noted that recruitment of replacement teachers would be difficult due to the shortage of available housing.

Over the past few years and continuing to the present, the school district has made significant investments in school facilities. Last year two science rooms in the high school were remodeled. Current building projects include:

- A new football field and track including bleachers and stadium lighting at the high school
- A new gymnasium and auditorium at the Longfellow School; the existing gymnasium is being converted to a band room and six classrooms

In addition, in the near-term, the school district has plans to repair or replace the roof of the high school gymnasium.

Figure 11.2: Baker High School



All of the recent and current building projects were funded by oil production tax revenue, which is a significant revenue source for school districts in high oil producing counties in the State of Montana. In 2011, the Baker School District received a total of $4,093,282 in oil production tax revenue distributions from the state.

In the 2011 Legislative Session Senate Bill 329 was enacted that significantly revised the formula for distributing oil production tax revenues to school districts. The new law limited school district distributions to 130 percent of the maximum school district budget. Oil production tax revenue distributions that exceed 130 percent of the maximum school district budget are retained by the state and not distributed to the school district. In 2011, when the new law went into effect, the Baker School District receipt of oil production tax revenue exceeded the 130 percent of the maximum school district budget threshold in the second quarter. During the second quarter the school district received only a small portion of its allotted distribution and received no oil production tax revenue distributions in the third and fourth quarters.

In 2011, the 130 percent maximum budget threshold for the Baker School District was $4,093,282 and a total of more than $3.7 million in oil production tax revenue was withheld from the school district. In the next school year the school district expects $3.9 million in oil production tax revenue will be withheld. If

the funding formula remains in place, the superintendent expects the school district will be required to request a property tax levy in the next two to three years to make up for the reduced oil production tax revenue.

Plevna School District

The Plevna School District has one school and organizes grades by K through 6th grades, 7th and 8th grades and 9th through 12th high school grades. In the current 2011-12 school year, the district has a total enrollment of 75 students. Table 11.3 shows the distribution of students by grade level:

Table 11.3: Plevna School District Students 2011-2012

Grades	2011-12 School Year
K through 6th grades	48
7th and 8th grades	10
9th through 12th grades	17
Total	75

Source: Baker School District

Five years ago the total school district enrollment was 90 students. The school district may be in jeopardy if student enrollment continues to drop at a similar rate in future years. Fortunately, recent trends suggest that elementary school enrollment will continue to increase and provide sustainable enrollment rates in the near term. The increases in elementary school enrollment are partially offset by a declining number of high school students. As noted earlier, high school students have been transferring to the Baker School District to participate in Class B athletic programs.

The school district employs 15 teachers, three administrative staff and eight classified staff. The small classroom sizes allow individualized instruction that has resulted in strong test scores.

The school district has history of positive engagement with the community. For example, the school district loaned money to the Town of Plevna to freeze water rates in the town for 10 years. Two years ago the district applied for and was awarded a safe route to school grant that provided funds to construct sidewalks around the school and at some locations along Main Street. The district has purchased four houses in Plevna to support teacher retention and recruitment. Rents in the town are now between $700 and $800. The district rents the houses to district staff for $250 per month plus utilities and propane at cost.

With starting teacher salaries at $28,000, the lack of affordable housing continues to create a teacher retention/recruitment problem. The district owns 14.7 acres of undeveloped land north of town. The district was prepared to sell the property for $1 in exchange for having affordable housing built on the site. Unfortunately, the district was unable to implement the plan because the town water system could not provide service to the site. Planned improvements to the town water system may be a catalyst for the affordable housing project.

The district's 130 percent of maximum budget threshold for 2011 was $1,165,097. In the third quarter of the year, oil production tax disbursements exceeded the threshold. The district received only a portion of its third quarter distribution and received no funds in the fourth quarter. A total of $471,000 in oil production tax revenue was withheld from the school district during the year.

In anticipation of reduced oil production tax revenue, the school district proposed and the voters in the district approved a 22 mills property tax. This was the first time in 10 years the school district needed to levy a property tax to maintain current operations. By state law, the tax levy will need to be authorized each year by the electorate in the school district.

Public Safety

Public safety services are provided by the Fallon County Sheriff Department and the City of Baker Police Department. The Sheriff Department currently has four sworn officers and one FTE administrative staff. The Sheriff has deputized the four city police officers as well as police officers in Slope, ND. The City of Baker currently has four sworn officers and no administrative staff.

The City Police Department and the Sheriff's Department share a public safety facility. The facility includes office space, a detention center and the multi-county dispatch center. The detention center has 11 beds in seven cells. However, two of the cells are being used to store evidence and equipment.

There is no 24-hour patrol coverage for either the City of Baker or Fallon County. The County Sheriff Department provides, on average, no more than 16 hours of patrol. When the District Court is in session the patrol hours are significantly reduced. The City of Baker Police Department provides 20 hours of patrol when the department has four sworn officers. The officers work 10-hour shifts and two officers are on patrol on Friday and Saturday nights. Officers are on on-call duty between 5:00 am to 7:00 am and 5:00 pm to 7:00 pm. Given the relatively high turnover of police officers, the police department often has only three sworn officers, in which case 16 hours of patrol are provided with on-call duty between 4:00 pm to 7:00 pm and 3:00 pm to 8:00 am.

Recent Trends in Crime

In recent years the Sheriff and Police Departments have observed an increase in the theft of unlocked vehicles and home invasions. The home invasions often involve the stealing of prescription drugs. Guns are being brought in bars and there was recently a shooting in the city. Most of these crimes have been committed by the transient population in the city.

During the last oil boom in 1995, there was a tenfold increase in crime and jail population. Between 2010 and 2011 there has been a significant increase in traffic violations and domestic cases. The increase in traffic violation is attributed to the increased traffic volume in the city. The use of synthetic methamphetamine and marijuana is also increasing in the community.

Table 11.4 provides data on the total days served in detention and the average number of inmates per day in the detention center. The data clearly indicates criminal activity in the community has increased in recent years, particularly during 2011.

Table 11.4: Fallon County Detention Center Statistics

Year	Total Days Served in Detention	Average No. of Inmates per Day
2009	570	1.56
2010	641	1.76
2011	1,320	3.62

Source: City of Baker Police Department

Table 11.5 shows data from the City of Baker Police Department on the number and type of arrests from 2006 to 2011. During the period, misdemeanor and felony arrests were relatively consistent; however, in 2011 there was a very significant increase in the number of traffic arrests.

Table 11.5: City of Baker Criminal Report, 2006-2011

	Traffic	Criminal Arrests		
Year	Arrests	Misdemeanor	Felony	Total Arrests
2006	72	92	14	178
2007	97	93	5	195
2008	125	60	5	190
2009	94	49	13	156
2010	113	50	4	167
2011	274	59	9	342

Source: City of Baker Police Department

Table 11.6 shows the number of incident reports for the City of Baker Police Department and the Fallon County Sheriff Department between 2006 and 2011. The data does not include the number of incidents on-call officers and deputies directly received.

Table 11.6: Incident Reports from Dispatched Calls, 2006-2011

Year	Baker Police Dept.	County Sheriff Dept.	Total Incident Reports
2006	1,034	352	1,386
2007	2,550	670	3,220
2008	1,914	727	2,641
2009	1,708	487	2,195
2010	1,302	380	1,682
2011	1,646	381	2,027

Footnote: Excludes nonemergency and non-911 calls
Source: Fallon County Dispatch Center

Public Safety Issues

The police and sheriff department both see a need for 24-hour patrol service in the community, particularly if the community grows.

There is a need for a new or expanded public safety facility. The existing facility is small with four officers and four deputies each sharing a small room. Additional space will address the office overcrowding issue and provide evidence and interview rooms that are currently not available.

The city police department has a problem with the retention of police officers. The average length of employment for city police officers is three years. The succession of new police officers has an impact on public safety because it takes up to one year for a new officer to become acquainted with the community and feel comfortable on the job.

The city patrol cars are maintained/repaired by the city mechanic. However, the Sheriff Department's patrols cars are maintained either by the deputies or commercial vehicle repair/maintenance is provided. It was recommended the two county mechanics assume the responsibility of maintaining/repairing sheriff department's patrol cars, which would be more cost effective and allow more deputy time to provide public safety service.

Fire Protection and Emergency Medical Services

There are three volunteer fire departments in the community: one in the City of Baker, one in the Town of Plevna and a Rural Fire Department.

Baker Fire Department

The Baker Fire Department (BFD) has two volunteer companies with approximately 28 volunteers per crew. One company handles only wildland/brush fires while the other company responds to structure fires, vehicle accidents, hazardous material cleanup and wildland fires. BFD sponsors a prevention program with K-4th graders. Businesses can also request annual prevention seminars, but the department only receives one or two requests per year.

A new fire department was built in 2010 and is equipped with two class "A" pumpers, wildland units, five tankers and one light rescue truck. New radios will need to be upgraded to all-digital signals and will substantially improve communications and responses to fires. BFD is also researching the requirements and needs for a potential full-time employee at the station house to deal with the increased growth. Table 11.7 shows the number of response units located throughout the County.

Table 11.7: Baker Rural Fire Department Response Units

NORTH UNITS		
Unit # 440	Wildland Unit	K. Rustad
Unit # 472	Wildland Unit	B. Steen
Unit # 418	Wildland Unit	D. Koenig
Unit # 424	2000 Gallon Pumper	T. Stark
CITY UNITS		
Unit # 426	Pumper	Firehall
Unit # 483	Wildland Unit	Firehall
Unit # 445	Wildland Unit	Firehall
Unit # 415	CAF Wildland Unit	Firehall
Unit # 489	CAF Wildland Unit	Firehall
Unit # 420	3500 Gallon Tender	Firehall
Unit # 478	6500 Gallon Tender	Firehall
Unit # 490	2000 Gallon Tender	Firehall
Unit # 475	Suburban (Support)	Firehall
Unit # 416	Pumper (City)	Firehall
Unit # 460	Pumper (City)	Firehall
Unit # 482	Hose Truck (City)	Firehall
Unit # Rescue 7	Light Rescue	Firehall
Unit # 409	Suburban (Command)	Chief Officer
SOUTH UNITS		
Unit # 446	Wildland Unit	B. Burdick
Unit # 496	Wildland Unit	D. Hayden
Unit # 442	Wildland Unit	D. Meccage
Unit # 411	Wildland Unit	S. Bruski
Unit # 433	2000 Gallon Pumper	R. Rusley
Unit # 476	Army 6x6	B. Meccage

Source: Baker Rural Fire Department

Fire response time is not an issue as the BFD was able to respond to most calls within five minutes. However, spacing of volunteers has been a growing problem because of train delays along Highway 7. BFD needs to have equipment stored and sufficient volunteers living north of the railroad in the event of trains blocking the crossing. Table 11.8 lists the types of calls BFD has responded to in the last six years.

Table 11.8: Response Calls per Type of Emergency (BFD)

Year	Structure	Wildland	MVA	Hydrocarbon	False Alarm	Other	Total
2006	12	32	5	2	4	5	60
2007	3	16	4	2	1	16	43
2008	5	23	3	1	6	16	53
2009	5	10	4	4	4	5	32
2010	2	14	9	0	7	10	42
2011	4	18	3	1	5	6	37

Source: Baker Rural Fire Department

Figure 11.3: Baker Fire Department



Plevna Fire Department

The Plevna Fire Department (PFD) has approximately 24 volunteers within one company. Firefighting equipment includes one class "A" pumper, two tankers, one command vehicle and 11 wildland trucks strategically placed around the county on private property.

PFD expects recruiting to become more difficult as residents age. The department is exploring ways to attract and retain volunteers; new housing would help with attracting new recruits.

Ambulance Service

The community has a volunteer ambulance service which operates three ambulances. All ambulance service equipment is owned by the city or county. The ambulance service complies with Section 50-6-322, MCA that contains provisions that specify staff qualifications for nonemergency ambulance transports. The statute specifies that transports in rural areas require one trained driver and one

emergency medical technician licensed at an emergency medical technician (EMT) basic level or higher. The ambulance service has four EMTs with basic licenses and advanced life support endorsements and five first responders who are drivers and provide assistance to the EMTs.

The ambulance service has a severe shortage of volunteers, which places a significant time and activity burden on the volunteers. In the last two years the service was able to recruit, train and certify four first responders who are currently serving. The last EMT to join the service was in 1999. Often people will participate in the training and get certified and not volunteer but instead use the credentials to obtain a paying position in the profession.

Community stakeholders familiar with the ambulance service report that people don't want to make the significant time commitment with no compensation. To get certified a volunteer needs to take 130-150 hours of classroom and practical instruction and take out of town written and practical skills tests. Then every two years a volunteer needs to get recertified by taking 72 hours of instruction. In compensation for the education and service time commitments, volunteers receive on average a $30 stipend for each ambulance run that delivers a person to a medical facility.

Emergency Services

Fallon County has two emergency services, a 911 Center and a full-time emergency services coordinator. The 911 Center provides dispatch service for Fallon, Carter, Wibaux and Prairie County, which represents an approximate service area of 8,000 square miles. The center is owned and operated by Fallon County. The center has four full-time and three part-time county employed dispatchers. The existing 911 system transmits analog data via copper lines. Within 10 years the Next Generation 911 in digital format with texting capabilities is expected to be in place.

The Fallon County Emergency Operations Plan (EOP) was last updated in 2011 and is the EOP for the City of Baker and Town of Plevna. The update of the five-year Pre-Disaster Mitigation Plan was completed during the preparation of this Growth Policy and is currently under state and FEMA review. The Pre-Disaster Mitigation Plan very thoroughly assesses risks associated with potential hazards and evaluates the vulnerability of critical facilities in the community. The plan also includes a community wildfire protection plan. Finally, the plan identifies a series of hazard mitigation strategies. A total of 12 hazard mitigation goals with accompanying objectives and policies/strategies are provided. Each policy/strategy is ranked according to priority. A total of eight high priority policies/strategies have not been implemented.

The Fallon County Emergency Operations Center is located in the courthouse. It has three telephone lines, radio communications equipment and cell phone boosters. The county has not designated a back-up emergency operations center that could be used in the event a disaster renders the courthouse non-operational.

The primary emergency shelter in the community is the Fair Grounds Exhibition Hall. The county recently purchased Red Cross cots for the emergency shelter. Pet emergency shelters are at the Fair Grounds barn and at the County Animal Shelter. Back-up emergency shelters are at city public schools and at church facilities. The Longfellow School has a large generator and has the capacity to shelter and feed residents in the event of an emergency.

The most recent disaster in the county occurred during the 2011 flooding due to excessive snow and rainfall that resulted in damage to county roads and bridges. The county was successful in documenting approximately $550,000 in damages that were reimbursed by FEMA.

Public Health and Medical Services and Facilities

Fallon Medical Complex (FMC)

The complex is anchored by a Critical Access Hospital with 25 beds that can be used for either acute care patients or long-term care residents. FMC provides 24-hour emergency care, fully digital diagnostic imaging, non-invasive surgical services such as scoping, and a full complement of lab services with microbiology and blood transfusion capabilities. FMC does not provide OB services; however, the complex does bring in visiting doctors and specialists to treat patients with non-emergent conditions.

FMC has an attached 15-bed skilled nursing facility, a rural health clinic with two physicians and two mid-levels, a home care agency and a rehabilitation department. Except for the health department, the facilities are privately operated.

Figure 11.4: Fallon Medical Complex in Baker



FMC Issues

Adequate funding from government programs and private payers has always been one of the larger facility issues. Medicare and Medicaid are the largest payers and have never provided an ongoing assurance that an adequate level of reimbursement can ever be expected by FMC. Unfortunately, private payers typically follow suit and demand greater discounts to make their plans competitively priced. These conditions make it difficult to predict whether cash flow will cover the facility's fixed expenses. FMC does not have the capability of capturing additional patients, since the size of its market area is fixed, so it needs to either raise rates or cut expenses.

Recruiting staff, especially professional staff such as nurses and doctors, is also a struggle because of the facility's location and the perceived lack of community amenities. For instance, many new employees cannot find housing. Moreover, staff retention is a problem as some employees have found better wages in the oilfield or have a spouse who is benefiting from higher wages and therefore no longer needs to work. In addition, some candidates for employment have expressed disappointment with a lack of entertainment options in Baker, thus making it more difficult to recruit younger employees to move to Baker. The railroad tracks also present an enormous challenge; doctors and staff are strongly discouraged from living north of the tracks because of train delays.

FMC has plans to continue renovating the building with the assistance of a taxpayer-approved mill levy that has funded improvements for the past eight years. In all, the building currently needs $2-$3 million in improvements. Similarly, the useful life of some equipment purchased in past years needs to be upgraded. No single funding source has been established; rather, FMC receives its equipment funding from Foundation gifts, grants, bed tax rebates, leases, county assistance and rarely, operational funds. Although FMC knows its equipment needs and has prioritized its list, there is no defined and assured source of funding which makes it difficult to determine when new equipment is able to be purchased.

Transient patients have been an issue in other eastern Montana counties and are beginning to present a similar issue to FMC. These patients usually require emergency services and don't have a valid means of paying for the visit; in some instances, they are committing insurance fraud. There is concern that crew camp members may present a similar situation in the future.

FMC also faces the stigma of being considered a county-run facility. Although Fallon County does provide meaningful support to FMC, the medical complex is operated by a private non-profit corporation. While being associated with the County is not an issue to FMC, many people believe they do not need to pay their bills or donate funds to the facility because they are already taxpayers and FMC is being funded by the County. In reality, county subsidies typically only account for approximately 10% of the facility's gross revenue.

Lastly, there seems to be a general perception that patients are at a better advantage seeing a specialist such as a pediatrician and therefore travel to Miles City or Glendive to receive treatment. This translates into lost revenue as most cases could be seen by a general practitioner at FMC.

Fallon County Public Health Department

The Fallon County Health Department promotes health and wellness to clients in the county. Services include immunizations, family planning, WIC, health screening, blood pressure testing, aging services (home visits, medication set-up, bathing assistance, foot-care clinics), equipment loans, assistance to schools with kindergarten round-up/preschool screening and athletic pre-physicals along with other health issues and Public Health Emergency Preparedness. There is no charge for services. Health insurance companies are billed for immunizations and family planning services. If a prescription is needed, the client is referred to a physician. Home visits are provided only to Fallon County residents. The Health Department has clients from outside the county; the typical service provided for these clients is immunization.

The public health department services are used by a significant portion of the community. Table 11.9 shows the number of unduplicated clients and total client visits between 2006-07 and 2010-11 fiscal years.

Table 11.9: Fallon County Public Health Department Clients and Client Visits, 2006-2011

Fiscal Year	Unduplicated Clients	Visits
2006-2007	1,121	2,960
2007-2008	1,133	2,860
2008-2009	1,082	2,719
2009-2010	1,067	2,437
2010-2011	879	2,089

Note: These figures do not include home visits or large group services (flu clinics, athletic physicals, etc.)
Source: Fallon County Public Health Department Records

The facility includes five offices and two examination rooms. The public health department staff includes two registered nurses, an administrative assistant and the County Emergency Services Coordinator. A mental health counselor visits the facility twice a week and a drug and alcohol counselor visits once a week.

Funding sources for the public health department include Fallon County, federal grants including WIC, Maternal Child Healthcare Grant (for woman under the age of 40 and infants and children to the age of 21), Immunization action program, emergency preparedness and vaccines for children. The home visiting nurse's wages and mileage are paid through the Council of Aging.

The Healthy Montana Kids program provides health insurance funded by the state tobacco settlement to households with incomes below 250 percent of the poverty level. This program has helped to reduce the Health Department client load.

Health Department Issues

The lack of home health services was identified as a significant healthcare issue for the community. The community clinic previously provided this service, but a change in Medicare reimbursement rates means the clinic offers very limited home health services. The Health Department tries to fill the need for this service, but the demand exceeds the capabilities of the community's healthcare providers.

The demand for nursing home and independent living facilities exceeds the capacity for the facilities. Currently, each facility has a long waiting list. No hospice care is provided in the County and is another service that would benefit residents.

Environmental Health Services

Environmental health services are provided by a part-time county sanitarian who is contracted by the county and Department of Environmental Quality (DEQ) to represent the county and incorporated areas in the county. The county sanitarian provides service to eight other counties in Montana. Responsibilities of the sanitarian include food safety, public accommodations, drinking water protection, wastewater treatment, air quality, storm water management and public health complaints.

The sanitarian performs DEQ reviews of subdivisions under 160 acres, reviews subdivisions for compliance with the Fallon County subdivision regulations, and licenses food establishments, hotels and motels, and tattoo parlors. Other duties include investigation of abandoned/derelict properties after the city identifies the problem and forwards a request to investigate. If the property is determined to be a public nuisance from a building or fire perspective the sanitarian has authority to bring the matter to municipal court. The City of Baker has a recently adopted "decay" ordinance that regulates the exterior appearance of a property that the city is actively enforcing.

Environmental Health Issues

Many commercial properties north of the railroad tracks and commercial properties on the east and west side of the city have failing or inadequate septic systems. The properties are served by city water. Annexation of these properties should be considered to provide sewer service so the septic systems can be decommissioned.

City water service cannot be extended beyond the airport due to lack of water pressure. An existing subdivision beyond the fairgrounds is served by private wells and the city is considering extending water service to the subdivision. A new or taller water tank will be needed to extend water service to the area.

The septic systems in the Stanhope Addition east of the city limits have never functioned properly. In addition, the city water service to the subdivision does not have adequate water pressure for fire

suppression. To correct the situation, the city should consider annexing the subdivision to enhance the water service and provide sewer service.

The DEQ has issued the county a cease and desist order for any activity in the lower Lake Baker. DEQ seeks a reclamation plan to mitigate non-permitted county activities. It would be beneficial if a negotiated settlement between DEQ and the county could be reached to resolve the matter.

County Extension Services

The Fallon/Carter County Extension Program extends Montana State University knowledge to the people of Fallon and Carter Counties. Extension gives every Montanan access to useful information and expert help via workshops, demonstrations, community meetings, publications, videos, the internet and other sources.

Figure 11.5: Montana State University Extension Service



Source: Montana State University

Services

The extension office serves as an information clearinghouse, provides pesticide applicator licensing and education, and administers the Noxious Weed Seed Free Forage program to help prevent the spread of noxious weeds in the County. The extension office provides information on soil testing, feed analysis and forage nitrate testing as well.

Homeowners and landowners can receive well water test kits through the local extension office and can receive help with estate planning, horticulture, insect, spider and plant identification, range management, soil health and much more. Furthermore, the extension office is the facilitator of the 4-H Youth Development program and has youth participating in project areas from livestock to sewing to woodwork, etc.

The extension office has received several questions regarding land prices and how much landowners can and should charge to lease land to oil companies and/or developers. People have also expressed interested in knowing if their land is suitable for ranching or if it has potential for oil and gas. The extension office cannot help people price land, but they can do water quality tests for potential livestock watering facilities.

Community Gardening

The Extension Office is coordinating the Montana State University's Master Gardener program for Fallon and Carter Counties. Interest in home gardening and horticulture is growing in the Fallon County, but

the program is being offered only to residents in Carter County. However, the extension office is working to expand the program to Fallon County. The goal is to help the community work together on a community gardening project while educating youth and citizens about gardening and food quality.

Weed Control

A five-member Fallon County Weed Board oversees the county weed control program. The program is funded by dedicated county millage (3 mills) and it receives funding from a dedicated millage on the state property tax. The county employs one full-time weed control manager. During four months each summer, seven seasonal workers are employed to perform weed control activities.

Equipment supporting the weed control programs includes three on-road pick-up trucks, one off-road truck that hauls two side-by-side vehicles, three four-wheeler trucks and a pick-up truck. Each truck has tanks and sprayers.

The program only sprays listed noxious weeds. The priority of the program is weed control along roads. The County has contracts with MDOT, BLM and the State of Montana to provide weed control services. Normally County Weed Control programs do not spray on private land; however, because there are no commercial applicators in the county the state Department of Agriculture has given the county permission to spray private property. The absence of a commercial operator is a clear indication the county does not have a level of weed infestation that can support a business operation. The program will spray private ranch and grazing land upon request and payment. When a noxious weed is observed by staff in the City of Baker or Town of Plevna, staff will contact the property owner to coordinate the spraying of the weed.

The county is currently is the process of updating the Fallon County Noxious Weed Management Plan. The main change to the plan will be making non-compliance provisions consistent with Department of Agriculture regulations.

The Montana County Noxious Weed Control Act requires that all property owners have and submit a management plan to the county. Management plans are required for any major ground disturbance such as a pipeline construction or a gravel pit. In practice, not all property owners have submitted management plans to the county.

Weed Control Issues

Unlike the major pipeline companies operating in the county, local pipeline companies do not submit weed control management plans. An improvement is needed in the communication between the county and these local pipeline companies to increase compliance. In addition, owners of property where pipelines are being installed need to be more aware of their responsibility to call the county if noxious weed infestation occurs as a result of pipeline work.

County Library

The current 3,600-square foot library was constructed in 1970. The library has between 20,000 and 22,000 volumes, as well as books on CD, DVD videos, newspapers and magazines. An inter-library book loan service is provided. The library has five public access computer stations, one of which is reserved for catalog searches, and is wired to accommodate four additional computers. The library has a media room that can be reserved for public meetings. The room has equipment to facilitate meetings.

The library staff includes the library director and three library aides. The library is overseen by the five-member Fallon County Library Board of Trustees which meets monthly. Library hours are Monday through Friday from 9:00 am to 6:00 pm and on Saturday from 9:00 am to 1:00 pm. The library is closed on Sundays and legal holidays. Summer hours are the same as above except the library is closed on Saturdays from Memorial Day weekend through Labor Day weekend.

The library has a dedicated county millage (1.5 mills) to support its operations. The library currently has approximately 1,500 library card holders and this level of patronage has remained steady over the past five years.

The library offers the following reading programs:

- Books and Babies – young children eight weeks to five years are introduced to vocabulary, print awareness, narrative skills, letter knowledge, print motivation and phonological sensitivity through rhyming games, finger plays and basic board games.
- Story Time – pre-school children meet at 11:15 am on Thursdays from mid-September through mid-May. Stories are read to children. Activities introducing and strengthening basic skills are offered; holiday craft projects are completed by the participants.
- Coffee and Books – a book discussion group is made available through a grant from Humanities Montana. The group meets September through November and March through May on the fourth Monday of each month at 7:00 pm at the Baker Senior Center.
- Summer Reading Program – begins the first Wednesday of June each year and continues through July. Books, games, and arts and crafts are all a part of each year's theme, which is selected by the Montana State Library.

Library Issues

The library has very limited space available to expand services or the number of volumes. It would be beneficial to physically separate the computer stations from the collection area. A closed room for the Story Time and Books and Babies programs would eliminate the auditory impact on library patrons.

City Public Works

The City of Baker Public Works Department is responsible for maintaining and operating the city streets, solid waste, sewer and water systems/programs. The public works shop provides office space for the Public Works Director and parking/storage of vehicles and equipment. The department has six employees including the director, one staff member devoted to solid waste collection, one staff member devoted to reading and maintenance of water meters and three general maintenance workers. Department vehicles and major equipment includes two haulers, one back-ho, two graders, two five-yard dump trucks, an asphalt patching machine, a camera truck and a vacuum street sweeper.

Sewer and Water System Maintenance

Sewer system responsibilities include operation of the wastewater treatment facility, maintenance of pumps, annual flushing of the sewer lines and inspection of sewer lines with the camera truck. Water system responsibilities include operation and maintenance of the city water well pumps, booster pumps and chlorinators.

Street Maintenance

Street maintenance activities include street repair and maintenance, snow removal, street sweeping and grading of the few city gravel streets and all city alleys. The department is responsible for maintaining approximately 14 miles of paved streets, a one-quarter mile section of a gravel street and all city gravel alleys. Potholes in the streets are repaired every summer. All city streets are chip sealed every five to seven years. For the first time, the city recently applied an emulsion to the city streets to replenish the surface of the streets.

Street Maintenance Issues

The department has struggled removing snow during heavy snowfall winters. The travel lanes of city streets narrow due to the volume of snow along the sides of the streets, and residents become upset when the department is unable to keep driveways clear of large amounts of snow. During heavy snowfall winters, the city needs a snow blower and a large dump truck to effectively remove snow from the streets. The city should purchase these items, or preferably, establish an arrangement with the county roads maintenance staff to share the two county snow blowers and one or two of the county's large dump trucks.

The cost of chip sealing city streets could be reduced by at least 50 percent if the county road maintenance staff did the chip sealing with their own equipment instead of contracting the work with private companies. This was done once in the past and the city paid for all of the material and contributed to the county labor costs.

County Road Maintenance

The Fallon County Road Department is responsible for maintenance of approximately 900 miles of county roads including public access easements. Nearly all county roads are gravel or scoria. Scoria

surface is used for roads with low volumes of traffic. There are relatively few paved county roads that are maintained with chip and seal.

The department has a crew of 14 workers that provide year round service. Department equipment includes six belly dump trucks, three end dump trucks, one large scraper, two crawlers, and three snow plow trucks and six blades for snow plowing.

There are three existing gravel pits and four existing scoria pits in the county. The pits are on private property leased by the county. The county buys gravel in bulk, 100,000 cubic yards at a time. A private company crushes the gravel and scoria and it is then stockpiled at the pit. The department utilizes a state bulk tank of calcium chloride which is an alternative to salt and sand that is applied on county roads during winter storm events.

There are mutual aid agreements between the County and the City of Baker and Town of Plevna to respond to emergency situations that impacts travel on roads. The department has no formal road maintenance program. Roads with heavy traffic are maintained more frequently and the remaining roads are maintained based on their condition. During the winter months the department's top priority is to keep vehicular routes open to the hospital and from the hospital to the airport.

Construction of roads is the responsibility of the property owner. If the new road is accepted by the county the road department will maintain it. An encroachment permit, approved by the County Commission, is required for any access to a county road.

Road Maintenance Issues

Obtaining good gravel in the county is becoming increasingly difficult and the cost of gravel has increased significantly in recent years. In the last several years the cost of gravel has increased from $0.40 per yard to its current price of $1.00 per yard.

As pipeline and oil well development grows, county roads will wear out faster, which will increase the cost of road maintenance and defer maintenance on some county roads. The County entered into an agreement concerning county road maintenance with the company responsible for construction of the Keystone Pipeline. The company agreed to contribute a fixed amount of money per mile of county road for road maintenance.

Solid Waste Collection

Solid waste collection service varies by area in the county. In the City of Baker, weekly curbside collection is provided by the city. The city has one garbage collection truck, and residential solid waste collection in provided on a weekly basis. It takes approximately three days to serve all the residential properties in the city. Solid waste collection for commercial properties in the city is provided on a daily basis, Monday through Friday. In the Town of Wibaux, G & G Garbage Company maintains a central container site that all property owners use to dispose of solid waste. The container is hauled to the

county landfill by G & G Garbage Company. The company also has a weekly solid waste collection route that serves residential and commercial customers roughly within a five-mile radius of the City of Baker. County residents and businesses located beyond the city's five-mile radius are responsible for the disposal of their own solid waste. Those property owners either burn or haul their solid waste to the landfill or a county container site on Coral Creek Road, about one mile outside the City of Baker.

The Fallon County landfill is located approximately eight miles southeast of the City of Baker on Coral Creek Road. The county landfill serves Fallon County, Wibaux County, Carter County and the Cities of Beach and Bowman, ND. The landfill receives approximately 12,000 tons of waste per year. Based on current usage and the design of the landfill, it is projected that the landfill has capacity for approximately another 27 years of service. The landfill hours of operation are Monday through Friday from 7:30 am to 4:00 pm.

Hours of operation for the Fallon County container site are Wednesday through Saturday from 10:00 am to 6:00 pm. The container site is for residential use only and accepts only household waste and yard debris.

Senior Citizen Services

The Fallon County Council on Aging provides a wide range of services for senior citizens in the community. The Glendive Action for Eastern Montana Area Agency on Aging has a 17-county jurisdiction including Fallon County. The agency administers state and federal funds and distributes funding to Fallon County based on service records.

The Fallon County Council on Aging staff includes a council coordinator, an administrative assistant, one full-time bus driver and two or three part-time bus drivers. The council office is located in the Baker Senior Center. The Baker Senior Center is open Monday through Friday from 8:00 am to 5:00 pm and the facility is also open during evenings to support organized activities. The center offers a variety of social activities and a daily exercise program. Paid membership to the center is not required; however, the center has 45 paid members. In the last nine months, 207 different senior citizens visited the center. The Plevna Senior Center is open Monday through Friday from 9:00 to 11:00 am. During the last nine months, 41 different senior citizens visited the center.

The following are programs offered by the Fallon County Council on Aging.

- Congregate Meals – The Council has contracted the Fallon Medical Complex to prepare meals for persons more than 60 years old Monday through Saturday in the complex dining room. A $4 donation is suggested. Approximately 475 meals are served each month.

- Home Delivered Meals – Approximately 200 meals are delivered each month. The meals are delivered by the Council bus and a $4 donation is suggested. The council has contracted the Fallon Medical Complex to prepare the meals.

- Transportation – The Council provides bus transportation Monday through Saturday from 8:00 am to 4:00 pm. Two out-of-town trips are provided each month, one to Miles City and the other to Dickinson. The trips to Miles City are primarily for medical reasons and the trips to Dickinson are more of a social outing. The transportation service is available to persons of any age. The Council also provides a call-in transportation service for trips within the City of Baker. A $1 donation is suggested for persons more than 60 years and $1 fee is charged for persons under 60 years. A 13-passenger, wheelchair accessible bus is used to provide transportation services. Approximately 700 one-way rides are provided each month.

- Skilled Nurse Home Visits – The service is provided Monday through Friday. A registered nurse provides home visits for medical needs such as medication management, bathing, fulfilling a doctor's order, blood pressure diabetes management, etc. The nurse normally visits each client once a week. A Public Health Department nurse provides the service.

- Health Screening – The Public Health Department nurse provides blood pressure monitoring twice per month and foot care once per month at the Baker or Plevna senior centers. Donations are suggested.

- Homemaker – Two part-time homemakers visit client homes on Monday through Friday to provide light housekeeping chores and run errands. The homemakers visit client homes two hours each week. The service is provided to clients more than 60 years old and donations are suggested.

- Respite Care – Respite care service is contracted through the Fallon Medical Complex. Caregivers needing a respite can visit the adult day care facility or nursing home for one or two days.

- Food Pantry Baker Community Cupboard – This program is completely supported by community food donations. There is no age or income eligibility requirement. Participation in the program varies between seven to ten families per month.

- Food Commodity Program – The program is for clients more than 60 years old with an income below 130 percent of the poverty rate. A 30-pound box of groceries is provided at no cost. The program currently serves 24 clients per month.

Facility and Equipment Issues

The Council has one older vehicle needing replacement. The Council would like to apply for a grant to secure 80 percent state funding for a new vehicle. If awarded, the grant requires a 20 percent local (county) match.

The Council buses are currently parked in the county shop. As a result, more time than would ordinarily be needed is required to clean the buses. A Council bus garage would eliminate this issue, and transportation logistics would be simplified if the garage would be located closer to the Baker Senior Center.

Service and Program Issues

There is a need to expand medical transportation services due to the unmet demand for out-of-town medical visits for specialized health services not offered in Baker. The only additional cost would be increased bus driver working hours.

There is an unmet need for well-care visits to seniors who are isolated in their homes. Senior citizens are in need of check-in visits, personal care service and homemaking assistance.

Chapter 12: Recreation Plan

Overview

Parks and recreational facilities significantly contribute to the quality of life in a community. They provide opportunities for residents and visitors to enjoy recreational and aesthetic pursuits. Parks and recreational areas also provide open space in an urban environment that makes a community a more desirable place to live, work and play.

The recreation plan identifies and assesses existing recreational programs and park facilities in the community. Overall goals and specific objectives are provided to guide future decisions regarding recreational opportunities in the community. Focused policies and strategies are recommended to enhance existing recreational programs and facilities.

The City of Baker is the population center of Fallon County with more than 60 percent of the county population residing in the city. The city's percentage of the total county population is even greater when nearby subdivisions outside the city limits are considered. It should be no surprise most of the recreational programs and facilities are provided in or adjacent to the City of Baker.

For a community of its size, Fallon County and the City of Baker offer a significant amount of recreational amenities and programs. Including the fairgrounds and County golf course, the community has nine outdoor recreational facilities. The approximate total land area of the facilities is 232 acres, not including outdoor recreational facilities at the several schools in the community. Relating the total outdoor recreation land area to the county population is an established way to evaluate a community's recreational "level of service". A common level of service communities seek to achieve is 10 acres per 1,000 persons. For Fallon County, the existing recreational level of service is approximately 80 acres per 1,000 persons and 34 acres per 1,000 persons excluding the fairgrounds and the County golf course. The community far exceeds the commonly accepted national standard with the existing outdoor recreational facilities.

In addition to public parks and other outdoor recreational facilities, Fallon County and the City of Baker support an impressive number of recreational and fitness programs. It should be noted the recreational programs outlined in this chapter do not include the number extracurricular activities supported by the community's schools.

County and City Parks

County Parks and Recreational Facilities

Fallon County Fairgrounds

The fairgrounds are the community's recreational centerpiece. The 52-acre facility is located along SR 7 just on the south side of the City of Baker. The fairgrounds include an exhibit hall, a livestock barn and various outdoor areas that support a wide range of community and recreational activities. The county fair is held the third full weekend of August. The 4-H and FFA programs make regular use of the fairground facilities. A sample of the events sponsored by these programs include livestock and horse judging, team roping, shooting sports, youth rodeo play day and program meetings. The fairgrounds are also used by the community for bull sales, rough stock rodeo, outdoor concerts and many other activities.

The exhibit hall is the county's largest indoor assembly and is regularly rented for public and private events. Private events include but are not limited to weddings and receptions, luncheons and reunions. Public events include auctions, rummage sales, public meetings and exercise classes.

Figure 12.1: Fallon County Fairgrounds



Triangle Park

This park is west of the south end of Baker Lake. Easiest access to the park is via East Center Avenue. Among the various parks in the community, Triangle Park offers the most recreational facilities for the community. The park includes covered picnic shelter/gazebo that provides sheltered eating area for 50 people with an adjacent restroom facility. Other amenities at the park include two public boat ramps and two docks, sand volleyball courts, a horseshoe pitching area, play equipment for ages 5 to 12 years, a beach area, two large grills, an amphitheater with covered seating for more than 100 people and plenty of parking. A concrete walkway around the lake connects Triangle Park with Iron Horse Park. Outdoor lighting is currently being installed along the walkway. During the summer months Shakespeare in the Park is performed in the amphitheater. When the lake freezes the park supports ice fishing and snowmobiling activities.

Mangold Sports Complex

This recreational complex is located directly north of Triangle Park. The facility is approximately three acres in size and has two little league fields and one softball field, a basketball court and a concession stand and restroom. There is plenty of parking at the facility.

