MONTANA DEPARTMENT OF TRANSPORTATION WETLAND MITIGATION MONITORING REPORT: YEAR 2003

Ridgeway Wetland Complex
Ekalaka, Montana

Prepared for:

MONTANA DEPARTMENT OF TRANSPORTATION
2701 Prospect Avenue
Helena, MT 59620-1001

Prepared by:

LAND & WATER CONSULTING, INC.
P.O. Box 8254
Missoula, MT 59807

March 2004

Project No: 130091.025

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1.0 INTRODUCTION

This annual report summarizes methods and results of the third year of monitoring at the Montana Department of Transportation's Ridgeway Complex mitigation site. The Ridgeway wetland complex was created to provide wetland mitigation credits to address impacts associated with MDT projects in Watershed #16 located in MDT District 4 (Glendive District). The complex, comprised of sixteen constructed impoundments, is located in Carter County, Montana, in Section 36, Township 4 South, Range 57 East and Sections 31-35, Township 4 South, Range 58 East **(Figure 1)**. Elevations in the complex range from approximately 3,300 to 3,400 feet.

Eight wetlands were created during the summer of 2000 and an additional eight were completed in January of 2001 (**Figure 1**). The objective for the Ridgeway Complex was to maximize the surface acres of each individual project to create 50 acres of shallow waterfowl habitat (USDA BLM 1999, **Appendix D**). Several construction designs were employed to create the impoundments (USDA BLM 1990); 15 of the 16 impoundments were originally intended to have a surface area of 3.5 acres and one impoundment (#3) 22 surface acres (Rau 1999).

For this monitoring report, Wetland #9 (W-9) was sampled for the third season according to the full sampling protocol on July 12, 2003. Wetland 9 was chosen out of the sixteen constructed open-water impoundments because of its representative wetland qualities. All data sheets for W-9 are included in **Appendix B**.

The remainder of the fifteen sites, impoundments 1-8, and 10-16, are shown on **Figure 1** and on **Figure 4 (Appendix I);** data sheets are included in Appendix H. The wetland area at these sites was approximated and general wetland vegetation boundaries were recorded on an aerial photograph during the 2003 site visit.

2.0 METHODS

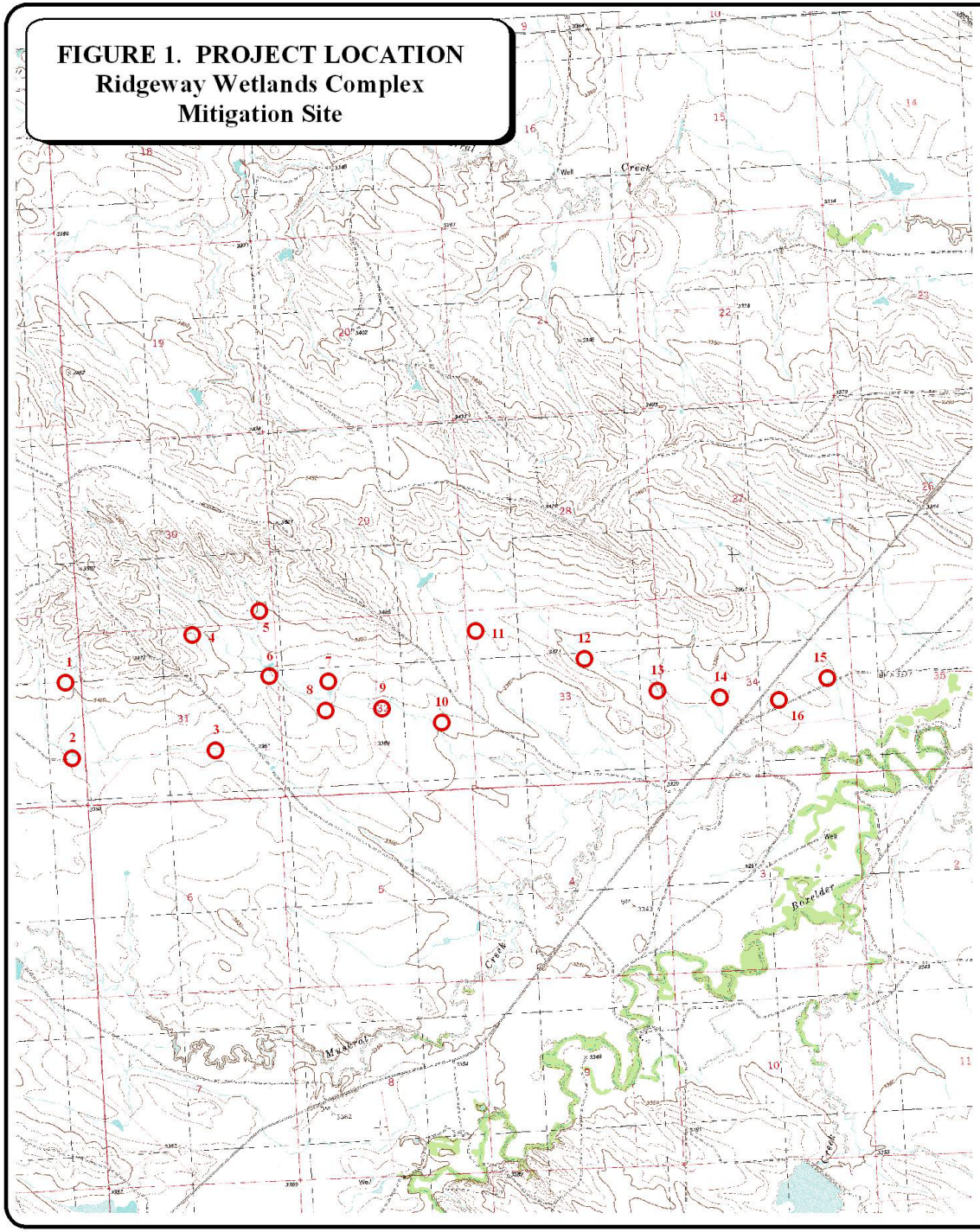
2.1 Monitoring Dates and Activities

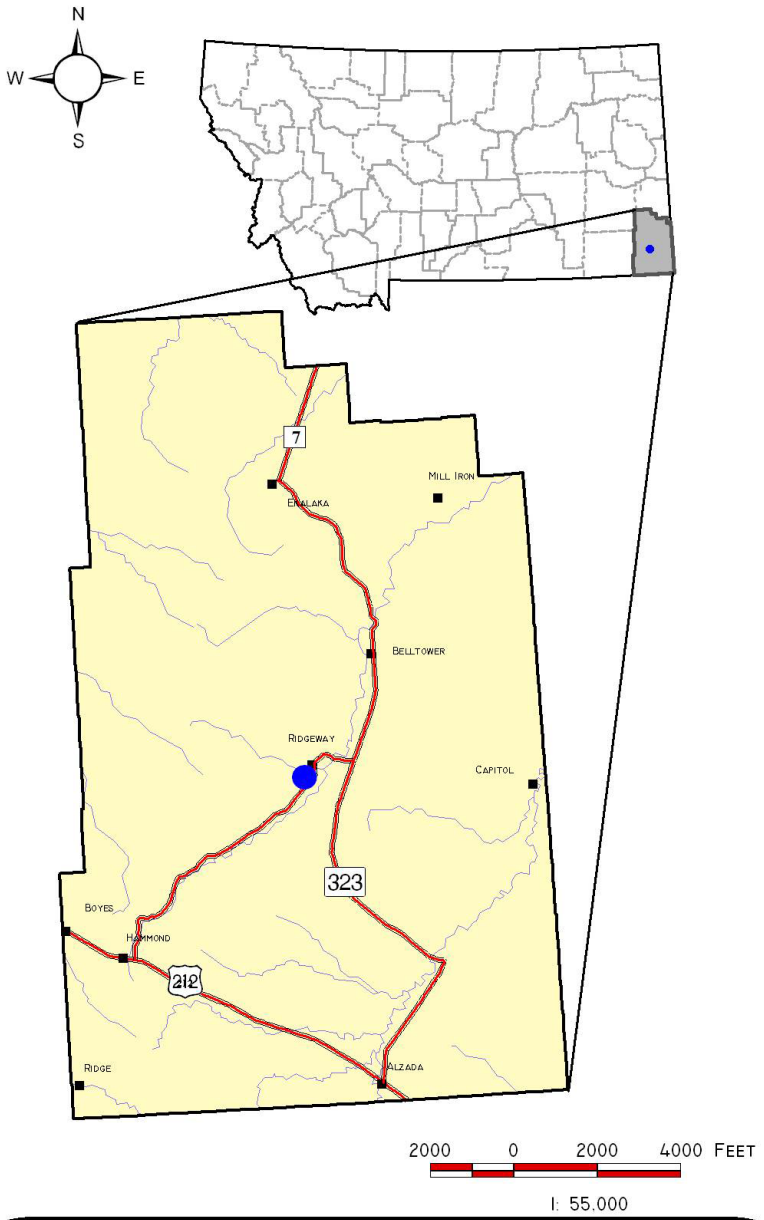
All sixteen wetland sites were investigated for wetland development on July 12, 2003. The Wetland Mitigation Site Monitoring Form data **(Appendix B)** were collected for W-9 at this time. Activities and information collected included: wetland delineation; wetland/open water boundary mapping; vegetation community mapping; vegetation transect data; soils data; hydrology data; bird and general wildlife use; photograph points; GPS data points; functional assessment; and, maintenance needs of inflow and outflow structures.

2.2 Hydrology

Wetland hydrology indicators for W-9 were recorded using procedures outlined in the US Army Corps' (COE) 1987 Wetland Delineation Manual. Hydrology data were recorded on the Routine Wetland Delineation Data Form **(Appendix B)**. Any additional hydrologic data were recorded on the mitigation site monitoring form **(Appendix B)**. The boundary between emergent

FIGURE 1. PROJECT LOCATION
Ridgeway Wetlands Complex
Mitigation Site





PROJECT #: 130091.025
DATE: APRIL 2001
LOCATION:
PROJECT MANAGER: B. DUTTON
DRAWN BY: B. NOECKER

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vegetation and open water for W-9 was mapped on the aerial photograph **(Figure 3, Appendix A)**. There are no groundwater monitoring wells at the site. Precipitation data for the year 2003 were compared to the 1971-2000 average (WRCC 2003).

2.3 Vegetation

General vegetation types for W-9 were delineated on an aerial photograph during the site visit (**Figure 3, Appendix A)**. Coverage of the dominant species in each community type is listed on the monitoring form **(Appendix B)**. A comprehensive plant species list for the entire site was compiled and will be updated as new species are encountered. Woody species were not planted on this site.

One transect was established at W-9 during the 2001 monitoring event to represent the range of current vegetation conditions at this wetland. The transect was lengthened in 2002 because of the dewatering that had occurred in the wetland which resulted in both ends of the transect being outside of actively growing wetland vegetation. The location of the transect is shown on **Figure 2, Appendix A**. Percent cover for each species was recorded on the vegetation transect data form **(Appendix B)**. The transect will be used to evaluate changes in species composition over time, especially the establishment and increase of hydrophytic vegetation.

Transect ends were marked with metal fence posts at W-9 and their locations were recorded with the GPS unit. Photos were taken from both ends of the transect during the site visit **(Appendix C)**.

The presence of emergent vegetation was noted on the aerial photographs for wetlands 1-8 and 10-16; photo and sample point locations are depicted on **Figure 2** and a **Figure 3** was compiled only for sites that had developed wetlands or had standing water (**Appendix G**). Photos showing representative vegetation were taken of wetlands sites W-1-8, 10-16; photos and photograph log are included as **Appendix H**.

2.4 Soils

Soils were evaluated during the site visit at W-9 according to the procedure outlined in the 1987 Wetland Delineation Manual. Soil data were recorded for each wetland determination point on the Routine Wetland Delineation Data Form **(Appendix B)**. A soil pit was excavated for all other wetland sites; COE data sheets are included in **Appendix H**.

2.5 Wetland Delineation

A wetland delineation for W-9 was conducted within the assessment area according to the 1987 manual. Wetland and upland areas within the monitoring area were investigated for the presence of wetland hydrology, hydrophytic vegetation and hydric soils. The indicator status of vegetation was derived from the National List of Plant Species that Occur in Wetlands: North Plains Region 4 (Reed 1988). The information was recorded on the Routine Wetland Delineation Forms **(Appendix B)**. The wetland/upland boundary was used to calculate the

wetland area. The wetland/upland boundary was estimated for each of the remaining wetland areas and recorded on **Figure 3 (Appendix A)**.

One sample point was established at each of wetlands 1-8 and 10-16 (**Figure 2, Appendix F**). The wetland/upland boundaries were recorded on aerial photographs (**Figure 3, Appendix G**) and the areas calculated. COE data sheets are included in **Appendix H**.

2.6 Mammals, Reptiles, and Amphibians

Mammal, reptile, and amphibian species observations were recorded on the wetland monitoring form for W-9 during the site visit **(Appendix B)**; observations of wildlife at all other wetland sites were recorded in the field notebook. Indirect use indicators were also recorded including tracks, scat and burrows. A comprehensive wildlife species list for the entire site was compiled and will be updated as new species are encountered. Observations from past years will be compared with new data to determine if wildlife use is changing over time.

2.7 Birds

Bird observations for W-9 were recorded during the site visit according to the established bird survey protocol **(Appendix E)**. A general, qualitative bird list has been compiled using these observations by Land & Water and MDT personnel. Observations will be compared between years in future studies.

2.8 Macroinvertebrates

One macroinvertebrate sample was collected at W-9 during the site visit following the 2001 protocol; sampling protocol and results are included in **Appendix F**. Samples were preserved as outlined in the sampling procedure and sent to a laboratory for analysis. The approximate location is indicated on **Figure 2, Appendix A.**

2.9 Functional Assessment

A functional assessment form was completed for W-9 using the 1999 MDT Montana Wetland Assessment Method. Field data necessary for this assessment were collected on a condensed data sheet. The remainder of the assessment was completed in the office.

2.10 Photographs

Wetland-9 photos were taken showing the current land use surrounding the site, the wetland buffer, the monitored area, and the vegetation transect. A description and compass direction for each photograph were recorded on the wetland monitoring form. Photographs of W-9 are included in **Appendix C** and photo points are shown on **Figure 2, Appendix A**.

The remaining wetland sites (W-1-8, 10-16) were photographed from two (2) locations during the 2003 season; photograph locations are shown on **Figure 2 (Appendix G)**. The wetland

photos and photo logs are included in **Appendix H**. All photographs were taken using a digital camera.

Aerial photographs of each wetland site flown in 2003 are included in **Appendix I**. A digital orthophoto quad (DOQ) was downloaded from the Natural Resources Information System (NRIS) and each of the wetland locations were applied using a CAD system (**Figure 4, Appendix I**).

2.11 GPS Data

During the 2002 monitoring season, survey points were collected using a resource grade Trimble, Geoexplorer III hand-held GPS unit **(Appendix E)**. Points collected included: the vegetation transect beginning and ending locations, survey points at three landmarks recognizable on the air photo for purposes of line fitting to the topography; and the wetland boundary **(Appendix A, Figures 2 and 3)**. Changes in the wetland boundary during 2003 were adjusted on the aerial photo by hand. Photo point location data at all other wetland sites were collected using GPS in 2001 and are indicated on **Figure 2, Appendix G**.

2.12 Maintenance Needs

The conditions of the W-9 inlet and dike were examined during the monitoring visit for maintenance needs. The position of all wetland sites relative to drainage direction was examined on the ground and on the aerial photograph (**Figure 4, Appendix I**) for appropriateness and opportunities for improvement.

3.0 RESULTS

3.1 Hydrology

The source of hydrology at W-9 is an intermittent stream. During the August 2003 visit, 25% of the assessment area was inundated with approximately 0-4 feet of standing water. This was slightly more than 2002 (17%) as a result of recent rains. Emergent vegetation on the south side and southeast corner of the borrow pit was inundated during the investigation. The only control structure was the constructed dike; no outflow pipe is installed in the dam.

According to the Western Regional Climate Center (WRCC 2003), the Ridgeway 1S station annual mean (1971 – 2000) precipitation was 14.36 inches; the average precipitation through the month of July was 9.74 inches. For the year 2003, precipitation through July was 9.1 inches or 93% of the mean. Recent rains had increased the water levels throughout most of wetlands in the complex.

3.2 Vegetation

Vegetation species identified on the site are presented in **Table 1** and in the monitoring form **(Appendix B)**. Four dominant vegetation communities were mapped for the mitigation area.

Table 1: ***2001-2003 Ridgeway Wetland Vegetation Species List***

Scientific Name[1]	Region 4 (North Plains) Wetland Indicator status
Agropyron dasystachyum	FAC
Alisma plantago-aquatica	OBL
Artemesia tridentate	- (UPL)
Atriplex argentea	FACU
Beckmannia syzigachne	OBL
Bouteloua gracilis	- (UPL)
Eleocharis palustris	OBL
Festuca idahoensis	- (UPL)
Glyceria sp.	- (OBL)
Grindelia gracifolia	- (UPL)
Hordeum jubatum	FACW
Juncus sp.	FACW-OBL
Rumex crispus	FACW
Scirpus heterochaetus	OBL
Spartina gracilis	FACW
Typha latifolia	OBL
Veronica peregrina	**OBL**

[1] **Bolded** species indicate those documented within the analysis area for the first time in 2003.

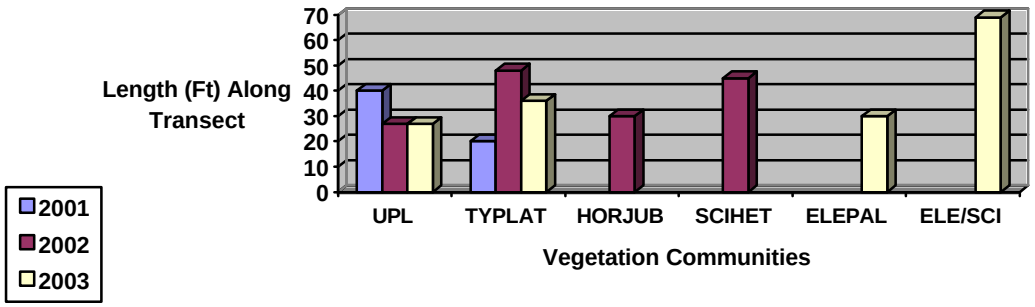
(**Figure 3, Appendix A**). The communities include: Type 1, *Artemesia tridentate/Atriplex argentea*; Type 2, *Typha latifolia;* Type 3, *Eleocharis palustris/Scirpus heterochaetus*; Type 4, *Hordeum jubatum*; and, Type 5 *Eleocharis palustris.* Dominant species within each community are listed on the monitoring form **(Appendix B)**. The dominant vegetation communities throughout the wetland site are represented by Type 2 and 4 and the site is essentially surrounded by the Type 1 community. Greater than 75% of the site has developed wetland vegetation; relatively no change had occurred in acreage since 2002, however community diversity and cover are increasing **(Table 2)**. Fewer hydrophytic plant species were observed along the transect in 2003; the extra species in 2002 was an individual sloughgrass plant.

The vegetation transect results are detailed in the monitoring form **(Appendix B)** and are summarized below in **Table 2**, the transect maps, and **Chart 1**. The transect was lengthened in 2002 from 60 to 150 feet. The composition of the vegetation communities has changed since 2002; there was a higher density of spikerush in Type 3 in 2003 and foxtail in Type 4 is being replaced by spikerush.

Table 2: ***2001-2003 Transect Data Summary***

Monitoring Year	2001	2002	2003
Transect Length	60 feet	150 feet	150 feet
# Vegetation Community Transitions along Transect	2	5	5
# Vegetation Communities along Transect	2	4	4
# Hydrophytic Vegetation Communities along Transect	1	3	3
Total Vegetative Species	7	12	9
Total Hydrophytic Species	4	6	5
Total Upland Species	3	3	4
Estimated % Total Vegetative Cover	53%	66%	78%
% Transect Length Comprised of Hydrophytic Vegetation Communities	33%	82%	82%
% Transect Length Comprised of Upland Vegetation Communities	67%	18%	18%
% Transect Length Comprised of Unvegetated Open Water	0%	0%	0%
% Transect Length Comprised of Bare Substrate	0%	0%	0%

Chart 1: Length of Vegetation Communities along Transect 1



2001 Transect Map[1]

Transect 1 Start	Upland Type 1 (40')	Wetland Type 2 (20')	Total 60'	End Transect 1

2002 Transect Map

Transect 1 Start	Upland Type 1 (27')	Wetland Type 4 (30')	Wetland Type 2 (33')	Wetland Type 3 (45')	Wetland Type 2 (15')	Total 150'	End Transect 1

2003 Transect Map

Transect 1 Start	Upland Type 1 (27')	Wetland Type 5 (15')	Wetland Type 2 (36')	Wetland Type 3 (69')	Wetland Type 5 (6')	Total 150'	End Transect 1

[1]Vegetation species within community types are not static across years.

3.3 Soils

The site was mapped as part of the Carter County Soil Survey. The dominant soils at Wetland 9 are the Bickerdyke clays. This soil type is typical of sedimentary plains. Bickerdyke is a non-hydric soil.

Soils were sampled at one wetland (SP-1) and one upland location (SP-2). The entire soil profile at SP-1 (0-16 inches) was a very dark grayish brown (10YR3/2) with yellowish red (5YR 5/6) mottles. From 6-18 inches the soil was dark gray (10YR 4/1) with yellowish red (10YR 5/6) mottles (50%). The soil at SP-1 was saturated at a depth of 8 inches. Soil at SP-2 was a silty clay from 0-16 inches and dark brown (10YR 3/3) with strong brown (7.5YR 5/8) mottles. No saturation was noted.

Soil data for each sample point within the 15 other sites are included on the COE data sheets (**Appendix H**).

3.4 Wetland Delineation

The delineated wetland boundary at Wetland 9 is depicted on **Figure 3, Appendix A**. The 2003 wetland boundary encompassed 3.41 acres of gross wetland area and 0.88 acres of open-water habitat. The net wetland area was 2.53 acres; a decrease of 0.33 acres (<9%) as a result of more open water and a slight adjustment (decrease) in the extent of community type 4 near the berm. The W-9 COE data forms are included in **Appendix B**.

The wetland area at sites 1-8 and 10-16 was estimated during 2003 (**Table 3**); W-9 data is also included in this table. As a result of recent precipitation a greater percentage of the sites were flooded on the day of investigation, which made it difficult to assess the wetland boundary. Sites 7, 8, 10, 11, 14, and 15 had no surface water and site 16 had approximately 2 inches of water in approximately 75% of the borrow pit. The open water acreage was included for site 16 although it is likely that water occurs only on an ephemeral basis within the borrow pit. Wetland acreage within the entire complex was estimated at 9.97 acres and open water acreage totaled 17.63 acres. The total acreage of open water and wetland habitat was estimated at 27.60 acres, approximately 55% of the 50-acre goal.

Based on the aerial photograph signature, an ordinary open water boundary was drawn on the **Figure 3** (**Appendix A** for W-9, **Appendix G** for W-1 throughW-6, W12 through W14) and the wetland boundary was equated with the water limits on the day of investigation. This was only performed for sites that included actual emergent wetland or qualified as true wetlands – no **Figure 3** was prepared for Sites W-7, W-8, W-10, W-11, W-15, or W-16.

Of the 16 sites, seven (7) do not qualify as wetlands (sites 7, 8, 10, 11, 14, 15, and 16) due to the lack of wetland vegetation, wetland hydrology, and/or hydric soil (**Table 3**). Sites 7 and 8 are located down-drainage of site 6 and up-drainage of site 9; both sites 6 and 9 are active wetlands which may indicate that sites 7 and 8 are not strategically placed along that drainage. Between sites 7 and 8 there is a borrow area that would likely qualify as a wetland; further indicating that there is potential to capture and hold water in this area.

Sites 10 and 11 are located adjacent to successfully-bermed drainages; site 10 is located slightly to the east of the site 9 drainage and site 11 is slightly to the east and down-drainage and of a successful unnamed wetland not part of the investigation.

Sites 14, 15 and 16 are located on minor drainages that may not have enough watershed to provide consist hydrology to the borrow pits. A large trench in the berm of site 16 suggests overflow has occurred. There is a possibility that these sites do not have sufficient clay layers to maintain the surface water.

In 2004 an attempt will be made to visit the site 1-2 weeks after a substantial precipitation event so that these boundary data can be refined to accurately depict wetland versus ordinary open water boundaries.

Table 3: ***Wetland Determination Results for All Ridgeway Wetland Sites***

Site	Wetland Determination[1]			Acreage			Comments
	Vegetation	Hydrology	Soils	Open Water[2]	Wetland	Total	
W-1	X	X	X	0.97	0.0003	0.97	No wetland vegetation in borrow pit area. Wetland (WL) vegetation 30% of "horse shoe" area perimeter.
W-2	X	X	X	5.21	0.77	5.98	Wetland vegetation 100% of perimeter.
W-3	X	X	X	1.92	1.18	3.10	Unknown if wetland vegetation is growing upstream in arm of wetland boundary because of flooding; assumption made in 2003 that it was colonized with hydrophytic plants. Will confirm in 2004. Wetland vegetation 30% of perimeter.
W-4	X	X	X	0.67	0.17	0.84	Wetland vegetation 55% of perimeter.
W-5	X	X	X	1.09	0.33	1.42	Wetland vegetation 100% of perimeter.
W-6	X	X	X	3.00	2.83	5.83	Wetland vegetation 100% of perimeter.
W-7		X	X	0	0	0	Surface of borrow pit dry, but soil pit saturated <12"; no WL vegetation.
W-8		X	X	0	0	0	Small puddle (not calculated) and hydric soils present.
W-9	X	X	X	0.88	2.53	3.41	Wetland has >60% WL vegetation; borrow pit perimeter 30% vegetated.
W-10		X	X	0	0	0	Surface of borrow pit dry but soil saturated, no WL vegetation.
W-11		X		0	0	0	Soil not saturated, no WL vegetation or hydric soil, hydrology indicator weak (water marks).
W-12	X	X	X	1.09	0.38	1.47	Unknown if wetland vegetation is growing upstream in arm of wetland boundary because of inundation; assumption made in 2003 that it was colonized with hydrophytic plants. Will confirm in 2004. Borrow pit perimeter 20% WL vegetation
W-13	X	X	X	2.19	1.78	3.97	Perimeter 90% WL vegetation.
W-14		X		0	0	0	Borrow pit dry; hydrology indicator was weak (water marks). No WL wetland vegetation or hydric soils.
W-15		X		0	0	0	Borrow pit dry but soil saturated; no WL wetland vegetation or hydric soils.
W-16		X		0.61	0	0.61	Surface water present in pit; no WL vegetation.
TOTAL				**17.63**	**9.97**	**27.60**	

[1] X: Indicates "Yes".
[2] Open water likely <4 feet deep.

3.5 Wildlife

Wildlife species are listed in **Table 4.** Activities and densities associated with these observations area are included on the monitoring form in **Appendix B**. Very few wildlife species were noted at Wetland #9 and no frogs were seen in 2003.

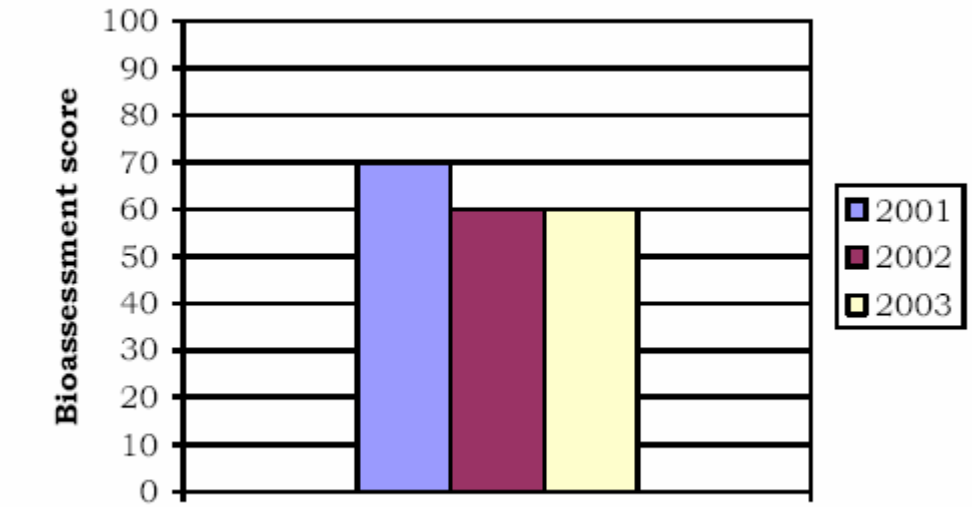
Table 4. ***2001-2003 Wildlife Species Observed on the Ridgeway Complex Mitigation Site***

AMPHIBIANS and REPTILES	
northern leopard frog (*Rana pipiens*)	
plains garter snake (*Thamnophis radix*)	
BIRDS	
American Avocet (*Recurvirostra americana*)	**Gray Partridge *(Perdix perdix)***
American Robin (*Turdus migratorius*)	**Killdeer (*Charadrius vociferous)***
American Wigeon (*Anas americana)*	**Mallard *(Anas platyrhynchos)***
Barn Swallow (*Hirundo pyrrhonota*)	**Meadowlark (*Sturnella neglecta*)**
Blue-winged Teal (*Anas discors)*	**Mourning Dove (*Zenaida macroura*)**
Bobolink (*Dolichonyx oryzivorus*)	**Red-winged Blackbird (*Agelaius phoeniceus*)**
Canada Goose (*Branta canadensis*)	**Short-earred Owl (*Asio flammeus*)**
Cinnamon Teal (*Anas cyanoptera)*	**Spotted sandpiper (*Actitis macularia)***
Ferruginous Hawk (*Buteo regalis*)	**Upland Sandpiper (*Bartramia longicauda*)**
Gadwall (*Anas strepera*)	**Vesper Sparrow (*Pooecetes gramineus)***
Grasshopper Sparrow (*Ammodramus savannarum)*	**Willet (*Catoptrophorus semipalmatus)***
Great Blue Heron (*Ardea herodias*)	**Wilson's Phalarope (*Phalaropus tricolor*)**
Greater Yellow Legs *(Tringa melanoleuca)*	**Willet (*Catoptrophorus semipalmatus)***
Horned Lark (*Eremophila alpestris*)	**Yellow-headed Blackbird *(xanthocepahlus xanthocephalus)***
MAMMALS	
Mule Deer (*Odocoileus hemionus*)	
White-tailed deer (*Odocoileus virginianus)*	
[1] **Bolded** species were observed during 2003 monitoring. All other species were observed during one or more of the previous monitoring years, but not during 2003.	

3.6 Macroinvertebrates

The sample collected at the Ridgeway site yielded very few organisms, making an assessment difficult (**Bollman 2003, Appendix F)**. *The depauperate fauna, along with a reduction in taxa richness, may have been the result of sampling technique or could indicate loss of habitat integrity. Water quality may have improved, since the biotic index value is lower in 2003 than in either of the previous years, but the low numbers of organisms make this hypothesis tenuous. The mayflies present in the 2002 sample did not reappear in the 2003 sample. Sub-optimal conditions were indicated by metric scores.*

Chart 2: *Bioassessment Results 2001-2003*



3.7 Functional Assessment

Completed functional assessment forms are included in **Appendix B** and summarized below in **Table 5**. The decrease in functional points after 2001 was the result of AA refinement. Functional points have increased slightly since 2002; from 23.8 FU to 25.88 FU. Wetland #9 rated as a Category II wetland because of its high function and value in the MTNHP species category. Other high ratings occurred in the following categories: short and long-term surface water storage, groundwater discharge/recharge, sediment/nutrient/toxicant removal, and sediment/shoreline stabilization. The Recreation/Education rating has increased as a result of ungulate observations and hunting potential.

