MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT

ROSTAD RANCH MITIGATION SITE
MEAGHER COUNTY, MONTANA

PROJECT COMPLETED: 2012

MONITORING REPORT #6: DECEMBER 2018



Prepared for:

VISION ZERO
zero deaths · zero serious injuries
MONTANA DEPARTMENT OF TRANSPORTATION

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MONTANA DEPARTMENT OF TRANSPORTATION WETLAND MITIGATION MONITORING REPORT: YEAR 2018

ROSTAD RANCH MITIGATION SITE MEAGHER COUNTY, MONTANA

MDT Project Number STPX-0002 (749)
Control Number 5565

USACE: NWO-2006-90851-MTB

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December 2018

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1.0 INTRODUCTION

The Rostad Ranch 2018 Wetland Mitigation Monitoring Report presents the results of the sixth year of post-construction monitoring at the Rostad Ranch wetland mitigation site. The Montana Department of Transportation (MDT) Rostad Ranch project is located in the southwestern quarter of Section 12 and the northwestern quarter of Section 13, Township 8 North, Range 11 East, Meagher County, Montana. The property is located approximately 0.6 mile northeast of Martinsdale, Montana, as illustrated in Figure 1-1. The site was constructed to provide MDT with an estimated 39.70 acres of wetland mitigation credits on a private ranch that had been historically used for grazing cattle and hay production.

The entire 60-acre mitigation site is protected long-term by an MDT wetland conservation easement agreement with the landowner. A fence that was installed along the boundaries of the wetland conservation easement demarcates the site.

Figures A-2 and A-3 (Appendix A) of this report show the site monitoring activity locations and mapped site features, respectively, and Figure A-4 (Appendix A) shows the 2018 wetland delineation boundaries compared to the pre-project wetland boundaries. The MDT Mitigation Site Monitoring form, US Army Corps of Engineers (USACE) Wetland Determination Data forms for the Great Plains (GP) Region [USACE, 2010], and the 2008 MDT Montana Wetland Assessment Method (MWAM) forms [Berglund and McEldowney, 2008] are included in Appendix B. Project site photographs are included in Appendix C, and the Preliminary Design Plan and Profile and 2017 Record Drawings for additional construction at the site are provided in Appendix D.

The Rostad Ranch site is located within Watershed #10 – Musselshell River Basin. Wetlands were developed at this location to provide compensatory mitigation for wetland impacts associated with future transportation projects in the Musselshell River Basin. The Rostad Ranch site was selected based on site evaluations and project feasibility assessments initiated by MDT in 2002.

The project objectives include the following:

- Provide 39.70 acres of wetland mitigation credits that result from restoration, creation, rehabilitation, and preservation within the site.
- Establish three types of wetland vegetation communities, including:
    1. Palustrine emergent wet meadow
    2. Palustrine scrub/shrub
    3. Emergent zones around the open-water areas
    4. Upland buffer established around the wetland perimeter.

The project credit ratios as presented in the *Rostad Ranch Wetland Mitigation Plan, Meagher County, Montana* [MDT, 2007], which was approved by the USACE, are shown in Table 1-1.

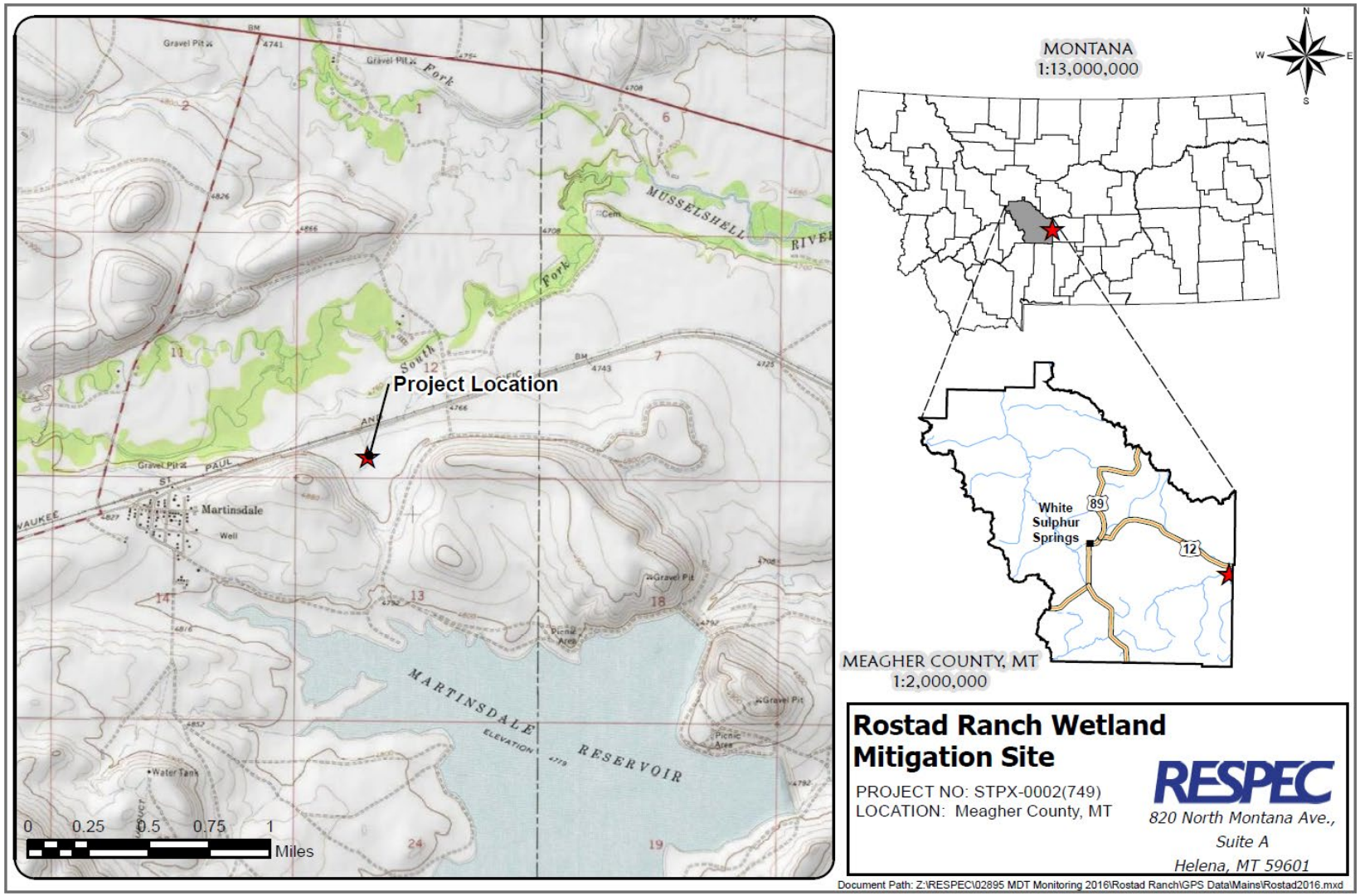


Figure 1-1. Project Location of the Rostad Ranch Site.

Table 1-1. Wetland Credit Determination for the Rostad Ranch Site

Compensatory Mitigation Type	Proposed Wetland Type[(a)]	Anticipated Mitigation Area (acres)	Approved Mitigation Ratios[(b)]	Anticipated Mitigation Credit (acres)
Restoration (Reestablishment)	Palustrine emergent and scrub/shrub	27.11	1:1	27.11
Creation (Establishment)	Palustrine emergent and scrub/shrub	9.84	1:1	9.84
Restoration (Rehabilitation)	Palustrine emergent	2.63	1.5:1	1.75
Preservation	Palustrine, scrub/shrub	0.25	4:1	0.06
Upland Buffer	N/A	6.76	5:1	1.35
Permanent Wetland Impact	N/A	N/A	1:1	–0.41
Totals	**Site Acreage**	**46.59**	**Credit Acreage**	**39.70**

(a) Cowardin et al. [1979].

(b) Mitigation credit ratios used were from the Montana Corps Regulatory Programs 2005 Wetland Credit Ratios [USACE, 2005].

The USACE-approved performance standards are listed below.

1. **Wetland Characteristics:** All of the restored, created, enhanced, and preserved wetlands within the project limits will meet the three parameter criteria for hydrology, vegetation, and soils established for determining wetland areas as outlined in the 1987 *Corps of Engineers Wetland Delineation Manual* (1987 Wetland Manual) [Environmental Laboratory, 1987] and the 2010 *Regional Supplement to the Corps of Engineers Manual: Great Plains Region (Version 2.0)* (2010 GP Regional Supplement) [USACE, 2010]. These methodologies were used to establish baseline wetland conditions on site.

    a. **Wetland Hydrology Success** will be achieved where wetland hydrology is observed according to technical guidelines in the above-referenced documents. The USACE technical standard for monitoring wetland hydrology requires 14 or more consecutive days of flooding or ponding, or a water table that is 12 inches (30 centimeters) or less below the soils surface during the growing season at a minimum frequency of 5 years in 10 (50 percent or higher probability).

    b. **Hydric Soil Success** will be achieved where hydric soil conditions are present (per the most recent Natural Resource Conservation Service [NRCS] definitions for hydric soil) or appear to be forming, the soil is sufficiently stable to prevent erosion, and the soil is able to support plant cover. Soil sampling will be conducted during the course of the monitoring period to determine if wetland areas are exhibiting characteristics of hydric soils per the 1987 Wetland Manual. Because typical hydric soil indicators may require long periods to form, a lack of distinctive hydric soil features will not be considered a failure if hydrologic and vegetation success is achieved.

    c. **Hydrophytic Vegetation Success** will be achieved where combined absolute cover of facultative or wetter species is greater than or equal to 70 percent and state-listed noxious

weeds do not exceed 5 percent absolute cover. The following concept of "dominance," as defined in the 2010 GP Regional Supplement, will be applied during future routine wetland determinations in the created/restored wetlands: "*Subjectively determine the dominant species by estimating those having the largest relative basal area (woody overstory), greatest height (woody understory), greatest percentage of aerial cover (herbaceous understory), and/or greatest number of stems (woody vines).*"

i. **Woody Plants –** Plantings will be considered successful where they exceed 50 percent survival after 5 years. MDT anticipates that natural colonization of woody plant species from nearby sources after construction activities are complete. The rate and extent of natural woody plant colonization will depend on factors such as habitat availability, animal activity, seed sources, and other natural selection factors.

ii. **Herbaceous Plants –** At the conclusion of the monitoring period, ocular coverage of desirable hydrophytic vegetation (wetland plants listed as OBL, FACW, and FAC) will be at least 80 percent. A wetland seed mix was prepared for this site that included tufted hair grass (*Deschampsia caespitosa*), Northwest Territory sedge (*Carex utriculata*), Baltic rush (*Juncus balticus*), American slough grass (*Beckmannia syzigachne*), American mannagrass (*Glyceria grandis*), and bluejoint reed grass (*Calamagrostis canadensis*).

2. **Open-Water Areas:** The intent of the project is to provide seasonal open water in the wetland enhancement areas where excavation in the existing wetland and upland will be completed. Open water that is established within the designated open-water areas will be considered successful and creditable if it does not exceed 10 percent of the total wetland acreage (39.83 acres).
3. **Upland Buffer:** Success will be achieved when noxious weeds do not exceed 5 percent of cover within the buffer areas on site. Any area within the creditable buffer zone disturbed by project construction must have at least 50 percent aerial cover of desirable upland plant species by the end of the monitoring period.
4. **Weed Control:** Implementation of weed control will be based on annual monitoring of the site to determine the weed species present and degree of infestation within the site. Based on the monitoring results, control measures will be implemented by MDT to reduce and eventually minimize infestations of state-listed noxious weed species within the site.
5. **Fencing:** Fencing for the proposed mitigation site has been installed along the perimeter of the easement boundary to protect the integrity of the wetland from disturbance that may be detrimental to the site. The installed fencing is designed to be wildlife-friendly to allow for wildlife movement into and out of the site.

Initial construction entailed filling of existing ditches, excavating and grading the site to distribute water across the site, and creating open-water areas. The primary source of wetland hydrology for the site is groundwater. A groundwater seep located in the south portion of the site provides water to the site during high groundwater periods. Surface water from an irrigation ditch that runs along the southern boundary of the site augments the site hydrology. A diversion structure was installed at the southern end of the project to direct irrigation water onto the site to recharge groundwater.

Revegetation tasks included using a combination of wetland seed mixes, native tree/shrub plantings, and willow cuttings that were collected from a variety of native species found in the area. Mitigation habitat types that were developed on the site through the construction process include restored open water; created, restored, and enhanced wetland areas; and upland buffer areas. Specific revegetation tasks were developed for each habitat type.

Post-construction monitoring at this site between 2013 and 2016 revealed that less than half of the anticipated mitigation credits had developed at the site with no encouraging signs that more wetland would develop without modifications to the site. During the spring of 2017, adaptive management efforts were initiated through a series of small berms and supply ditches constructed at the site to help spread irrigation water across a broader area than had been previously flooded. The Record Drawings for this work are included in Appendix D. 2018 represents the second year of monitoring since site improvements were completed.

Monitoring the site will be completed according to MDT's *Standard Monitoring Protocol*, which has been used for all of the MDT wetland mitigation sites since 1998. Monitoring will be implemented for a minimum of 5 years or longer as determined by the USACE Montana Regulatory Office's review of the annual monitoring reports for the site. The USACE will make the final decision as to whether the site has met wetland success criteria.

2.0 METHODS

The first year of monitoring at the Rostad Ranch site was completed on August 21, 2013. During this visit, MDT established permanent photo points and vegetation transects within the site. During the 2017 monitoring event, one additional vegetation transect and three new photo points were established to help document future wetland development at the site as a result of 2017 site modifications. One additional set of matched data points was established at the site in 2018 to document wetland development. The 2018 monitoring event was completed on July 9, 2018. Information for the Wetland Mitigation Site Monitoring form and Wetland Determination Data forms was recorded in the field during the site investigation (Appendix B). Monitoring activity sites were located with a global positioning system (GPS) and are illustrated on Figure A-2 (Appendix A). Data-collection activities included a wetland delineation, vegetation community mapping, vegetation transect monitoring, soil and hydrology data collection, bird- and wildlife-use documentation, photographic documentation, functional assessment, and a non-engineering examination of the infrastructure established within the mitigation project area. Monitoring methods have remained relatively consistent at this site since the onset of monitoring. The 2013 Rostad Ranch monitoring report [Confluence Consulting, Inc., 2013] provides a detailed description of monitoring methods at this site. The 2013 monitoring report for this MDT mitigation site can be found online (*https://www.mdt.mt.gov/other/webdata/external/planning/wetlands/2013_REPORTS/ROSTAD_RANCH_2013_FINAL.PDF*).

3.0 RESULTS

3.1 HYDROLOGY

Climate data from the meteorological station at the Lennep 5 WSW (244954) weather station [Western Regional Climate Center, 2018], which is located approximately 11 miles southwest of the site, recorded an average annual precipitation rate of 17.13 inches from 1959 to 2017. Annual precipitation in recent years was 16.8 inches (2013), 17.2 inches (2014),17.1 inches (2015), 17.6 inches (2016), and 17.1 inches in 2017. These data indicate that near-average precipitation has been recorded at the site in each of the last 5 years. Precipitation in 2018 from January through August totaled 18.55 inches at the Lennep 5 WSW (244954) meteorological station. This 8-month total is approximately 6.01 inches above the long-term 8-month average (12.54 inches), which was recorded at the Lennep 5 WSW meteorological station.

The hydrology for the site is supplied from multiple sources, including a shallow seasonal groundwater table, groundwater that emerges from a natural spring located near the narrow-leaf willow (*Salix exigua*) stand in the south portion of the site, direct precipitation, surface runoff, and surface-water diversion out of an adjacent irrigation canal. Construction included excavating and grading to fill drainage ditches, distributing water across the site, creating open-water areas, and installing a diversion structure in the southern end of the site to direct irrigation water to the site. MDT has secured water rights to use surface water as a secondary source of hydrology to supplement the groundwater and ensure long-term viability of the site. The irrigation canal originates west of Martinsdale and is supplied by flows from the South Fork Musselshell River.

During the 2018 field survey, approximately 85 percent of the wetland area was inundated, including one wetland depression that was impounded by a constructed dike in the northern half of the site and two excavated depressions located in the southern half of the site. MDT turned the irrigation water into the Rostad site on June 8 and utilized the entire allocation of 105.5 acre-feet, the same amount that was utilized in 2017.

Adaptive management activities in the spring of 2017 created areas of open water towards the middle of the site and helped distribute water to other areas of the mitigation site. Some upland areas contained standing water during both the July 10, 2017, and July 9, 2018, site visits and have the potential to develop into wetlands, assuming that this inundation is repeated annually and for long enough during the growing season to create anaerobic soil conditions. Overall, inundation increased from approximately 15 acres in 2016 to more than 25 acres across the site in 2017 and nearly 29 acres in 2018. Overall, precipitation levels were well above average in 2018, which likely aided the overall increased inundation across the site.

Water depths ranged from 0.25 to 3.0 feet across the site and averaged 1.0 foot. Water depth at the edge of the open-water boundary was 0.5 foot in the lower cell where water depths reach close to 3 feet. Areas that were not inundated across the site exhibited seasonal soil saturation to the ground surface. Evidence of wetland hydrology that was observed on the site in 2018 included drainage patterns, soil saturation, a high water table, oxidized rhizospheres, geomorphic position, water marks, drift deposits, and a positive FAC-neutral test.

Six data points (three matched pairs) were sampled to determine the upland and wetland boundaries across the site (Wetland Determination Data forms, Appendix B). DP-1W, which was located along the western border of the site, has been in place since monitoring began in 2013. Soils at DP-1W were moist to the surface at the time of the survey but not saturated. This location is likely saturated early in the growing season. DP-2W was relocated in 2018 to the eastern part of the site along Transect T-1. Soils were saturated at this data point at a depth of 10 inches. DP-3W is a new data point that was established in 2018 near the end of Transect T-2. Approximately 2 inches of surface water was noted at DP-3w during the field survey. No primary or secondary indicators of wetland hydrology were observed at DP-1U,DP-2U, or DP-3U, which are located upslope of the wetland data points in upland community Type 8.