Iron Horse Park

Iron Horse Park is located on the east side of Baker Lake. Amenities in the park include a covered picnic shelter with four tables, two small covered picnic shelters with one picnic table each, restrooms, a recreational vehicle dump station and space for a few recreational vehicles with dry hook-ups (no water or electricity). The demand for recreational vehicle parking is largely from special events such as high school graduation, weddings, etc. There are plans to provide space for an additional 10 to 15 recreational vehicle spaces.

Baker Lake

Baker Lake is a county-owned recreational resource that is valued and enjoyed by members of the community. Baker Lake provides the following recreational opportunities for the community: fishing and ice fishing, boating, skiing, jet skiing and ice skating. A County Commission appointed Lake Board provides advisory recommendations concerning recreational issues and opportunities and maintenance of the lake's water quality and the shoreline.

County Golf Course

The community has a County par 36, nine-hole public golf course. The 80-acre golf course is located between Airport Road and the Baker Municipal Airport. The golf course is on City-owned land but the County maintains and operates the golf course facility. The golf course clubhouse is privately operated.

City Parks

Eastside Park

The park is located in the eastern portion of the city, south of Texas Avenue. Its size is approximately equivalent to four city lots. Amenities in the park include a picnic shelter with seating for 50 persons, playground equipment for children aged two to five years, and a restroom. All facilities in the park are ADA compliant. On-street parking is available for users of park.

Senior Citizen's Centennial Park

This is a small park located on 1st Street West near the post office. A picnic shelter with one table is the only amenity provided at this park.

Steve McClain Memorial Park

This park is located on 3rd Street West just north of the Fallon Medical Complex. Amenities in the park include a picnic shelter with seating for 40 persons, a large playground facility with equipment for children aged five to twelve years, grills and a footbridge to restroom facilities at the city-owned Walt's Memorial Recreational Vehicle Park.

Figure 12.2: Steve McClain Memorial Park



Coldwell Field

Coldwell Field is located across the street from the Steve McClain Memorial Park with access to the facility from 3rd Street West and Park Drive. Amenities at the facility include a lighted baseball field with a fenced outfield, scoreboard, bleachers, concession stand and restrooms. Babe Ruth and American Legion baseball is played at this field. The facility also has a batting cage, horseshoe pits and an ice skating rink with a warming house.

In addition to the above park facilities, the Town of Plevna has one town park located near the town center. Finally, the County owns, operates and maintains a gun club that is open to the public.

Parks Funding, Governance and Operations

Park operations, maintenance and improvements are funded by Fallon County and the City of Baker. Since the largest parks are county facilities the majority of funding is provided by Fallon County. There is one full-time City-County Parks Director responsible for administrative duties related to the parks. During the summer months, six part-time college or high school students are hired to maintain the parks. Adequate equipment is available to maintain the parks.

A Park Board comprised of the Baker City mayor, one county commissioner, one member of the Baker City Council and one member of the public provide governance over park operations and improvements. The Park Board meets twice a year.

Fallon County and the City of Baker do not have a Parks Plan. Periodically, the Parks Director conducts a community survey to identify the public's level of satisfaction with existing park facilities. A community survey is planned to be conducted during spring 2012.

County and City Supported Recreational Programs

Staffing, Facilities and Funding

There are two full-time staff who administer the community's recreational programs. The City of Baker Recreation Department has one full-time staff person responsible for administration and operation of numerous recreational programs, and four part-time staff and three fitness instructors who run the

after-school program. The Baker School District employs a Recreation Center Director who coordinates extensively with recreation department to maximize utilization of the school district owned recreation center.

The recreation center, which is an annex to the City of Baker High School building, is the primary recreational facility in the community. The recreation center facilities include a 25-meter indoor pool, weight room, three racquetball courts and a cardio/fitness room. Since it is a school district facility, the facility is primarily used by students. Recreational and fitness programs open to the public are accommodated to the greatest extent possible. However, due to the dual use function of the recreation center, many of the recreational programs are provided in a wide variety of community facilities including the Lincoln School gym, the Baker High School gym and track, the fairgrounds exhibit hall, the Longfellow School gym, Triangle Park, Coldwell Field, the Mangold Complex, the Lincoln School athletic field and even the Fallon County Courthouse.

The strong demand for recreational programs far exceeds the availability and space of the recreation center. As a result, recreational program activities are scattered throughout the community and create logistical and programmatic challenges. The one key recommendation provided in this chapter is for the community to centralize recreational program activities in one location. In addition to addressing the existing logistical and programmatic challenges, one community-wide recreational facility could become a safe community hub or gathering place for residents of all ages and enhance the community's indoor recreational amenities. Communities that have invested in recreation centers have witnessed far exceeded membership goals.

The funding or contribution to the community's recreational programs is widespread. The salary for the city recreation department staff is shared by the county and city. The Recreation Center Director is a Baker School District employee. Daily visit and membership fees for the recreation center provide funds for recreational equipment. The recreation center does not have a budget, and as a result funding requests for routine operational or maintenance expenditure are required. There are nominal fees for all recreation programs and the fees are used to purchase program equipment and material.

Recreation and Fitness Programs – Recreation Center

The recreation center swimming pool and other facilities are open to the public each day of the week. The current program hours are as follows:

Swimming Pool:

- Monday through Friday: open to the general public from 6:00 am to 7:00 am, adult swimming from 10:00 am to 7:00 pm, children swimming from 7:00 pm to 8:30 pm.
- Saturday and Sunday: two swim times open to the public, 1:00 pm to 2:45 pm, and 3:00 pm to 4:45 pm.

Cardio/Fitness Room:

- Monday through Friday, 6:00 pm to 8:30 pm.
- Saturday and Sunday, 1:00 pm to 4:45 pm.

Weight Room:

- Monday through Friday: 6:00 am to 7:00 am, and 1:30 pm to 8:30 pm.
- Saturday and Sunday, 1:00 pm to 4:45 pm.

Racquetball Courts:

- Monday through Friday: 6:00 am to 7:00 am, and 10:00 am to 8:30 pm.
- Saturday and Sunday, 1:00 pm to 4:45 pm.

Recreation and Fitness Programs – City Recreation Department

The after-school program is the department's top priority program with a very high demand for the service. The program is offered Monday through Wednesday from the close of school to 5:00 pm. The program is held at the Lincoln School gym, multi-purpose room and playground. Program activities, include but are not limited to volleyball, dance and other ball sports. The current fee for the program is $2.50 per day.

Other recreation department programs include:

- Pre-school crafts at the courthouse.
- Adult fitness at the recreation center.
- City league basketball and adult volleyball at the high school gym.
- Fitness programs at the fairgrounds exhibit hall.
- Spring track at the high school track.
- Flag football at the Lincoln School field.
- Pre-school sports time at the recreation center.
- K-6 dance recital at the high school gym.
- Youth soccer and Babe Ruth baseball at the Caldwell Field.
- Little league and T-ball at the Mangold Complex.
- Youth basketball tournaments at the high school and Longfellow School gyms.
- Adult education (painting, computer education, etc.) at the high school.

Community Sponsored Recreational Events

There are several annual community sponsored recreational events that bring members of the community together. Some of the major community events include the Touch a Truck Program, Fallon

County Day on the 4th of July, Youth Rodeo Play Day, Parade of Lights parade and festivities, and Relay for Life.

Recreation Objectives and Policies and Strategies

Recreation objectives and policies and strategies were developed from input and comments provided at public meetings, responses to the community survey and interviews with community stakeholders who were informed on the subject of recreation. The planning consultant organized the input to provide a planning framework and enhance concepts and strategies to provide actionable recommendations which will enhance the recreation opportunities and planning for the community. The recreation objectives and policies and strategies can be found in the Implementation Chapter of the Growth Policy.

Chapter 13: Natural Resources

Overview

Fallon County values natural resources such as agricultural lands, wildlife habitat, water resources including wetlands and native vegetation as evidenced in the goals and the community survey. However, additional resources such as oil and gas should also be emphasized as these provide the County with substantial income and economic development opportunities. The County has several natural features scattered throughout its boundaries, but the major natural resources are located in and around the City of Baker including Lake Baker, numerous oil and gas wells, and prime agricultural lands.

Agricultural Land

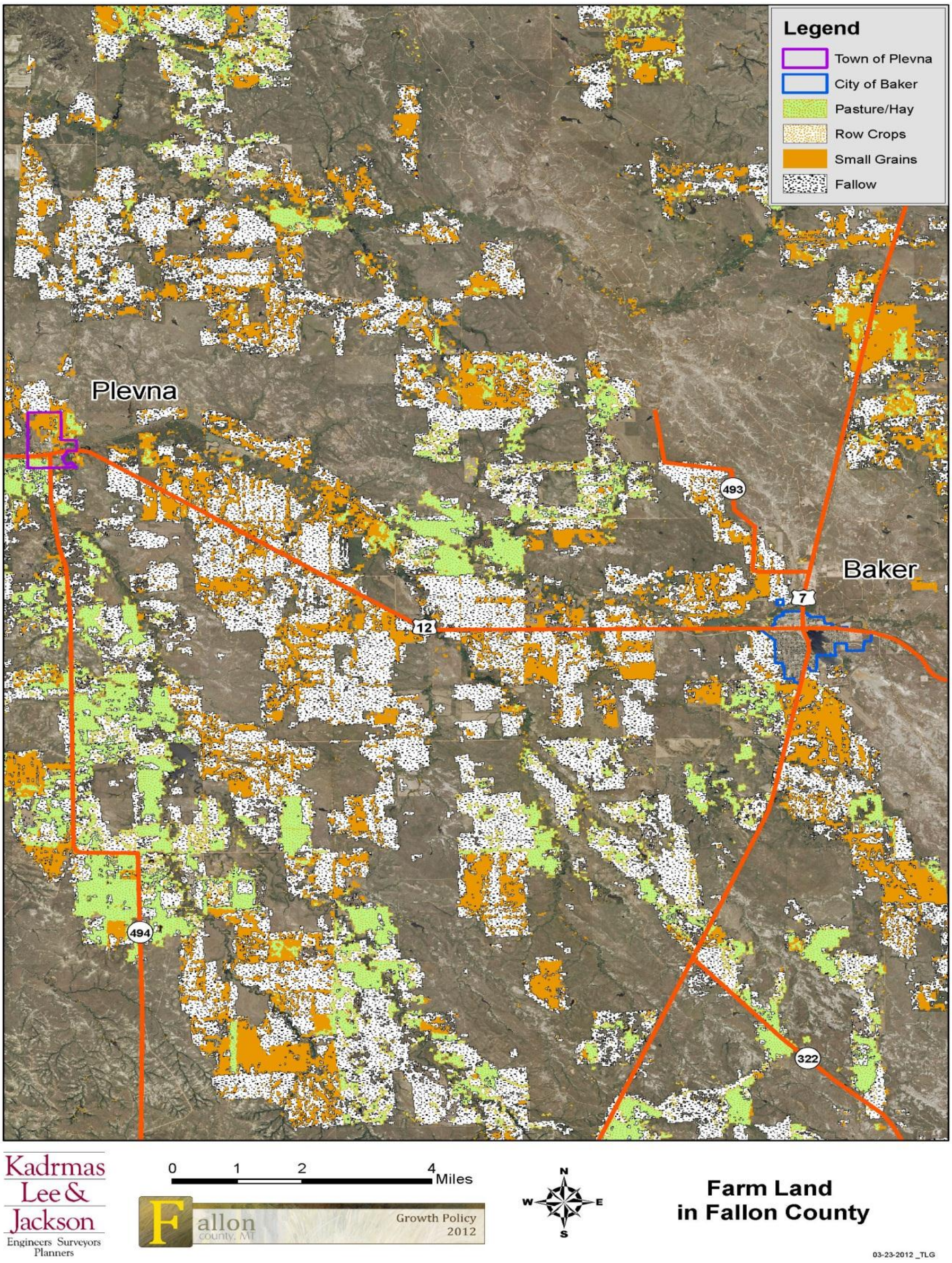
In 2007, the vast majority of land (94 percent) within Fallon County is classified as agricultural and rangeland, with more than 978,000 acres used for farming or ranching as noted in the 2007 Agricultural Census (AC) and shown in Table 13.1. A portion of the agricultural land comes from publicly owned land that is used for ranching or grazing purposes. The agricultural multiuse agreement concept allows local ranchers and farmers to lease and use public lands for grazing and farming, while a federal or state agency owns the land. The benefit is that local residents maintain and use the land that would otherwise sit vacant and unused. The State of Montana and the Montana Department of Natural Resources and Conservation (DNRC) administer the land management and multiuse system, which currently has 13 agreements totaling 6,800 acres that are up for renewal by February 2013. Animal grazing accounts for more than 5,300 acres (78 percent) of leased public lands, while farming accounts for 20 percent.

Table 13.1: 2007 Fallon County Agricultural Census Data

	2007	2002	% change
Number of Farms	296	327	- 9
Land in Farms	978,818 acres	932,211 acres	+ 5
Average Size of Farm	3,307 acres	2,851 acres	+ 16
Market Value of Products Sold	$35,938,000	$35,938,000	+ 60
Crop Sales	$6,981,000 (19 percent)		
Livestock Sales	$28,957,000 (81 percent)		
Average Per Farm	$121,412	$121,412	+ 77

Source: 2007 Agricultural Censu

Figure 13.1: Fallon County Agricultural Land Types



Note: Only partial data was available for the County

The average size of a farm was 3,307 acres according to the 2007 AC with the market value of products sold totaling $35.9 million dollars; 19 percent for crop sales and 81 percent for livestock sales. Cattle were the highest grossing livestock with sheep and lambs a distant second. Forage – land used for all hay and hayage, grass silage and greenchop – was the dominant crop item with more than 90,000 acres dedicated to this use. Wheat (38,500 acres) was the second largest crop produced, followed by barley and safflower.

Soils

The US Department of Agricultural (USDA) completed a comprehensive soil study for Fallon County in 2003. The study, *MT025 – Soil Survey of Fallon County, Montana*, highlights all soil types found throughout the County as well as a detailed analysis of each soil classification. The study, which can be accessed at http://soildatamart.nrcs.usda.gov/manuscripts/MT025/0/Fallon_PartI.pdf, contains additional information on how soil impacts and supports agronomy, rangeland, recreation, wildlife habitat, engineering and development.

Figure 13.2: Rangeland in Fallon County



Cropland and rangeland limitations are essential to the preservation of soil health. Cropland and rangeland limitations are essential to the preservation of soil health. The MT025 study suggests a combination of several practices should be implemented to control soil blowing and water erosion including conservation tilage, stripcropping, windbreaks, tall grass barriers and countour farming. Proper grazeland management also leads to healthier livestock ensuring future generations can continue to ranch. No single grazeland management system suits all circumstances; a diversified approach is best including developing livestock watering locations, fencing, properly locating slad and mineral suppliments, seeding, rotating grazeland and using no more than one-half of the current year's growth for grazing.

Water and Wildlife Habitat

Rivers, Streams and Lakes

Fallon County has no major rivers, but it does contain several streams and small creeks that feed into lakes and dams. Little Beaver, O'Fallon and Sandstone Creeks are the largest streams in the County, followed by Cottonwood and Red Butte Creeks. Lake Baker is the largest freshwater lake that serves as a recreational opportunity for area residents.

Wetlands

Wetlands play an integral part for supporting wildlife and livestock. Without wetlands, several bird species, fish and mammals including beaver, muskrat, mink and small mammals would not be able to survive. Moreover, wetlands improve water quality by filtering sediments, pollutants and chemicals while recharging groundwater. The Eastern Plains Economic Development Corporation (EPEDC) also identified several benefits and funding opportunities to preserve wetlands in the 2006 Comprehensive Economic Development Strategy.

Specifically, EPEDC noted that the USDA Natural Resources Conservation Service offers the wetlands reserve program (WRP), whereby land owners can receive financial incentives to restore, protect and enhance wetlands in exchange for retiring marginal land from agricultural uses. In Montana, the types of WRP restoration projects most often fall into the following categories: pothole restoration, floodplain restoration and riparian corridors. In the Eastern Plains EDC area, wetlands are primarily the floodplain wetlands along riverine systems.

Figure 13.3 and 13.4 shows the identified wetlands in Fallon County and Baker, although the digitized data from the National Wetlands Inventory was not high-quality. Data was only available for part of the county, but it is much better than previous versions.

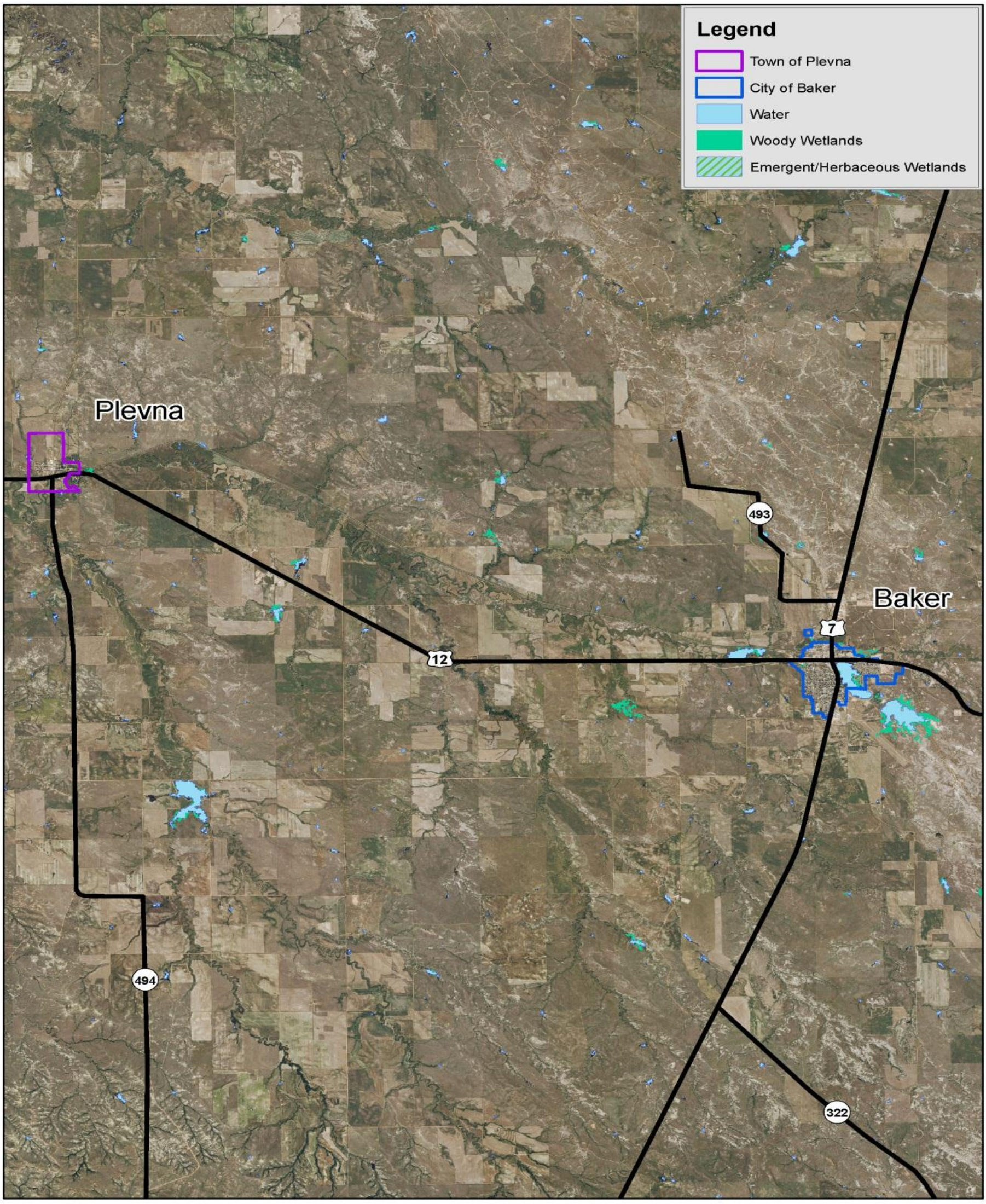
Wildlife Habitat

Fallon County has no designated critical habitat for federally listed endangered or threatened species nor does the county have any threatened plant species, according to the Eastern Plains Economic Development Corporation's *Comprehensive Economic Development Strategy* report, 2006. In addition, the *MT025* study produced by USDA identifies numerous wildlife species and habitat. Pronghorn antelope, mule deer and while-tailed deer can be found throughout the county. Several bird species including ring-necked pheasant, Hungarian partridge, sage and sharp-tailed grouse also occupy lands in the County. Other animals found in Fallon County include beaver, mink, muskrat, badger, bobcat, coyote, fox and small mammals.

The County also has several habitat areas suited for wildlife including prairie grasslands, bushy draws, rough breaks, cropland, rangeland, ponds and bottomlands, which are located along Little Beaver, O'Fallon and Sandstone Creeks. Areas of ponderosa pine are also scattered throughout Fallon County.

The MT025 study identifies recommendations for preserving wildlife habitat, which include development of odd or irregularly shaped areas in and adjacent to farmland to provide food and cover, protection of habitat from fire or grazing, and establishment of woody vegetation to provide winter shelter. Wildlife habitat may also be enhanced through application of commonly employed conservation practices including minimum tillage, planned grazing systems, pond construction, and shelterbelts and field windbreaks.

Figure 13.3: Fallon County Wetlands



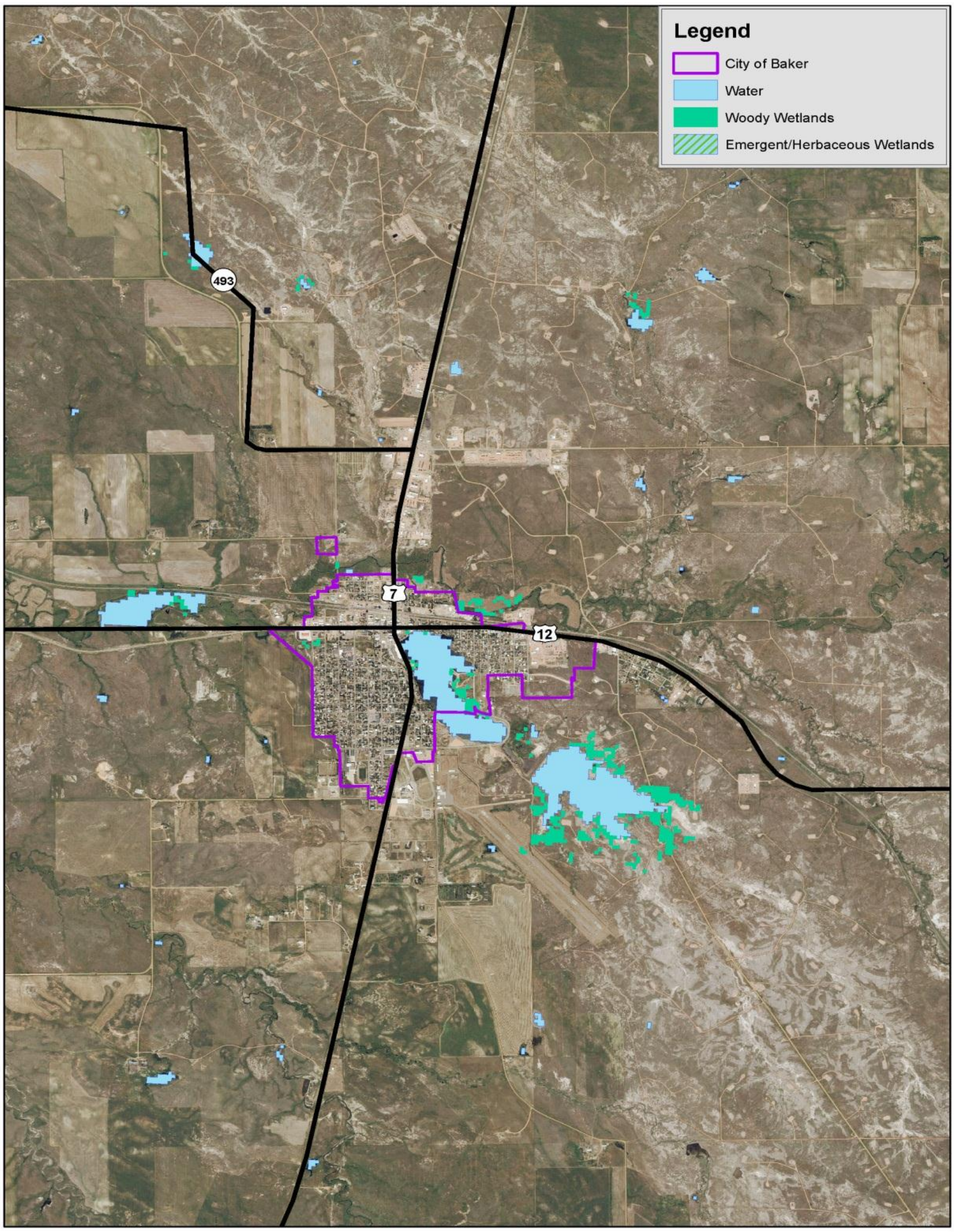
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Wetlands in Fallon County

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Figure 13.4: Baker Wetlands



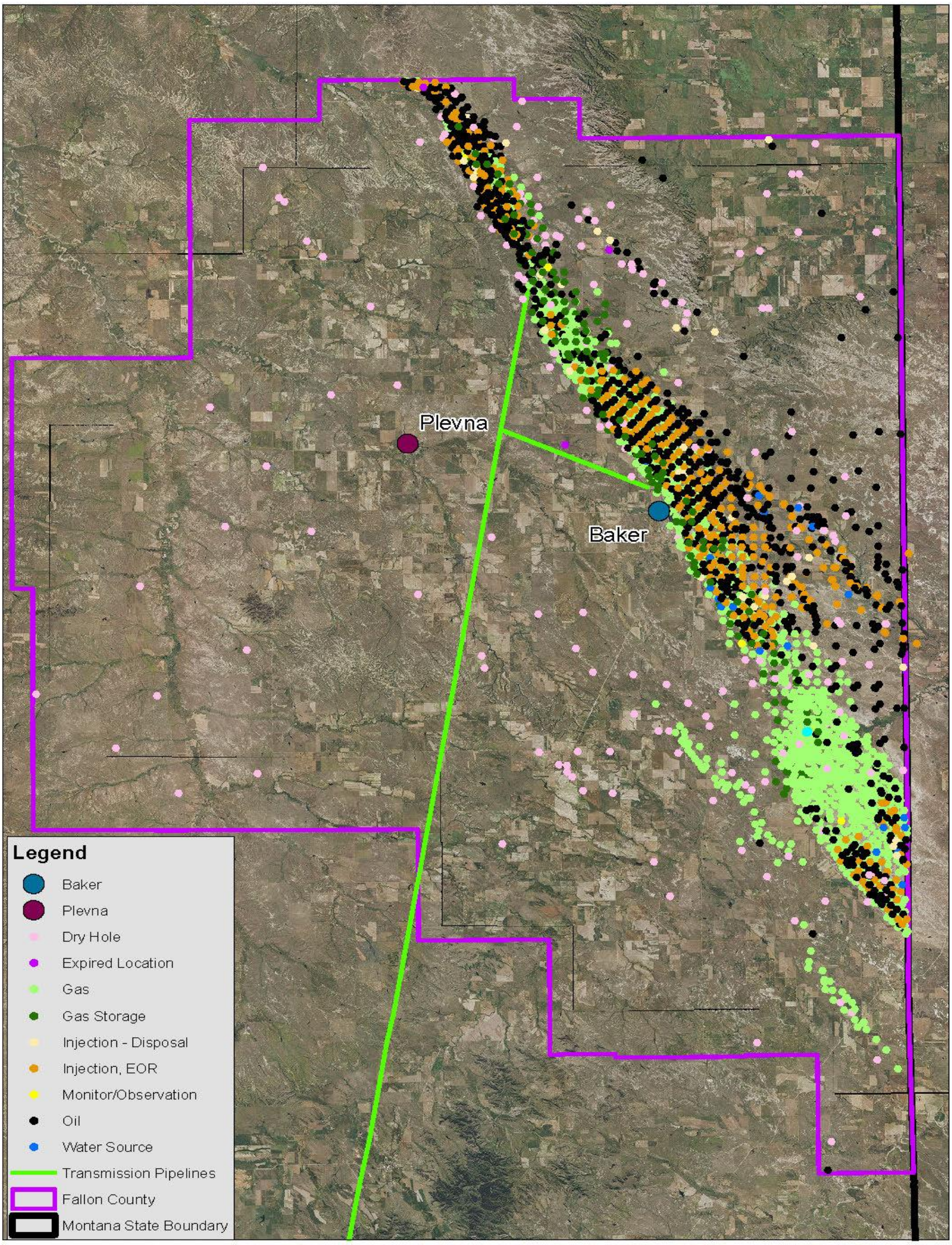
Oil and Gas Resources

Fallon County has an abundant number of oil and gas wells located in eastern and southeastern portions of the County near Baker. The majority of wells are situated on the Cedar Creek Anticline. The recent oil boom in western North Dakota has had a limited effect on the oil and natural gas exploration in Fallon County as some energy companies, which were interviewed as stakeholders, said they were waiting to see what happens with the exploration phase before ramping up operations. Even without a significant increase in new drilling rigs, the County was the second highest oil producing county behind Richland County. However, Fallon County was the highest producing gas county in the state during 2010.

According to the DNRC Trust Land Management Division's Fiscal Year 2010 Annual Report, Fallon County produced more than 311,000 barrels of oil on state trust lands only and accounted for nearly 20 percent of oil production in 2010. Fallon County received more than 2.6 million dollars from oil royalties. Fallon County produced more than 956,000 mcf (one-thousand cubic feet) units of gas resulting in more than $355,000 dollars in royalties. Data was only provided for state and public trust lands. Figure 13.5 shows the location of wells and pipelines.

The County should continue to support and develop these natural resources as the energy sector can help spur economic development throughout the County and will continue to give the County a viable source of economic security.

Figure 13.5: Oil and Gas Wells and Transmission Lines

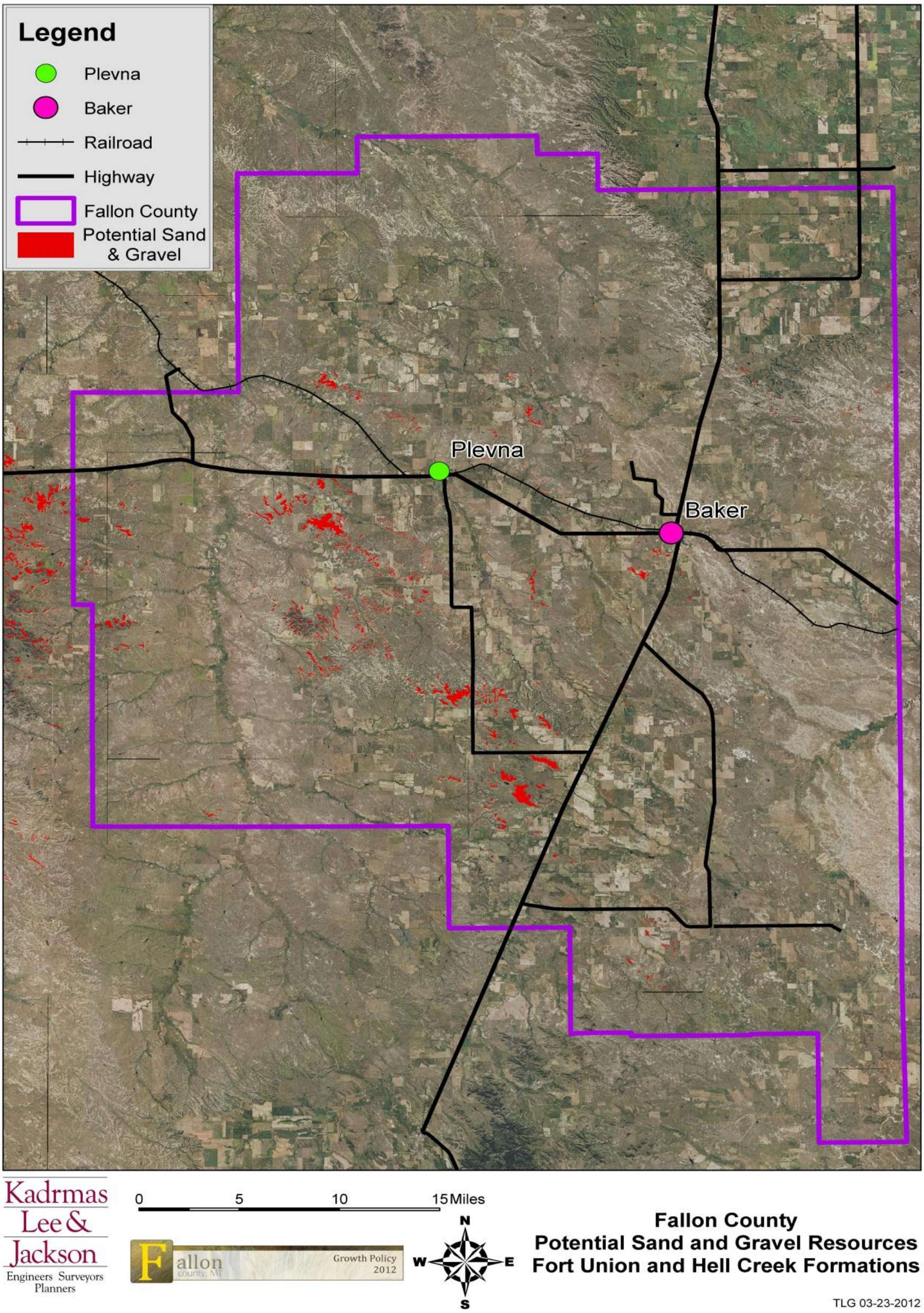


Sand and Gravel Resources

Sand and gravel are an integral part of Fallon County's road maintenance program as well as to the building and development arenas. Without sufficient sand and gravel resources, the County would be unable to provide maintenance for County and local roads. However, Fallon County does lack sufficient sand and gravel pits that contain the minimum soil quality needed for state and federal roads. As such, the County needs to truck in these resources from other counties and cities, most notably from Dawson County and Prairie County.

As of 2011, approximately 17 sand and gravel pits were operating in Fallon County, with the largest pit located just north of Baker. The Thielen pit is managed by Griffith Excavating. The Fallon Ready Mix Plant also operates a sand and gravel pit called the Mehling pit. Fifteen pits are managed by the Fallon County Road Department and are scatted across the County. Figure 13.6 shows potential areas that may have sand and gravel resources that the County can use for local road maintenance.

Figure 13.6: Potential Sand and Gravel Resource Locations



Brownfield Sites and Other Potential Contaminants

Brownfields

Brownfield sites are properties that could be redeveloped but may have potential hazardous substances, pollutants or contaminants on site. The County has no officially designated brownfield sites, although potential properties in both Baker and Plevna may qualify as brownfields depending on environmental test results. A particular concern is the abandoned automotive garage site at the intersection of Highway 12 and Main Street in Plevna. Cleaning up and reinvesting in this property and others like it in the County can help promote development and reuse of the property. The most common reason brownfield sites are not redeveloped is not knowing what type or how much contamination is on site, which results in the property remaining vacant and underdeveloped.

Fallon County can help existing property owners and potential buyers with identifying potential brownfield sites as well as providing funding for assessments and cleanup. By providing assessment funding, potential buyers can identify what level of contamination exists and what steps may be necessary for cleanup. However, because property owners may be unwilling to perform assessments themselves for fear of being responsible for cleanup, the County can do the assessment for the property owner, thus removing a barrier for remediation.

The Southeastern Montana Development Corporation (SEMDC) has received brownfield site assessment grants to help local communities and property owners determine what level, if any, of remediation may be necessary. Unfortunately, SEMDC does not serve Fallon County, but the organization contains knowledgeable staff that would be more than willing to help Fallon County. In addition, the EPEDC serves Fallon County, but does not currently have any brownfield grant assessment monies. The EPEDC is more than willing to assist Fallon County in cleaning up and redeveloping brownfield sites as well.

The Montana Department of Environmental Quality (DEQ), DNRC and the US Environmental Protection Agency (EPA) all offer grants for brownfield assessment and cleanup. DNRC has the Resource and Development Grants (RDG) that are similar to brownfield assessment and cleanup grants but are geared specifically towards publically owned contaminated properties in Montana. A link to the DNRC grant page is listed below and contains the grant coordinator's (Alicia Stickney) contact information. http://dnrc.mt.gov/cardd/ResourceDevelopment/rdg/ProjectPlanningGrants.asp

DEQ also receives some money from the EPA to assist communities with assessment or cleanup of brownfield sites. These would be similar to EPA's targeted brownfields assessment grants and the DNRC's RDG grant. The National Association of Local Government Environmental Professionals (NALGEP) is also a good resource for technical assistance and funding sources although this group serves communities nationwide, whereas DNRC and DEQ serve Montana communities only. NALGEP's website is below and has several grant opportunities relating to brownfields. http://www.nalgep.org/issues/brownfields/

Leaking Underground Storage Tanks

Fallon County has 22 leaking underground storage tanks (LUST), 12 of which have been removed or remedied. Eight sites currently need some form of remediation and/or removal. Two sites are currently listed as high priority on DEQ's site assessment website (http://nris.mt.gov/deq/remsitequery/default.aspx?qt=lust), while four other tanks are ranked with a medium priority. Only one site is being managed for groundwater, while another is pending closure.

Wildland-Urban Interface

The State of Montana requires communities to analyze the wildland-urban interface, which is the area surrounding an urban or municipal boundary containing forests, grasslands and other vegetation that are at a risk to wildfire. The transition zone is one-half (0.5) mile and varies depending upon the boundary of the municipality. Figure 13.7, 13.8 and 13.9 shows the wildland-urban interface boundary for Baker and Plevna; however, the County should strongly consider implementing guidelines for all areas where future development may infringe upon wildland vegetation.