3.8 Photographs

Representative photographs of W-9 taken from photo points and transect ends are included in **Appendix C.** All photos for the remaining wetlands (1-8, 10-16) are included as **Appendix H.**

3.9 Maintenance Needs/Recommendations

No maintenance needs were observed for W-9. Five of the 16 constructed impoundments at the time of investigation did not contain water, which in part is a result of the drought, but may also be the result of the construction methods and/or borrow pit and berm locations. All of the borrow pits are nearly square and do not blend into the drainage landscape. Blending the constructed wetlands into the landscape may enable the depression to capture more water in a controlled manner while providing more substrate for shallow open-water areas; generally the elongated shallows colonize more readily with diverse wetland vegetation communities. The berm at Site 16 had a large trench on the west end excavated by stormwater flow.

Table 5: ***Summary of 2001-2003 Wetland Function/Value Ratings and Functional Points at the Ridgeway W-9 Wetland Mitigation Project***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	2001	2002	2003
Listed/Proposed T&E Species Habitat	Low (0)	Low (0)	Low (0)
MNHP Species Habitat	High (1.0)	High (1.0)	High (1.0)
General Wildlife Habitat	High (0.9)	Mod (0.5)	Mod (0.5)
General Fish/Aquatic Habitat	Mod (0.6)	NA	NA
Flood Attenuation	Mod (0.5)	Mod (0.5)	Mod (0.5)
Short and Long Term Surface Water Storage	High (1.0)	High (.9)	High (.9)
Sediment, Nutrient, Toxicant Removal	High (1.0)	High (1.0)	High (1.0)
Sediment/Shoreline Stabilization	Mod (0.7)	High (.9)	High (.9)
Production Export/Food Chain Support	Mod (0.7)	Mod (0.7)	Mod (0.7)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)	High (1.0)
Uniqueness	Mod (0.4)	Low (0.3)	Low (0.3)
Recreation/Education Potential	Low (0.1)	Low (0.1)	Low (0.5)
Actual Points/ Possible Points	7.9/12	6.9/11	7.3/11
% of Possible Score Achieved	66%	62%	66%
Overall Category	II	II	II
Total Acreage of Assessed Wetlands within Easement	4.34 ac	3.45 ac	3.41 ac
Functional Units (acreage x actual points)	34.33 fu	23.8 fu	25.88 fu
Net Acreage Gain	4.34 ac	3.45 ac	3.41 ac
Net Functional Unit Gain	34.33 fu	23.81 fu	25.88 fu
Total Functional Unit "Gain"	34.33 fu	23.81 fu	25.88 fu

3.10 Current Credit Summary

The delineated wetland boundary at Wetland 9 is depicted on **Figure 3, Appendix A**. The 2003 wetland boundary encompassed 3.41 acres of gross wetland area and 0.88 acres of open-water habitat. The net wetland area of W-9 was 2.53 acres, a slight decrease (0.33 acre) because of the flooding from recent rains. Wetland communities are becoming more diverse and increasing in density; an overall improvement in wetland condition. Functional units increased from 23.81 to 25.88 units. The COE and functional assessment forms are included in **Appendix B**.

The wetland area at sites 1-8 and 10-16 was estimated during 2003 (**Table 3**); W-9 data is also included in this table. Wetland acreage within the entire complex was estimated at 9.97 acres and open water acreage totaled 17.63 acres. The total acreage of open water and wetland habitat was estimated at 27.60 acres, approximately 55% of the 50-acre shallow waterfowl habitat goal.

As a result of recent precipitation a greater percentage of the sites were flooded on the day of investigation, which made it difficult to assess the wetland boundary; sites 7, 8, 10, 11, 14, and 15 had no surface water and site 16 had approximately 2 inches of water in approximately 75% of the borrow pit. Based on the aerial photograph signature, an ordinary open water boundary was drawn on individual **Figure 3's** (for those sites that had emergent vegetation) and the wetland boundary was equated with the water limits on the day of investigation. Sites with only water and no wetland vegetation were assigned no wetland acreage.

Of the 16 sites, seven (7) do not qualify as wetlands (Sites 7, 8, 10 , 11, 14, 15, and 16). Sites 7 and 8 are located down-drainage of site 6 and up-drainage of site 9. Both sites 6 and 9 are active wetlands, which may indicate that sites 7 and 8 are not strategically placed along that drainage. Between sites 7 and 8 there is a borrow area that would likely qualify as a wetland; further indicating that there is potential to capture and hold water in this area.

Sites 10 and 11 are located adjacent to successfully-bermed drainages; site 10 is located slightly to the east of the site-9 drainage and site 11 is slightly to the east and down-drainage and of a successful unnamed pond.

Sites 14, 15 and 16 are located on minor drainages that may not have enough watershed to provide consist hydrology to the borrow pits. A large trench in the berm of site 16 suggests overflow has occurred. There is a possibility that these sites do not have sufficient clay layers to maintain the surface water.

4.0 REFERENCES

Berglund, J. 1999. *MDT Montana Wetland Assessment Method*. Prepared for Montana Department of Transportation. May 1999.

Bollman, W. 2003. MDT Wetland Mitigation Monitoring Project – Aquatic Invertebrate Monitoring Summary 2001, 2002, 2003. Rhithron Associates Inc. Missoula, MT.

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. US Army Corps of Engineers. Washington, DC.

Reed, P.B. 1988. National list of plant species that occur in wetlands: North Plains (Region 4). Biological Report 88(26.4), May 1988. U.S. Fish and Wildlife Service. Washington, D.C.

Rau, L. 1999. Ridgeway Wetland Complex, Impoundment Size Letter. BLM, Miles City Field Office. Miles City, MT.

US Army Corps of Engineers. 1987. *Corps of Engineers Wetlands Delineation Manual*. US Army Corps. Washington, DC.

UDSA Bureau of Land Management. 1990. Typical Water Retention Pit. BLM, Miles City Field Office. Miles City, MT.

UDSA Bureau of Land Management. 1999. Ridgeway Wetland Complex Environmental Assessment. BLM, Miles City Field Office. Miles City, MT.

USDA Natural Resource Conservation Service. Soil Survey of Carter County, Montana.

Western Regional Climate Center, 2003. Ridgeway 1S Station: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?mtridg.

Appendix A

WETLAND-9: FIGURES 2 - 3

MDT Wetland Mitigation Monitoring
Ridgeway Wetland 9 (W-9)
Ekalaka, Montana

LAND & WATER

Figure 2 Monitoring Activity Locations 2003

PROJECT NAME: MDT Ridgeway Complex W-9 Wetland Mitigation

DRAWING TITLE: Monitoring Activity Locations 2003

PROJ NO: 130091.025 | DRAWN: RA
FILE NAME: TASK2\SW9BASE.dwg | CHECKED:
SCALE: 1"= 100ft | APPVD: BD
LOCATION: Ridgeway Complex | PROJ MGR: BD

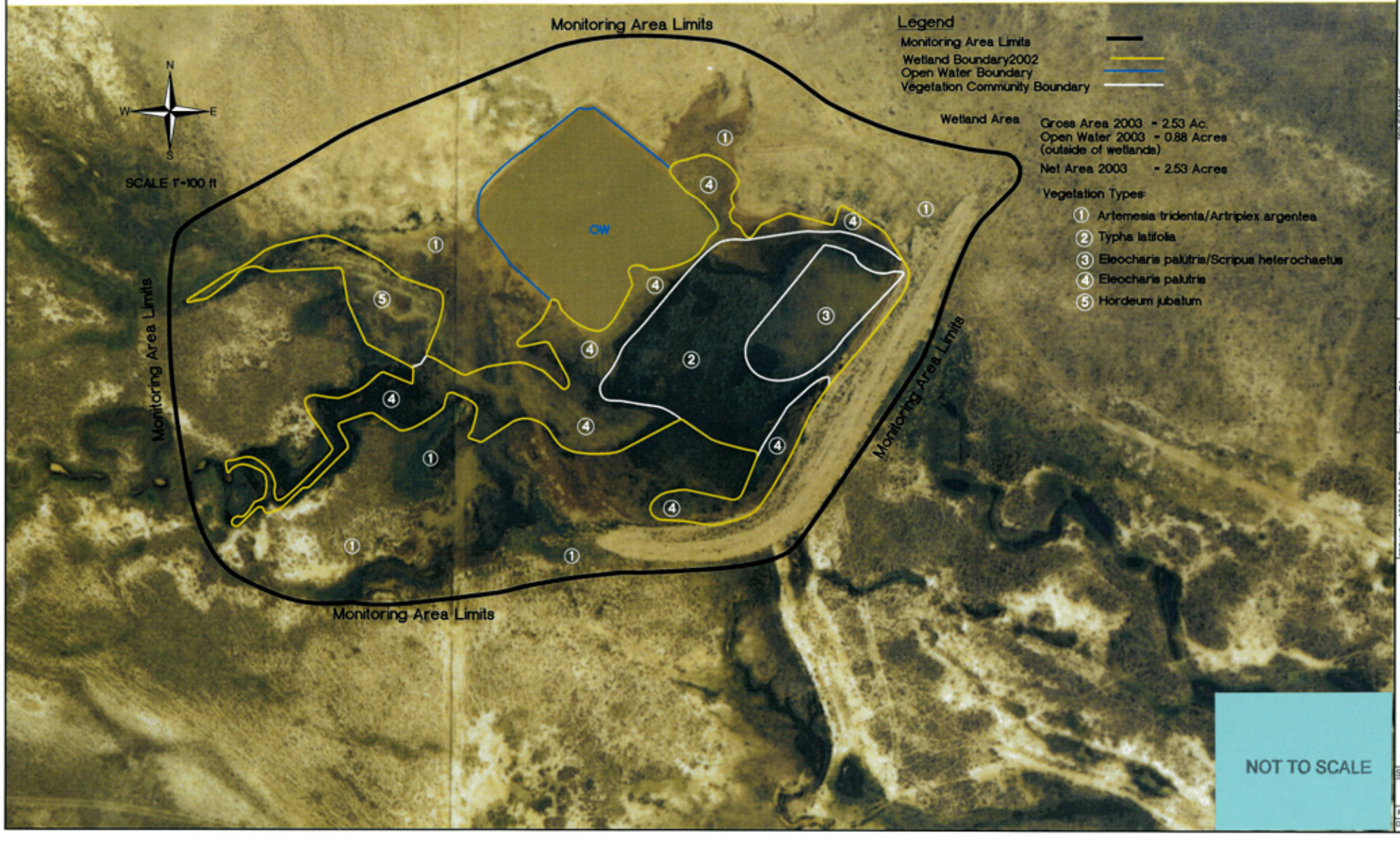
LAND & WATER CONSULTING, INC.
P.O. BOX 7814
Missoula, MT 59807

SHEET NUMBER 2

REV -

DATE: 1-15-03

Figure 3 Mapped Site Features 2003



PROJECT NAME: MDT Ridgeway Complex W-9 Wetland Mitigation

DRAWING TITLE: Mapped Site Features 2003

PROJ NO: 130091.025 | DRAWN: RA
FILE NAME: TASK2GW9BASE.dwg | CHECKED: LB
SCALE: 1"= 100ft | APPVD: JB
LOCATION: Ridgeway Complex | PROJ MGR: JB

LAND & WATER CONSULTING, INC.
P.O. BOX 8254
Missoula, MT 59807

SHEET NUMBER 3

REV -

DATE: 12-16-03

Appendix B

WETLAND-9:

2003 WETLAND MITIGATION SITE MONITORING FORM
2003 BIRD SURVEY FORMS
2003 WETLAND DELINEATION FORMS
2003 FIELD AND FULL FUNCTIONAL ASSESSMENT FORMS

MDT Wetland Mitigation Monitoring
Ridgeway Wetland (W-9)
Ekalaka, Montana

LAND & WATER

LWC / MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name:___Ridgeway #9___ Project Number:__1300091-025__ Assessment Date:__7/1&2/03_
Location:____Ridgeway, MT_____ MDT District:_____#5____ Milepost:___NA_____
Legal description: T_4S/4S_ R_58E/57E___ Section_31-35/36__ Time of Day: 6AM-8PM____
Weather Conditions:__overcast, windy_____ Person(s) conducting the assessment:__LB/LWC____
Initial Evaluation Date:__8/_9_/_02_ Visit #:_____3__ Monitoring Year:___2003_____
Size of evaluation area:__3.45_acres Land use surrounding wetland : grazing rangeland_____

HYDROLOGY

Surface Water Source:____intermittent drainage_____
Inundation**:** Present_X___ Absent____ Average depths:__3__ft Range of depths:__0_-_4_ft
Assessment area under inundation:__25 %
Depth at emergent vegetation-open water boundary:_*see below*___ft
If assessment area is not inundated are the soils saturated w/in 12" of surface**:** Yes__X__No____
Other evidence of hydrology on site (drift lines, erosion, stained vegetation etc.): __water lines, drainage pattern_____

***Excavated area inundated; emergent vegetation colonizing 1 side of created pond with a few springs noted infrequently along other sides. Area in front of dam also inundated from recent storms; vegetation community diverse and proliferating nicely.**

Groundwater
Monitoring wells: Present_____ Absent _____X_____
Record depth of water below ground surface

Well #	Depth	Well #	Depth	Well #	Depth

Additional Activities Checklist:
__X___Map emergent vegetation-open water boundary on air photo
__X___Observe extent of surface water during each site visit and look for evidence of past surface water elevations (drift lines, erosion, vegetation staining etc.)
__NA___GPS survey groundwater monitoring wells locations if present

COMMENTS/PROBLEMS: _____

VEGETATION COMMUNITIES

Community No.:__1__ Community Title (main species):__ *Artemesia tridentata /Atriplex argentea* _____

Dominant Species	% Cover	Dominant Species	% Cover
Atriplex argentea	20	*Agropyron smithii*	20
Festuca idahoensis	15		
Bouteloua gracilis	5		
Grindelia graciflora	10		
Artemesia tridentata	30		

COMMENTS/PROBLEMS: _____

Community No.:__2__ Community Title (main species):___ *Typha latifolia*_____

Dominant Species	% Cover	Dominant Species	% Cover
Rumex crispus	<10		
Typha latifolia	75		
Eleocharis palustris	15		

COMMENTS/PROBLEMS: ____communities shifting slightly since 2002_____

Community No.:__3 __ Community Title (main species): *Eleocharis palustris/Scirpus heterochaetus*

Dominant Species	% Cover	Dominant Species	% Cover
Scirpus heterochaetus	10	*Rumex crispus*	5
Alisma plantago-aquatica	15	*Beckmannia syzigachne*	<1
Sagittaria cuneata	<1		
Eleocharis palustris	30		
Open water	40		

COMMENTS/PROBLEMS: _____

Additional Activities Checklist:
__X__Record and map vegetative communities on air photo

VEGETATION COMMUNITIES (continued)

Community No.:_4___ Community Title (main species):_____ *Hordeum jubatum* _____

Dominant Species	% Cover	Dominant Species	% Cover
Hordeum jubatum	95		
Agropyron smithii	5		

COMMENTS/PROBLEMS:

_____

_____

Community No.:__5__ Community Title (main species*):*___ *Eleocharis palustris*

Dominant Species	% Cover	Dominant Species	% Cover
Rumex crispus	20	*Alisma plantago-aquatica*	5
Eleocharis palustris	65		
Spartina gracilis	<5		
Hordeum jubatum	<5		
Alopecurus aequalis	5		

COMMENTS/PROBLEMS: _____

_____

_____

_____

Community No.:____ Community Title (main species):_____

Dominant Species	% Cover	Dominant Species	% Cover

COMMENTS/PROBLEMS: _____

_____

_____

_____

COMPREHENSIVE VEGETATION LIST

Species	Vegetation Community Number(s)	Species	Vegetation Community Number(s)
Agropyron smithii	1,5		
Alisma plantago-aquatica	3,4		
Alopecurus aequalis	4		
Artemesia tridentata	1		
Atriplex argentea	1		
Beckmannia syzigachne	3		
Bouteloua gracilis	1		
Eleocharis palustris	2, 4		
Festuca idahoensis	1		
Grindelia gracifolia	1		
Hordeum jubatum	4		
Rumex crispus	2, 4		
Sagittaria cuneata	3		
Scirpus heterochaetus	2, 3		
Spartina gracilis	2, 4		
Typha latifolia	2, 4		
Veronica peregrina	**4**		

Bold denotes observed in 2003 for first time.

COMMENTS/PROBLEMS: _____

_____

_____

_____

_____

_____

_____

PLANTED WOODY VEGETATION SURVIVAL

Species	Number Originally Planted	Number Observed	Mortality Causes
NONE			

COMMENTS/PROBLEMS: ___None_____

WILDLIFE

BIRDS

(Attach Bird Survey Field Forms)

Were man made nesting structures installed? Yes____ No_X___Type:_____ How many?_____ Are the nesting structures being utilized? Yes____ No____ Do the nesting structures need repairs? Yes____ No____

MAMMALS, AMPHIBIANS AND REPTILES

Species	Number Observed	Indirect indication of use			
		Tracks	Scat	Burrows	Other
W-9:					
Mule Deer doe inside cattail area bedding down	1	x			
plains garter snake swimming in borrow area	1				
Other Sightings:					
leopard frog (W-9&12 MDT, June)					
antelope (W-12 MDT, June)					
badger (W-4 MDT, June)					
“frogs and turtles” (W-7/8 MDT: June)					
fox species (W-1 LWC, July)					

Additional Activities Checklist:
___X__Macroinvertebrate sampling (if required)

COMMENTS/PROBLEMS: _____

_____
_____
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PHOTOGRAPHS

Using a camera with a 50 mm lenses and color film take photographs of the following permanent reference points listed in the checklist below. Record the direction of the photograph using a compass. (The first time at each site establish a permanent reference point by setting a ½ inch rebar or fencepost extending 2-3' above ground, survey the location with a resource grade GPS and mark the location on the air photo.)
Checklist:

___X__ One photo for each of the 4 cardinal directions surrounding wetland
___X__ At least one photo showing upland use surrounding wetland – if more than one upland use exists, take additional photos
___X__ At least one photo showing buffer surrounding wetland
___X__ One photo from each end of vegetation transect showing transect

Location	Photo Frame #	Photograph Description	Compass Reading
A		not taken in 2003	288
B		wetland view, buffer in foreground	268
C		wetland view, buffer in foreground	238
D		(same as G; removed)	
E		wetland view	80
F		wetland view	116
G		wetland view from WL end of transect	310
H		UPL veg transect end	358

COMMENTS/PROBLEMS: _____

GPS SURVEYING

Using a resource grade GPS survey the items on the checklist below. Collect at least 3 location points with the GPS unit set at 5 second recording rate. Record file numbers fore site in designated GPS field notebook

Checklist:

__X__ Jurisdictional wetland boundary
__(2)_ 4-6 landmarks recognizable on the air photo
__X___ Start and end points of vegetation transect(s)
__X___ Photo reference points
__NA___ Groundwater monitoring well locations

COMMENTS/PROBLEMS: _GPSed the boundary again this year to clarify.

WETLAND DELINEATION

(Attach Corps of Engineers delineation forms)

At each site conduct the items on the checklist below:
__X___Delineate wetlands according to the 1987 Army Corps manual.
__X__ Delineate wetland-upland boundary on the air photo
__X___ Survey wetland-upland boundary with a resource grade GPS survey

COMMENTS/PROBLEMS: _____

FUNCTIONAL ASSESSMENT

(Complete and attach full MDT Montana Wetland Assessment Method field forms; also attach abbreviated field forms, if used)

COMMENTS/PROBLEMS: _____

MAINTENANCE

Were man-made nesting structures installed at this site? YES___ NO_X___
If yes, do they need to be repaired? YES____ NO____
If yes, describe problems below and indicate if any actions were taken to remedy the problems.

Were man-made structures build or installed to impound water or control water flow into or out of the wetland? YES____ NO_X___
If yes, are the structures working properly and in good working order? YES____ NO___
If no, describe the problems below.

COMMENTS/PROBLEMS:

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: Ridgeway Complex (#9) Date: 7-1-03 Examiner: LB/LWC Transect # 1

Approx. transect length: 150 ft Compass Direction from Start (Upland): 170

Vegetation type A:	CT-1	
Length of transect in this type:	27’	feet
Species:		Cover:
ATRARG		10
Chenopodium sp		35
BROTEC		5
AGRSMI		35
	Total Vegetative Cover:	100%

Vegetation type B:	CT-4	
Length of transect in this type:	15’	feet
Species:		Cover:
ELEPAL		90
RUMCRI		10
Open water		<1
	Total Vegetative Cover:	100%

Vegetation type C:	CT-2	
Length of transect in this type:	36’	feet
Species:		Cover:
TYPLAT		100
	Total Vegetative Cover:	100%

Vegetation type D:	CT-3	
Length of transect in this type:	69’	feet
Species:		Cover:
TYPLAT		15
SCIHET		15
Unknown emergent*		15
Open water		50
ELEPAL		5
*no flowering portion; 6-12” in length, oblong leaf with gradual taper from stem to leaf base (may be *Alisma*?)		
	Total Vegetative Cover:	50%

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: Ridgeway Complex (#9) Date: 7-1-03 Examiner: LB/LWC Transect # 1

Approx. transect length: 150 ft Compass Direction from Start (Upland): 170

Vegetation type A:	CT-4	
Length of transect in this type:	15’	feet
Species:		Cover:
TYPLAT		5
ELEPAL		20
open water		75
Unknown emergent (same as above)		<1
Total Vegetative Cover:		25%

Vegetation type B:		
Length of transect in this type:		feet
Species:		Cover:
Total Vegetative Cover:		

Vegetation type C:		
Length of transect in this type:		feet
Species:		Cover:
Total Vegetative Cover:		

Vegetation type D:		
Length of transect in this type:		feet
Species:		Cover:
Total Vegetative Cover:		

LAND & WATER

MDT WETLAND MONITORING – VEGETATION TRANSECT (back of form)

Cover Estimate

+ = <1%
1 = 1-5%
2 = 6-10%
3 = 11-20%
4 = 21-50%
5 = >50%

Indicator Class:

+ = Obligate
- = Facultative/Wet
0 = Facultative

Source:

P = Planted
V = Volunteer

Percent of perimeter 70% % developing wetland vegetation – excluding dam/berm structures.

Establish transects perpendicular to the shoreline (or saturated perimeter). The transect should begin in the upland area. Permanently mark this location with a standard metal fencepost. Extend the imaginary transect line towards the center of the wetland, ending at the 3 food depth (in open water), or at a point where water depths or saturation are maximized. Mark this location with another metal fencepost.

Estimate cover within a 10 ft wide "belt" along the transect length. At a minimum, establish a transect at the windward and leeward sides of the wetland. Remember that the purpose of this sampling is to monitor, not inventory, representative portions of the wetland site.

Notes:

Excavated portion of wetland is ~25% vegetated on side adjacent to original portion of wetland (in front of berm).

3/01 rev

LAND & WATER

BIRD SURVEY – FIELD DATA SHEET

Page__1_of__1_
Date: 8/9/02
Survey Time: 4PM

SITE: Ridgeway #9

Bird Species	“	Behavior	Habitat	Bird Species	#	Behavior	Habitat
Wetland 9, 2003							
unident hen duck	1	FO	OW				
Killdeer	5	BD	MA				
Sandpiper unk.	1	BD	MA				
Upland Plover	1	BD	adj. upland				
yellow-headed blackbird	1	BD					
Other Species (MDT, late June), 2003:	**sites seen:**			**Other Species (LWC, 7/1&2/03), 2003, sites seen:**			
American Avocet	13,12,11,9,7/8,6(nesting),3			4,2 (adults + young)			
American Robin	9						
American Wigeon	13,9,6						
Barn Swallow	9						
Blue-winged Teal	13,12,9,6,5,4,3						
Bobolink	13,9,6						
Canada geese	13,6 (family),5 (family)						
cinnamon teal	12						
ferruginous hawk	4 (adjacent)						
gadwall	13,12,6,3			6 (adult + chicks)			
grasshopper sparrow	6						
great blue heron	13						
greater yellow legs	10,9 (“yellowlegs”),6,3			12			
horned larks	12,9,6						
Hungarian partridge	6						
killdeer	15/16,13,11,10,9,7/8,6,5,3			14,12			
mallard	12,9,3			4			
meadow lark	15/16,12,9,6						
mourning dove	15,16,						
red-winged blackbird	15/16,9,6						
ring-necked duck	93						
short-eared owl	9						
sparrows	13,12						
upland plover	11,9						
vesper sparrow	9,6						
willet	9,6,3			6 (adult + young)			
Wilson’s phalarope	13,12,9&6&3: (“phalarope”)						
yellow-headed blackbird	9,6						

Behavior: BP – one of a breeding pair; BD – breeding display; F – foraging; FO – flyover; L – loafing; N – nesting

Habitat: AB – aquatic bed; FO – forested; I – island; MA – marsh; MF – mud flat; OW – open water; SS – scrub/shrub; UP – upland buffer; WM – wet meadow, US – unconsolidated shoreline

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Ridgeway Complex (#9)	Date: 7/1/03
Applicant/Owner: MDT	County: Carter
Investigator: Lynn Bacon, Land & Water Consulting	State: MT

Do Normal Circumstances exist on the site:	x	Yes		No	Community ID: Emergent
Is the site significantly disturbed (Atypical Situation)?		Yes	x	No	Transect ID:
Is the area a potential Problem Area?:		Yes	x	No	Plot ID: SP-1
(If needed, explain on reverse.)					

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Eleocharis palustris*	H	OBL	9			
2	*Rumex crispus*	H	FACW	10			
3	*Alisma plantago-aquatica*	H	OBL	11			
4	unknown aquatic veg; desiccated	H	(OBL)	12			
5	*Alopecurus aequalis*	H	OBL	13			
6	*Agropyron smithii*	H	FACU	14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 5/6 = 83%

HYDROLOGY

x Recorded Data (Describe in Remarks):
- Stream, Lake, or Tide Gauge
- x Aerial Photographs
- Other

No Recorded Data Available

Field Observations:

Depth of Surface Water: NA (in.)

Depth to Free Water in Pit: NA (in.)

Depth to Saturated Soil: 8” (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 Inches
- Water Marks
- Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 Inches
- Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Approx. 50% of the wetland is inundated.

SOILS

Map Unit Name (Series and Phase): Bickerdyke Clay

Drainage Class: well

Field Observations

Taxonomy (Subgroup): Udorthentic Chromusterts

Confirm Mapped Type? X Yes ___ No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0 - 16	A	10YR 3/2	5YR 4/6	50%	silt clay loam

Hydric Soil Indicators:

___	Histosol	___	Concretions
___	Histic Epipedon	___	High Organic Content in surface Layer in Sandy Soils
___	Sulfidic Odor	___	Organic Streaking in Sandy Soils
___	Aquic Moisture Regime	___	Listed on Local Hydric Soils List
___	Reducing Conditions	___	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	___	Other (Explain in Remarks)

Low-chroma with mottles.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	X	Yes		No	
Wetland Hydrology Present?	X	Yes		No	
Hydric Soils Present?	X	Yes		No	
Is this Sampling Point Within a Wetland?	x	Yes		No	

Remarks:

Wetland is undated in excavated area and has open water in area in front of dam. New veg spp. are colonizing wetland, or perhaps adequate moisture is giving already-seeded or rooted species opportunity to proliferate.

Approved by HQUSACE 2/92

LAND & WATER

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Ridgeway Complex (#9)	Date: 8-9-02
Applicant/Owner: MDT	County: Carter
Investigator: Lynn Bacon, Land & Water Consulting	State: MT

Do Normal Circumstances exist on the site:	x	Yes		No	Community ID: UPL
Is the site significantly disturbed (Atypical Situation)?		Yes	x	No	Transect ID:
Is the area a potential Problem Area?:		Yes	x	No	Plot ID: SP-2
(If needed, explain on reverse.)					

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	AGRSMI	H	FACU	9			
2	GRIGRA	H	(UPL)	10			
3	CHEsp.	H	?	11			
4	HORJUB	H	FACW	12			
5				13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 1/4=25%

SP not within the wetland boundary.

HYDROLOGY

x Recorded Data (Describe in Remarks):
- Stream, Lake, or Tide Gauge
- x Aerial Photographs
- Other

No Recorded Data Available

Field Observations:

Depth of Surface Water: NA (in.)

Depth to Free Water in Pit: NA (in.)

Depth to Saturated Soil: NA (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- Saturated in Upper 12 Inches
- Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 Inches
- Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Not enough hydrologic indicators present.

LAND & WATER

SOILS

Map Unit Name (Series and Phase): Bickerdyke Clay
Drainage Class: well
Taxonomy (Subgroup): Udorthentic Chromusterts
Field Observations
Confirm Mapped Type? X Yes ___ No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0 - 16	A	10YR3/3	7.5YR 5/8 (0-3")	50% coarse	silt clay loam

Hydric Soil Indicators:

___ Histosol	___ Concretions
___ Histic Epipedon	___ High Organic Content in surface Layer in Sandy Soils
___ Sulfidic Odor	___ Organic Streaking in Sandy Soils
___ Aquic Moisture Regime	___ Listed on Local Hydric Soils List
___ Reducing Conditions	___ Listed on National Hydric Soils List
___ Gleyed or Low-Chroma Colors	___ Other (Explain in Remarks)

Hydric soils absent

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	___	Yes	X	No
Wetland Hydrology Present?	___	Yes	X	No
Hydric Soils Present?	___	Yes	X	No

Is this Sampling Point Within a Wetland? ___ Yes X No

Remarks:

Rather abrupt edge around the WL boundary.

Approved by HQUSACE 2/92

LAND & WATER

MDT MONTANA WETLAND ASSESSMENT FORM (revised May 25, 1999)

1. Project Name: Ridgeway Complex **2. Project #:** 130091 **Control #:** -025

3. Evaluation Date: 7/12/2003 **4. Evaluator(s):** LB/LWC **5. Wetland / Site #(s):** W-9

6. Wetland Location(s) i. T: 4 S **R:** 58 E **S:** 32 **T:** __ N **R:** __ E **S:** _____

ii. Approx. Stationing / Mileposts: _____

iii. Watershed: 10110202 **GPS Reference No. (if applies):** _____

Other Location Information: _____

7. A. Evaluating Agency LWC

8. Wetland Size (total acres): 3.41 (visually estimated)
_____ (measured, e.g. GPS)

B. Purpose of Evaluation:
- ☐ Wetlands potentially affected by MDT project
- ☐ Mitigation wetlands; pre-construction
- ☒ Mitigation wetlands; post-construction
- ☐ Other

9. Assessment Area (total acres): _____ (visually estimated)
_____ (measured, e.g. GPS)

10. CLASSIFICATION OF WETLAND AND AQUATIC HABITATS IN AA

HGM CLASS [1]	SYSTEM [2]	SUBSYSTEM [2]	CLASS [2]	WATER REGIME [2]	MODIFIER [2]	% OF AA
Depression	Palustrine	None	Unconsolidated Bottom	Permanently Flooded	Excavated	25
Riverine	Riverine	Lower Perennial	Emergent Wetland	Intermittently Flooded	---	30
Depression	Palustrine	None	Emergent Wetland	Intermittently Flooded	---	45
---	---	---	---	---	---	

[1] = Smith et al. 1995. [2] = Cowardin et al. 1979.

11. ESTIMATED RELATIVE ABUNDANCE (of similarly classified sites within the same Major Montana Watershed Basin)
Common **Comments:** _____

12. GENERAL CONDITION OF AA

i. Regarding Disturbance: (Use matrix below to select appropriate response.)