3.2 VEGETATION

A total of 70 plant species were identified on the site from 2013 through 2018, as provided in Table 3-1. One new species, stalk-grain sedge (*carex stipata*), an obligate wetland species, was identified on the site in 2018 and is bolded in Table 3-1. Vegetation plant communities were identified by plant composition and dominance. The following vegetation community types were identified in 2018:

- Upland Type 8 – *Bromus inermis/Trifolium* spp.
- Upland Type 11 – Elymus trachycaulus/*Pascopyrum smithii*
- Wetland Type 2 – *Juncus balticus/Carex nebrascensis*
- Wetland Type 3 – *Salix exigua*
- Wetland Type 5 – *Glyceria grandis/Typha latifolia*
- Wetland Type 6 – Open Water/Aquatic Macrophytes
- Wetland Type 7 – *Phalaris arundinacea*
- Wetland Type 10 – *Alopecurus pratensis.*

The community composition for each community type is provided in full detail on the Wetland Mitigation Site Monitoring form (Appendix B), and the community boundaries are shown on Figure A-3 (Appendix A). These community types are discussed below.

Upland community Type 8 – *Bromus inermis/Trifolium* spp. was identified on approximately 28.04 acres across the site. This community was previously identified as Type 1 – *Phleum pratense*/*Trifolium* spp. from 2013 through 2015. The community generally represented undisturbed uplands that were historically used for hay and cattle production and areas where spoils from excavation activities were deposited. A total of 42 species were identified within the community. Dominant species included smooth brome (*Bromus inermis*) and white clover (*Trifolium repens*), with lesser percent coverage of creeping wild rye (*Elymus repens*), meadow false rye grass (*Schedonorus pratensis*), spotted knapweed (*Centaurea stoebe*), red clover (*Trifolium pratense*), and yellow sweet clover (*Melilotus officinalis*).

Table 3-1. Vegetation Species Observed From 2013 Through 2018 at the Rostad Ranch Site (Page 1 of 2)

Scientific Names	Common Names	GP Indicator Status[(a)]
Achillea millefolium	Common Yarrow	FACU
Agropyron cristatum	Crested Wheatgrass	UPL
Agrostis gigantea	Black Bentgrass	FACW
Algae, green	Algae, green	NL
Alopecurus arundinaceus	Creeping-Meadow Foxtail	FACW
Alopecurus pratensis	Field Meadow Foxtail	FACW
Amaranthus retroflexus	Red-Root	FACU
Ambrosia acanthicarpa	Flat-Spine Ragweed	UPL
Aster sp.	Aster	UPL
Bassia scoparia	Mexican-Fireweed	FACU
Beckmannia syzigachne	American Slough Grass	OBL
Berteroa incana	Hoary False-Alyssum	UPL
Bromus arvensis	Field Brome	FACU
Bromus carinatus	California Brome	UPL
Bromus inermis	Smooth Brome	UPL
Carex nebrascensis	Nebraska Sedge	OBL
Carex stipata	**Stalk-Grain Sedge**	**OBL**
Carex utriculata	Northwest Territory Sedge	OBL
Centaurea stoebe	Spotted Knapweed	UPL
Chenopodium album	Lamb's-Quarters	FACU
Chenopodium sp.	Goosefoot	UPL
Cirsium arvense	Canada Thistle	FACU
Convolvulus arvensis	Field Bindweed	UPL
Cynoglossum officinale	Gypsy-Flower	FACU
Cyrtorhyncha cymbalaria	Alkali Buttercup	OBL
Deschampsia caespitosa	Tufted Hair Grass	FACW
Descurainia sophia	Herb Sophia	UPL
Downingia laeta	Great Basin Calico Flower	OBL
Eleocharis palustris	Common Spike-Rush	OBL
Elymus repens	Creeping Wild Rye	FACU
Elymus trachycaulus	Slender Wild Rye	FACU
Epilobium ciliatum	Fringed Willowherb	FACW
Glyceria grandis	American Mannagrass	OBL
Glycyrrhiza lepidota	American Licorice	FACU
Helianthus annuus	Common Sunflower	FACU
Hordeum jubatum	Foxtail Barley	FACW
Juncus articulatus	Joint-Leaf Rush	OBL

Table 3-1. Vegetation Species Observed From 2013 Through 2018 at the Rostad Ranch Site (Page 2 of 2)

Scientific Names	Common Names	GP Indicator Status[(a)]
Juncus balticus	Baltic Rush	FACW
Juncus bufonius	Toad Rush	OBL
Lactuca serriola	Prickly Lettuce	FAC
Lepidium densiflorum	Miner's Pepperwort	FAC
Medicago sativa	Alfalfa	UPL
Melilotus albus	White Sweet Clover	UPL
Melilotus officinalis	Yellow Sweet Clover	FACU
Mentha arvensis	American Wild Mint	FACW
Pascopyrum smithii	Western Wheatgrass	FACU
Phalaris arundinacea	Reed Canary Grass	FACW
Phleum pratense	Common Timothy	FACU
Poa palustris	Fowl Bluegrass	FACW
Poa pratensis	Kentucky Bluegrass	FACU
Polypogon monspeliensis	Annual Rabbit's-Foot Grass	FACW
Populus angustifolia	Narrow-Leaf Cottonwood	FACW
Populus balsamifera	Balsam Poplar	FACW
Populus tremuloides	Quaking Aspen	FAC
Potentilla gracilis	Graceful Cinquefoil	FAC
Rumex crispus	Curly Dock	FAC
Rumex occidentalis	Western Dock	OBL
Salix exigua	Narrow-Leaf Willow	FACW
Schedonorus pratensis	Meadow False Rye Grass	FACU
Sinapis arvensis	Wild Mustard	UPL
Sonchus arvensis	Field Sow-Thistle	FAC
Tanacetum vulgare	Common Tansy	FACU
Taraxacum officinale	Common Dandelion	FACU
Thlaspi arvense	Field Pennycress	FACU
Tragopogon dubius	Meadow Goat's-Beard	UPL
Trifolium arvense	Rabbit-foot Clover	UPL
Trifolium pratense	Red Clover	FACU
Trifolium repens	White Clover	FACU
Typha latifolia	Broad-Leaf Cattail	OBL
Veronica peregrina	Neckweed	FACW

(a) 2016 NWPL [Lichvar et al., 2016].
New species that were identified in 2018 are bolded.

Upland Community Type 11 – *Elymus trachycaulus/Pascopyrum smithii* was identified on approximately 2.77 acres across the site. This community represents excavated and bermed areas across the site that were constructed and seeded in the spring of 2017. Common plant species associated with Type 11 include goosefoot (*Chenopodium sp.*), slender wild rye (*Elymus trachycaulus*), and western wheatgrass (*Pascopyrum smithii*).

Wetland Community Type 2 – *Juncus balticus/Carex nebrascensis* characterized a majority of the wetland areas delineated from 2013 through 2018. The community was mapped across 8.13 acres within the creation, reestablishment, and rehabilitation areas of the site. A total of 35 species were identified within the community. Baltic rush (*Juncus balticus*), Nebraska sedge (*Carex nebrascensis*), and American slough grass (*Beckmannia syzigachne*) were dominant components of this community. Other species included foxtail barley (*Hordeum jubatum*), tufted hair grass (*Deschampsia caespitosa*), reed canary grass (*Phalaris arundinacea*), common spike-rush (*Eleocharis palustris*), and narrow-leaf willow (*Salix exigua*).

Wetland Community Type 3 – *Salix exigua* was identified within the 0.42-acre preexisting wetland area in the southern end of the site that remained undisturbed during 2012 construction. Narrow-leaf willow dominated the area. Many willow cuttings were installed around this community, which exhibited an approximate 50 percent survival during the 2018 field survey. This community is expected to expand over time, as indicated by the willow saplings/cuttings noted around the margins of the community. Fowl bluegrass (*Poa palustris*), tufted hair grass, Nebraska sedge, Northwest Territory sedge (*Carex utriculata*), field meadow foxtail (*Alopecurus pratensis*), American slough grass (*Beckmannia syzigachne*), black bentgrass (*Agrostis gigantea*), broad-leaf cattail (*Typha latifolia*), common spike-rush, and neckweed (*Veronica peregrina*) were also identified within the community.

Wetland Community Type 5 – *Glyceria grandis/Typha latifolia* was observed around the margins of inundated cells located in the south and north half of the site. The 3.51-acre community was dominated by emergent species, including American mannagrass (*Glyceria grandis*), broad-leaf cattail, common spike-rush, and American slough grass.

Wetland Community Type 6 – Open Water/Aquatic Macrophytes was identified on 3.03 acres and included three inundated areas: one was impounded by a constructed dike in the northern half of the site, and the other two associated with excavated depressions located in the middle of the site. Emergent and submergent species are expected to continue to establish in subsequent monitoring years. Twelve species were observed within the community, including common spike-rush, broad-leaf cattail, American slough grass, and American mannagrass. A trace amount of green algae (a protist) was present in the open water.

Wetland Community Type 7 – *Phalaris arundinacea* was identified on 11.66 acres of the site, which is a significant increase since 2016. The increase in reed canary grass could be attributed to the expanded area of inundation in 2017 and 2018 because of site improvements.

Wetland Community Type 10 – *Alopecurus pratensis* was identified on 2.11 acres along the western edge of the site in 2018. Other species occurring in this community type include reed canary grass,

red top, Baltic rush, and foxtail barley. Geographically, this community type occurs around the upslope perimeter of wetland areas where inundation is less permanent than near the low point of the wetland.

Vegetation cover was measured along four transects at the site in 2018 (Figure A-2, Appendix A). The data recorded on T-1 (Wetland Mitigation Site Monitoring form, Appendix B) are summarized in tabular and graphical formats in Table 3-2 and Charts 3-1 and 3-2, respectively. Photographs of the transect ends are provided in Appendix C. T-1 extends 422 feet from a corner of the easement area into the large wetland depression that was impounded by the constructed dike. The transect intercepted upland community Types 8–*Bromus inermis/Trifolium* spp. and 11–*Elymus trachycaulus/Pascopyrum smithii* and wetland community Types 2–*Juncus balticus/Carex nebrascensis*, 5–*Glyceria grandis/Typha latifolia*, 6–Open Water/Aquatic Macrophytes, and 7–*Phalaris arundinacea*. Eleven hydrophytic and fifteen upland species were identified along the transect. The low dike feature in this area was extended into the existing transect in 2017, which resulted in a short segment of upland Type 11 near the center of the transect. Adaptive management implemented at the site in 2017 likely resulted in increased wetland habitat along this transect in 2018 as indicated by an increased length of hydrophytic vegetation communities along the transect.

Table 3-2. Data Summary for T-1 From 2013 Through 2018 at the Rostad Ranch Site

Monitoring Year	2013	2014	2015	2016	2017	2018
Transect Length (feet)	**422**	**422**	**422**	**422**	**422**	**422**
Vegetation Community Transitions Along Transect	4	3	3	4	5	5
Vegetation Communities Along Transect	2	2	3	5	5	5
Hydrophytic Vegetation Communities Along Transect	1	1	2	4	4	4
Total Vegetative Species	27	30	30	26	23	26
Total Hydrophytic Species	9	9	9	10	10	11
Total Upland Species	18	21	21	16	13	15
Estimated % Total Vegetative Cover	90	95	95	95	95	95
Estimated % Unvegetated	10	5	5	5	5	5
% Transect Length Comprising Hydrophytic Vegetation Communities	30.6	30.3	47.2	59.0	56.0	62
% Transect Length Comprising Upland Vegetation Communities	56.9	52.8	52.8	41.0	44.0	38
% Transect Length Comprising Unvegetated Open Water	12.6	16.8	0	0	0	0
% Transect Length Comprising Mudflat	0	0	0	0	0	0

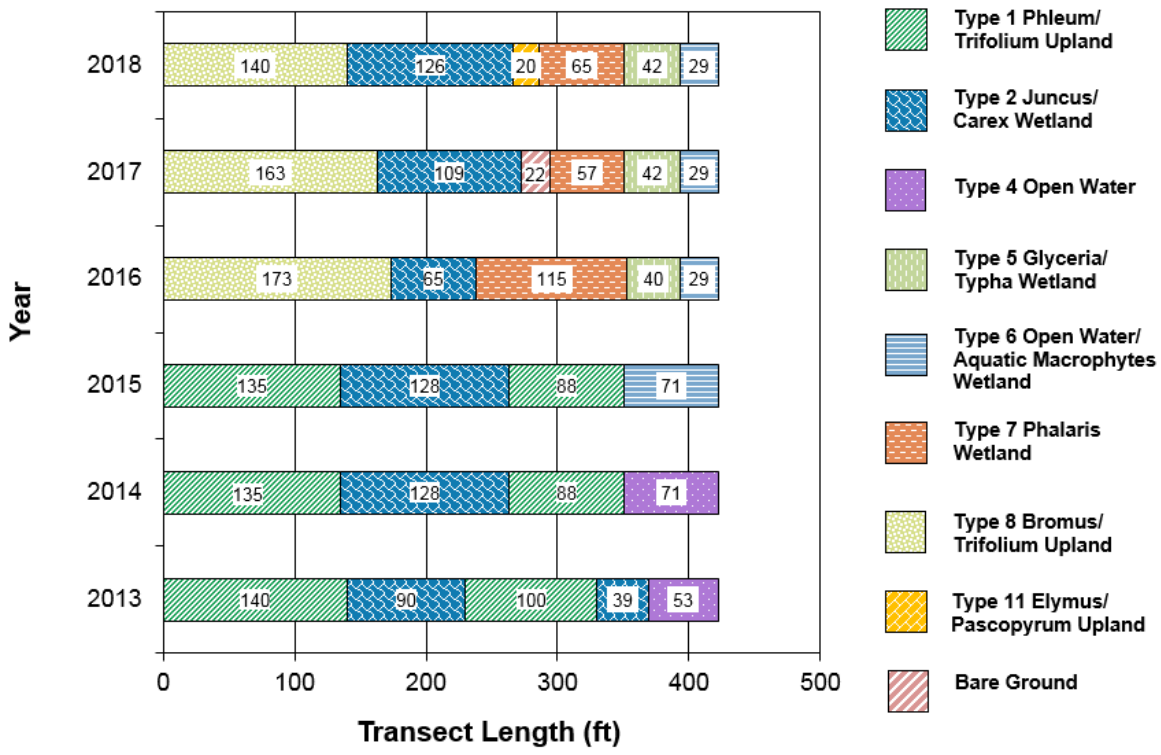


Chart 3-1. Transect Maps Showing Community Types on T-1 From 2013 Through 2018 at the Rostad Ranch Site.

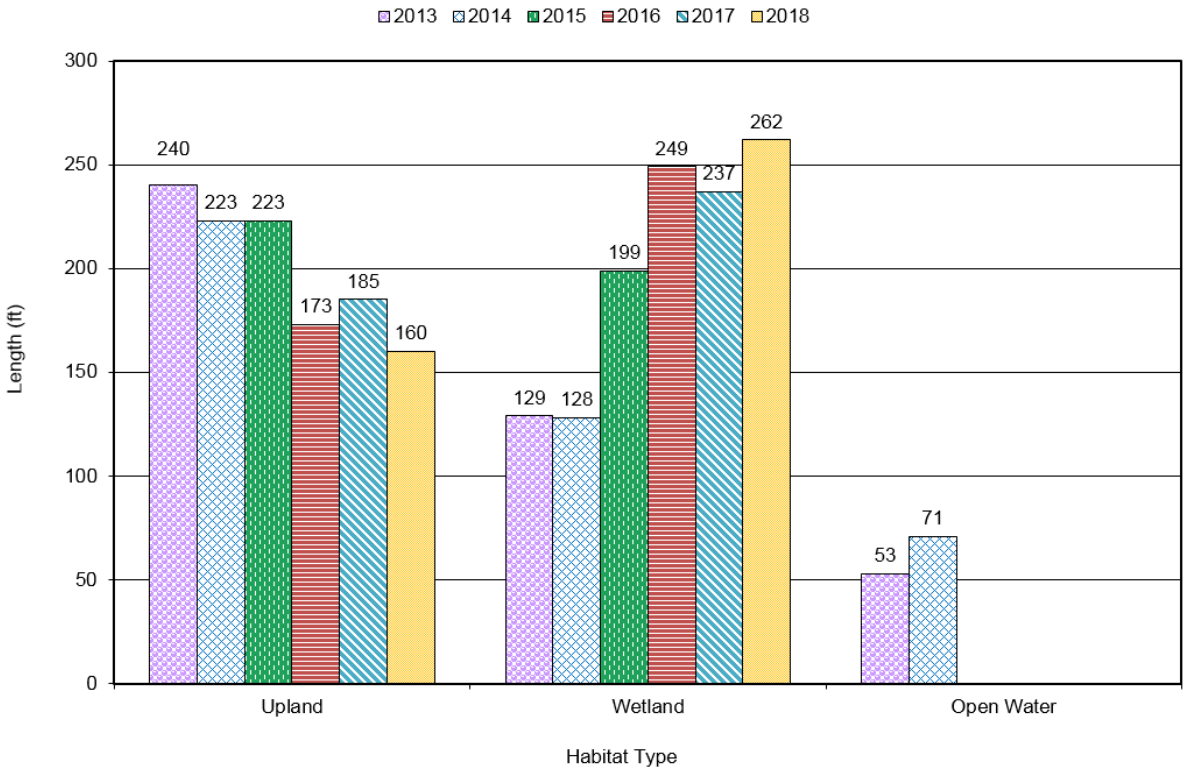


Chart 3-2. Length of Habitat Types Within T-1 From 2013 Through 2018 at the Rostad Ranch Site.

Data collected on T-2 (Wetland Mitigation Site Monitoring form, Appendix B) are summarized in tabular and graphic formats in Table 3-3 and Charts 3-3 and 3-4, respectively. Photographs at the transect endpoints are provided in Appendix C. This transect begins at a mature narrow-leaf cottonwood (*Populus angustifolia*) tree near the entrance of the site, extends 453 feet, and alternates between upland community Type 8 and wetland community Types 2 and 7. Seven hydrophytic and nine upland species were identified along the transect. Hydrophytic vegetation composed 76 percent of T-2 in 2018. The percentage of hydrophytic communities have steadily increased along this transect from a low of 45 percent in 2013 to 76 percent in 2017 and 2018.