Fallon County can help eliminate potential wildfire risks by adopting the *Guidelines for Development within the Wildland-Urban Interface, 2009*, produced by the Montana DNRC. The Guidelines provide information on a range of topics including:

- Wildland Fuel Mitigation
- Site Development Recommendations
- Fuelbreak and Greenbelt Spacing
- Access and Water Supply Considerations
- Alternative Development Examples

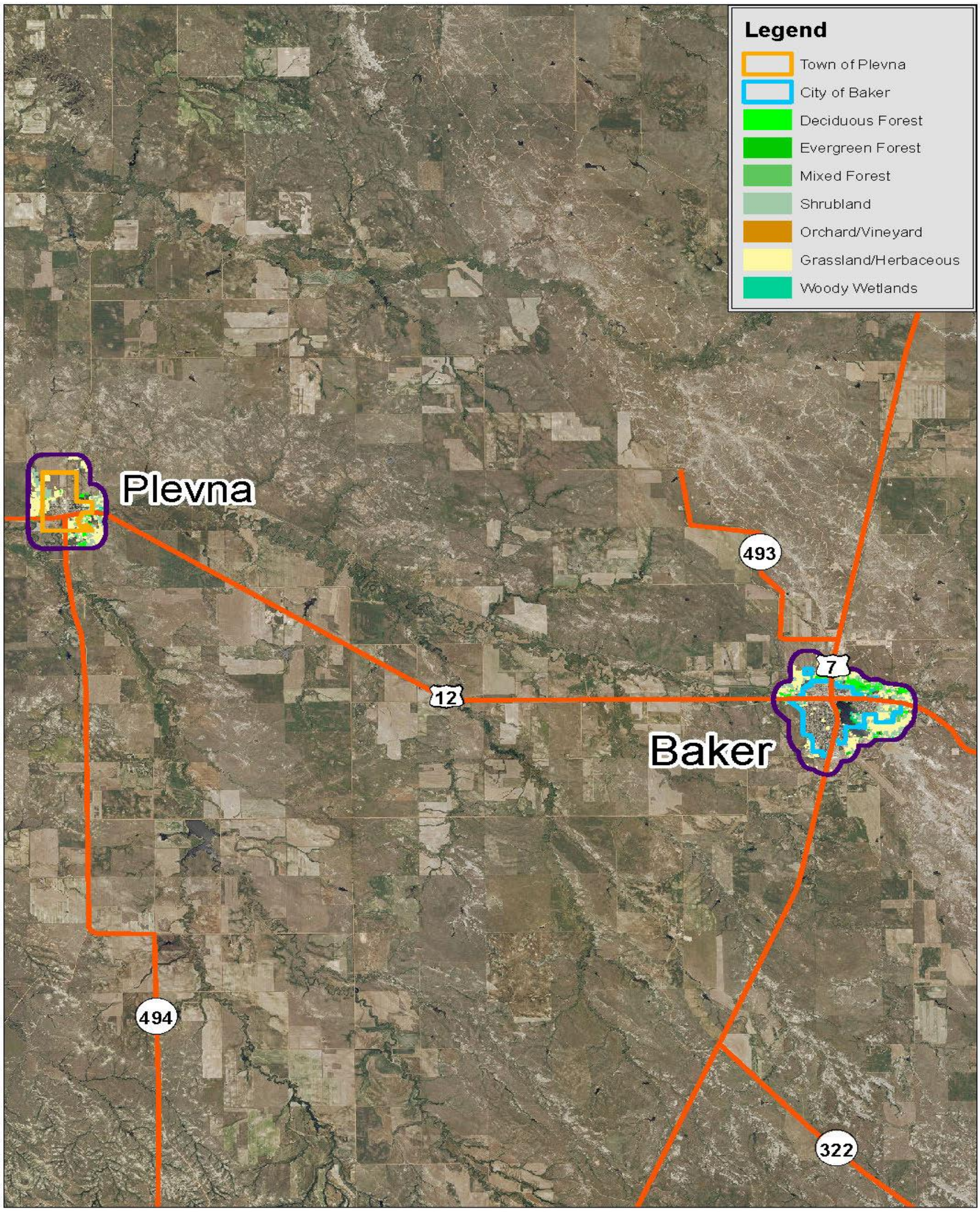
The Guidelines also offer recommendations for zoning such as clearing vegetation within five feet of public roads and driveways, providing at least two access points into a subdivision, ensuring fire apparatus can access a building within 150 feet and constructing "break away" gates for emergency vehicles. In addition, information is provided for homeowner responsibilities that include recommendations for how residents can help prevent damage to property and guidelines for establishing defensible space standards.

The goal of the Guidelines and county-wide adoption is not to limit property rights or future development. The goal is to:

- Protect life and property
- Reduce the potential for a fire on improved property from spreading into wildland fuels, and from a fire in wildland fuels from spreading into improved property or structures
- Provide safe working areas for emergency responders fighting fire
- Maintain important native plant communities and reduce the potential for loss of native vegetation and crops

Fallon County already has a hazard mitigation plan, but the plan does not address wildland-urban interface issues; it only addresses defensible space.

Figure 13.7: Wildland-Urban Interface in Fallon County



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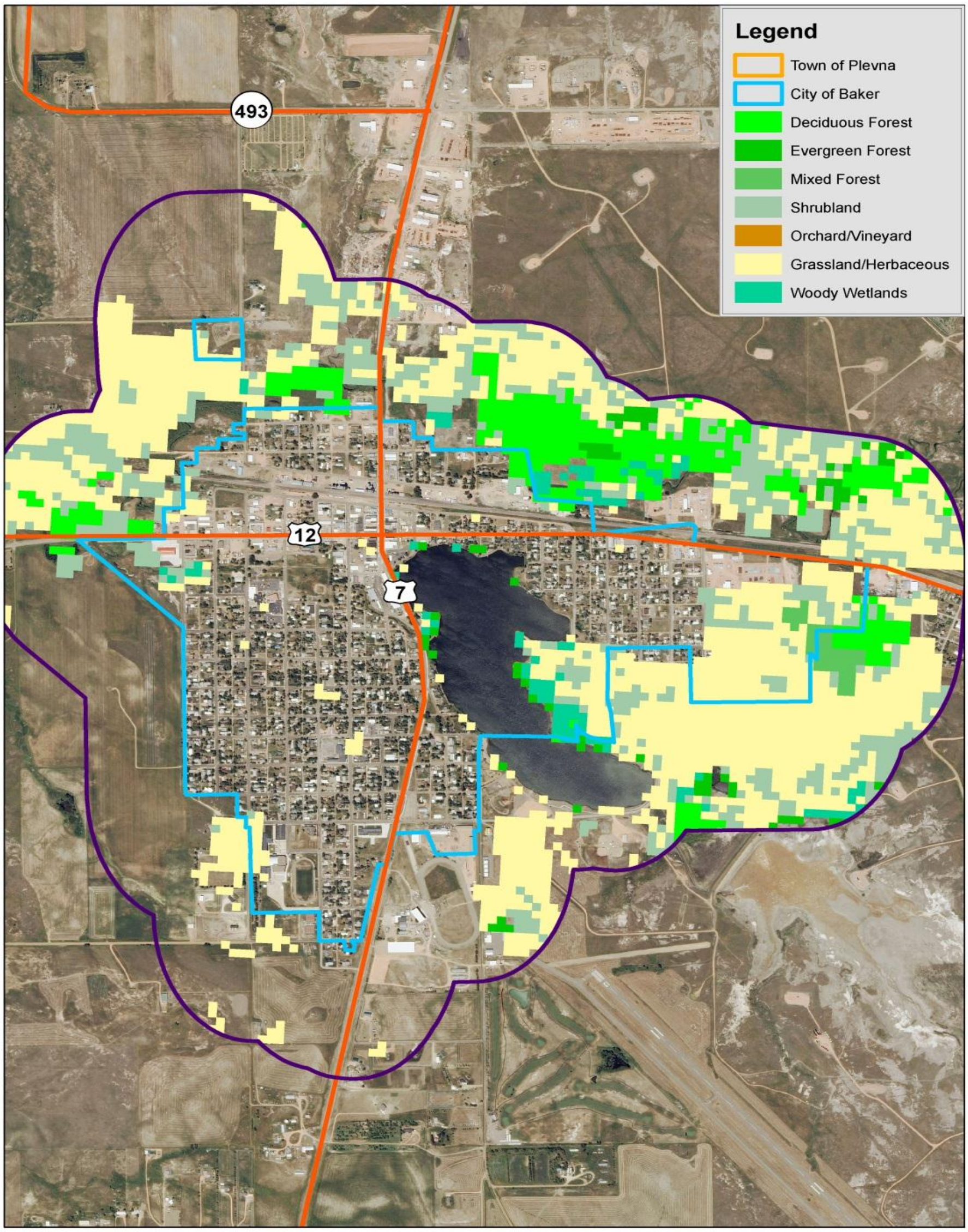
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Wildland-Urban Interface in Fallon County

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Figure 13.8: Wildland-Urban Interface in Baker



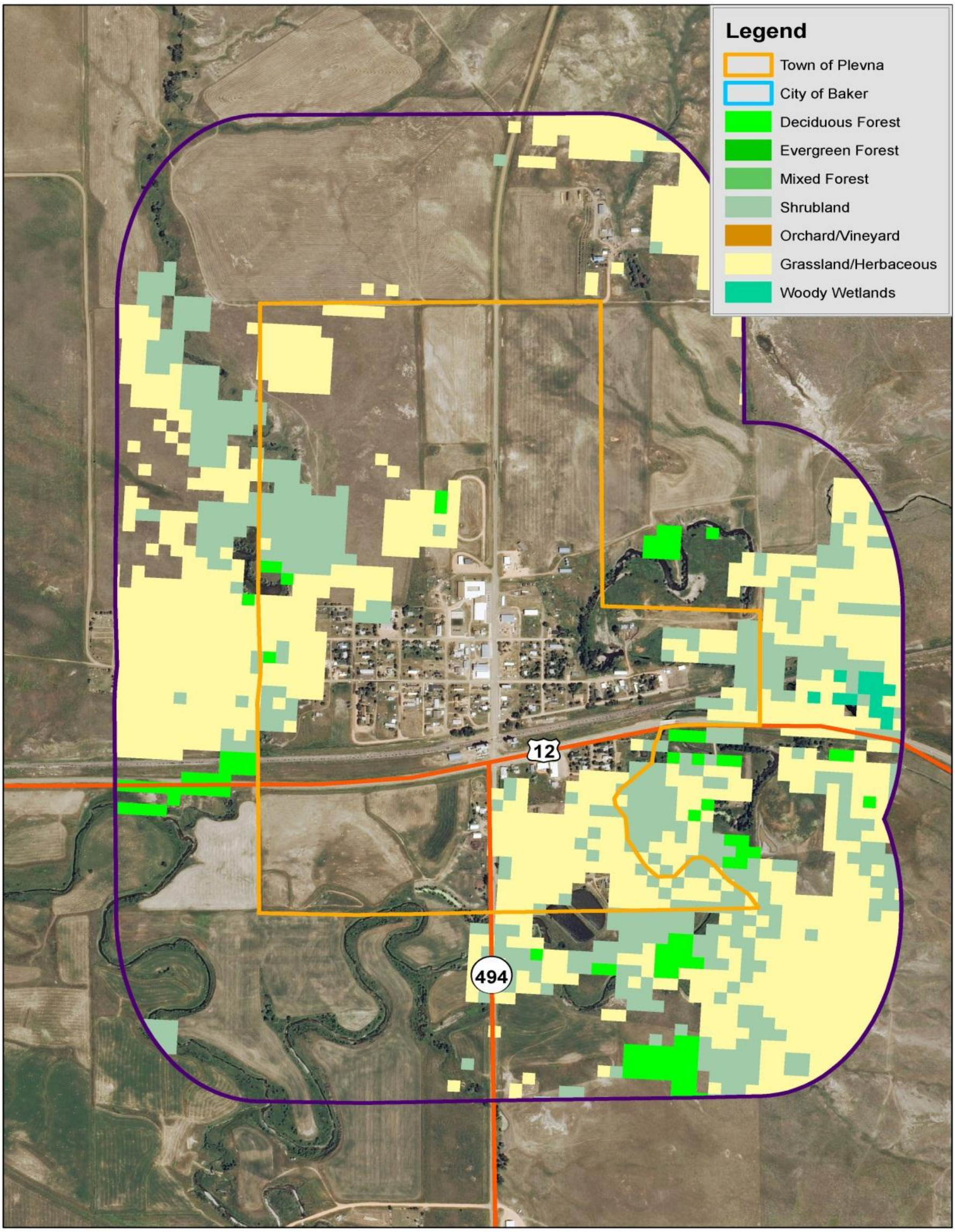
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Wildland-Urban Interface in Fallon County

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Figure 13.9: Wildland-Urban Interface in Plevna



Chapter 14: Growth Policy Implementation

Overview

The 2012 Fallon County Growth Policy is a significant upgrade of the 2006 Growth Policy. The 2006 Growth Policy provided very useful information regarding existing community characteristics as well as recent trends that had future implications for the community. However, it lacked specific recommendations regarding how the community may best address existing and emerging issues.

The 2012 Growth Policy provides recommended implementation measures for each planning topic objective. The implementation measures are expressed as either recommended policy or strategy. A policy is a statement of intent of how a governing body will address a planning topic or issue. A strategy is a specific course of action a governing body will address a specific planning topic or issue.

Implementation Tools

This section identifies several types of Growth Policy implementation tools. Generally, there are five types of tools at a local government's disposal to help implement a growth policy. The types of tools include regulations, policy, government finance, education and coordination. The policies and strategies recommended in this chapter include each of the tools.

Regulatory tools are implemented with regulations authorized by Montana Code Annotated (MCA) and are adopted into law by local government. The Growth Policy and other adopted plans contain policies that express a community's interest in pursuing a course of action on particular topics or issues. Unlike regulations, local government has discretion in the implementation of policy. Government finance tools represent a community's financial commitment to fund the implementation of policy and strategies contained in the growth policy. Education tools, such as the growth policy itself, include a number of activities to inform the public, appointed officials and elected officials that facilitate effective decision making. Finally, coordination tools are voluntary measures with a local government or between a local government and other local governments and regional, state and federal agencies that result in more efficient delivery of services or a shared response to a common concern.

Provided below is a discussion of each of the types of growth policy implementation tools. The tools described are not all inclusive but rather are intended to provide examples of tools that are commonly used by communities in Montana. Several of the tools are currently being used by Fallon County and the City of Baker. The tools currently not in use should be considered as additional means to advance the implementation of the Growth Policy.

Regulatory Tools

Subdivision Regulations

The MCA requires counties to adopt subdivision regulations that comply with the Montana Subdivision and Platting Act. Subdivision regulations control the creation or modification of the division of land into new parcels or tracts. They also control the design of subdivisions and provide standards for adequate provision of infrastructure without adversely impacting public services and natural resources.

Fallon County has adopted subdivision regulations that are enforced in the City of Baker and the Town of Plevna. The Fallon County subdivision regulations are currently being updated to be consistent with the last three State of Montana legislative sessions.

Zoning regulations

Zoning regulations are a common regulatory tool to control land use. One of the primary purposes of zoning regulations is to minimize land use incompatibility. Zoning regulations also establish standards that limit the density or intensity of development as well as other characteristics of development such as off-street parking, signs, lighting, site layout, etc. Zoning regulations are supplemented to a zoning map that establishes zoning districts in the jurisdiction. The zoning map provides the means to separate incompatible land uses and zoning regulations mitigate potential land use incompatibilities at the boundaries separating different zoning districts.

The City of Baker adopted zoning regulations in 1979. Over the years a number of amendments were made to the zoning regulations. The city is in the process of reviewing a comprehensive update to the zoning regulations prepared by the planning consultant. Pursuant to the MCA, the City of Baker can establish extraterritorial zoning jurisdiction one mile beyond the city limits. To do so the city is required to adopt its own subdivision regulations and have the Fallon County subdivision regulations amended to exclude the City of Baker.

Fallon County has zoning regulations that apply to a limited area outside the City of Baker. The zoning regulations contain only one zoning district, an industrial district. The zoning regulations were established to control industrial uses in a tax increment finance district that has yet to be implemented. The Town of Plevna has no zoning regulations.

Design Standards

Design standards are most often contained within zoning regulations but can also be established in subdivision regulations. The purpose of design standards is to enhance the appearance and functionality of a development. Overly restrictive design standards can impede development. If properly crafted, design standards can significantly enhance the built environment without placing undue burden on a developer.

Floodplain Regulations

Floodplain regulations are intended to regulate the use of land located within an officially designated 100-year floodplain in order to protect buildings and its occupants from the risks associated with flooding. Floodplain provisions are contained in the Fallon County subdivision regulations. Some communities choose to participate in the National Flood Insurance Program Community Rating System (CRS). CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. Any community in compliance with the minimum requirements of NFIP may participate. Participation in the CRS will result in discounted premiums for flood insurance policy holders; between 5 to 45 percent discounts are provided depending on the rating of proposed floodplain management activities and will reduce the likelihood or magnitude of damage resulting from a flood.

Zoning Compliance Permits

Zoning compliance permits are a tool to ensure that development activities are in compliance with a jurisdiction's zoning regulations. The City of Baker requires the issuance of zoning compliance permits for most types of improvements to private property. Fallon County and the Town of Plevna do issue zoning compliance permits.

Building Permits

Building permits are a tool to ensure that construction of building is in compliance with the State of Montana Building Code. A State of Montana Building Inspector issues building permits for Fallon County, including the City of Baker and Town of Plevna, and 13 other counties in the region. Building permits are required for all non-residential buildings and residential buildings with five or more dwelling units. The State Building Inspector issues a letter of completion when the construction of a building is complete and ready for occupancy. For residential buildings with four or less dwelling units only state issued electrical and plumbing permits are required.

Policy Tools

Neighborhood or Area Plans

The Growth Policy can be further implemented by more detailed neighborhood or area plans. With the adoption of this Growth Policy, plans may be prepared that provide a greater level of detail for specific areas or issues.

Annexation Policy

A city expands its boundaries and its jurisdictional authority through the process of annexation. There are six different methods for annexation authorized by state statute (Parts 42 through 46 of Title 7, Chapter 2, MCA). Part 46 authorizes an annexation resulting from a petition from private property owners. Cities use two tools to facilitate and guide future annexations.

The first is a "Limits of Annexation" map that delineates the areas surrounding a city that can be reasonably supported by urban services and infrastructure. The map is prepared in coordination with the preparation of a capital improvements program described in the government finance tool section, below. The second is the use of annexation agreements. Entering into an annexation agreement with a property owner prior to the submission of development plans gives a local jurisdiction the opportunity to assign infrastructure and other costs associated with development of the annexed property.

Urban Planning Area

Designation of an urban planning area is a tool to plan for the extension of urban services as a jurisdiction grows. It delineates the geographic extent of how far outside the city limits the jurisdiction is prepared to extend urban services within a 10-year planning horizon. This is often accomplished by establishing an urban service area boundary beyond the city limits. The urban service area boundary is established in coordination with planned growth areas identified in the Growth Policy as well as the city's capital improvement program. This tool helps a city plan for future growth outside the city limits and puts property owners outside the city limits on notice of what areas will and will not be supported by the extension of urban services.

Urban Renewal Districts

The establishment of urban renewal districts is an implementation tool that facilitates redevelopment of selected areas in a city. Title 7, Chapter 15, Part 42 of the MCA, gives municipalities authority to establish urban renewal districts in areas that meet the statutory definition of "blighted" areas and authorizes the municipality to expend funds in the area to stimulate private investment. Tax increment finance districts are often used to recapture a city's expenditure of funds for public improvements in the redevelopment area. Prior to establishing an urban renewal district, the municipality is required to prepare and adopt an urban renewal plan.

Government Finance Tools

Capital Improvement Programs

City and county governments often program capital improvements on an annual basis. This is a reasonable practice for communities experiencing no or low levels of growth. However, for communities anticipating or experiencing high levels of growth, the use of multi-year capital improvement programs is an important tool to plan for public expenditures associated with growth. In such cases, a local government will establish a five-year capital improvement program. As noted above, a multi-year capital improvement program can support the establishment of urban service areas and facilitate negotiation of an annexation agreement.

Fee Incentives

The reduction or full waiver of municipal fees is a tool to support implementation of specific growth policy goals and objectives. Often the financial incentive is used to support affordable housing or redevelopment projects. The tool can also be used to support specific economic development policy.

Impact Fees

An impact fee is a charge on development assessed at the building permit or zoning compliance permit stage of a project to assist the funding of new or expanded facilities that are needed to accommodate the development. Impact fees are used by communities anticipating or experiencing high levels of growth and are intended to maintain existing or minimum levels of service with minimal costs to existing property owners. Impact fees can be assessed to a wide range of community services including but not limited to public safety (EMS, police and fire), public works (sewer, water, transportation and drainage facilities), recreation, libraries, etc. Those assessed impact fees need to receive benefit from impact fee expenditures within a reasonable period of time, which most often is considered five years.

The City of Baker adopted Ordinance No. 351 in May, 2012 which reiterated the city's authority to establish impact fees and established a process for preparation of impact fees. The ordinance further established an Impact Fee Advisory Committee to research the subject and implement an impact fee program. The city has yet to determine which public facilities/services would be the basis for an impact fee.

Local Government Owned Land

Land that is owned by local government, including school districts, is a valuable resource that can be used to implement growth policy goals and objectives. Undeveloped public land can be used to financially leverage private development that meets a community's high demand need. By reducing or eliminating land acquisition costs the jurisdiction provides a significant financial incentive to facilitate development that supports the implementation of land use, housing or economic development policy. When this implementation tool is used the local government should enter into a development agreement to ensure the developer provides the desired outcome.

Tax Increment Financing (TIF)

Tax Increment Financing (TIF) was first authorized by the Montana legislature in 1974. It is a locally-driven funding mechanism that allows cities and counties to direct property tax dollars that accrue from new development, within a specifically designed district, to community and economic development activities within that district. It is intended as a tool that can encourage and support investment in areas where growth has been hindered by a lack of sufficient infrastructure and/or the presence of blight. TIF does not increase property taxes for individuals and businesses located within a designated district. Rather, it only affects the way that taxes are distributed after they have been collected. A base taxable

value is determined upon the establishment of a TIF district, and any additional tax revenue that accrues due to new development over a specified time frame is used to finance a variety of district improvements. Eligible improvement activities include:

- Land acquisition
- Rehabilitation and renovation
- Demolition and removal of structures
- Planning, marketing and analysis
- General redevelopment activities
- Constructing, improving and connecting to infrastructure

Education Tools

Planning Studies and Data Collection

This Growth Policy provides a great deal of information and data on the community's various characteristics. It also provides an extensive list of policies and strategies to implement growth policy objectives. In most cases the information and data contained in the growth policy will be sufficient to justify and implement the policies and strategies. However, there may be cases where the community will need to conduct more detailed follow-up planning studies and collect additional information to support an implementation activity. Establishing impact fees or an urban renewal district are two examples of implementation measures that require additional study and data collection. In addition, as discussed below, the ongoing collection of data will support monitoring of the Growth Policy.

Growth Policy Monitoring

The recommended policies and strategies contained in the Growth Policy are based on an assessment of current information and data. The policies and strategies will remain relevant so long as conditions in the community are aligned with current trends. However, unanticipated circumstances or opportunities may likely arise that will warrant a re-evaluation of recommended policies or strategies whether they have been implemented or not. To support a re-evaluation of policies or strategies, data that is applicable to various planning topics should be collected and reported on an annual basis. The data will, in effect, provide community indicator information allowing the community to identify emergence of new trends.

The planning consultant recommends preparation of an annual community indicator report that can be used to support an evaluation of the level of success in achieving community goals and objectives, and an assessment of the need to implement or revise selected policies and strategies contained in the Growth Policy. Annual community Indicator reports will provide valuation information that can be used in the next update of the Growth Policy. The reports can also be used to justify need when requests for outside funding are made.

The community indicator reports should provide information that can be compared to information contained in the Growth Policy so change can be measured. The community indicator reports should include, but not be limited to, the following information:

- Building permits for new housing
- Volume of sales of residential property
- Crime statistics
- Client caseloads for Council of Aging supported programs
- The number and type of new or expanded businesses
- The number and type of new jobs created
- Sales tax revenue
- School enrollment
- Levels of participation in various recreational programs
- Remaining capacity of sewer treatment facilities
- Remaining capacity of the landfill
- Measurements of activity in the oil and natural gas industries, such as number of new wells
- Updated population projections prepared by the Montana Department of Commerce
- Annual departmental budget reports/requests

Coordination Tools

Intra-Governmental Coordination

The functions of local government are logically divided into departments. The departmentalization of local government services tends to discourage the sharing of information and coordination between departments. Too often synthesizing information from the various departments to get a holistic view of the community is solely the responsibility of the elected officials and most often occurs during preparation of annual budgets. The planning consultant recommends department reports be shared with one member of staff who is responsible for overseeing implementation of the Growth Policy.

In addition, individual departments should be assigned the task of implementing or evaluating the need to implement recommended policies and strategies. This is an excellent way to spread ownership of the Growth Policy. Annual department reports should provide information on implementation activities and the need to initiate implementation of policies and strategies. To formalize or institutionalize the community's commitment to Growth Policy implementation, the planning consultants recommend each local government's budget include a Growth Policy Implementation section.

Intra-governmental coordination is also an effective tool to more efficiently deliver services. The leaders of each department should meet periodically to share information and service delivery challenges. The meetings will provide an opportunity to enhance coordination between departments and identify ways

that staff, equipment and other departmental resources can be shared to mitigate service delivery challenges.

Inter-Governmental Coordination

The same principles discussed in the previous section apply to coordination between local governments and between local governments and regional, state and federal agencies. Inter-governmental coordination provides an opportunity to regularly share information about plans and programs and enhance working relationships.

The planning consultant recommends establishing a semi-annual meeting schedule with regional, state and federal agencies and a quarterly meeting schedule for local governments in the county. Individual County Commissioners and City and Town Council members can be designated as the liaison for each agency and local government. The intangible benefits of this coordination will be maintaining open lines of communication and a greater mutual understanding of the perspectives and needs.

Evaluation of the Fallon County Subdivision Regulations

An evaluation of the administration and standards contained in the Fallon County subdivision regulation is required as part of the Growth Policy. There are three items that need to be evaluated per Title 76, Chapter 1, Part 6, 76-1-601(3)(h), MCA.

The evaluation concerns how the local governments define the various impacts assessments specified in 76-3-608(3)(a), how local government decisions with respect to the impact assessments are made and how public hearings for proposed subdivisions are conducted.

Impact Assessments: Definitions and Evaluation Factors

Local government subdivision regulations are required to review proposed subdivision in accordance with the following criteria provided in 76-3-608(3)(a):

- The effect on agriculture
- The effect on agricultural water user's facilities
- The effect on local services
- The effect on the natural environment
- The effect on wildlife and wildlife habitat
- The effect on public health and safety

For each of the above criteria, applicable definitions and evaluative provisions contained in the Fallon County subdivision regulations will be identified.

Agriculture

Agriculture is defined as all aspects of farming or ranching including the cultivation or tilling of soil; dairying; the production, cultivation, growing, harvesting of agricultural or horticultural commodities; raising of livestock, bees, fur-bearing animals or poultry; and any practices including forestry or lumbering operations, including preparation for market or delivery to storage, to market, or to carriers for transportation to market.

The effect on agriculture is evaluated by the following provisions:

- Is the proposed subdivision or associated improvements located on or near prime farmland or farmland of statewide importance as defined by the Natural Resource Conservation Service? If so, identify each area on a copy of the preliminary plat.
- Describe whether the subdivision would remove any agricultural or timber land from production.
- Describe possible conflicts with nearby agricultural operations (e.g., residential development creating problems for moving livestock, operating farm machinery, maintaining water supplies, controlling weeds or applying pesticides; agricultural operations suffering from vandalism, uncontrolled pets or damaged fences).
- Describe possible nuisance problems which may arise from locating a subdivision near agricultural or timber lands.
- Describe effects the subdivision would have on the value of nearby agricultural lands.

Agricultural Water User Facilities

Agricultural water user facilities are defined as those facilities which provide water for irrigation or stock watering to agricultural lands for the production of agricultural products. These facilities include, but are not limited to, ditches, head gates, pipes and other water conveying facilities.

The effect on agricultural water user facilities is evaluated by the following provisions:

- Describe conflicts the subdivision would create with agricultural water user facilities (e.g. residential development creating problems for operating and maintaining irrigation systems) and whether agricultural water user facilities would be more subject to vandalism or damage because of the subdivision.

- Describe possible nuisance problems which the subdivision would generate with regard to agricultural water user facilities (e.g. safety hazards to residents or water problems from irrigation ditches, head gates, siphons, sprinkler systems or other agricultural water user facilities).

Local Services

Local services are defined as any and all services that local governments, public or private utilities are authorized to provide for the benefit of their citizens.

The effect on local services is evaluated by the following provisions:

- Describe the additional or expanded public services and facilities that would be demanded of local government or special districts to serve the subdivision.
    - Describe additional costs which would result for services such as roads, bridges, law enforcement, parks and recreation, fire protection, water, sewer and solid waste systems, schools or busing, (including additional personnel, construction and maintenance costs).
    - Who would bear these costs (e.g. all taxpayers within the jurisdiction, people within special taxing districts, or users of a service)?
    - Can service providers meet the additional costs given legal or other constraints (e.g. statutory ceilings on mill levies or bonded indebtedness)?
    - Describe off-site costs or costs to other jurisdictions that may be incurred (e.g. development of water sources or construction of a sewage treatment plant; costs borne by a nearby municipality).
- Describe how the subdivision allows existing services, through expanded use, to operate more efficiently, or makes the installation or improvement of services feasible (e.g. allow installation of a central water system, or upgrading a country road).
- What are the present tax revenues received from the un-subdivided land?
    - By the County $_____
    - By the municipality, if applicable, $ _____
    - By the school(s) $_____
- Provide the approximate revenues received by each above taxing authority if the lots are reclassified, and when the lots are all improved and built upon. Describe any other taxes that would be paid by the subdivision and into what funds (e.g. personal property taxes on mobile/manufactured homes are paid into the County general fund).
- Would new taxes generated from the subdivision cover additional public costs?

- How many special improvement districts would be created which would obligate local government fiscally or administratively? Are any boding plans proposed which would affect the local government's bonded indebtedness?

Natural Environment

Natural environment is defined as the physical conditions which exist within a given area, including land, air, water, mineral, flora, fauna, sound, light and objects of historic and aesthetic significance.

The effect on the natural environment is evaluated by the following provisions:

- Describe and locate on a plat overlay or sketch map known or possible historic, paleontological, archaeological or cultural sites, structures or objects which may be affected by the proposed subdivision.

- How would the subdivision affect surface and groundwater, soils, slopes, vegetation, historical or archaeological features within the subdivision or on adjacent land? Describe plans to protect these sites.

    - Would any stream banks or lake shorelines be altered, streams re-channeled or any surface water contaminated from sewage treatment systems, run-off carrying sedimentation, or concentration of pesticides or fertilizers?

    - Would groundwater supplies likely be contaminated or depleted as a result of the subdivision?

    - Would construction of roads or building sites require cuts and fills on steep slopes or cause erosion on unstable, erodible soils? Would soils be contaminated by sewage treatment systems?

    - Describe the impacts that removal of vegetation would have on soil erosion, bank or shoreline instability.

    - Would the value of significant historical, visual or open space features be reduced or eliminated?

- Describe possible natural hazards the subdivision could be subject to (e.g., natural hazards such as flooding, rock, snow or landslides, high winds, severe wildfires, or difficulties such as shallow bedrock, high water table, unstable or expansive soils, or excessive slopes).

- How would the subdivision affect visual features within the subdivision or on adjacent land? Describe efforts to visually blend the proposed development with the existing environment (e.g. use of appropriate building materials, colors, road design, underground utilities and re-vegetation of earthworks).

Wildlife and Wildlife Habitat

Wildlife is defined as those animals that are not domesticated or tamed, or as may be defined in a Growth Policy, and wildlife habitat is defined as the place or area where wildlife naturally lives or travels through.

The effect on wildlife and wildlife habitat are evaluated by the following provisions:

- Describe what impacts the subdivision or associated improvements would have on wildlife areas such as big game wintering range, migration routes, nesting areas, wetlands or important habitat for rare or endangered species.

- Describe the effect pets or human activity would have on wildlife.

Public Health and Safety

Public health and safety is defined as the prevailing healthful, sanitary condition of wellbeing for the community at large. Conditions relating to public health and safety include but are not limited to: disease control and prevention; emergency services; environmental health; flooding, fire or wildfire hazards, rock falls or landslides, unstable soils, steep slopes and other natural hazards; high voltage lines or high pressure gas lines; and air or vehicular traffic safety hazards.

The effect on public health and safety is evaluated by the following provisions:

- Describe any health or safety hazards on or near the subdivision, such as: natural hazards, lack of water, drainage problems, heavy traffic, dilapidated structures, high pressure gas lines, high voltage power lines or irrigation ditches. These conditions, proposed or existing, should be accurately described with their origin and location identified on a copy of the preliminary plat.

- Describe how the subdivision would be subject to hazardous conditions due to high voltage lines, airports, highways, railroads, dilapidated structures, high pressure gas lines, irrigation ditches and adjacent industrial or mining uses.

- Describe land uses adjacent to the subdivision and how the subdivision will affect the adjacent land uses. Identify existing uses such as feed lots, processing plants, airports or industrial firms which could be subject to lawsuits or complaints from residents of the subdivision.

- Describe public health or safety hazards, such as dangerous traffic, fire conditions or contamination of water supplies which would be created by the subdivision.

In addition to the above factors required to be evaluated in the review of a proposed subdivision, the Fallon County subdivision regulations also require preparation of a community impact report on the following public services and facilities.

- Education and busing
- Roads and maintenance
- Water, sewage and solid waste facilities
- Fire and police protection
- Payment for extension of capital facilities

Public Hearing Requirements and Procedures

The Fallon County subdivision regulations contain several sections that specify the procedural requirements for the following types of subdivision applications.

- Divisions of land exempt from subdivision review
- Review and approval procedures for minor subdivisions
- Review and approval procedures for major subdivisions, including review and approval of preliminary and final plats
- Expedited review of a first minor subdivision

The Fallon County subdivision regulations apply to all jurisdictions in the county. The County is in the process of updating the subdivision regulations for consistency with all applicable enacted amendments to the MCA during the last three legislative sessions. All procedural provisions, including those applicable to public hearings, are consistent with the current statutory provisions contained in the MCA.