Conditions Within AA	Predominant Conditions Adjacent (within 500 Feet) To AA		
	Land managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings.	Land not cultivated, but moderately grazed or hayed or selectively logged or has been subject to minor clearing; contains few roads or buildings.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density.
AA occurs and is managed in predominantly a natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings.	---	---	---
AA not cultivated, but moderately grazed or hayed or selectively logged or has been subject to relatively minor clearing, or fill placement, or hydrological alteration; contains few roads or buildings.	---	moderate disturbance	---
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density.	---	---	---

Comments: (types of disturbance, intensity, season, etc.) sheep grazing

ii. Prominent weedy, alien, & introduced species: _____

iii. Briefly describe AA and surrounding land use / habitat: grazing rangeland

13. STRUCTURAL DIVERSITY (Based on 'Class' column of #10 above.)

Number of 'Cowardin' Vegetated Classes Present in AA	≥3 Vegetated Classes or ≥ 2 if one class is forested	2 Vegetated Classes or 1 if forested	= 1 Vegetated Class
Select Rating	---	---	Low

Comments: _____

LAND & WATER

14A. HABITAT FOR FEDERALLY LISTED OR PROPOSED THREATENED OR ENDANGERED PLANTS AND ANIMALS

i. AA is Documented (D) or Suspected (S) to contain (check box):

Primary or Critical habitat **(list species)** ☐ D ☐ S
Secondary habitat **(list species)** ☐ D ☐ S
Incidental habitat **(list species)** ☐ D ☐ S
No usable habitat ☐ D ☐ S

ii. **Rating** (Based on the strongest habitat chosen in 14A(i) above, find the corresponding rating of High (H), Moderate (M), or Low (L) for this function.

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point and Rating	---	---	---	---	---	---	0 (L)

If documented, list the source (e.g., observations, records, etc.)**:** _____

14B. HABITAT FOR PLANTS AND ANIMALS RATED AS S1, S2, OR S3 BY THE MONTANA NATURAL HERITAGE PROGRAM.
Do not include species listed in 14A(i).

i. AA is Documented (D) or Suspected (S) to contain (check box):

Primary or Critical habitat **(list species)** ☐ D ☒ S Rana pipiens (2001 observation)
Secondary habitat **(list species)** ☐ D ☐ S _____
Incidental habitat **(list species)** ☐ D ☐ S _____
No usable habitat ☐ D ☐ S _____

iii. **Rating** (Based on the strongest habitat chosen in 14B(i) above, find the corresponding rating of High (H), Moderate (M), or Low (L) for this function.

Highest Habitat Level:	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point and Rating	---	.8 (H)	---	---	---	---	---

If documented, list the source (e.g., observations, records, etc.)**:** _____

14C. General Wildlife Habitat Rating

i. **Evidence of overall wildlife use in the AA:** (Check either substantial, moderate, or low)

☐ **Substantial** (based on any of the following)
- ☐ observations of abundant wildlife #s or high species diversity (during any period)
- ☐ abundant wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ☐ presence of extremely limiting habitat features not available in the surrounding area
- ☐ interviews with local biologists with knowledge of the AA

☐ **Low** (based on any of the following)
- ☐ few or no wildlife observations during peak use periods
- ☐ little to no wildlife sign
- ☐ sparse adjacent upland food sources
- ☐ interviews with local biologists with knowledge of AA

☐ **Moderate** (based on any of the following)
- ☒ observations of scattered wildlife groups or individuals or relatively few species during peak periods
- ☐ common occurrence of wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ☒ adequate adjacent upland food sources
- ☐ interviews with local biologists with knowledge of the AA

ii. **Wildlife Habitat Features** (Working from top to bottom, select appropriate AA attributes to determine the exceptional (E), high (H), moderate (M), or low (L) rating. Structural diversity is from #13. For class cover to be considered evenly distributed, vegetated classes must be within 20% of each other in terms of their percent composition in the AA (see #10). Duration of Surface Water: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; A= absent.

Structural Diversity (from #13)	☐High								☐Moderate								☒Low			
Class Cover Distribution (all vegetated classes)	☐Even				☐Uneven				☐Even				☐Uneven				☒Even			
Duration of Surface Water in ? 10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	M	--	--
High disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

iii. **Rating** (Using 14C(i) and 14C(ii) above and the matrix below to arrive at the functional point and rating of exceptional (E), high (H), moderate (M), or low (L) for this function.)

Evidence of Wildlife Use from 14C(i)	**Wildlife Habitat Features Rating** from 14C(ii)			
	☐ Exceptional	☐ High	☒ Moderate	☐ Low
Substantial	--	--	--	--
Moderate	--	--	.5 (M)	--
Low	--	--	--	--

Comments: most of site not

14D. GENERAL FISH/AQUATIC HABITAT RATING ☒ **NA** (proceed to 14E)

If the AA is not or was not historically used by fish due to lack of habitat, excessive gradient, then check the NA box above.

Assess if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [*e.g.* fish use is precluded by perched culvert or other barrier, etc.]. If fish use occurs in the AA but is not desired from a resource management perspective (*e.g.* fish use within an irrigation canal], then Habitat Quality [14D(i)] below should be marked as "Low", applied accordingly in 14D(ii) below, and noted in the comments.

i. **Habitat Quality** (Pick the appropriate AA attributes in matrix to pick the exceptional (E), high (H), moderate (M), or low (L) quality rating.

Duration of Surface Water in AA	☐ Permanent/Perennial			☐ Seasonal / Intermittent			☐ Temporary / Ephemeral		
Cover - % of waterbody in AA containing cover objects (*e.g.* submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation)	>25%	10-25%	<10%	>25%	10-25%	<10%	>25%	10-25%	<10%
Shading - >75% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities	--	--	--	--	--	--	--	--	--
Shading – 50 to 75% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities.	--	--	--	--	--	--	--	--	--
Shading - < 50% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities.	--	--	--	--	--	--	--	--	--

ii. **Modified Habitat Quality:** Is fish use of the AA precluded or significantly reduced by a culvert, dike, other man-made structure or activity **or** is the waterbody included on the 'MDEQ list of waterbodies in need of TMDL development' with 'Probable Impaired Uses' listed as cold or warm water fishery or aquatic life support**?**
☐ **Y** ☐ **N** If yes, reduce the rating from 14D(i) by one level and check the modified habitat quality rating: ☐ E ☐ H ☐ M ☐ L

iii. **Rating** (Use the conclusions from 14D(i) and 14D(ii) above and the matrix below to pick the functional point and rating of exceptional (E), high (H), moderate (M), or low (L).)

Types of Fish Known or Suspected Within AA	**Modified Habitat Quality** from 14D(ii)			
	☐ Exceptional	☐ High	☐ Moderate	☐ Low
Native game fish	--	--	--	--
Introduced game fish	--	--	--	--
Non-game fish	--	--	--	--
No fish	--	--	--	--

Comments: _____

14E. FLOOD ATTENUATION ☐ **NA** (proceed to 14G)

Applies only to wetlands subject to flooding via in-channel or overbank flow.
If wetlands in AA do not flooded from in-channel or overbank flow, check NA above.

i. **Rating** (Working from top to bottom, mark the appropriate attributes to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.)

Estimated wetland area in AA subject to periodic flooding	☐ ≥ 10 acres			☒ <10, >2 acres			☐ ≤2 acres		
% of flooded wetland classified as forested, scrub/shrub, or both	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains **no outlet or restricted outlet**	--	--	--	--	--	.5 (M)	--	--	--
AA contains **unrestricted outlet**	--	--	--	--	--	--	--	--	--

ii. **Are residences, businesses, or other features which may be significantly damaged by floods located within 0.5 miles downstream of the AA?** (check)
☐**Y** ☐**N** **Comments:** _____

14F. SHORT AND LONG TERM SURFACE WATER STORAGE ☐ **NA** (proceed to 14G)

Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow.
If no wetlands in the AA are subject to flooding or ponding, check NA above.

i. Rating (Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.)
Abbreviations: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral.

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding.	☒ >5 acre feet			☐ <5, >1 acre feet			☐ ≤1 acre foot		
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond [3] **5 out of 10 years**	--	.9 (H)	--	--	--	--	--	--	--
Wetlands in AA flood or pond **< 5 out of 10 years**	--	--	--	--	--	--	--	--	--

Comments: _____

14G. SEDIMENT/NUTRIENT/TOXICANT RETENTION AND REMOVAL ☐ **NA** (proceed to 14H)

Applies to wetlands with potential to receive excess sediments, nutrients, or toxicants through influx of surface or ground water or direct input.
If no wetlands in the AA are subject to such input, check NA above.

i. **Rating** (Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.)

Sediment, Nutrient, and Toxicant Input Levels Within AA	AA receives or surrounding land use has potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants **or** AA receives or surrounding land use has potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% cover of wetland vegetation in AA	☒ ≥ 70%		☐ < 70%		☐ ≥ 70%		☐ < 70%	
Evidence of flooding or ponding in AA	☒ Yes	☐ No	☐ Yes	☐ No	☐ Yes	☐ No	☐ Yes	☐ No
AA contains **no or restricted outlet**	1 (H)	--	--	--	--	--	--	--
AA contains **unrestricted outlet**	--	--	--	--	--	--	--	--

Comments: _____

14H. SEDIMENT/SHORELINE STABILIZATION ☐ **NA** (proceed to 14I)

Applies only if AA occurs on or within the banks or a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body that is subject to wave action. If this does not apply, check NA above.

i. **Rating** (Working from top to bottom, use the matrix below to arrive at the functional point and rating exceptional (E), high (H), moderate (M), or low (L) for this function.

% Cover of wetland streambank or shoreline by species with deep, binding rootmasses.	***Duration of Surface Water Adjacent to Rooted Vegetation***		
	☐Permanent / Perennial	☒Seasonal / Intermittent	☐Temporary / Ephemeral
[3] **65 %**	--	.9 (H)	--
35-64 %	--	--	--
< 35 %	--	--	--

Comments:

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

i. **Rating** (Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.
A = acreage of vegetated component in the AA. **B** = structural diversity rating from #13. **C** = Yes (Y) or No (N) as to whether or not the AA contains a surface or subsurface outlet; **P/P** = permanent/perennial; **S/I** = seasonal/intermittent; **T/E/A**= temporary/ephemeral/absent.

A	☐ Vegetated component >5 acres						☒ Vegetated component 1-5 acres						☐ Vegetated component <1 acre					
B	☐ High		☐ Moderate		☐ Low		☐ High		☐ Moderate		☒ Low		☐ High		☐ Moderate		☐ Low	
C	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☒Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N
P/P	--	--	--	--	--	--	--	--	--	--	.7M	--	--	--	--	--	--	--
S/I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T/E/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Comments:

14J. GROUNDWATER DISCHARGE/RECHARGE (D/R) (Check the indicators in i & ii below that apply to the AA)

i. ☐ **Discharge Indicators**
- ☐ Springs are known or observed.
- ☒ Vegetation growing during dormant season/drought.
- ☐ Wetland occurs at the toe of a natural slopes.
- ☐ Seeps are present at the wetland edge.
- ☒ AA permanently flooded during drought periods.
- ☐ Wetland contains an outlet, but no inlet.
- ☐ Other

ii. ☐ **Recharge Indicators**
- ☐ Permeable substrate presents without underlying impeding layer.
- ☒ Wetland contains inlet but not outlet.
- ☐ Other

iii. **Rating:** Use the information from 14J(i) and 14j(ii) above and the table below to arrive at the functional point and rating of high (H) or low (L) for this function.

Criteria	Functional Point and Rating
AA has known Discharge/Recharge area or one or more indicators of D/R present	1 (H)
No Discharge/Recharge indicators present	--
Available Discharge/Recharge information inadequate to rate AA D/R potential	--

Comments:

14K. UNIQUENESS

i. Rating (Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.

Replacement Potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland or plant association listed as "S1" by the MTNHP.			AA does not contain previously cited rare types and structural diversity (#13) is high or contains plant association listed as "S2" by the MTNHP.			AA does not contain previously cited rare types or associations and structural diversity (#13) is low-moderate.		
Estimated Relative Abundance from #11	☐rare	☐common	☐abundant	☐rare	☐common	☐abundant	☐rare	☒common	☐abundant
Low disturbance at AA (#12i)	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (#12i)	--	--	--	--	--	--	--	.3L	--
High disturbance at AA (#12i)	--	--	--	--	--	--	--	--	--

Comments:

14L. RECREATION / EDUCATION POTENTIAL

i. Is the AA a known recreational or educational site? ☐ **Yes (Rate** ☐ **High (1.0)**, then proceed to 14L(ii) only] ☒ **No** [Proceed to 14L(iii)]

ii. Check categories that apply to the AA: ☐ Educational / scientific study ☐ Consumptive rec. ☐ Non-consumptive rec. ☐ Other

iii. Based on the location, diversity, size, and other site attributes, is there a strong potential for recreational or educational use?

☒ **Yes** [Proceed to 14L (ii) and then 14L(iv).] ☐ **No** [Rate as low in 14L(iv)]

iv. Rating (Use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.

Ownership	Disturbance at AA from #12(i)		
	☐ Low	☒ Moderate	☐ High
Public ownership	--	.5(M)	--
Private ownership	--	--	--

Comments: hunting opportunities slight

FUNCTION, VALUE SUMMARY, AND OVERALL RATING

Function and Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage)
A. Listed/Proposed T&E Species Habitat	L	0.00	1	
B. MT Natural Heritage Program Species Habitat	H	1.00	1	
C. General Wildlife Habitat	M	0.50	1	
D. General Fish/Aquatic Habitat	NA		--	
E. Flood Attenuation	M	0.50	1	
F. Short and Long Term Surface Water Storage	H	0.90	1	
G. Sediment/Nutrient/Toxicant Removal	H	1.00	1	
H. Sediment/Shoreline Stabilization	H	0.90	1	
I. Production Export/Food Chain Support	M	0.70	1	
J. Groundwater Discharge/Recharge	H	1.00	1	
K. Uniqueness	L	0.30	1	
L. Recreation/Education Potential	L	0.50	1	
	Totals:	7.3	11.00	24
	Percent of Total Possible Points:		**66%** (Actual / Possible) x 100 [rd to nearest whole #]	

Category I Wetland: (Must satisfy **one** of the following criteria. If not proceed to Category II.)
- ☐ Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; **or**
- ☐ Score of 1 functional point for Uniqueness; **or**
- ☐ Score of 1 functional point for Flood Attenuation **and** answer to Question 14E(ii) is "yes"; **or**
- ☐ Percent of total Possible Points is > 80%.

Category II Wetland: (Criteria for Category I not satisfied **and** meets any **one** of the following Category II criteria. If not satisfied, proceed to Category IV.)
- ☒ Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; **or**
- ☐ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
- ☐ Score of .9 or 1 functional point for General Fish/Aquatic Habitat; **or**
- ☐ "High" to "Exceptional" ratings for **both** General Wildlife Habitat **and** General Fish / Aquatic Habitat; **or**
- ☐ Score of .9 functional point for Uniqueness; **or**
- ☒ Percent of total possible points is > 65%.

☐ **Category III Wetland:** (Criteria for Categories I, II, or IV not satisfied.)

Category IV Wetland: (Criteria for Categories I or II are not satisfied **and** all of the following criteria are met; If not satisfied, proceed to Category III.)
- ☐ "Low" rating for Uniqueness; **and**
- ☐ "Low" rating for Production Export / Food Chain Support; **and**
- ☐ Percent of total possible points is < 30%.

OVERALL ANALYSIS AREA (AA) RATING: (Check appropriate category based on the criteria outlined above.)

☐ **I** ☒ **II** ☐ **III** ☐ **IV**

Appendix C

WETLAND-9: REPRESENTATIVE PHOTOGRAPHS

MDT Wetland Mitigation Monitoring
Ridgeway Wetland
Ekalaka, Montana

LAND & WATER

WL#: 9 **Location:** B **Description:** Wetland view, buffer in foreground **Compass Reading:** 268°

WL#: 9 **Location:** C **Description:** Wetland view, buffer in foreground **Compass Reading:** 238°

WL#: 9 **Location:** E **Description:** Wetland view **Compass Reading:** 80°

WL#: 9 **Location:** F **Description:** Wetland view **Compass Reading:** 116°

WL#: 9 **Location:** G **Description:** Wetland view from WL end of transect (same as D) **Compass Reading:** 170°

WL#: 9 **Location**: H **Description:** UPL veg transect end **Compass Reading:** 358°

Appendix D

1999 Ridgeway Complex Environmental Assessment
1990 BLM Typical Water Retention Pit Plans
Impoundment Sizes: L. Rau, BLM (1999)

MDT Wetland Mitigation Monitoring
Ridgeway Wetland
Ekalaka, Montana

LAND & WATER

RIDGEWAY WETLAND COMPLEX
ENVIRONMENTAL ASSESSMENT

EA NUMBER MT-020-9-87 **RIPS #** 9777 **GR#**

PROPOSED ACTION/TITLE TYPE: Ridgeway Wetland Complex/Wildlife Project

LOCATION OF PROPOSED ACTION: T.4S., R.58E., Section 28-35

PREPARING OFFICE: Miles City Field Office, Miles City, MT

APPLICANT: L. Tauk, Richards, Steig

DATE OF PREPARATION: 2/24/99

CONFORMANCE WITH APPLICABLE LAND USE PLAN:

This proposed action is subject to the Powder River Resource Area R approved in 1985. The proposed action has been reviewed for conformance with this plan and its terms and conditions as required 43 CFR 1610.6.

PURPOSE AND NEED: A complex of small to medium-sized water impoundments will be constructed to enhance waterfowl habitat. This approach is to create many shallow wetlands in a relatively small a (5 sections) to maximize that habitats' potential to produce waterf and other wetland species.

PROPOSED ACTION: BLM proposes construction of a complex of wetlands (20-25 ponds) on a 5 section parcel of public lands. Objective will be to maximize the surface acres of each individual project to create shallow water waterfowl habitat. There will be about 5 different construction designs based on individual site characteristics. Existing dams will be repaired and modified, spreader dikes will be modified with pits dug in front of structure, and 2-3 different pit and fill structures will be designed to meet site characteristics.

ALTERNATIVE CONSIDERED BUT NOT ANALYZED IN DETAIL: No Action - the project would not be completed as planned. This is not within present BLM management consideration for the area and will not be considered further.

AFFECTED ENVIRONMENT:

Vegetation: Vegetation consists of Wyoming sagebrush, western wheatgrass and low sagebrush.

Soils: Soils in this area have developed in residuum and alluvium derived from the Cretaceous Pierre Shale. As a result, surface and

subsurface textures are commonly clay, silty clay loam, and clay loam. Slopes range up to 25 percent, but commonly average around 8 percent. Near drainages, slopes may be less than two percent. Upland soils are commonly shallow on summits and soil depths increase down slope to deep and very deep on the alluvial fans and flats.

The characteristics of the marine shale parent material dominates physical and chemical characteristics of the soils. Soluble salts, predominately sodium, are present in most soils of the area. Slope wash concentrates these salts in the lowest parts of the landscape, usually in or near drainages. Concentration of salts may result in a claypan area. Salts will effect vegetation population and composition.

Hydrology: Water in this area is affected by the physical and chemical characteristics of the Pierre Shale. This is commonly expressed in salt context and suspended solids. The shale is often unstable and subject to mass movement, exposing unprotected material, ultimately affecting water quality.

Recreation Opportunities: Most recreation opportunity is during hunting season and focuses on antelope and some deer hunting.

Wildlife Habitat: The most common big game species in the area is antelope. Mule deer and sage grouse use the area infrequently. Non-game species that frequent the Wyoming sagebrush, western wheatgrass, and low sagebrush habitats are well represented resulting from good rangeland conditions.

Riparian: There are no riparian values on the project area at this time.

ENVIRONMENTAL IMPACTS:

There would be no impacts to the following elements of the human environment: air quality; ACECs; cultural resources; farmlands, prime/unique; floodplains; Native American concerns; environmental justice; T&E species; wastes, hazardous/solid; water quality; wetlands/riparian; wild & scenic rivers; wilderness.

DESCRIPTION OF IMPACTS FROM PROPOSED ACTION:

Vegetation: Some native vegetation will be destroyed in the excavation process. All native vegetation impacted by flooding will be killed. Dryland habitats will transition into wetland, sub-irrigated type vegetation as the reservoirs reach equilibrium.

Cultural Resources: Survey is required.

Soils: Heavier textured soils in this area are highly susceptible to water erosion. Water flowing over the surface may form rills and gullies. When vegetation is removed, water erosion may result.

Hydrology: Until vegetation is re-established, water quality may be damaged. Suspended solids may increase as well as dissolved solids and salts of many forms. Ultimately as vegetation re-establishes, water quality will return to a natural state.

Recreational Opportunities/VRM: Hunting season recreational opportunities will be enhanced as waterfowl begin using the area. Wildlife viewing opportunity will be improved with the addition of many wetland obligate species and endemic species that will come to water.

Wildlife Species: Non-game wildlife that have very small home ranges and limited movement potential will be impacted by habitat flooding. With the creation of wetland habitats, the associated wetland wildlife species will benefit from the project. Avian and terrestrial predators will benefit from enhanced prey base.

Riparian Values: Riparian/wetland values will be greatly enhanced. Shorelines will rapidly develop into stands of sedge, rush, cattail/bubrush and wet-meadow grasses and forbs.

Land Uses: There are several Rights-of-Way in Section 34, some which are buried. If any digging takes place in this section, must coordinate with rights-of-way holders.

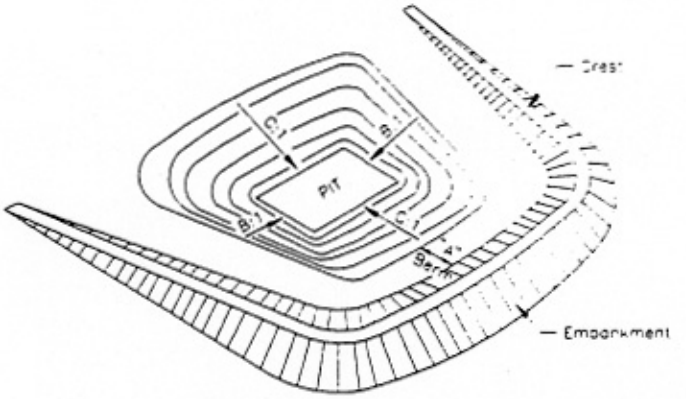
STIPULATIONS:

The contractor shall immediately bring to the attention of the BLM Field Manager any and all antiquities or other items of cultural or scientific interest, including but not limited to historic or prehistoric ruins, fossils, artifacts or burials discovered as a result of his operations, and shall leave such discoveries intact until told to proceed by the BLM Field Manager.

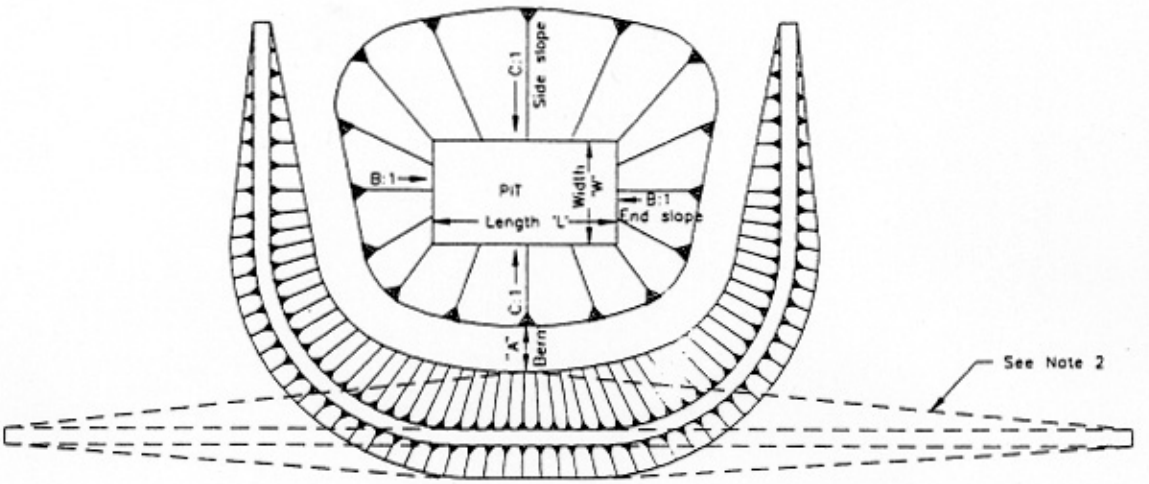
LIST OF PREPARERS:

Miles City Field Office Personnel: Jeff Gustad, Rangeland Mgmt Spec; Ted Birnie, Archaeologist; Pam Wall, Realty Specialist; Robert Mitchell, Soil Scientist; Dan Bricco, Outdoor Recreation Planner; Larry Rau, Wildlife Biologist.

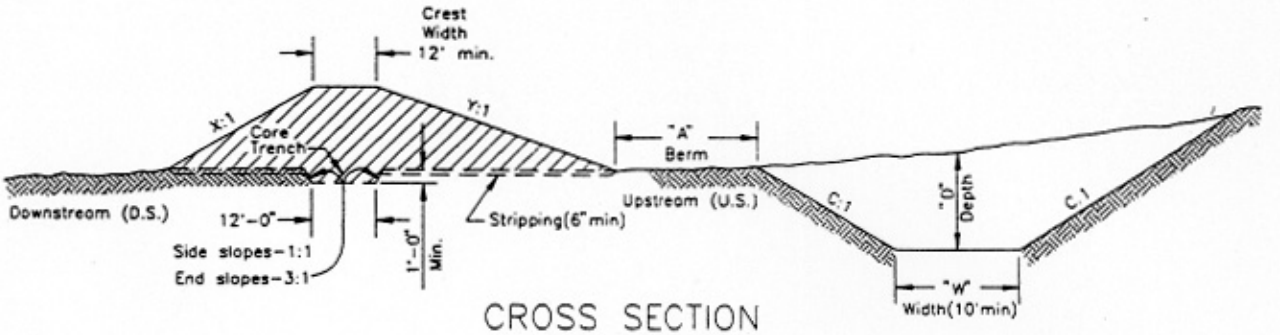
LAND & WATER D-4



PERSPECTIVE VIEW



PLAN



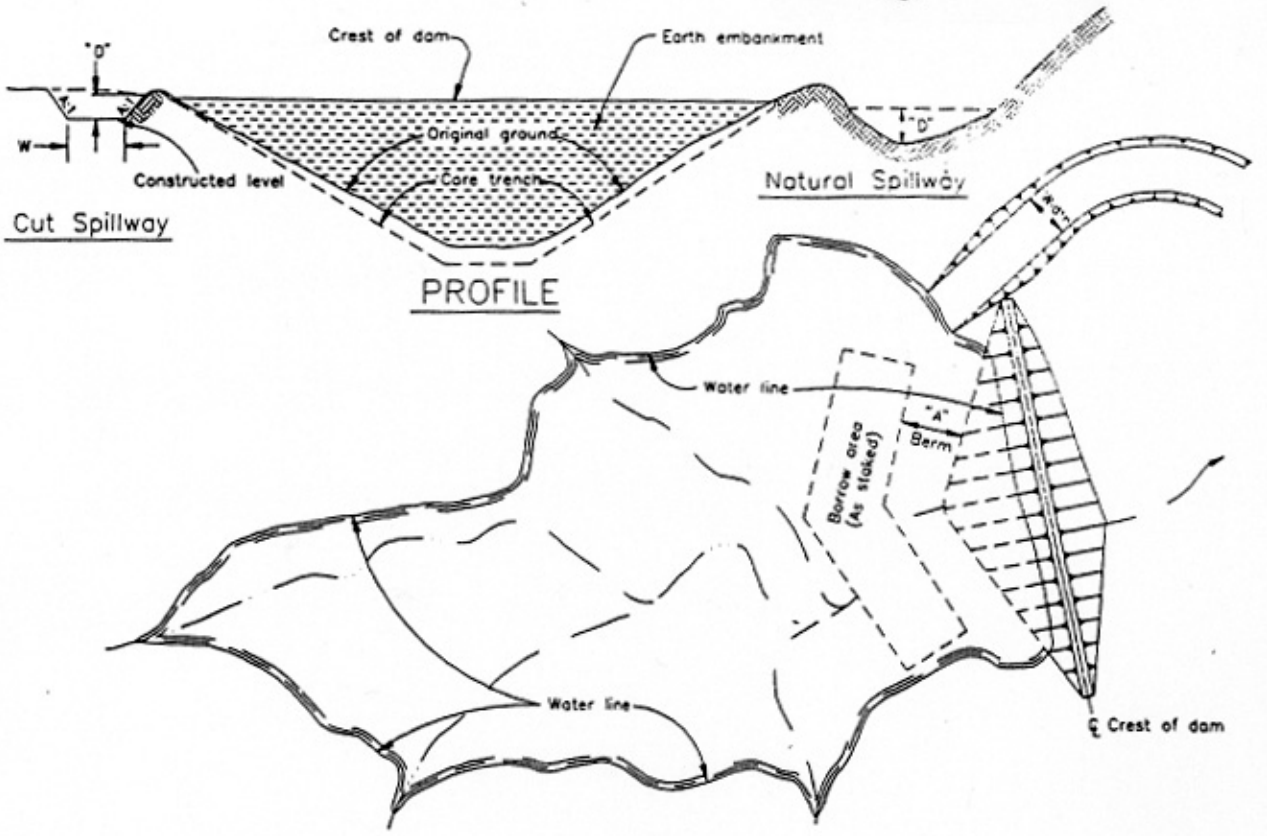
CROSS SECTION

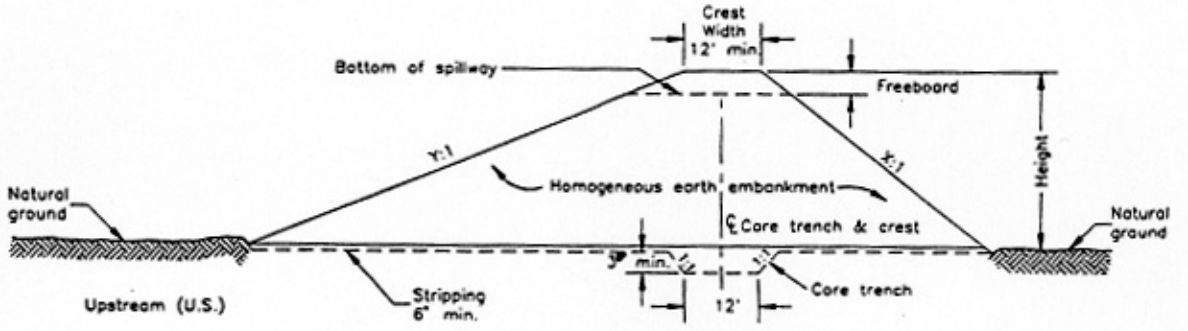
NOTES:

1. Pit and embankment slopes and dimensions shall be as shown on the Work Data Sheet or as staked.
2. Embankment may be "U", "L", "I", or straight line shape. Construct as indicated in specifications or as staked.

ALWAYS THINK SAFETY

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT DIVISION OF TECHNICAL SERVICES SERVICE CENTER	
TYPICAL WATER RETENTION PIT	
DESIGNED by others REVIEWED APPROVED	
DRAWN	SCALE NONE
DATE AUGUST 5, 1990	SHEET OF
DRAWING NO. 02291-1	





CROSS-SECTION
(BOTTOM OF DRAINAGE)

NOTES:

1. Embankment slopes and dimensions shall be as shown in specifications.
2. Berm with "A" minimum of 25' or as shown on the Work Data Sheet or as staked.
3. Freeboard as shown on the Work Data Sheet.

ALWAYS THINK SAFETY

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
DIVISION OF TECHNICAL SERVICES SERVICE CENTER

TYPICAL MINOR RETENTION DAM

DESIGNED by others
REVIEWED
APPROVED

DRAWN
DATE
SCALE NONE
SHEET OF
DRAWING NO. 02291-2

LAND & WATER D-6

Larry 6/28

Enclosed are some examples of typical pit/fill projects that will be applied on the Ridgway waterfowl project.

At this time, we have 15-17 separate projects that will incorporate one or a combination of these examples.

The basic idea, as explained in previous correspondance, is to create as much shallow water/wetlands using the topography to the best of our advantage. The fill material will come from the pit which will designed for large surface, i.e. 200 x 200', and shallow depth, 6-8'.

The large dam will have more extensive & specific design. However, our engineering staff is waiting until we secure the water right before proceeding. We are expecting this documentation this summer.

Also included is the Environmental Analysis for this project.

