

Whitmore Ravine

Erosion Control & Storm Drainage



May 2010

On Behalf of:
Cascade County Conservation District



PER Funding Assistance Provided by: Department of Natural Resources & Conservation

WHITMORE RAVINE DRAINAGE AREAS

GREAT FALLS, MONTANA

LEGEND

MALMSTROM	NON-MALMSTROM	DRAINAGE	
			WEST FORK DRAINAGE AREAS
			MIDDLE FORK DRAINAGE AREAS
			EAST FORK DRAINAGE AREAS
			LOWER WHITMORE DRAINAGE AREAS

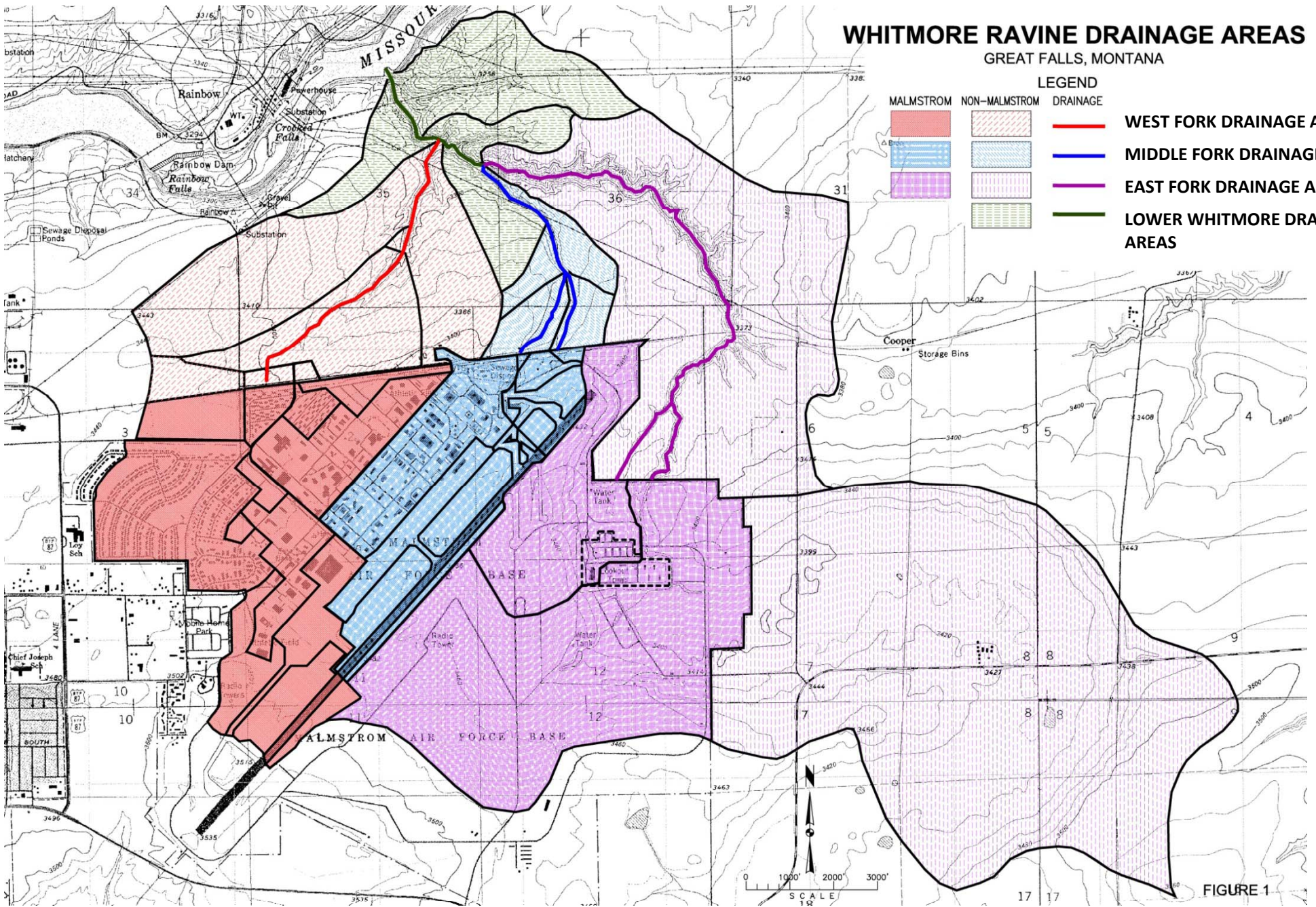


FIGURE 1



Whitmore Ravine - East Fork





AUGUST 1937



JULY 1968



SEPTEMBER 2007



JULY 2009



Design Criteria

- Design storm: 100-yr predevelopment runoff
- MAFB / on-base improvements
- 20-year design life
- Energy Dissipation Structures
- Wetland Mitigation Efforts