Objectives and Policies and Strategies

The following are the recommended objectives and policies and strategies for each topic of the Growth Policy. For each policy and strategy the entity responsible for implementation is identified and a recommended time frame for implementation is provided. The entity listed first for each policy and strategy (in italicized type) is assigned the primary responsibility to initiate and follow-through with implementation measures. In a few cases, multiple entitles are assigned the primary responsibility for implementation. Other listed entities for recommended policies and strategies are responsible for supporting the implementation measures. Four implementation time frames are provided:

- Immediate
- Short-term – not later than two years after adoption of the Growth Policy
- Mid-term – between two and four years after adoption of the Growth Policy
- Long-term – prior to the update of the Growth Policy in 2017

Land Use Objectives and Policies and Strategies

Objective: Ensure developable land is available to accommodate anticipated population increases.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Use the future land use map to guide development in Fallon County.	*Planning Board* County Commission City and Town Councils	Immediate
Retain existing residents, including the young adult population, and accommodate new people, including energy sector workers and their families, moving into the community.	EMEDA/SMART County Commission City and Town Councils	Immediate

Objective: Accommodate future growth in areas that can be efficiently served by public services.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Establish county land use policies and development standards adjacent to Baker and Plevna that are compatible with city land use and development standards and town land uses and infrastructure.	*Planning Board* County Commission	Short-term
Investigate the use of an urban service boundary or adequate public facilities ordinance to promote efficient extensions of infrastructure.	*Planning Board* City Council	Short-term

Objective: Implement land use policies and strategies to promote investment in downtown Baker and development of commercial uses in the Town of Plevna.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Identify areas in the City of Baker that would meet the MCA criteria for establishing a redevelopment plan.	*EMEDA/SMART* City Council	Short-term
Provide regulatory and financial incentive to promo development of a grocery store, convenience store/gas station or similar commercial uses that provide basic goods and services for the residents of the Town of Plevna.	*Planning Board* Town Council	Short-term
Review the Town of Plevna code of ordinances to determine if existing regulations are imposing a constraint on new development.	*Town Council*	Mid-term
Evaluate the interest & feasibility of the Plevna establishing zoning regulations; through an agreement with the City of Baker, the city could assume much of the administrative responsibilities.	*Planning Board* Town Council City Council	Mid-term

Objective: Establish land use compatibility policy in planned future growth areas, including policy to limit incompatible development in existing agricultural areas.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Establish future land use policy to guide decisions on rezone and future land use map amendment applications.	*Planning Board* City Council County Commission	Short-term
Enforce zoning standards to mitigate adjacent land use incompatibilities.	*Planning Board* City Council	Immediate
Establish zoning standards that address land use transitions and compatibility with existing rural residential developed properties.	*Planning Board* City Council	Mid-term
Require recordation and notification of buyers of residential properties of the proximity of agricultural land uses and operations such as harvesting, grazing of animals, etc.	*Planning Board* City Council County Commission	Short-term

Objective: Establish an annexation policy for Baker and Plevna encouraging coordination with the County.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Develop a coordinated city-county policy on the subject of annexation of developed properties addressing the transition from rural to urban services and fiscal impacts associated with the annexation.	*Planning Board* City Council County Commission	Short-term
Establish extraterritorial zoning one mile beyond Baker city limits. To implement this policy the City of Baker will need to adopt its own city subdivision regulations.	*Planning Board* City Council	Short-term
To facilitate the annexation and provision of sewer service to the Stanhope Addition subdivision, the City of Baker should consider an annexation agreement provision that would allow the existing property owners to have horses and livestock on their properties or for the long-term provide assurances to property owners with horses and livestock would be considered a legal nonconforming use that could continue so long as the use is maintained. Alternatively, the Animal Control Authority can authorize and the City Council can amend section 7.04.080(b) of the Code of Ordinances to exempt the Stanhope Addition subdivision.	*Planning Board* City Council County Commission	Short-term

Objective: Improve the physical appearance of existing neighborhoods and high visible properties to retain a clean and safe sense of place.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Enforce zoning landscaping standards and consider establishing open space requirements for development projects.	*Planning Board* City Council	Immediate and short-term
Establish a street tree/landscaping program for community gateways and selected commercial sites.	*Planning Board* City Council County Commission	Long-term
Enhance code enforcement of properties not maintained or in need of repair.	*Planning Board* City Council Town Council	Immediate
Local officials in the county, city and town need to report the identification of abandoned or derelict properties to the County Sanitarian who has the authority to conduct an investigation and make a determination if a public nuance exists. If such a determination is made the matter will be brought to municipal court.	*City Council* *Town Council* *County Commission* County Sanitarian	Immediate
Continue to amend the City of Baker zoning ordinance to promote high quality development.	*Planning Board* City Council	Short-term
Update and enforce ordinances in City of Baker and Town of Plevna.	*Planning Board* City Council Town Council	Short-term

Housing Objectives and Policies and Strategies

Objective: Increase the availability of housing choices for all people including low and fixed-income residents, senior citizens, homeless and disabled persons.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Encourage development of apartment buildings in the Town of Plevna and the City of Baker to provide more housing options for residents with fix incomes.	*EMEDA/SMART* Planning Board City Council County Commission	Short-term
The City of Baker and Fallon County should work with the owner of the Prairie Manor Apartments, the only residential complex that accepts Section 8 Housing Vouchers. Financial incentives such as tax abatement or directly monthly payments to the property owner should be considered.	*County Commission* *City Council*	Immediate
Actively pursue Montana Board of Housing (MBH) assistance in the development of housing for persons with special needs. The apartments can be owned and operated by private owners, local	*EMEDA/SMART* Council on Aging	Short-term

government or private non-profit organizations.		
Objective: Increase availability of housing in the community, with special emphasis on increasing the supply of affordable and workforce housing.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Use surplus city, county, town and school district owned land to establish public-private partnerships for developing affordable and workforce housing.	*County Commission* *City Council* *Town Council* *School Districts*	Short-term
Establish affordable housing programs with the Eastern Montana Economic Development Authority, USDA Rural Development and other organizations with sufficient financial incentives to promote and/or implement the programs.	*EMEDA/SMART* City Council	Short-term
Seek funding from the Montana Entity of Commerce annual competitive Home Program grants that can be used to construct, acquire and/or rehabilitate rental housing or develop new affordable housing for homeownership.	*EMEDA/SMART* City Council County Commission	Short-term
Create a non-profit community land trust with help from Neighbor-Works Montana to reduce costs associated with housing and to ensure future low and moderate-income families have affordable housing choices.	*EMEDA/SMART*	Mid-term
Provide regulatory and financial incentives for affordable and workforce housing development such as a density bonus for development projects that include affordable housing. Density bonuses would be based on the number of affordable units in the project and would be implemented using a sliding scale (e.g. more affordable units equals higher density).	*Planning Board* City Council County Commission	Short-term
Implement revisions to Baker's zoning ordinance to encourage residential development and redevelopment in existing neighborhoods.	*Planning Board* *City Council*	Immediate

Promote Neighbor Works-Montana housing programs which include but are not limited to home buyer assistance (including income-based loans), foreclosure intervention, home maintenance guides, purchase of mobile homes, etc.	*EMEDA/SMART* City Council Town Council	Mid-term
Allow accessory dwelling units on single-family detached properties subject to lot area, height and floor area standards to increase the supply of affordable housing.	*Planning Board* City Council	Mid-term
Implement workforce housing zoning in the county and municipalities to promote the health, safety, morals, and general welfare of the community.	*Planning Board*	Immediate

Objective: Reduce the number of substandard housing units by securing outside funding for repair and rehabilitation.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Establish a local housing rehabilitation program and seek state and federal funds to support its activities.	*EMEDA/SMART*	Short-term
Apply for Montana Entity of Commerce Community Development Block Grant funds that can be used to develop a housing assistance program.	*EMEDA/SMART*	Short-term
Seek funding from the Montana Entity of Commerce Home Program non-competitive homeowner rehabilitation funds.	*EMEDA/SMART*	Short-term

Objective: Make targeted public investments in neighborhoods to stimulate private investment.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Seek Montana Entity of Commerce Community Block Grant Program funds for public facility projects in neighborhoods.	*City Council*	Short-term
Establish a City/County grant program to fund neighborhood supported improvement projects.	*County Commission* *City Council* EMEDA/SMART	Mid-term
Utilize existing not-for-profit organizations such as Neighbor-Works Montana to promote resident owned communities (resident buy-out of mobile home communities).	*EMEDA/SMART* City Council	Long-term

Objective: Establish minimum standards for temporary worker housing.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Establish zoning and subdivision standards for the appropriate location, size, design standards, reclamation procedures and infrastructure for temporary worker housing.	*Planning Board* County Commission City Council	Immediate

Transportation Objectives and Policies and Strategies

Objective: Improve traffic safety and maintain existing streets and roads.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Formalize an adequately funded street and road maintenance program that is responsive to citizen complaints and uses criteria to prioritize street maintenance projects.	*City Council* *County Commission*	Long-term
Establish, implement and enforce load limits on streets to reduce damage to streets, truck traffic congestion and noise and visual impacts of heavy truck traffic.	*Planning Board* *City Council* *County Commission*	Short-term
Prohibit hazardous material trucking through the City of Baker.	*City Council*	Short-term
Establish access management regulations in the City of Baker zoning ordinance and the Fallon County subdivision regulations.	*Planning Board* City Council	Mid-term

Objective: Reduce disruptions to traffic circulation resulting from railroad operations.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Document the occurrence, duration and impacts of railroad operations that block rail crossings for more than fifteen minutes.	*City Clerk*	Short-term
Coordinate with railroad and MDT officials to minimize traffic circulation disruptions caused by railroad operations.	*City Council* *County Commission*	Mid-term

Objective: Identify and secure sand and gravel resources for future maintenance of county roads.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Secure long-term contracts and options for properties in the county with existing and potential sand and gravel resources.	*County Commission*	Long-term

Objective: Plan for new streets and roads in future growth areas by preserving right-of-way for street and road extensions.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Implement the Future Roadway Functional Classification map to coordinate alignment of extended or new streets and in growth areas to maximize connectivity of the street network.	*Planning Board* City Council	Immediate
Prepare specifications for new roads based on the projected overall traffic volume and truck traffic volume, including the expected weight of loads.	*City Council* *County Commission*	Mid-term
Document truck traffic impacts and coordinate with MDT and the State Legislature to establish a truck by-pass route.	*City Council* County Commission	Short-term
Establish street connectivity standards in the City of Baker zoning ordinance.	*Planning Board* City Council	Short-term

Objective: Maintain existing and future operations at the Baker Municipal Airport.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Require any entity to coordinate with the Baker Municipal Airport when proposed actions may potentially impact airport operations. Require such actions to avoid or, to the greatest extent possible, minimize impacts on airport operations.	*Baker Municipal Airport*	Short-term
Collaborate with surrounding local airports to oppose expansion of the Powder River Military Operating Airspace designation.	*Baker Municipal Airport*	Short-term
Enforce existing airport zoning regulations to protect airspace.	*County Commission*	Immediate

Infrastructure Objectives and Policies and Strategies

Objective: Maximize the functional life of existing water, sewer, storm water and solid waste facilities.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Establish a town inspection and maintenance program for sewer, water and drainage facilities and continue the City inspection and maintenance program.	*City Council* *Town Council*	Short-term
Identify strategies to comply with new Montana Entity of Environmental Quality regulations concerning discharge of effluent into water bodies. Possible strategies including enlarging a sewage treatment cell, constructing a new fourth cell or increasing irrigation of treated wastewater.	*City Council*	Immediate
Preserve natural drainage ways to reduce velocity and increase quality of storm water runoff. The drainage way should be dedicated to the public along with access and maintenance easements to allow periodic clearing of obstructions.	*County Sanitarian* County Commission City Council	Short-term
Consider enhancing the City of Baker wastewater treatment facility to enable the City to sell treated water to oil companies for fracking and establish water rates that could pay back facility costs or support a revenue bond.	*City Commission*	Long-term

Objective: Coordinate infrastructure planning with future land use policy and future growth areas.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Coordinate future infrastructure investment with future land use designations.	*City Commission* *Planning Board*	Short-term
Develop a financially feasible five-year capital improvement plan for infrastructure improvements in designated growth areas.	*City Council*	Mid-term
Create compatible development standards for streets, roads, water, and sewer in the county and municipalities.	*Planning Board* City Council Town Council	Immediate

Objective: Establish policies that clearly define financial responsibilities for infrastructure improvements associated with existing and new development.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Refine policy and regulation on infrastructure cost sharing associated with development by providing preferential terms for development that clearly promote multiple Growth Policy goals and objectives.	*Planning Board* *City Council*	Short-term
Monitor funding programs and apply for infrastructure project grant funds. Details on several grant programs that support community infrastructure projects are provided below.	*City Council* *Town Council*	Immediate

Montana Entity of Environmental Quality, Water Pollution Control State Revolving Fund Loan Program
The Montana Legislature established the Water Pollution Control State Revolving Fund (WPCSRF) Loan Program for water pollution control projects. The program provides at or below market interest rate loans to eligible Montana entities. Cooperatively, DEQ and DNRC administer the Water Pollution Control State Revolving Fund Loan Program.

Eligible water quality projects include wastewater treatment plant improvements, interceptors, collectors and lift stations, lagoon construction and rehabilitation, engineering and project inspection, and land used for disposal purposes. All projects must be included in a project priority list and intended use plan for the fiscal year in which funding is anticipated, and the ability to repay loan funding must be demonstrated.

Eligible applicants are municipalities for wastewater projects as well as municipalities and private entities for nonpoint source projects.

The current interest rate for loans is 3.75 percent with payment schedules not to exceed 20 years. Water Pollution Control projects qualifying as disadvantaged may extend term up to 30 years.

The application process begins in June, but applications are accepted year-round. Preliminary engineering analysis must be reviewed prior to submittal of application.

Contact Information:
Paul LaVigne, 406 444 5321, plawvigne@mt.gov

Montana Entity of Environmental Quality, Drinking Water State Revolving Fund Loan Program
The Montana Legislature established the Drinking Water State Revolving Fund (DWSRF) Loan Program for Drinking Water projects. The program provides at or below market interest rate loans to eligible Montana entities. The Department of Environmental Quality (DEQ) is the administering agency and assures the technical, financial and programmatic requirements of the program are met.

Eligible water projects include acquisition of land that is integral to the project, consolidating water supplies, engineering, new sources, treatment, source water protection, storage and distribution.

Eligible applicants are municipalities, public or private community water systems and non-profit non-community water systems.

The current interest rate for loans is 3.75 percent with payment schedules not to exceed 20 years. Drinking Water Projects qualifying as disadvantaged may extend term up to 30 years.

The application process begins in June, but applications are accepted year-round. Preliminary engineering analysis must be reviewed prior to submittal of application.

Contact Information:
Mark Smith, 406 444 5325, msmith@mt.gov

Montana Entity of Commerce, Community Development Block Grant Public Facilities Grant
This program provides funding for basic community infrastructure improvements including drinking water and wastewater facilities affordable to low and moderate income families.

Eligible applicants are incorporated cities and towns and consolidated city-county governments. A 50 percent match is required for this funding program. The application deadline occurs annually in March. For the fiscal year 2012, the deadline has been extended to September 14, 2012.

Contact Information:
Maria Jackson, 406 841 2550, DOCCDBG@mt.gov

Montana Entity of Commerce, Treasure State Endowment Program Preliminary Engineering Grants
The Treasure State Endowment Program (TSEP) awards matching grants to local governments for construction of local infrastructure projects. TSEP construction grants provide help in financing infrastructure projects throughout Montana. This grant program provides matching grants for preliminary engineering work.

Eligible activities include preparation of plans, studies, analyses or research required to complete a preliminary engineering report.

Eligible applicants include incorporated cities and towns, counties, consolidated governments, Tribal governments and county or multi-county water, sewer or solid waste districts.

A dollar-for-dollar match is required. Other state grant funds may not be used towards the required match.

The maximum award attainable through this program is $15,000. Applications are due the first week of May on even numbered years.

Contact Information:
Richard Knatterud, 406 841 2784, rknatterud@mt.gov

Montana Entity of Commerce, Treasure State Endowment Program Construction Grants
The Treasure State Endowment Program (TSEP) awards matching grants to local governments for construction of local infrastructure projects. TSEP construction grants provide help in financing infrastructure projects throughout Montana.

Eligible applicants include incorporated cities and towns, counties, consolidated governments, Tribal governments and county or multi-county water, sewer or solid waste districts.

A dollar-for-dollar match is required, but in cases of extreme financial hardship where the public's health and safety are seriously affected, grants up to 75 percent of the project costs may be awarded. Matching funds can be public or private funds. Construction grant applications are limited to a maximum of $750,000. Applications are due the first week of May on even numbered years.

Contact Information:
Becky Anseth, 406 841 2786, banseth@mt.gov

US Entity of Agriculture, Water and Environmental Loan and Grant Program
Water and Environmental Programs (WEP) provides loans and grants for drinking water, sanitary sewer, solid waste and storm drainage facility projects in rural areas and cities and towns of 10,000 or less. WEP also makes grants to nonprofit organizations to provide technical assistance and training to assist rural communities with their water, wastewater and solid waste problems. Eligible projects include construction, repair and expansion of water, wastewater, storm water and solid waste systems.

Public bodies, non-profit organizations and recognized Indian Tribes are all eligible applicants for the program. This funding opportunity is capped at 75 percent of total project costs. Applications are accepted on a continual basis.

Contact Information:
Steven P. Troendle, 406 585 2520, steve.troendle@mt.usda.gov

Economic Development Administration, Public Works Grant Program
The Economic Development Administration (EDA) provides public works investments to support construction or rehabilitation of essential public infrastructure and facilities to help communities and regions leverage their resources and strengths to create new and better jobs, drive innovation, become centers of competition in the global economy and ensure resilient economies. Eligible projects are those pertaining to water and wastewater systems that address national strategic priorities, assist economically distressed and underserved communities, demonstrate a good return on EDA's investment through job

creation or retention, demonstrate or support regional collaboration and employ public-private partnerships to use both public and private resources and/or leverage complementary investments.

Eligible applicants include municipalities, counties and Indian Tribes. The maximum award attainable is 75 percent of project cost. The next deadline for this application is June 10, 2012.

Contact Information:
John Rogers, 406 449 5380, jrogers@eda.doc.gov

US Entity of Interior, Water Smart Grant Program System Optimization Review Grant
The Water SMART Program focuses on improving water conservation, sustainability and helping water resource managers make sound decisions about water use. It identifies strategies to ensure present and future generations will have sufficient supplies of clean water for drinking, economic activities, recreation and ecosystem health. The program also identifies adaptive measures to address climate change and its impact on future water demands.
Eligible projects include any plan of action that focuses on improving efficiency and operations on a regional or basin perspective. Eligible applicants include state, Indian Tribe, irrigation district, water district or other organization with water or power delivery authority.

A 50 percent match is required for this funding opportunity and the maximum award attainable is $300,000. The next projected deadline is April 2013, but has not been officially announced.

Contact Information:
Dean Marrone, 303 445 3577, dmarrone@.usbr.gov

Objective: Establish policies that clearly define financial responsibilities for infrastructure improvements associated with existing and new development.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Extend sewer service to existing developments adjacent to the City of Baker that are on septic systems and are failing to adequately treat wastewater. It is preferred such areas be annexed into the city. If the property owners oppose annexation, establish a sewer improvement district to service the areas.	*City Council*	Short-term

Economic Development Objectives and Policies and Strategies

Objective: Develop economic development strategies that create a diverse local economy with employment opportunities for all ages.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Develop a marketing brand for Fallon County, Baker and Plevna to market to potential businesses and future residents.	*EMEDA/SMART*	Short-term
Increase the supply of housing to address the growing problem of public and private sector employee recruitment and retention.	*EMEDA/SMART*	Short-term
Survey existing businesses to identify needed skill sets and to identify ways the County or City can provide assistance to improve business operations and productivity.	*EMEDA/SMART*	Mid-term
Establish a one-stop service center that distributes information about available regional, state and federal technical assistance, loans and grant programs for expanding and start-up businesses.	*EMEDA/SMART* City Council County Commission	Short-term
Acquire an existing commercial building or construct a new facility to serve as a business incubator.	*EMEDA/SMART*	Long-term
Refine existing economic development strategies to target under-represented industries with forecasted high-demand for jobs.	*EMEDA/SMART*	Mid-term
Capitalize on energy-sector growth and expand businesses to support primary energy industries.	*County Commission* *City Council*	Mid-term
Seek state and federal funds to increase telecommunications infrastructure in the community (specifically bandwidth) to increase efficiency of businesses, enhance the technology courses offered at the city high school and attract new businesses that require high-capacity telecommunications infrastructure.	*EMEDA/SMART* City Council EPEDC	Short-term
Support start-up businesses by providing technical assistance and temporary financial assistance such as low-interest guaranteed loans.	*EMEDA/SMART* EPEDC	Short-term

Establish a limited-term property tax abatement program for new businesses.	*City Council* *County Commission*	Short-term

Objective: Enhance the community's quality of life as a way to stimulate private investment.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Develop a main street grant program to fund façade and other property improvements to enhance visual aspects of downtown Baker.	*EMEDA/SMART*	Short-term
Establish a business improvement district or special district to fund streetscape improvements in downtown Baker.	*EMEDA/SMART* City Council	Mid-term
Promote the use of the SMART revolving loan fund that is intended to provide gap lending for business development. The fund has not been used since it was established in 2006.	*EMEDA/SMART*	Immediate
Enhance the quality of life in Plevna by encouraging development of commercial uses such as a grocery and retail and convenience stores, and enhancing recreational and cultural opportunities.	*Town Council*	Short-term
Promote more downtown special events by the Chamber of Commerce and other civic organizations to increase business activity and enhance the community's quality of life.	*EMEDA/SMART*	Mid-term

Objective: Maximize the use of outside economic development funding opportunities.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Take maximum advantage of existing economic development technical assistance and loan and grant programs offered by USDA Rural Development, the Montana Community Development Corporation, the Eastern Montana Economic Development Authority and other regional, state and federal agencies. Details on two grant programs that facilitate community economic development efforts are provided below:	*EMEDA/SMART* City Council County Commission	Short-term

Community Development Block Grant Program

Each year the US Entity of Housing and Urban Development (HUD) allocates grant funding to the Montana Entity of Commerce for the Community Development Block Grant (CDBG) program. Funds are intended to benefit low or moderate income persons, aid in prevention or elimination of slums or meet urgent community development needs. CDBG is broken into five different funding categories: Planning, Public Facilities, Housing and Neighborhood Renewal, Neighborhood Stabilization Program and Economic Development.

Eligible applicants include counties, incorporated cities and towns, and consolidated city-county governments. Deadlines are staggered throughout the year and the grant program reoccurs annually.

Contact Information:

Gus Byrom, 406 841 2777, gbyrom@mt.gov

Montana Entity of Commerce, Montana Main Street Program

The mission of the Montana Entity of Commerce's Main Street program is to be a coordinating resource for communities seeking to revitalize their historic downtown commercial districts and to provide technical assistance to communities of all sizes. The underlying premise of the Montana Main Street Program is to encourage economic development within the context of historic preservation. In 2011, the project began being geared toward community development. The Montana Main Street Program was awarded a Preserve America sub grant from the Montana State Historic Preservation Office (SHPO) in 2011. The purpose of the grant was to focus downtown planning and build capacity under the Main Street program. It was this sub grant that geared the program toward community development. It has not been disclosed if the same will occur in 2012.

The deadline for the second quarter of this grant cycle is June 30, 2012.

Contact Information:
Julie Burk, 406 841 2756, jburk@mt.gov

Objective: Ensure existing job training services provide skills needed by existing and targeted businesses.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Modify existing job training programs to be responsive to employment trends, specifically forecasted high-demand occupations.	*EMEDA/SMART*	Long-term
Promote establishment of a college satellite facility or a trade school or nursing programs in the City of Baker and remote learning programs to reduce transportation costs for college students and increase the number of college-aged students who remain in the community.	*City Council* *County Commission* EMEDA/SMART EPEDC	Short-term
The Baker and Plevna School Districts should expand the number of high school courses that offer college credits and enter into Articulation Agreements with nearby colleges to receive formal acknowledgement of the course credentials.	*School Districts*	Short-term

Objective: Support development of agriculture in the community.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Support specialized agricultural businesses that produce high-value, high-demand products.	*MSU Extension*	Mid-term
Encourage continued and expanded use of state and federal land for agricultural purposes.	*County Commission*	Immediate
Promote community gardening programs in the county to encourage local residents to plant more local produce and create/expand farmer markets in Baker.	*MSU Extension*	Short-term

Objective: Develop a TIF district to create economic incentives and spur growth in downtown Baker.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Create TIF district with reasonable boundaries.	City Council EMEDA/SMART	Short-term
Complete Determination of Blight study for selected district.	City Council Planning Commission EMEDA/SMART	Short-term
Work with City of Baker, SMART and other entities to establish who will be responsible for managing various aspects of the TIF district.	City Council Planning Commission EMEDA/SMART	Short-term
Create an Urban Renewal Plan in accordance with MCA conditions addressing blight.	Planning Commission	Mid-term
Hold public hearing, adopt plan and receive certification by the Montana Department of Revenue.	City Council Montana Dept of Revenue	Mid-term
Determine taxable value of the district and calculate tax increment. Develop financing strategy for tax increment funds.	City Council EMEDA/SMART	Mid-term
Utilize tax increment funds to implement improvements in district.	City Council Planning Commission EMEDA/SMART	Long-term

Public Facilities and Services Objectives and Policies and Strategies

Objective: Maintain acceptable levels of service in developed areas as the City of Baker and Town of Plevna grow.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Establish policies that set minimum levels of service for essential services such as schools, fire, police, water and sewer.	*City Council* *School Districts*	Mid-term
If the population of the county and city increases significantly, provide 24-hour city police Entity and county sheriff Entity patrol coverage.	*City Council* *County Commission*	Mid-term

Objective: Improve effectiveness and efficiency of government programs and services.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Encourage continued and expanded joint-use of public facilities to provide cost effective local services.	*County Commission* *City Council* *Town Council*	Short-term
Coordinate County, City and Town services, and share facilities/equipment to increase efficiency of providing local services.	*County Commission* *City Council* *Town Council*	Short-term
Examine feasibility and cost savings associated with consolidating City, Town and County services.	*County Commission* *City Council* *Town Council*	Short-term
Evaluate feasibility and cost savings associated with the county purchase of gravel crushing equipment.	*County Commission*	Mid-term
Require the county mechanics to assume responsibility of maintaining and repairing county sheriff Entity patrol vehicles. Currently, patrol vehicles are maintained by sheriff deputies and repairs are provided by commercial venders. This strategy would reduce maintenance/repair costs and free up sheriff deputy's time for patrol and other public safety duties.	*County Commission*	Immediate
Require the property owner to pay for the construction or installation of culverts and aprons within the public easement when an encroachment permit is issued.	*County Commission*	Short-term
Evaluate effectiveness of the existing differentiated water rates measured by per capita water consumption.	*City Clerk* City Council	Short-term
Evaluate short and long-term cost effectiveness of establishing a curbside recycling program/service.	*City Council* *County Commission*	Long-term

Objective: Provide responsive public services that improve the health, welfare and safety of County residents.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Create a brochure or marketing materials to increase the number of volunteer firefighters and ambulance service first responders and emergency medical technicians.	*Emergency Services Coordinator*	Short-term

To address the severe shortage of ambulance service volunteers, consider the following strategies: • Provide volunteers a stipend for on-call duty. • Hire an ambulance service director to assume administrative, coordination of training and other duties that are currently being done by volunteers. • Recruit a certified lead instructor so all required volunteer training could be conducted locally. This strategy would require development of a state-approved training course. The textbook portion of the course could be offered online to increase convenience. • Establish a county EMS Entity with paid staff to replace the volunteer service. • Compare ambulance fees with other comparably sized communities, a justified increase in fees could help fund any other above strategies.	*Emergency Management Coordinator* County Commission City Council	Short-term
Provide funding to resolve the unmet high demand for home health services and to provide hospice care in the county while ensuring facilities at the regional hospital remain in good working condition.	*Council on Aging* County Commission	Short-term
Facilitate expansion of the existing assisted living facility to address the unmet high demand for this housing option for senior citizens.	*County Commission*	Mid-term
Expand the county-owned nursing home facility to address the unmet high demand for this housing option for senior citizens.	*County Commission*	Mid-term
Establish a back-up Emergency Operations Center (EOC) facility that would be used during a declared emergency in the event the EOC in the courthouse is damaged or destroyed.	*Emergency Management Coordinator* County Commission	Short-term
Prepare new marketing strategies and outreach efforts to identify special need populations in the community.	*Emergency Management Coordinator*	Short-term
Provide time and a half overtime compensation to promote the retention of sheriff deputies.	*County Commission*	Mid-term

To promote the retention of city police officers (the average length of employment is three years), improve the compensation package for city police officers.	*City Council*	Mid-term
Support the establishment of a well-care home visit program that would provide check-in and socialization services for seniors who are isolated in their homes.	*Council on Aging* County Commission	Short-term
Expand the existing public safety facility shared by the city police department and the county sheriff department to provide additional office space, an evidence room and interview room.	*County Commission* *City Council*	Mid-term
Support expansion of the Fallon County Council of Aging transportation program to provide a greater level of service for out-of-town medical visits and support the agency's grant application to replace an existing old bus.	*Council on Aging* County Commission	Mid-term
Provide a closed room in the Fallon County Library to reduce disruptions to patrons from the Story Time and Books and Babies programs.	*Fallon County Library* County Commission	Short-term

Objective: Enhance public involvement and timely/accurate notification of City, Town and County projects.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Encourage public participation in decisions on public projects and services.	*County Commission* *City Council* *Town Council*	Immediate
Utilize citizen task forces to research and evaluate the feasibility of new or expanded programs and community enhancement projects.	*County Commission* *City Council* *Town Council*	Short-term

Recreation Objectives and Policies and Strategies

Objective: Identify unmet recreational and cultural needs of Fallon County residents of all ages, including youth, and provide solutions to meet needs.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Institute a Baker Parks and Recreation bi-annual community survey to assess recreational needs.	*Parks Director*	Short-term
Develop a small neighborhood park on the north side of the City of Baker; the area north of the railroad tracks has no park for residents in the area.	*Parks Director* City Commission	Mid-term
Institute a procedure requiring the parks director to attend pre-application meetings on residential subdivisions to provide comment on the location and design of required parks and fee in lieu of park dedication.	*Parks Director* Planning Board	Short-term
Confirm community support for the following new recreational amenities that can be located at existing parks, evaluate the feasibility and costs of the amenities and program funding for the amenities. • A splash park • A skateboarding facility • Paving the ice rink for roller skating/hockey	*Parks Director* City Council	Short-term

Objective: Maintain and enhance existing parks and recreational facilities.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Formalize maintenance programs for City and County parks to enhance the aesthetic qualities of the open space and upkeep of recreational facilities.	*Parks Director*	Short-term
Establish a multi-use community center in Baker that can accommodate all recreational program needs and serve as a community gathering place for leisure activities.	*Recreation Department* City Council County Commission	Mid-term
Expand the recreation center facility to meet the high demand for the facility, provide a central location for the numerous successful recreational programs offered by the City of Baker Recreation Entity, add new recreational facilities such as an indoor track, provide needed office and storage space and provide a more convenient location for	*Baker School District* *City Council* *County Commission* Recreation Department	Mid-term

restrooms.		
Establish a budget for the recreation center to pay for routine operating expenses. Having an operating budget will eliminate the administrative costs associated with submitting and processing funding requests to the Baker School District.	*Baker School District* *City Council* *County Commission*	Immediate
Create a database of potential grants that could be used to fund new playground and recreational equipment at county and city parks and at the Plevna school playground.	*Recreation Department*	Short-term
Continue implementing recommendations from the 1991 Fallon County and City of Baker Park Master Plan, which includes Baker Lake and recreation paths.	*Recreation Department*	Mid-Term

Objective: Maintain and enhance the water quality of Baker Lake and its shoreline.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Continue the aeration of lower Baker Lake that has successfully reduced the PH of the lake water to acceptable levels.	*County Sanitarian* County Commission	Short-term
Create standards so all storm water is adequately treated prior to discharge into Baker Lake.	*County Sanitarian* City Council County Commission	Short-term
Enhance shoreline vegetation and wetlands adjacent to Lake Baker.	*County Commission* *City Council*	Mid-term
Control weed and algae growth in Baker Lake in a manner that will destroy aquatic life.	*County Commission* *City Council*	Short-term
Include in the Baker Parks and Recreation Department bi-annual community survey questions related to recreational needs associated with Baker Lake.	*Recreation Department*	Short-term
Periodically stock Baker Lake with game fish.	*County Commission*	Long-term
Ensure zoning and future uses abutting lake property are compatible with recreation uses.	*Planning Board*	Short-Term
Utilize all available resources to remove restrictions from Baker Lake and make the lake a viable recreation amenity.	*County Sanitarian* County Commission	Mid-Term

Natural Resources Objectives and Policies and Strategies

Objective: Improve the quality of all water resources in the county and ensure construction activities implement measures to protect water quality and minimize erosion.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Amend the subdivision ordinance to establish best management practices for erosion and sedimentation control for construction projects.	*Planning Board* County Sanitarian	Short-term
Establish setback and buffer standards to preserve native vegetation along streams and rivers.	*Planning Board*	Short-term
Create standards so all storm water is adequately treated prior to discharge into Baker Lake.	*Planning Board* County Sanitarian	Short-term
Enhance shoreline vegetation and wetlands adjacent to Lake Baker.	*County Commission* *City Council*	Mid-term
Continue the aeration of lower Baker Lake that has successfully reduced the PH of the lake water to acceptable levels.	*County Sanitarian* County Commission	Immediate

Objective: Effectively control weed populations to improve agricultural productivity, preserve native vegetation and reduce wildfire risks and soil erosion.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Adequately fund the county weed control program and coordinate with the Montana Entity of Transportation to improve weed control along state highways.	*County Weed Control Department* County Commission	Short-term
Improve communication with 1) local pipeline companies to increase compliance with the Montana County Noxious Weed Control Act requirement to prepare and submit a weed management plan to the county and 2) property owners where pipelines are installed to encourage them to contact the county weed supervisor when a noxious weed infestation occurs as a result of pipeline work.	*County Weed Control Department*	Short-term
Amend the Fallon County Noxious Weed Management Plan to make the non-compliance provisions of the plan consistent with Entity of Agriculture regulations.	*County Commission* County Weed Control Department	Immediate
Objective: Enhance the community's ability to suppress wildfires from spreading to urban areas.		
Policies and Strategies	**Responsible Entity**	**Time Frame**

Maintain access routes to fringe areas surrounding the City of Baker and the Town of Plevna and ensure there is adequate equipment and water supply to suppress wildfires adjacent to the two urban areas.	*Fire Districts* County Commission City Council	Immediate
Increase fire prevention education, including training on creating defensible space around structures.	*Emergency Management Coordinator* Fire Districts	Short-term

Objective: Encourage and facilitate cleanup of environmental contaminated sites in the county.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Create or obtain a database of potential contaminated sites in the county.	*County Sanitarian*	Short-term
Collaborate with property owners, Montana Entity of Environmental Quality and other local agencies to identify brownfield sites and seek state and federal funding and establish local incentives to facilitate cleanup and redevelopment of brownfield sites.	*County Commission* *City Council* *Town Council*	Long-term

Intergovernmental Coordination Objectives and Policies and Strategies

Objective: Increase collaboration between Fallon County, the City of Baker and Town of Plevna on matters of mutual interest and maintain open lines of communications to effectively manage conflict when disagreements arise.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Establish quarterly joint City Commission, Town Council and County Commission meetings to enhance working relationships, share information and identify issues that can be addressed in a collaborative manner.	*County Commission* *City Council* *Town Council*	Immediate
Identify collaborative measures that will enhance the level of local services such as joint-use facilities and the sharing of staff and equipment.	*County Commission* *City Council*	Short-term
Establish shared policy to facilitate coordinated and well-planned annexations.	*Planning Board* County Commission City Council	Short-term
Have Fallon County, the City of Baker and the Baker School District enter into an agreement that addresses 1) establishment of an operating budget for the recreation center, 2) the funding for an expansion of the recreation center and 3) the shared use of the recreation center.	*Baker School District* *County Commission* *City Council*	Short-term
Continue with joint agreements between the County and Baker regarding shared office space at the courthouse as well as the airport.	*County Commission* *City Council*	Immediate
Share responsibility between governments to maintain and enhance community appearance.	*County Commission* *City Council* *Town Council*	Short-term
Fallon County and the City of Baker should work together to incorporate extraterritorial zoning to assist with streamlining annexations	*Planning Board* City Council	Immediate
Implement annexation plans for the City of Baker and Town of Plevna that include development standards.	*Planning Board* City Council Town Council	Immediate

Objective: Proactively inform with regional, state and federal agencies and the State Legislature funding needs that arise as a result of growth pressures.		
Policies and Strategies	**Responsible Entity**	**Time Frame**
Assign community representatives to regularly attend selected regional, state and federal board or leadership meetings.	*County Commission* *City Council*	Short-term
Extensively document community impacts and needs to support funding requests.	*City Council* *Town Council* *County Commission*	Immediate
Support lobbying efforts to repeal or revise Senate Bill 329 that was enacted in the 2011 legislative session. The new law placed a cap on the amount of oil and natural gas production tax revenue that is disbursed from the state to local school districts. The cap is 130 percent of the calculated maximum school district budget. Both the Plevna and Baker School District have exceeded the cap for the current fiscal year and will receive no fourth quarter oil and natural gas production revenue from the state. The Baker School District expects to lose $3.9 million in oil and natural gas production tax revenue during the next school year.	*School Districts* County Commission City Council Town Council	Immediate
Modify the emergency mutual aid agreements so that the agreements do not need to be renewed with any changes in the membership of the Board of County Commissioners.	*Emergency Management Coordinator*	Short-term
Collaborate with local airports and County/City governments in eastern Montana and western North Dakota to reduce effects of expanding the Powder River Military Operating Airspace designation. Specific items include drafting letters to state and federal senators and congressional representatives.	*Baker Municipal Airport* County Commission City Council	Immediate

Appendix A: Community Stakeholder Interviews

Angie Rabbit (City Recreation Department) and Jennifer Fisher (City of Baker Recreation Center Director)

Services, Programs and Facilities

Angie is a city employee and the county pays one-half of her salary. Jennifer is a Baker School District employee. The recreation center is a school district facility and the facility's primary emphasis is to provide recreational programs to students. The facility is also used for recreation department programs and is open to the public, but in both cases these users are accommodated after school district needs are met. Jennifer runs swimming programs. From 6:00 to 7:00 am the pool is open to the public; adult swim hours are 10:00 am to 7:00 pm and hours for children are from 7:00 to 8:30 pm. The entire pool was recently resurfaced at a cost of $500,000. The facility has a weight room, cardio/fitness room, 25-meter swimming pool and three racquetball courts.

The following are fees for the recreation center: $2 per visit, $5 per visit for racquetball, quarterly membership is $40 for all facilities, annual membership is $70 for all facilities. The fees pay for recreational equipment.

The recreation center does not have a budget. All expenses need to be approved by the school district administration.

The only county parks include Triangle Park, Iron Horse Park and Mangold Field, all of which are adjacent to Baker Lake.

The following are programs offered by recreation department:

After School: at the Lincoln School Gym and one multi-purpose room and the school playground - youth volleyball, other ball sports and dance. This is a top priority program with very high demand. It is offered Monday through Wednesday until 5:00 pm. The cost is $2.50 per day. The after school program has four staff and three fitness instructors, all of which are city employees with one-half of their salaries paid by the county.

There is a $20 fee for each of the following additional recreational programs. They are eight-hour programs so the cost is $2.50 per hour.

- Pre-school crafts at the courthouse
- Adult fitness at the recreation center
- City league basketball and adult volleyball at the high school gym
- Fitness programs at the Fairgrounds Exhibition Hall

- Spring track program at the high school track
- Flag football program at the Lincoln school field
- Pre-school sports time at the recreation center, offering sports sampler and pre-school tumbling
- K-6 Dance Recital at the high school gym
- Youth Soccer and Babe Ruth baseball at the city ball field at Coldwell Park
- Little League and T-ball at the county Mangold softball complex
- Youth basketball tournaments at the high school and Longfellow School gyms
- Adult Education (painting, computer education, etc.) at the high school

Community events include:

- Touch a Truck program at McLain Park
- Fallon County Day (4th of July) at the county Triangle Park
- Youth Rodeo Play Day at the county fairgrounds
- Parade of Lights in the downtown (parade and floats) in December
- Relay for Life (cancer awareness event) sponsored by volunteers

Recreation Issues

There is a need for more space at the recreation center. The very high demand for recreational programs causes logistic difficulties for finding space for the programs. An expanded recreation center would provide a central local for the majority of the recreational programs and enhance coordination. It would provide much needed storage and office space and a more convenient location for the restrooms. An indoor tract and more room for cardio/weight training could be provided as well as an indoor lap track.

The new gym and auditorium at Longfellow School is a needed improvement. However, it is physically removed from the recreation center and is still controlled by the school district (school needs will be the priority, just like at the recreation center).

Recommend establishing a budget for the recreation center to simplify the process for expenditures and provide a greater level of operational independence. One mechanism to establish the recreation center budget is through an agreement between the school district, the city and the county.

Arlene Singer (Fallon County Health Department)

Mission and Services Provided

The Fallon County Health Department promotes health and wellness to clients in the county. Services include immunizations, family planning, WIC, health screening, blood pressure testing, aging services (home visits, medication set-up, bathing assistance, foot-care clinics), equipment loan, assistance to schools with kindergarten round-up/preschool screening and athletic pre-physicals along with other health issues and Public Health Emergency Preparedness. There is no charge for services. Health

insurance companies are billed for immunizations and family planning services. If a prescription is needed, the client will be referred to a physician. Home visits are provided only to Fallon County residents. The Health Department has clients from outside the county, the typical service is immunization.

Table A.1: Health Department Patient Visits **Fiscal Year**	**Unduplicated Clients**	**Visits**
2006-2007	1,121	2,960
2007-2008	1,133	2,860
2008-2009	1,082	2,719
2009-2010	1,067	2,437
2010-2011	879	2,089

Note: These figures do not include home visits or large group services (flu clinics, athletic physicals, etc.)

Facility, Staffing and Funding

The existing facility houses the Health Department and one office for Eastern Montana Mental Health. The facility is new and located at the county-owned Medical Clinic complex which also includes apartments for the aged and a nursing home. The Health Department facility includes five offices and two examination rooms. Health Department staff includes two RNs, one administrative assistant and one emergency preparedness coordinator. A mental health counselor visits the community twice a week and a drug and alcohol counselor visits once a week.

Funding sources for the Health Department include Fallon County, federal grants including WIC, Maternal Child Healthcare Grant (for woman under the age of 40 and infants and children to the age of 21), Immunization action program, emergency preparedness and vaccines for children. Our home visiting nurse's wages and mileage are paid through the Council of Aging.

The Healthy Montana Kids program, which provides health insurance funded by the tobacco settlement, provides services to households with incomes below the 250 percent of the poverty level. This program has helped to reduce the Health Department client load.

Healthcare Issues

It is very difficult to recruit nursing staff.

People need to go outside the community to receive specialized care (e.g. pediatric care, set a broken bone, deliver a baby and any surgery. People typically go to Miles City for these services. An OB/GYN visits the medical clinic for pre-natal and post-natal care.

There is a long waiting list for assisted living and nursing home. The assisted living facility is privately owned and operated. The nursing home property and facility are owned by the county but privately operated.

There is a lack of home health services (top issue). This service was previously provided by the medical clinic, but since the change in Medicare reimbursement rates the medical clinic provides very limited home health services. The Health Department tries to fulfill the service shortages.

There is no hospice care in the county.

Bobby Weidmer (Fallon County Road Foreman)

Staffing, Equipment and Resources

The county road department has a crew of 14 workers that provide year round service. The department has excellent equipment; there are no needs for equipment and storage. There is approximately 900 miles of county roads including public easements. Very few of the roads are paved and are maintained with chip and seal. The vast majority of county roads are gravel or scoria (red clay-like material). Scoria is only used for low volume roads. Obtaining good gravel is becoming increasingly difficult. All of the gravel sources are in the county. There are three existing gravel pits and four existing scoria pits. Land for the pits is leased by the county, permitted by the county and subject to DEQ review. The cost of gravel has increased significantly in recent years. It previously cost $0.40 per yard, and is now $1.00 per yard. The county buys gravel in bulk, 100,000 cubic yards at a time. A private company crushes the gravel and scoria and it is then stockpiled at the pit. The department utilizes a state bulk tank of calcium chloride, an alternative to salt and sand, and applies it on county roads during winter storm events. The department has very good snow removal equipment: three snow plow trucks and six blades for snow plowing. Other department equipment includes six belly dump trucks, three end dump trucks and one large scraper and two crawlers.