Thanks for your help. Hopefully this info will help move things along.

Stay in touch -

Larry Lan

RECEIVED
JUN 29 1999
ENVIRONMENTAL

Ridgeway Wetlands Complex

LAND & WATER D-7

Project No	Yardage	Storage	Surface Area	Drainage Area	25 year storm yield
1.	5479 c.y.	4.0 AC Ft	3.5 AC	80 AC.	6.67 AC. Ft.
2.	2633 c.y.	3.0 Ac Ft	2.0 AC.	80 AC	6.67 AC. Ft.
3.	35,000 c.y.	80.0 AC. Ft	22.0 AC	900 AC.	75.0 AC. Ft.
4.	5420 c.y.	4.0 AC. Ft.	3.5 AC.	140 AC.	11.7 AC. Ft.
5.	5420 c.y.	4.0 AC. Ft.	3.5 AC.	200 AC.	16.7 AC. Ft.
6.	5479 c.y.	4.0 AC. Ft.	3.5 AC	500 AC	41.7 AC. Ft
7.	4152 c.y.	4.0 AC. Ft	3.5 AC.	1200 AC.	100.0 AC. Ft.
8.	4152 c.y.	4.0 AC. Ft.	3.5 AC.	400 AC.	33.3 AC. Ft
9.	5243 c.y.	4.0 AC. Ft.	3.5 AC.	1500 AC.	125.0 AC. Ft
10.	5420 c.y.	4.0 AC Ft	3.5 AC.	230 AC.	19.2 AC. Ft.
11.	5420 c.y.	4.0 AC. Ft.	3.5 AC.	340 ±	28.3 AC. Ft.
12.	5420 c.y.	4.0 AC Ft.	3.5 AC.	580 AC.	48.3 AC. Ft.
13.	5420 c.y.	4.0 AC. Ft.	3.5 AC	45 AC	3.75 AC. Ft.
14.	5479 c.y.	4.0 AC. Ft	3.5 AC	370 AC	30.8 AC. Ft
15.	5243 c.y.	4.0 AC. Ft.	3.5 AC	725 AC.	60.0 AC. Ft
16.	5243 c.y.	4.0 AC. Ft	3.5 AC.	725 AC.	60.0 AC. Ft

Appendix E

BIRD SURVEY PROTOCOL
GPS PROTOCOL

MDT Wetland Mitigation Monitoring
Ridgeway Wetland
Ekalaka, Montana

LAND & WATER

BIRD SURVEY PROTOCOL

The following is an outline of the MDT Wetland Mitigation Site Monitoring Bird Survey Protocol. Though each site is vastly different, the bird survey data collection methods must be standardized to a certain degree to increase repeatability. An Area Search within a restricted time frame will be used to collect the following data: a bird species list, density, behavior, and habitat-type use. There will be some decisions that team members must make to fit the protocol to their particular site. Each of the following sections and the desired result describes the protocol established to reflect bird species use over time.

Species Use within the Mitigation Wetland: Survey Method

Result: To conduct a bird survey of the wetland mitigation site within a restricted period of time and the budget allotment.

Sites that can be circumambulated or walked throughout.

These types of sites will include ponds, enhanced historic river channels, wet meadows, and any area that can be surveyed from the entirety of its perimeter or walked throughout. If the wetland is not uncomfortably inundated, conduct several "meandering" transects through the site in an orderly fashion (record the number and approximate location/direction of the transects in the field notebook; they do not have to be formalized or staked). If a very small portion of the site cannot be crossed due to inundation, this method will also apply. Though the sizes of the site vary, each site will require surveying to the fullest extent possible within a set time limit. The optimum times to conduct the survey are in the morning hours. Conduct the survey from sunrise to no later than 11:00 AM. (Note: some sites may have to be surveyed in the late afternoon or evening due to time constraints or weather; if this is the case, record the time of day and include this information in your report discussion.) If the survey is completed before 11:00 AM and no additions are being made to the list, then the task is complete. The overall limiting factor regarding the number of hours that are spent conducting this survey is the number of budgeted hours; this determination must be made by site by each individual.

In many cases, binoculars will be the only instrument that is needed to identify and count the birds using the wetland. If the wetland includes deep water habitat that can not be assessed with binoculars, then a scope and tripod are necessary. If this is the case, establish as many lookout posts as necessary from key vantage points to collect the data. Depending on the size of the open water, more time may be spent viewing the mitigation area from these vantage points than is spent walking the peripheries of more shallow-water wetlands.

Sites that cannot be circumambulated.

These types of sites will include large-bodied waters, such as reservoirs, particularly those with deep water habitat (>6 ft) close to the shore and no wetland development in that area of the shoreline. If one area of the reservoir was graded in such a way to create or enhance the development of a wetland, then that will be the area in which the ambulatory bird survey is conducted. The team member must then determine the length of the shoreline that will be surveyed during each visit.

As stated above in the ambulatory site section, these large sites most likely will have to be surveyed from established vantage points.

Species Use within the Mitigation Wetland: Data Recording

Result: A complete list of bird species using the site, an estimate of bird densities and associated behaviors, and identification of habitat use.

1. Bird Species List

Record the bird species on the Bird Survey - Field Data Sheet using the appropriate 4-letter code of the common name. The coding uses the first two letters of the first two words of the birds' common name or if one name, the first four (4) letters. For example, mourning dove is coded MODO and mallard is MALL. If an unknown individual is observed, use the following protocol and define your abbreviation at the bottom of the field data sheet: unknown shorebird: UNSB; unknown brown bird (UNBR); unknown warbler (UNWA); unknown waterfowl (UNWF). For a flyover of a flock of unknown species, use a term that describes the birds' general characteristics and include the approximate flock size in parentheses; do not fill in the habitat column. For example, a flock of black, medium-sized birds could be coded: UNBB / FO (25). You may also note on the data sheet if that particular individual is using a constructed nest box.

2. Bird Density

In the office, sum the Bird Survey – Field Data Sheet data by species and by behavior. Record this data in the Bird Summary Table.

3. Bird Behavior

Bird behavior must be identified by what is known. When a species is simply observed, the behavior that it is immediately exhibiting is what is recorded. Only behaviors that have discreet descriptive terms should be used. The following terms are recommended: breeding pair individual (BP); foraging (F); flyover (FO); loafing (L; e.g. sleeping, roosting, floating with head tucked under wing are loafing behaviors); and, nesting (N). If more behaviors are observed that do have a specific descriptive word, use them and we will add it to the protocol; descriptive words or phrases such as "migrating" or "living on site" are unknown behaviors.

4. Bird Species Habitat Use

We are interested in what bird species are using which particular habitat within the mitigation wetlands. This data is easily collected by simply recording what habitat the species was initially observed. Use the following broad category habitat classifications: aquatic bed (AB - rooted floating, floating-leaved, or submergent vegetation); forested (FO); marsh (MA – cattail, bulrush, emergent vegetation, etc. with surface water); open water (OW – primarily unvegetated); scrub-shrub (SS); and upland buffer (UP); wet meadow (WM – sedges, rushes, grasses with little to no surface water). If other categories are observed onsite that are not suggested here, we will make a new category next year.

GPS Mapping and Aerial Photo Referencing Procedure

The wetland boundaries, photograph location points and sampling locations were field located with mapping grade Trimble Geo III GPS units. The data was collected with a minimum of three positions per feature using Course/Acquisition code. The collected data was then transferred to a PC and differentially corrected to the nearest operating Community Base Station. The corrected data was then exported to ACAD drawings in Montana State Plain Coordinates NAD 83 international feet.

The GPS positions collected and processed had a 68% accuracy of 7 feet except in isolated areas of Tasks .008 and .011, where it went to 12 feet. This is within the 1 to 5 meter range listed as the expected accuracy of the mapping grade Trimble GPS.

Aerial reference points were used to position the aerial photographs. This positioning did not remove the distortion inherent in all photos; this imagery is to be used as a visual aide only. The located wetland boundaries were given a final review by the wetland biologist and adjustments were made if necessary.

Any relationship of features located to easement or property lines are not to be construed from these figures. These relationships can only be determined with a survey by a licensed surveyor.

Appendix F

2003 MACROINVERTEBRATE SAMPLING PROTOCOL AND DATA (W-9)

MDT Wetland Mitigation Monitoring
Ridgeway Wetland
Ekalaka, Montana

LAND & WATER

AQUATIC INVERTEBRATE SAMPLING PROTOCOL

Equipment List

- D-frame sampling net with 1 mm mesh. Wildco is a good source of these.
- Spare net.
- 1-liter plastic sample jars, wide-mouth. VWR has these: catalog #36319-707.
- 95% ethanol: Northwest Scientific in Billings carries this.

All these other things are generally available at hardware or sporting goods stores. Make the labels on an ink jet printer preferably.

- hip waders.
- pre-printed sample labels (printed on Rite-in-the-Rain or other coated paper, two labels per sample).
- pencil.
- plastic pail (3 or 5 gallon).
- large tea strainer or framed screen.
- towel.
- tape for affixing label to jar.
- cooler with ice for sample storage.

Site Selection

Select the sampling site with these considerations in mind:

- Select a site accessible with hip waders. If substrates are too soft, lay a wide board down to walk on.
- Determine a location that is representative of the overall condition of the wetland.

Sampling

Wetland invertebrates inhabit the substrate, the water column, the stems and leaves of aquatic vegetation, and the water surface. Your goal is to sweep the collecting net through each of these habitat types, and then to combine the resulting samples into the 1-liter sample jar.

Dip out about a gallon of water into the pail. Pour about a cup of ethanol into the sample jar. Fill out the top half of the sample labels, using pencil, since ink will dissolve in the ethanol.

Ideally, you can sample a swath of water column from near-shore outward to a depth of approximately 3 feet with a long sweep of the net, keeping the net at about half the depth of the water throughout the sweep. Sweep the water surface as well. Pull the net through a vegetated area, beneath the water surface, for at least a meter of distance.

Sample the substrate by pulling the net along the bottom, bumping it against the substrate several times as you pull.

This step is optional, but it gives you a chance to see that you've collected some invertebrates. Rinse the net out into the bucket, and look for insects, crustaceans, etc. If necessary, repeat the sampling process in a nearby location, and add the net contents to the bucket. Remember to sample all four environments.

Sieve the contents of the bucket through the straining device and pour or carefully scrape the contents of the strainer into the sample jar.

If you skip the bucket-and-sieve steps, simply lift handfuls of material out of the sampling net into the jars. In either case, please include some muck or mud and some vegetation in the jar. Often, you will have collected a large amount of vegetable material. If this is the case, lift out handfuls of material from the sieve into the jar, until the jar is about half full. Please limit material you include in the sample, so that there is only a single jar for each sample.

Top off the sample jar with enough ethanol to cover all the material in the jar. Leave as little headroom as possible.

It is not necessary to sample habitats in any specified order. Keep in mind that disturbing the habitats prior to sampling will chase off the animals you are trying to capture.

Complete the sample labels. Place one label inside the sample jar and tape the other label securely to the outside of the jar. Dry the jar before attaching the outer label if necessary. In some situations, it may be necessary to collect more than one sample at a site. If you take multiple samples from the same site, clearly indicate this by using individual sample numbers, along with the total number of samples collected at the site (e.g. Sample #3 of 5 total samples).

Photograph the sampled site.

Sample Handling/Shipping

- In the field, keep collected samples cool by storing them in a cooler. Only a small amount of ice is necessary.
- Inventory all samples, preparing a list of all sites and enumerating all samples, before shipping or delivering to the laboratory.
- Deliver samples to Rhithron.

MDT WETLAND MITIGATION MONITORING PROJECT
Aquatic Invertebrate Monitoring
Summary 2001, 2002, 2003

METHODS

Among other monitoring activities, aquatic invertebrate assemblages were collected at a number of mitigation wetlands throughout Montana. This report summarizes data generated from three years of collection.

The method employed to assess these wetlands is based on constructing an index using a battery of 12 bioassessment metrics or attributes (**Table 1**) tested and recommended by Stribling et al. (1995) in a report to the Montana Department of Health and Environmental Science. In that study, it was determined that some of the metrics were of limited use in some geographic regions, and for some wetland types. Despite that finding, all 12 metrics are used in this evaluation of mitigated wetlands, since detailed geographic information and wetland classifications were unavailable.

Scoring criteria for metrics were developed by generally following the tactic used by Stribling et al. Boxplots were generated and distributions, ranges, and quartiles for each metric were examined. All sites were used except Camp Creek, which was sampled in 2002 and 2003. The fauna at that site was different from that of the other sites, and suggested montane stream conditions rather than wetland conditions. The Camp Creek site was assessed using the tested metric battery developed for montane streams of Western Montana (Bollman 1998). For the wetlands, "optimal" scores were generally those that fell above the 75th percentile (for those metrics that decrease in value in response to stress) or below the 25th percentile (for metrics that respond to stress by an increase in value) of all scores. Additional scoring ranges were established by bisecting the range below the 75th percentile for decreasing scores (or above the 25th percentile for increasing scores) into "sub-optimal" and "poor" assessment categories. A score of 5, 3, or 1 was assigned to optimal, sub-optimal, and poor metric performance, respectively. In this way, metric values were translated into normalized metric scores, and scores for all metrics were summed to produce a total bioassessment score. Total bioassessment scores were classified according to a similar process, using the ranges and distributions of total scores for all sites studied.

The purpose of constructing an index from biological attributes or metrics is to provide a means of integrating information to facilitate the determination of whether management action is needed. The nature of the action needed is not determined solely by the index score, however, but by consideration of an analysis of the component metrics, the taxonomic composition of the assemblages and other issues. The diagnostic functions of the metrics and taxonomic data need more study; our understanding of the interrelationships of natural environmental factors and anthropogenic disturbances are tentative. Thus, the further interpretive remarks accompanying the raw taxonomic and metric data are offered cautiously.

Sample Processing

Aquatic invertebrate samples were collected at mitigation wetland sites in the summer months of 2001, 2002, and 2003 by personnel of Wetlands West, Inc. and/or Land & Water Consulting, Inc. Sampling procedures utilized were based on the protocols developed by the Montana Department of Environmental Quality (MDEQ).

Sampling consisted of D-frame net sweeps through emergent vegetation (when present), the water column, over the water surface, and included disturbing and scraping substrates at each sampled sites. Samples were preserved in ethanol at each wetland site and subsequently delivered to Rhithron Associates, Inc. for processing, taxonomic determinations, and data analysis.

At Rhithron's laboratory, Caton subsamplers and stereomicroscopes with 10X magnification were used to randomly select a minimum of 200 organisms, when possible, from each sample. In some cases, the entire sample contained fewer than 200 organisms; in these cases, all organisms from the sample were taken. Taxa were identified in general accordance with the taxonomic resolution standards set out in the MDEQ Standard Operating Procedures for Sampling and Sample Analysis (Bukantis 1998). Ten percent of samples were re-identified by a second taxonomist

for quality assurance purposes. The identified samples have been archived at Rhithron's laboratory. Taxonomic data and organism counts were entered into an Excel 2000 spreadsheet, and metrics were calculated and scored using spreadsheet formulae.

Bioassessment Metrics

An index based on the performance of 12 metrics was constructed, as described above. **Table 1** lists those metrics, describes their calculation and the expected response of each to increased degradation or impairment of the wetland.

In addition to the summed scores of each metric and the associated impairment classification described above, each individual metric informs the bioassessment to some degree. The four richness metrics (Total taxa, POET, Chironomidae taxa, and Crustacea taxa + Mollusca taxa) can be interpreted to express habitat complexity as well as water quality. Complex, diverse habitats consist of variable substrates, emergent vegetation, variable water depths and other factors, and are potential features of long-established stable wetlands with minimal human disturbance. In the study conducted by Stribling et al. (1995), all four richness metrics were found to be significantly associated with water quality parameters including conductance, salinity, and total dissolved solids.

Four composition metrics (%Chironomidae, %Orthocladiinae of Chironomidae, %Crustacea + %Mollusca, and Amphipoda) measure the relative contributions of certain taxonomic groups that may have significant responses to habitat and/or water quality impacts. For example, amphipods have been demonstrated to increase in abundance in alkaline conditions. Short-lived, relatively mobile taxa such as chironomids dominate ephemeral environments; any are hemoglobin-bearers capable of tolerating de-oxygenated conditions.

Two tolerance metrics (the Hilsenhoff Biotic Index and %Dominant taxon) were included in the bioassessment battery. The HBI indicates the overall invertebrate assemblage tolerance to nutrient enrichment, warm water, and/or low dissolved oxygen conditions. The percent abundance of the dominant taxon has been demonstrated to be strongly associated with pH, conductance, salinity, total organic carbon, and total dissolved solids.

Two trophic measures (%Collector-gatherers and %Filterers) may be helpful in expressing functional integrity of the invertebrate assemblage, which can be impacted by poor water quality or habitat degradation. High proportions of filtering organisms suggest nutrient and/or organic enrichment, while abundant collectors suggest more positive functional conditions and well-developed wetland morphology. These organisms graze periphyton growing on stable surfaces such as macrophytes.

RESULTS

In 2001, 29 sites were sampled statewide. Nineteen of these sites were revisited in 2002, and 13 new sites were sampled. In 2003, 17 sites that had been visited in both 2001 and 2002 were re-sampled, and 11 sites sampled for the first time in 2001 were re-visited. In addition, 2 new sites were sampled. Thus, the 2003 database contains records for 90 sampling events at 44 unique sites. **Table 2** summarizes sites and sampling dates.

Metric scoring criteria were re-developed each year as new data was added. For 2003, 88 records were utilized. Because of the addition of data, scoring criteria changed for several metrics in 2003; thus, biotic condition classifications assigned in 2002 for some sites also changed. However, ranges of individual metrics, as well as median metric values remained remarkably consistent in each of the three years.

Table 1. Aquatic invertebrate metrics employed in the MTDT mitigation wetland monitoring study, 2001- 2003.

Metric	Metric Calculation	Expected Response to Degradation or Impairment
Total taxa	Count of unique taxa identified to lowest recommended taxonomic level	Decrease
POET	Count unique Plecoptera, Trichoptera, Ephemeroptera, and Odonata taxa identified to lowest recommended taxonomic level	Decrease
Chironomidae taxa	Count unique midge taxa identified to lowest recommended taxonomic level	Decrease
Crustacea taxa + Mollusca taxa	Count unique Crustacea taxa and Mollusca taxa identified to lowest recommended taxonomic level	Decrease
% Chironomidae	Percent abundance of midges in the subsample	Increase
Orthocladiinae/Chironomidae	Number of individual midges in the sub-family Orthocladiinae / total number of midges in the subsample.	Decrease
%Amphipoda	Percent abundance of amphipods in the subsample	Increase
%Crustacea + %Mollusca	Percent abundance of crustaceans in the subsample plus percent abundance of molluscs in the subsample	Increase
HBI	Relative abundance of each taxon multiplied times that taxon's modified Hilsenhoff Biotic Index value. These numbers are summed over all taxa in the subsample.	Increase
%Dominant taxon	Percent abundance of the most abundant taxon in the subsample	Increase
%Collector-Gatherers	Percent abundance of organisms in the collector-gatherer functional group	Decrease
%Filterers	Percent abundance of organisms in the filterer functional group	Increase

LITERATURE CITED

Bollman, W. 1998. Montana Valleys and Foothill Prairies Ecoregion. Master's Thesis. (M.S.) University of Montana. Missoula, Montana.

Bukantis, R. 1998. Rapid bioassessment macroinvertebrate protocols: Sampling and sample analysis SOP's. Working draft. Montana Department of Environmental Quality. Planning Prevention and Assistance Division. Helena, Montana.

Stribling, J.B., J. Lathrop-Davis, M.T. Barbour, J.S. White, and E.W. Leppo. 1995. Evaluation of environmental indicators for the wetlands of Montana: the multimetric approach using benthic macroinvertebrates. Report to the Montana Department of Health and Environmental Science. Helena, Montana.

Table 2. Sampled MDT Mitigation Sites by Year

2001	2002	2003
Beaverhead 1	Beaverhead 1	Beaverhead 1
Beaverhead 2	Beaverhead 2	
Beaverhead 3	Beaverhead 3	
Beaverhead 4	Beaverhead 4	Beaverhead 4
Beaverhead 5	Beaverhead 5	Beaverhead 5
Beaverhead 6	Beaverhead 6	Beaverhead 6
Big Sandy 1		
Big Sandy 2		
Big Sandy 3		
Big Sandy 4		
Johnson-Valier		
VIDA		
Cow Coulee	Cow Coulee	Cow Coulee
Fourchette - Puffin	Fourchette - Puffin	Fourchette - Puffin
Fourchette – Flashlight	Fourchette – Flashlight	Fourchette – Flashlight
Fourchette – Penguin	Fourchette – Penguin	Fourchette – Penguin
Fourchette – Albatross	Fourchette – Albatross	Fourchette – Albatross
Big Spring	Big Spring	Big Spring
Vince Ames		
Ryegate		
Lavinia		
Stillwater	Stillwater	Stillwater
Roundup	Roundup	Roundup
Wigeon	Wigeon	Wigeon
Ridgeway	Ridgeway	Ridgeway
Musgrave – Rest. 1	Musgrave – Rest. 1	Musgrave – Rest. 1
Musgrave – Rest. 2	Musgrave – Rest. 2	Musgrave – Rest. 2
Musgrave – Enh. 1	Musgrave – Enh. 1	Musgrave – Enh. 1
Musgrave – Enh. 2		
	Hoskins Landing	Hoskins Landing
	Peterson - 1	Peterson – 1
	Peterson – 2	
	Peterson – 4	Peterson – 4
	Peterson – 5	Peterson – 5
	Jack Johnson - main	Jack Johnson - main
	Jack Johnson - SW	Jack Johnson - SW
	Creston	Creston
	Lawrence Park	
	Perry Ranch	
	SF Smith River	SF Smith River
	Camp Creek	Camp Creek
	Kleinschmidt	Kleinschmidt – pond
		Kleinschmidt – stream
		Ringling - Galt

Aquatic Invertebrate Taxonomic Data

Site Name RIDGEWAY **Date Collected**

Order	Family	Taxon	Count	Percent	Unique	BI	FFG
		Ostracoda	7	15.91%	Yes	8	CG
Acarina							
	Acari						
		Acari	1	2.27%	Yes	5	PR
Amphipoda							
	Talitridae						
		Hyalella	2	4.55%	Yes	8	CG
Basommatophora							
	Lymnaeidae						
		Stagnicola	1	2.27%	Yes	6	SC
Coleoptera							
	Dytiscidae						
		Liodessus	1	2.27%	Yes	5	PR
	Hydrophilidae						
		Berosus	10	22.73%	Yes	5	PR
Diptera							
	Ceratopogonidae						
		Ceratopogoninae	2	4.55%	Yes	6	PR
	Chironomidae						
		Cryptotendipes	5	11.36%	Yes	6	CG
		Dicrotendipes	1	2.27%	Yes	8	CG
		Microtendipes	8	18.18%	Yes	6	CF
Heteroptera							
	Notonectidae						
		Notonecta	4	9.09%	Yes	5	PR
Odonata							
	Lestidae						
		Lestes	1	2.27%	Yes	9	PR
	Libellulidae						
		Libellulidae	1	2.27%	Yes	9	PR
Grand Total			**44**				

Aquatic Invertebrate Data Summary

Project ID: MDT03LW
STORET Station ID:
Station Name: RIDGEWAY

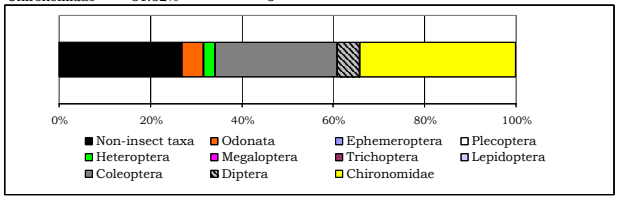
Activity ID:

Sample Date:

Sample type	
SUBSAMPLE TOTAL ORGANISMS	44
Portion of sample used	100.00%
Estimated number in total sample	44
Sampling effort	
Time	
Distance	
Jabs	
Habitat type	
EPT abundance	0
Taxa richness	13
Number EPT taxa	0
Percent EPT	0.00%

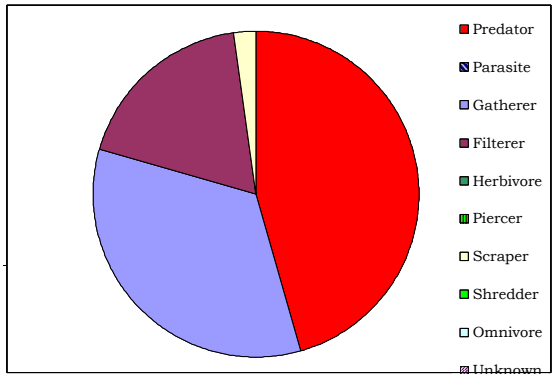
TAXONOMIC COMPOSITION

GROUP	PERCENT	#TAXA
Non-insect taxa	25.00%	4
Odonata	4.55%	2
Ephemeroptera	0.00%	0
Plecoptera	0.00%	0
Heteroptera	2.27%	1
Megaloptera	0.00%	0
Trichoptera	0.00%	0
Lepidoptera	0.00%	0
Coleoptera	25.00%	2
Diptera	4.55%	1
Chironomidae	31.82%	3



FUNCTIONAL COMPOSITION

GROUP	PERCENT	#TAXA
Predator	45.45%	7
Parasite	0.00%	0
Gatherer	34.09%	4
Filterer	18.18%	1
Herbivore	0.00%	0
Piercer	0.00%	0
Scraper	2.27%	1
Shredder	0.00%	0
Omnivore	0.00%	0
Unknown	0.00%	0



COMMUNITY TOLERANCES

Sediment tolerant taxa	1
Percent sediment tolerant	2.27%
Sediment sensitive taxa	0
Metals tolerance index (McGuire)	7.73
Cold stenotherm taxa	0
Percent cold stenotherms	0.00%

HABITUS MEASURES

Hemoglobin bearer richness	3
Percent hemoglobin bearers	29.55%
Air-breather richness	2
Percent air-breathers	25.00%
Burrower richness	2
Percent burrowers	6.82%
Swimmer richness	4
Percent swimmers	11.36%

DOMINANCE

TAXON	ABUNDANCE	PERCENT
Berosus	10	22.73%
Microtendipes	8	18.18%
Ostracoda	7	15.91%
Cryptotendipes	5	11.36%
Notonecta	4	9.09%
SUBTOTAL 5 DOMINANTS	34	77.27%
Hyalella	2	4.55%
Ceratopogoninae	2	4.55%
Stagnicola	1	2.27%
Acari	1	2.27%
Lestes	1	2.27%
TOTAL DOMINANTS	41	93.18%

SAPROBITY

Hilsenhoff Biotic Index	6.62

DIVERSITY

Shannon H (loge)	3.06
Shannon H (log2)	2.12
Margalef D	3.17
Simpson D	0.12
Evenness	0.16

VOLTINISM

TYPE	# TAXA	PERCENT
Multivoltine	5	50.00%
Univoltine	5	22.73%
Semivoltine	3	27.27%

TAXA CHARACTERS

	#TAXA	PERCENT
Tolerant	5	40.91%
Intolerant	0	0.00%
Clinger	1	18.18%

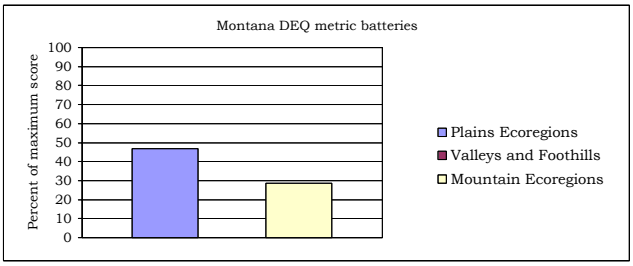
BIOASSESSMENT INDICES

B-IBI (Karr et al.)