Table 3-3. Data Summary for T-2 From 2013 Through 2018 at the Rostad Ranch Site

Monitoring Year	2013	2014	2015	2016	2017	2018
Transect Length (feet)	**453**	**453**	**453**	**453**	**453**	**453**
Vegetation Community Transitions Along Transect	4	4	4	2	2	3
Vegetation Communities Along Transect	2	2	2	2	2	3
Hydrophytic Vegetation Communities Along Transect	1	1	1	1	1	2
Total Vegetative Species	26	27	27	25	17	16
Total Hydrophytic Species	8	7	7	7	6	7
Total Upland Species	18	20	20	18	11	9
Estimated % Total Vegetative Cover	90	95	95	95	95	95
Estimated % Unvegetated	10	5	5	5	5	5
% Transect Length Comprising Hydrophytic Vegetation Communities	44.6	55.2	55.2	70.0	76.0	76.0
% Transect Length Comprising Upland Vegetation Communities	55.4	44.8	44.8	30.0	24.0	24.0
% Transect Length Comprising Unvegetated Open Water	0	0	0	0	0	0
% Transect Length Comprising Mudflat	0	0	0	0	0	0

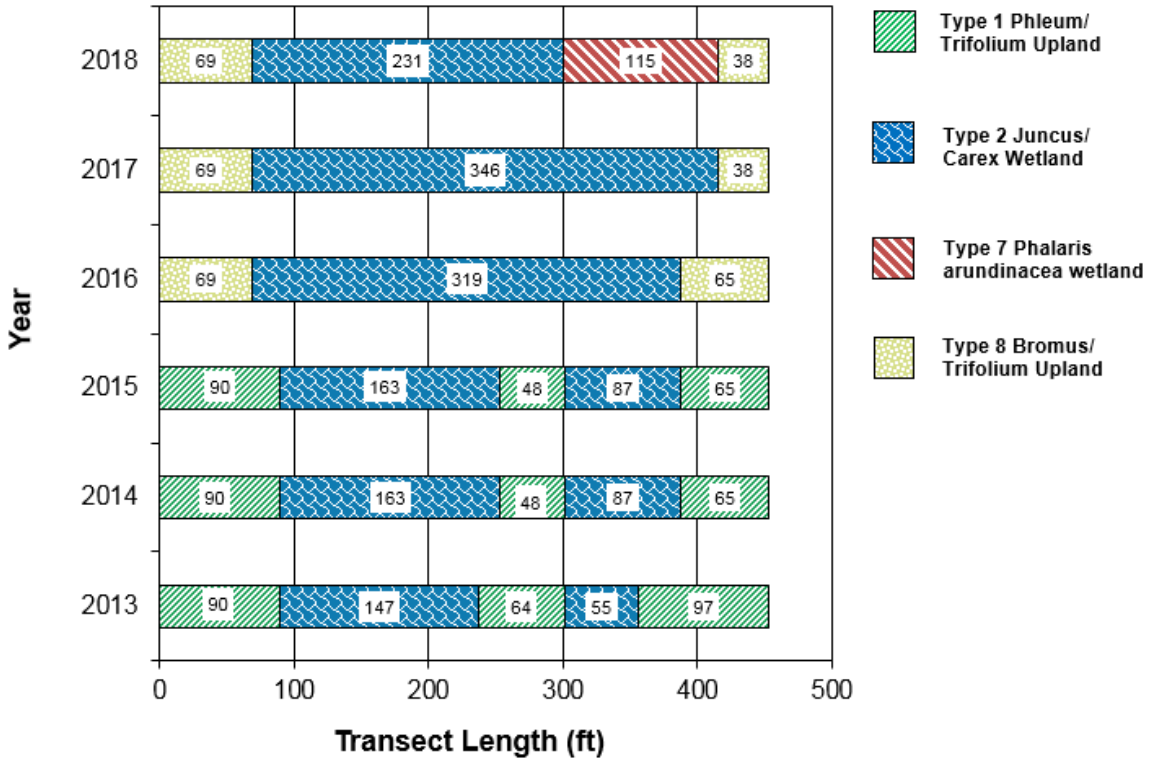


Chart 3-3. Transect Maps Showing Community Types on T-2 From 2013 Through 2018 at the Rostad Ranch Site.

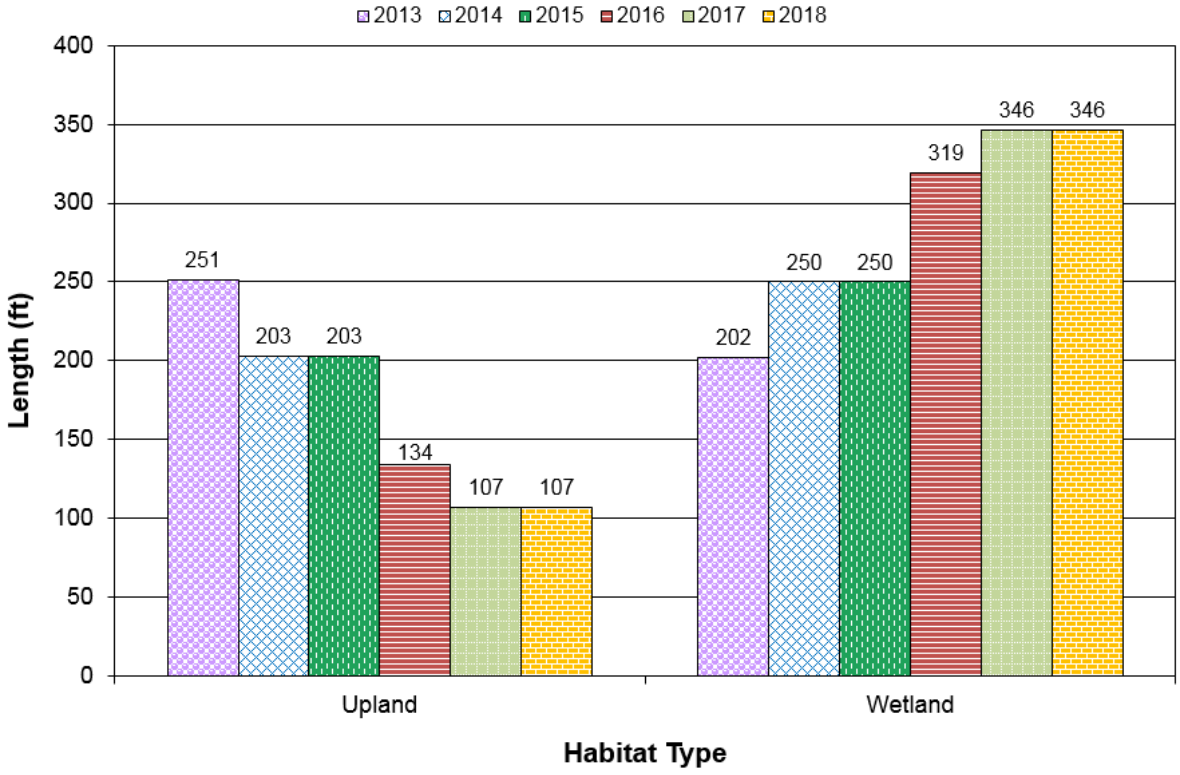


Chart 3-4. Length of Habitat Types Within T-2 From 2013 Through 2018 at the Rostad Ranch Site.

T-3 was established in the southern end of the mitigation site and traversed the excavated reestablishment and rehabilitation credit areas. Data collected on T-3 (Wetland Mitigation Site Monitoring form, Appendix B) are summarized in tabular and graphic formats in Table 3-4 and Charts 3-5 and 3-6, respectively. T-3 also begins at a mature narrow-leaf cottonwood tree and extends east for 320 feet (Figure A-2, Appendix A). Photographs of the transect endpoints are shown in Appendix C. This transect originally began in upland community Type 8, which has developed into Wetland Community Type 7 after 2 years of increased inundation in this area. The transect also crossed Wetland Community Types 2 and 5 with 100 percent of the transect now crossing hydrophytic vegetation communities.

Table 3-4. Data Summary for T-3 From 2013 Through 2018 at the Rostad Ranch Site

Monitoring Year	2013	2014	2015	2016	2017	2018
Transect Length (feet)	**320**	**320**	**320**	**320**	**320**	**320**
Vegetation Community Transitions Along Transect	3	4	4	4	3	3
Vegetation Communities Along Transect	2	3	4	4	3	3
Hydrophytic Vegetation Communities Along Transect	1	2	3	3	2	3
Total Vegetative Species	25	31	31	31	23	23
Total Hydrophytic Species	14	16	16	16	15	16
Total Upland Species	11	15	15	15	8	7
Estimated % Total Vegetative Cover	85	90	90	90	80	85
Estimated % Unvegetated	15	10	10	10	20	15
% Transect Length Comprising Hydrophytic Vegetation Communities	65.3	88.4	93.4	93.4	91.0	100
% Transect Length Comprising Upland Vegetation Communities	6.6	6.6	6.6	6.6	9.0	0
% Transect Length Comprising Unvegetated Open Water	28.1	5	0	0	0	0
% Transect Length Comprising Mudflat	0	0	0	0	0	0

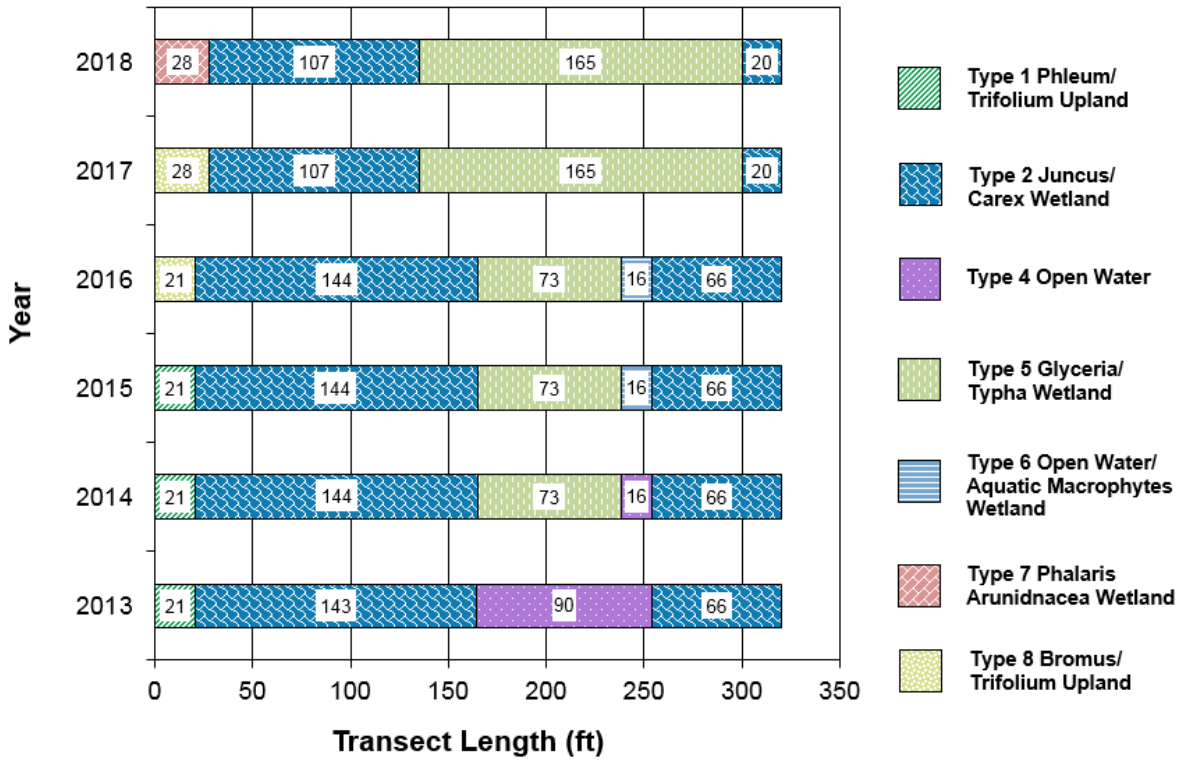


Chart 3-5. Transect Maps Showing Community Types on T-3 From 2013 Through 2018 at the Rostad Ranch Site.

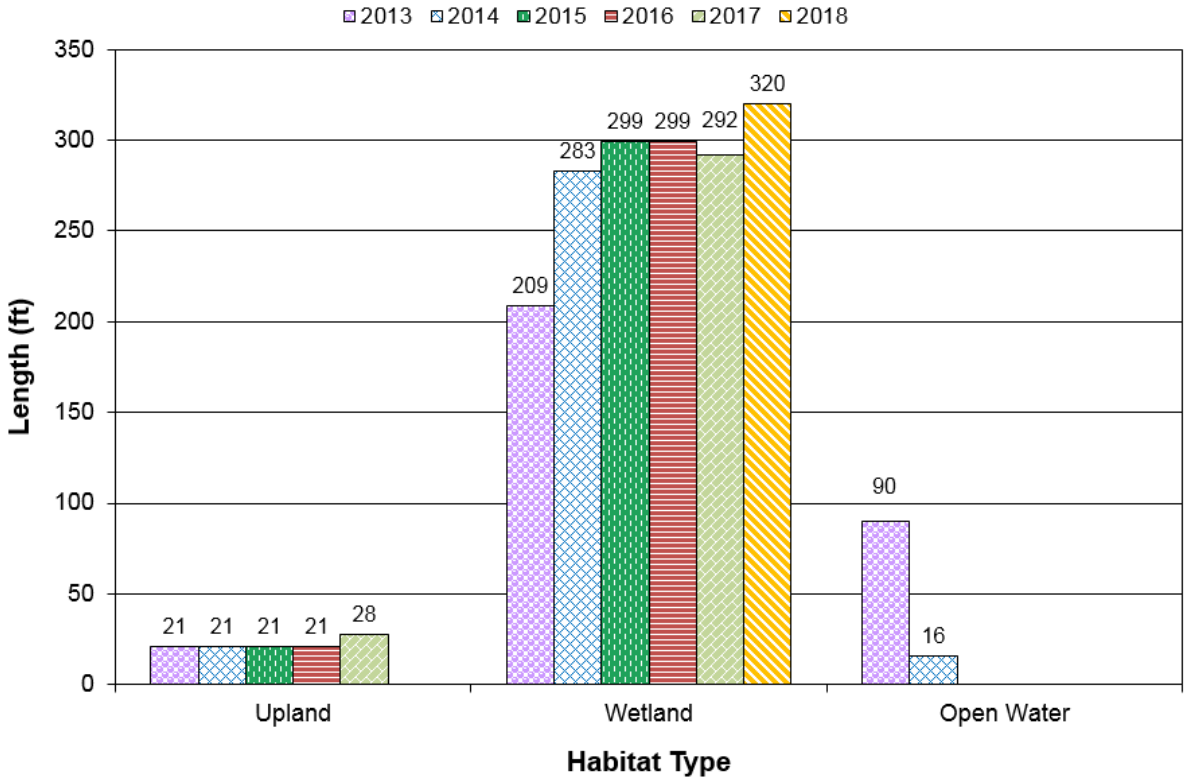


Chart 3-6. Length of Habitat Types Within T-3 From 2013 Through 2018 at the Rostad Ranch Site.

T-4 was established in 2017 to assess hydrologic and plant community changes on the western portion of the site caused by the adaptive management changes initiated in 2017. Data collected on T-4 (Wetland Mitigation Site Monitoring form, Appendix B) are summarized in tabular and graphic formats in Table 3-5 and Charts 3-7 and 3-8, respectively. T-4 starts on a newly constructed berm, extends northerly for 412 feet, and terminates at an interpretive sign adjacent to the main roadway adjacent to the property (Figure A-2, Appendix A). Photographs of the transect endpoints are shown in Appendix C. This transect originates in upland community Type 11 on the newly constructed dike, transitions into wetland Type 7 – *Phalaris arundinacea,* and then alternates between upland Type 8 – *Bromus inermis/Trifolium* spp. and Type 11. Inundation was noted across much of this transect in 2017 and 2018 because of irrigation water being spread across the site. Recent inundation had not yet caused plant community changes in this area in 2018.

Table 3-5. Data Summary for T-4 From 2017 Through 2018 at the Rostad Ranch Site

Monitoring Year	2017	2018
Transect Length (feet)	**412**	**412**
Vegetation Community Transitions Along Transect	4	3
Vegetation Communities Along Transect	3	2
Hydrophytic Vegetation Communities Along Transect	1	1
Total Vegetative Species	10	16
Total Hydrophytic Species	1	3
Total Upland Species	10	13
Estimated % Total Vegetative Cover	70	80
Estimated % Unvegetated	30	20
% Transect Length Comprising Hydrophytic Vegetation Communities	12	12
% Transect Length Comprising Upland Vegetation Communities	88	88
% Transect Length Comprising Unvegetated Open Water	0	0
% Transect Length Comprising Mudflat	0	0

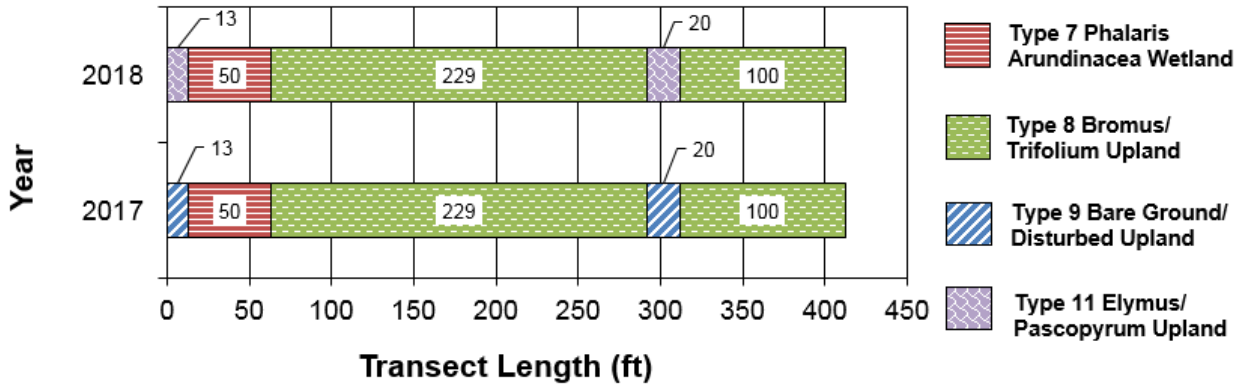


Chart 3-7. Transect Maps Showing Community Types on T-4 From 2017 Through 2018 at the Rostad Ranch Site.