There are mutual aid agreements between the county and Baker and Plevna to respond to emergency situations. The department has no formal road maintenance program. Roads with heavy traffic are maintained more frequently and the remaining roads are maintained based on their conditions. The county does not build roads; the roads are built by the owner. If the new road is accepted by the county the road department will maintain it. An encroachment permit, approved by the County Commission, is required to for any access contention to the county road. Bobby will provide specifications for culverts. If the culvert and apron is located with the public easement the road department will install the improvements at no cost.

Road Maintenance Issues

A top priority of the department is to maintain access to the hospital and the route from the hospital to the airport.

As pipeline and oil well development increases county roads will deteriorate faster, adding costs and deferring maintenance of other roads. The county has an agreement regarding the Keystone Pipeline where the company will pay a fixed amount of money per mile of county road, which is then used to pay for road maintenance.

Possible Strategies

The preparation of specifications for new roads (the county has no specifications) based on the projected overall traffic volume and project truck traffic and the weight of loads.

Require the owner to pay for construction/installation of culverts and aprons in the public easement.

Evaluate the feasibility and cost saving associated with the county purchasing gravel crushing equipment.

Carla Brown (Coordinator of Fallon County Council on Aging)

Services/Programs Offered

Congregate and home delivered meals, transportation program, skilled nursing program, health screening, homemaker program, respite care program, food commodity program, senior centers and Baker Community Cupboard.

Glendive Action for Eastern Montana Area Agency on Aging has a 17-county jurisdiction including Fallon County. They administer state and federal funds and distribute funding to the Fallon County based on service records.

Congregate meals – contracted through Fallon Medical Complex, Monday through Saturday in the complex dining room. A donation of $4/meal is suggested. Meals are for those over age 60. An average of 475 meals is served per month. No activities after meals.

Home delivered meals – 200 meals per month, delivered with their bus Monday through Saturday. A donation of $4/month is suggested. Fallon Medical Complex is contracted to make the meals.

Transportation – busing program Monday through Saturday, 8:00-4:00 pm. Two out-of-town trips each month, one to Miles City and one to Dickinson. Miles City trips are primarily medical; Dickinson trips are primarily social (shopping, having lunch). Open to all ages, considered public transportation. In-town transportation, call driver on cell phone to be picked up and request of $1 donation for persons over 60 years and $1 fee for persons under 60 years old. Small bus, seats 13 passengers, is wheelchair accessible. Average of 700 rides per month (one ride is when person gets off bus).

Skilled nursing – provided Monday through Friday. A registered nurse provides home visits for medical needs such as medication management, bathing, fulfilling a doctor's order, blood pressure diabetes management, etc. Normally visit a client once a week. More needs than can be met, limited stay when visiting. Need for personal care service. Skilled nurse is from the public health office.

Health Screening – blood pressure (twice per month) and foot care (once per month) at the Baker or Plevna senior center. Donation suggested. Skilled nurse does this work.

Homemaker – Monday through Friday and go into home for two hours once a week. Light housekeeping chores are done to enable person to stay in home longer. For clients more than 60 years old, and donations are suggested. There are two part-time homemakers who do house cleaning and run errands.

Respite care – not used often. The person needing care is brought to the Fallon Medical Complex (contracted service) into adult day care facility or nursing home for a day or two.

Food pantry Baker Community Cupboard is 100 percent community funded (food donated by members of the community. There is no eligibility requirement. Adequate supply of food is donated and generous amounts of food are provided. Participation varies between 7-10 families per month.

Food Commodity Program is for clients more than 60 years old and an income below 130 percent of the poverty rate. Thirty-pound boxes of groceries are provided at no cost. Currently serves 24 clients per month, previously served 36, but more of the older population is moving into nursing homes.

Senior Centers. Baker Senior Center is open 8:00 am to 5:00 pm Monday through Friday with senior organized activities at other times. Social activities, exercise program offered daily. Plevna Senior Center is open 9:00 to 11:00 am Monday through Friday offering social activities. Membership not required, but seniors are encouraged to pay annual membership fee of $10 per year. Baker – 45 paid members this year. Plevna – has about the same level of membership, it is a more tight-knit community. For the last nine months, 248 different people visited both senior centers (41 in Plevna, 207 in Baker).

Staffing, Facilities and Equipment

Staff includes a coordinator (Carla), an associate/assistant to Carla, one full-time bus driver, and 2-3 part-time bus drivers. Current staffing level is adequate.

The office is in the Baker Senior Center and it adequately meets the needs of staff and programs.

There is one older vehicle requiring replacement. Need to apply for grant, state pays 80 percent, local source (county commission) pays 20 percent of cost for vehicle. County needs to sign grant application.

Would like to have their own bus garage preferably closer to the Baker Senior Center. Currently the buses are parked in the county shop. The buses could be kept cleaner if they were not parked in the county shop. The county shop provides free maintenance service for the buses, the council pays for the parts.

Service and Program Issues

There is a need to expand medical transportation services because there is an unmet demand for out-of-town medical visits for specialized health services not offered in Baker. The only additional cost would be increased labor cost for the bus driver.

There is an unmet need for well-care visits to seniors who are isolated in their homes – check in visits and socialization.

Carla does social work in office including assistance with payment of bills, preparation of applications for various programs, etc.

Legal Assistance – contracted with local attorney for providing fixed amount ($500) of service each year. Rarely is the full $500 spent.

Chuck Lee (Fallon County 911 and Emergency Services Coordinator)

Services, Staffing and Planning Documents

Chuck has 11 years of experience in the areas of planning, dispatch, emergency services and economic development. He is the one county employee responsible for 911 and emergency services. The 911 Center provides dispatch service for approximately 8,000 square miles for Fallon, Carter, Wibaux and Prairie County. The center has four full-time and three part-time county employed dispatchers. The existing 911 system uses copper lines for analog data. The Next Generation of 911 (within a 10-year time frame) will be in a digital format that will have texting capabilities. A 5-year Pre-Disaster Mitigation Plan was recently submitted for review. The Emergency Operations Plan was updated last year and includes the City of Baker and Town of Plevna. The Emergency Operations Center is located in the courthouse. It has three phone lines, radio communications and cell phone boosters. Overall, the facility is adequate. The main emergency shelter is the Fair Grounds Exhibit Hall. Back-up emergency shelters include schools and churches. The county recently purchased Red Cross cots for the Exhibit Hall. The emergency shelters for pets are at the Fairgrounds barn and the Animal Shelter.

There is a volunteer fire and ambulance service. All equipment is city or county owned. There are three ambulances. Equipment for these services is good. The ambulance service complies with Section 50-6-322, Staffing – nonemergency ambulance transports – transports in rural areas which require one trained driver and one emergency medical technician licensed at an emergency medical technician basic level or higher. The ambulance service has four EMTs with basic licenses and advanced life support endorsements, and five first responders who are drivers and provide assistance to the EMTs.

The 2011 flooding resulted in $500,000 to $600,000 in documented (by aerial photos) damage to county roads and bridges, which was reimbursed by FEMA.

Emergency Service Issues

Mutual aid agreements expire with changes in the membership of the County Commission. The agreements should be modified to eliminate the expiration to save time and costs of renewing agreements.

There is no back-up EOC facility. The County should plan for the establishment of a back-up EOC facility.

The identification of special (medical) needs population is a challenge. People prefer not to volunteer that information or they don't want to be considered a "special population". Outreach efforts for the identification of special needs populations may need to be revised to overcome these obstacles.

The ambulance service has a severe shortage of volunteers, which places a significant time and activity burden on the volunteers. In the last two years the service was able to recruit, train and certify four first responders who are currently serving. The last EMT to join the service was in 1999. Often people will participate in the training and get certified and not volunteer but instead use the credentials to get a job. Overall, people don't want to make the significant time commitment with no compensation. Certification requires 130-150 hours of classroom and practical instruction as well as out-of-town written and practical skills tests. Every two years the volunteer needs to get recertified by taking 72 hours of instruction. On average, the volunteers receive a $30 stipend for each run.

Possible strategies to address the above issues

- Provide volunteers a stipend for on-call duty.
- Hire a director who could assume administrative, coordination of training and other duties that are currently being done by volunteers.
- Acquire a certified lead instructor so that all training activities could occur in town; this would involve development of a course that requires state approval. The textbook portion of the course work could be offered online to increase training convenience.
- Establish a paid EMS staff to replace the volunteer service.
- Compare ambulance fees with other comparably sized communities; an increase in fees may be justified and could help fund any of the above activities.

Don Schillinger (Baker School District Superintendent)

School System, Enrollment, Staffing

The Baker School District is a Class B K-12 school district. It is District 12. The district organizes classes as follows: K-3rd grade (Lincoln School, built in 1956), 4th -6th grades (Longfellow School, constructed in 1968), 7th and 8th grades (Baker 7-8, constructed in 1968) and 9th -12th grades (Baker High School, constructed in 1961). Currently a total of 80 students are bused to school.

Table A.2: Baker School Enrollment Figures

Grades	2005-06 School Year		2011-12 School Year	
	Fall	Spring	Fall	Spring
K through 6th	183	182	237	234
7th and 8th	56	56	64	64
9th through 12th	149	149	125	122
District Total	388	387	426	420

Last year two science rooms in the high school were remodeled. Current building projects include: 1) a new football field and track facility including bleachers and stadium lighting at the high school and 2) new gym and

auditorium (the old gym is being converted to a band room and classrooms, six new classrooms). All the above projects were funded by oil production tax revenue. Near-term future project – need to repair/replace high school gym roof. The district has not needed to propose a property tax levy; they are hoping that lobbying efforts to restore school district allocations will be restored. If that legislative effort is not successful, the school will likely need to request a tax levy within the next two to three years. Note: every year a tax levy needs to be reapproved by the voters. The district will be losing $3.9 million next school year due to the decreased oil production tax allocation.

The district has 41 teaching positions, 6 administrative positions and 29 classified staff (custodians, cooks, bus drivers, etc.). Teaching staff retention has not been an issue for the district because there has been very little turnover. However, if the district needs to hire a new teacher there would be difficulty finding housing.

The district's schools have adequate capacity for the foreseeable future (next five years). The district has moderate classroom sizes based on state standards. The district has no excess/surplus land. There is a big generator at the Longfellow school – the school has the capacity to shelter and feed residents in the case of an emergency.

Judy Brown & Jim Hurley (Realtors)

Data for Housing Market

Judy and Jim did not have data for the housing market in Baker, although they did provide qualitative data. Homes that were originally selling for $80,000 in 2010 are now going for $110,000 in 2011-2012.

Housing Issues Facing the Community

Availability is the most important issue and priority for residents. Low income people cannot qualify to get mortgages and rent is too high for them to afford a decent place to stay. Judy and Jim receive daily calls from companies looking to place employees in the Baker area. Vacant lots are not selling because land owners want to see how much money they can receive and as a result, prices have skyrocketed and availability has dwindled.

Mobile home development and manufactured housing is needed to help the affordability problem. The credit union can finance a mobile home for 15 years with a maximum cost of $50,000. However, the mobile home needs to have a foundation and this drives up the price, making it extremely difficult to get lending to people who need it most. Trailer parking spots that have year-round facilities such as running water, sewer and heat are also needed.

Teachers and other moderate and low-income wage earners need places to stay. In addition, several oil companies have called expressing the need for multiple rooms for a drilling crew. Unfortunately, there is nowhere in town to send the crews or the teachers. The community needs three and four-bedroom units/apartment complexes to accommodate families and crew workers.

Crew camps would help alleviate some of the pressures, but residents have expressed concern on the people coming into town. Moreover, the credit union and banks may have difficultly serving existing customers if temporary workers decide to cash paychecks at local banks without having an investment with the bank or community. What is going to happen when they leave? How will the town look and will it be able to support the high prices that came with the boom?

Other Issues in the Community

Residents have expressed a desire to have more shopping and retail services in Baker. Most people go to Miles City for shopping. It would be nice to have an Alco or similar shop near downtown.

Community appearance and upkeep has been slightly declining as more trash is appearing in parks and on streets. It would be beneficial to have community groups such as 4H, boy scouts, girl scouts and the local chamber volunteer to clean up the parks around Lake Baker.

Jule Walker (Plevna School District Superintendent)

School System, Enrollment, Staffing

The Plevna School District is a Class C K-12 school district. It is District 55. The district organizes classes as follows: K through 6th grades, 7th and 8th grades and high school 9th through 12th grades. All grades are contained in one school building. Bus routes extend 15 miles to the west, 20 miles to the south, 25 miles to the north and as far east as Baker. Students in the City of Baker take private transportation to Plevna.

Current enrollment is as follows: total – 75 students, K through 6 – 48 students, 7th and 8th grades – 10 students and high school – 17 students. Currently, 1st and 2nd grades are combined in one classroom. Five years ago the total enrollment was 90 students. The recent trend is that elementary enrollment is increasing and high school enrollment is decreasing. One of the reasons for the decrease in high school enrollment is that Plevna is losing students to the Baker School District because of the Class B athletics offered in Baker.

Staffing includes 16 teachers and 10 support staff (bus drivers, cooks and custodian). The teachers are unionized and in their second year of a three-year contract. The small class sizes allow for individualized instruction and the school has had great test scores. The school facility is well-maintained largely to the past availability of oil production tax revenue that was allocated to the school. Ninety-two percent of the school district budget is devoted to salaries and benefits.

The school district owns four residential dwelling units (the fourth was purchased two years ago). Rent is $250 per month plus utilities and propane is provided at cost. The school district acquired the residential properties because of high housing costs. Rents in Plevna are now between $700 and $800. The starting salary for a teacher is $28,000 and the school district offers full health insurance at no cost to the teachers (costs the school district $11,000 per year).

Last legislative session SB 329 became law. As a result of the law, the state retains more oil production revenue (goes into the general fund) and less is allocated to school districts. In the fourth quarter of 2011, the Plevna school district did not receive a distribution because it had exceeded its allocation. As a result of the reduction in oil production tax revenue, the district's proposed 22 mills property tax was approved by voters in the district. This is the first time in 10 years the district levied a property tax.

The school district loaned the town money for the water system to freeze water rates for 10 years. The district applied for and was awarded a Safe Route to Schools Grant and sidewalk construction around the school and some sidewalks on Main Street were constructed two years ago.

Issues and Possible Strategies

The school district has had problems retaining teachers due to lack of affordable housing. The district owns 14.7 acres of land north of town and floated a proposal to sell the land for $1 in exchange of getting affordable apartments built. The proposal did not move forward because the town water system could not provide service to the site. Some of the older homes in town are in poor condition and should be demolished to allow construction of new dwelling units.

Ken Griffith (Oilfield/Developer)

Issues Facing Your Business

The state permitting process for gravel pits is a problem. The gravel from Fallon County cannot be used for federal or state roads as it does not meet the minimum standards; however, it can be used for county and local roads. No sufficient gravel pits exist in Fallon County to meet the state/federal needs as it will all have to be trucked in from another county. Gravel demands for oil pads and related businesses will have some difficulty getting good gravel and it too may need to be trucked in from Miles City or Glendive.

Infrastructure assistance is not needed for developing property. Putting in infrastructure is part of developing property and doing business. It is a responsibility of the developer; however, the City of Baker cannot afford to help put in infrastructure as it has greater needs that require city funding such as upgrades to the lagoon and water system. These services benefit all citizens so that is where the city should focus its efforts.

Issues Facing the Community

The city and county have been working together and communication between the two entities has improved. The two jurisdictions should continue to improve relations and talk with each other about future projects. However, some issues related to funding and the disparity between the County's budget and the City's budget still remain.

A railroad loading/unloading facility will be needed if oil development and growth continue. Oil companies will need a place to unload pipe, but the railroad will not stop in Baker as there is not enough demand. As a result, trucking is the only way to get pipe into the county and this leads to increased traffic and impacts to county/city roads. Another railroad crossing is needed as the two (one in town and one west of town) are blocked when the train stops.

Housing availability is a great concern for many citizens. Zoning needs to be updated to reflect current issues and ensure development has more options for providing housing choices. The community needs places to rent, more senior citizen housing and commercial businesses. Demand for housing is not an issue; the issue is getting enough developers to build and land owners to release land. The City needs firm commitments from companies that they will be willing to rent rooms for a given time period.

Lending is another issue that has constricted development. Commercial loans are difficult to obtain as are residential loans because homes are not being appraised for their true value and the new regulations that banks are required to follow. The local credit union provides some services that Wells Fargo and the Bank of Baker cannot, but it is not enough. Developers and businesses need to bring financing with them in order to build in Baker.

Maria Braun (Farm Service Agency)

Agricultural Activities

Most agricultural operations in the county have combined farm and ranching operations. There are also some small grain (wheat, barley, oats, etc.) and specialty crop (sunflower, corn, safflower, peas, etc.) producers.

Issues Facing the Agricultural Community

There has been a decrease in the number of family farms, including multi-generational farms in the county. There is a trend of wealth investors buying agricultural land which is either leased out or taken out of production for recreational use. This trend has driven up agricultural land prices. Younger people (grown children of the farmers) are leaving the farm. The high price of agricultural land ($500/acre) is contributing to this exodus of young people from the farm. Most farmers/ranchers need one spouse to work to provide additional income. This is true even with the favorable commodity prices because of high operating costs (diesel fuel, fertilizer, herbicides and pesticides and the cost of new or repair of farm equipment).

Overall, the agricultural community is satisfied with county weed control measures. The county weed control service sprays road ditches and non-farm dry creeks. Property owners need to pay a fee for weed control service on private property.

Energy development in the oil patch is also impacting the agricultural community. The agricultural community values land stewardship and do not appreciate the environmental impacts from the oil

industry (dust, oil spills, etc.). In addition, the oil and natural gas activities are also contributing to increased land prices.

The Baker Livestock Commission livestock auction yard closed approximately three years ago. Ranchers now need to use the Lemmon Livestock drop-off in Baker on each Tuesday of the week to have livestock trucked to Lemmon, SD where the livestock are sold on Wednesday, or transport the livestock themselves to Bowman (45 miles), Glendive (75 miles) or Miles City (85 miles).

Finally, the agricultural community is anticipating significant reductions or the elimination of federal direct and counter-cyclical agricultural programs. These changes will result in even higher levels of participation in commodity insurance, which will add to operating costs.

Mike Rinaldi (County Sanitarian)

Services

Mike is an environmental engineer. He is contracted by the county and DEQ and represents the county and incorporated areas in the county. He provides service to eight other counties in Montana. His duties/roles include: environmental officer, sanitarian, does DEQ reviews, reviews subdivisions, performs the following Department of Health duties – licensing for food establishment, hotels and motels and tattoo parlors, and he oversees matters related to public water, public sewer, storm water and air quality.

Subdivisions (under 160 acres) require DEQ approval. He investigates abandoned/derelict properties after the city identifies the problem and forwards a request to investigate. If he determines the case is a public nuisance from a building or fire perspective he takes the matter to the municipal court. The city has a new "decay" ordinance that regulates the exterior appearance of a property and the city is enforcing the ordinance.

Issues and Possible Strategies

Every commercial property north of the railroad tracks and commercial properties on the east and west side of town needs to be annexed. These properties are served by city water and have inadequate septic systems.

City water currently cannot be expanded beyond the airport due to lack of pressure. An existing subdivision beyond the fairgrounds is served by private wells and the City wants to extend water to this subdivision. A new or higher water tank will be needed to extend water service to these areas.

East of town is the Standhope Addition subdivision on septic systems and city water. The septic systems have never worked properly and water pressure to the area is inadequate. Fire flows are not adequate anywhere in the city. This subdivision is outside of the city limits; an annexation and establishment of a sewer and water district is the suggested way to address this area.

The DEQ has issued a cease and desist order on the county regarding any activity in the lower Lake Baker and is asking for a reclamation plan. Mike felt that the lower lake is in better condition now than before

the county activities that resulted in the order. For example, through the county's aeration the pH of the water has dropped to acceptable levels (in the past the pH was 9). Note: both the upper and lower lakes are owned by the county.

There is a need for senior housing in the community.

Natural gas is being stored in empty caverns in the county and transported to oil well sites as a means to facilitate oil extraction.

From an infrastructure perspective, the logical direction for future growth is the area west of town.

Mona Madler (Eastern MT Economic Development Authority and SMART)

Services

Mona is the executive director of both organizations. SMART is a 501C3 non-profit organization. It receives funding from the Chamber of Commerce, the city and the county to do community development, housing and economic development projects. It also provides assistance to start-up businesses, e.g. preparation of business plans. It has a $16,000 revolving loan fund started in 2006 to provide gap lending for business development. SMART also provides assistance in the areas of relocation information and travel information for potential residents. SMART plays a large role as a member of the Chamber of Commerce, which is comprised of volunteers. The SMART building was purchased two years ago and required major renovations. The goal of the project was to provide more office space in Baker.

EMEDA (Port Authority) is funded by 2 mills on the county property tax. It was established in 2005. EMEDA can purchase and sell property. Its priorities include housing (address the housing shortage) and main street beautification. A recent project was construction of the Frontier apartments, which provided workforce housing. The completed project was sold to a private investor in January 2012. EMEDA also owns four residential lots which it is marketing for apartments/workforce housing. There are two historic properties on the south side of the intersection of highways 12 and 7 that should be preserved.

Issues and Possible Strategies

There are empty commercial buildings and the need for store front improvements. Code violations are not enforced (e.g. old vehicles in yards, blighted/unsafe buildings.

The provision of infrastructure services needs to be improved. It is important to clean up the entrances to the community. The community needs to be proactive about growth issues. The Town of Plevna needs to grow, too often it is overlooked.

Elin Westover (County Extension Services)

Planning Related Services/Programs Offered

The Fallon/Carter County Extension Program extends University knowledge to the people of Fallon and Carter Counties. Extension gives every Montanan access to useful information and expert help via

workshops, demonstrations, community meetings, publications, videos, the Internet and other sources. Serving as an information clearinghouse is the greatest service the Extension office offers. The Fallon/Carter Extension Service provides pesticide applicator licensing and education, and administers the Noxious Weed Seed Free Forage program to help prevent the spread of noxious weeds in the county. In addition, the Extension office provides information on soil testing, feed analysis and forage nitrate testing. Homeowners and landowners can also receive well water test kits through the local Extension Office. The County Extension Service also provides information on estate planning, horticulture, insect, spider and plant identification, range management, soil health and much more. Furthermore, the Extension Service is the facilitator of the 4-H Youth Development program and has youth participating in project areas from livestock to sewing to woodwork, etc.

Data Resources for Agricultural Community

The most requested and helpful data would be the web soil survey, which is offered by the USDA. The site provides data soil type and has a host of other useful information that may be of help for the growth policy.

Community Issues

The Extension office has received several questions pertaining to the land prices and how much money people can and should charge to lease land. People also want to know what price their land is worth in terms of ranching capabilities and oil potential. Landowners are also concerned with water quality and land disturbance as the oil and gas industry moves closer to the area.

People have raised concerns regarding the growth facing Baker, and have raised the following questions:

- When will the growth happen?
- How much will it be? How long will it stay?
- What types of people are coming into town?

The community would like stable families to move into Baker and be an active part of community organization, and avoid having transient populations that come and go.

Housing is probably the greatest issue facing the community and the ability for people to pay affordable prices for single-unit structures.

Other Items

The Extension Office is coordinating the Montana State University's Master Gardener program for Fallon and Carter County. There is in increasing interest in home gardening and horticulture in the area. Currently this program is being offered to the residents in Carter County and will be offered in Fallon County in the near future. Through this program, the community can work together on a community gardening project to help educate youth and citizens about gardening and food quality.

Chad Shepherd, Account Manager (Nalco Energy Services)

Please describe your company's operations in Fallon County.
Service big oilfield companies with specialty chemical used for above and below ground applications. Service area within 70 miles of Baker. Business is good, not great.

How many transient and permanent workers do you employ in Fallon County?
Eleven permanent workers.

Do your employees have difficulties finding housing in Baker or Plevna?
Yes, one staff member had to move to Ekalaka, couldn't find housing in Baker.

Does your company plan to expand operations in Fallon County? If so, please describe and are you planning to hire more employees?
None.

Are there any factors that are negatively affecting your operations (e.g. lack of housing, employee retention, cost of labor, transportation issues, etc.)?
Employee retention, employees can go to Williston to make more money. Fidelity drills 8-10 natural gas wells a year, may suspend drilling because of the low cost of natural gas. Continental has one oil rig now close to Baker.

Debbie Newell (National Oil Well)

Please describe your company's operations in Fallon County.
Distribution business that provides materials/equipment for production and drilling rigs. Their market includes the following areas: Baker, Glendive and Buffalo SD, east to Bowman. They deliver materials on site. Business is doing well. The largest volume of sales comes from drilling as opposed to production.

How many transient and permanent workers do you employ in Fallon County?
Eight permanent employees that all live in Baker.

Do your employees have difficulties finding housing in Baker or Plevna?
A couple new employees have had troubles finding housing. One is still living with his sister.

Does your company plan to expand operations in Fallon County? If so, please describe and are you planning to hire more employees?
Expansion of the pipe yard is planned, no need for new employees right now. They expanded their building a couple of years ago. If the oil companies begin drilling in Wibaux and Fallon Counties, the company will grow.

Are there any factors that are negatively affecting your operations (e.g. lack of housing, employee retention, cost of labor, transportation issues, etc.)?
None.

Debbie is a resident of Baker – Issues: enforcing old buildings that are hazardous, need for apartments/affordable housing for young people starting out. Wages are not enough to cover housing costs.

Rumors that drilling may start in Fallon and Wibaux County. Petro Hunt is active in the area doing seismo-graphing, and Whiting is drilling too, on the east side of Highway 7 in Montana and North Dakota.

A constraint for drilling companies is the shortage of rigs.

WBI (Williston Basin Interstate, pipeline company) and Fidelity (a drilling company) are subsidiaries of MDU, and are active in the natural gas drilling sector in Fallon County. New natural gas wells have been drilled in Fallon County for years. The drilling operation doesn't take long because the natural gas is in shallow locations. The natural gas is then stored in underground cavities in the county.

Scott Rabbit (City-County Parks Director)

Parks and Park Facilities

The Parks' budget is funded by the county and the city with most funds provided by the county, given that most parkland is owned by the county. Scott is the only full-time employee in Parks; he hires six part-time college/high school students between June and August to do maintenance work.

County Parks:

Triangle Park

Facilities include covered picnic shelter with seating for 50, restroom on city water and sewer, amphitheater with seating for 100 (Shakespeare in the Park occurs there), playground equipment for ages 5 to 12 years, two boat launches, two large grills and plenty of parking.

Mangold Sports Complex

Approximately three acres, two little league fields and one softball field, concession and restroom on city water and sewer, plenty of parking.

Ironhorse Park

Restrooms on city water and sewer, covered picnic shelter with four tables, two small covered picnic shelters with one picnic table each, RV dump station, and space for a few RVs with dry hook-ups (no water or electricity, long-term plan is to add 10 RV spaces (dry hook-up). The demand for RV parking in this park is largely for special events (e.g. high school graduation, weddings, etc.).

City Parks:

Eastside Park
Size: about four city lots, picnic shelter with seating for 50, restroom, playground equipment for toddlers to age 5, on-street parking, facility is ADA compliant.

Centenial Park
Size: small, one city lot, picnic shelter with one table, no restrooms, no parking on-site.

City Park
Size: ½ city block, picnic shelter with seating for 40, large playground with equipment for ages 5 to 12, footbridge to the city owned RV park (dry hook-ups, there are two private campgrounds/RV parks in town), restroom, parking.

Coldwell Field
One field with lighting, Babe Ruth and American Legion baseball, concession and restrooms, ice staking rink with a warming house.

There is adequate equipment to maintain the parks. There is no Parks plan. There is a Park Board – members include the mayor, a county commissioner, a city council member and one member of the public. The Board normally meets twice a year. Scott plans to do a community survey on the parks department in the spring.

Park Issues

There is no park on the north side of town (north of the railroad tracks). The goal would be to provide a small neighborhood park (two city lots).

Potential facility improvements include: 1) a splash park, 2) skateboarding facility and 3) paving the ice rink for roller skating and roller hockey. All of these improvements could be accommodated on existing parkland.

Overall, the community has an adequate amount of parkland. Proposed development west of town will result in two new neighborhood parks. Parkland is required for major subdivisions.

Recommend that the Parks Director has an opportunity to participate in pre-application meetings and review major subdivisions for the location and design of proposed parks.

Tim Barkley (Fallon County Sheriff) and Randy Ketterling (City of Baker Chief of Police)

Police/Sheriff Department's Service

There is no 24-hour patrol coverage for either the City of Baker or Fallon County. The County Sheriff Department provides on average no more than 16 hours of patrol (and when the District Court is in

session the patrol hours are significantly reduced). The City of Baker Police Department provides 20 hours of patrol when the department has four sworn officers. The officers work 10-hour shifts and two officers are on patrol on Friday and Saturday nights. Officers are on on-call duty between 5:00 to 7:00 am and 5:00 to 7:00 pm. Given the relatively high turnover of police officers, the police department often has only three sworn officers, in which case 16 hours of patrol are provided with on-call duty between 4:00 to 7:00 pm and 3:00 to 8:00 am. The City of Baker currently has four sworn officers and no administrative staff. The Sheriff Department currently has four sworn officers and one FTE administrative staff. The Sheriff has deputized the four city police officers as well as the police officers in Slope, ND. The City Police Department and the Sheriff Department work together very effectively.

Facilities and Equipment

The City Police Department and the Sheriff's Department share a facility. The facility is small with four officers and four deputies each sharing a small room. There are 11 beds in 7 cells in the detention center. However, two of the cells are being used to store evidence and equipment. The dispatch center is also located in the facility. The city and county have provided sufficient funding for patrol vehicles and other public safety equipment.

Public Safety Issues

Both parties expressed a need for 24-hour patrol service. Most of the public is not aware of the eight-hour on-call service.

There is a need for additional public safety facility. This will address the office over-crowding issue and allow establishment of an evidence room and an interview room which are currently not available.

The city police department has a problem with the retention of police officers. The average length of employment for city police officers is three years. The succession of new police officers has an impact on public safety because it takes up to one year for a new officer to become acquainted with the community and feel comfortable on the job.

Compensation for sheriff deputies is a concern. They are paid straight time (not overtime pay) for time work hours exceeding 40 hours per week. The 40+ hours per week is required because of the on-call duty and covering for deputies who are sick or on vacation.

The city patrol cars are maintained/repaired by the city mechanic. However, the Sheriff Department's patrols cars are maintained either by the deputies or commercial vehicle repair/maintenance is provided. It was recommended that the two county mechanics assume the responsibility of maintaining/repairing patrol cars. This would be more cost effective and free up deputy time to provide public safety service.

Recent Trends in Crime

In recent years both parties observed an increase in the theft of unlocked vehicles and home invasions (stealing of prescription drugs). Guns are being brought in bars and there was recently a shooting in the city – these incidents are from the transient population in the city. During the last oil boom in 1995, there was a tenfold increase in crime and jail population. Between 2010 and 2011 there has been a significant increase in traffic violations and domestic cases. The increase in traffic violations is attributed to the increased volume of vehicle movement of in the city. The use of synthetic methamphetamines and marijuana has increased.

Table A.3: Inmate Detention Statistics

Year	Total Days Served in Detention	Average No. of Inmates per Day
2009	570	1.56
2010	641	1.76
2011	1,320	3.62

Table A.4: City of Baker Criminal Report

	Traffic	Criminal Arrests		
Year	Arrests	Misdemeanor	Felony	Total Arrests
2006	72	92	14	178
2007	97	93	5	195
2008	125	60	5	190
2009	94	49	13	156
2010	113	50	4	167
2011	274	59	9	342
Total	775	403	50	1,228

Table A.5: Incident Reports from Dispatched Calls

Year	BPD	FCSD	Total Arrests
2006	1,034	352	1,386
2007	2,550	670	3,220
2008	1,914	727	2,641
2009	1,708	487	2,195
2010	1,302	380	1,682
2011	1,646	381	2,027
Total	10,154	2997	13,151

Note: Excludes non-emergency and non-911 calls

Boyd Plumber (Williston Basin Pipeline, District Manager of Baker District)

Please describe your company's operations in Fallon County.

Operation of gas compressor stations and pipelines for natural gas and natural gas storage; the largest gas storage facility in North America. Compressor stations – compress gas and move gas down the pipeline. Storage in wells that produced previously; gas injected back in wells. Why storage? Spread in prices in different markets. Fidelity sister company did not drill last year, haven't drilled for two years.

How many transient and permanent workers do you employ in Fallon County?

50 full-time permanent employees, no transient employees. Most workers operate the wells and compressor; office workers, 10 workers do construction at plant (compressor station) and pipelines.

Do your employees have difficulties finding housing in Baker or Plevna?

Is a problem to hire new employee from outside the area; most employees are local so it hasn't been a problem. Outside the area workers have turned down jobs due to lack of housing.

Does your company plan to expand operations in Fallon County? If so, please describe and are you planning to hire more employees?

No, not in Fallon County. The company is expanding but in the Bakken. Seismograph activity has occurred between Wibaux and Baker last year and a lot of leasing activity. No surveying activity.

Are there any factors that are negatively affecting your operations (e.g. lack of housing, employee retention, cost of labor, transportation issues, etc.)?

Lack of housing (potential outside employees) and lack of shopping for the wife; the bigger draw in the Bakken with higher wages there, but with higher housing and/or transportation costs the net income gain isn't significant.

Brenda Wood (County Clerk)

County Data

Brenda provided detail data for county departments, number of staff, budgets and existing and planned facilities. The golf course superintendent splits time between the golf course (March – November) and the road department (December – February).

County Specific Issues

The County and Baker have several joint agreements. The City owns 10 percent of the County courthouse building, and through an inter-local agreement, the City pays the County a flat amount per month for City offices in the building. The City provides sewer and water to the fairgrounds through an inter-local agreement; however, the agreement is not finished as of February, 2012. The County owns buildings at the airport, which is on City-owned land. The County landfill and buildings (shop/office) at the landfill operate on land leased by a private party. The recreation director previously had office space that was provided by the school, but now the office is in the basement of the library. The school allows for programs to be held on school property for the after-school program, soccer, basketball, etc. The County uses water from Baker's lagoon to water the County golf course as well.

A building at the fairgrounds is possibly scheduled to be removed and replaced with a new building. The Baker Rural Fire Department also stores some equipment at the County shop.

The County recently set aside $2 million to upgrade Baker's sewer system and $1 million to improve Plevna's water system.

Other Issues in the Community

Housing is a growing problem for the community. Older homes need to be renovated or removed as they present safety issues to existing and surrounding residents. The west side of Baker may be developed for new homes and/or apartments as land was recently purchased by private individuals.

BLM Information

The Commission signed a cooperating agency form with the BLM on January 17, 2012 in preparation of a land use plan amendment and associated environmental impact statement to address greater sage-grouse habitat conservation.

The Commission also signed a MOU between the Miles City Field office (BLM) for revision of the Miles City Field Office Resource Management Plan and associated EIS on January 31, 2011.

Another agreement, which was signed in 1987, may still be in effect between the Fallon County Sheriff and the BLM, but the County clerk is checking on it. Other agreements may exist, but may not be on file.

Clayton Hornung (City of Baker Mayor)

City Issues

There is a need to improve the city's water and sewer systems. Some sewer lines are collapsing; a few years ago the city took photos inside the sewer lines and a number of the clay tile lines were blocked. The estimated cost to upgrade the entire sewer system and provide water lines to the airport and golf course clubhouse is $4 million. The county has provided $2 million and the city funding will come from the sewer enterprise fund and reserves that are dedicated for capital improvements. There may not be sufficient funds to complete the project. Clayton may request additional funds from the county. Percia and Associates out of Helena has been retained to provide engineering services for the project.

The next infrastructure project the city would like to initiate is the extension of water lines. The Standhope Addition and the North Fallon Water District are two areas where the city has extended water mains to the city limits and installed a water meter. Each of these two water districts then extended water lines to individual properties. Both water districts want city sewer service. The mayor feels if sewer service is provided to these areas they should be annexed. The Standhope Addition has concerns about annexation because once in the city they will not be able to have horses and livestock on their properties.

Possible Strategies

Well No. 3 has been down for some time now. Need to determine the cause and remedy.

The city needs to aggressively pursue grant opportunities to help fund the infrastructure improvements.

A deal should be made with Standhope Addition concerning the horses and livestock on their properties. An annexation agreement could grandfather the existing owners or the city code could be amended to exempt this subdivision.

Street connectivity needs to be maintained in new growth areas.

The Baker School District will likely be losing four or five teachers due to retirement. Housing for the replacement teachers will be a major concern.

Dale Butori (County Weed Supervisor)

Service and Equipment

There is a five-member Fallon County Weed Board that meets monthly. Dale is the only full-time weed control employee. He hires seven seasonal (four months) full-time high school or college workers. Equipment includes three on-road pick-up trucks, one off-road truck that hauls two side-by-side vehicles (large golf cart-like vehicle that seats two), three four-wheeler trucks and a pick-up truck used by Dale. Each truck has tanks and sprayers. The equipment is in good condition and meets their needs. They also have two backpack sprayers that are rarely used because it is labor intensive to spray by hand.

The program only sprays listed noxious weeds. The program's main emphasis is weed control along roads. The County has contracts with MDT, BLM and the state (for state owned land). Dale will coordinate with Baker and Plevna on noxious weed control. If Dale observes a noxious weed he will contact Kevin and someone in Plevna, and they will contact the property owner to coordinate the spraying. The program will spray private ranch and grazing land upon request and payment. The program doesn't provide service to all property owners; Dale would need to double his staff to provide that level of service but he doesn't have the equipment for such an expanded program. Normally County Weed Control does not spray on private land. However, there are no commercial applicators in the county so the Department of Agriculture has given Dale permission to spray private property. The primary reason there are no commercial operators in the county is that the county doesn't have a significant weed problem so there's not enough work.

The program is funded by dedicated county millage (3 mills) and it receives funds from the state that are obtained from a dedicated millage on the state property tax.

Dale is currently in the process of updating the County Noxious Weed Management Plan. The main change to the plan is making the non-compliance provisions consistent with the Department of Agriculture regulations. A draft plan should be prepared by the end of May.

The Montana County Noxious Weed Control Act requires that all property owners have and submit a management plan to the county. Management plans are required for any major ground disturbance such as pipeline construction or a gravel pit. In practice, not all property owners have submitted management plans to the county.

Issues

Unlike the major pipeline companies (Butte and Bison), the local pipeline companies don't submit management plans. There needs to be improved communication between the County and these local pipeline companies to get management plans prepared and submitted. Property owners where pipelines are being installed need to be more aware of their responsibility to call the County if noxious weed infestation occurs as a result of pipeline work.

Fallon Medical Complex

Data Request

David Espeland, CEO, Selena Nelson, CFO, and Judy McWilliams, QI attended the interview and provided sufficient data for the comprehensive plan. The medical complex is the largest employer in Baker and Fallon County.