METRIC	VALUE	SCORE	
Taxa richness	13	1	
E richness	0	1	
P richness	0	1	
T richness	0	1	
Long-lived	3	3	
Sensitive richness	0	1	
%tolerant	40.91%	3	
%predators	45.45%	3	
Clinger richness	1	1	
%dominance (3)	56.82%	3	
	TOTAL SCORE	18	36%

MONTANA DEQ METRICS (Bukantis 1998)

METRIC	VALUE	Plains Ecoregions	Valleys and Foothills	Mountain Ecoregions
Taxa richness	13	1	0	0
EPT richness	0	0	0	0
Biotic Index	6.62	1	0	0
%Dominant taxon	22.73%	3	3	3
%Collectors	52.27%	3	3	3
%EPT	0.00%	0	0	0
Shannon Diversity	2.12	1		
%Scrapers +Shredders	2.27%	0	0	0
Predator taxa	7	3		
%Multivoltine	50.00%	2		
%H of T	#DIV/0!		#DIV/0!	
TOTAL SCORES		14	#DIV/0!	6
PERCENT OF MAXIMUM		46.67	#DIV/0!	28.57
IMPAIRMENT CLASS		MODERATE	#DIV/0!	MODERATE



Montana Plains ecoregions metrics (Bramblett and Johnson)

Riffle		*Pool*	
EPT richness	0	E richness	0
Percent EPT	0.00%	T richness	0
Percent Oligochaetes and Leeches	0.00%	Percent EPT	0.00%
Percent 2 dominants	40.91%	Percent non-insect	25.00%
Filterer richness	1	Filterer richness	1
Percent intolerant	0.00%	Univoltine richness	5
Univoltine richness	5	Percent supertolerant	27.27%
Percent clingers	18.18%		
Swimmer richness	4		

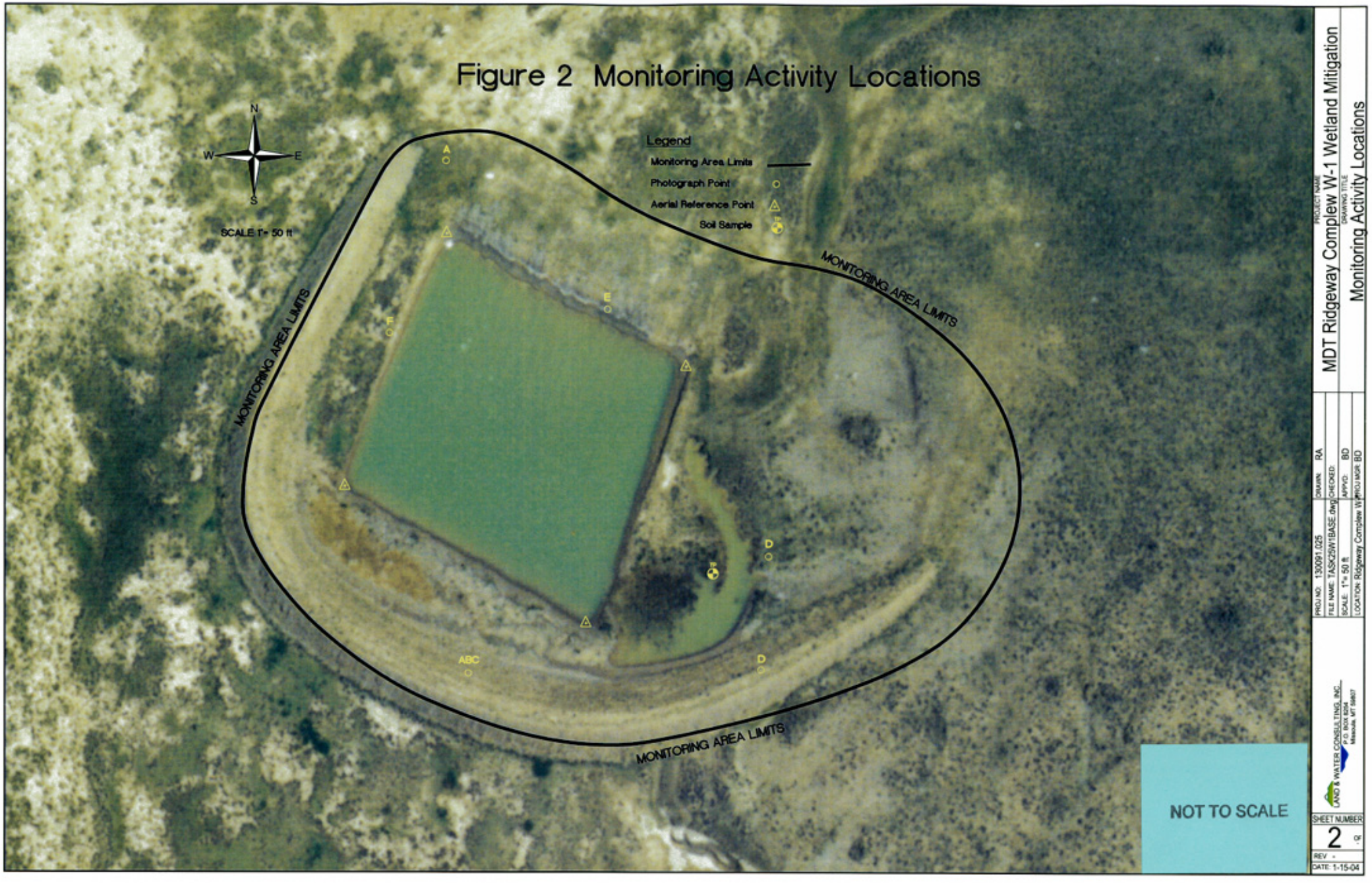
Appendix G

WETLANDS 1-8 AND 10-16: FIGURE 2
WETLANDS 1-6, 12-14: FIGURE 3

MDT Wetland Mitigation Monitoring
Ridgeway Wetland
Ekalaka, Montana

LAND & WATER

Figure 2 Monitoring Activity Locations



PROJECT NAME: MDT Ridgeway Complew W-1 Wetland Mitigation

DRAWING TITLE: Monitoring Activity Locations

PROJ NO: 130091.025 | DRAWN: RA

FILE NAME: TASK2SW1BASE.dwg | CHECKED:

SCALE: 1"= 50 ft | APPVD: BD

LOCATION: Ridgeway Complew W | PROJ MGR: BD

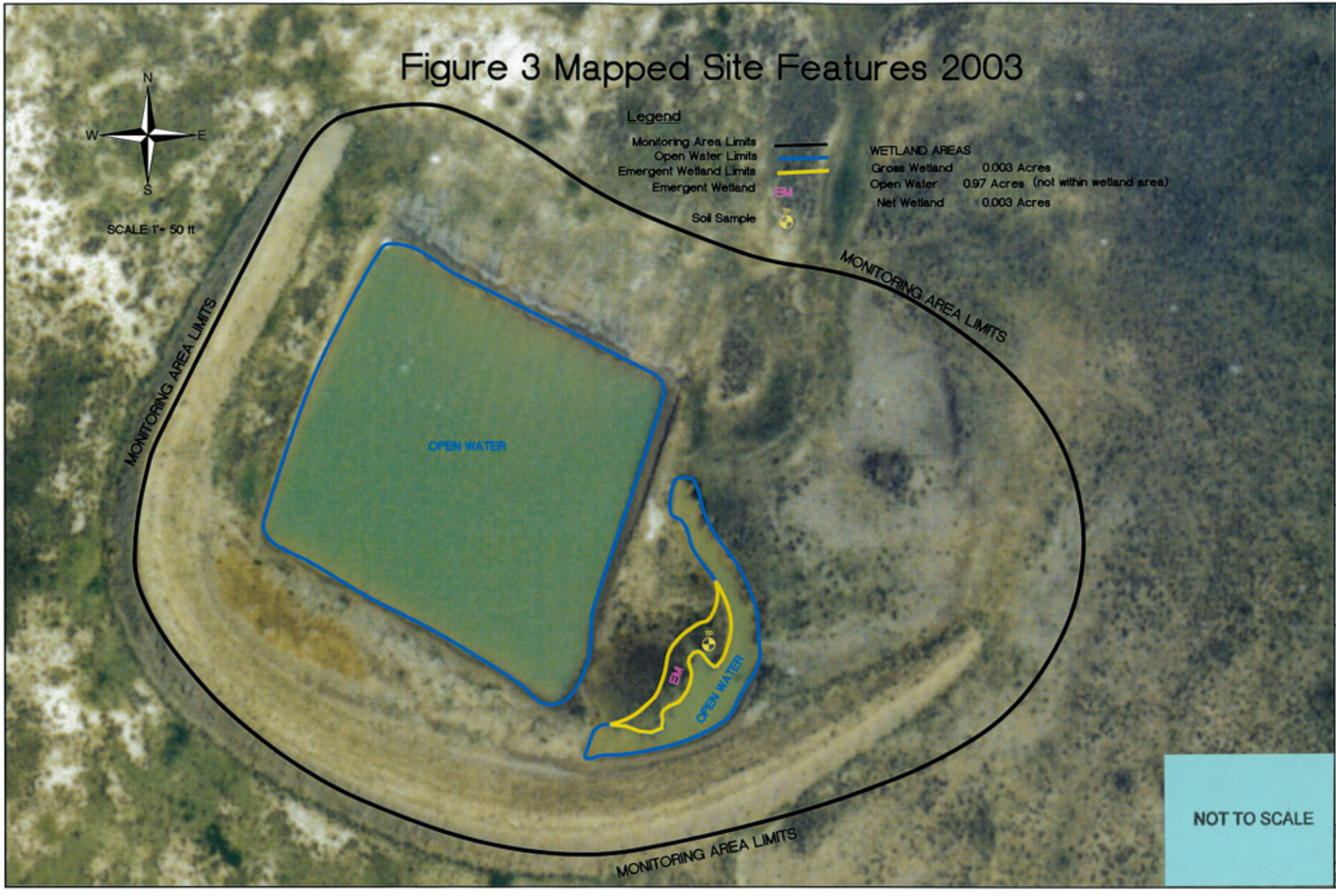
LAND & WATER CONSULTING, INC.
P.O. BOX 8354
Missoula, MT 59807

SHEET NUMBER: 2 of

REV: -

DATE: 1-15-04

Figure 3 Mapped Site Features 2003



PROJECT NAME: MDT Ridgeway Complew W-1 Wetland Mitigation

DRAWING TITLE: Mapped Site Features 2003

PROJ NO: 130091.025 | DRAWN: RA
FILE NAME: TASK025W1BASE.dwg | CHECKED:
SCALE: 1"= 50 ft | APPVD: BD
LOCATION: Ridgeway Complew W1 | PROJ MGR: BD

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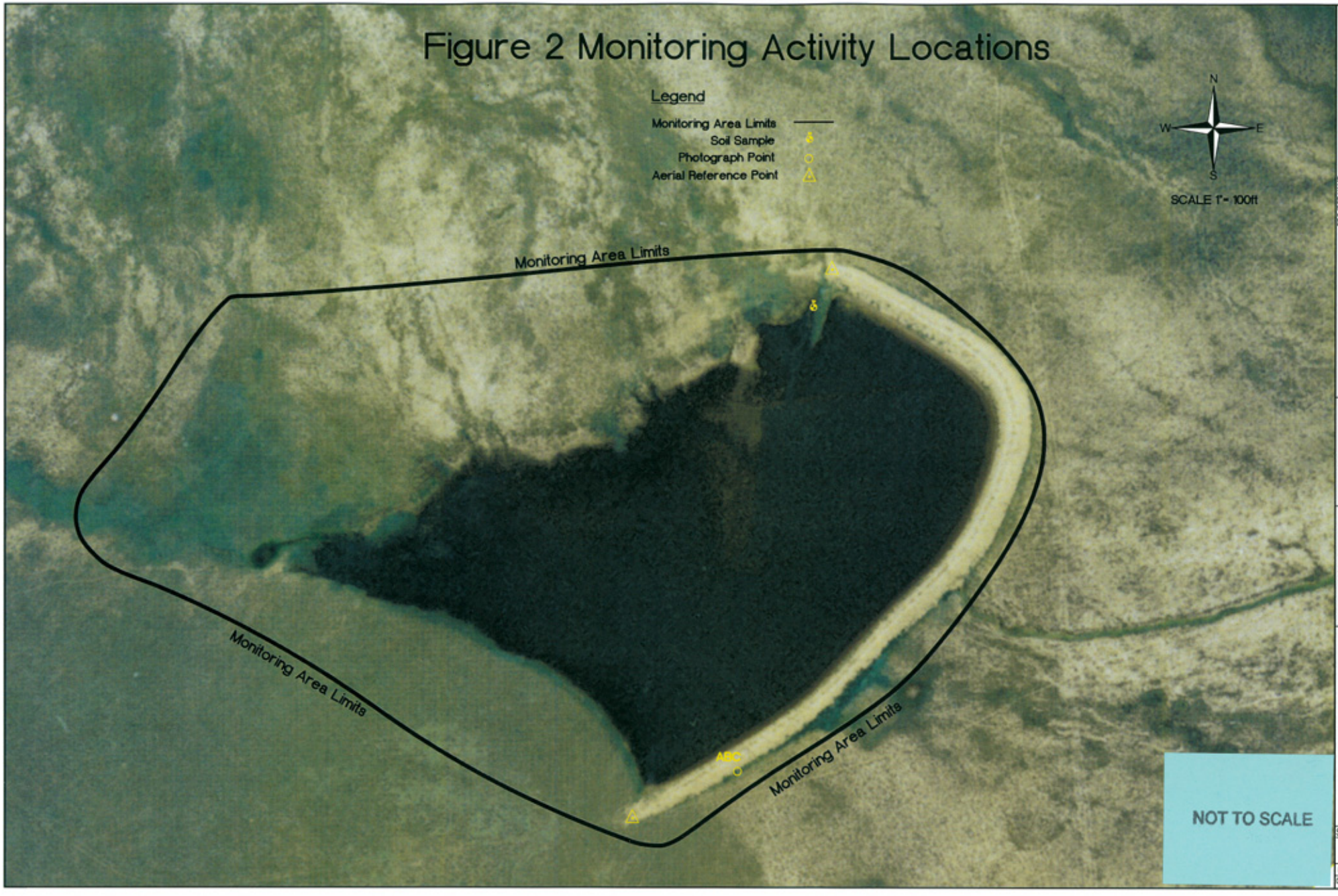
Missoula, MT 59807

SHEET NUMBER: 3

REV: -

DATE: 12-16-03

Figure 2 Monitoring Activity Locations



PROJECT NAME: MDT Ridgeway Compex W-2 Wetland Mitigation

DRAWING TITLE: Monitoring Activity Locations

PROJ NO: 130091.02SW2 | DRAWN: RA
FILE NAME: TASK2SW2BASE.dwg | CHECKED:
SCALE: 1"=100 ft | APPVD: BD
LOCATION: Ridgeway Complex W | PROJ MGR: BD

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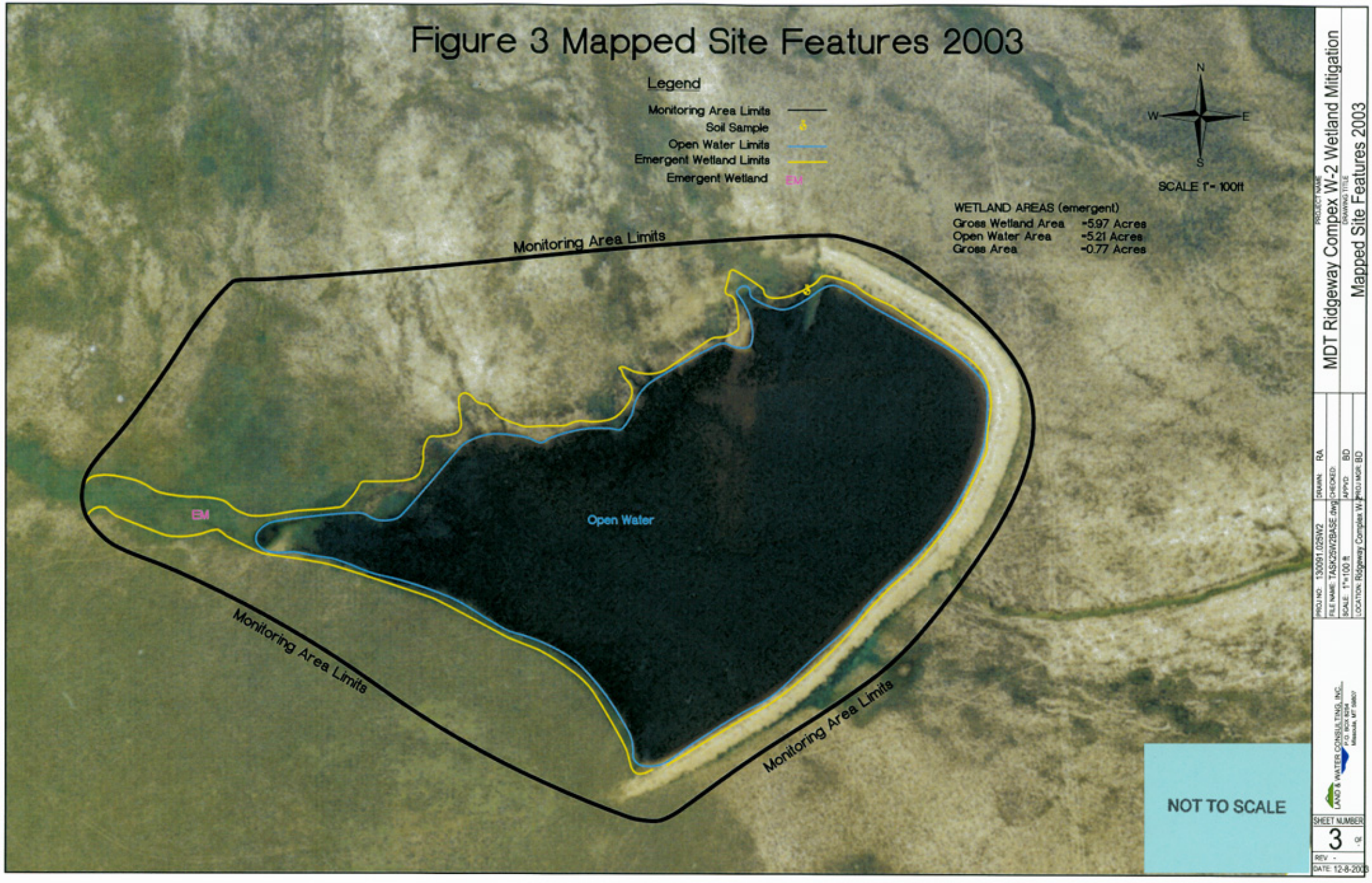
Missoula, MT 59807

SHEET NUMBER: 2

REV: -

DATE: 1-15-04

Figure 3 Mapped Site Features 2003



PROJECT NAME: MDT Ridgeway Compex W-2 Wetland Mitigation

DRAWING TITLE: Mapped Site Features 2003

PROJ NO: 1300911.025W2 | DRAWN: RA

FILE NAME: TASK2SW2BASE.dwg | CHECKED:

SCALE: 1"=100 ft | APPVD: BD

LOCATION: Ridgeway Complex W-2 | PROJ MGR: BD

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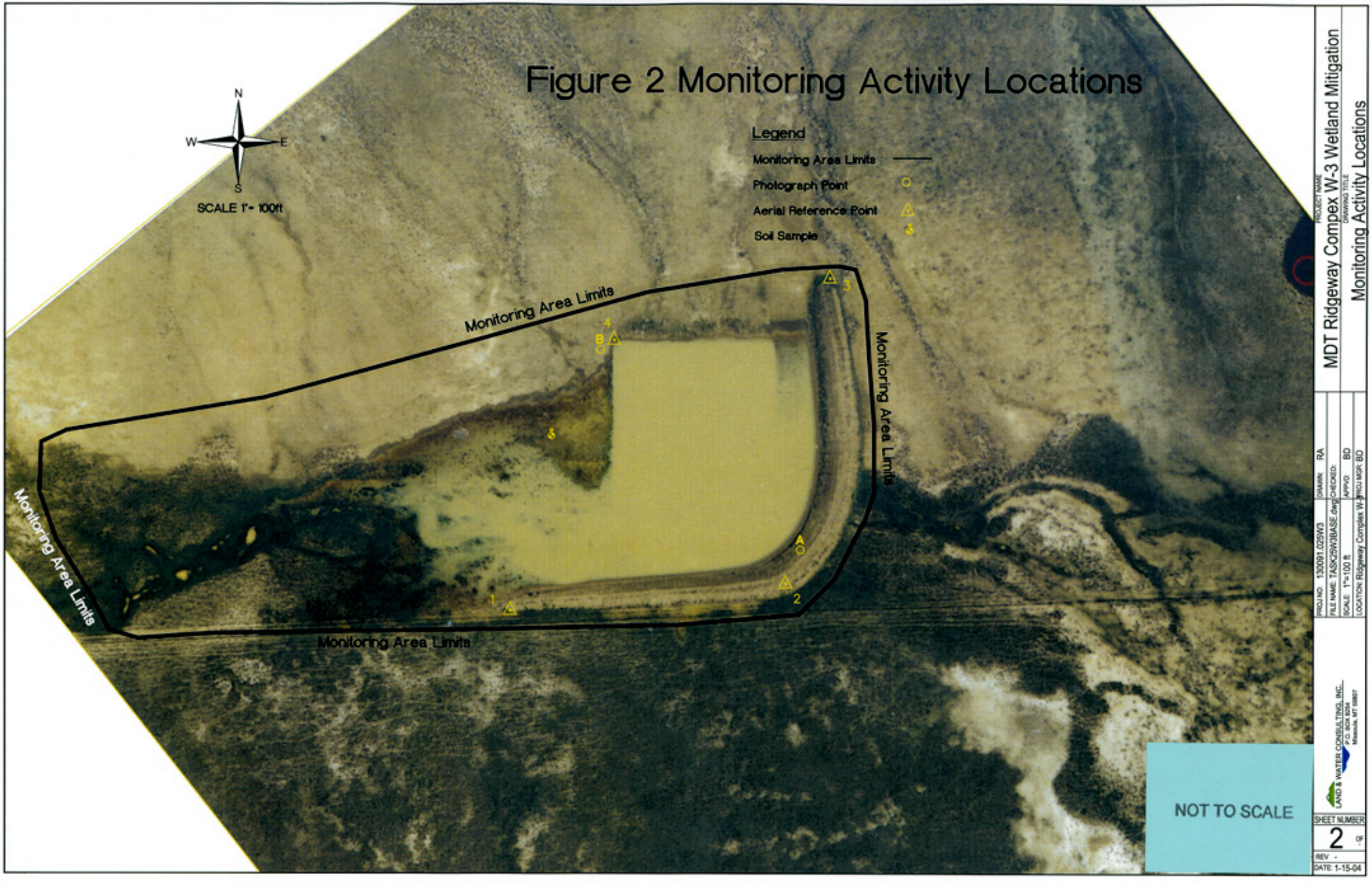
Missoula, MT 59807

SHEET NUMBER: 3 of

REV: -

DATE: 12-8-2003

Figure 2 Monitoring Activity Locations



PROJECT NAME
MDT Ridgeway Compex W-3 Wetland Mitigation

DRAWING TITLE
Monitoring Activity Locations

PROJ NO: 130091.025W3 | DRAWN: RA
FILE NAME: TASK2SW3BASE.dwg | CHECKED:
SCALE: 1"=100 ft | APPVD: BD
LOCATION: Ridgeway Complex W-3 | PROJ MGR: BD

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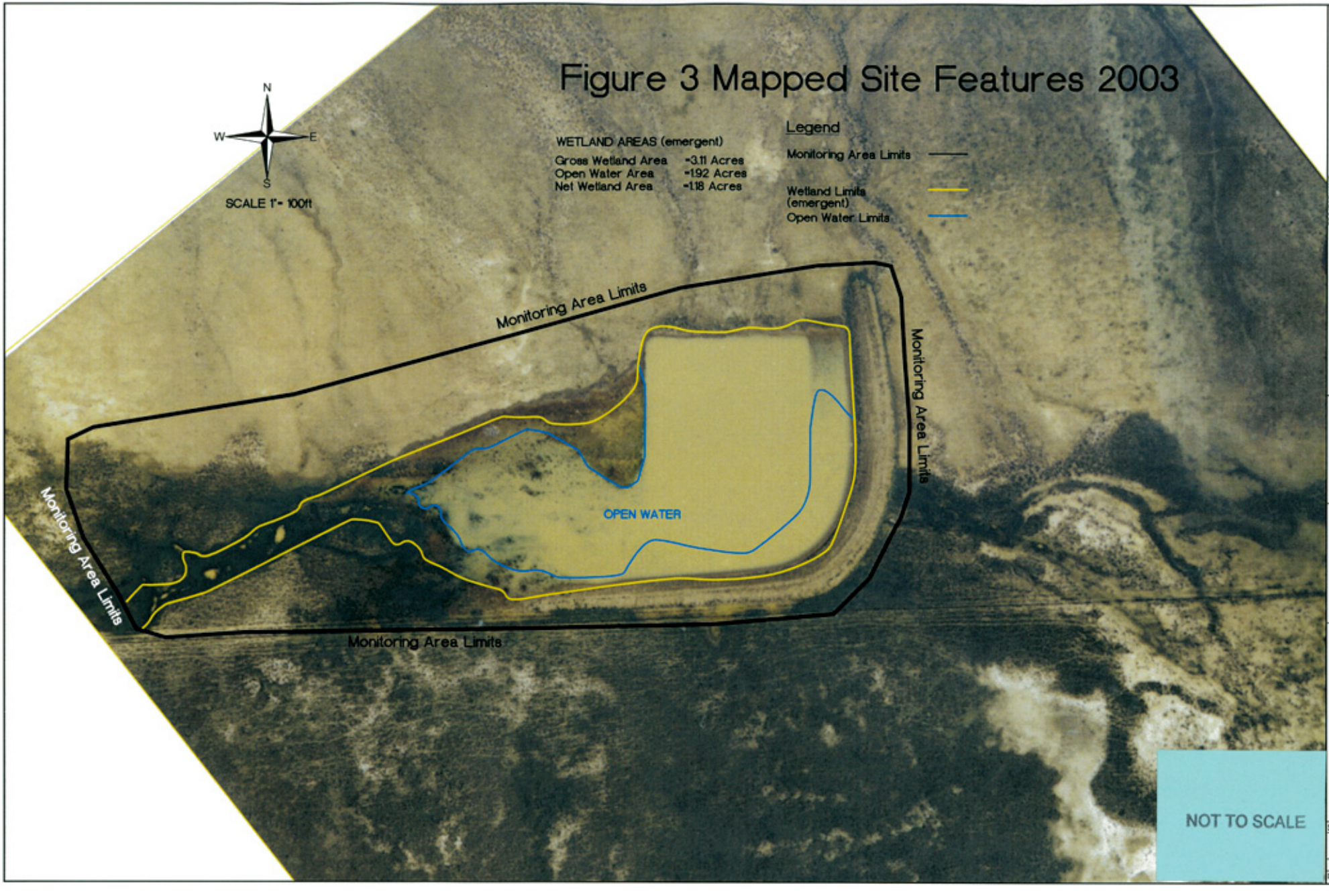
Missoula, MT 59807

SHEET NUMBER
2

REV -
DATE: 1-15-04

Figure 3 Mapped Site Features 2003



PROJECT NAME: MDT Ridgeway Compex W-3 Wetland Mitigation

DRAWING TITLE: Mapped Site Features 2003

PROJ NO: 130091.029W3 | DRAWN: RA

FILE NAME: TASK29W3BASE.dwg | CHECKED:

SCALE: 1"=100 ft | APPVD: BD

LOCATION: Ridgeway Complex W-3 | PROJ MGR: BD

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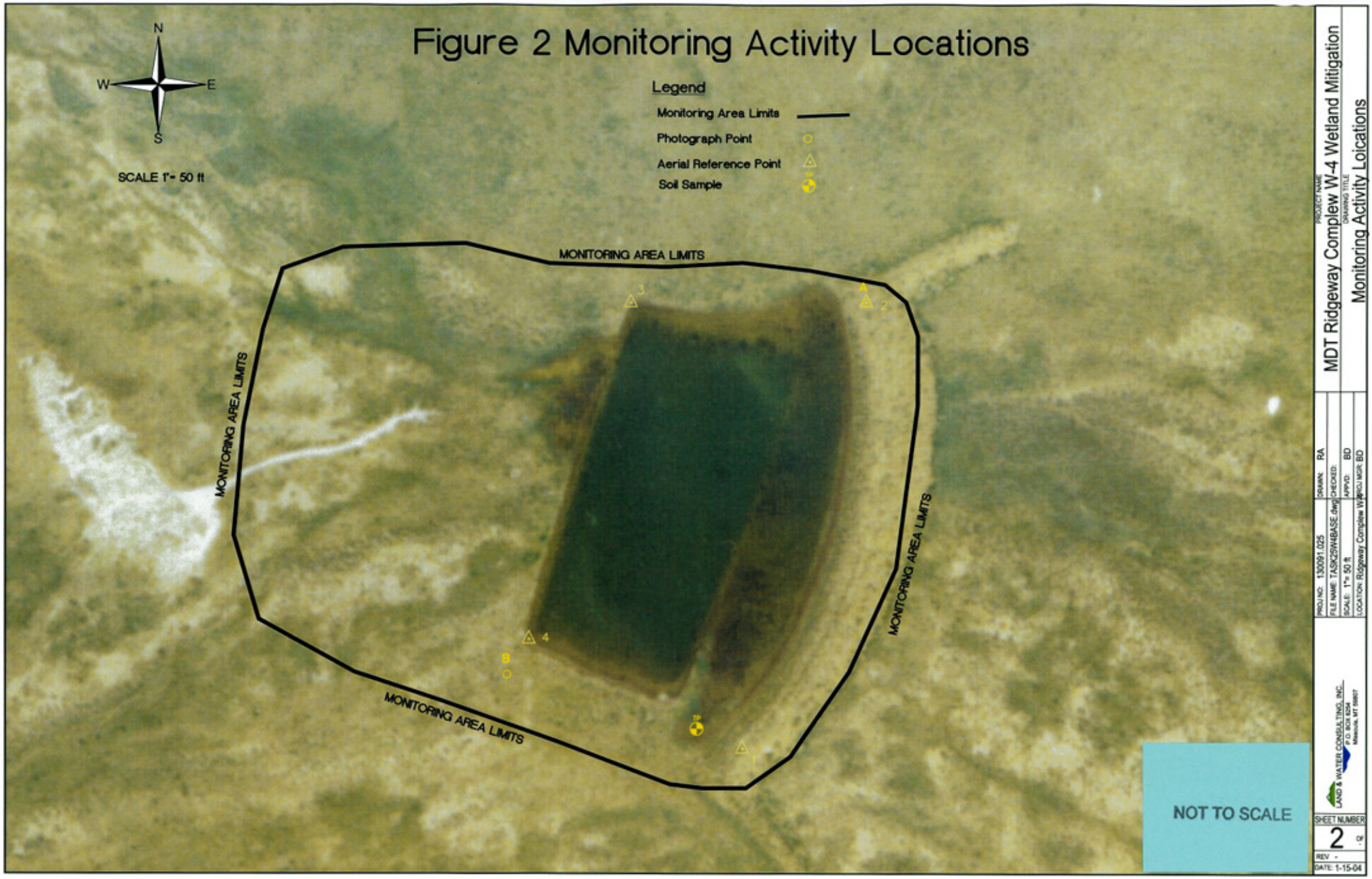
Missoula, MT 59807

SHEET NUMBER: 3

REV: -

DATE: 12-16-03

Figure 2 Monitoring Activity Locations



PROJECT NAME: MDT Ridgeway Complew W-4 Wetland Mitigation

DRAWING TITLE: Monitoring Activity Loications

PROJ NO: 130091.025 | DRAWN: RA

FILE NAME: TASK2SWHBASE.dwg | CHECKED:

SCALE: 1"= 50 ft | APP'VD: BD

LOCATION: Ridgeway Complew W | PROJ MGR: BD

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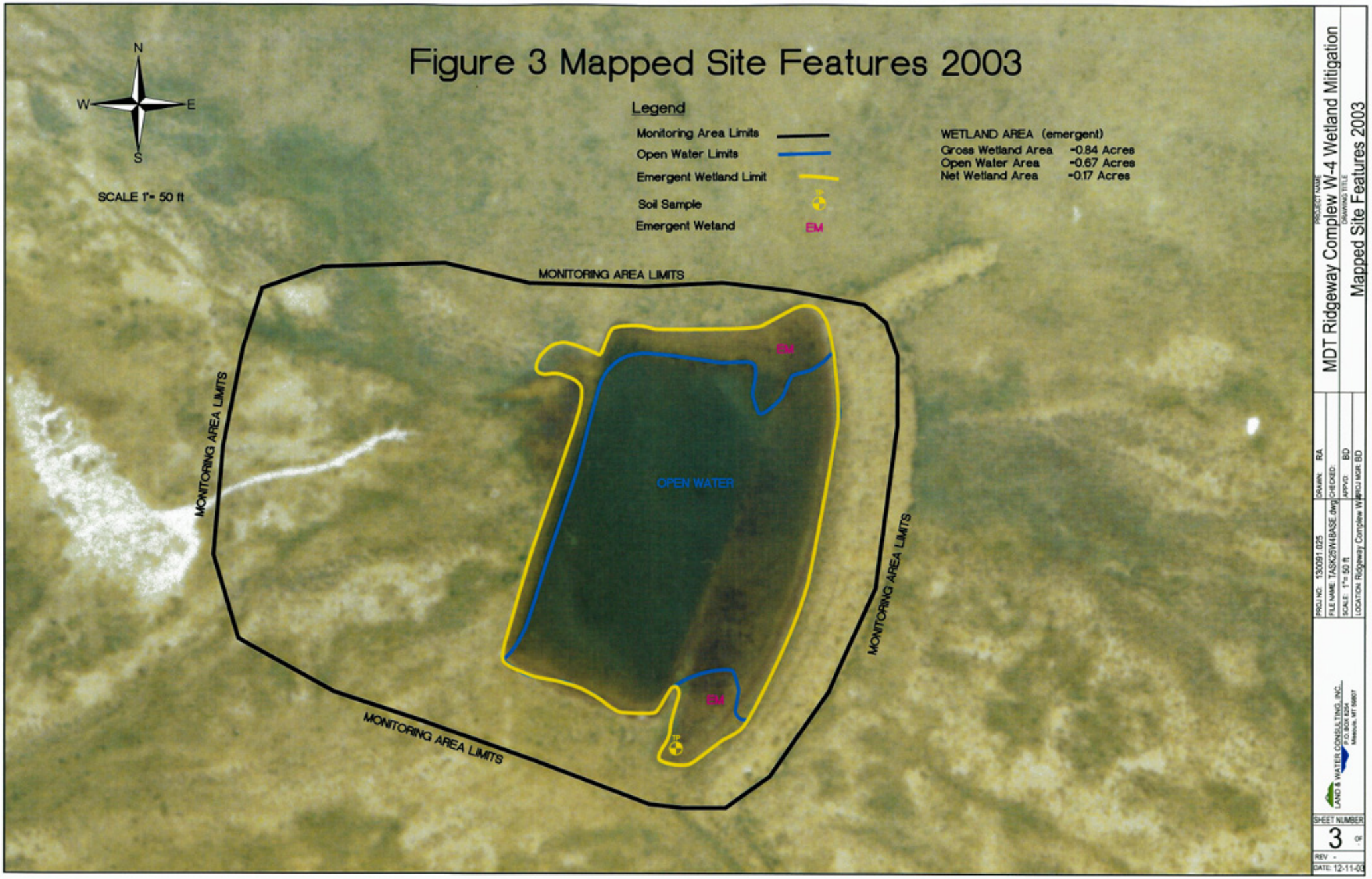
Missoula, MT 59807