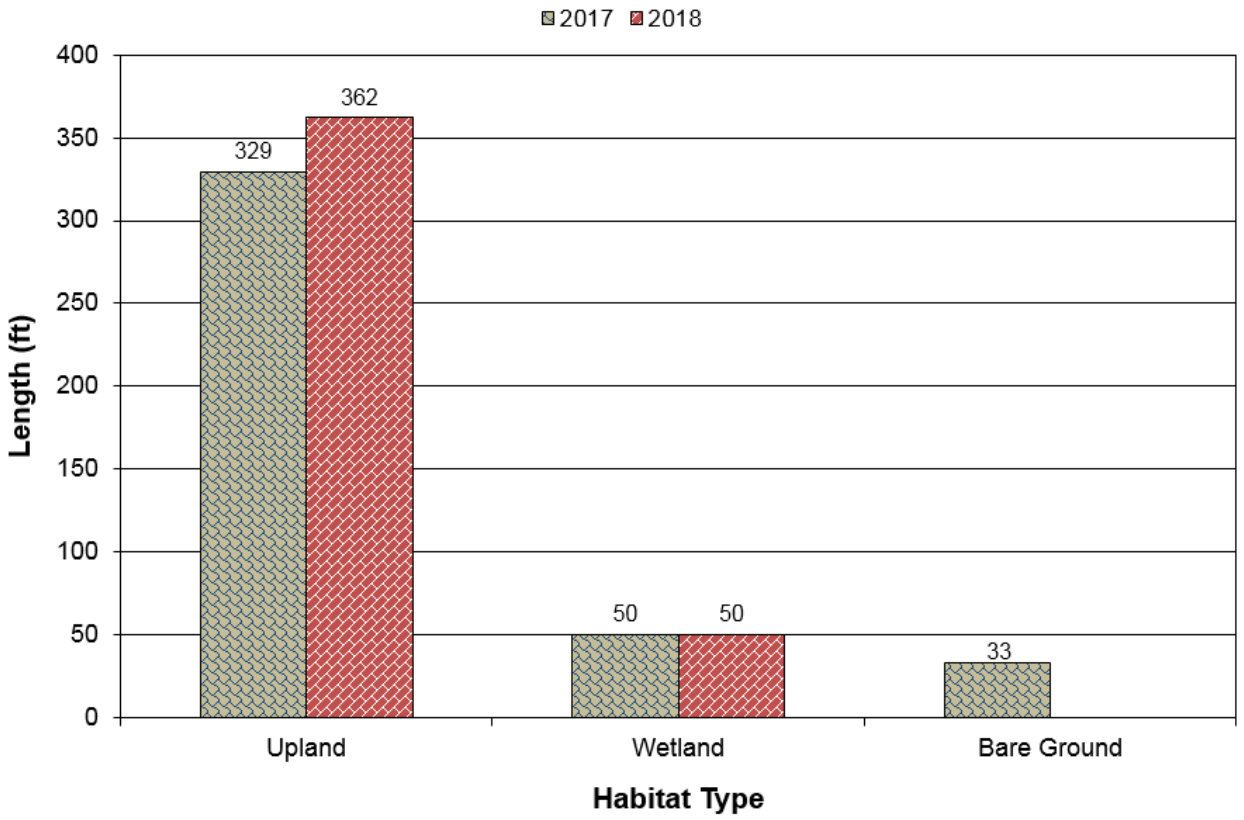


Chart 3-8. Length of Habitat Types Within T-4 From 2017 Through 2018 at the Rostad Ranch Site.

Priority 2B noxious weeds that were identified within the Rostad Ranch site included spotted knapweed, Canada thistle (*Cirsium arvense*), and gypsy-flower (*Cynoglossum officinale*),. A total of 15 infestation areas were mapped in 2018. The majority of the infestations have cover classes that range from a trace (less than 1 percent) to moderate (6–25 percent). Most of the infestation are associated with constructed wetlands in upland community Type 8 and Type 11. Weeds were sprayed at this site on June 30, 2018.

Approximately 2,000 willow cuttings were planted throughout the excavated areas. An estimated 50 percent of the willow cuttings survived through 2018. The cuttings appeared healthy and vigorous with some sign of browse. A total of 100 black cottonwoods (*Populus balsamifera*) and 100 quaking aspens (*Populus tremuloides*) were installed around the perimeter of the proposed open-water areas in 2012. Survival of these containerized, 5-gallon plant materials was also estimated at 50 percent in 2018. Natural recruitment of woody species may be occurring, but extremely tall grass in the herbaceous layer makes surveying for and identifying planted and volunteer shrubs across the site very difficult.

3.3 SOIL

The Web Soil Survey for Meagher County [US Department of Agriculture, 2014] indicates two soil complexes occurring within the project site. These soil complexes are identified as the Varney-Notter cobbly loam and Delpoint variant, Marmath-Cabbart loam soils. The Varney-Notter cobbly loam

mapped soil unit was located across the northern half of the site while the Delpoint variant-Marmarth-Cabbart loam mapped soil unit was located across the southern half. Both series generally consist of very deep, well-drained soils formed in alluvium. The mapped soil units were not identified on the *Montana Hydric Soils List* [US Department of Agriculture, 2015].

Soil test pits were excavated at six locations, all within what was originally mapped as the Delpoint variant-Marmarth-Cabbart loam soil series (Figure A-2, Appendix A). DP-1W, DP-2W, and DP-3W are located in areas that exhibited hydric soils. The soil at DP-1W, which is located at the edge of an excavated depression, consisted of an upper 4-inch, brown (10YR 4/3) loam and a lower 16-inch, dark gray (10YR 4/1) clay loam with 10 percent yellowish brown (10YR 5/6), redoximorphic concentrations. The soil met the criteria for depleted matrix (F3) and classification as a hydric soil. DP-1U, which is located upslope from DP-1W, displayed a dark grayish brown (10YR 4/2), sandy clay loam and did not meet the criteria for any hydric soil indicators. The soil profile at DP-2W, which is a new location in 2018, revealed a single 20-inch layer of 10YR 4/2 clay loam with 20 percent 10YR 5/8, redoximorphic concentrations. The soil met the criteria for depleted matrix (F3) and classification as a hydric soil. DP-2U, which is located upslope from DP-2W, exhibited a dark grayish-brown (10YR 4/2), clay loam and did not meet the criteria for any hydric soil indicators. The soil profile at DP-3W, which is a new data point in 2018, revealed a single 20-inch layer of 10YR 3/2 clay loam with 10 percent 10YR 5/8, redoximorphic concentrations. The soil met the criteria for depleted matrix (F3) and classification as a hydric soil. DP-3U, which is located upslope from DP-3W, exhibited a dark grayish-brown (10YR 4/2) clay loam and did not meet the criteria for any hydric soil indicators.

3.4 WETLAND DELINEATION

Six data points were evaluated in 2018 to determine the wetland and upland boundaries at this site (Figure A-2, Appendix A; Wetland Determination Data forms, Appendix B). DP-1W, DP-2W, and DP-3W are located in areas that met the wetland criteria. The total wetland acreage delineated in 2018, including preexisting wetland areas, was 28.86 acres, which is an increase of 2.44 acres since 2017 and 13.96 acres since 2016. The delineated acreages are provided in Table 3-6. The adaptive management strategies implemented in 2017 resulted in broader inundation across the site, and in response to the inundation, some areas that were previously delineated as upland were delineated as wetland in 2018. Some areas quickly responded to the increased inundation and reed canary grass dominated the vegetation. Other areas, like the upland habitat near vegetation transect T-4, was inundated at the time of the survey, but vegetation had not changed, and these areas were left out of the delineation.

Table 3-6. Total Wetland Acres Delineated From 2013 Through 2018 at the Rostad Ranch Site

Wetland and Upland Habitats	2013 Delineated Acres	2014 Delineated Acres	2015 Delineated Acres	2016 Delineated Acres	2017 Delineated Acres	2018 Delineated Acres
Project Area	60.00	60.00	60.00	60.00	60.00	60.00
Created Wetlands	1.07	2.68	3.18	3.18	10.74	13.18
Restoration Wetlands (Reestablishment)	10.89	9.91	9.91	9.97	14.62	14.62
Restoration Wetlands (Rehabilitation)	1.53	1.56	1.56	1.56	0.81	0.81
Preservation Wetlands	0.25	0.25	0.25	0.25	0.25	0.25
Total Wetlands	**13.74**	**14.40**	**14.90**	**14.96**	**26.42**	**28.86**

The proposed wetland areas that were identified within the mitigation plan were overlaid with the wetlands surveyed in 2018 to identify the extent of wetlands within each crediting area. The 2018 wetland delineation included 0.25 acre within the preservation credit area, 14.62 acres within the reestablishment credit area, 0.81 acres within the wetland rehabilitation credit area, and 13.18 acres within the creation credit area. To date, the site is 17.73 acres short of the intended goal of 46.59 acres across the site. Corrective actions in 2017 resulted in approximately 14.0 acres of additional wetland at the site in 2018, with additional area that was inundated but had not yet developed wetland characteristics. Continued monitoring will determine how much additional wetlands develops at the site.

3.5 WILDLIFE

A comprehensive list of birds and other wildlife species that were observed directly or indirectly from 2013 through 2018 is presented in Table 3-7 and the Wetland Mitigation Site Monitoring form in Appendix B. White-tailed deer (*Odocoileus virginianus*), pronghorn antelope (*Antilocapra americana*), one unidentified frog species, and nine bird species were observed in 2018. Wildlife that were observed in 2018 are bolded in Table 3-7.

Table 3-7. Wildlife Species Observed From 2013 Through 2018 at the Rostad Ranch Site (Page 1 of 2)

Common Name	Scientific Name
Amphibian	
Boreal Chorus Frog	*Pseudacris maculata*
Frog Sp.	
Bird	
American Crow	*Corvus brachyrhynchos*
American Goldfinch	*Spinus tristus*
American Robin	*Turdus migratorius*
American White Pelican	*Pelecanus erythrorhynchos*
Bank Swallow	*Riparia riparia*
Blue-Winged Teal	*Anas discors*
Bobolink	***Dolichonyx oryzivorus***
Brewer's Blackbird	***Euphagus cyanocephalus***
Brown-Headed Cowbird	*Molothrus ater*
Canada Goose	*Branta canadensis*
Cinnamon Teal	*Spatula cyanoptera*
Common Grackle	*Quiscalus quiscula*
Common Yellowthroat	*Geothlypis trichas*
Eared Grebe	*Podiceps nigricollis*
Eastern Kingbird	*Tyrannus tyrannus*
Ferruginous Hawk	*Buteo regalis*
Grasshopper Sparrow	*Ammodramus savannarum*
Green-Winged Teal	*Anas crecca*
Killdeer	*Charadrius vociferous*
Long-Billed Curlew	*Numenius americanus*
Mallard	***Anas platyrhynchos***
Northern Flicker	*Colaptes auratus*
Northern Harrier	*Circus cyaneus*
Northern Shoveler	*Anas clypeata*
Red-Tailed Hawk	*Buteo jamaicensis*
Red-Winged Blackbird	***Agelaius phoeniceus***
Ring-Necked Pheasant	*Phasianus colchicus*
Sandhill Crane	***Grus canadensis***
Song Sparrow	***Melospiza melodia***
Sparrow sp.	
Spotted Sandpiper	***Actitis macularius***

Table 3-7. Wildlife Species Observed From 2013 Through 2018 at the Rostad Ranch Site (Page 2 of 2)

Common Name	Scientific Name
Bird (continued)	
Tree Swallow	***Tachycineta bicolor***
Vesper Sparrow	*Pooecetes gramineus*
Western Meadowlark	*Sturnella neglecta*
Willet	*Tringa semipalmata*
Wilson's Phalarope	*Phalaropus tricolor*
Wilson's Snipe	***Gallinago delicata***
Yellow-Headed Blackbird	*Xanthocephalus xanthocephalus*
Mammal	
Black Bear	*Ursus americanus*
Coyote	*Canis latrans*
Deer sp.	*Odocoileus sp.*
Mountain Cottontail	*Sylvilagus nuttallii*
Muskrat	*Ondatra zibethicus*
Pronghorn	***Antilocapra Americana***
Raccoon	*Procyon lotor*
Richardson's Ground Squirrel	*Urocitellus richarsonii*
White-Tailed Deer	***Odocoileus virginianus***

Species that were identified in 2018 are bolded.

3.6 FUNCTIONAL ASSESSMENT

The 1999 MDT MWAM [Berglund, 1999] was used to evaluate the three existing wetlands that were identified within the site in 2004. The 2008 MWAM [Berglund and McEldowney, 2008] has been used to evaluate the site from 2013 through 2018. All of the wetlands that were identified from 2013 through 2018 were evaluated as one AA. The results of the 2004 and 2013–2018 assessments are summarized in Table 3-8. The completed 2018 MWAM form is included in Appendix B.

The 2004 assessment identified 3.4 acres of Category III wetlands. The majority of the existing wetlands within the site before construction consisted of man-made drainage and irrigation ditches that had been constructed to drain and disperse water throughout the site. The only remnants of the historic wetlands are a willow thicket and roadside drainage ditch. The preexisting wetlands averaged 34 percent of the possible score and attained a total of 12.46 functional units. Wetlands across the site in 2018 rate as Category II with high ratings for Montana Natural Heritage Program (MTNHP) species habitat, sediment/nutrient/toxicant removal, sediment/shoreline stabilization, and production export/food chain support. The 13.90-acre increase in wetland acreage from 2016 to 2018 increased the total functional units from 85.7 to 175.59.

Table 3-8. Functions and Values of the Rostad Ranch Site From 2004 and 2013 Through 2018

Function and Value Parameters From the Montana Wetland Assessment Method	2004[(a)] W-1-04	2004[(a)] W-2-04	2004[(a)] W-3-04	2013[(b)]	2014[(b)]	2015[(b)]	2016[(b)]	2017[(b)]	2018[(b)]
Listed/Proposed Threatened and Endangered (T&E) Species Habitat	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)	Low (0)	Low (0)	Low (0)	Low (0)	Low (0)
MTNHP Species Habitat	Low (0.2)	Low (0.2)	Low (0.2)	High (0.9)	High (0.9)	High (0.9)	High (0.9)	High (0.9)	High (0.9)
General Wildlife Habitat	Low (0.3)	Low (0.3)	Low (0.3)	Mod (0.5)	Low (0.3)	Mod (0.5)	Mod (0.5)	Mod (0.5)	Mod (0.5)
General Fish/Aquatic Habitat	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Flood Attenuation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Short- and Long-Term Surface Water Storage	Low (0.2)	Low (0.2)	Low (0.2)	High (0.8)	Mod (0.6)	Mod (0.6)	Mod (0.6)	High (0.9)	High (0.9)
Sediment/Nutrient/Toxicant Removal	Mod (0.6)	Mod (0.6)	Mod (0.6)	Mod (0.7)	Mod (0.7)	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Sediment/Shoreline Stabilization	Mod (0.6)	Mod (0.6)	N/A	N/A	Mod (0.6)	High (0.9)	High (0.9)	High (0.9)	High (0.9)
Production Export/Food Chain Support	Mod (0.7)	Mod (0.7)	Low (0.3)	High (0.9)	Mod (0.6)	High (0.8)	High (0.8)	High (0.8)	High (0.8)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)	N/A	High (1.0)	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (0.7)
Uniqueness	Low (0.2)	Low (0.2)	Low (0.2)	Mod (0.4)	Low (0.2)	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)
Recreation/Education Potential (bonus points)	Low (0.1)	Low (0.1)	Low (0.1)	Low (0.05)	Low (0.05)	Low (0.05)	Low (0.05)	Low (0.05)	Low (0.05)
Actual Points/Possible Points	**3.9/10**	**3.9/10**	**1.9/8**	**5.25/8**	**4.65/9**	**5.75/9**	**5.75/9**	**6.05/9**	**6.05/9**
% of Possible Score Achieved	**39.0%**	**39.0%**	**24.0%**	**65.6%**	**51.7%**	**63.9%**	**63.9%**	**67%**	**67%**
Overall Category	**III**	**III**	**III**	**II**	**III**	**III**	**III**	**II**	**II**
Total Acreage of Assessed Wetlands Within Site Boundaries	**1.2**	**1.8**	**0.4**	**13.74**	**14.40**	**14.90**	**14.96**	**26.42**	**28.86**
Functional Units (acreage × actual points)	**4.68**	**7.02**	**0.76**	**72.1**	**67.0**	**85.7**	**86.02**	**159.85**	**175.59**

(a) 1999 MWAM form [Berglund, 1999].
(b) 2008 MWAM form [Berglund and McEldowney, 2008].

3.7 PHOTOGRAPHIC DOCUMENTATION

Photographs that were taken at Photo Points 1–10 (PP1 to PP7), transect endpoints, and wetland determination data points are shown in Appendix C.

3.8 MAINTENANCE NEEDS

Priority 2B noxious weeds that were identified within the Rostad Ranch site included spotted knapweed, Canada thistle, and gypsy-flower. A total of 15 infestation areas were mapped in 2018. The majority of the infestations, with cover classes that range from trace (less than 1 percent) to moderate (6–25 percent), were located at the edge of the constructed wetlands in upland community Type 8. A weed contractor with MDT treated the site in June and October, 2018, with treatment concentrated in areas of infestation by the three noxious weed species observed on site. MDT has an ongoing weed-control program for their mitigation sites that includes an annual assessment of weeds identified at each location during the yearly monitoring and treatment of mapped weeds to contain and control identified populations.

The wildlife-friendly fence that was installed around the easement area was intact during the 2018 site visit. Seven bluebird boxes were installed around the site perimeter in 2012 and were in good condition in 2018. The irrigation headgate structure was in good condition during the 2018 site visit.