Fallon Medical Complex (FMC) Information

The complex is anchored by a Critical Access Hospital with 25 beds that can be used for either acute care patients or long-term care residents. FMC provides 24-hour emergency care, fully digital diagnostic

imaging, non-invasive surgical services such as scoping, and a full complement of lab services with microbiology and blood transfusion capabilities. FMC does not provide OB services; however, the complex does bring in visiting doctors and specialists to treat patients with non-emergent conditions. FMC has an attached 15 bed skilled nursing facility, a rural health clinic with two physicians and two mid-levels, a home care agency and a rehabilitation department.

FMC Issues

Adequate funding from government programs and private payers has always been one of the larger facility issues. Medicare and Medicaid are the largest payers and have never provided an ongoing assurance that an adequate level of reimbursement can ever be expected by FMC. Unfortunately, private payers typically follow suit and demand greater discounts in order to make their plans competitively priced. These conditions make it difficult to predict whether there will be enough cash flow to cover the facility's fixed expenses. FMC does not have the capability of capturing additional patients, since the size of its market area is fixed, so it has to either raise rates or cut expenses.

Recruiting staff, especially professional staff such as nurses and doctors is also a struggle because of the facility's location and the perceived lack of community amenities. For instance, many new employees cannot find housing. Moreover, staff retention is a problem as some staff has found better wages in the oilfield or has a spouse that is benefiting from higher wages and therefore no longer needs to work. In addition, some candidates for employment have expressed disappointment with a lack of entertainment options in Baker, thus making it more difficult to recruit younger employees to move to Baker.

FMC has plans to continue renovating the building with the assistance of a taxpayer-approved mill levy that has funded improvements for the past eight years. In all, the building currently needs $2-$3 million in improvements. Similarly, the useful life of some equipment that was purchased in past years needs to be upgraded. No single funding source has been established; rather, FMC receives its equipment funding from Foundation gifts, grants, bed tax rebates, leases, county assistance and rarely, operational funds. Although FMC knows its equipment needs and has prioritized its list, there is no defined and assured source of funding, which makes it difficult to determine when new equipment is able to be purchased.

Transient patients have been an issue in other eastern Montana counties and are beginning to present a similar issue to FMC. These patients usually require emergency services and don't have a valid means of paying for the visit; in some instances, they are committing insurance fraud. There is a concern that crew camp members may present a similar experience in the future.

Lastly, there seems to be a general perception that patients are at an advantage seeing a specialist such as a pediatrician and therefore travel to Miles City or Glendive to receive treatment. This translates into lost revenue as most cases could be seen by a general practitioner at FMC.

Other Issues

The railroad tracks present an enormous challenge; doctors and staff are strongly discouraged from living north of the tracks because of train delays.

FMC also faces the stigma of being considered a County-run facility. Although Fallon County does provide meaningful support to FMC, the medical complex is operated by a private non-profit corporation. While being associated with the County is not an issue to FMC, many people believe they do not need to pay their bills or donate funds to the facility because they are already taxpayers and FMC is being funded by the County. In reality, county subsidies typically only account for about 10 percent of the facility's gross revenue.

Kevin Dukart (City Clerk)

Data Request

Kevin provided two key maps showing the City's public lands.

City Departments and Facilities

The City has the following departments: parks and recreation, judge, police, fire, public works, clerk/treasurer and attorney.

The City has joint agreements with the following jurisdictions: County (sewer and water districts), North Baker and the Rural Fire Department. The City owns the land for the parks, but shares park maintenance costs with the County. The City also owns the airport, but the County owns several buildings at the airport.

Other City facilities include the courthouse (partial ownership with the County), the old fire hall buildings, the city shop, parks, the city lagoons and water tanks.

City Issues

Baker does not currently have a capital improvements program, but would like a general plan that identified items to be addressed in 5-10 years. The program should be flexible enough to allow priority projects to be funded immediately; the CIP would serve only as a guideline.

Funding issues tend to be the greatest concern for the City. The area's median household income is too high, thus limiting the amount and type of grant funding the community can pursue. Baker may need to look at different options to fund improvements including the potential increase in water and sewer rates. In addition, the tax rate and structure for oil producing areas is weighted toward the counties and not municipalities.

Fallon County has been good to work with and they recently provided $2 million to replace sewer lines in Baker. However, friction between the two entities still exists on certain elements and between certain people. Overall, the relationship has improved and continues to get better.

The ability for the City to provide policies regarding sewer and water is essential as development continues to occur. Baker should have policy and a development agreement regarding who is responsible for putting in infrastructure before development begins. In addition, having a one-mile extraterritorial zoning area is essential for compatible development along the City's current boundary.

Other issues include having locations for permanent RV and campers, while still maintaining temporary spaces for visitors and tourists. Definitions need to be updated to reflect new uses in both commercial and industrial zones.

Randy Hoenke (Baker Rural Fire Chief)

Data Request

Randy provided data regarding the type, number, duration and location of response calls for the last five years.

Fire Department Issues

Call issues tend to be the greatest problem as people will call their neighbor or local fire volunteer instead of routing the call through 911. The department is trying to educate local residents about the benefits of calling into 911 instead of calling a neighbor who is a member of the fire department.

Recruiting for the fire department has not been an issue; however, EMS has a hard time being staffed. The state currently sets a limit of 28 volunteers per company; Baker Rural Fire has two companies. One serves only wild land fires and other serves wild land fires as well as structural fires, vehicle accidents and hazardous material cleanup.

The department is funded by both the County and Baker, with Baker taking a more conservative approach to funding the department. Radios will need to be updated to an all-digital signal; this will be a major improvement and will require funds to make the switch.

Response time is not an issue; however, spacing of volunteers has been a problem because of the train tracks. The department needs to have sufficient volunteers north of the tracks in case a train blocks the crossings in Baker.

Fire Department Programs

Currently, the department sponsors a prevention program with K-4 graders at the local schools. Companies can invite the fire department to perform annual prevention seminars, but the department only gets one or two calls per year.

The department is looking at the requirements/needs to hire a full-time employee at the station house.

Joint training programs with the Plevna Rural Fire Department have occurred, but not recently. It would be beneficial to implement another training seminar, although it does require a personal commitment as it is a volunteer position.

The goal of the Baker Rural Fire Department was to become a regional training center for the eastern side of the state, similar to Great Falls, MT in the west. There would be an opportunity to pursue this as Baker does receive calls from western North Dakota.

Roger Meggers (Baker Municipal Airport)

Airport Concerns

Expansion of the Powder River Military Operating Space is a huge concern for the airport because it could severely limit air travel into and out of Baker. The airport does not support the complete expansion of the MOA, but recognizes that some expansion may be necessary. Under current proposed expansion plans, the airport would lose access to commercial flights in Baker as the new guidelines would limit the time and altitude at which flights can fly directly to Baker. While most flights would be able to access the airport via a non-direct route, the rerouting is not economically viable and would add potential hours to flight times. Moreover, if the MOA expands it could impact sprayers and crop dusters depending upon the new flight rules.

Community Issues

Housing is a real concern as community residents are having a hard time finding available land that is affordable to build on. People on fixed incomes and the elderly will likely have a hard time staying in town if new housing is not built.

The county and city are beginning to work better together as evidenced by the airport expansion plans.

Current county and city zoning ordinances need to be updated to match the airport zoning regulations so the airport can limit incompatible development and preserve future lands for expansion.

Shane Mintz (Montana Department of Transportation)

Issues Facing the County

The County does not have any pressing issues with state highways reaching capacity as evidenced in the data tables provided.

Programmed Improvements

Jct. MT 7 – East on S-336 (MP 0.0 to MP 7.9), tentative letting FY 2015

Jct. S-494 – North and South on MT 7 (MP 15.4 to MP 23.4), tentative letting FY 2015

Train Delays

The Federal Railroad Administration (FRA) does not regulate the length of time a train may block a grade crossing. However, FRA rail safety rules do address standing (idling) trains that unnecessarily activate grade crossing warning devices such as flashing lights and gate arms. The federal rule specifically prohibits standing trains, locomotives or other rail equipment from activating warning devices unless it is part of normal train movements or switching operations. If the FRA were to file a violation against a railroad it would be through the railroad's own rules. In the case of railroads in this area that would be covered in the General Code of Operating Rules (GCOR) item 6.32.6 Blocking Public Crossings: When practical, a standing train or switching movement must avoid blocking a public crossing longer than 10 minutes.

One of the things the city could do is document the locomotive number, date and time, and duration of blockage (actual stop time, rolling train doesn't constitute time), and any other observations that may be helpful (i.e. second train approached 5 or 30 minutes later, crew member ran over to quick stop, track crew working, etc.) This would help the FRA and BNSF in assessing this issue.

There is a state law pertaining to the period that a railroad can block a crossing, 15 minutes, but it applies to crossings outside of incorporated cities and towns (MCA 69-14-626). The city might be able to pass a city ordinance prohibiting extended blocking of crossings.

Vera Abrams (County Library Director)

Library Staff, Programs and Facilities

The library staff includes Vera, the director and three library aides. The library is overseen by the five-member Fallon County Library Board of Trustees which meets monthly. Library hours are Monday through Friday, 9:00 am to 6:00 pm, Saturday 9:00 am to 1:00 pm. The library is closed on Sundays and legal holidays. Summer hours, same as above but closed Saturday from Memorial Day weekend through Labor Day weekend.

The current library was constructed in 1970. The facility is 60' x 60'. The library has between 20,000 and 22,000 volumes, books on CD, DVD videos, newspapers and magazines. It provides inter-library book loans. It has five public access computer stations and is wired to accommodate four additional computers. One computer is reserved for catalog searches. The staff has five computers. The library has a media room that can be reserved for public meetings. The room has equipment to facilitate meetings.

The library has a dedicated county millage (1.5 mills) to support its operations. The library has 1,500 library cardholders; this level of patronage has remained steady over the past five years.

The library offers the following reading programs:

Books and Babies – young children eight weeks to five years are introduced to vocabulary, print awareness, narrative skills, letter knowledge, print motivation and phonological sensitivity through rhyming games, finger plays and basic board games.

Story Time – pre-school children meet at 11:15 am on Thursdays from mid-September through mid-May. Stories are read to children. Activities introducing and strengthening basic skills are offered; holiday craft projects are completed by the participants.

Coffee and Books – a book discussion group is made available through a grant from Humanities Montana. The group meets in September through November, and March through May on the fourth Monday of each month at 7:00 pm at the Baker Senior Center.

Summer Reading Programs – begins the first Wednesday of June each year and continues through July. Books, games and arts and crafts are all a part of each year's theme, which is selected by the Montana State Library.

Library Issues

There is a need for more space, would like to separate the computer stations from the collection area and would like a closed room for Story Time and Books and Babies programs.

Willie Benner (Plevna Mayor)

Data Request

Willie provided two critical maps regarding the sewer and water line locations in Plevna.

Town Departments and Facilities

Plevna has only two departments: the rural fire department and the town clerk.

Town Issues

Plevna has a sewer machine that cleans sewer lines, which they purchased with the County. The County has also paid $1 million for a water upgrade for existing residents and helped buy a snow plow for town use. Plevna and the County have a good working relationship and the town is grateful for helping with expenses it cannot afford.

If the town grows, a lagoon system upgrade may be needed with the potential to add another cell depending on growth. Roads are chip sealed, but are deteriorating faster than they can be repaired.

Law enforcement is an issue as residents have concerns about potential drug problems and fear of methamphetamine labs developing in town.

The Town would like to update an ordinance for trailer homes. The ordinance will address siding, skirting and other design elements to make the mobile homes look like stick-built buildings. Plevna

needs additional housing and is not against mobile homes, but the units need to look good and be designed to last longer than 20 years.

Plevna residents would like a convenience store near town. The potential exists to reuse an existing auto repair shop (Highway 12 and Plevna Road), but site contamination is an issue.

Appendix B: Community Survey Results

Fallon County Strategies

SurveyMonkey

1. Do you agree with this vision statement?

	Response Percent	Response Count
Yes	94.6%	228
No	5.4%	13
If no, what would you change?		15
answered question		241
skipped question		7

2. Where do you currently live?

	Response Percent	Response Count
City of Baker	70.6%	173
Town of Plevna	4.1%	10
Fallon County (outside Baker and Plevna)	25.3%	62
answered question		245
skipped question		3

3. What are the most important Land Use objectives you'd like to see accomplished (choose 2)?

	Response Percent	Response Count
Establish a future land use map to help make decisions about development	24.1%	47
Create policies that promote public and private sector investment in Baker and Plevna	28.2%	55
Coordinate future infrastructure investment with targeted growth areas	43.6%	85
Improve the physical appearance of existing neighborhoods and highly visible properties	**64.1%**	**125**
Establish annexation policies for Baker and Plevna that encourages coordination with Fallon County	21.5%	42
Limit incompatible development in existing agricultural areas	10.3%	20
	answered question	**195**
	skipped question	**53**

4. What Housing objectives are most important to you (choose 2)?

	Response Percent	Response Count
Increase the availability of affordable and workforce housing	**77.3%**	**150**
Develop more special-needs housing (senior citizens, disabled, homeless)	20.1%	39
Create more housing choices for low- and fixed-income residents	47.9%	93
Establish appropriate locations for crew camp (man camp) housing	19.1%	37
Reduce substandard housing units by securing funding for repair and rehabilitation	22.7%	44
Allow a more homes per acre (higher residential density)	7.7%	15
	answered question	**194**
	skipped question	**54**

5. How should Economic Development be improved throughout the county (choose 2)?

	Response Percent	Response Count
Diversify the local economy with employment opportunities for all ages	50.8%	98
Provide more amenities such as grocery stores, retail businesses and more shopping opportunities	62.2%	120
Capitalize on energy-sector growth and expand businesses to support primary energy industries	26.4%	51
Enhance job training services to develop skills needed by local businesses	14.5%	28
Support specialized agricultural businesses the produce high-value, high-demand products	18.7%	36
Expand telecommunication technologies to meet existing and future business needs	24.4%	47
	answered question	193
	skipped question	55

6. What is the most important Infrastructure objective?

	Response Percent	Response Count
Maximize the functional life of existing road, water, sewer, storm-sewer and solid waste facilities	**45.6%**	**88**
Coordinate infrastructure planning with future land use growth areas	36.8%	71
Determine financial responsibilities (who pays for what) for infrastructure improvements	17.6%	34
answered question		193
skipped question		55

7. What do you think is the most important Public Service objective?

	Response Percent	Response Count
Create equitable community services for all county residents (should we list some examples?)	17.9%	34
Improve Baker's gateway image (Hwy 7 and Hwy 12 entrances) and Plevna's prominent street frontages	**41.6%**	**79**
Enhance public involvement and notification of county, city and town projects	14.7%	28
Provide responsive services that improve the health, welfare and safety of county residents	25.8%	49
answered question		190
skipped question		58

8. What Natural Resource objective is your highest priority?

	Response Percent	Response Count
Enhance water conservation efforts for all water users including commercial and industrial uses	27.7%	54
Implement measures to protect water quality during construction activities	23.1%	45
Control weed populations to improve agricultural productivity and preserve native vegetation	14.9%	29
Improve water quality of Lake Baker	**34.4%**	**67**
	answered question	**195**
	skipped question	**53**

9. What Transportation objectives should be implemented first (choose 2)?

	Response Percent	Response Count
Improve traffic safety by maintaining roads and bridges	51.5%	100
Reduce traffic disruptions that result from railroad operations	**55.7%**	**108**
Preserve right-of-way for new roads and establish future road connections in growth areas	18.0%	35
Reduce truck traffic in Baker	40.2%	78
Protect Baker Municipal Airport's airspace from incompatible land uses	10.3%	20
	answered question	**194**
	skipped question	**54**

10. What is the most important Recreation objective?

	Response Percent	Response Count
Encourage sharing facilities between the County, Baker, Plevna and the school districts	24.1%	46
Provide year-round recreational opportunities for all age groups	**41.9%**	**80**
Maintain and enhance existing parks and recreation facilities	28.8%	55
Establish an interconnected trail system that connects the County's natural features	5.2%	10
	answered question	191
	skipped question	57

11. Should Baker establish a 1-mile extraterritorial zoning boundary (zoning beyond city limits) to ensure compatible development OR should the County maintain its land use authority along municipal boundaries?

	Response Percent	Response Count
Establish extraterritorial zoning	**53.2%**	**92**
Allow County to plan for uses along city boundary	46.8%	81
	answered question	173
	skipped question	75

12. Should open space and landscaping standards be developed along gateway corridors (Hwy 7 & Hwy 12) and/or in commercial areas throughout Baker?

	Response Percent	Response Count
Yes - both along gateways and in commercial areas	**81.8%**	**148**
Yes - only gateways	3.9%	7
Yes - only commercial areas	5.0%	9
No	9.4%	17
	answered question	**181**
	skipped question	**67**

13. To improve Baker and Plevna's downtowns, should City/Town officials enforce codes on non-maintained properties OR use grant funding to enhance downtown structures and facilities?

	Response Percent	Response Count
Enforce codes only	9.2%	17
Use grant funding only	5.4%	10
Use a combination of both code enforcement and grant funding	**83.2%**	**153**
Neither	2.2%	4
If you selected neither, please tell us what should be done to improve downtown.		4
	answered question	**184**
	skipped question	**64**

14. Should the County/City offer incentives (more homes per acre, fee waivers) for developers to build affordable housing or should the City require that developers construct affordable housing?

	Response Percent	Response Count
Offer incentives	13.3%	24
Require developers to build affordable units	18.2%	33
Depends upon the incentives	18.8%	34
Combination of incentives and requirements	**49.7%**	**90**
	answered question	**181**
	skipped question	**67**

15. Where should crew camp (man camp) housing be located?

	Response Percent	Response Count
In close proximity to an existing/planned crew camp west of Baker	**58.1%**	**104**
Inside Baker city boundaries	1.7%	3
Inside Plevna town boundaries	1.7%	3
Somewhere else within the county	7.8%	14
I do not want crew camps in my community	30.7%	55
If you do not like the selected answers, please tell us where a crew camp should be placed.		12
	answered question	**179**
	skipped question	**69**

16. Please rank the types of affordable housing would you like to see built.

	First choice	Second choice	Third choice	Fourth choice	Fifth choice	Response Count
Single-family homes	**65.4% (121)**	19.5% (36)	7.0% (13)	4.3% (8)	3.8% (7)	185
Townhomes/row homes	10.2% (18)	31.1% (55)	**32.8% (58)**	17.5% (31)	8.5% (15)	177
Apartments	16.8% (31)	**29.3% (54)**	25.0% (46)	25.5% (47)	3.3% (6)	184
Manufactured homes (pre-built homes)	10.6% (19)	19.4% (35)	28.3% (51)	**37.8% (68)**	3.9% (7)	180
Mobile home parks	3.3% (6)	3.8% (7)	7.1% (13)	10.4% (19)	**75.3% (137)**	182
					answered question	186
					skipped question	62

17. If you could brand (market) Fallon County, what term would you use to describe Fallon County to attract new residents and businesses?

	Response Count
	91
answered question	91
skipped question	157

18. What Economic Development strategy would you like to see established first?

	Response Percent	Response Count
Promote downtown special events to increase business activity	20.1%	34
Establish a limited-term property tax abatement program for new businesses	11.8%	20
Create incentives to attract a trade school or nursing program to locate in Fallon County	32.0%	54
Develop a revolving loan fund or grant program to improve downtown buildings	**36.1%**	**61**
Please list other strategies you think would be good to implement.		18
answered question		**169**
skipped question		**79**

19. If feasible, should Fallon County, Baker and Plevna consolidate public services to save money?

	Response Percent	Response Count
Yes	**75.1%**	**133**
No	24.9%	44
Please provide examples.		22
answered question		**177**
skipped question		**71**

20. Would you support creating setback and buffer standards to preserve native vegetation along streams, rivers and wetlands?

	Response Percent	Response Count
Yes	44.4%	80
No	15.6%	28
Depends upon what would happen to my ability to develop my property	40.0%	72
answered question		180
skipped question		68

21. What do you consider is the most important Environmental strategy?

	Response Percent	Response Count
Fund the county weed program to improve agricultural productivity and reduce wildfire risks and soil erosion	33.1%	58
Treat all storm-water (rain/runoff) before it enters Lake Baker	8.6%	15
Identify potentially contaminated sites and find ways to clean the identified sites	53.1%	93
Establish a water-fee program to encourage water conservation	5.1%	9
answered question		175
skipped question		73

22. Do you support a truck route around Baker with connections to Highway 7 on the east and west sides of Baker?

	Response Percent	Response Count
Yes	86.9%	159
No	13.1%	24
answered question		183
skipped question		65

23. Do you support establishing and enforcing truck load limits (weight limits) on city streets, thus reducing noise and damage to city streets?

	Response Percent	Response Count
Yes	84.5%	153
No	15.5%	28
answered question		181
skipped question		67

24. With limited transportation funding, which improvement should the County focus on first?

	Response Percent	Response Count
Create a truck by-pass route	**47.3%**	**86**
Maintain existing county roads and city streets	40.7%	74
Prohibit trucking of hazardous materials/heavy loads through Baker	3.3%	6
Establish a railroad quiet zone in Baker (quiet zones enforce no train whistles and require trains to slow down, thus reducing noise)	8.8%	16
	answered question	**182**
	skipped question	**66**

25. What would you like to see implemented to encourage greater coordination between officials from Fallon County, Baker and Plevna?

	Response Percent	Response Count
Establish quarterly or semi-annual meetings between all three governments	**50.0%**	**90**
Assign community representatives to attend regional, state and federal meetings and report back to all three governments	6.1%	11
Encourage joint-use of facilities and equipment	43.9%	79
	answered question	**180**
	skipped question	**68**

26. Please rank (most important to least important) the recreation items you would like to see implemented.

	1 (Most Important)	2	3	4	5 (Least Important)	Response Count
Create a multi-use community center in Baker that accommodates a variety of activities	**44.8% (81)**	12.2% (22)	16.6% (30)	8.8% (16)	17.7% (32)	181
Improve boat ramp facilities for Iron Horse Park and Triangle Park	2.3% (4)	15.9% (28)	26.7% (47)	**30.1% (53)**	25.0% (44)	176
Develop an interconnected trail system that expands beyond Baker	7.3% (13)	11.2% (20)	18.5% (33)	28.1% (50)	**34.8% (62)**	178
Institute a yearly or semi-yearly survey to assess community recreation needs	9.0% (16)	23.6% (42)	23.0% (41)	19.7% (35)	**24.7% (44)**	178
Maintain/clean up existing parks and recreation facilities	**44.4% (80)**	34.4% (62)	14.4% (26)	6.1% (11)	0.6% (1)	180
					answered question	**182**
					skipped question	**66**

Page 1, Q1. Do you agree with this vision statement?		
1	should include safety, education; doesn't necessarily need the reference to rapid growth	Mar 13, 2012 1:20 PM
2	It's realistic to diversify our economy. We are reliant upon oil, natural gas, and agriculture. We need to capitalize on those opportunities.	Mar 12, 2012 8:09 AM
3	I agree with the vision statement is that what they are doing No ... example Commissioner agenda building Park View garages where there is a big need for housing	Mar 11, 2012 9:33 AM
4	Fallon county should be looking to close up shop, its over	Mar 8, 2012 2:29 PM
5	How are they doing this?	Mar 8, 2012 8:57 AM
6	words? who and how do you do this? we do a poor job of this now. so what changes?	Mar 8, 2012 8:28 AM
7	IT IS A GREAT CONCEPT BUT THERE IS NO WAY THE GROUP OOF LEADERS WE HAVE NOW CAN EVEN FIGUE OUT HOW TO HAVE EMS COVERAGE ON A DAILY BASIS RIGHT NOW LET ALONG THE INCREASE IN THE VOLUME OF CALLS THAT WILL OCCUR WITH THIS BOOM, WILLISTON SERVICE ARE EXPERIENCING 30 PLUS CALLS A DAY.	Mar 7, 2012 12:32 PM
8	I would like to ask what Fallon county does to promote sustainable growth and diversify the economy?	Mar 7, 2012 10:04 AM
9	I do not see anything that the County nor the City is doing to prepare for growth and what are their plans to retain local people. Some individuals in town are 'raping' locals with extremely high rent. The County and City need to build some affordable housing for locals and perspective people who may want to move here.	Mar 7, 2012 9:48 AM
10	I would open it up for all new companies and not pick and chose the companies that the county wants which I know happens in a small town/county such as this one.	Mar 7, 2012 9:36 AM
11	I agree with everything - but the last statement "...mitigate the impacts of rapid growth..." can be interpreted may different ways. We certainly want to be cautious of rapid growth, but we also want to embrace it.	Mar 7, 2012 9:25 AM
12	Build a a recreation center beside the high school so the people who utilize don't have to go by the school's schedule. More access, more hours, and set up for working out in one place.	Mar 6, 2012 5:45 PM
13	we need a paid ambulance service and more places people can afford to rent on min wage jobs	Mar 6, 2012 7:59 AM
14	Other words that come to mind are: safe, clean, business-friendly, reinvests in itself, well-maintained infrastructure...	Mar 5, 2012 5:20 PM
15	Clean up existing problems. ex: old abandoned houses, businesses and machinery in and around town.	Mar 5, 2012 12:20 PM

Page 3, Q13. To improve Baker and Plevna's downtowns, should City/Town officials enforce codes on non-maintained properties OR use grant funding to enhance downtown structures and facilities?		
1	Get the right people in the downtown area and they will improve the downtown.	Mar 16, 2012 12:12 PM
2	private bussnes should be left private can we afford to tear down and rebuild downtown baker and where will the lines be drawn , start where , stop where. and who pays , not me , its not a government duty to sub, private ind. or buisness	Mar 11, 2012 10:25 AM
3	our county has lots of $$$$ why not use it to make Bkare look better both ways and especially downtown!!!!	Mar 7, 2012 5:33 PM
4	Codes probably need updated to enforce those which apply to todays standards. Large quonset buildings should not be allowed in residential areas	Feb 7, 2012 11:30 PM

Page 3, Q15. Where should crew camp (man camp) housing be located?		
1	I think hotels should be built to house workers. We can always use hotels anyway.	Mar 11, 2012 5:39 PM
2	there are more questions to ask and not enough room here. and without specifics there can not be any answers . It should always be about the economics , the final sheet not whats seen up front , to many people are like a kid and a shiney penny compare to a dull dime they want the penny	Mar 11, 2012 10:25 AM
3	In another county	Mar 9, 2012 7:35 PM
4	i dont think Baker will see a large need for this.	Mar 8, 2012 8:42 AM
5	COMMISSIONER RIEGERS BACK YARD	Mar 7, 2012 12:51 PM
6	I don't think "man camps" are the answer. Focus on increasing rental properties.	Mar 7, 2012 9:53 AM
7	planning the location should be consistant with future use once it is no longer used a s man camp,consideration of the previuos questions would determine the best location for man camps if they follow the guide lines set forth	Mar 7, 2012 8:09 AM
8	North?	Mar 6, 2012 8:33 AM
9	I thought the planned man camp was west of Baker	Mar 5, 2012 5:48 PM
10	West of Baker Approximately 3 miles	Mar 5, 2012 5:32 PM
11	West of Baker where it is planned, not north.	Mar 5, 2012 2:59 PM
12	Just where they planned it already.	Mar 5, 2012 10:24 AM

Page 3, Q17. If you could brand (market) Fallon County, what term would you use to describe Fallon County to attract new residents and businesses?		
1	RURAL	Mar 18, 2012 4:30 PM
2	A city with a lake in it.	Mar 17, 2012 4:08 PM
3	friendly	Mar 16, 2012 7:29 PM
4	Friendly	Mar 16, 2012 12:12 PM
5	Friendly scenic badlands	Mar 15, 2012 6:42 PM
6	Rural, Redefined	Mar 15, 2012 11:00 AM
7	Friendly community that has a lot to offer. Great school system, golf course, lake, sports complex, shooting range, parks, safe place to raise families/retire. We need to clean up and enhance what we have to be more attractive to new residents.	Mar 15, 2012 10:26 AM
8	friendly	Mar 15, 2012 8:29 AM
9	Down home feel in a growing community.	Mar 15, 2012 8:03 AM
10	small town hospitality	Mar 15, 2012 5:59 AM
11	friendly	Mar 14, 2012 12:33 PM
12	warmer than Alaska, cooler than Arizona	Mar 13, 2012 6:31 PM
13	Small town atmosphere with big opportunities	Mar 13, 2012 6:14 PM
14	Family fun. The rec-center. Baker lake. Christian chuches	Mar 13, 2012 8:40 AM
15	job opportunities	Mar 12, 2012 8:21 AM
16	old boys club	Mar 11, 2012 5:24 PM
17	poor	Mar 10, 2012 8:03 AM
18	It doesn't need a brand.	Mar 9, 2012 7:35 PM
19	Not sure at this time.	Mar 9, 2012 6:33 PM
20	FREINDLY AND QUITE	Mar 9, 2012 11:11 AM
21	Oil and Gas Industry support	Mar 9, 2012 6:26 AM
22	energetic	Mar 8, 2012 8:37 PM
23	comfortable	Mar 8, 2012 3:47 PM
24	good economy	Mar 8, 2012 1:18 PM
25	poor	Mar 8, 2012 10:56 AM

Page 3, Q17. If you could brand (market) Fallon County, what term would you use to describe Fallon County to attract new residents and businesses?

26	typical eastern montana comunity	Mar 8, 2012 9:25 AM
27	Wide open spaces,clean air and good people that care.	Mar 8, 2012 9:10 AM
28	We need to clean this town up. Look at Bowman?	Mar 8, 2012 8:42 AM
29	Friendly	Mar 8, 2012 8:38 AM
30	DIVERSE	Mar 8, 2012 7:52 AM
31	Friendly	Mar 8, 2012 6:29 AM
32	great job opportunities with wonderful friendly families!!!	Mar 7, 2012 5:33 PM
33	?	Mar 7, 2012 5:10 PM
34	As a growing community	Mar 7, 2012 4:05 PM
35	friendly community minded	Mar 7, 2012 11:05 AM
36	small town culture	Mar 7, 2012 10:45 AM
37	Small town atmosphere...	Mar 7, 2012 10:21 AM
38	Quiet and Safe place to retire/raise children	Mar 7, 2012 10:18 AM
39	Non-Growing	Mar 7, 2012 10:01 AM
40	full of opportunities - bring the family :)	Mar 7, 2012 9:39 AM
41	opportunity	Mar 7, 2012 9:12 AM
42	Friendly, Inviting, and Looking to the Future	Mar 7, 2012 8:50 AM
43	Caring Community	Mar 7, 2012 8:37 AM
44	concerned	Mar 7, 2012 8:09 AM
45	We're simply wonderful -utilizing simple as a descriptive term	Mar 6, 2012 9:12 PM
46	a safe, friendly community	Mar 6, 2012 8:21 PM
47	dont need to market	Mar 6, 2012 5:05 PM
48	Friendly	Mar 6, 2012 4:04 PM
49	Diversified with Pride	Mar 6, 2012 3:34 PM
50	Friendly family town - great place to raise kids!	Mar 6, 2012 3:01 PM
51	Pleasantville	Mar 6, 2012 2:39 PM
52	community driven	Mar 6, 2012 2:10 PM

Page 3, Q17. If you could brand (market) Fallon County, what term would you use to describe Fallon County to attract new residents and businesses?		
53	friendly and safe environment	Mar 6, 2012 11:57 AM
54	friendly	Mar 6, 2012 11:38 AM
55	Friendly	Mar 6, 2012 11:19 AM
56	Family Oriented Community	Mar 6, 2012 10:31 AM
57	Friendly	Mar 6, 2012 10:12 AM
58	Wanting to be the Best Host City Welcoming Events, Families to our community.	Mar 6, 2012 10:12 AM
59	Safe	Mar 6, 2012 9:44 AM
60	The new frontier	Mar 6, 2012 9:30 AM
61	Space air to breath room to grow...of course it would be good if we cleaned out streets in the winter and offered a cleaner city	Mar 6, 2012 9:08 AM
62	When the going gets tough the Town gets going	Mar 6, 2012 8:45 AM
63	this place is a dump, needs cleaing up. old cars etc.	Mar 6, 2012 8:39 AM
64	N/A	Mar 6, 2012 8:38 AM
65	Neighborly	Mar 6, 2012 8:36 AM
66	Progressive	Mar 6, 2012 8:33 AM
67	Family	Mar 6, 2012 8:21 AM
68	friendly	Mar 6, 2012 8:10 AM
69	great place to raise children	Mar 6, 2012 8:09 AM
70	close knit, family friendly	Mar 6, 2012 8:04 AM
71	COMMUNITY SUPPORTED	Mar 6, 2012 7:35 AM
72	Friendly	Mar 6, 2012 7:03 AM
73	Small down home hospitality	Mar 6, 2012 6:55 AM
74	Opportunities in a small, friendly environment	Mar 6, 2012 6:29 AM
75	Friendliness	Mar 6, 2012 4:47 AM
76	opportune	Mar 5, 2012 11:44 PM
77	Family Orientated	Mar 5, 2012 11:21 PM
78	Small town friendliness	Mar 5, 2012 9:54 PM

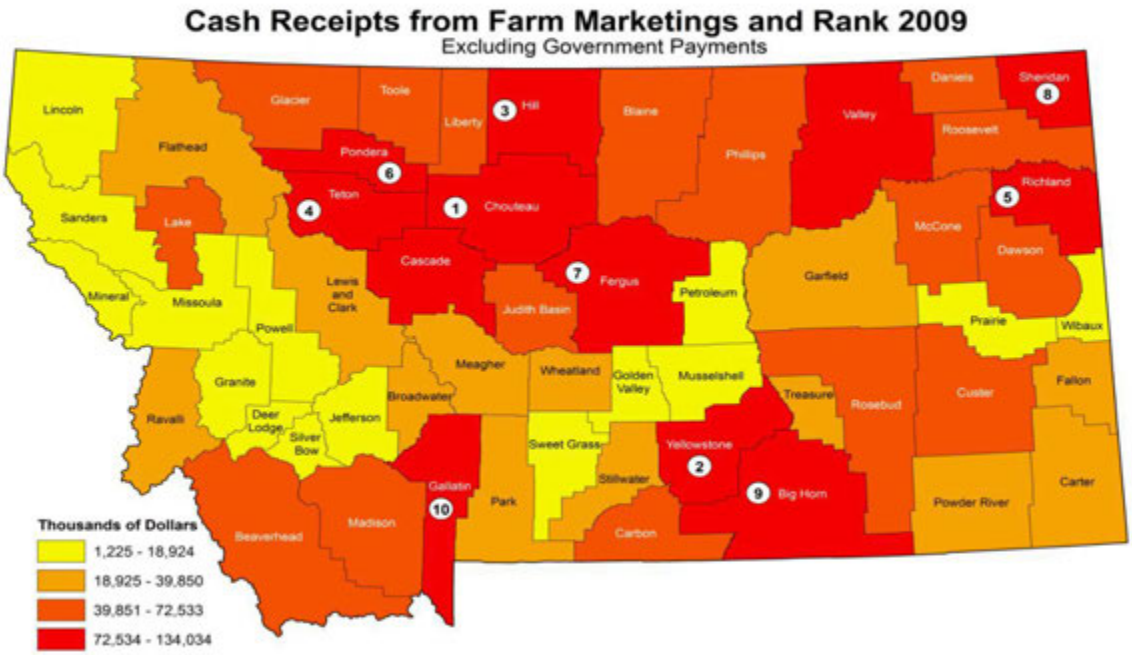
Page 3, Q17. If you could brand (market) Fallon County, what term would you use to describe Fallon County to attract new residents and businesses?		
79	stable	Mar 5, 2012 6:34 PM
80	Small town, friendly	Mar 5, 2012 5:48 PM
81	Family living at its best.	Mar 5, 2012 5:35 PM
82	Community Friendly	Mar 5, 2012 2:59 PM
83	Room to Grow - Space to stretch your legs!	Mar 5, 2012 2:28 PM
84	good wages/low taxes	Mar 5, 2012 2:13 PM
85	good medical facility and schools	Mar 5, 2012 12:42 PM
86	Progressive small community w friendly atmosphere	Mar 5, 2012 11:53 AM
87	Thriving growing and great small community that wants YOU!	Mar 5, 2012 10:24 AM
88	?	Feb 28, 2012 2:15 PM
89	growing but keeping small town atmosphere	Feb 20, 2012 1:00 PM
90	Fallon County- The Real Montana	Feb 2, 2012 4:37 PM
91	People you can depend on.	Feb 1, 2012 4:37 PM

Page 3, Q18. What Economic Development strategy would you like to see established first?		
1	incentive for buisness man. or serv. is not a bad thing as long as the incentive is based on the number of direct employees the compony will hire	Mar 11, 2012 10:25 AM
2	Make Baker a place were people are proud to live and all this will come.	Mar 8, 2012 8:42 AM
3	Housing	Mar 8, 2012 7:04 AM
4	Provide health insurance or better pay or some kind of incentive to provide more volunteers for ambulance call	Mar 7, 2012 11:05 AM
5	have a open door policy to ALL NEW BUISNESS and not just the ones that the POPULARS WOULD WANT	Mar 7, 2012 10:01 AM
6	We have lost so many good workers due to the appearance of Baker. I have heard of too many men that begin working in the patch, but have to leave because their spouses see the town and don't want to move here. Or, the men travel and their wives live elsewhere.	Mar 7, 2012 9:39 AM
7	as well as add some trees or make the overall appeareance nicer and more welcoming.	Mar 6, 2012 2:10 PM
8	Make the main street longer, with more business choice, more attactive shopping area, better parking,	Mar 6, 2012 10:12 AM
9	have a plan...clean it up and add some nice amenities not everyone has great taste, and businesses look at dollars	Mar 6, 2012 9:08 AM
10	We need more businesses	Mar 6, 2012 8:45 AM
11	Provide funding, grants, that promote vacant, poor housing removal. Establishment codes that promote such development, fire hazards, condemnation, minimum water and sewer rates on vacant properties, promote building, tax breaks, to promote new construction	Mar 6, 2012 8:33 AM
12	More housing first	Mar 6, 2012 7:03 AM
13	more stores--ie grocery	Mar 6, 2012 6:55 AM
14	improve on Baker's appearance and infrastructure	Mar 5, 2012 11:21 PM
15	Incentives for business to build more shopping facilities, such as Pamida/Alco or family style restaraunts open later in the evening. Some don't like to go to a bar to get a meal.	Mar 5, 2012 2:28 PM
16	support the existing businesses & not shut off the water & golf course because the mayor is pissed off !!!	Mar 5, 2012 2:13 PM
17	Getting the area cleaned up, it's difficult to attract new people to a town that looks like a mechanics shop or abandoned building site.	Mar 5, 2012 12:42 PM
18	Trade / vocational / technical center as well as a work program for those with cognotive disabilities, such as a laundry service	Feb 7, 2012 11:30 PM