SHEET NUMBER: 2

REV: -

DATE: 1-15-04

Figure 3 Mapped Site Features 2003



PROJECT NAME: MDT Ridgeway Complex W-4 Wetland Mitigation

DRAWING TITLE: Mapped Site Features 2003

PROJ NO: 130091.025
FILE NAME: TASK2SW4BASE.dwg
SCALE: 1"= 50 ft
LOCATION: Ridgeway Complex W-4

DRAWN: RA
CHECKED:
APPVD: BD
PROJ MGR: BD

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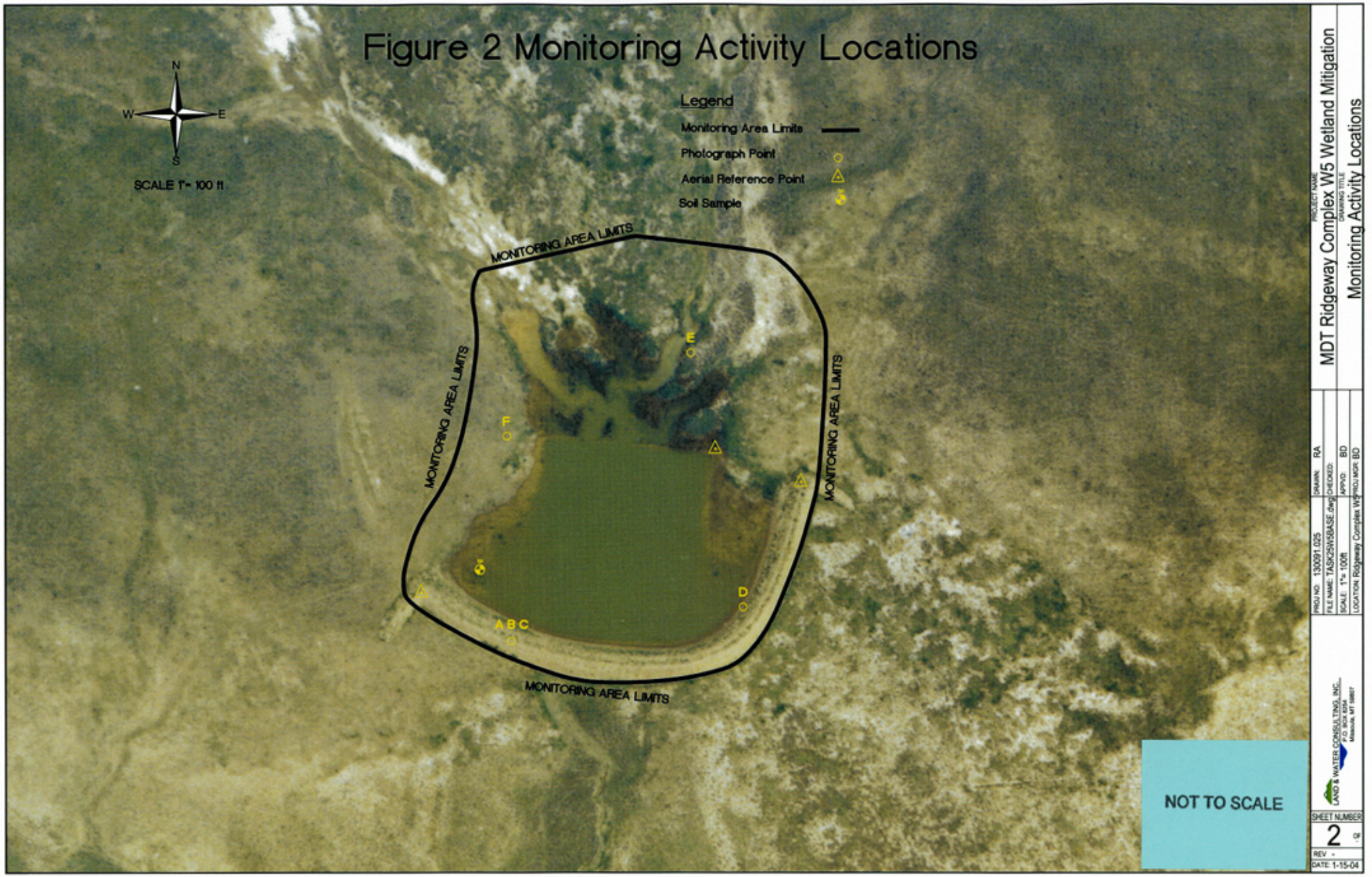
Missoula, MT 59807

SHEET NUMBER
3

REV -
DATE: 12-11-03

Figure 2 Monitoring Activity Locations



PROJECT NAME: MDT Ridgeway Complex W5 Wetland Mitigation

DRAWING TITLE: Monitoring Activity Locations

PROJ NO: 130091.025 | DRAWN: RA

FILE NAME: TASK2SW5BASE.dwg | CHECKED: BD

SCALE: 1"= 100ft | APPVD: BD

LOCATION: Ridgeway Complex W5 | PROJ MGR: BD

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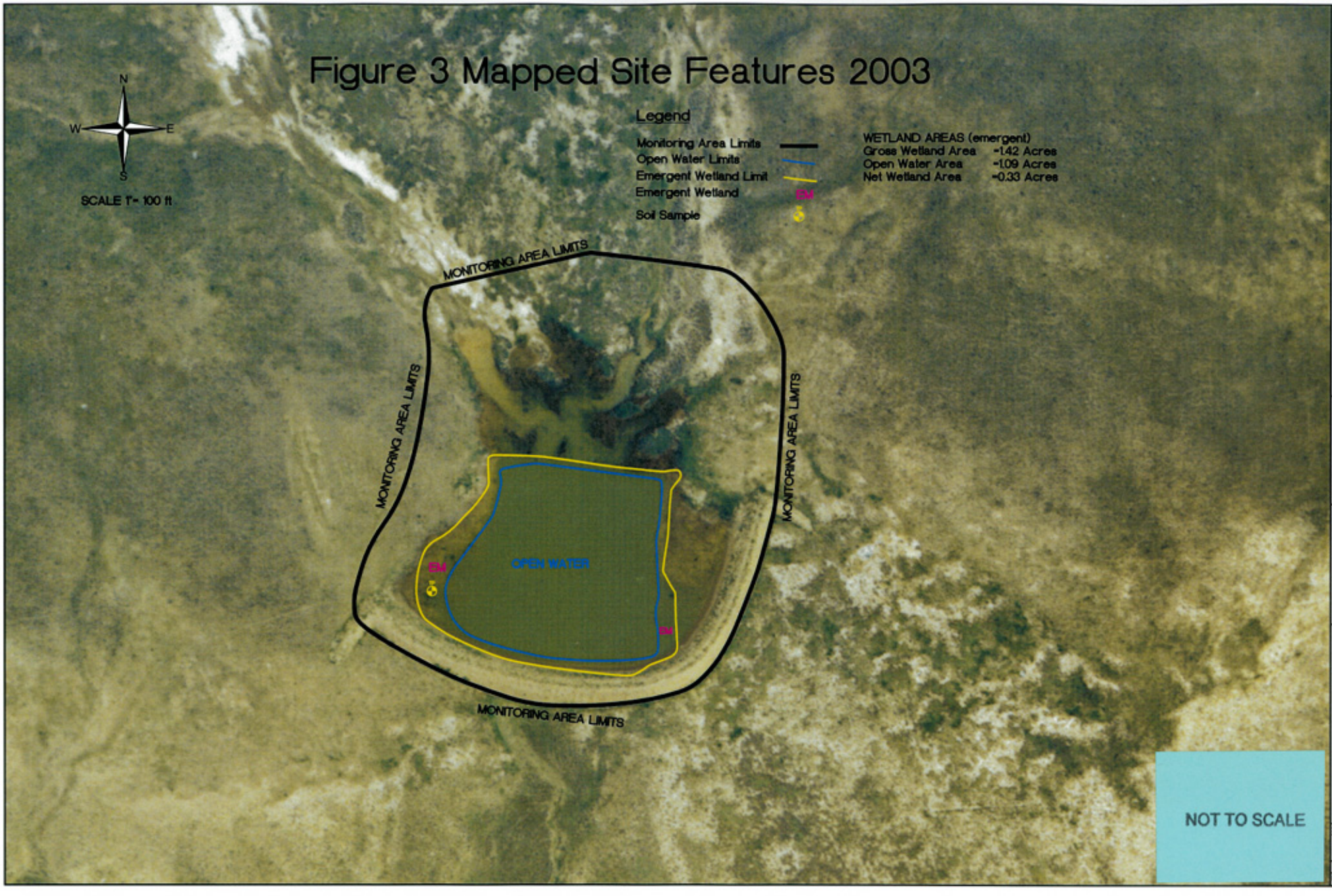
P.O. BOX 8254
Missoula, MT 59807

SHEET NUMBER: 2

REV: -

DATE: 1-15-04

Figure 3 Mapped Site Features 2003



PROJECT NAME
MDT Ridgeway Complex W5 Wetland Mitigation
DRAWING TITLE
Mapped Site Features 2003

PROJ NO: 130091.025 | DRAWN: RA
FILE NAME: TASK2\5W5BASE.dwg | CHECKED: BD
SCALE: 1"= 100ft | APPVD: BD
LOCATION: Ridgeway Complex W5 | PROJ MGR: BD

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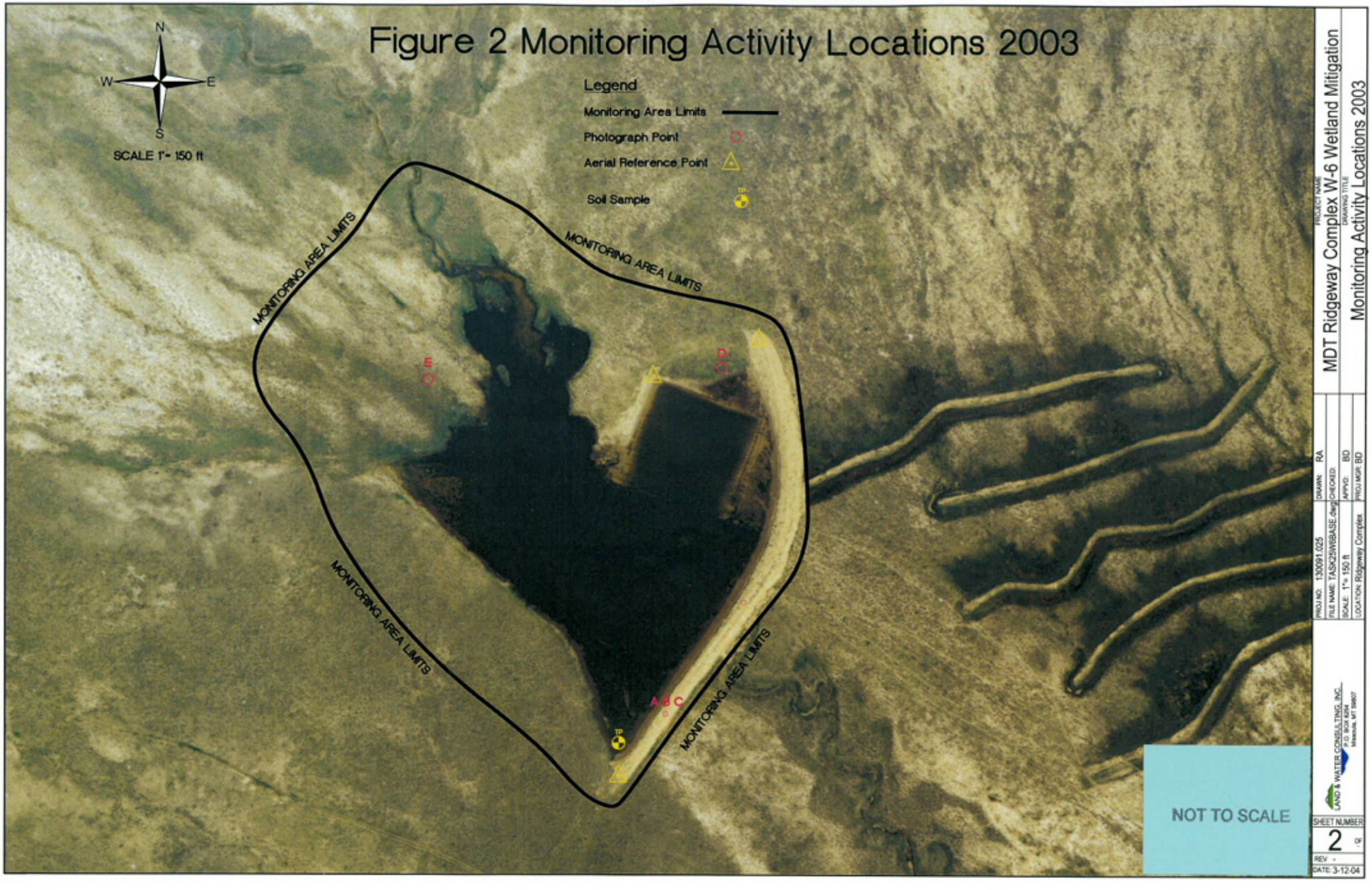
P.O. BOX 8254
Missoula, MT 59807

SHEET NUMBER
3
REV -
DATE: 12-16-03

Figure 2 Monitoring Activity Locations 2003



PROJECT NAME: MDT Ridgeway Complex W-6 Wetland Mitigation

DRAWING TITLE: Monitoring Activity Locations 2003

PROJ NO: 130091.025 | DRAWN: RA

FILE NAME: TASK25WBASE.dwg | CHECKED:

SCALE: 1"= 150 ft | APPVD: BD

LOCATION: Ridgeway Complex | PROJ MGR: BD

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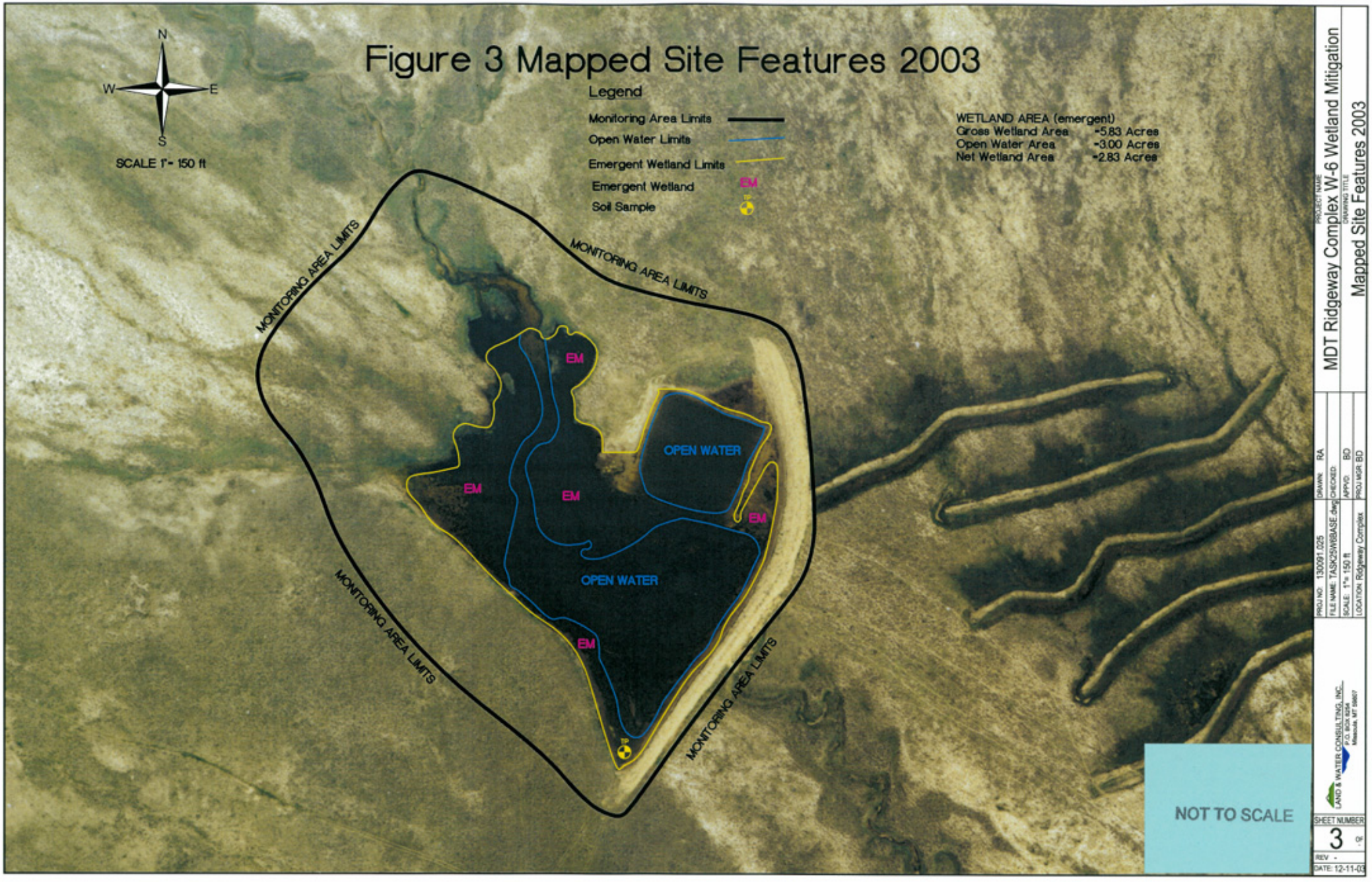
Missoula, MT 59807

SHEET NUMBER 2

REV -

DATE: 3-12-04

Figure 3 Mapped Site Features 2003



PROJECT NAME: MDT Ridgeway Complex W-6 Wetland Mitigation
DRAWING TITLE: Mapped Site Features 2003

PROJ NO: 130091.025 | DRAWN: RA
FILE NAME: TASK2SW6BASE.dwg | CHECKED:
SCALE: 1"= 150 ft | APPVD: BD
LOCATION: Ridgeway Complex | PROJ MGR: BD

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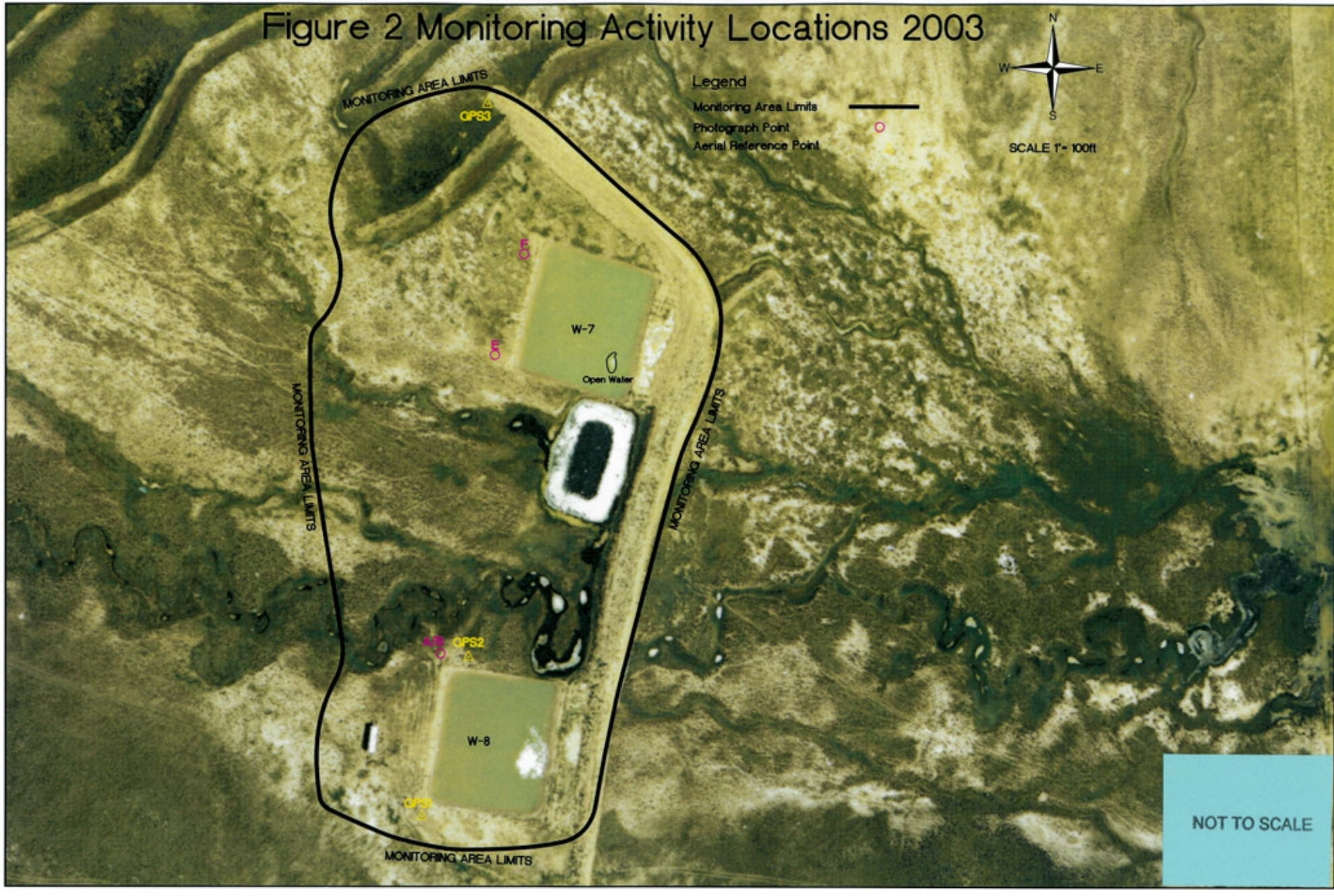
Missoula, MT 59807

SHEET NUMBER 3
REV -
DATE: 12-11-03

Figure 2 Monitoring Activity Locations 2003



PROJECT NAME: MDT Ridgeway Complex W7-8 Wetland Mitigation

DRAWING TITLE: Monitoring Activity Locations 2003

PROJ NO: 130091.025W7-8 | DRAWN: RA
FILE NAME: TASK25/W8BASE.dwg | CHECKED:
SCALE: 1"= 100ft | APPVD: BD
LOCATION: Ridgeway Complex | PROJ MGR: BD

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Missoula, MT 59807

SHEET NUMBER: 2

REV: -

DATE: 1-15-04

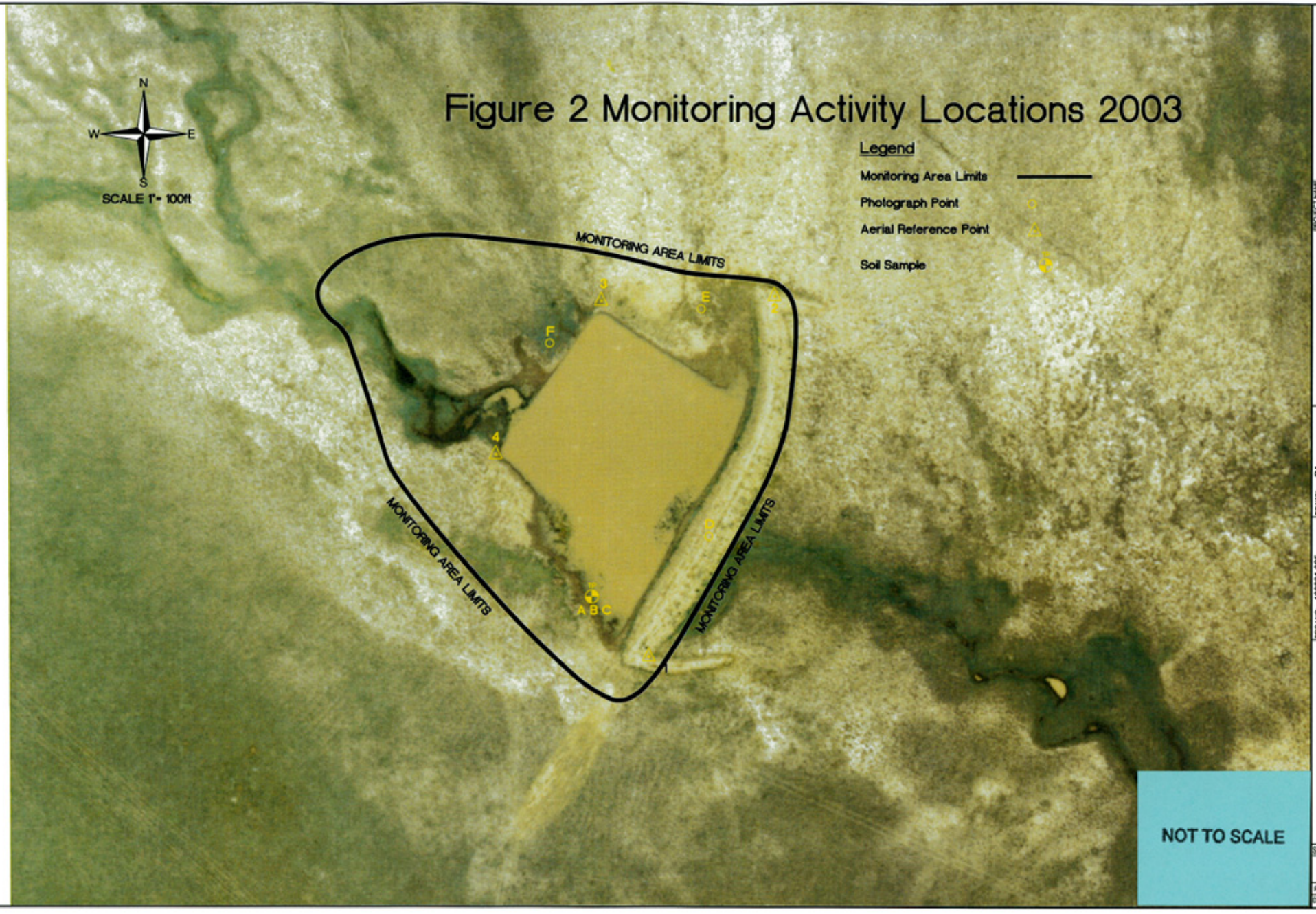
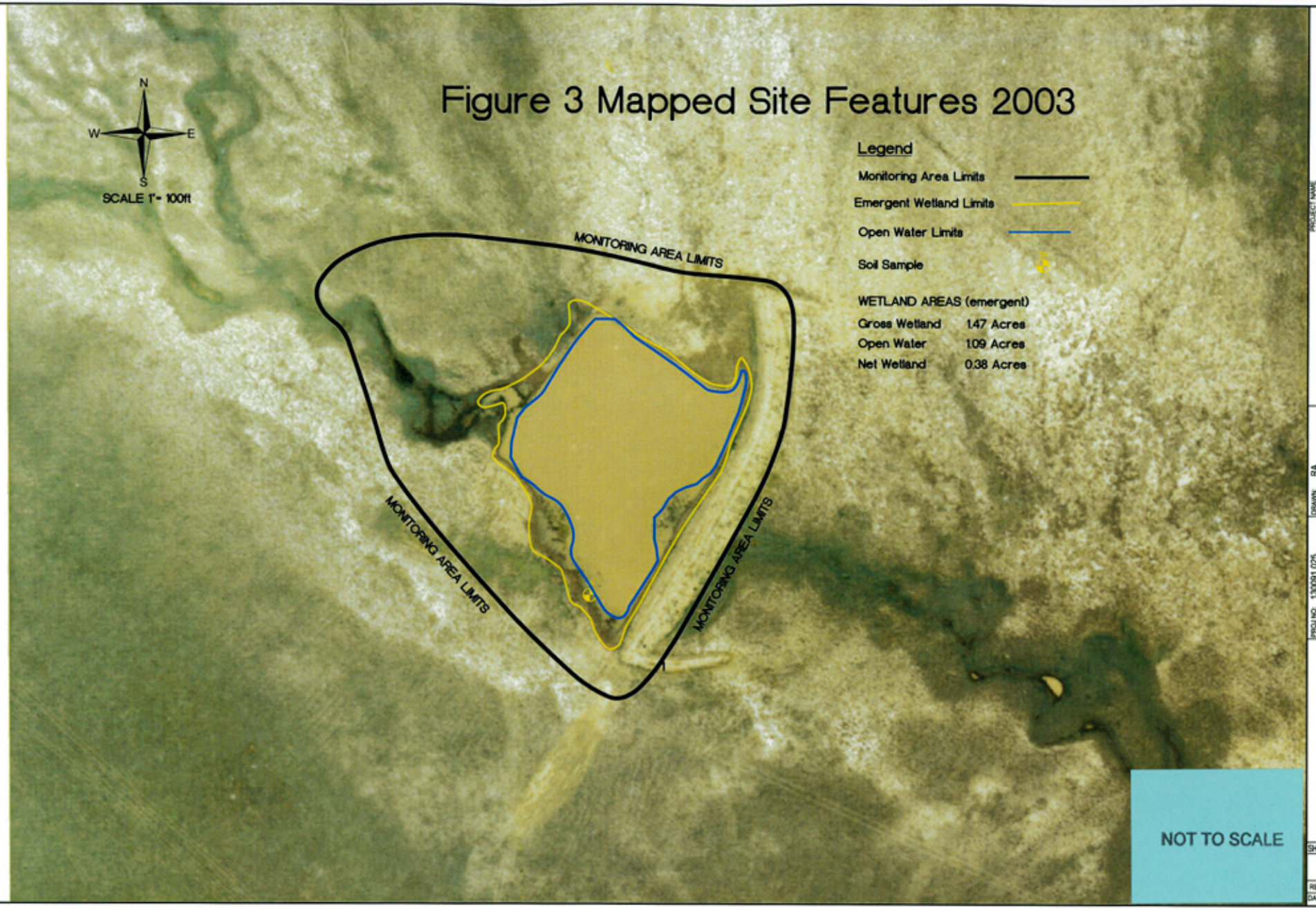


Figure 2 Monitoring Activity Locations 2003
N
W
E
S
SCALE 1"= 100ft
Legend
Monitoring Area Limits
Photograph Point
Aerial Reference Point
Soil Sample
MONITORING AREA LIMITS
MONITORING AREA LIMITS
MONITORING AREA LIMITS
1
2
3
4
A
B
C
D
E
F
NOT TO SCALE
PROJECT NAME
MDT Ridgeway Complex W-12 Wetland Mitigation
DRAWING TITLE
Monitoring Activity Locations 2003
PROJ NO: 130091.025
DRAWN: RA
FILE NAME: TASK25W12BASE.dwg
DESIGNED:
SCALE: 1"= 100ft
APPVD: BD
LOCATION: Ridgeway Complex
PROJ MGR: BD
LAND & WATER CONSULTING, INC.
P.O. BOX 8264
Missoula, MT 59807
SHEET NUMBER
2
REV -
DATE: 12-12-03

Figure 3 Mapped Site Features 2003



PROJECT NAME: MDT Ridgeway Complex W-12 Wetland Mitigation

DRAWING TITLE: Mapped Site Features 2003

PROJ NO: 130091.025 | DRAWN: RA
FILE NAME: TASK2SW12BASE.dwg | CHECKED:
SCALE: 1"= 100ft | APPVD: BD
LOCATION: Ridgeway Complex | PROJ MGR: BD