3.9 CURRENT CREDIT SUMMARY

Table 3-9 summarizes the estimated wetland credits based on the USACE-approved credit ratios and the wetland delineation completed in July 2018. Proposed mitigation credits from the 2007 *Rostad Ranch Mitigation Plan, Meagher County, Montana* [MDT, 2007] included reestablishing 27.11 wetland acres, rehabilitating 2.63 wetland acres, creating 9.84 wetland acres, preserving 0.25 wetland acre, and maintaining 6.76 acres of upland buffer. The wetland acreages that were delineated in 2018 included 14.62 acres of reestablished wetlands, 0.81 acres of rehabilitated wetland, 13.18 acres of created wetland, and 0.25 acre of preservation wetland (community Type 3 – *Salix exigua*). Adaptive management activities on the site in 2017 resulted in a shift of crediting, which decreased the overall rehabilitated wetland acreage and increased the reestablished and created wetland acreage. The total mitigation credit estimated in 2018, including the upland buffer credit and the deduction for the 0.41-acre wetland impact incurred during mitigation construction, totaled 29.34 credit acres, which is an increase of 14.15 acres since 2016. The site is still approximately 10.36 acres short of the original goal of 39.70 acres of credit.

Table 3-9. Summary of Wetland Credits at the Rostad Ranch Site From 2014 Through 2018

Compensatory Mitigation Type	Wetland Type[a]	Approved Mitigation Ratio[b]	Anticipated Mitigation Area (acres)	Anticipated Mitigation Credit (acres)	2014 Delineated Mitigation Areas (acres)	2014 Estimated Mitigation Areas (acres)	2015 Delineated Mitigation Areas (acres)	2015 Estimated Mitigation Credit (acres)	2016 Delineated Mitigation Areas (acres)	2016 Estimated Mitigation Credit (acres)	2017 Delineated Mitigation Areas (acres)	2017 Estimated Mitigation Credit (acres)	2018 Delineated Mitigation Areas (acres)	2018 Estimated Mitigation Credit (acres)
Restoration (Reestablishment)	Palustrine emergent	1:1	27.11	27.11	9.91	9.91	9.91	9.91	9.96	9.96	14.62	14.62	14.62	14.62
Creation (Establishment)	Palustrine emergent	1:1	9.84	9.84	2.68	2.68	3.18	3.18	3.18	3.18	10.74	10.74	13.18	13.18
Restoration (Rehabilitation)	Palustrine emergent	1.5:1	2.63	1.75	1.56	1.04	1.56	1.04	1.56	1.04	0.81	0.54	0.81	0.54
Preservation	Palustrine, scrub/shrub	4:1	0.25	0.06	0.25	0.06	0.25	0.06	0.25	0.06	0.25	0.06	0.25	0.06
Upland Buffer	N/A	5:1	6.76[c]	1.35	6.76	1.35	6.76	1.35	6.76	1.35	6.76	1.35	6.76	1.35
Permanent Wetland Impact	N/A	1:1	N/A	–0.41	N/A	–0.41	N/A	–0.41	N/A	–0.41	N/A	–0.41	N/A	–0.41
Totals			**46.59**	**39.70**	**21.16**	**14.63**	**21.66**	**15.13**	**21.72**	**15.19**	**33.18**	**26.90**	**35.62**	**29.34**

(a) Cowardin et al. [1979].
(b) The mitigation credit ratios that were used are from the Montana Corps Regulatory Programs 2005 Wetland Credit Ratios [USACE, 2005].
(c) The anticipated upland buffer credit was used until wetland areas expand to full extent.

Table 3-10 provides a summary of the approved performance standards and success criteria based on site conditions documented in 2018. All of the wetlands that were delineated at the Rostad Ranch site in 2018 satisfied the three criteria of wetland hydrology, hydrophytic vegetation, and hydric soils. Willow stakes that were planted within the site exhibited a 50 percent survival rate; however, not all of the live cuttings may have been located because of tall grass. Even at 50 percent, this criteria is still being met. Although the site was recently disturbed from construction efforts in 2017, vegetation is successfully establishing, with aerial coverage by desirable plants estimated at greater than 90 percent. The coverage of state-listed noxious weeds in the upland buffer was approximately 2 percent in 2018. The cover of noxious weeds within the delineated wetlands was less than 1 percent. The extent of the open water surveyed in 2018 composed approximately 5 percent of the total wetland acreage, which is below the cap of 10 percent stipulated in the USACE-approved performance criteria. The percentage of open water may continue to decrease as additional emergent wetlands develop on the site. The entire 60-acre easement area has been fenced to exclude grazing during the development and monitoring phase, but may be used as a vegetative management tool in the future.

Table 3-10. Summary of Performance Standards and Success Criteria (Page 1 of 2)

Performance Standards	Success Criteria	Criteria Achieved Y/N	Discussion
Wetland Characteristics	The three parameter criteria for hydrology, vegetation, and soils are met as outlined in the 1987 Wetland Manual and 2010 GP Regional Supplement.	Y	Wetland habitat areas within the mitigation site meet the three parameter criteria.
Wetland Hydrology	Soil saturation is present for at least 12.5 percent of the growing season.	Y	Irrigation water was turned into the site on June 8 and turned off on September 6, 2018. All wetlands within the project area were likely saturated for greater than the minimum 12.5 percent of growing season.
Hydric Soil	Hydric soil conditions are present or appear to be forming.	Y	The recently constructed wetland complex is beginning to exhibit hydric soil development in areas originally identified as before construction. Preexisting hydric soil characteristics are present in several areas that had been identified as wetland before project construction.
	Soil is sufficiently stable to prevent erosion.	Y	Disturbed soil is stable and does not exhibit signs of erosion.
	Soil is able to support plant cover.	Y	Plant cover has continued to develop across disturbed soils.
Hydrophytic Vegetation	Combined absolute cover of facultative or wetter species is greater than or equal to 70 percent.	Y	Areas identified as wetland habitat within the mitigation site support a prevalence of hydrophytic vegetation (OBL, FACW, and FAC) with absolute cover exceeding 70 percent.
	Noxious weeds do not exceed 5 percent cover.	Y	Noxious weed infestations have been mapped across this site, primarily outside of site wetlands. Noxious weed infestations continue to receive annual treatment and are decreasing site-wide. Estimated noxious weed cover within delineated wetlands is below 5 percent.
Woody Plants	Plantings exceed 50 percent survival after 5 years.	Y	Approximately 50 percent of the woody plantings observed were alive in 2018, which meets the 50 percent survival rate.
Herbaceous Plants	At the conclusion of the monitoring period, ocular coverage of desirable hydrophytic vegetation will be at least 80 percent.	Y	Created wetlands generally exhibited greater than 90 percent vegetation cover during the 2018 monitoring event.
Open-Water Areas	Open water that is established within the designated wetland cells will be considered successful and creditable if open water does not exceed 10 percent of the total wetland acreage.	Y	Open water was mapped within 10 percent of the total wetland acreage in 2018. These areas are exhibiting emergent vegetation development and are anticipated to continue to develop aquatic macrophyte communities within the 5-year monitoring period.

Table 3-10. Summary of Performance Standards and Success Criteria (Page 2 of 2)

Performance Standards	Success Criteria	Criteria Achieved Y/N	Discussion
Upland Buffer	Success will be achieved when noxious weeds do not exceed 5 percent cover within the buffer areas on the site.	Y	Noxious weed infestations, including Canada thistle, spotted knapweed, and hoary alyssum were mapped within the site in 2018. Although a variety of noxious weeds are present throughout the site, aerial coverage does not exceed 5 percent.
	Any area that was disturbed within creditable buffer zone must have at least 50 percent aerial cover of desirable upland plant species by the end of the monitoring period.	Y	Upland buffers that surround wetland areas within the site exhibited greater than 50 percent aerial cover of non-weed species in 2018.
Weed Control	Weed-control measures are implemented to minimize and/or eliminate infestations of state-listed noxious weed species within the site.	Y	State-listed noxious weed species across the site have been estimated at 2 percent absolute cover in 2018.
Fencing	Wildlife-friendly fencing is installed along the easement boundaries.	Y	Wildlife-friendly fencing has been installed around the easement boundaries and is in good condition.

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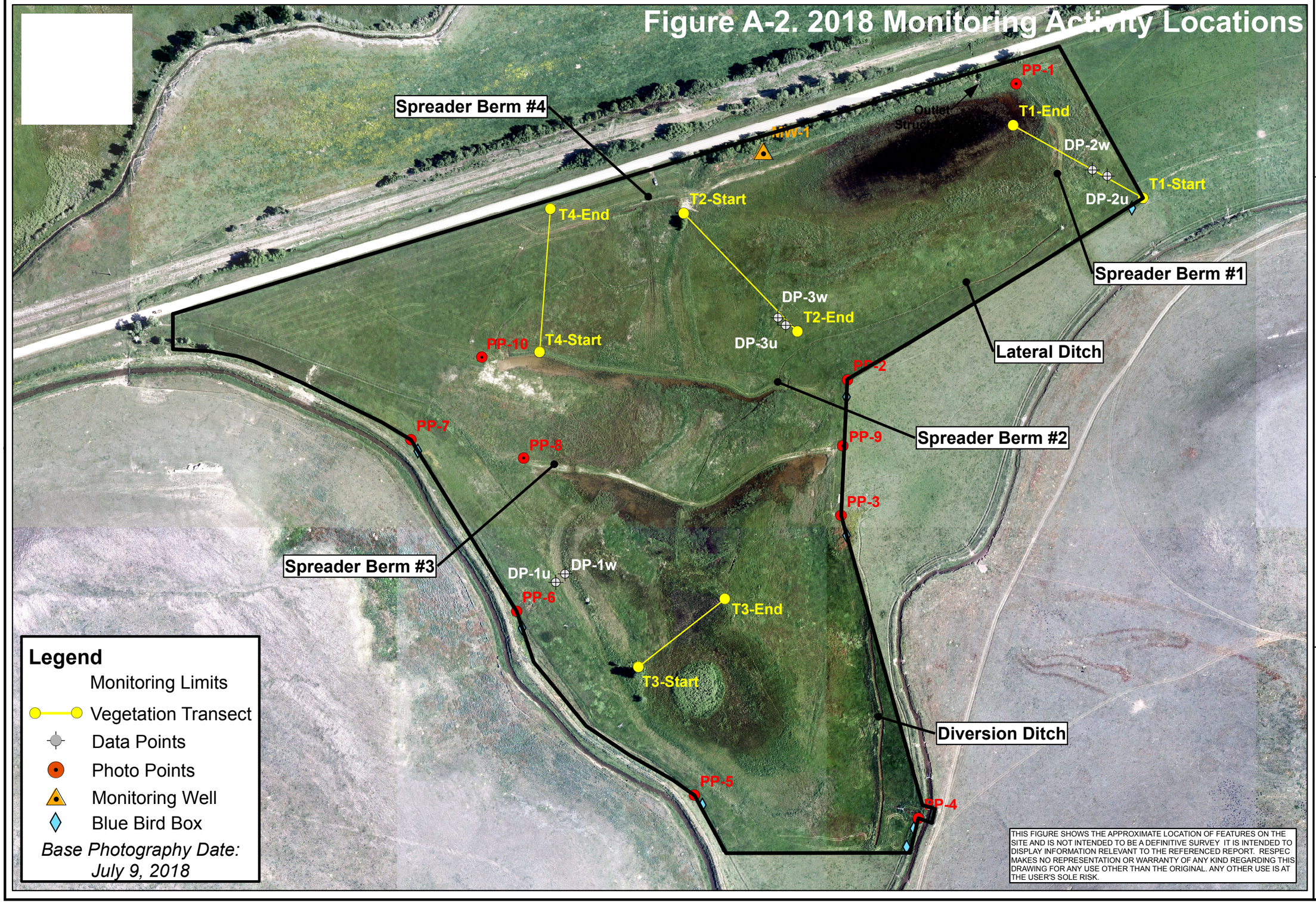
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APPENDIX A
PROJECT AREA MAPS

MDT Wetland Mitigation Monitoring
Rostad Ranch Mitigation Site
Meagher County, Montana

Figure A-2. 2018 Monitoring Activity Locations



THIS FIGURE SHOWS THE APPROXIMATE LOCATION OF FEATURES ON THE SITE AND IS NOT INTENDED TO BE A DEFINITIVE SURVEY IT IS INTENDED TO DISPLAY INFORMATION RELEVANT TO THE REFERENCED REPORT. RESPEC MAKES NO REPRESENTATION OR WARRANTY OF ANY KIND REGARDING THIS DRAWING FOR ANY USE OTHER THAN THE ORIGINAL. ANY OTHER USE IS AT THE USER'S SOLE RISK.

RESPEC
820 North Montana Ave., Suite A
Helena, MT 59601

Rostad Ranch Wetland Mitigation Site
2018 Monitoring Activity Locations

0 100 200 400 600 800 1,000 Feet

Project: STPX-0002 (749)
Location: Meagher Co., Montana
Date: December 2018
Project Manager: M. Traxler
Drawn By: J. Rosenbaum

File: Z:\RESPEC\02895 MDT Monitoring 2016 - 2018\Rostad Ranch\GPS Data\Mains\Monitor2018.mxd

Figure A-3. 2018 Mapped Site Features

Vegetation Community Types

- (2) Juncus balticus/Carex nebrascensis
- (3) Salix exigua
- (5) Glyceria grandis/Typha latifolia
- (6) Open Water/Aquatic Macrophytes
- (7) Phalaris arundinacea
- (8) Bromus inermis/Trifolium spp.
- (10) Alopecurus pratensis
- (11) Elymus trachycaulus/Pascopyrum smithii

Acreages

Project Area	60.00 acres
Total Wetlands	28.86 acres
Re-established Wetlands	14.62 acres
Created Wetlands	13.18 acres
Rehabilitated Wetlands	0.81 acres
Preserved Wetlands	0.25 acres
Upland	31.14 acres

Noxious Weeds
Centaurea stoebe
Cynoglossum officinale
Cirsium arvense
Cover Class
T = Trace (<1% cover)
L = Low (1-5% cover)
M = Moderate (6-25% cover)
H = High (26-100% cover)

Legend

Monitoring Limits
Wetland Limits
Vegetation Communities

Base Photography Date: July 9, 2018

THIS FIGURE SHOWS THE APPROXIMATE LOCATION OF FEATURES ON THE SITE AND IS NOT INTENDED TO BE A DEFINITIVE SURVEY IT IS INTENDED TO DISPLAY INFORMATION RELEVANT TO THE REFERENCED REPORT. RESPEC MAKES NO REPRESENTATION OR WARRANTY OF ANY KIND REGARDING THIS DRAWING FOR ANY USE OTHER THAN THE ORIGINAL. ANY OTHER USE IS AT THE USER'S SOLE RISK.

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820 North Montana Ave., Suite A
Helena, MT 59601

Rostad Ranch Wetland Mitigation Site
2018 Mapped Site Features

0 100 200 400 600 800 1,000 Feet

Project: STPX-0002 (749)
Location: Meagher Co., Montana
Date: December 2018
Project Manager: M. Traxler
Drawn By: J. Rosenbaum

File: Z:\RESPEC\02895 MDT Monitoring 2016 - 2018\Rostad Ranch\GPS Data\Mairs\Veg2018.mxd

Project Area	60.00 acres
Pre-Project Wetland	2.51 acres
Wetland - 2018	28.86 acres

Legend

Monitoring Limits

Pre-Project Wetland Area

Wetland Area - 2018

Base Photography Date: July 9, 2018

THIS FIGURE SHOWS THE APPROXIMATE LOCATION OF FEATURES ON THE SITE AND IS NOT INTENDED TO BE A DEFINITIVE SURVEY. IT IS INTENDED TO DISPLAY INFORMATION RELEVANT TO THE REFERENCED REPORT. RESPEC MAKES NO REPRESENTATION OR WARRANTY OF ANY KIND REGARDING THIS DRAWING FOR ANY USE OTHER THAN THE ORIGINAL. ANY OTHER USE IS AT THE USER'S SOLE RISK.

RESPEC
820 North Montana Ave.,
Suite A
Helena, MT 59601

Rostad Ranch Wetland Mitigation Site
2018 Wetland Delineation

0 100 200 400 600 800 1,000 Feet

Project: STPX-0002 (749)

Location: Meagher Co., Montana

Date: December 2018

Project Manager: M. Traxler

Drawn By: J. Rosenbaum

File: Z:\RESPEC\02895 MDT Monitoring 2016 - 2018\Rostad Ranch\GPS Data\Mains\Delin2018.mxd

APPENDIX B
MONITORING FORMS

MDT Wetland Mitigation Monitoring
Rostad Ranch Mitigation Site
Meagher County, Montana

RESPEC/MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: **Rostad Ranch** Project Number: _____
Assessment Date: **July 9, 2018** Person(s) conducting the assessment: **M. Traxler**
Location: **Martinsdale, Montana** MDT District: **Billings**
Milepost: _____
Legal Description: T **8N** R **11E** Section **12 and 13**
Weather Conditions: **Sunny, 85 degrees** Time of Day: **9:00 AM**
Initial Evaluation Date: **August 21, 2013** Monitoring Year: **6** # Visits in Year: **1**
Size of evaluation area: **60 acres** Land use surrounding wetland: **Agriculture**

HYDROLOGY

Surface Water Source: **Groundwater, supplemental hydrology from ditch/headgate, surface runoff**
Inundation: **Present** Average Depth: **1.0 feet** Range of Depths: **0.25-3 ft.**
Percent of assessment area under inundation: **45%**
Depth at emergent vegetation-open water boundary: **2.5 feet**
If assessment area is not inundated then are the soils saturated within 12 inches of surface: **Yes**
Other evidence of hydrology on the site (ex. – drift lines, erosion, stained vegetation, etc.):
Drainage patterns, soil saturation, water marks, drift deposits, oxidized rhizospheres on living roots, geomorphic position, FAC-nuetral test

Groundwater Monitoring Wells: **Present**
Record depth of water below ground surface (in feet):

Well Number	Depth	Well Number	Depth	Well Number	Depth
MW-1					

Additional Activities Checklist:
☒ Map emergent vegetation-open water boundary on aerial photograph.
☒ Observe extent of surface water during each site visit and look for evidence of past surface water elevations (drift lines, erosion, vegetation staining, etc.)
☐ Use GPS to survey groundwater monitoring well locations, if present.