Figure 4.3



TITLE:
ALTERNATE 6

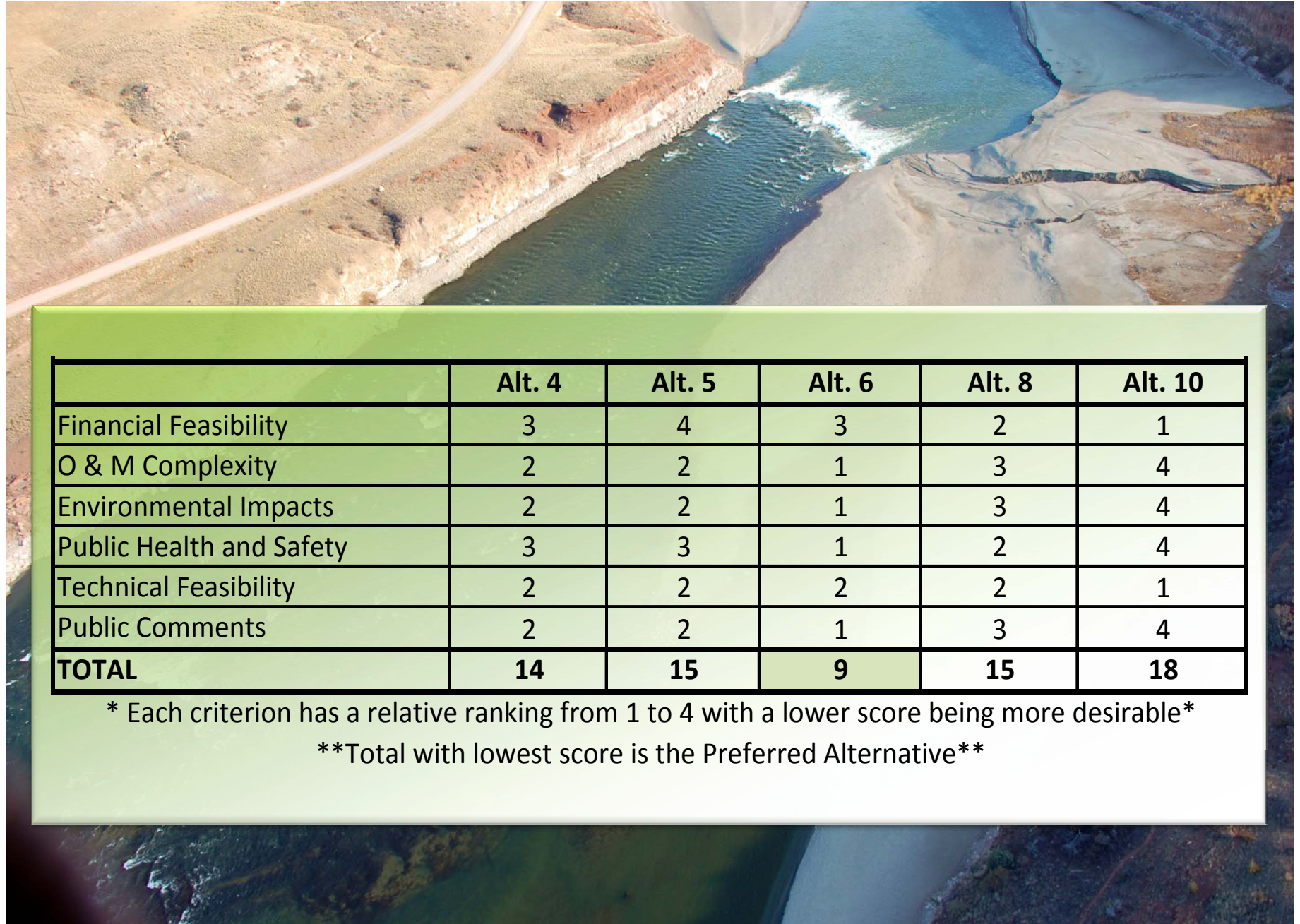
PROJECT:
**WHITMORE RAVINE
GREAT FALLS, MONTANA**