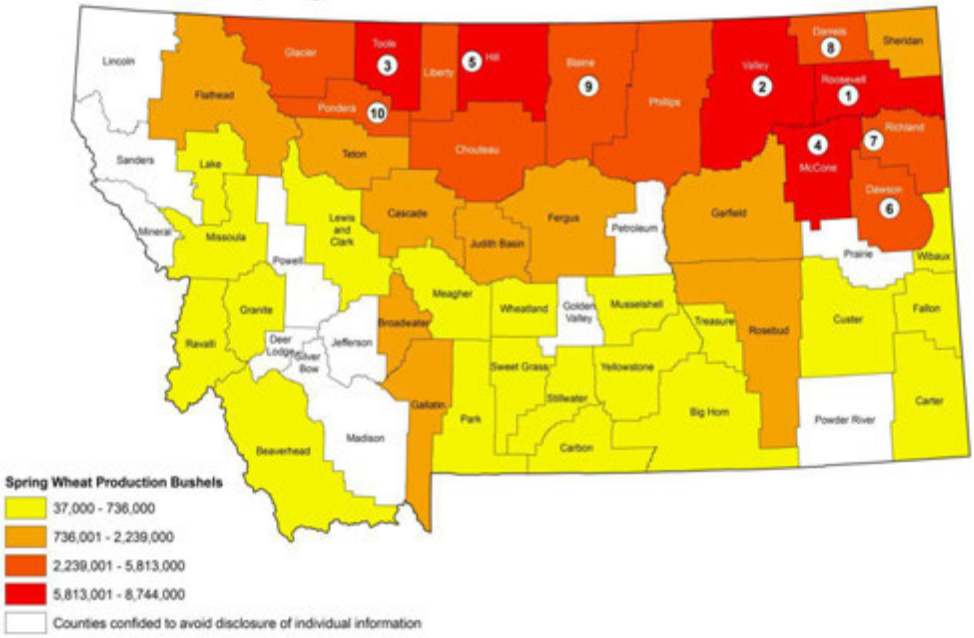
Page 3, Q19. If feasible, should Fallon County, Baker and Plevna consolidate public services to save money?		
1	consolidate the high school	Apr 3, 2012 12:44 PM
2	County and city government needs to be combined into one unit	Mar 17, 2012 4:08 PM
3	what are the public services you are talking about. You should have listed more examples in your survey	Mar 14, 2012 8:14 AM
4	What are the public services you are talking about?	Mar 14, 2012 8:13 AM
5	The city needs the County's assistance to improve the water and sewer infrastructure	Mar 12, 2012 8:21 AM
6	they have never worked well together before dont srr that changing	Mar 11, 2012 10:25 AM
7	Schools especially high school should be consolidated.	Mar 8, 2012 8:37 PM
8	I think that it only makes sense to consolidate law enforcement. At the same time hire more officers before the boom starts. Don't wait till it gets here and say " Wow we need more officers"	Mar 8, 2012 9:10 AM
9	Law inforcement is a fine place to start. Road work.	Mar 8, 2012 8:42 AM
10	SCHOOLS,	Mar 7, 2012 12:51 PM
11	garbage, city services such as street maintenance	Mar 7, 2012 11:26 AM
12	sheriff's office and police dept. city and county roads and bridges	Mar 7, 2012 11:05 AM
13	This would become a 'testosterone political battle' only hate and discontent will ensue if this were to happen!!!	Mar 7, 2012 10:01 AM
14	snow removal,road upgrades,law enforcement,	Mar 7, 2012 8:09 AM
15	nor sure i understand the questions what like what?	Mar 6, 2012 9:08 AM
16	Combine schools, no-brainer, someone has to step up and make the difficult decision!	Mar 6, 2012 8:33 AM
17	Combine schools--	Mar 6, 2012 6:55 AM
18	Combining resources such as land owned by the county(Fairgrounds) could be developed into a place for appartments and building a multipurpose auditorium/theater for performances/movies, speakers, etc.	Mar 5, 2012 2:28 PM
19	lalw enforcement needs to be consolidated	Mar 5, 2012 2:13 PM
20	The scholl would be a good place to start.	Mar 5, 2012 12:42 PM
21	Sharing equipment, office space, job duties when feasible. Work together on many projects to benefit the who county/communities.	Mar 5, 2012 11:53 AM
22	I doubt this would ever happen	Feb 7, 2012 11:30 PM

Appendix C: Agricultural Statistics

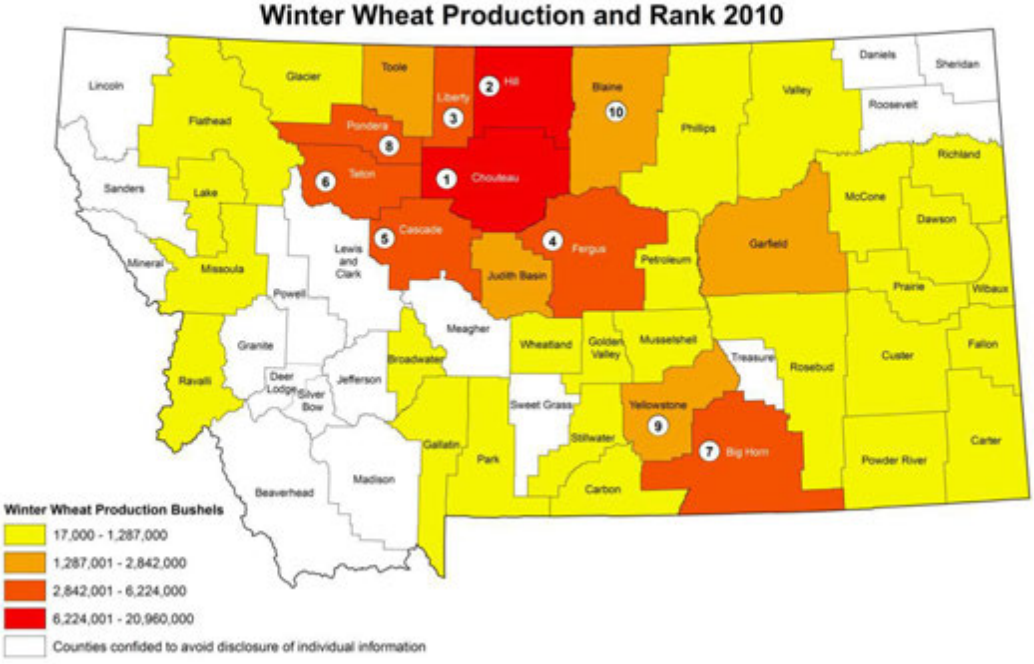
The following data was obtained from the October 2011 Montana Agricultural Statistics Report prepared by the USDA, NASS, Montana Field Office.



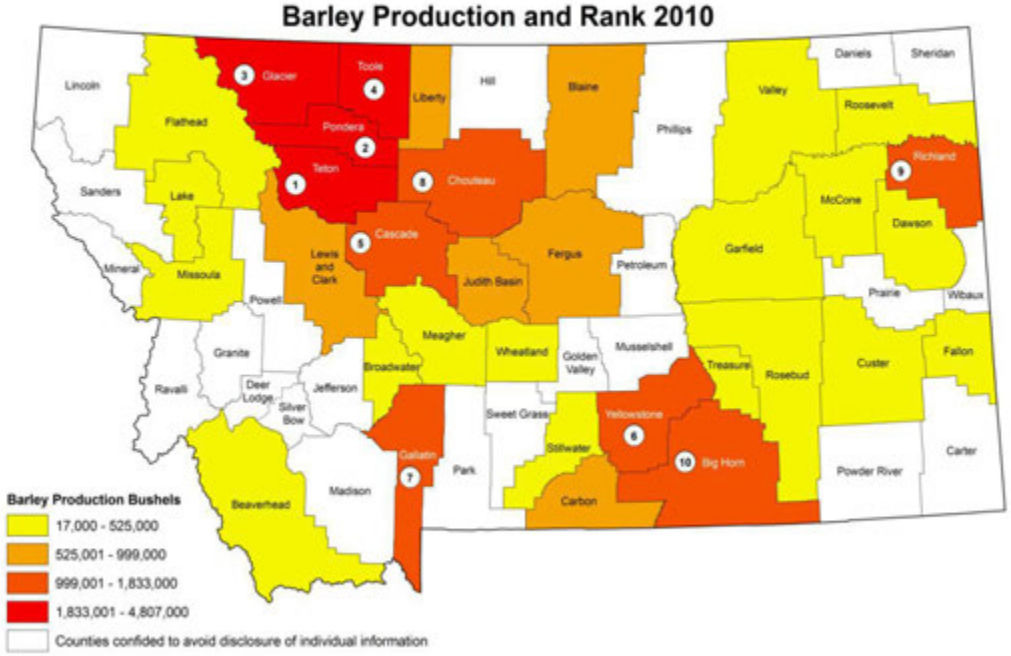
Spring Wheat Production and Rank 2010



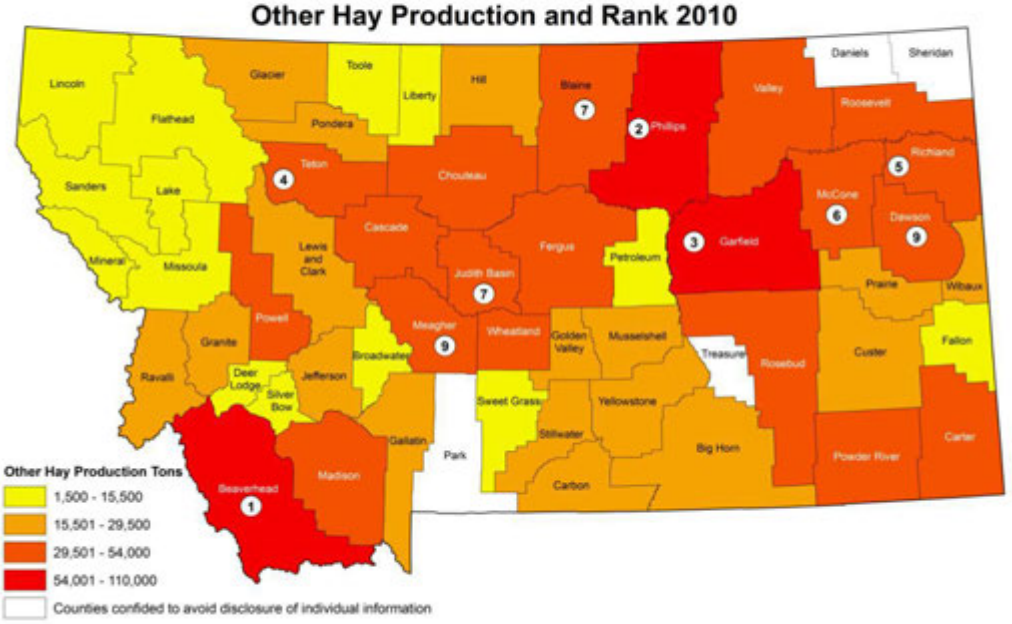
Winter Wheat Production and Rank 2010



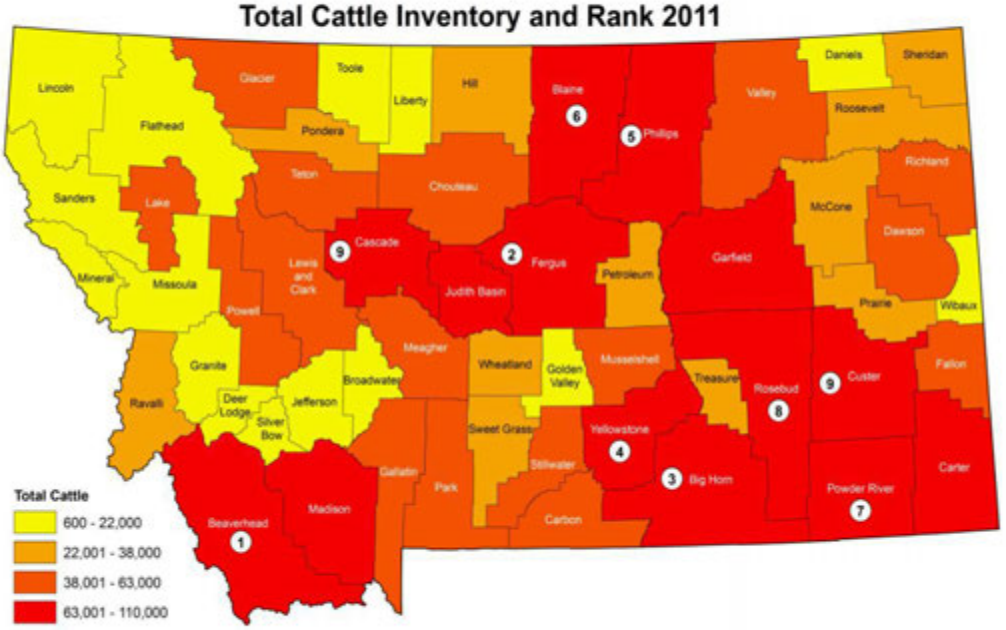
Barley Production and Rank 2010



Other Hay Production and Rank 2010



Total Cattle Inventory and Rank 2011



Total Sheep Inventory and Rank 2011

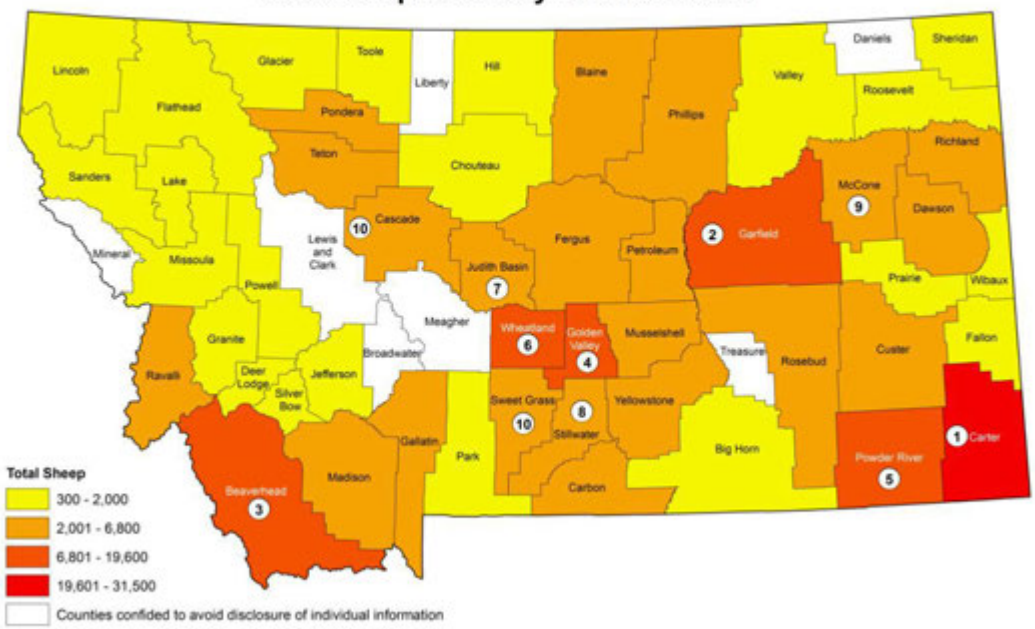


Table A.6: Winter Wheat Acreage, Yield and Production by Counties and Districts, 2009-2010

Location	Planted Acres	Harvested Acres	Yield Bushel	Production	
				Bushels	State Rank
2009					
Fallon County	20,000	16,700	30.0	505,000	27
Southeast District			33.5		
Montana			37.0		
2010					
Fallon County	9,500	9,400	33.6	316,000	32
Southeast District			38.8		
Montana			48.0		

Table A.7: Spring Wheat Acreage, Yield and Production by Counties and Districts, 2009-2010

Location	Planted Acres	Harvested Acres	Yield Bushel	Production	
				Bushels	State Rank
2009					
Fallon County	23,000	22,600	34.0	773,000	22
Southeast District			31.0		
Montana			30.0		
2010					
Fallon County	28,000	25,100	27.1	679,000	30
Southeast District			33.1		
Montana			38.0		

Table A.8: All Barley Acreage, Yield and Production by Counties and Districts, 2009-2010

Location	Planted Acres	Harvested Acres	Yield Bushel	Production	
				Bushels	State Rank
2009					
Fallon County	6,000	2,000	34.0	68,000	42
Southeast District			70.0		
Montana			57.0		
2010					
Fallon County	5,000	1,600	33.1	53,000	43
Southeast District			64.3		
Montana			62.0		

Table A.9: Oats Acreage, Yield and Production by Counties and Districts, 2009-2010

Location	Planted Acres	Harvested Acres	Yield Bushel	Production	
				Bushels	State Rank
2009					
Fallon County	1,800	800	41.0	33,000	18
Southeast District			44.0		
Montana			56.0		
2010					
Fallon County	1,100	800	38.8	31,000	21
Southeast District			49.4		
Montana			65.0		

Table A.10: Dry Peas Acreage, Yield and Production by Counties and Districts, 2009-2010

County and District	2009				2010			
	Planted Acres	Harvested Acres	Yield Pounds	Production Cwt.	Planted Acres	Harvested Acres	Yield Pounds	Production Cwt.
Fallon County	3,100	2,700	1,830	49,500	2,600	2,600	1,670	43,500
Southeast District			1,630				1,940	
Montana			1,330				2,000	

Table A.11: Safflower Acreage, Yield and Production by Counties and Districts, 2009-2010

County and District	2009				2010			
	Planted Acres	Harvested Acres	Yield Pounds	Production Pounds	Planted Acres	Harvested Acres	Yield Pounds	Production Pounds
Fallon County	3,400	3,400	940	3,179,000	2,700	2,700	900	2,420,000
Southeast District			890				880	
Montana			770				850	

Table A.12: Alfalfa Hay Acreage, Yield and Production by Counties and Districts, 2009-2010

Location	2009				2010			
	Harvested Acres	Yield Tons	Production		Harvested Acres	Yield Tons	Production	
			Tons	Rank			Tons	Rank
Fallon County	67,000	1.35	92,000	16	77,000	1.5	117,000	16
Southeast District		1.80				1.90		
Montana		2.10				2.3		

Table A.13: Other Hay Acreage, Yield and Production by Counties and Districts, 2009-2010

Location	2009				2010			
	Harvested Acres	Yield Tons	Production		Harvested Acres	Yield Tons	Production	
			Tons	Rank			Tons	Rank
Fallon County	14,000	1.30	18,500	28	11,000	1.40	15,500	41
Southeast District		1.20				1.45		
Montana		1.50				1.80		

Table A.14: All Cattle, Calves and Beef Cows, January 1, 2009-2011

Number of Head			Rank
2009	2010	2011	
54,000	53,000	52,000	19

Table A.15: Sheep and Lamb Inventories by Counties and Districts, January 1, 2009-2011

Number of Head			Rank
2009	2010	2011	
2,200	2,100	2,000	30

BAKER CORRIDOR
PLANNING STUDY

APPENDIX D: Field Review and Photo Log

Baker Corridor Planning Study

Date:	Tuesday, November 25, 2014
Project:	Baker Corridor Planning Study
To:	Corrina Collins, MDT Project Manager
From:	Jon Schick, HDR Project Manager
Subject:	Field Review and Photo Log Documentation from November 04, 2014 Site Visit

Purpose:

HDR conducted a field review of the Baker Corridor Planning Study Area on November 4, 2014. The field review entailed photo and written documentation of the existing transportation conditions and constraint areas within the study area. The photos and conditions noted are representative of the existing conditions within the study area and should not be considered a comprehensive account.

A GPS-enabled camera was used during the field review and photo points were imported into GIS. Where noted for U.S. Highway 12 (US 12), Montana Highway 7 (MT 7), and Secondary Highway 493 (S-493), photo locations were compared against the MDT Reference Marker (RM) spatial file for approximate locations. Figure 1 depicts the photo locations and site photographs and captions are included below. The field review did not entail detailed inspections or testing.

US Highway 12: RM 79 to 88.1

The study area includes US 12, from approximately RM 79 to RM 88.1. Representative photos taken along US 12 are numbered1 through 27 and are ordered west to east.

General observations and additional information not pictured includes the following:

- US 12 had a recent pavement preservation job done west of city limits, from approximately RM 77 to the western city limit boundary, RM 82.45.
- Side slopes along US 12 outside of Baker city limits (both east and west of Baker) were approximately 5:1.
- Highway fatality markers were observed at: RM 79.85, RM 83.48, RM 85.23, RM 87.63 (double fatality), and RM 87.97.
- Minimal evidence of wildlife/vehicle collisions was observed. Dead pheasants were observed at RM 79.48 and RM 82.05.

MT Highway 7: RM 31.9 to 37.6

The study area includes MT 7, from approximately RM 31.9 to RM 37.6. Representative photos taken along MT 7 are numbered 28 through 44 and are ordered south to north.

General observations and additional information not pictured includes the following:

- Side slopes along MT 7 outside of Baker city limits (both north and south of Baker) were approximately 5:1. Steeper slopes exist north of town where roadway gains elevation, north of the S-493 intersection.

- One dead rabbit was observed along MT 7 within the study area at approximately RM 37.6.

Secondary Highway 493 (Pennel Road): RM 0 to RM 2.1

The study area includes Secondary Highway 493, from RM 0 to approximately RM 2.1. Representative photos taken along S-493 are numbered 45 through 50 and are ordered generally east to west.

General observations and additional information not pictured includes the following:

- Side slopes along S-493 were approximately estimated at 2:1 and steeper in some locations.
- The highway is paved from RM 0 to approximately RM 1 then transitions to dirt immediately north of the first 90 degree turn.

U.S. Highway 12, RM 79 to RM 88.1



Photo 1: Looking east on US 12, RM 79. West study area boundary.



Photo 2: Looking northeast, US 12 and Latigo Trail intersection, RM 79.2.



Photo 3: Looking south, unnamed drainage, RM 79.35.



Photo 4: Looking south, utilities adjacent R/W with potential pipeline underneath US 12, RM 79.45.



Photo 5: Looking south, Red Butte Creek, RM 79.77.



Photo 6: Looking northeast, large-diameter double culvert on Red Butte Creek, RM 79.77.



Photo 7: Looking south, Fallon County Shooting Range, RM 80.75.



Photo 8: Looking northeast, culvert under US 12 at unnamed drainage, RM 81.4.



Photo 9: Looking south, utilities adjacent R/W with potential pipeline underneath US 12, RM 81.76.



Photo 10: Looking east, culvert under US 12 at unnamed drainage, RM 81.9.



Photo 11: Looking west, culvert under US 12 on unnamed drainage, RM 82.



Photo 12: Looking southeast, City of Baker sign, RM 82.06.



Photo 13: Looking east, 45 mph warning sign, RM 82.2.



Photo 14: Looking east, start 45 mph zone, RM 82.33.



Photo 15: Looking northeast, US 12 bridge spanning tributary to Sandstone Creek, approximate western city limits boundary, RM 82.43.



Photo 16: Looking east, start of 25 mph zone, US 12 and 5th Street intersection, RM 82.68.



Photo 17: Looking east on US 12 towards downtown Baker, RM 82.9.



Photo 18: Looking west, US 12/MT 7 intersection, RM 83.07. The US 12/MT 7 intersection is stop controlled and has a blinking light. Note semi trailer turning eastbound on MT 7 and occupying a portion of the oncoming travel lane.



Photo 19: Looking west, fatality marker adjacent US 12, BNSF railroad, RM 83.48.



Photo 20: Looking northwest, Berwald Road at-grade rail crossing, RM 83.75.



Photo 20: Looking north, Willow Lane at-grade railroad crossing, RM 84.16.



Photo 21: Looking east, Motor Carrier Services (MCS) weighing pad and pullout on US 12, RM 84.48.



Photo 22: Looking northwest, BNSF railroad, eastern limit of railroad double track, RM 84.95.



Photo 23: Looking west, ontop the US 12/BNSF railroad bridge, RM 85.77.



Photo 24: Looking north, unnamed tributary to Sandstone Creek flows underneath US 12, RM 86.



Photo 25: Looking west, US 12 east of railroad bridge, RM 86.07.



Photo 26: Looking east, US 12, RM 87.51.



Photo 27: Looking north, US 12/Sheep Corner Road intersection, RM 88.12.

Montana Highway 7, RM 31.9 to RM 37.6



Photo 28: Looking north, MT 7, southern study area boundary, RM 31.9 .



Photo 29: Looking northeast, waterbody adjacent right-of-way, RM 32.28.



Photo 30: Looking west, MDT wetland mitigation site adjacent MT 7 and unnamed tributary of Red Butte Creek flows underneath highway, RM 32.68.



Photo 31: Looking south, culvert underneath MT 7 conveying Red Butte Creek, RM 33.05.



Photo 32: Looking north on MT 7, RM 33.12.



Photo 33: Looking north on MT 7, beginning of no passing zone, RM 33.4.



Photo 34: Looking east from MT 7, Fallon County Fairgrounds entrance, RM 34.51.



Photo 35: Looking north, MT 7 and Harriet Avenue intersection, RM 35.39.



Photo 36: Looking north on MT 7 towards US 12/MT 7 intersection, RM 35.44.



Photo 37: Looking north towards at-grade railroad crossing on MT 7, MT 7 and Railroad Avenue intersection, RM 35.56.



Photo 38: Looking southeast on MT 7 at the at-grade railroad crossing, RM 35.6.



Photo 39: Looking south towards downtown on MT 7, RM 35.82.



Photo 40: Looking northwest, MT 7 bridge over Sandstone Creek, RM 35.86.



Photo 41: Looking north, industrial development along MT 7, RM 36.1



Photo 42: Looking northwest, MT 7/ S-493 (Pennel Rd)/Shell Oil Road intersection, RM 36.54.



Photo 43: Looking south on MT 7 towards Mitchell's Oil Field Service, RM 37



Photo 44: Looking south on MT 7, approximate northern limits of study area, RM 37.6. This intersection appeared to receive higher volumes of traffic turning from the oil/gas access road onto MT 7, as evidenced by the tire marks and amount of gravel/dirt on the highway.

Montana Secondary Highway 493 (Pennel Road), RM 0 to RM 2.4



Photo 45: Looking west, MT 7/ S-493 (Pennel Road) intersection, RM 0. S-493 is paved until approximately RM 1 and unpaved beyond.



Photo 46: Looking north, S-493 (Pennel Road), probable wetlands adjacent roadway, RM 0.21. Unnamed tributary to Sandstone Creek flows underneath S-493.



Photo 47: Looking south onto Bonnievale Road from S-493, RM 0.42. Note recent drainage improvements along S-493.



Photo 48: Looking southwest from S-493/Bonnievale Road intersection, RM 0.42. Substation on southwest corner of intersection.



Photo 49: Looking south on S-493, RM 1.15. Left curve warning sign located before 90 degree turn.



Photo 50: Looking south on S-493, RM 2.4.

***OFF SYSTEM ROUTES* - Shell Oil Road**



Photo 51: Looking northeast, MT 7/Shell Oil Road intersection.



Photo 52: Looking north from Shell Oil Road. Montana Dakota Utilities substation.



Photo 53: Looking southeast from Shell Oil Road. Drainage issues noted adjacent roadway.



Photo 54: Looking east on Shell Oil Road. Road is unpaved beyond photo location.



Photo 55: Looking east, large box culvert underneath Shell Oil Road conveying an unnamed tributary of Sandstone Creek.



Photo 56: Looking east from intersection of Shell Oil Road and School House Road.



Photo 57: Looking east, probable wetland areas abutting Shell Oil Road.

Miscellaneous Photos



Photo 58: Looking southeast, Bonnievale Road bridge spanning Sandstone Creek. A Weight Limit of 12 Tons sign located at either end of the structure.



Photo 59: Looking south towards the at-grade railroad crossing on West End Crossover Road.



Photo 60: Looking north from Sandstone Road.



Photo 61: Looking south, quadruple culverts underneath Sandstone Road on Red Butte Creek.



Photo 62: Looking east, left curve warning sign on Sandstone Road.



Photo 63: Looking north, Brackett Butte Road transitions from dirt to asphalt.



Photo 64: Looking west from Coral Creek Road towards inundation area and USACE dam.



Photo 65: Looking east from Coral Creek Road at headgates and culverts on east side of the road.



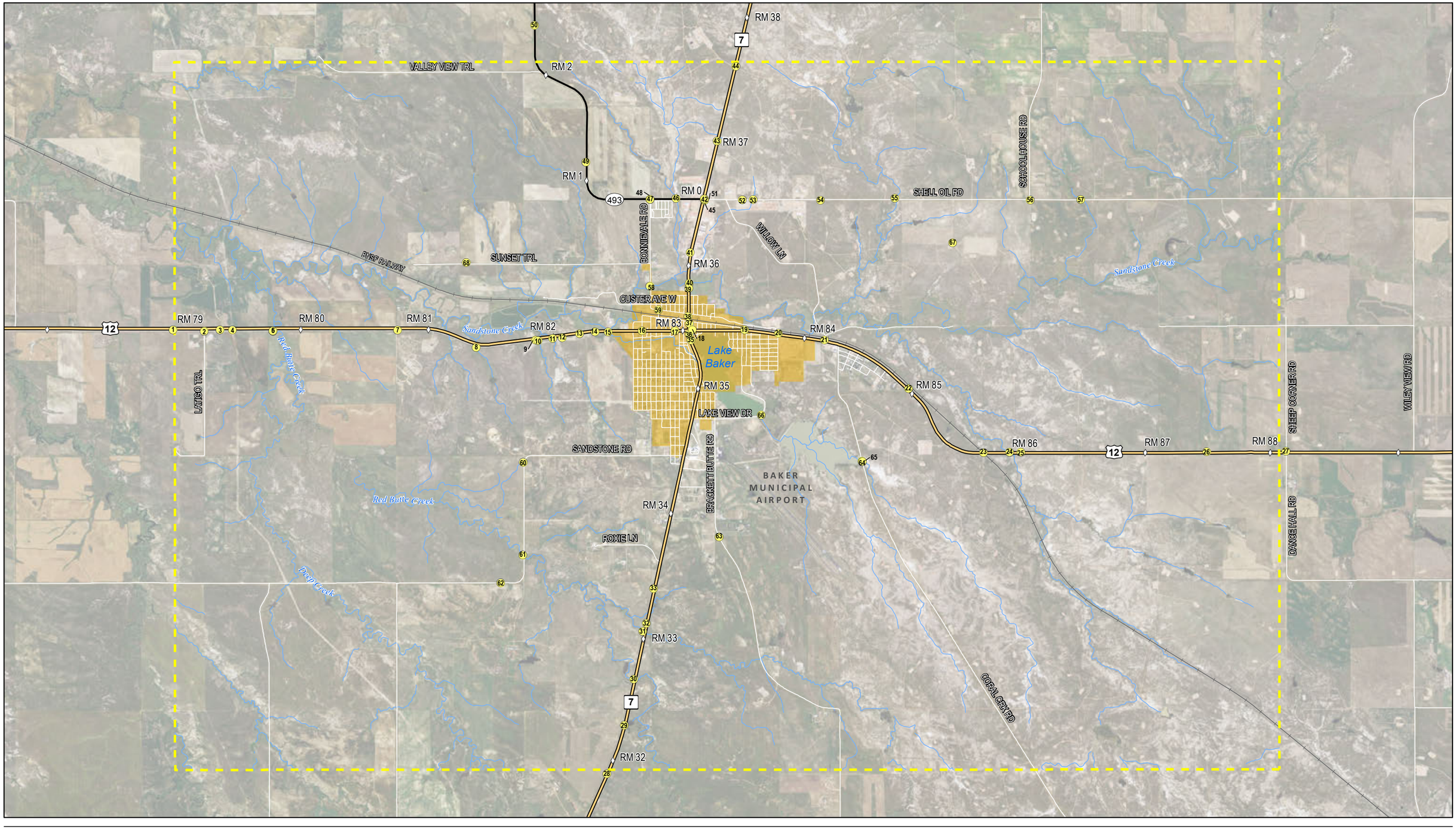
Photo 66: Looking northwest from Lake View Drive, southeast corner of Baker Lake. A separated bike/ped path wraps around the lake.



Photo 67: Looking southwest from an unnamed access road south of Shell Oil Road.



Photo 68: Looking east on Sunset Trail Road towards the city lagoons (in background). New transmission poles erected; transmission lines not yet mounted.



0 0.25 0.5 1 Miles

Date: November 24, 2014
Projection: MT Stateplane, NAD83 Ft
Sources: MDT, HDR, ESRI

LEGEND

- Photo Location and Number
- Reference Markers (RM)
- Environmental Scan Boundary
- BNSF Railroad
- Stream/Irrigation Ditch
- Baker City Limits
- Primary On System Route
- Secondary On System Route
- Off System Route

BAKER CORRIDOR PLANNING STUDY

City of Baker, Fallon County, MT

FIGURE 1: STUDY AREA and FIELD REVIEW PHOTO LOCATIONS

BAKER CORRIDOR
PLANNING STUDY

APPENDIX E: Miscellaneous Reports

Baker Corridor Planning Study

2014 PAVEMENT DATA FOR BAKER CORRIDOR PLANNING STUDY AREA

Route	Direction	Lane	Begin Mile	End Mile	Pavement Type	Length	Width	# of Lanes	Financial District	Maintenance Division	AADT	ESAL	cesal	Pavement Age	IRI Index	Rut Index	ACI Index	MCI - ACP Index	OPI	Raveling Index	Base Thickness	Surface Type	O'Lay Thick	TOTAL THICK	Flexible Thickness	Road Structure Category	Year Constructed	Year of Last Surface	Last Treatment Year	County	NHS/STP	System	MDT_SYS_NHS STP_ID	ROUTE DESCRIPTION
C000002	All	All	77.2	82.6	ASPHALT	5.40	28	2	GLENDIVE	MILES CITY	1,291	46	247,936	15	65.09	53.91	95.47	95.17	54.07	99.66	3.23	PMS-B	0.34	3.57	0.34	AC Reconstruction	1998	1998	1998	FAL	STP	Prim	Primary STP	P-2
C000002	All	All	82.6	83.749	ASPHALT	1.15	46	2	GLENDIVE	MILES CITY	3,240	82	331,416	11	48.00	74.67	100.00	100.00	57.41	92.57	0.9	PMS-D	0.4	1.3	0.4	AC Reconstruction	2002	2002	2002	FAL	STP	Prim	Primary STP	P-2
C000002	All	All	83.749	95.514	ASPHALT	11.77	33	2	GLENDIVE	MILES CITY	1,004	98	288,490	8	80.33	75.46	99.25	97.68	74.09	100.00	1	PMS-S	0.143	1.893	0.893	AC Minor Rehabilitation	1968	2005	2005	FAL	STP	Prim	Primary STP	P-2
C000027	All	All	29	35.4	ASPHALT	6.40	28	2	GLENDIVE	MILES CITY	1,065	99	108,419	3	72.07	75.71	98.35	97.99	69.57	99.73	1.07	PMS-S	0.32	1.39	0.32	AC Reconstruction	2010	2010	2010	FAL	STP	Prim	Primary STP	P-27
C000027	All	All	35.4	44.5	ASPHALT	9.10	28	2	GLENDIVE	MILES CITY	1,288	92	302,646	9	67.95	70.79	98.19	95.58	64.64	98.37	0	PMS-S	0.15	0.55	0.55	AC Thin Overlay	1983	2004	2004	FAL	STP	Prim	Primary STP	P-27

Montana Department of Transportation

INITIAL ASSESSMENT FORM FOR STRUCTURE :

P00002082+06161

Location : WEST EDGE BAKER Structure Name: none

General Location Data

District Code, Number, Location : **04** **Dist 4** **GLENDIVE**
County Code, Location : **025** **FALLON**
Kind fo Hwy Code, Description : **2** **2 U.S. Numbered Hwy**
Str Owner Code, Description : **1** **State Highway Agency**
Intersecting Feature : **DRAINAGE**
Structure on the State Highway System : [X]
Structure on the National Highway System : [ ]
Str Meet or Exceed NBIS Bridge Length : [X]
Latitude : **46°22'04"**
Longitude : **104°17'18"**

MDT Maintenance Section : **43-14 Baker**
Division Code, Location : **43** **MILES CITY**
City Code, Location : **03475** **BAKER**
Signed Route Number : **00012**
Maintained by Code, Description : **1** **State Highway Agency**
Kilometer Post, Mile Post : **132.70 km** **82.46**

Traffic Data

Current ADT : **3,730** ADT Count Year : **2009** Percent Trucks : **2 %**

Construction Data

Construction Project Number : **STPP 2-2(9)77**
Construction Station Number : **1782+12.00**
Construction Drawing Number : **16560**
Construction Year : **1998**
Reconstruction Year :

Structure Loading, Rating and Posting Data

Loading Data :

Design Loading :		**5 MS 18 (HS 20)**
Inventory Load, Design :	**32.6 mton**	**B ASD Assigned**
Operating Load, Design :	**36.2 mton**	**B ASD Assigned**
Posting :		**5 At/Above Legal Loads**

Rating Data :

	Operating	Inventory	Posting
Truck 1 Type 3 :			
Truck 2 Type 3-S3 :			
Truck 3 Type 3-3 :	**40**		

Structure, Roadway and Clearance Data

Structure Deck, Roadway and Span Data :

Structure Length : **19.56 m**
Deck Area : **228.00 m sq**
Deck Roadway Width : **10.97 m**
Approach Roadway Width : **8.50 m**
Median Code, Description : **0** **No median**

Structure Vertical and Horizontal Clearance Data :

Vertical Clearance Over the Structure : **99.99 m**
Reference Feature for Vertical Clearance : **N Feature not hwy or RR**
Vertical Clearance Under the Structure : **0.00 m**
Reference Feature for Lateral Underclearance : **N Feature not hwy or RR**
Minimum Lateral Under Clearance Right : **0.00 m**
Minimum Lateral Under Clearance Left : **0.00 m**

Span Data

Main Span

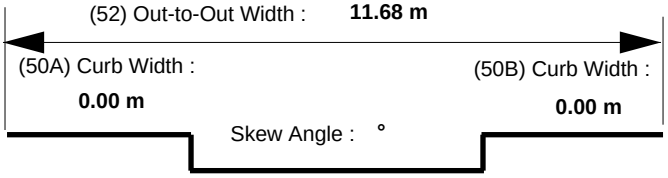
Number Spans : **3**
Material Type Code, Description : **2** **Concrete continuous**
Span Design Code, Description : **1** **Slab**

Approach Span

Number of Spans : **0**
Material Type Code, Description :
Span Design Code, Description :

Deck

Deck Structure Type : **1** **Concrete Cast-in-Place**
Deck Surfacing Type : **1** **Monolithic concrete (concurrently placed with struct**
Deck Protection Type : **1** **Epoxy Coated Reinforcing**
Deck Membrain Type : **0** **None**



Structure Vertical and Horizontal Clearance Data Inventory Route :

Over / Under Direction Name	Inventory Route	South, West or Bi-directional Travel			North or East Travel		
		Direction	Vertical	Horizontal	Direction	Vertical	Horizontal
Route On Structure	P00002	Both	99.99 m	8.50 m	N/A		
US 12							

INITIAL ASSESSMENT FORM FOR STRUCTURE :