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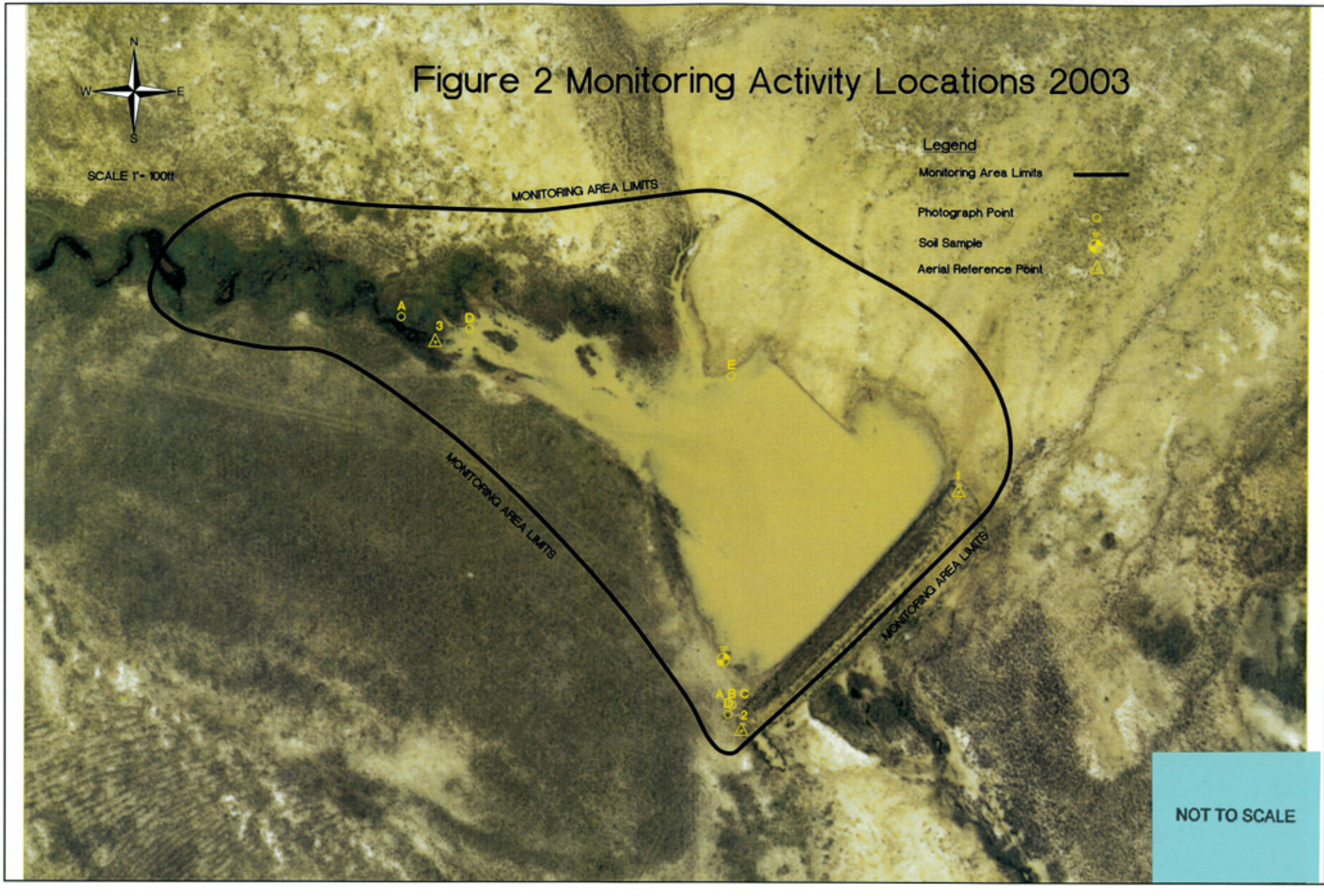
Missoula, MT 59807

SHEET NUMBER: 3 of

REV: -

DATE: 12-12-03

Figure 2 Monitoring Activity Locations 2003



PROJECT NAME: MDTRidgeway Complex W-13 Wetland Mitigation

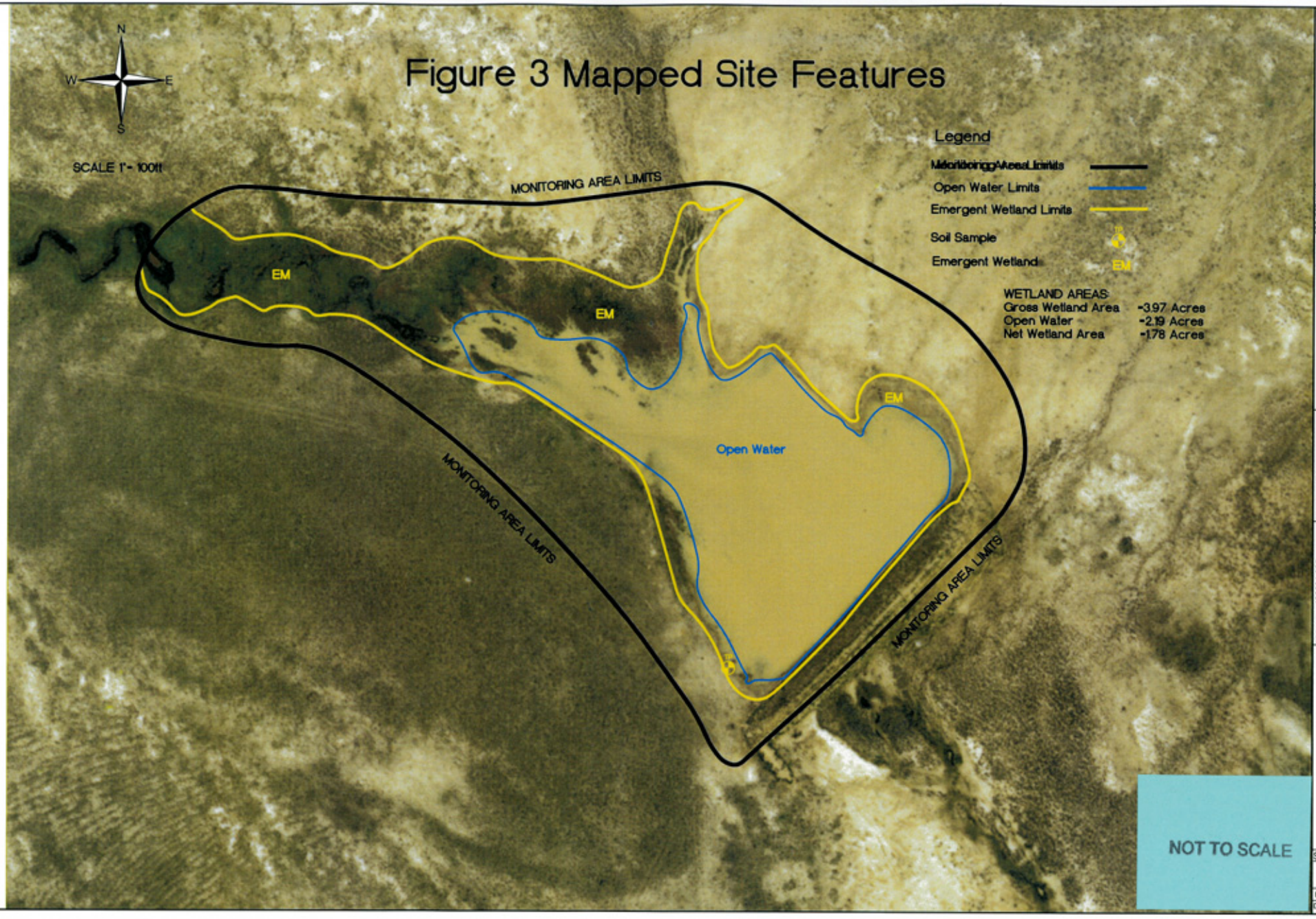
DRAWING TITLE: Monitoring Activity Locations 2003

PROJ NO: 13009.025 | DRAWN: RA
FILE NAME: TASK25W13BASE.dwg | CHECKED:
SCALE: 1"= 100ft | APPVD: BD
LOCATION: | PROJ MGR: Ridgeway Complex

LAND & WATER CONSULTING, INC.
P.O. Box 1714
Missoula, MT 59807

SHEET NUMBER: 2 of -
REV: -
DATE: 3-12-04

Figure 3 Mapped Site Features



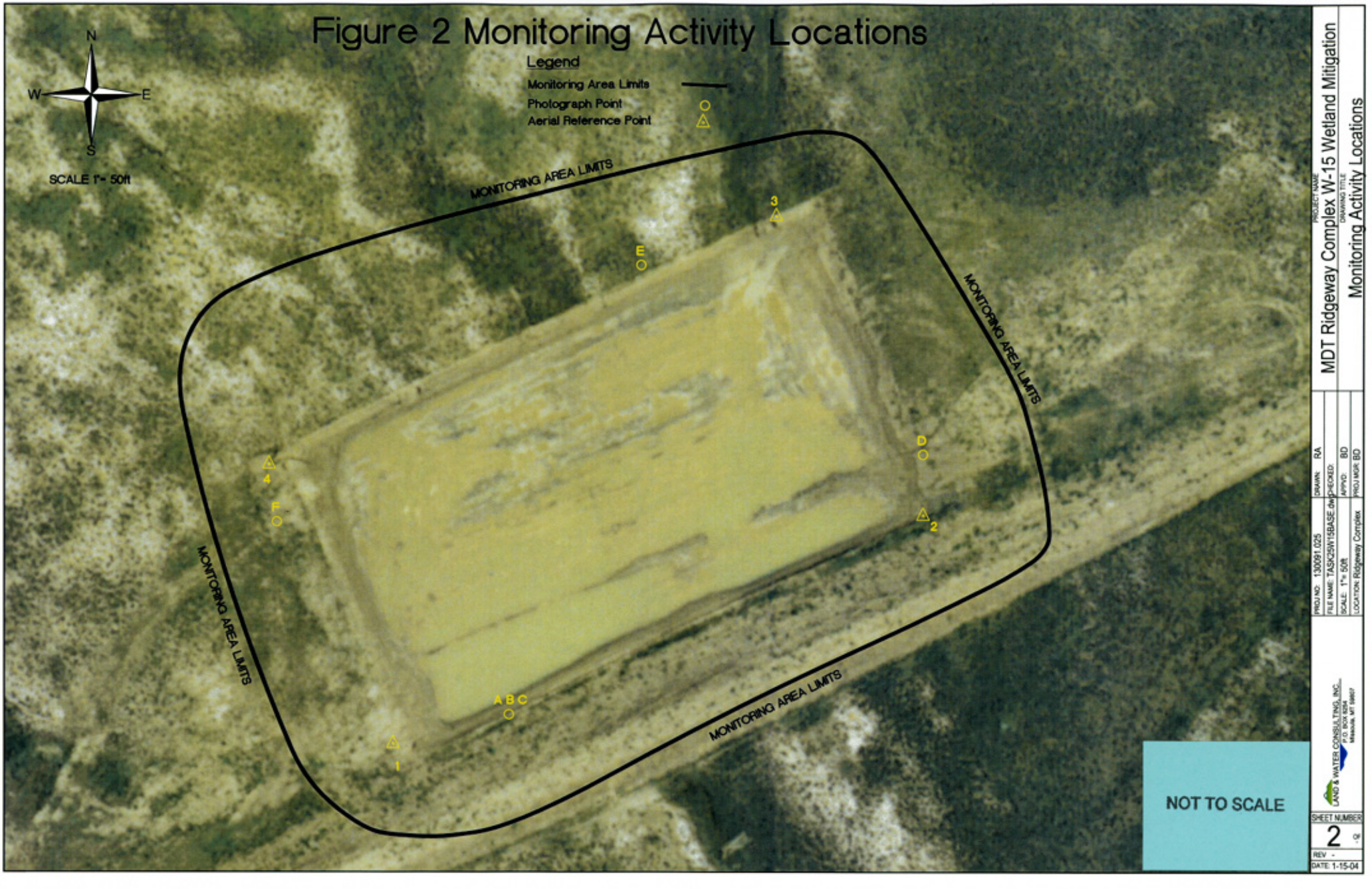
PROJECT NAME: MDTRidgeway Complex W-13 Wetland Mitigation
DRAWING TITLE: Mapped Site Features 2003

PROJ NO: 130091.025
FILE NAME: TASK2\W13BASE.dwg
SCALE: 1" = 100ft
LOCATION:
DRAWN: RA
CHECKED:
APPVD: BD
PROJ MGR: Ridgeway Complex

LAND & WATER CONSULTING, INC.
P.O. BOX 8254
Missoula, MT 59807

SHEET NUMBER: 3
REV: -
DATE: 12-12-03

Figure 2 Monitoring Activity Locations



PROJECT NAME: MDT Ridgeway Complex W-15 Wetland Mitigation

DRAWING TITLE: Monitoring Activity Locations

PROJ NO: 130091.025 | DRAWN: RA

FILE NAME: TASK25W15BASE.dwg | CHECKED:

SCALE: 1"= 50ft | APPVD: BD

LOCATION: Ridgeway Complex | PROJ MGR: BD

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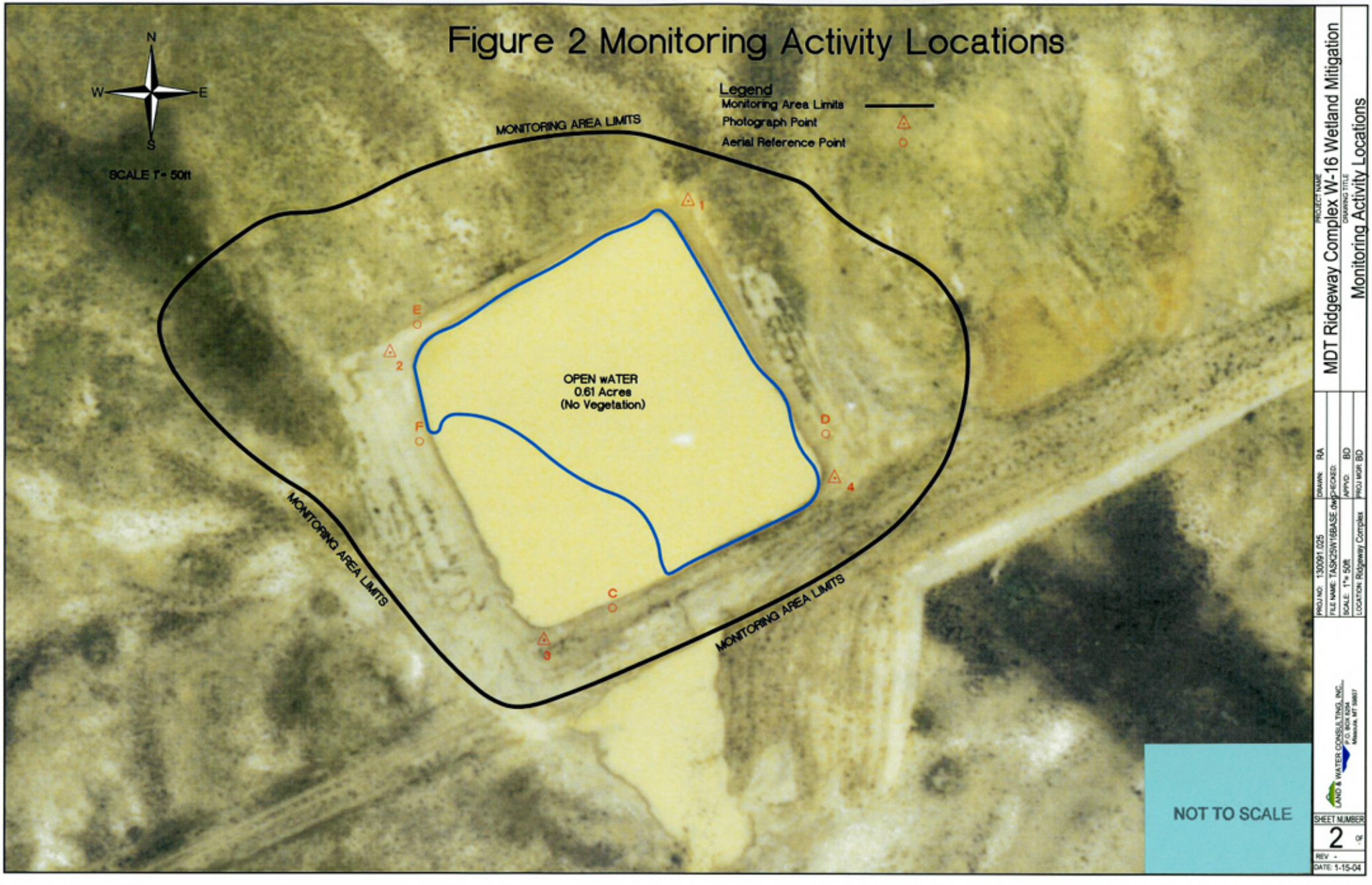
Missoula, MT 59807

SHEET NUMBER: 2

REV: -

DATE: 1-15-04

Figure 2 Monitoring Activity Locations



PROJECT NAME
MDT Ridgeway Complex W-16 Wetland Mitigation

DRAWING TITLE
Monitoring Activity Locations

PROJ NO: 130091.025 | DRAWN: RA
FILE NAME: TASK2SW16BASE.DWG | CHECKED:
SCALE: 1" = 50ft | APPVD: BD
LOCATION: Ridgeway Complex | PROJ MGR: BD

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P.O. BOX 8254
Missoula, MT 59807

SHEET NUMBER
2

REV -
DATE: 1-15-04

Appendix H

WETLANDS 1-8 AND 10-16 :
2003 WETLAND DELINEATION FORMS
2003 PHOTOGRAPH LOGS
2003 REPRESENTATIVE PHOTOGRAPHS

MDT Wetland Mitigation Monitoring
Ridgeway Wetland
Ekalaka, Montana

LAND & WATER

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Ridgeway Complex	Date: 7/1/03
Applicant/Owner: MDT	County: Carter
Investigator: Lynn Bacon, Land & Water Consulting	State: MT

Do Normal Circumstances exist on the site:	x	Yes		No	Community ID: Emergent
Is the site significantly disturbed (Atypical Situation)?		Yes	x	No	Transect ID:
Is the area a potential Problem Area?:		Yes	x	No	Plot ID: W-1
(If needed, explain on reverse.)					

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	AGRSMI	H	FACU	9			
2	ELOPAL	H	OBL	10			
3	LEMMIN	H	OBL	11			
4	CHEsp	H		12			
5				13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 3/4= 75%

Most of emergent veg in horseshoe area to east.

HYDROLOGY

x Recorded Data (Describe in Remarks):
- Stream, Lake, or Tide Gauge
- x Aerial Photographs
- Other

No Recorded Data Available

Field Observations:

Depth of Surface Water: NA (in.)

Depth to Free Water in Pit: NA (in.)

Depth to Saturated Soil: 4" (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 Inches
- X Water Marks
- Drift Lines
- Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 Inches
- Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

SP in horseshoe area in EM veg community.

LAND & WATER

SOILS

Map Unit Name (Series and Phase): Bickerdyke Clay (87A)

Drainage Class: well

Field Observations

Taxonomy (Subgroup): Udorthentic Chromusterts

Confirm Mapped Type? X Yes ___ No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0 - 18	A	2.5Y4/2	5YR 4/6	10%	clay loam

Hydric Soil Indicators:

___	Histosol	___	Concretions
___	Histic Epipedon	___	High Organic Content in surface Layer in Sandy Soils
___	Sulfidic Odor	___	Organic Streaking in Sandy Soils
___	Aquic Moisture Regime	___	Listed on Local Hydric Soils List
___	Reducing Conditions	___	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	___	Other (Explain in Remarks)

Clayey soils, hydric soils; likely the same within the ponded.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	X	Yes		No	
Wetland Hydrology Present?	X	Yes		No	
Hydric Soils Present?	X	Yes		No	
Is this Sampling Point Within a Wetland?	X	Yes		No	

Remarks:

No wetland veg developing in ponded excavated portion.

Approved by HQUSACE 2/92

LAND & WATER

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Ridgeway Complex	Date: 7/1/03
Applicant/Owner: MDT	County: Carter
Investigator: Lynn Bacon, Land & Water Consulting	State: MT

Do Normal Circumstances exist on the site:	x	Yes		No	Community ID: Emergent
Is the site significantly disturbed (Atypical Situation)?		Yes	x	No	Transect ID:
Is the area a potential Problem Area?:		Yes	x	No	Plot ID: W-2
(If needed, explain on reverse.)					

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	ELEPAL	H	OBL	9			
2	ALIPLA	H	OBL	10			
3	SAGCUN	H	OBL	11			
4	ELEACI	H	OBL	12			
5	ALOAEQ	H	OBL	13			
6	AGRSMI	H	FACU	14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 6/6 = 100%

Open-water area completely surrounded by wetland veg community.

HYDROLOGY

x Recorded Data (Describe in Remarks):
- Stream, Lake, or Tide Gauge
- x Aerial Photographs
- Other

No Recorded Data Available

Field Observations:

Depth of Surface Water: NA (in.)

Depth to Free Water in Pit: NA (in.)

Depth to Saturated Soil: 0" (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 Inches
- X Water Marks
- Drift Lines
- Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 Inches
- Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Wetland inundated.

SOILS

Map Unit Name (Series and Phase): Bickerdyke Clay (87A)

Drainage Class: well

Taxonomy (Subgroup): Udorthentic Chromusterts

Field Observations

Confirm Mapped Type? X Yes ___ No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0 - 18	A	2.5Y4/2			clay loam
0-1			2.5YR4/8	100%	mottled layer under an organic layer
1-6			7.5YR 5/6	fine 5%	

Hydric Soil Indicators:

___	Histosol	___	Concretions
___	Histic Epipedon	___	High Organic Content in surface Layer in Sandy Soils
___	Sulfidic Odor	___	Organic Streaking in Sandy Soils
___	Aquic Moisture Regime	___	Listed on Local Hydric Soils List
___	Reducing Conditions	___	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	___	Other (Explain in Remarks)

Interesting soil profile, completely orange beneath an organic layer.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	X	Yes		No	
Wetland Hydrology Present?	X	Yes		No	
Hydric Soils Present?	X	Yes		No	
Is this Sampling Point Within a Wetland?	X	Yes		No	

Remarks:

Wetland developing.

Approved by HQUSACE 2/92

LAND & WATER

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Ridgeway Complex	Date: 7/1/03
Applicant/Owner: MDT	County: Carter
Investigator: Lynn Bacon, Land & Water Consulting	State: MT

Do Normal Circumstances exist on the site:	x	Yes		No	Community ID: Emergent
Is the site significantly disturbed (Atypical Situation)?		Yes	x	No	Transect ID:
Is the area a potential Problem Area?:		Yes	x	No	Plot ID: W-3
(If needed, explain on reverse.)					

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	ELEspp.	H	OBL	9			
2	RUMCRI	H	FACW	10			
3	LIMAQU	H	OBL	11			
4				12			
5				13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 3/3 = 100%

Wetland veg community inundated on day of investigation. Could see the veg beneath the water and likely edge of wetland 75% vegetated.

Sough grass also noted in wetland.

HYDROLOGY

x Recorded Data (Describe in Remarks):	Wetland Hydrology Indicators:
____ Stream, Lake, or Tide Gauge	Primary Indicators:
x Aerial Photographs	X Inundated
____ Other	X Saturated in Upper 12 Inches
____ No Recorded Data Available	X Water Marks
	____ Drift Lines
	____ Sediment Deposits
	X Drainage Patterns in Wetlands
Field Observations:	Secondary Indicators (2 or more required):
Depth of Surface Water: NA (in.)	X Oxidized Root Channels in Upper 12 Inches
Depth to Free Water in Pit: NA (in.)	____ Water-Stained Leaves
Depth to Saturated Soil: 0” (in.)	____ Local Soil Survey Data
	____ FAC-Neutral Test
	____ Other (Explain in Remarks)

Remarks:

Wetland inundated.

SOILS

Map Unit Name (Series and Phase): Bickerdyke Clay (87A)

Drainage Class: well

Taxonomy (Subgroup): Udorthentic Chromusterts

Field Observations

Confirm Mapped Type? X Yes ___ No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12	A	2.5Y 4/2	10YR 5/6	1% faint	silty clay loam

Hydric Soil Indicators:

___	Histosol	___	Concretions
___	Histic Epipedon	___	High Organic Content in surface Layer in Sandy Soils
___	Sulfidic Odor	___	Organic Streaking in Sandy Soils
___	Aquic Moisture Regime	___	Listed on Local Hydric Soils List
___	Reducing Conditions	___	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	___	Other (Explain in Remarks)

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	X	Yes	___	No	
Wetland Hydrology Present?	X	Yes	___	No	
Hydric Soils Present?	X	Yes	___	No	
Is this Sampling Point Within a Wetland?	X	Yes	___	No	

Remarks:

Wetland developing.

Approved by HQUSACE 2/92

LAND & WATER

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Ridgeway Complex	Date: 7/1/03
Applicant/Owner: MDT	County: Carter
Investigator: Lynn Bacon, Land & Water Consulting	State: MT

Do Normal Circumstances exist on the site:	x	Yes		No	Community ID: Emergent
Is the site significantly disturbed (Atypical Situation)?		Yes	x	No	Transect ID:
Is the area a potential Problem Area?:		Yes	x	No	Plot ID: W-4
(If needed, explain on reverse.)					

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	ELEPAL. (dominant)	H	OBL	9			
2	AGRSMI	H	FACU	10			
3	unk weedy spp.	H		11			
4				12			
5				13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 1/1=100%

Wetland veg community inundated on day of investigation. Could see the veg beneath the water and likely edge of wetland 100% vegetated.

HYDROLOGY

x Recorded Data (Describe in Remarks):
- Stream, Lake, or Tide Gauge
- x Aerial Photographs
- Other

No Recorded Data Available

Field Observations:

Depth of Surface Water: NA (in.)

Depth to Free Water in Pit: NA (in.)

Depth to Saturated Soil: 0” (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 Inches
- X Water Marks
- Drift Lines
- Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 Inches
- Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Wetland inundated.

LAND & WATER

SOILS

Map Unit Name (Series and Phase): Bickerdyke Clay (87A)

Drainage Class: well

Field Observations

Taxonomy (Subgroup): Udorthentic Chromusterts

Confirm Mapped Type? X Yes ___ No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12	A	2.5Y 4/2	2.5Y 5/6	5% faint	silty clay loam

Hydric Soil Indicators:

___	Histosol	___	Concretions
___	Histic Epipedon	___	High Organic Content in surface Layer in Sandy Soils
___	Sulfidic Odor	___	Organic Streaking in Sandy Soils
___	Aquic Moisture Regime	___	Listed on Local Hydric Soils List
___	Reducing Conditions	___	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	___	Other (Explain in Remarks)

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	X	Yes		No	
Wetland Hydrology Present?	X	Yes		No	
Hydric Soils Present?	X	Yes		No	
Is this Sampling Point Within a Wetland?	X	Yes		No	

Remarks:

Wetland developing.

Approved by HQUSACE 2/92

LAND & WATER

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Ridgeway Complex	Date: 7/1/03
Applicant/Owner: MDT	County: Carter
Investigator: Lynn Bacon, Land & Water Consulting	State: MT

Do Normal Circumstances exist on the site:	x	Yes		No	Community ID: Emergent
Is the site significantly disturbed (Atypical Situation)?		Yes	x	No	Transect ID:
Is the area a potential Problem Area?:		Yes	x	No	Plot ID: W-5
(If needed, explain on reverse.)					

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	ELEACI	H	OBL	9			
2	AGRSMI	H	FACU	10			
3	POAsp.	H		11			
4	ELEPAL	H	OBL	12			
5	ALIPLA	H	OBL	13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 3/5=60%

Wetland veg community inundated on day of investigation. Could see the veg beneath the water and likely edge of wetland 100% vegetated.

HYDROLOGY

x Recorded Data (Describe in Remarks):
- Stream, Lake, or Tide Gauge
- x Aerial Photographs
- Other

No Recorded Data Available

Field Observations:

Depth of Surface Water: NA (in.)

Depth to Free Water in Pit: NA (in.)

Depth to Saturated Soil: 8” (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 Inches
- X Water Marks
- Drift Lines
- Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 Inches
- Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Wetland inundated.

LAND & WATER

SOILS

Map Unit Name (Series and Phase): Bickerdyke Clay (87A)

Drainage Class: well

Field Observations

Taxonomy (Subgroup): Udorthentic Chromusterts

Confirm Mapped Type? X Yes ___ No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12	A	2.5Y 4/2	5Y 4/6	30% mod	silty clay loam

Hydric Soil Indicators:

___	Histosol	___	Concretions
___	Histic Epipedon	___	High Organic Content in surface Layer in Sandy Soils
___	Sulfidic Odor	___	Organic Streaking in Sandy Soils
___	Aquic Moisture Regime	___	Listed on Local Hydric Soils List
___	Reducing Conditions	___	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	___	Other (Explain in Remarks)

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	X	Yes		No	
Wetland Hydrology Present?	X	Yes		No	
Hydric Soils Present?	X	Yes		No	
Is this Sampling Point Within a Wetland?	X	Yes		No	

Remarks:

Wetland developing.

Approved by HQUSACE 2/92

LAND & WATER

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Ridgeway Complex	Date: 7/1/03
Applicant/Owner: MDT	County: Carter
Investigator: Lynn Bacon, Land & Water Consulting	State: MT

Do Normal Circumstances exist on the site:	x	Yes		No	Community ID: Emergent
Is the site significantly disturbed (Atypical Situation)?		Yes	x	No	Transect ID:
Is the area a potential Problem Area?:		Yes	x	No	Plot ID: W-6
(If needed, explain on reverse.)					

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	ELEACI	H	OBL	9			
2	RUMCRI	H	FACW	10			
3	HORJUB	H	FACW	11			
4	ELEPAL	H	OBL	12			
5	RANCYM	H	OBL	13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 5/5=100%

Pond area inundated on day of investigation. Emergent veg surrounds open water and has colonized appox. 40% of AA.

other spp.: Scirpus, Hordeum, Alisma? (just leaves beneath the surface of water)

HYDROLOGY

x Recorded Data (Describe in Remarks):
- Stream, Lake, or Tide Gauge
- x Aerial Photographs
- Other

No Recorded Data Available

Field Observations:

Depth of Surface Water: NA (in.)

Depth to Free Water in Pit: NA (in.)

Depth to Saturated Soil: 0” (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 Inches
- X Water Marks
- Drift Lines
- Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 Inches
- Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Wetland inundated.

LAND & WATER

SOILS

Map Unit Name (Series and Phase): Bickerdyke Clay (87A)

Drainage Class: well

Field Observations

Taxonomy (Subgroup): Udorthentic Chromusterts

Confirm Mapped Type? X Yes ___ No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12	A	10YR4/3	5YR 4/6	50% mod	silty clay loam
12”					organic streak

Hydric Soil Indicators:

___	Histosol	___	Concretions
___	Histic Epipedon	___	High Organic Content in surface Layer in Sandy Soils
___	Sulfidic Odor	___	Organic Streaking in Sandy Soils
___	Aquic Moisture Regime	___	Listed on Local Hydric Soils List
___	Reducing Conditions	___	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	___	Other (Explain in Remarks)

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	X	Yes		No	
Wetland Hydrology Present?	X	Yes		No	
Hydric Soils Present?	X	Yes		No	
Is this Sampling Point Within a Wetland?	X	Yes		No	

Remarks:

Wetland well developed, likely the most diverse within the complex.

Approved by HQUSACE 2/92

LAND & WATER

ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Ridgeway Complex	Date: 7/1/03
Applicant/Owner: MDT	County: Carter
Investigator: Lynn Bacon, Land & Water Consulting	State: MT
Do Normal Circumstances exist on the site: x Yes ___ No	Community ID: Emergent
Is the site significantly disturbed (Atypical Situation)? ___ Yes x No	Transect ID:
Is the area a potential Problem Area?: ___ Yes x No	Plot ID: W-7
(If needed, explain on reverse.)	

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	ELE sprigs	H	OBL	9			
2				10			
3				11			
4				12			
5				13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 1/1=100%

Excavated area almost dry, vegetation almost non-existent. Not 30% WL veg cover.

HYDROLOGY

x Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- x Aerial Photographs
- ___ Other

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: NA (in.)

Depth to Free Water in Pit: NA (in.)

Depth to Saturated Soil: 4” (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- X Saturated in Upper 12 Inches
- X Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:

Bottom of excavated area almost dry; one 25 sqft area w/ water (puddle).