FIGURE
4.3

Table 4.3 – Alternative 6 Cost Estimate

Component	Quantity	Unit	Unit Cost	Cost Outside MAFB Fenceline	Salvage
A. West Fork Pipeline					
27 in. Pipe from OF2 to Tie into West Fork Pipeline	815	L.F.	\$125	\$101,875	\$50,938
36 in. Pipe from OF1 to Tie into West Fork Pipeline	150	L.F.	\$180	\$27,000	\$13,500
60" Pipe on Edge of the West Fork Ravine	7,085	L.F.	\$265	\$1,877,525	\$938,763
Bedding Material	7,130	C.Y.	\$28	\$199,640	\$0
Manhole	18	Ea.	\$7,000	\$126,000	\$63,000
Junction Structure to Tie OF1 and OF2 together	1	L.S.	\$20,000	\$20,000	\$0
Permanent Easment	8	acre	\$10,000	\$80,000	\$0
Energy Dissipation at Whitmore Ravine Confluence	1	L.S.	\$46,000	\$46,000	\$0
Erosion Control, Topsoil and Seeding (Pipeline Corridor)	10	acre	\$7,500	\$75,000	\$0
Wetlands Mitigation	1	L.S.	\$50,000	\$50,000	\$0
Construction Survey and Layout	1	L.S.	\$25,000	\$25,000	\$0
Temp. Access Road to Whimore Ravine Confluence	1	L.S.	\$70,000	\$70,000	\$0
B. Middle Fork Pipeline & Fencing					
Wetland Mitigation Pond	1	L.S.	\$340,000	\$340,000	\$0
6" Pipe to Connect to Wetland Mitigation Pond	1,100	L.F.	\$60	\$66,000	\$0
42"Pipe on Edge of Middle Fork Ravine	6,050	L.F.	\$185	\$1,119,250	\$559,625
Bedding Material	4,500	C.Y.	\$28	\$126,000	\$0
Manhole	16	Ea.	\$4,500	\$72,000	\$36,000
Permanent Easment	7	acre	\$10,000	\$70,000	\$0
Energy Dissipation at Whitmore Ravine Confluence	1	L.S.	\$46,000	\$46,000	\$0
Erosion Control, Topsoil and Seeding (Pipeline Corridor)	10	acre	\$5,000	\$50,000	\$0
Construction Survey and Layout	1	L.S.	\$25,000	\$25,000	\$0
Temp Access Road to Whitmore Ravine Confluence	1	L.S.	\$75,000	\$75,000	\$0
Fence Around Middle Fork (Safety Fence)	2500	L. F.	\$8	\$20,000	\$10,000
C. West Fork Ravine Restoration					
Ravine Excavation	120,000	C.Y.	\$10	\$1,200,000	\$0
Ravine Fill	120,000	C.Y.	\$15	\$1,800,000	\$0
Construction Survey and Layout	1	L.S.	\$30,000	30,000	\$0
Erosion Control and Reseeding (Ravine)	50	acre	\$5,000	\$250,000	\$0
Subtotal				\$7,987,290	\$1,671,825
Environmental Assesment and Permits (3%)				\$239,619	
Administrative Costs, Legal, Bidding				\$90,000	
Design and Construction Administration (20%)				\$1,597,458	
Contingency (20%)				\$1,597,458	
Total Capital Costs				\$11,511,825	

Table 4.6 – Summary of Alternatives



	Alt. 4	Alt. 5	Alt. 6	Alt. 8	Alt. 10
Financial Feasibility	3	4	3	2	1
O & M Complexity	2	2	1	3	4
Environmental Impacts	2	2	1	3	4
Public Health and Safety	3	3	1	2	4
Technical Feasibility	2	2	2	2	1
Public Comments	2	2	1	3	4
TOTAL	14	15	9	15	18

* Each criterion has a relative ranking from 1 to 4 with a lower score being more desirable*

Total with lowest score is the Preferred Alternative

➤ Recommended Alternative: Alternative #6

➤ Implementation Steps

- Finalize PER – to be submitted ~May 10th
- App to congressional delegates, Mar. 1st
- RRGL and RDGP app's, due May 15th
- NRCS EQIP app's, due June 1st
- Complete funding package
- Split project into phases, if necessary
- Final Engineering Design
- Construction