COMMENTS / PROBLEMS:
Structural features were designed and constructed at the site in spring 2017 to spread surface water across a larger portion of the site. Increased inundation was observed across the site in 2018 as a result of the new dike features constructed in 2017.

VEGETATION COMMUNITIES

Community Number: **8** Community Title (main spp): **Bromus inermis / Trifolium spp.**

Dominant Species	% Cover	Dominant Species	% Cover
Bromus inermis	5 = > 50%	Pascopyrum smithii	1 = 1-5%
Trifolium repens	3 = 11-20%	Phleum pratense	3 = 11-20%
Schedonorus pratensis	2 = 6-10%	Populus angustifolia	1 = 1-5%
Elymus repens	2 = 6-10%	Taraxacum officinale	1 = 1-5%
Melilotus officinalis	2 = 6-10%	Trifolium pratense	1 = 1-5%
Achillea millefolium	1 = 1-5%	Centaurea stoebe	1 = 1-5%

Comments / Problems: **Previously recorded as community Type 1 with a prevalence of Phleum pratense. Upland communities across the site are dominated by Bromus inermis.**

Community Number: **2** Community Title (main spp): **Juncus balticus / Carex nebrascensis**

Dominant Species	% Cover	Dominant Species	% Cover
Carex nebrascensis	4 = 21-50%	Open Water	1 = 1-5%
Juncus balticus	4 = 21-50%	Poa palustris	1 = 1-5%
Beckmannia syzigachne	3 = 11-20%	Sonchus arvensis	1 = 1-5%
Phalaris arundinacea	2 = 6-10%	Deschampsia caespitosa	1 = 1-5%
Hordeum jubatum	2 = 6-10%	Rumex crispus	1 = 1-5%
Eleocharis palustris	1 = 1-5%	Typha latifolia	1 = 1-5%

Comments / Problems: **Wet meadow, revegetation successful since 2013.**

Community Number: **3** Community Title (main spp): **Salix exigua /**

Dominant Species	% Cover	Dominant Species	% Cover
Salix exigua	5 = > 50%	Alopecurus pratensis	1 = 1-5%
Deschampsia caespitosa	2 = 6-10%	Carex nebrascensis	1 = 1-5%
Poa palustris	2 = 6-10%	Agrostis gigantea	+ = < 1%
Beckmannia syzigachne	1 = 1-5%	Veronica peregrina	+ = < 1%
Carex utriculata	1 = 1-5%	Typha latifolia	+ = < 1%
Eleocharis palustris	1 = 1-5%		

Comments / Problems: **Undisturbed salix community near southern extent of monitoring boundary.**

Community Number: **5** Community Title (main spp): **Glyceria grandis / Typha latifolia**

Dominant Species	% Cover	Dominant Species	% Cover
Glyceria grandis	4 = 21-50%		
Typha latifolia	3 = 11-20%		
Eleocharis palustris	3 = 11-20%		
Open Water	3 = 11-20%		
Beckmannia syzigachne	2 = 6-10%		

Comments / Problems: _____

VEGETATION COMMUNITIES (continued)

Community Number: **6** Community Title (main spp): **Open Water / Aquatic macrophytes**

Dominant Species	% Cover	Dominant Species	% Cover
Open Water	5 = > 50%	Carex nebrascensis	+ = < 1%
Eleocharis palustris	2 = 6-10%	Juncus balticus	+ = < 1%
Typha latifolia	3 = 11-20%	Polypogon monspeliensis	+ = < 1%
Beckmannia syzigachne	2 = 6-10%	Downingia laeta	+ = < 1%
Glyceria grandis	1 = 1-5%	Rumex crispus	+ = < 1%
Phalaris arundinacea	+ = < 1%	Veronica peregrina	+ = < 1%

Comments / Problems: **New ponds - Typha, Beckmannia, Eleocharis palustris, Phalaris arundinacea**

Community Number: **7** Community Title (main spp): **Phalaris arundinacea /**

Dominant Species	% Cover	Dominant Species	% Cover
Phalaris arundinacea	5 = > 50%		
Elymus trachycaulus	3 = 11-20%		
Poa pratensis	1 = 1-5%		
Trifolium pratense	1 = 1-5%		
Medicago sativa	+ = < 1%		
Thlaspi arvense	1 = 1-5%		

Comments / Problems:

Community Number: **11** Community Title (main spp): **Elymus trachycaulus / Pascopyrum smithii**

Dominant Species	% Cover	Dominant Species	% Cover
Bare Ground	2 = 6-10%	Trifolium hybridum	3 = 11-20%
Chenopodium sp.	2 = 6-10%		
Elymus trachycaulus	3 = 11-20%		
Pascopyrum smithii	3 = 11-20%		
Melilotus officinalis	3 = 11-20%		
Sinapis arvensis	3 = 11-20%		

Comments / Problems: **Construction in spring 2017 resulted in several berms and other disturbed areas. In 2018 constructed berms had 80% vegetative cover with planted species and volunteer grasses and forbs.**

Community Number: **10** Community Title (main spp): **Alopecurus pratensis**

Dominant Species	% Cover	Dominant Species	% Cover
Alopecurus pratensis	4 = 21-50%		
Phalaris arundinacea	3 = 11-20%		
Agrostis gigantea	2 = 6-10%		
Juncus balticus	2 = 6-10%		
Hordeum jubatum	1 = 1-5%		

Comments / Problems: _____

PLANTED WOODY VEGETATION SURVIVAL

Plant Species	Number Originally Planted	Number Observed	Mortality Causes
Populus balsamifera	100		Estimated 50% survival
Populus tremuloides	100		Estimated 50% survival
Salix spp.	2000		Estimated 50% survival

Comments / Problems: **Willow stakes were planted in spring 2013. Due to tall herbaceous vegetation, locating all plantings was difficult during the site visit. Especially difiicult was locating plants (stems) that had died. Those plants observed looked healthy with minor deer browse noted. Survival in 2018 was estimated at 50% survival based on the number of live stems observed. Willows are naturally expanding around Vegetation Community 3 in the south portion of the site.**

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Rostad Ranch** Date: **July 9, 2018** Examiner: **M. Traxler**
Transect Number: **1** Approximate Transect Length: **422 feet** Compass Direction from Start: **290°** Note: _____

Transect Interval Length: **140 feet (station 0-140)**	
Vegetation Community Type: Bromus inermis / Trifolium spp.	
Plant Species	**Cover**
Bromus inermis	4 = 21-50%
Poa palustris	2 = 6-10%
Trifolium pratense	2 = 6-10%
Achillea millefolium	1 = 1-5%
Medicago sativa	1 = 1-5%
Phleum pratense	2 = 6-10%
Tragopogon dubius	1 = 1-5%
Taraxacum officinale	1 = 1-5%
Total Vegetative Cover:	90%

Transect Interval Length: **126 feet (station 140-266)**	
Vegetation Community Type: Juncus balticus / Carex nebrascensis	
Plant Species	**Cover**
Poa palustris	3 = 11-20%
Juncus balticus	3 = 11-20%
Carex nebrascensis	2 = 6-10%
Phalaris arundinacea	2 = 6-10%
Trifolium pratense	2 = 6-10%
Eleocharis palustris	1 = 1-5%
Deschampsia caespitosa	1 = 1-5%
Phleum pratense	1 = 1-5%
Alopecurus pratensis	1 = 1-5%
Total Vegetative Cover:	95%

Transect Interval Length: **20 feet (station 266-286)**	
Vegetation Community Type: Elymus trachycaulus / Pascopyrum smithii	
Plant Species	**Cover**
Bare Ground	3 = 11-20%
Elymus trachycaulus	3 = 11-20%
Melilotus officinalis	3 = 11-20%
Trifolium pratense	2 = 6-10%
Phalaris arundinacea	1 = 1-5%
Pascopyrum smithii	1 = 1-5%
Total Vegetative Cover:	70%

Transect Interval Length: **65 feet (station 286-351)**	
Vegetation Community Type: Phalaris arundinacea	
Plant Species	**Cover**
Phalaris arundinacea	5 = > 50%
Elymus trachycaulus	3 = 11-20%
Phleum pratense	2 = 6-10%
Poa pratensis	1 = 1-5%
Trifolium pratense	1 = 1-5%
Cirsium arvense	1 = 1-5%
Agrostis gigantea	1 = 1-5%
Total Vegetative Cover:	95%

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Rostad Ranch** Date: **July 9, 2018** Examiner: **M. Traxler**
Transect Number: **1** Approximate Transect Length: **422 feet** Compass Direction from Start: **290°** Note: _____

Transect Interval Length: **42 feet (station 351-393)**	
Vegetation Community Type: Glyceria grandis / Typah latifolia	
Plant Species	**Cover**
Glyceria grandis	2 = 6-10%
Phalaris arundinacea	4 = 21-50%
Typha latifolia	1 = 1-5%
Eleocharis palustris	1 = 1-5%
Rumex crispus	2 = 6-10%
Total Vegetative Cover:	75%

Transect Interval Length: **29 feet (station 393-422)**	
Vegetation Community Type: Open Water / Aquatic macrophytes	
Plant Species	**Cover**
Open Water	5 = > 50%
Glyceria grandis	5 = > 50%
Eleocharis palustris	2 = 6-10%
Typha latifolia	2 = 6-10%
Beckmannia syzigachne	2 = 6-10%
Total Vegetative Cover:	50%

Transect Interval Length:	
Vegetation Community Type:	
Plant Species	**Cover**
Total Vegetative Cover:	%

Transect Interval Length:	
Vegetation Community Type:	
Plant Species	**Cover**
Total Vegetative Cover:	%

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Rostad Ranch** Date: **July 9, 2018** Examiner: **M. Traxler**
Transect Number: **2** Approximate Transect Length: **453 feet** Compass Direction from Start: **120˚** Note: _____

Transect Interval Length: **69 feet (station 0-69)**	
Vegetation Community Type: Bromus inermis / Trifolium spp.	
Plant Species	**Cover**
Bromus inermis	1 = 1-5%
Trifolium pratense	1 = 1-5%
Melilotus officinalis	1 = 1-5%
Elymus repens	2 = 6-10%
Phalaris arundinacea	5 = > 50%
Populus angustifolia	3 = 11-20%
Poa palustris	2 = 6-10%
Phleum pratense	2 = 6-10%
Descurainia sophia	1 = 1-5%
Total Vegetative Cover:	85%

Transect Interval Length: **231 feet (station 69-300)**	
Vegetation Community Type: Juncus balticus / Carex nebrascensis	
Plant Species	**Cover**
Juncus balticus	4 = 21-50%
Carex nebrascensis	3 = 11-20%
Trifolium pratense	2 = 6-10%
Phleum pratense	2 = 6-10%
Phalaris arundinacea	4 = 21-50%
Poa pratensis	2 = 6-10%
Salix exigua	1 = 1-5%
Pascopyrum smithii	1 = 1-5%
Alopecurus pratensis	1 = 1-5%
Carex stipata	1 = 1-5%
Total Vegetative Cover:	90%

Transect Interval Length: **115 feet (station 300-415)**	
Vegetation Community Type: Phalaris arundinacea	
Plant Species	**Cover**
Phalaris arundinacea	5 = > 50%
Phleum pratense	2 = 6-10%
Total Vegetative Cover:	80%

Transect Interval Length: **38 feet (station 415-453)**	
Vegetation Community Type: Bromus inermis / Trifolium spp.	
Plant Species	**Cover**
Bromus inermis	3 = 11-20%
Trifolium pratense	3 = 11-20%
Poa pratensis	3 = 11-20%
Elymus trachycaulus	2 = 6-10%
Juncus balticus	2 = 6-10%
Pascopyrum smithii	2 = 6-10%
Elymus repens	2 = 6-10%
Phalaris arundinacea	1 = 1-5%
Phleum pratense	1 = 1-5%
Total Vegetative Cover:	75%

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Rostad Ranch** Date: **July 9, 2018** Examiner: **M. Traxler**
Transect Number: **3** Approximate Transect Length: **320 feet** Compass Direction from Start: **30˚** Note: _____

Transect Interval Length: **28 feet (station 0-28)**	
Vegetation Community Type: Phalaris arundinacea	
Plant Species	**Cover**
Populus angustifolia	4 = 21-50%
Phalaris arundinacea	4 = 21-50%
Elymus repens	2 = 6-10%
Amaranthus retroflexus	1 = 1-5%
Phleum pratense	1 = 1-5%
Bare Ground	1 = 1-5%
Total Vegetative Cover:	70%

Transect Interval Length: **107 feet (station 28-135)**	
Vegetation Community Type: Juncus balticus / Carex nebrascensis	
Plant Species	**Cover**
Hordeum jubatum	1 = 1-5%
Deschampsia caespitosa	3 = 11-20%
Juncus balticus	4 = 21-50%
Phalaris arundinacea	2 = 6-10%
Salix exigua	2 = 6-10%
Trifolium pratense	2 = 6-10%
Alopecurus pratensis	1 = 1-5%
Carex nebrascensis	2 = 6-10%
Epilobium ciliatum	1 = 1-5%
Beckmannia syzigachne	1 = 1-5%
Juncus bufonius	1 = 1-5%
Total Vegetative Cover:	90%

Transect Interval Length: **165 feet (station 135-300)**	
Vegetation Community Type: Glyceria grandis / Typha latifolia	
Plant Species	**Cover**
Glyceria grandis	2 = 6-10%
Typha latifolia	4 = 21-50%
Eleocharis palustris	3 = 11-20%
Alopecurus pratensis	3 = 11-20%
Beckmannia syzigachne	3 = 11-20%
Salix exigua	2 = 6-10%
Open Water	1 = 1-5%
Total Vegetative Cover:	75%

Transect Interval Length: **20 feet (station 300-320)**	
Vegetation Community Type: Juncus balticus / Carex nebrascensis	
Plant Species	**Cover**
Eleocharis palustris	5 = > 50%
Phalaris arundinacea	2 = 6-10%
Salix exigua	1 = 1-5%
Typha latifolia	+ = < 1%
Elymus trachycaulus	+ = < 1%
Beckmannia syzigachne	+ = < 1%
Hordeum jubatum	+ = < 1%
Deschampsia caespitosa	+ = < 1%
Juncus balticus	2 = 6-10%
Carex nebrascensis	2 = 6-10%
Poa palustris	1 = 1-5%
Total Vegetative Cover:	75%

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Rostad Ranch** Date: **July 9, 2018** Examiner: **M. Traxler**
Transect Number: **4** Approximate Transect Length: **412 feet** Compass Direction from Start: **0˚** Note: _____

Transect Interval Length: **13 feet (station 0-13)**	
Vegetation Community Type: Elymus trachycaulus/Pascopyrum smithii	
Plant Species	**Cover**
Chenopodium sp.	1 = 1-5%
Cardaria draba	1 = 1-5%
Phleum pratense	1 = 1-5%
Bare Ground	1 = 1-5%
Bromus inermis	3 = 11-20%
Elymus trachycaulus	3 = 11-20%
Pascopyrum smithii	3 = 11-20%
Melilotus officinalis	3 = 11-20%
Total Vegetative Cover:	90%

Transect Interval Length: **50 feet (station 13-63)**	
Vegetation Community Type: Phalaris arundinacea	
Plant Species	**Cover**
Phalaris arundinacea	4 = 21-50%
Bromus inermis	4 = 21-50%
Phleum pratense	3 = 11-20%
Poa palustris	2 = 6-10%
Alopecurus arundinaceus	1 = 1-5%
Poa pratensis	1 = 1-5%
Trifolium pratense	3 = 11-20%
Medicago sativa	1 = 1-5%
Taraxacum officinale	1 = 1-5%
Total Vegetative Cover:	80%

Transect Interval Length: **229 feet (station 63-292)**	
Vegetation Community Type: Bromus inermis/ Trifolium sp.	
Plant Species	**Cover**
Trifolium pratense	3 = 11-20%
Bromus inermis	5 = > 50%
Phleum pratense	3 = 11-20%
Medicago sativa	1 = 1-5%
Taraxacum officinale	1 = 1-5%
Poa pratensis	2 = 6-10%
Total Vegetative Cover:	80%

Transect Interval Length: **20 feet (station 292-312)**	
Vegetation Community Type: Elymus trachycaulus/Pascopyrum smithii	
Plant Species	**Cover**
Bare Ground	1 = 1-5%
Chenopodium sp.	2 = 6-10%
Cardaria draba	1 = 1-5%
Sinapis arvensis	3 = 11-20%
Elymus trachycaulus	2 = 6-10%
Melilotus officinalis	3 = 11-20%
Pascopyrum smithii	2 = 6-10%
Total Vegetative Cover:	80%

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Rostad Ranch** Date: **July 9, 2018** Examiner: **M. Traxler**
Transect Number: **4** Approximate Transect Length: **412 feet** Compass Direction from Start: **0˚** Note: _____

Transect Interval Length: **100 feet (station 312-412)**	
Vegetation Community Type: Bromus inermis/Trifolium sp	
Plant Species	**Cover**
Trifolium pratense	3 = 11-20%
Bromus inermis	5 = > 50%
Phleum pratense	2 = 6-10%
Poa pratensis	2 = 6-10%
Total Vegetative Cover:	80%

Transect Interval Length:	
Vegetation Community Type:	
Plant Species	**Cover**
Total Vegetative Cover:	%

Transect Interval Length: **)**	
Vegetation Community Type:	
Plant Species	**Cover**
Total Vegetative Cover:	%

Transect Interval Length:	
Vegetation Community Type: .	
Plant Species	**Cover**
Total Vegetative Cover:	%

MDT WETLAND MONITORING – VEGETATION TRANSECT

Cover Estimate		**Indicator Class**	**Source**
+ = < 1%	3 = 11-10%	+ = Obligate	P = Planted
1 = 1-5%	4 = 21-50%	- = Facultative/Wet	V = Volunteer
2 = 6-10%	5 = > 50%	0 = Facultative	

Percent of perimeter 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 foot depth (in open water), or at the point where water depths or saturation are maximized. Mark this location with another metal fencepost.