SOILS

Map Unit Name (Series and Phase):	Bickerdyke Clay (87A)	Drainage Class:	well
Taxonomy (Subgroup):	Udorthentic Chromusterts	Field Observations Confirm Mapped Type?	X Yes ___ No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12	A	2.5YR3/2	2.5YR 4/8	30% fine	silty clay loam

Hydric Soil Indicators:

___	Histosol	___	Concretions
___	Histic Epipedon	___	High Organic Content in surface Layer in Sandy Soils
___	Sulfidic Odor	___	Organic Streaking in Sandy Soils
___	Aquic Moisture Regime	___	Listed on Local Hydric Soils List
___	Reducing Conditions	___	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	___	Other (Explain in Remarks)

WETLAND DETERMINATION

Hydrophytic Vegetation Present?		Yes	X	No	Is this Sampling Point Within a Wetland? Yes ___ X No
Wetland Hydrology Present?	X	Yes	___	No	
Hydric Soils Present?	X	Yes	___	No	

Remarks:

Poorly developed “Wetland”, very little water in W-7 while many of the created wetlands do have water. This area may require re-evaluation to increase stormwater collection.

Approved by HQUSACE 2/92

LAND & WATER

ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Ridgeway Complex	Date: 7/1/03
Applicant/Owner: MDT	County: Carter
Investigator: Lynn Bacon, Land & Water Consulting	State: MT
Do Normal Circumstances exist on the site: x Yes ___ No	Community ID: Emergent
Is the site significantly disturbed (Atypical Situation)? ___ Yes x No	Transect ID:
Is the area a potential Problem Area?: ___ Yes x No	Plot ID: W-8
(If needed, explain on reverse.)	

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	Alisma sprigs	H	OBL	9			
2	Typha sprigs	H	OBL	10			
3				11			
4				12			
5				13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 2/2=100%

Excavated area almost dry, vegetation almost non-existent. Not 30% WL veg cover.

HYDROLOGY

x Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- x Aerial Photographs
- ___ Other

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: NA (in.)

Depth to Free Water in Pit: NA (in.)

Depth to Saturated Soil: 8” (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- X Saturated in Upper 12 Inches
- X Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:

Bottom of excavated area almost dry; one area w/ water (puddle).

LAND & WATER

SOILS

Map Unit Name (Series and Phase): Bickerdyke Clay (87A)

Drainage Class: well

Field Observations

Taxonomy (Subgroup): Udorthentic Chromusterts

Confirm Mapped Type? X Yes ___ No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12	A	2.5Y 3/2			silty clay loam

Hydric Soil Indicators:

___	Histosol	___	Concretions
___	Histic Epipedon	___	High Organic Content in surface Layer in Sandy Soils
___	Sulfidic Odor	___	Organic Streaking in Sandy Soils
___	Aquic Moisture Regime	___	Listed on Local Hydric Soils List
___	Reducing Conditions	___	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	___	Other (Explain in Remarks)

WETLAND DETERMINATION

Hydrophytic Vegetation Present?		Yes	X	No	Is this Sampling Point Within a Wetland? Yes ___ X No
Wetland Hydrology Present?	X	Yes	___	No	
Hydric Soils Present?	X	Yes	___	No	

Remarks:

Poorly developed “Wetland”, very little water in W-8 while many of the created wetlands in the complex do have water. This area may require re-evaluation to increase stormwater collection.

Approved by HQUSACE 2/92

LAND & WATER

ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Ridgeway Complex	Date: 7/1/03
Applicant/Owner: MDT	County: Carter
Investigator: Lynn Bacon, Land & Water Consulting	State: MT
Do Normal Circumstances exist on the site: x Yes ___ No	Community ID: Emergent
Is the site significantly disturbed (Atypical Situation)? ___ Yes x No	Transect ID:
Is the area a potential Problem Area?: ___ Yes x No	Plot ID: W-10
(If needed, explain on reverse.)	

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	ELE? (no flowering)	H	OBL	9			
2				10			
3				11			
4				12			
5				13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 1/1=100%

Excavated area dry, vegetation almost non-existent.

HYDROLOGY

x Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:

Depth of Surface Water: NA (in.)

Depth to Free Water in Pit: NA (in.)

Depth to Saturated Soil: 0” (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
X Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks:

Bottom of excavated area dry.

SOILS

Map Unit Name (Series and Phase): Bickerdyke Clay (87A)

Drainage Class: well

Field Observations

Taxonomy (Subgroup): Udorthentic Chromusterts

Confirm Mapped Type? X Yes ___ No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12	A	2.5Y 4/3	10YR5/8	5% fine	silty clay loam
6+			"	40% coarse	

Hydric Soil Indicators:

___	Histosol	___	Concretions
___	Histic Epipedon	___	High Organic Content in surface Layer in Sandy Soils
___	Sulfidic Odor	___	Organic Streaking in Sandy Soils
___	Aquic Moisture Regime	___	Listed on Local Hydric Soils List
___	Reducing Conditions	___	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	___	Other (Explain in Remarks)

WETLAND DETERMINATION

Hydrophytic Vegetation Present?		Yes	X	No	
Wetland Hydrology Present?	X	Yes	___	No	
Hydric Soils Present?	X	Yes	___	No	
Is this Sampling Point Within a Wetland?	___	Yes	X	No	

Remarks:

Wetland has not developed; may need to re-evaluate design to increase stormwater collection.

Approved by HQUSACE 2/92

LAND & WATER

ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Ridgeway Complex	Date: 7/1/03
Applicant/Owner: MDT	County: Carter
Investigator: Lynn Bacon, Land & Water Consulting	State: MT
Do Normal Circumstances exist on the site: x Yes ___ No	Community ID: Emergent
Is the site significantly disturbed (Atypical Situation)? ___ Yes x No	Transect ID:
Is the area a potential Problem Area?: ___ Yes x No	Plot ID: W-11
(If needed, explain on reverse.)	

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	RUMCRI	H	FACW	9			
2	HORJUB	H	FACW	10			
3	LACSER	H	FACU	11			
4				12			
5				13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 2/3=60%

Excavated area dry, vegetation almost non-existent; <30% veg cover.

HYDROLOGY

x Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- x Aerial Photographs
- ___ Other

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: NA (in.)

Depth to Free Water in Pit: NA (in.)

Depth to Saturated Soil: NA (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- X Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:

Bottom of excavated area dry.

SOILS

Map Unit Name (Series and Phase): Marvan Silty Clay
Drainage Class: well
Taxonomy (Subgroup): _____
Field Observations
Confirm Mapped Type? _____ Yes X No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-18	A	10YR3/2			silty loam

Hydric Soil Indicators:

_____ Histosol
_____ Histic Epipedon
_____ Sulfidic Odor
_____ Aquic Moisture Regime
_____ Reducing Conditions
_____ Gleyed or Low-Chroma Colors
_____ Concretions
_____ High Organic Content in surface Layer in Sandy Soils
_____ Organic Streaking in Sandy Soils
_____ Listed on Local Hydric Soils List
_____ Listed on National Hydric Soils List
_____ Other (Explain in Remarks)

No mottles, but salt lines noted in profile.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? _____ Yes X No
Wetland Hydrology Present? X Yes _____ No
Hydric Soils Present? _____ Yes X No

Is this Sampling Point Within a Wetland? _____ Yes X No

Remarks:

Wetland has not developed; may need to re-evaluate design to increase stormwater collection.

Approved by HQUSACE 2/92

LAND & WATER

ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Ridgeway Complex	Date: 7/1/03
Applicant/Owner: MDT	County: Carter
Investigator: Lynn Bacon, Land & Water Consulting	State: MT
Do Normal Circumstances exist on the site: x Yes ___ No	Community ID: Emergent
Is the site significantly disturbed (Atypical Situation)? ___ Yes x No	Transect ID:
Is the area a potential Problem Area?: ___ Yes x No	Plot ID: W-12
(If needed, explain on reverse.)	

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	ELEPAL	H	OBL	9			
2				10			
3				11			
4				12			
5				13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 1/1=100%

Wetland vegetation noted in inlet area and on SW side. May have been vegetation under water that wasn't observed.

HYDROLOGY

x Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:

Depth of Surface Water: NA (in.)

Depth to Free Water in Pit: NA (in.)

Depth to Saturated Soil: 0" (in.)

Wetland Hydrology Indicators:
Primary Indicators:
X Inundated
___ Saturated in Upper 12 Inches
X Water Marks
___ Drift Lines
___ Sediment Deposits
X Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks:

Wetland inundated.

LAND & WATER

SOILS

Map Unit Name (Series and Phase): Vaeda silty clay loam
Taxonomy (Subgroup): _____
Drainage Class: _____
Field Observations
Confirm Mapped Type? X Yes ___ No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-18	A	2.5Y 4/1;4/2	10YR 5/8	10%, fine	silty clay loam

Hydric Soil Indicators:

___	Histosol	___	Concretions
___	Histic Epipedon	___	High Organic Content in surface Layer in Sandy Soils
___	Sulfidic Odor	___	Organic Streaking in Sandy Soils
___	Aquic Moisture Regime	___	Listed on Local Hydric Soils List
___	Reducing Conditions	___	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	___	Other (Explain in Remarks)

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	X	Yes		No	
Wetland Hydrology Present?	X	Yes		No	
Hydric Soils Present?	X	Yes		No	
Is this Sampling Point Within a Wetland?	X	Yes		No	

Remarks:

Wetland is developing.

Approved by HQUSACE 2/92

LAND & WATER

ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Ridgeway Complex	Date: 7/1/03
Applicant/Owner: MDT	County: Carter
Investigator: Lynn Bacon, Land & Water Consulting	State: MT
Do Normal Circumstances exist on the site: x Yes ___ No	Community ID: Emergent
Is the site significantly disturbed (Atypical Situation)? ___ Yes x No	Transect ID:
Is the area a potential Problem Area?: ___ Yes x No	Plot ID: W-13
(If needed, explain on reverse.)	

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	ELEPAL	H	OBL	9			
2	CHEsp	H	unk	10			
3	AGRSMI	H	FACU	11			
4	HORJUB	H	FACW	12			
5				13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 2/4=50%

Chenopdium sp. dominant in area of SP; WL veg persistent around OW.

HYDROLOGY

x Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- x Aerial Photographs
- ___ Other

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: NA (in.)

Depth to Free Water in Pit: NA (in.)

Depth to Saturated Soil: 6” (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 Inches
- X Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:

Wetland inundated.

SOILS

Map Unit Name (Series and Phase): Vaeda silty clay loam

Taxonomy (Subgroup):

Drainage Class:

Field Observations

Confirm Mapped Type? X Yes ___ No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-18	A	10YR4/6	10YR 4/6	5%, fine	silty clay loam

Hydric Soil Indicators:

___	Histosol	___	Concretions
___	Histic Epipedon	___	High Organic Content in surface Layer in Sandy Soils
___	Sulfidic Odor	___	Organic Streaking in Sandy Soils
___	Aquic Moisture Regime	___	Listed on Local Hydric Soils List
___	Reducing Conditions	___	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	___	Other (Explain in Remarks)

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	X	Yes		No	
Wetland Hydrology Present?	X	Yes		No	
Hydric Soils Present?	X	Yes		No	
Is this Sampling Point Within a Wetland?	X	Yes		No	

Remarks:

Wetland is developing.

Approved by HQUSACE 2/92

LAND & WATER

ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Ridgeway Complex	Date: 7/1/03
Applicant/Owner: MDT	County: Carter
Investigator: Lynn Bacon, Land & Water Consulting	State: MT
Do Normal Circumstances exist on the site: x Yes ___ No	Community ID: Emergent
Is the site significantly disturbed (Atypical Situation)? ___ Yes x No	Transect ID:
Is the area a potential Problem Area?: ___ Yes x No	Plot ID: W-14
(If needed, explain on reverse.)	

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	AGRSMI	H	FACU	9			
2	HORJUB	H	FACW	10			
3				11			
4				12			
5				13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 1/2=50%

Veg cover <30%.

HYDROLOGY

x Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- x Aerial Photographs
- ___ Other

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: NA (in.)

Depth to Free Water in Pit: NA (in.)

Depth to Saturated Soil: NA (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- X Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:

No surface water. Moist soil profile, no sat.

SOILS

Map Unit Name (Series and Phase): Vaeda silty clay loam
Taxonomy (Subgroup): _____
Drainage Class: _____
Field Observations
Confirm Mapped Type? _____ Yes X No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-2	A	2.5Y3/2			silt loam (moist)
2-3	B				shale chips, soft
3-16	C				yellow crumbly chips

Hydric Soil Indicators:

_____ Histosol	_____ Concretions
_____ Histic Epipedon	_____ High Organic Content in surface Layer in Sandy Soils
_____ Sulfidic Odor	_____ Organic Streaking in Sandy Soils
_____ Aquic Moisture Regime	_____ Listed on Local Hydric Soils List
_____ Reducing Conditions	_____ Listed on National Hydric Soils List
_____ Gleyed or Low-Chroma Colors	_____ Other (Explain in Remarks)

Strange soil profile, not seen anywhere else on site.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?		Yes	X	No	
Wetland Hydrology Present?	X	Yes		No	
Hydric Soils Present?		Yes	X	No	
Is this Sampling Point Within a Wetland?		Yes	X	No	

Remarks:

Wetland is not developing; area requires re-evaluation to improve stormwater collection.

Approved by HQUSACE 2/92

LAND & WATER

ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Ridgeway Complex	Date: 7/1/03
Applicant/Owner: MDT	County: Carter
Investigator: Lynn Bacon, Land & Water Consulting	State: MT

Do Normal Circumstances exist on the site:	x	Yes		No	Community ID: Emergent
Is the site significantly disturbed (Atypical Situation)?		Yes	x	No	Transect ID:
Is the area a potential Problem Area?:		Yes	x	No	Plot ID: W-15
(If needed, explain on reverse.)					

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	CHEsp.	H	unk	9			
2	HORJUB	H	FACW	10			
3				11			
4				12			
5				13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 1/2=50%

Veg cover <30%, very few "sprigs".

HYDROLOGY

x Recorded Data (Describe in Remarks):
- Stream, Lake, or Tide Gauge
- x Aerial Photographs
- Other

No Recorded Data Available

Field Observations:

Depth of Surface Water: NA (in.)

Depth to Free Water in Pit: NA (in.)

Depth to Saturated Soil: 6" (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- X Saturated in Upper 12 Inches
- X Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 Inches
- Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

No surface water.

SOILS

Map Unit Name (Series and Phase): Vaeda silty clay loam
Taxonomy (Subgroup): _____
Drainage Class: _____
Field Observations
Confirm Mapped Type? _____ Yes X No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12	A	2.5Y3/3,4/2,5/2			silt loam
12-16	B	2.5Y5/4			silt loam

Hydric Soil Indicators:

_____ Histosol
_____ Histic Epipedon
_____ Sulfidic Odor
_____ Aquic Moisture Regime
_____ Reducing Conditions
_____ Gleyed or Low-Chroma Colors
_____ Concretions
_____ High Organic Content in surface Layer in Sandy Soils
_____ Organic Streaking in Sandy Soils
_____ Listed on Local Hydric Soils List
_____ Listed on National Hydric Soils List
_____ Other (Explain in Remarks)

Not a hydric soil.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? _____ Yes X No
Wetland Hydrology Present? X Yes _____ No
Hydric Soils Present? _____ Yes X No

Is this Sampling Point Within a Wetland? _____ Yes X No

Remarks:

Wetland is not developing; area requires re-evaluation to improve stormwater collection.

Approved by HQUSACE 2/92

LAND & WATER

ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Ridgeway Complex	Date: 7/1/03
Applicant/Owner: MDT	County: Carter
Investigator: Lynn Bacon, Land & Water Consulting	State: MT
Do Normal Circumstances exist on the site: x Yes ___ No	Community ID: Emergent
Is the site significantly disturbed (Atypical Situation)? ___ Yes x No	Transect ID:
Is the area a potential Problem Area?: ___ Yes x No	Plot ID: W-16
(If needed, explain on reverse.)	

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1				9			
2				10			
3				11			
4				12			
5				13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 0

no vegetation

HYDROLOGY

x Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
x Aerial Photographs
___ Other
___ No Recorded Data Available

Field Observations:

Depth of Surface Water: NA (in.)

Depth to Free Water in Pit: NA (in.)

Depth to Saturated Soil: 3” (in.)

Wetland Hydrology Indicators:
Primary Indicators:
X Inundated
X Saturated in Upper 12 Inches
X Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks:

Surface water present, but may not have water often enough to promote wetland vegetation colonization.

SOILS

Map Unit Name (Series and Phase): Vaeda silty clay loam
Taxonomy (Subgroup): _____
Drainage Class: _____
Field Observations
Confirm Mapped Type? _____ Yes X No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0	A	2.5Y6/4,7/6			silt? (strange)
0-1	B	2.5Y4/2			silt loam
1-3	C	2.5YR5/8			silt loam
3-16	B2	2.5Y 6/4,7/6			silt loam

Hydric Soil Indicators:

_____ Histosol	_____ Concretions
_____ Histic Epipedon	_____ High Organic Content in surface Layer in Sandy Soils
_____ Sulfidic Odor	_____ Organic Streaking in Sandy Soils
_____ Aquic Moisture Regime	_____ Listed on Local Hydric Soils List
_____ Reducing Conditions	_____ Listed on National Hydric Soils List
_____ Gleyed or Low-Chroma Colors	_____ Other (Explain in Remarks)

Not a hydric soil.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?		Yes	X	No	
Wetland Hydrology Present?	X	Yes		No	
Hydric Soils Present?		Yes	X	No	
					Is this Sampling Point Within a Wetland? Yes _____ X No

Remarks:

Wetland is not developing; area requires re-evaluation to improve stormwater collection.

Approved by HQUSACE 2/92

LAND & WATER

W-1-8, 10-16
2002 PHOTOGRAPH LOG

Wetland #	Photo Location	Photograph Description	Compass Reading
1	D	wetland view	234
1	A	wetland view	162
2	A	panoramic wetland view	48
2	B	panoramic wetland view	20
2	C	panoramic wetland view	342
2	extra	vegetation development 2003	
3	A	wetland view	320
3	B	wetland view	58
4	B	wetland view	16
4	A	wetland view	230
5	A	wetland view	244
5	B	wetland view	50
6	A	wetland view	346
6	B	wetland view	258
7	F	wetland view	168
7	E	wetland view	54
8	A	wetland view	116
8	B	wetland view	160
10	F	wetland view	126
10	A	wetland view	0
11	D	wetland view	288
11	F	wetland view	100
12	A	wetland view	38
12	D	wetland view	270
13	D	wetland view	102
13	A	wetland view	0
14	E	wetland view	180
14	A	wetland view	326
15	E	wetland view	216
15	A	wetland view	38
16	C	wetland view	270
16	E	wetland view	90

WL#: 1 **Location:** D **Description:** Wetland view **Compass Reading:** 234°

WL#: 1 **Location:** A **Description:** Wetland view **Compass Reading:** 162°

WL#: 2 **Location:** A **Description:** Panoramic wetland view **Compass Reading:** 48°

WL#: 2 **Location:** B **Description:** Panoramic wetland view **Compass Reading:** 20°

WL#: 2 **Location:** C **Description:** Panoramic wetland view **Compass Reading:** 342°

WL#: 3 **Location:** A **Description:** Wetland view
Compass Reading: 320°

WL#: 3 **Location:** B **Description:** Wetland view
Compass Reading: 58°

WL#: 4 **Location:** A **Description:** Wetland view
Compass Reading: 16°

WL#: 4 **Location:** B **Description:** Wetland view
Compass Reading: 230°

WL#: 5 **Location:** A **Description:** Wetland view
Compass Reading: 244°

WL#: 5 **Location:** B **Description:** Wetland view
Compass Reading: 50°

WL#: 6 **Location:** A **Description:** Wetland view **Compass Reading:** 288°

WL#: 6 **Location:** B **Description:** Wetland view, buffer in foreground **Compass Reading:** 28°

WL#: 7 **Location:** F **Description:** Wetland view **Compass Reading:** 168°

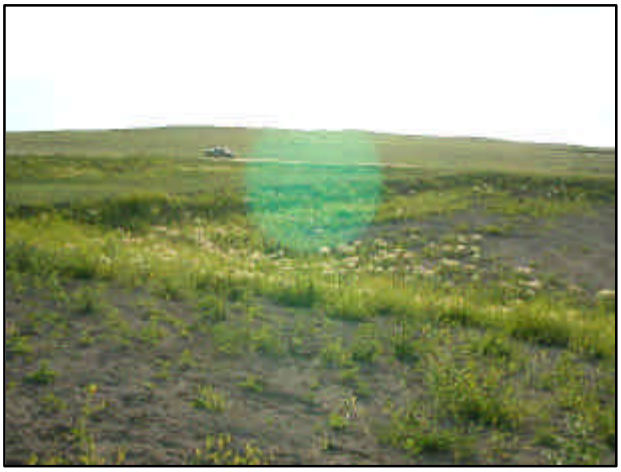
WL#: 7 **Location:** E **Description:** Wetland view **Compass Reading:** 54°

WL#: 8 **Location:** A **Description:** Wetland view **Compass Reading:** 116°

WL#: 8 **Location:** B **Description:** Wetland view, buffer in foreground **Compass Reading:** 160°

WL#: 10 **Location**: A **Description:** Wetland view
Compass Reading: 0°

WL#: 10 **Location**: F **Description:** Wetland view
Compass Reading: 126°



WL#: 11 **Location**: D **Description:** Wetland view
Compass Reading: 288°

WL#: 11 **Location**: F **Description:** Wetland view
Compass Reading: 100°

WL#: 12 **Location**: A **Description:** Wetland view
Compass Reading: 38°

WL#: 12 **Location**: D **Description:** Wetland view
Compass Reading: 270°

WL#: 13 **Location**: A **Description:** Wetland view
Compass Reading: 1200°

WL#: 13 **Location**: D **Description:** Wetland view
Compass Reading: 0°

WL#: 14 **Location**: A **Description:** Wetland view
Compass Reading: 326°

WL#: 14 **Location**: E **Description:** Wetland view
Compass Reading: 180°

WL#: 15 **Location**: A **Description:** Wetland view
Compass Reading: 38°

WL#: 15 **Location**: E **Description:** Wetland view
Compass Reading: 216°

WL#: 16 **Location**: C **Description:** Wetland view
Compass Reading: 270°

WL#: 16 **Location**: E **Description:** Wetland view
Compass Reading: 90°

Appendix I

ALL WETLANDS:
FIGURE 4: DOQ WETLAND LOCATIONS
2003 AERIAL PHOTOGRAPHS: ALL WETLAND SITES

MDT Wetland Mitigation Monitoring
Ridgeway Wetland
Ekalaka, Montana

LAND & WATER

PROJECT NAME
MDT MITIGATION MONITORING

DRAWING TITLE
RIDGEWAY COMPLEX WETLAND LOCATIONS

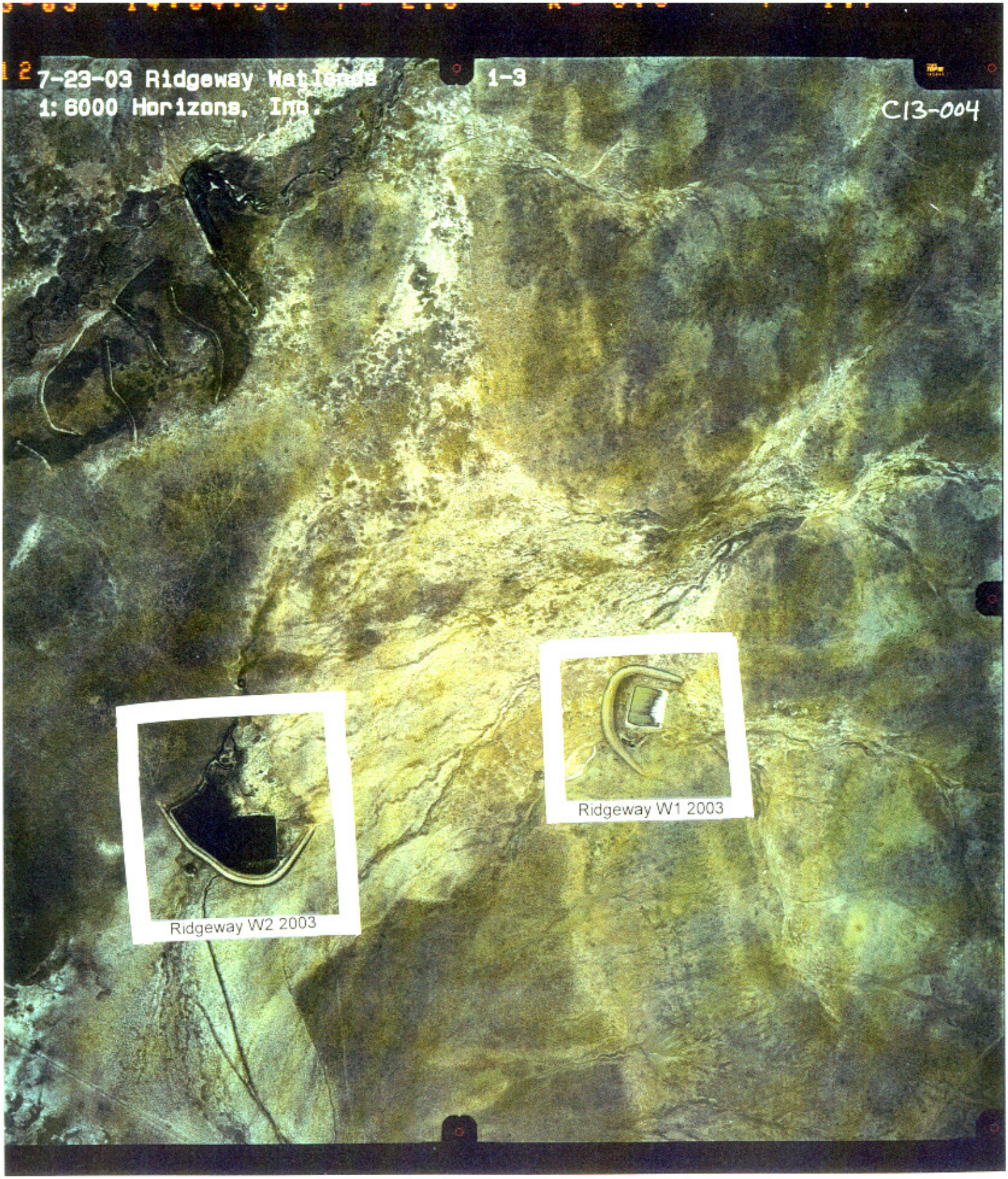
PROJ NO: 130091
FILE NAME: maps.dwg
SCALE: NOTED
LOCATION: Ekalaka, MT

DRAWN: SD
CHECKED: LB
APPVD: LB
PROJ MGR: LB

LAND & WATER CONSULTING, INC.
P.O. BOX 1132
Bozeman, MT 59771

SHEET NUMBER
1

REV -
DATE: 12/15/03


7-23-03 Ridgeway Wetlands
1:6000 Horizons, Inc.
1-3
C13-004
Ridgeway W2 2003
Ridgeway W1 2003


7-23-03 Ridgeway Wetlands
1:6000 Horizons, Inc.
1-3
C13-007
Ridgeway W3 2003


7-23-03 Ridgeway Wetlands
4-10
C13-013
Ridgeway W4 2003
Ridgeway W5 2003
Ridgeway W6 2003


-03 14:10:41 P=-1.9 R=3.3 Y=1.3
2 7-23-03 Ridgeway Wetlands 4-10
1:6000 Horizons, Inc.
C13-014
Ridgeway W6 2003
Ridgeway W7 2003
Ridgeway W8 2003
Ridgeway W9 2003

-03 14:10:55 P=-3.1 R=2.1 Y=-1.3

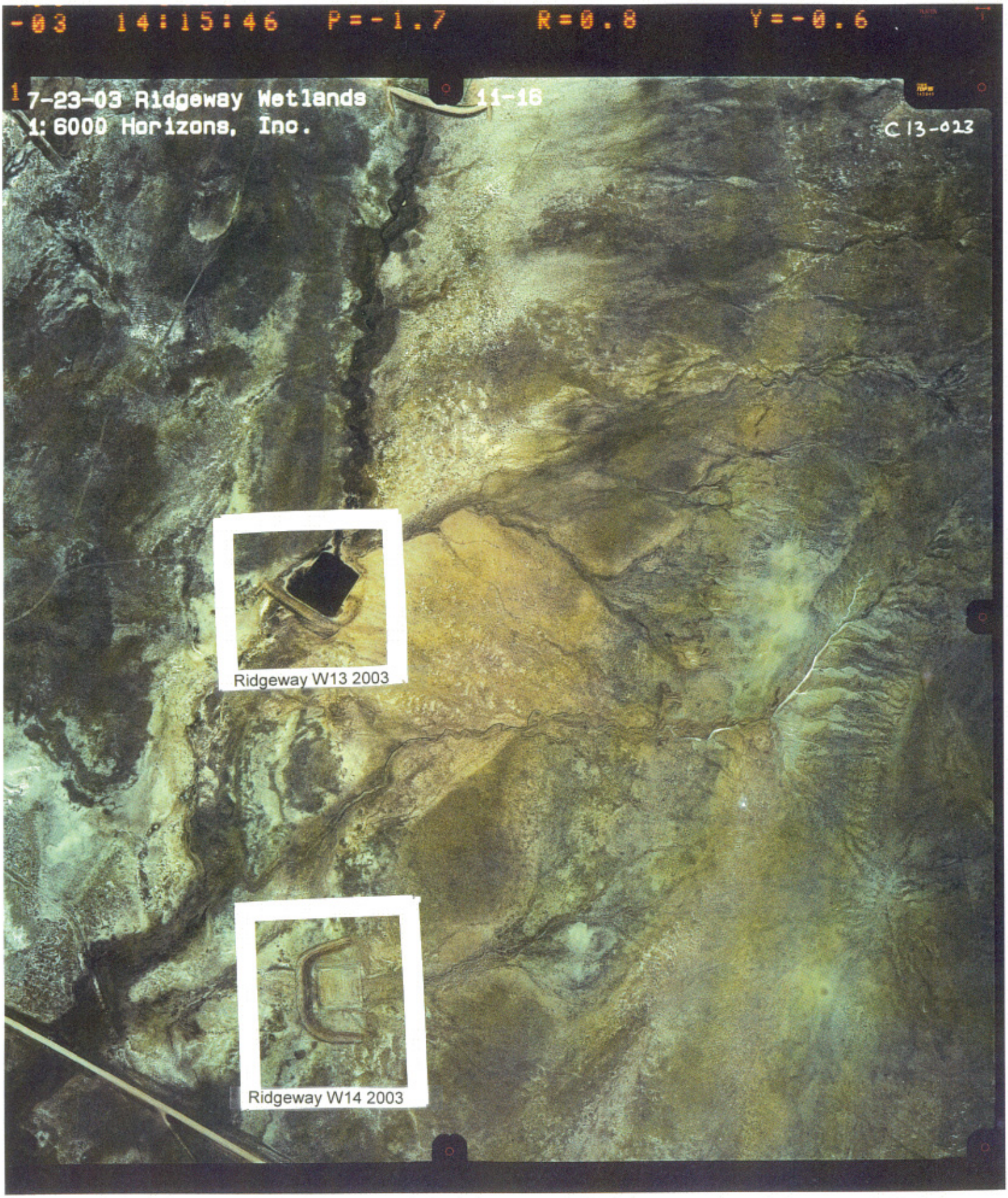
4 7-23-03 Ridgeway Wetlands 4-10
1: 6000 Horizons, Inc.

C13-016

Ridgeway W9 2003

Ridgeway W10 2003


-03 14:15:33 P=-1.7 R=0.6 Y=1.3
9
7-23-03 Ridgeway Wetlands 11-16
1:6000 Horizons, Inc.
C 13-021
Ridgeway W11 2003
Ridgeway W12 2003


-03 14:15:46 P=-1.7 R=0.8 Y=-0.6
1 7-23-03 Ridgeway Wetlands 11-16
1:6000 Horizons, Inc.
C13-023
Ridgeway W13 2003
Ridgeway W14 2003


-03 14:15:59 P=-2.6 R=0.9 Y=-0.6
7-23-03 Ridgeway Wetlands 11-16
1:8000 Horizons, Inc.
C 13-025
Ridgeway W16 2003
Ridgeway W15 2003