P00002082+06161

Continue

Inspection Data

Sufficiency Rating : **83**
Structure Status : **Not Deficient**

Inspection Due Date : 16 October 2014
(91) Inspection Frequency (months) : **24**

NBI Inspection Data

(90) Date of Last Inspection :	16 October 2012	Last Inspected By :	Troy Hafele - 2056
(90) Inspection Date :		Inspected By :	

(58) Deck Rating :	7	(68) Deck Geometry :	5	(36A) Bridge Rail Rating :	1	(62) Culvert Rating :	N
(59) Superstructure Rating :	7	(67) Structure Rating :	7	(36B) Transition Rating :	1	(61) Channel Rating :	7
(60) Substructure Rating :	7	(69) Under Clearance :	N	(36C) Approach Rail Rating :	1	(71) Waterway Adequacy :	8
(72) App Rdwy Align :	8	(41) Posting Status :	A	(36D) End Rail Rating :	1	(113) Scour Critical :	8

Unrepaired Spalls : 0 m sq

Deck Surfacing Depth : 0.00 in

Inspection Hours

Crew Hours for inspection :	1.5	Snooper Required :	N
Helper Hours :	-1	Snooper Hours for inspection :	-1
Special Crew Hours :	-1	Flagger Hours :	-1
Special Equipment Hours :	-1		

Inspection Work Candidates		Status	Priority	Effected Structure Unit	Scope of Work	Action	Covered Condition States
Candidate ID	Date Requested						

Late Reason:
Inspection Date: 10/16/2012

INITIAL ASSESSMENT FORM FOR STRUCTURE :

P00002082+06161

Continue

Element Inspection Data

*** * * * * * * * * * Span : Main-0 - concrete slab, Spans 1 thru 3 * * * * * * * * * ***

Element Description

Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 52 - Conc Slab/Coatd Bars epoxy, (plan, 19.56m x 11.68m = 228.46m, pave notch and width)										
	1	1	228	sq.m.	X	100	0	0	0	0
						%	%	%	%	%

Previous Inspection Notes :

10/16/2012 - longitudinal cracks plus efflorescence on bottom side. Underside Abut 1 right and Abut 4 left, fillets have minor spalls. TH RLHZ
11/04/2010 - some transverse cracks, some scaling concrete and few small spalls at tined marks. TH PDLJ
09/16/2008 - None ZXBZ
01/10/2007 - None. QIKT
02/09/2005 - None KAHZ
02/07/2003 - None LDBZ
01/12/2001 - None ZAAV
01/20/1999 - None JBBU

Inspection Notes:

Element 202 - Paint Stl Column Bents 2 and 3 each have 4, 16 inch outside diameter x 1/2 inch wall thickness

	1	2	8	ea.		90	5	5	0	0
						%	%	%	%	%

Previous Inspection Notes :

10/16/2012 - (photo Bent 2 looking back West). TH RLHZ
11/04/2010 - some peeling paint at bottom of columns with surface rust. TH PDLJ
09/16/2008 - None ZXBZ
01/10/2007 - None QIKT
02/09/2005 - None KAHZ
02/07/2003 - None LDBZ
01/12/2001 - None ZAAV
01/20/1999 - _ JBBU

Inspection Notes:

Element 215 - R/Conc Abutment 1 / West and 4 / East (plan, 48' 4 inch x 2 = 29.46m)

	1	2	29	m.		100	0	0	0	
						%	%	%	%	%

Previous Inspection Notes :

10/16/2012 - None RLHZ
11/04/2010 - both abutments have riprap(photo Abut 1). TH PDLJ
09/16/2008 - None ZXBZ
01/10/2007 - None QIKT
02/09/2005 - Same as previously reported. KAHZ
02/07/2003 - None LDBZ
01/12/2001 - Light spall in fillet at lt side of abut. 3. ZAAV
01/20/1999 - _ JBBU

Inspection Notes:

INITIAL ASSESSMENT FORM FOR STRUCTURE :

P00002082+06161

Continue

*** * * * * * * * * *** Span : **Main-0 - concrete slab, Spans 1 thru 3 (cont.) * * * * * * * * * ***

Element Description

Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 234 - R/Conc Cap Bents 2 and 3 (plan, 37' 4 inch x 2 = 22.76m)										
	1	2	23	m.		100	0	0	0	
						%	%	%	%	%

Previous Inspection Notes :

10/16/2012 - None RLHZ

Inspection Notes:

Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 334 - Metal Rail Coated T101, all galvanized W beam with 3w x 4h inch tube rail stiffeners and 6 inch I beam posts										
	1	1	39	m.		100	0	0	0	0
						%	%	%	%	%

Previous Inspection Notes :

10/16/2012 - (plan, 127.8m = 38.95m). TH RLHZ
11/04/2010 - None PDLJ
09/16/2008 - Damaged boxing glove. ZXBZ
01/10/2007 - None. QIKT
02/09/2005 - None KAHZ
02/07/2003 - None LDBZ
01/12/2001 - None ZAAV
01/20/1999 - _ JBBU

Inspection Notes:

General Inspection Notes

10/16/2012 - entire bridge opening is lined with riprap. TH (Drainage flows to the North. TH 8-27-13) RLHZ
QA 9-10-13 AJ, CH, JP, TH, DO, AE

11/04/2010 - 12' underclearance to water and 13' to bottom of channel. TH PDLJ
09/16/2008 - None ZXBZ
01/10/2007 - None QIKT
02/09/2005 - None KAHZ
02/07/2003 - None LDBZ
01/12/2001 - None ZAAV
01/20/1999 - None JBBU

Montana Department of Transportation

INITIAL ASSESSMENT FORM FOR STRUCTURE :

P00002085+07161

Location : 2M SE BAKER Structure Name: none

General Location Data

District Code, Number, Location : **04** **Dist 4** **GLENDIVE**
County Code, Location : **025** **FALLON**
Kind fo Hwy Code, Description : **2** **2 U.S. Numbered Hwy**
Str Owner Code, Description : **1** **State Highway Agency**
Intersecting Feature : **BN RAILROAD**
Structure on the State Highway System : [X]
Structure on the National Highway System : [ ]
Str Meet or Exceed NBIS Bridge Length : [X]
Latitude : **46°21'14"**
Longitude : **104°13'37"**

MDT Maintenance Section : **43-14 Baker**
Division Code, Location : **43** **MILES CITY**
City Code, Location : **00000** **RURAL AREA**
Signed Route Number : **00012**
Maintained by Code, Description : **1** **State Highway Agency**
Kilometer Post, Mile Post : **138.00 km** **85.75**

Traffic Data

Current ADT : **880** ADT Count Year : **2009** Percent Trucks : **2 %**

Construction Data

Construction Project Number : **F FG 86-30**
Construction Station Number : **1525+44.00**
Construction Drawing Number : **8172**
Construction Year : **1968**
Reconstruction Year :

Structure Loading, Rating and Posting Data

Loading Data :

Design Loading :		**5 MS 18 (HS 20)**
Inventory Load, Design :	**32.6 mton**	**A LFD Assigned**
Operating Load, Design :	**45.3 mton**	**A LFD Assigned**
Posting :		**5 At/Above Legal Loads**

Rating Data :

	Operating	Inventory	Posting
Truck 1 Type 3 :	**48**		
Truck 2 Type 3-S3 :	**64**		
Truck 3 Type 3-3 :	**73**		

Structure, Roadway and Clearance Data

Structure Deck, Roadway and Span Data :

Structure Length : **65.28 m**
Deck Area : **697.00 m sq**
Deck Roadway Width : **9.14 m**
Approach Roadway Width : **11.60 m**
Median Code, Description : **0** **No median**

Structure Vertical and Horizontal Clearance Data :

Vertical Clearance Over the Structure : **99.99 m**
Reference Feature for Vertical Clearance : **R Railroad beneath struc**
Vertical Clearance Under the Structure : **7.32 m**
Reference Feature for Lateral Underclearance : **R Railroad beneath struc**
Minimum Lateral Under Clearance Right : **5.79 m**
Minimum Lateral Under Clearance Left : **5.79 m**

Span Data

Main Span

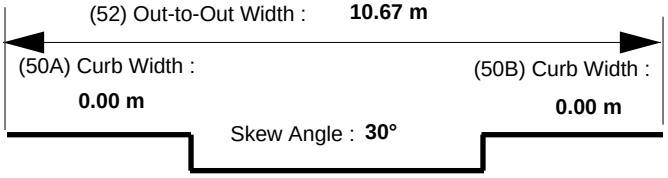
Number Spans : **3**
Material Type Code, Description : **5** **Prestressed concrete**
Span Design Code, Description : **2** **Stringer/Multi-beam or Girder**

Approach Span

Number of Spans : **0**
Material Type Code, Description :
Span Design Code, Description :

Deck

Deck Structure Type : **1** **Concrete Cast-in-Place**
Deck Surfacing Type : **1** **Monolithic concrete (concurrently placed with struct**
Deck Protection Type : **0** **None**
Deck Membrain Type : **0** **None**



Structure Vertical and Horizontal Clearance Data Inventory Route :

Over / Under Direction Name	Inventory Route	South, West or Bi-directional Travel			North or East Travel		
		Direction	Vertical	Horizontal	Direction	Vertical	Horizontal
Route On Structure	P00002	Both	99.99 m	9.14 m	N/A		
US 12							

Montana Department of Transportation

INITIAL ASSESSMENT FORM FOR STRUCTURE :

P00002085+07161

Continue

Inspection Data

Sufficiency Rating : **77.1**
Structure Status : **Not Deficient**

Inspection Due Date : 07 May 2016
(91) Inspection Frequency (months) : **24**

NBI Inspection Data

(90) Date of Last Inspection : 07 May 2014
Last Inspected By : Debra Ohm - 2070
(90) Inspection Date :
Inspected By :

(58) Deck Rating :	7	(68) Deck Geometry :	6	(36A) Bridge Rail Rating :	1	(62) Culvert Rating :	N
(59) Superstructure Rating :	8	(67) Structure Rating :	7	(36B) Transition Rating :	1	(61) Channel Rating :	N
(60) Substructure Rating :	7	(69) Under Clearance :	7	(36C) Approach Rail Rating :	1	(71) Waterway Adequacy :	N
(72) App Rdwy Align :	6	(41) Posting Status :	A	(36D) End Rail Rating :	1	(113) Scour Critical :	N

Unrepaired Spalls : 0 m sq
Deck Surfacing Depth : 0.00 in

Inspection Hours

Crew Hours for inspection : 2
Helper Hours : -1
Special Crew Hours : -1
Special Equipment Hours : -1

Snooper Required : N
Snooper Hours for inspection : -1
Flagger Hours : -1

Inspection Work Candidates

Candidate ID	Date Requested	Status	Priority	Effected Structure Unit	Scope of Work	Action	Covered Condition States
D41-FY2008-000030	05 June 2008	Approved	High	M Main	Bridge	Repl Joint	

Seal bridge-pavement joint at West Abut 1 and East Abut 4(updated photos 2012). TH

Approved. DRC

Updated picture. Bearings below on abutment 4 are rusting out because of it. (see photo). 5-7-14 DO

Late Reason:
Inspection Date: 05/07/2014

INITIAL ASSESSMENT FORM FOR STRUCTURE :

P00002085+07161

Continue

Element Inspection Data

********** Span : **Main-0 - -1** **********

Element Description

Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 12 - Bare Concrete Deck (plan = 65.28m x 10.67m = 696.54m, pave notch and width)										
	1	1	697	sq.m.	X	100	0	0	0	0
						%	%	%	%	%

Previous Inspection Notes :

05/07/2014 - None on this inspection. (Element 359 - soffit smart flag deleted per last QA) DO	HTDZ
05/09/2012 - some exposed aggregate at Bent 3(photo). TH	KZEZ
05/20/2010 - deck has some cracking. See element 359 soffit smart flag for Abut 1 left(photo 2010) and Abut 4 right(photo 2008) underside. TH	UIDZ
05/29/2008 - Popouts are rock pockets. (64.92 X 10.06 = 653.095)	FDJZ

Inspection Notes:

Element 109 - P/S Conc Open Girder 6 Type A I beams at 70' each per Spans 1 thru 3

	1	1	384	m.		100	0	0	0	
						%	%	%	%	%

Previous Inspection Notes :

05/07/2014 - None on this inspection.	HTDZ
05/09/2012 - None	KZEZ
05/20/2010 - 6 I beams. TH	UIDZ
05/29/2008 - None	FDJZ
11/17/2004 - None	BZBZ
01/12/2001 - None	ZAAX
12/04/1996 - None	QGAE
12/01/1992 - None	REFI

Inspection Notes:

Element 205 - R/Conc Column Bents 2 and 3 each have 2 square columns

	1	2	4	ea.		95	5	0	0	
						%	%	%	%	%

Previous Inspection Notes :

05/07/2014 - None on this inspection.	HTDZ
05/09/2012 - Bent 3 Span 2(photo) left column 3/4 up has 4" diameter x 1/8" depth shotgun impact; right column lower end has 3, 2" diameter x 1/4" depth bullet impacts. TH	KZEZ
05/20/2010 - Bent 2 has some spalls, changed from 100,0 to 95,5 percent. TH	UIDZ
05/29/2008 - None	FDJZ

Inspection Notes:

INITIAL ASSESSMENT FORM FOR STRUCTURE :

P00002085+07161

Continue

*** * * * * * * * * * *** Span : **Main-0 - -1 (cont.) * * * * * * * * * * ***

Element Description

Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 215 - R/Conc Abutment 1 / West and 4 / East (plan = 48.583' x 2 = 29.6m)										
	1	2	30	m.		90	5	5	0	
						%	%	%	%	%

Previous Inspection Notes :

05/07/2014 - Abutment 1 girder 6 outside 10in x 4in delam. Bay 5 16in x 6in delam. Bay 4 girder 4 20in x 6in delam and 4in x 3in x 1/2in spall. Bay 3 girder 3 17in x 7in delam. Bay 2 girder 2 15in x 6in delam and 8in x 4in x 1/4in spall. Abutment 4 bay 1 girder 2 17in x 10in delam. Bay 2 girder 3 16in x 6in delam and 9in x 3in x 1/2in deep spall. Bay 3 14in x 7in delam. Bay 5 9in x 6in delam with spalling around it. DO HTDZ

05/09/2012 - Abut 1 right corner is sloughing away and is starting to seperate FETS from drain pipe(photo). Abut 4 right has water seeping out of backwall/cap (work order). Abut 4 left corner is sloughing fill/plant mix away from transition posts(photo). TH
QA 9-10-13 Spalls likely caused by rusting of anchor bolts embedded in the concrete. DO KZEZ

05/20/2010 - Abut 1 and 4 both have some spalls where the beam embedment meets the backwall. TH UIDZ

05/29/2008 - 12 bearings in backwalls. Spalls at bearings. Bent 4 bearings heavy active corrosion with section loss. FDJZ

11/17/2004 - None BZBZ

01/12/2001 - None ZAAX

12/04/1996 - None QGAE

12/01/1992 - None REFI

Inspection Notes:

Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 234 - R/Conc Cap Bents 2 and 3 (plan = 34.17' x 2 = 20.8m)										
	1	1	21	m.		95	5	0	0	
						%	%	%	%	%

Previous Inspection Notes :

05/07/2014 - None on this inspection. HTDZ

05/09/2012 - Bent 3 Span 3 left end has had concrete patch previously added for G1 right bearing bolt embeddment(photo 2008). Bent 3 Span 2 right face above right columns has 3 bullet impacts(photo). TH KZEZ

05/20/2010 - Changed from 100,0 to 95,5 percent. TH UIDZ

05/29/2008 - None FDJZ

11/17/2004 - Same as previously reported. BZBZ

01/12/2001 - RTside of cap at bent 3 has a small spalled area. ZAAX

12/04/1996 - None QGAE

12/01/1992 - None REFI

Inspection Notes:

INITIAL ASSESSMENT FORM FOR STRUCTURE :

P00002085+07161

Continue

*** * * * * * * * * * *** Span : **Main-0 - -1 (cont.)** *** * * * * * * * * * ***

Element Description

Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 313 - Fixed Bearing Abut 1 = 6, Bent 2 = 6 / 6, Bent 3 = 6 / 6, Abut 4 = 6										
	1	1	36	ea.		70	30	0		
						%	%	%	%	%

Previous Inspection Notes :

05/07/2014 - Abutment 4 girder 6 bearing (see photo) typical of all the abutment 4 bearings. DO HTDZ

05/09/2012 - None KZEZ

05/20/2010 - Abut 4 bearings have scaling rust, some other bearings have some surface rust. Changed quantity from 24 to 36 to include bearings with 1 bolt visible in both backwalls and changed from 100,0 to 70,30 percent. TH UIDZ

05/29/2008 - None FDJZ

11/17/2004 - None BZBZ

01/12/2001 - None ZAAX

12/04/1996 - None QGAE

12/01/1992 - None REFI

Inspection Notes:

Element 334 - Metal Rail Coated Galv thrie beam and 6 in painted I beam posts and 7 3/4 in wood blockouts on top 30w x 12h conc curb

	1	1	139	m.		90	5	5	0	0
						%	%	%	%	%

Previous Inspection Notes :

05/07/2014 - None on this inspection. HTDZ

05/09/2012 - posts have some freckled and surface rust. TH (as-built plan summary = 456.94' = 139.28m) KZEZ

05/20/2010 - Galvanized thrie beam. TH UIDZ

05/29/2008 - None. (64.92 X 2 = 129.84) FDJZ

11/17/2004 - None BZBZ

01/12/2001 - None ZAAX

12/04/1996 - None QGAE

12/01/1992 - None REFI

Inspection Notes:

INITIAL ASSESSMENT FORM FOR STRUCTURE :

P00002085+07161

Continue

General Inspection Notes

05/07/2014 - Inspection runs West to East. Settlement in front of abutment 4 on the roadway and a little in front of abutment 1. (see photos) Abutment 1 right erosion under wing wall and abutment 4 left erosion under wing wall. Element 359 soffit smart flag was deleted last QA. DO	HTDZ
05/09/2012 - QA 9-10-13 AJ, CH, JP, TH, MK, DO, AE	KZEZ
05/20/2010 - Last snoopered 5/28/2008. TH 3-7-11	UIDZ
05/29/2008 - None	FDJZ
11/17/2004 - Same as previously reported.	BZBZ
01/12/2001 - Bridge is in a hump vertical.	ZAAX
12/04/1996 - Sufficiency Rating Calculation Accepted by ops$a0241 at 8/14/97 16:18:40 OPS$A0241 inspection comments - Structure P00002085+07161 - Date 12/4/96 - Previous comments > Sufficiency Rating Calculation Accepted by ops$u5963 at 3/10/97 14:27:51 Sufficiency Rating Calculation Accepted by ops$u9004 at 2/19/97 14:58:21	QGAE
12/01/1992 - Sufficiency Rating Calculation Accepted by ops$u5963 at 3/10/97 14:27:51 Sufficiency Rating Calculation Accepted by ops$u9004 at 2/19/97 14:58:21	REFI
11/01/1990 - Updated with tape 1992	NB92
11/01/1988 - Updated with tape 1990	NB90
01/01/1987 - Updated with tape 1988	NB88
02/01/1985 - Updated with tape 1986	NB86
01/01/1983 - Updated with tape 1984	NB84
02/01/1981 - Updated with tape 1982	NB82
04/01/1979 - Updated with tape 1980	NB80

Montana Department of Transportation

INITIAL ASSESSMENT FORM FOR STRUCTURE :

P00027035+01721

Location : BAKER Structure Name: none

General Location Data

District Code, Number, Location : **04** **Dist 4** **GLENDIVE**
County Code, Location : **025** **FALLON**
Kind fo Hwy Code, Description : **3** **3 State Hwy**
Str Owner Code, Description : **1** **State Highway Agency**
Intersecting Feature : **BAKER LAKE OVERFLOW**
Structure on the State Highway System : **X**
Structure on the National Highway System :
Str Meet or Exceed NBIS Bridge Length : **X**
Latitude : **46°21'51"**
Longitude : **104°16'25"**

MDT Maintenance Section : **43-14 Baker**
Division Code, Location : **43** **MILES CITY**
City Code, Location : **03475** **BAKER**
Signed Route Number : **00007**
Maintained by Code, Description : **1** **State Highway Agency**
Kilometer Post, Mile Post : **56.70 km** **35.23**

Traffic Data

Current ADT : **2,070** ADT Count Year : **2009** Percent Trucks : **2 %**

Construction Data

Construction Project Number : **STPP 27-2(14)29**
Construction Station Number : **195+47.00**
Construction Drawing Number :
Construction Year : **2009**
Reconstruction Year :

Structure Loading, Rating and Posting Data

Loading Data :

Design Loading :		**2 M 13.5 (H 15)**
Inventory Load, Design :	**25.1 mton**	**2 AS Allowable Stress**
Operating Load, Design :	**36.7 mton**	**2 AS Allowable Stress**
Posting :		**5 At/Above Legal Loads**

Rating Data :

	Operating	Inventory	Posting
Truck 1 Type 3 :	**33.51**	**22.88**	
Truck 2 Type 3-S3 :	**52.93**	**36.14**	
Truck 3 Type 3-3 :	**65.11**	**44.46**	

Structure, Roadway and Clearance Data

Structure Deck, Roadway and Span Data :

Structure Length : **10.70 m**
Deck Area : **0.00 m sq**
Deck Roadway Width : **0.00 m**
Approach Roadway Width : **12.70 m**
Median Code, Description : **0 No median**

Structure Vertical and Horizontal Clearance Data :

Vertical Clearance Over the Structure : **99.99 m**
Reference Feature for Vertical Clearance : **N Feature not hwy or RR**
Vertical Clearance Under the Structure : **0.00 m**
Reference Feature for Lateral Underclearance : **N Feature not hwy or RR**
Minimum Lateral Under Clearance Right : **0.00 m**
Minimum Lateral Under Clearance Left : **0.00 m**

Span Data

Main Span

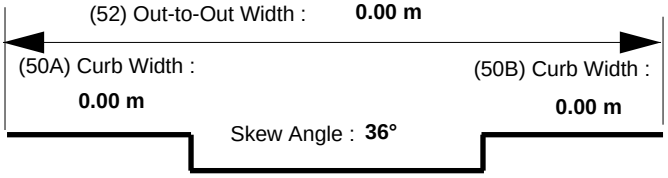
Number Spans : **2**
Material Type Code, Description : **1 Concrete**
Span Design Code, Description : **19 Culvert (includes frame culverts)**

Approach Span

Number of Spans : **0**
Material Type Code, Description :
Span Design Code, Description :

Deck

Deck Structure Type : **N Not applicable**
Deck Surfacing Type : **N Not Applicable (applies only to strutures with no dec**
Deck Protection Type : **N Not applicable (applies only to structures with no de**
Deck Membrain Type : **N Not applicable (applies only to structures with no de**



Structure Vertical and Horizontal Clearance Data Inventory Route :

Over / Under Direction Name	Inventory Route	South, West or Bi-directional Travel			North or East Travel		
		Direction	Vertical	Horizontal	Direction	Vertical	Horizontal
Route On Structure	P00027	Both	99.99 m	12.70 m	N/A		
MT 7							

Montana Department of Transportation

INITIAL ASSESSMENT FORM FOR STRUCTURE :

P00027035+01721

Continue

Inspection Data

Sufficiency Rating : ***91.4**
Structure Status : **Not Deficient**

Inspection Due Date : 16 October 2014
(91) Inspection Frequency (months) : **24**

NBI Inspection Data

(90) Date of Last Inspection :	16 October 2012	Last Inspected By :	Troy Hafele - 2056
(90) Inspection Date :		Inspected By :	

(58) Deck Rating :	N	(68) Deck Geometry :	N	(36A) Bridge Rail Rating :	N	(62) Culvert Rating :	8
(59) Superstructure Rating :	N	(67) Structure Rating :	6	(36B) Transition Rating :	N	(61) Channel Rating :	8
(60) Substructure Rating :	N	(69) Under Clearance :	N	(36C) Approach Rail Rating :	N	(71) Waterway Adequacy :	8
(72) App Rdwy Align :	4	(41) Posting Status :	A	(36D) End Rail Rating :	N	(113) Scour Critical :	8

Unrepaired Spalls : 0 m sq

Deck Surfacing Depth : 0.00 in

Inspection Hours

Crew Hours for inspection :	1.5	Snooper Required :	N
Helper Hours :	-1	Snooper Hours for inspection :	-1
Special Crew Hours :	-1	Flagger Hours :	-1
Special Equipment Hours :	-1		

Inspection Work Candidates		Status	Priority	Effected Structure Unit	Scope of Work	Action	Covered Condition States
Candidate ID	Date Requested						

Late Reason:
Inspection Date: 10/16/2012

Element Inspection Data

********** Span : **Main-0 - -1** **********

Element Description

Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 241 - Concrete Culvert double RCB 4.8s x 1.2r x 36.9m										
	1	2	74	m.		100	0	0	0	
						%	%	%	%	%

Previous Inspection Notes :

10/16/2012 - (photo culvert info stamp). TH RZHZ

11/08/2010 - new in 2009, 67' from inlet end flowable fill leaked through joint in South cell on North wall(photo). Flowable fill between culverts is eroding away(photo). Both inlet and outlet ends have concrete slope protection. TH QZDZ

Inspection Notes:

General Inspection Notes

10/16/2012 - (Drainage flows to the West. TH 8-28-13)
QA 9-10-13 AJ, CH, JP, MK, TH, DO, AE RZHZ

11/08/2010 - None QZDZ

Montana Department of Transportation

INITIAL ASSESSMENT FORM FOR STRUCTURE :

P00027035+08231

Location : NORTH EDGE BAKER Structure Name: none

General Location Data

District Code, Number, Location : **04** **Dist 4** **GLENDIVE**
County Code, Location : **025** **FALLON**
Kind fo Hwy Code, Description : **3** **3 State Hwy**
Str Owner Code, Description : **1** **State Highway Agency**
Intersecting Feature : **SANDSTONE CREEK**
Structure on the State Highway System : **X**
Structure on the National Highway System :
Str Meet or Exceed NBIS Bridge Length : **X**
Latitude : **46°22'24"**
Longitude : **104°16'32"**

MDT Maintenance Section : **43-14 Baker**
Division Code, Location : **43** **MILES CITY**
City Code, Location : **03475** **BAKER**
Signed Route Number : **00007**
Maintained by Code, Description : **1** **State Highway Agency**
Kilometer Post, Mile Post : **57.71 km** **35.86**

Traffic Data

Current ADT : **3,660** ADT Count Year : **2009** Percent Trucks : **2 %**

Construction Data

Construction Project Number : **2 A 2**
Construction Station Number : **19+81.00**
Construction Drawing Number : **2279**
Construction Year : **1941**
Reconstruction Year :

Structure Loading, Rating and Posting Data

Loading Data :

Design Loading :		**2 M 13.5 (H 15)**
Inventory Load, Design :	**24.0 mton**	**2 AS Allowable Stress**
Operating Load, Design :	**34.8 mton**	**2 AS Allowable Stress**
Posting :		**5 At/Above Legal Loads**

Rating Data :

	Operating	Inventory	Posting
Truck 1 Type 3 :	**30.22**	**20.81**	
Truck 2 Type 3-S3 :	**45.63**	**31.41**	
Truck 3 Type 3-3 :	**58.72**	**40.43**	

Structure, Roadway and Clearance Data

Structure Deck, Roadway and Span Data :

Structure Length : **19.66 m**
Deck Area : **156.00 m sq**
Deck Roadway Width : **7.63 m**
Approach Roadway Width : **7.90 m**
Median Code, Description : **0 No median**

Structure Vertical and Horizontal Clearance Data :

Vertical Clearance Over the Structure : **99.99 m**
Reference Feature for Vertical Clearance : **N Feature not hwy or RR**
Vertical Clearance Under the Structure : **0.00 m**
Reference Feature for Lateral Underclearance : **N Feature not hwy or RR**
Minimum Lateral Under Clearance Right : **0.00 m**
Minimum Lateral Under Clearance Left : **0.00 m**

Span Data

Main Span

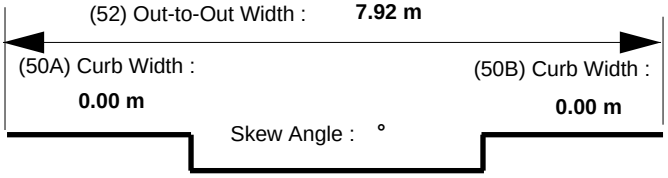
Number Spans : **3**
Material Type Code, Description : **7 Wood or Timber**
Span Design Code, Description : **2 Stringer/Multi-beam or Girder**

Deck

Deck Structure Type : **8 Wood or Timber**
Deck Surfacing Type : **6 Bituminous**
Deck Protection Type : **0 None**
Deck Membrain Type : **0 None**

Approach Span

Number of Spans : **0**
Material Type Code, Description :
Span Design Code, Description :



Structure Vertical and Horizontal Clearance Data Inventory Route :

Over / Under Direction Name	Inventory Route	South, West or Bi-directional Travel			North or East Travel		
		Direction	Vertical	Horizontal	Direction	Vertical	Horizontal
Route On Structure	P00027	Both	99.99 m	7.63 m	N/A		
MT 7							

Montana Department of Transportation

INITIAL ASSESSMENT FORM FOR STRUCTURE :

P00027035+08231

Continue

Inspection Data

Sufficiency Rating : **70.6**
Structure Status : **Func Obs - Elg Rehab**

Inspection Due Date : 16 October 2014
(91) Inspection Frequency (months) : **24**

NBI Inspection Data

(90) Date of Last Inspection : 16 October 2012
Last Inspected By : Troy Hafele - 2056
(90) Inspection Date :
Inspected By :

(58) Deck Rating :	6	(68) Deck Geometry :	2	(36A) Bridge Rail Rating :	1	(62) Culvert Rating :	N
(59) Superstructure Rating :	6	(67) Structure Rating :	6	(36B) Transition Rating :	1	(61) Channel Rating :	7
(60) Substructure Rating :	7	(69) Under Clearance :	N	(36C) Approach Rail Rating :	1	(71) Waterway Adequacy :	4
(72) App Rdwy Align :	8	(41) Posting Status :	A	(36D) End Rail Rating :	1	(113) Scour Critical :	5

Unrepaired Spalls : 0 m sq
Deck Surfacing Depth : 6.00 in

Inspection Hours

Crew Hours for inspection : 1.5
Helper Hours : -1
Special Crew Hours : -1
Special Equipment Hours : -1

Snooper Required : N
Snooper Hours for inspection : -1
Flagger Hours : -1

Inspection Work Candidates		Status	Priority	Effected Structure Unit	Scope of Work	Action	Covered Condition States
Candidate ID	Date Requested						

Late Reason:
Inspection Date: 10/16/2012

INITIAL ASSESSMENT FORM FOR STRUCTURE :

P00027035+08231

Continue

Element Inspection Data

*** * * * * * * * * * Span : Main-0 - wood, Spans 1 thru 3 * * * * * * * * * ***

Element Description

Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 32 - Timber Deck/AC Ovly 1 5/8 x 3 1/2 inch creosote boards on edge (plan plus 18 inch = 19.66m x 7.92m = 155.7m)										
	1	3	156	sq.m.	X	0	100	0	0	
						%	%	%	%	%

Previous Inspection Notes :

10/16/2012 - repaired potholes at Abut 1 left(photo) and Bent 2 right(photo of edge) are breaking up. TH RZHZ

11/08/2010 - plant mix surfacing is cracking and has 4 patched areas. TH QREZ

09/16/2008 - Patches less than 2 pct. ZZLX

01/10/2007 - None. QZKC

02/09/2005 - New A/C overlay 2004 KEHX

01/30/2003 - The a/c is still in the same condition. VIBZ

01/12/2001 - A/C overlay is badly crackesd and breaking up. MBHQ

01/20/1999 - A/C overlay is cracking and breaking up.
wearing surface is not considered in the deck rating. I raised rating from 6 to 7. bgn HBKN

11/26/1996 - None AXHC

03/01/1995 - None YDNF

11/01/1992 - None REFI

Inspection Notes:

Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 111 - Timber Open Girder 13, 5 3/4 x 17 1/2 inch creosote beams per spans 1 and 2, plus Span 2 = 13, 7 3/4 x 17 1/2 inch										
	1	1	254	m.		85	10	5	0	
						%	%	%	%	%

Previous Inspection Notes :

10/16/2012 - None RZHZ

11/08/2010 - None QREZ

09/16/2008 - Span 1, 2nd and 5th RT split, 7th RT cracked(split TH 11-8-10), photo.
Span2, 2nd RT split. ZZLX

01/10/2007 - Revision: Span 1. 7th from RT. diaginal crack.
Span 2. 2nd from RT. diaginal crack. Beams have some checking. QZKC

02/09/2005 - Same as previously reported. KEHX

01/30/2003 - Same condition as last insp. VIBZ

01/12/2001 - Same as the last report. MBHQ

01/20/1999 - (span 1) 3rd, 5th and 7th rt and 3rd lt has diagonal cracks. (span 2) 2nd rt diagonal crack 4th rt horizontal crack. (span 3) 5th and 6th lt horizontal cracks. HBKN

11/26/1996 - None AXHC

03/01/1995 - None YDNF

11/01/1992 - None REFI

Inspection Notes:

INITIAL ASSESSMENT FORM FOR STRUCTURE :

P00027035+08231

Continue

*** * * * * * * * * *** Span : **Main-0 - wood, Spans 1 thru 3 (cont.) * * * * * * * * * ***

Element Description

Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 206 - Timber Column Abuts 1 thru 4 each have 5, 12 inch diameter creosote pile										
	1	2	20	ea.		90	10	0	0	
						%	%	%	%	%

Previous Inspection Notes :

10/16/2012 - Bents 2(photo looking back South) and 3 have riprap plus are in water. TH RZHZ
QA 9-10-13 Light vertical checks. NO cracks. DO

11/08/2010 - None QREZ
09/16/2008 - None ZZLX
01/10/2007 - None QZKC
02/09/2005 - Same as previously reported. KEHX
01/30/2003 - Bent 2 has 2 piling with deep vertical cracks. VIBZ
01/12/2001 - Same as the last report. MBHQ
01/20/1999 - PILIING AT BENTS 2 AND 3 ARE WEATHERED WITH LIGHT VERTICAL CRACKS. HBKN

Inspection Notes:

Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 216 - Timber Abutment 1 / South and 4 / North each have 3 x 12 inch creosote planks										
	1	2	22	m.		100	0	0	0	
						%	%	%	%	%

Previous Inspection Notes :

10/16/2012 - Abut 4(photo) has 6 inch gap below backwall plank plus erosion at P1 and P5. TH RZHZ
11/08/2010 - None QREZ
09/16/2008 - None ZZLX
01/10/2007 - None QZKC
02/09/2005 - None KEHX
01/30/2003 - None VIBZ
01/12/2001 - None MBHQ
01/20/1999 - None HBKN
11/26/1996 - None AXHC
03/01/1995 - None YDNF
11/01/1992 - None REFI

Inspection Notes:

INITIAL ASSESSMENT FORM FOR STRUCTURE :

P00027035+08231

Continue

*** * * * * * * * * * Span : Main-0 - wood, Spans 1 thru 3 (cont.) * * * * * * * * * ***

Element Description

Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 235 - Timber Cap Abuts 1 thru 4 each have 11 3/4 inch square creosote beam										
	1	1	34	m.		95	5	0	0	
						%	%	%	%	%

Previous Inspection Notes :

10/16/2012 - None	RZHZ
11/08/2010 - some checks. TH	QREZ
09/16/2008 - None	ZZLX
01/10/2007 - Revision: Not crushing over bent 2 and 3.	QZKC
02/09/2005 - Same as previously reported.	KEHX
01/30/2003 - Same as last insp.	VIBZ
01/12/2001 - All the caps have light crushing over the piling.	MBHQ
01/20/1999 - Caps at bents 2 and 3 are crushing over piling in areas.	HBKN
11/26/1996 - None	AXHC
03/01/1995 - None	YDNF
11/01/1992 - None	REFI

Inspection Notes:

Element 334 - Metal Rail Coated T101, all galvanized W beam with 3w x 4h inch tube rail stiffeners and 6 inch I beam posts

	1	2	39	m.		100	0	0	0	0
						%	%	%	%	%

Previous Inspection Notes :

10/16/2012 - (photo Abut 1 left) (photo Bent 2 right backside). TH	RZHZ
11/08/2010 - None	QREZ
09/16/2008 - None	ZZLX
01/10/2007 - New rail (and posts. TH 10-22-12).	QZKC
02/09/2005 - Same as previously reported.	KEHX
01/30/2003 - Same as last insp.	VIBZ
01/12/2001 - Same as the last report. Plus the Lt. post at abut 4 is broken. Rt. rail post has heavey rot at the top. Numerous other posts are cracking and have deep splits. Rt, appr. sections near abut. 1 has a 2' tear.	MBHQ
01/20/1999 - RT side rail blocks are broken out. RT appr. section near abut. 1 has a two foot tear in it.	HBKN
11/26/1996 - None	AXHC
03/01/1995 - None	YDNF
11/01/1992 - None	REFI

Inspection Notes:

INITIAL ASSESSMENT FORM FOR STRUCTURE :

P00027035+08231

Continue

General Inspection Notes

10/16/2012 - (Sandstone Creek flows to the West. TH 8-28-13) QA 9-10-13 Changed Super Structure Rating from a 5 to a 6. DO AJ, CH, JP, TH, MK, DO, AE	RZHZ
11/08/2010 - 7' underclearance to water and 9' to bottom of channel. TH	QREZ
09/16/2008 - None	ZZLX
01/10/2007 - None	QZKC
02/09/2005 - None	KEHX
01/30/2003 - None	VIBZ
01/12/2001 - None	MBHQ
01/20/1999 - None	HBKN
11/26/1996 - Sufficiency Rating Calculation Accepted by ops$a0241 at 8/15/97 16:19:29 OPS$A0241 inspection comments - Structure P00027035+08231 - Date 11/26/96 - Previous comments > Sufficiency Rating Calculation Accepted by ops$u5963 at 3/10/97 14:36:05 Sufficiency Rating Calculation Accepted by ops$u5963 at 3/10/97 14:31:36 Sufficiency Rating Calculation Accepted by ops$u9004 at 2/19/97 15:00:35	AXHC
03/01/1995 - Sufficiency Rating Calculation Accepted by ops$u5963 at 3/10/97 14:36:05 Sufficiency Rating Calculation Accepted by ops$u5963 at 3/10/97 14:31:36 Sufficiency Rating Calculation Accepted by ops$u9004 at 2/19/97 15:00:35	YDNF
11/01/1992 -	REFI
02/01/1991 - Updated with tape 1993	NB93
11/01/1988 - Updated with tape 1991	NB91
01/01/1987 - Updated with tape 1988	NB88
02/01/1985 - Updated with tape 1986	NB86
01/01/1983 - Updated with tape 1984	NB84
02/01/1981 - Updated with tape 1983	NB83
04/01/1979 - Updated with tape 1980	NB80

Baker Area Development Map November 2014