Estimate cover within a 10 foot 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.

Comments: _____

PHOTOGRAPHS

Take photographs of the following permanent reference points listed in the check list below. Record the direction of the photograph using a compass. When at the site for the first time, establish a permanent reference point by setting a ½ inch rebar or fencepost extending 2-3 feet above ground. Survey the location with a resource grade GPS and mark the location on the aerial photograph.

Photograph Checklist:

- ☐ One photograph for each of the four cardinal directions surrounding the wetland.
- ☐ At least one photograph showing upland use surrounding the wetland. If more than one upland exists then take additional photographs.
- ☐ At least one photograph showing the buffer surrounding the wetland.
- ☐ One photograph from each end of the vegetation transect, showing the transect.

Location	Photograph Frame #	Photograph Description & Lat/Long	Compass Reading (°)
PP-1		Photo Point 1 (Pano): 46.463894 / -110.292686	140-240
PP-2		Photo Point 2 (Pano): 46.461612 / -110.294534	180-70
PP-2		Photo Point 2 (WNW): 46.461612 / -110.294534	275
PP-3		Photo Point 3 (Pano): 46.460579 / -110.294502	160-360
PP-4		Photo Point 4 (Pano): 46.458241 / -110.29377	190-340
PP-5		Photo Point 5 (Pano): 46.458417 / -110.296185	300-110
PP-6		Photo Point 6 (NNE): 46.459839 / -110.298195	30
PP-6		Photo Point 6 (ESE): 46.459839 / -110.298195	100
PP-7		Photo Point 7 (Pano): 46.461119 / -110.299371	0-300
PP-8		Photo Point 8 (E): 46.460987 / -110.298118	90
PP-9		Photo Point 9 (SW): 46.461106 / -110.294579	240
PP-10		Photo Point 10 (ENE): 46.461759 / -110.298593	80
T-1 start		Transect 1 start: 46.463043 / -110.291222	290
T-1 end		Trasnect 1 end: 46.463577 / -110.29274	110
T-2 start		Transect 2 start: 46.46286 / -110.296341	130
T-2 end		Transect 2 end: 46.46191 / -110.295059	310
T-3 start		Transect 3 start: 46.459347 / -110.296814	30
T-3 end		Transect 3 end: 46.459827 / -110.295876	210
T-4 start		Transect 4 start: 46.462945 / -110.297834	0
T-4 end		Transect 4 end: 46.461803 / -110.297953	180
DP-1W		Wetland soil pit #1: 46.462577 / -110.294263	
DP-1U		Upland soil pit #1: 46.462457 / -110.294063	
DP-2W		Wetland soil pit #2: 46.463243 / -110.29184	
DP-2U		Upland soil pit #2: 46.463196 / -110.291675	
DP-3W		Wetland soil pit #3: 46.462084 / -110.295312	
DP-3U		Upland soil pit #3: 46.462029 / -110.295224	

Comments / Problems: **DP-3W and DP-3U are new data points in 2018. DP-2W and DP-2U were moved in 2018.**

GPS SURVEYING

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

GPS Checklist:

- ☒ Upland/wetland boundary.
- ☒ 4-6 landmarks that are recognizable on the aerial photograph.
- ☒ Start and End points of vegetation transect(s).
- ☒ Photograph reference points.
- ☐ Groundwater monitoring well locations.
- ☒ Bird nest boxes.

Comments / Problems: _____

WETLAND DELINEATION

(attach COE delineation forms)

At each site conduct these checklist items:

- ☒ Delineate wetlands according to the 1987 Army COE manual and regional supplement.
- ☒ Delineate wetland – upland boundary onto aerial photograph.

Comments / Problems: _____

FUNCTIONAL ASSESSMENT

- ☒ Complete and attach full MDT Montana Wetland Assessment Method field forms.

Comments / Problems: _____

MAINTENANCE

Were man-made nesting structure installed at this site? **Yes**
If yes, do they need to be repaired? **No**
If yes, describe the problems below and indicate if any actions were taken to remedy the problems.

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

Comments / Problems: _____

WILDLIFE

Birds

Were man-made nesting structures installed? **Yes**
If yes, type of structure: **Box** How many? **7**
Are the nesting structures being used? **Yes**
Do the nesting structures need repairs? **No**

Mammals and Herptiles

Mammal and Herptile Species	Number Observed	Indirect Indication of Use			
		Tracks	Scat	Burrows	Other
White-tailed Deer	2	☐	☐	☐	
Frog sp.	1	☐	☐	☐	Tadpole
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	

Additional Activities Checklist:
NA Macroinvertebrate Sampling (if required)

Comments / Problems: No bird boxes in use. All bird boxes are full and need cleaning. Four pronghorn were observed on the adjacent property.

BIRD SURVEY – FIELD DATA SHEET

Site: **Rostad Ranch** Date: **7/9/18**
Survey Time: **9:00 am** to **4:00 pm**

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
Song sparrow	1	FO	UP				
Mallard	10	F	OW				
Spotted Sandpiper	1	F L FO	UP MA				
Red-winged Blackbird	20	L F FO	UP MA				
Tree Swallow	1	FO	UP				
Bobolink	4	F FO L	UP MA				
Brewer's Blackbird	10	L F FO	MA UP				
Sandhill Crane	2	BP FO	UP MA				
Wislon's snipe	6	L FO F	UP MA				

BEHAVIOR CODES
BP = One of a breeding pair
BD = Breeding display
F = Foraging
FO = Flyover
L = Loafing
N = Nesting

HABITAT CODES
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 shore

Weather: **85 degrees, partly cloudy**

Notes: **Sandhill cranes thought to be nesting. Nest not searched for or located but adults flushed from heavy wetland cover in vicinity of previous documented nesting.**

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Rostad Ranch **City/County:** Meagher **Sampling Date:** 09-Jul-18

Applicant/Owner: MDT **State:** MT **Sampling Point:** **DP-1U**

Investigator(s): M. Traxler **Section, Township, Range:** **S** 12 **T** 8N **R** 11E

Landform (hillslope, terrace, etc.): Footslope **Local relief (concave, convex, none):** convex **Slope:** 1.5% 0.9 °

Subregion (LRR): LRR F **Lat.:** 46.462457 **Long.:** -110.294063 **Datum:** WGS_19

Soil Map Unit Name: Delpoint variant-Marmarth-Cabbart loam, 2 to 8 percent slopes **NWI classification:** Not Mapped

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ○	No ◉	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Hydric Soil Present?	Yes ○	No ◉	
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:
Upland sample point.

VEGETATION - Use scientific names of plants

FWS Region: GP

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 30 Foot Radius)				
1.	0	☐		
2.	0	☐		
3.	0	☐		
4.	0	☐		
	0	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Foot Radius)				
1.	0	☐		
2.	0	☐		
3.	0	☐		
4.	0	☐		
5.	0	☐		
	0	= Total Cover		
Herb Stratum (Plot size: 5 Foot Radius)				
1. Bromus inermis	60	☑	66.7%	UPL
2. Cirsium arvense	5	☐	5.6%	FACU
3. Centaurea maculosa	5	☐	5.6%	UPL
4. Poa palustris	15	☐	16.7%	FACW
5. Phleum pratense	5	☐	5.6%	FACU
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	90	= Total Cover		
Woody Vine Stratum (Plot size: 30 Foot Radius)				
1.	0	☐		
2.	0	☐		
	0	= Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	15	x 2 =	30	
FAC species	0	x 3 =	0	
FACU species	10	x 4 =	40	
UPL species	65	x 5 =	325	
Column Totals:	90	(A)	395	(B)

Prevalence Index = B/A = 4.389

Hydrophytic Vegetation Indicators:

- ☐ **1 - Rapid Test for Hydrophytic Vegetation**
- ☐ **2 - Dominance Test is > 50%**
- ☐ **3 - Prevalence Index is ≤3.0[1]**
- ☐ **4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)**
- ☐ **Problematic Hydrophytic Vegetation[1] (Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present.**

Hydrophytic Vegetation Present? Yes ○ No ◉

Remarks:
Smooth brome is dominant grass in this upland plot.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: DP-1U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 4/2	100					Sandy Clay Loam	

1Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains ²Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR F)
- ☐ 1 cm Muck (A9) (LRR F,G,H)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ☐ Sandy Gleyed Matrix S4
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 and 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR I, J)
- ☐ Coastal Prairie Redox (A16) (LRR F, G, H)
- ☐ Dark Surface (S7) (LRR G)
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 and 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

No hydric soil indicators observed.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-neutral Test (D5)
- ☐ Frost Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches): _____

Water Table Present? Yes ○ No ◉ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches): _____

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available:

Remarks:

No indicators observed.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Rostad Ranch **City/County:** Meagher **Sampling Date:** 09-Jul-18

Applicant/Owner: MDT **State:** MT **Sampling Point:** **DP-1W**

Investigator(s): M. Traxler **Section, Township, Range:** S 12 T 8N R 11E

Landform (hillslope, terrace, etc.): Lowland **Local relief (concave, convex, none):** concave **Slope:** 1.5% 0.9 °

Subregion (LRR): LRR F **Lat.:** 46.462577 **Long.:** -110.294263 **Datum:** WGS_19

Soil Map Unit Name: Delpoint variant-Marmarth-Cabbart loam, 2 to 8 percent slopes **NWI classification:** Not Mapped

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ◉ No ○

Hydric Soil Present? Yes ◉ No ○

Wetland Hydrology Present? Yes ◉ No ○

Is the Sampled Area within a Wetland? Yes ◉ No ○

Remarks:
Wetland sample point.

VEGETATION - Use scientific names of plants

FWS Region: GP

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 30 Foot Radius)				
1.	0	☐		
2.	0	☐		
3.	0	☐		
4.	0	☐		
	0	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Foot Radius)				
1.	0	☐		
2.	0	☐		
3.	0	☐		
4.	0	☐		
5.	0	☐		
	0	= Total Cover		
Herb Stratum (Plot size: 5 Foot Radius)				
1. Phalaris arundinacea	40	☑	42.1%	FACW
2. Agrostis gigantea	30	☑	31.6%	FACW
3. Alopecurus pratensis	10	☐	10.5%	FACW
4. Juncus balticus	10	☐	10.5%	FACW
5. Cirsium arvense	5	☐	5.3%	FACU
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	95	= Total Cover		
Woody Vine Stratum (Plot size: 30 Foot Radius)				
1.	0	☐		
2.	0	☐		
	0	= Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	90	x 2 =	180	
FAC species	0	x 3 =	0	
FACU species	5	x 4 =	20	
UPL species	0	x 5 =	0	
Column Totals:	95	(A)	200	(B)

Prevalence Index = B/A = 2.105

Hydrophytic Vegetation Indicators:

- ☑ **1 - Rapid Test for Hydrophytic Vegetation**
- ☑ **2 - Dominance Test is > 50%**
- ☑ **3 - Prevalence Index is ≤3.0[1]**
- ☐ **4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)**
- ☐ **Problematic Hydrophytic Vegetation[1] (Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:

FACW species dominate this plot. Dominance test >50% and Prevalence Index < 3.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: DP-1W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR	4/3	100						Loam	
4-20	10YR	4/1	90	10YR	5/6	10	D	M	Clay Loam	mottles

1Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains ²Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR F)
- ☐ 1 cm Muck (A9) (LRR F,G,H)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ☐ Sandy Gleyed Matrix S4
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 and 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR I, J)
- ☐ Coastal Prairie Redox (A16) (LRR F, G, H)
- ☐ Dark Surface (S7) (LRR G)
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 and 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

Redox features starting at 4 inches.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☑ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-neutral Test (D5)
- ☐ Frost Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches): _____

Water Table Present? Yes ○ No ◉ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches): _____

Wetland Hydrology Present? Yes ◉ No ○

Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available:

Remarks:

Data point location likely saturated earlier in growing season.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Rostad Ranch **City/County:** Meagher **Sampling Date:** 09-Jul-18

Applicant/Owner: MDT **State:** MT **Sampling Point:** **DP-2U**

Investigator(s): M. Traxler **Section, Township, Range:** **S** 12 **T** 8N **R** 11E

Landform (hillslope, terrace, etc.): Footslope **Local relief (concave, convex, none):** concave **Slope:** 1.0% 0.6 °

Subregion (LRR): LRR F **Lat.:** 46.463196 **Long.:** -110.291675 **Datum:** WGS_19

Soil Map Unit Name: Delpoint variant-Marmarth-Cabbart loam, 2 to 8 percent slopes **NWI classification:** Not Mapped

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ○ No ◉

Hydric Soil Present? Yes ○ No ◉

Wetland Hydrology Present? Yes ○ No ◉

Is the Sampled Area within a Wetland? Yes ○ No ◉

Remarks:
Soil moist to surface but no hydrology. Data point moved in 2018.

VEGETATION - Use scientific names of plants

FWS Region: GP

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 30 Foot Radius)				
1.	0	☐		
2.	0	☐		
3.	0	☐		
4.	0	☐		
	0	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Foot Radius)				
1.	0	☐		
2.	0	☐		
3.	0	☐		
4.	0	☐		
5.	0	☐		
	0	= Total Cover		
Herb Stratum (Plot size: 5 Foot Radius)				
1. Trifolium pratense	15	☑	21.4%	FACU
2. Phleum pratense	20	☑	28.6%	FACU
3. Poa palustris	20	☑	28.6%	FACW
4. Bromus inermis	15	☑	21.4%	UPL
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	70	= Total Cover		
Woody Vine Stratum (Plot size: 30 Foot Radius)				
1.	0	☐		
2.	0	☐		
	0	= Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 25.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	20	x 2 =	40	
FAC species	0	x 3 =	0	
FACU species	35	x 4 =	140	
UPL species	15	x 5 =	75	
Column Totals:	70	(A)	255	(B)

Prevalence Index = B/A = 3.643

Hydrophytic Vegetation Indicators:

- ☐ **1 - Rapid Test for Hydrophytic Vegetation**
- ☐ **2 - Dominance Test is > 50%**
- ☐ **3 - Prevalence Index is ≤3.0[1]**
- ☐ **4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)**
- ☐ **Problematic Hydrophytic Vegetation[1] (Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present.**

Hydrophytic Vegetation Present? Yes ○ No ◉

Remarks:

Plot dominated by FACU and UPL species.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: DP-2U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR	3/2	100					Loam	roots and earthworms
10-20	10YR	4/2	100					Clay Loam	

1Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains ²Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR F)
- ☐ 1 cm Muck (A9) (LRR F,G,H)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ☐ Sandy Gleyed Matrix S4
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 and 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR I, J)
- ☐ Coastal Prairie Redox (A16) (LRR F, G, H)
- ☐ Dark Surface (S7) (LRR G)
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 and 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

No hydric soil indicators observed.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-neutral Test (D5)
- ☐ Frost Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):
Water Table Present?	Yes ◉	No ○	Depth (inches): 6
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available:

Remarks:

No hydrology indicators observed.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Rostad Ranch **City/County:** Meagher **Sampling Date:** 09-Jul-18

Applicant/Owner: MDT **State:** MT **Sampling Point:** DP-2W

Investigator(s): M. Traxler **Section, Township, Range:** S 12 T 8N R 11E

Landform (hillslope, terrace, etc.): Lowland **Local relief (concave, convex, none):** concave **Slope:** 1.5% 0.9 °

Subregion (LRR): LRR F **Lat.:** 46.463243 **Long.:** -110.29184 **Datum:** WGS_19

Soil Map Unit Name: Delpoint variant-Marmarth-Cabbart loam, 2 to 8 percent slopes **NWI classification:** Not Mapped

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ◉ No ○

Hydric Soil Present? Yes ◉ No ○

Wetland Hydrology Present? Yes ◉ No ○

Is the Sampled Area within a Wetland? Yes ◉ No ○

Remarks:
Data point moved in 2018 to NE corner of the site

VEGETATION - Use scientific names of plants

FWS Region: GP

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 30 Foot Radius)				
1.	0	☐		
2.	0	☐		
3.	0	☐		
4.	0	☐		
	0	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Foot Radius)				
1.	0	☐		
2.	0	☐		
3.	0	☐		
4.	0	☐		
5.	0	☐		
	0	= Total Cover		
Herb Stratum (Plot size: 5 Foot Radius)				
1. Juncus balticus	50	☑	50.0%	FACW
2. Phalaris arundinacea	50	☑	50.0%	FACW
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	100	= Total Cover		
Woody Vine Stratum (Plot size: 30 Foot Radius)				
1.	0	☐		
2.	0	☐		
	0	= Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	100	x 2 =	200	
FAC species	0	x 3 =	0	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column Totals:	100	(A)	200	(B)

Prevalence Index = B/A = 2

Hydrophytic Vegetation Indicators:

- ☑ **1 - Rapid Test for Hydrophytic Vegetation**
- ☑ **2 - Dominance Test is > 50%**
- ☑ **3 - Prevalence Index is ≤3.0[1]**
- ☐ **4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)**
- ☐ **Problematic Hydrophytic Vegetation[1] (Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:
Phalaris and Juncus dominant in this plot. Dominance Test >50% and Prevalence Index <3.0.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: DP-2W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR	4/2	80	10YR	5/8	20	D	M	Clay Loam	

1Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains ²Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR F)
- ☐ 1 cm Muck (A9) (LRR F,G,H)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ☐ Sandy Gleyed Matrix S4
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 and 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR I, J)
- ☐ Coastal Prairie Redox (A16) (LRR F, G, H)
- ☐ Dark Surface (S7) (LRR G)
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 and 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

Prominent redox features

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-neutral Test (D5)
- ☐ Frost Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present?	Yes ○ No ◉	Depth (inches):	
Water Table Present?	Yes ○ No ◉	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ◉ No ○	Depth (inches):	10

Wetland Hydrology Present? Yes ◉ No ○

Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available:

Remarks:

Saturation noted at 10 inches during survey.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Rostad Ranch **City/County:** Meagher **Sampling Date:** 09-Jul-18

Applicant/Owner: MDT **State:** MT **Sampling Point:** **DP-3U**

Investigator(s): M. Traxler **Section, Township, Range:** **S** 12 **T** 8N **R** 11E

Landform (hillslope, terrace, etc.): Footslope **Local relief (concave, convex, none):** concave **Slope:** 1.0% 0.6 °

Subregion (LRR): LRR F **Lat.:** 46.462029 **Long.:** -110.295224 **Datum:** WGS_19

Soil Map Unit Name: Delpoint variant-Marmarth-Cabbart loam, 2 to 8 percent slopes **NWI classification:** Not Mapped

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ○	No ◉	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Hydric Soil Present?	Yes ○	No ◉	
Wetland Hydrology Present?	Yes ◉	No ○	

Remarks:
New data point added in 2018. Located near end of Transect 2.

VEGETATION - Use scientific names of plants

FWS Region: GP

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 30 Foot Radius)				
1.	0	☐		
2.	0	☐		
3.	0	☐		
4.	0	☐		
	0	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Foot Radius)				
1.	0	☐		
2.	0	☐		
3.	0	☐		
4.	0	☐		
5.	0	☐		
	0	= Total Cover		
Herb Stratum (Plot size: 5 Foot Radius)				
1. Bromus inermis	10	☐	10.5%	UPL
2. Trifolium pratense	30	☑	31.6%	FACU
3. Poa palustris	30	☑	31.6%	FACW
4. Phleum pratense	20	☑	21.1%	FACU
5. Phalaris arundinacea	5	☐	5.3%	FACW
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	95	= Total Cover		
Woody Vine Stratum (Plot size: 30 Foot Radius)				
1.	0	☐		
2.	0	☐		
	0	= Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 33.3% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	35	x 2 =	70	
FAC species	0	x 3 =	0	
FACU species	50	x 4 =	200	
UPL species	10	x 5 =	50	
Column Totals:	95	(A)	320	(B)

Prevalence Index = B/A = 3.368

Hydrophytic Vegetation Indicators:

- ☐ **1 - Rapid Test for Hydrophytic Vegetation**
- ☐ **2 - Dominance Test is > 50%**
- ☐ **3 - Prevalence Index is ≤3.0**[1]
- ☐ **4 - Morphological Adaptations**[1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **Problematic Hydrophytic Vegetation**[1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present.**

Hydrophytic Vegetation Present? Yes ○ No ◉

Remarks:
Upland grasses and forbs dominant

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: DP-3U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-20	10YR 4/2	100					Clay Loam	

1Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains ²Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR F)
- ☐ 1 cm Muck (A9) (LRR F,G,H)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ☐ Sandy Gleyed Matrix S4
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 and 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR I, J)
- ☐ Coastal Prairie Redox (A16) (LRR F, G, H)
- ☐ Dark Surface (S7) (LRR G)
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 and 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

No hydric soil indicators observed.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-neutral Test (D5)
- ☐ Frost Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present?	Yes ○ No ◉	Depth (inches):	
Water Table Present?	Yes ◉ No ○	Depth (inches):	12
Saturation Present? (includes capillary fringe)	Yes ◉ No ○	Depth (inches):	10

Wetland Hydrology Present? Yes ◉ No ○

Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available:

Remarks:

Wetland hydrology expanding because of adaptive management completed in 2017.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Rostad Ranch **City/County:** Meagher **Sampling Date:** 09-Jul-18

Applicant/Owner: MDT **State:** MT **Sampling Point:** DP-3W

Investigator(s): M. Traxler **Section, Township, Range:** S 12 T 8N R 11E

Landform (hillslope, terrace, etc.): Lowland **Local relief (concave, convex, none):** concave **Slope:** 0.0% 0.0 °

Subregion (LRR): LRR F **Lat.:** 46.462084 **Long.:** -110.295312 **Datum:** WGS_19

Soil Map Unit Name: Delpoint variant-Marmarth-Cabbart loam, 2 to 8 percent slopes **NWI classification:** Not Mapped

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ◉ No ○

Hydric Soil Present? Yes ◉ No ○

Wetland Hydrology Present? Yes ◉ No ○

Is the Sampled Area within a Wetland? Yes ◉ No ○

Remarks:
New data point added in 2018. Located near end of Transect 2.

VEGETATION - Use scientific names of plants

FWS Region: GP

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 30 Foot Radius)				
1.	0	☐		
2.	0	☐		
3.	0	☐		
4.	0	☐		
	0	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Foot Radius)				
1.	0	☐		
2.	0	☐		
3.	0	☐		
4.	0	☐		
5.	0	☐		
	0	= Total Cover		
Herb Stratum (Plot size: 5 Foot Radius)				
1. Phalaris arundinacea	80	☑	84.2%	FACW
2. Phleum pratense	15	☐	15.8%	FACU
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	95	= Total Cover		
Woody Vine Stratum (Plot size: 30 Foot Radius)				
1.	0	☐		
2.	0	☐		
	0	= Total Cover		

% Bare Ground in Herb Stratum 5

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	80	x 2 =	160	
FAC species	0	x 3 =	0	
FACU species	15	x 4 =	60	
UPL species	0	x 5 =	0	
Column Totals:	95	(A)	220	(B)

Prevalence Index = B/A = 2.316

Hydrophytic Vegetation Indicators:

- ☑ **1 - Rapid Test for Hydrophytic Vegetation**
- ☑ **2 - Dominance Test is > 50%**
- ☑ **3 - Prevalence Index is ≤3.0[1]**
- ☐ **4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)**
- ☐ **Problematic Hydrophytic Vegetation[1] (Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:
Phalaris-dominated.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: DP-3W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR	3/2	90	10YR	5/8	10	D	M	Clay Loam	roots

1Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains ²Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR F)
- ☐ 1 cm Muck (A9) (LRR F,G,H)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ☐ Sandy Gleyed Matrix S4
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 and 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR I, J)
- ☐ Coastal Prairie Redox (A16) (LRR F, G, H)
- ☐ Dark Surface (S7) (LRR G)
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 and 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

Prominent redox features

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-neutral Test (D5)
- ☐ Frost Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present?	Yes ○ No ◉	Depth (inches):	
Water Table Present?	Yes ◉ No ○	Depth (inches):	2
Saturation Present? (includes capillary fringe)	Yes ◉ No ○	Depth (inches):	0

Wetland Hydrology Present? Yes ◉ No ○

Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available:

Remarks:

Water in pit at 2 inches.

MDT MONTANA WETLAND ASSESSMENT FORM (revised March 2008)

1. Project Name: Rostad Ranch **2. MDT Project #:** STPX-0002(749) **3. Control #:** 5565

3. Evaluation Date: July 9, 2018 **4. Evaluator(s):** Mark Traxler **5. Wetland/Site #(s):** Rostad Mitigation Site

6. Wetland Location(s): Township 8 N, Range 11 E, Section 12; Township 8 N, Range 11 E, Section 13

Approximate Stationing or Roadposts: _____

Watershed: 10 - Musselshell **County:** Meagher _____

7. Evaluating Agency: RESPEC for MDT

Purpose of Evaluation:

- ☐ **Wetland potentially affected by MDT project**
- ☐ **Mitigation wetlands; pre-construction**
- ☒ **Mitigation wetlands; post-construction**
- ☐ **Other** _____

8. Wetland Size (acre): _____ (visually estimated)
28.86 (measured, e.g. GPS)

9. Assessment Area (AA) Size (acre): _____ (visually estimated)
(see manual for determining AA) 28.86 (measured, e.g. GPS)

10. CLASSIFICATION OF WETLAND AND AQUATIC HABITATS IN AA (See manual for definitions.)

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% OF AA
Slope	Emergent Wetland	Excavated	Seasonal / Intermittent	78
Slope	Scrub-Shrub Wetland		Seasonal / Intermittent	2
Depressional	Unconsolidated Bottom	Excavated	Seasonal / Intermittent	6
Depressional	Emergent Wetland	Excavated	Seasonal / Intermittent	14

Comments: _____

11. ESTIMATED RELATIVE ABUNDANCE (of similarly classified sites within the same Major Montana Watershed Basin; see manual.)
common

12. GENERAL CONDITION OF AA

i. Disturbance: Use matrix below to select the appropriate response; see manual for Montana listed noxious weed and aquatic nuisance vegetation species lists.

Conditions within AA	Predominant Conditions Adjacent to (within 500 feet of) AA		
	Managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings; and noxious weed or ANVS cover is ≤15%.	Land not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to minor clearing; contains few roads or buildings; noxious weed or ANVS cover is ≤30%.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >30%.
AA occurs and is managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings; and noxious weed or ANVS cover is ≤15%.	---	---	---
AA not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to relatively minor clearing, fill placement, or hydrological alteration; contains few roads or buildings; noxious weed or ANVS cover is ≤30%.	---	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; or noxious weed or ANVS cover is >30%.	---	---	---

Comments (types of disturbance, intensity, season, etc.)**:** The wetland mitigation site was constructed in Fall 2012/Spring 2013 with adaptive management features added to the site in spring 2017. Extensive excavation occurred to create depressional areas and spread out water across the site. Decreased disturbance from cultivation, grazing, and construction since 2017 led to moderate disturbance rating in 2018.

ii. Prominent noxious, aquatic nuisance, and other exotic vegetation species: Spotted knapweed, Canada thistle, houndstongue, hoary alyssum, field bindweed, common tansy

iii. Provide brief descriptive summary of AA and surrounding land use/habitat: The AA is a historically drained wetland area/meadow that was heavily grazed by cattle. A drainage ditch bisected the property prior to wetland mitigation construction. Existing wetlands were expanded through construction activities with emergent and scrub-shrub wetland communities present. Surrounding land use includes transportation (county road, historic railroad berm), agriculture (hay production and cattle grazing), and the South Fork of the Musselshell River located to the north of the mitigation site.

13. STRUCTURAL DIVERSITY (Based on number of "Cowardin" ***vegetated*** classes present [do not include unvegetated classes]; see #10 above.)

Existing # of "Cowardin" Vegetated Classes in AA	Initial Rating	Is current management preventing (passive) existence of additional vegetated classes?		Modified Rating
≥3 (or 2 if one is forested) classes	---	NA	NA	NA
2 (or 1 if forested) classes	mod	NA	NA	NA
1 class, but not a monoculture	---	←NO	YES→	---
1 class, monoculture (1 species comprises ≥90% of total cover)	---	NA	NA	NA

Comments: Emergent and scrub-shrub vegetation classes

Wetland/Site #(s): Rostad Mitigation Site

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

i. AA is Documented (D) or Suspected (S) to contain: Check box based on definitions in manual.

Primary or critical habitat (**list species**) ☐ D ☐ S _____
Secondary habitat (**list species**) ☐ D ☐ S _____
Incidental habitat (**list species**) ☐ D ☐ S _____
No usable habitat ☒ S

ii. Rating: Based on the strongest habitat chosen in 14A(i) above, select the corresponding functional point and rating.

Highest Habitat Level	Doc/Primary	Sus/Primary	Doc/Secondary	Sus/Secondary	Doc/Incidental	Sus/Incidental	None
Functional Point/Rating	---	---	---	---	---	---	0L

Sources for documented use (e.g. observations, records): USFWS list for Meagher County; no habitat specifications present for species or documented occurences.

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

i. AA is Documented (D) or Suspected (S) to contain: Check box based on definitions in manual.

Primary or critical habitat (**list species**) ☒ D ☐ S Downingia laeta (S2S3)
Secondary habitat (**list species**) ☒ D ☐ S Long-billed curlew (S3B); Mountain plover (S2B)
Incidental habitat (**list species**) ☐ D ☐ S _____
No usable habitat ☐ S

ii. Rating: Based on the strongest habitat chosen in 14A(i) above, select the corresponding functional point and rating.

Highest Habitat Level	Doc/Primary	Sus/Primary	Doc/Secondary	Sus/Secondary	Doc/Incidental	Sus/Incidental	None
S1 Species Functional Point/Rating	---	---	---	---	---	---	---
S2 and S3 Species Functional Point/Rating	.9H	---	---	---	---	---	---

Sources for documented use (e.g. observations, records): Observations of Downingia laeta in wetland during 2013-2015 site visits; past observations of curlew/plover

14C. GENERAL WILDLIFE HABITAT RATING

i. Evidence of Overall Wildlife Use in the AA: Check substantial, moderate, or low based on supporting evidence.

☐ ***Substantial:*** Based on any of the following [check].
- ☐ 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
- ☐ interview with local biologist with knowledge of the AA

☐ ***Minimal:*** Based on any of the following [check].
- ☐ few or no wildlife observations during peak use periods
- ☐ little to no wildlife sign
- ☐ sparse adjacent upland food sources
- ☐ interview with local biologist with knowledge of AA

☒ ***Moderate:*** Based on any of the following [check].
- ☒ 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
- ☐ interview with local biologist with knowledge of the AA

ii. Wildlife Habitat Features: Working from top to bottom, check appropriate AA attributes in matrix to arrive at rating. Structural diversity is from #13. For class cover to be considered evenly distributed, the most and least prevalent **vegetated** classes must be within 20% of each other in terms of their percent composition of the AA (see #10). Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; and A = absent [see manual for further definitions of these terms].

Structural Diversity (see #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 #12i)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
☒ **Moderate Disturbance** at AA (see #12i)	---	---	---	---	---	---	---	---	---	---	---	---	---	M	---	---	---	---	---	---
☐ **High Disturbance** at AA (see #12i)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

iii. Rating: Use the conclusions from i and ii above and the matrix below to select the functional point and rating.

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

Comments: Site appears to be getting use by white-tailed deer and numerous bird species. Active Sandhill Crane nesting observed in wetlands in 2016 and 2018.

Wetland/Site #(s): Rostad Mitigation Site

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

If the AA is not used by fish, fish use is not restorable due to habitat constraints, or is not desired from a management perspective [such as fish entrapped in a canal], then check the NA box and proceed to 14E.

Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier].

Type of Fishery: ☐ Cold Water (**CW**) ☐ Warm Water (**WW**) **Use the CW or WW guidelines in the manual to complete the matrix.**

i. Habitat Quality and Known / Suspected Fish Species in AA: Use matrix to select the functional point and rating.

Duration of Surface Water in AA	☐ **Permanent / Perennial**						☐ **Seasonal / Intermittent**						☐ **Temporary / Ephemeral**					
Aquatic Hiding / Resting / Escape Cover	☐ **Optimal**		☐ **Adequate**		☐ **Poor**		☐ **Optimal**		☐ **Adequate**		☐ **Poor**		☐ **Optimal**		☐ **Adequate**		☐ **Poor**	
Thermal Cover: optimal / suboptimal	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**
FWP Tier I fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Tier II or **Native Game** fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Tier III or **Introduced Game** fish	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Non-Game Tier IV or **No** fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Sources used for identifying fish spp. potentially found in AA: _____

ii. Modified Rating: NOTE: Modified score cannot exceed 1.0 or be less than 0.1.

a) Is fish use of the AA significantly reduced by a culvert, dike, or other man-made structure or activity, ***or*** *is the waterbody included on the current final MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support,* ***or*** *do aquatic nuisance plant or animal species (see* ***Appendix E****) occur in fish habitat?* ☐ **YES**, reduce score in **i** by 0.1 = __ or ☒ **N0**

b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area; specify in comments) for native fish or introduced game fish? ☐ **YES**, add to score in **i** or **iia** 0.1 = __ or ☒ **N0**

iii. Final Score and Rating: _ **Comments:** No perennially flowing water within AA for fish habitat.

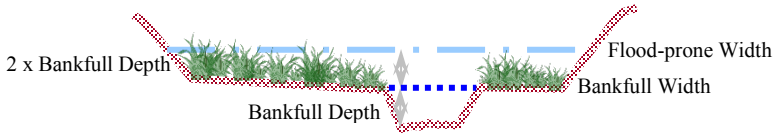
14E. FLOOD ATTENUATION ☒ **NA** (proceed to 14F)

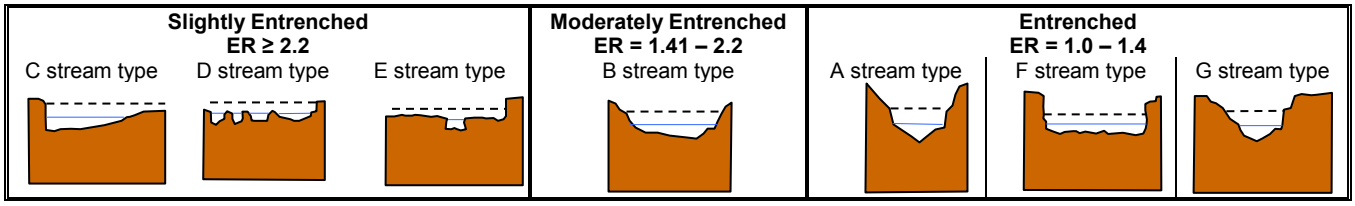
Applies only to wetlands that are subject to flooding via in-channel or overbank flow.
If wetlands in AA are not flooded from in-channel or overbank flow, check the NA box and proceed to 14F.

Entrenchment Ratio (ER) Estimation (see manual for additional guidance). Entrenchment ratio = (flood-prone width) / (bankfull width).
Flood-prone width = estimated horizontal projection of where 2 X maximum bankfull depth elevation intersects the floodplain on each side of the stream.

_____ / _____ = _____

flood prone width / bankfull width = entrenchment ratio





i. Rating: Working from top to bottom, use the matrix below to select the functional point and rating.

Estimated or Calculated Entrenchment (Rosgen 1994, 1996)	☐ Slightly Entrenched C, D, E stream types			☐ Moderately Entrenched B stream type			☐ Entrenched A, F, G stream types		
Percent of Flooded Wetland Classified as Forested and/or Scrub/Shrub	☐ 75%	☐ 25-75%	☐ <25%	☐ 75%	☐ 25-75%	☐ <25%	☐ 75%	☐ 25-75%	☐ <25%
AA contains **no outlet or restricted outlet**	---	---	---	---	---	---	---	---	---
AA contains **unrestricted outlet**	---	---	---	---	---	---	---	---	---

ii. Are ≥10 acres of wetland in the AA subject to flooding AND are man-made features which may be significantly damaged by floods located within 0.5 mile downstream of the AA? ☐ YES ☒ NO **Comments:** No flooding occurs via in-channel or overbank flow.

Wetland/Site #(s): Rostad Mitigation Site

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, then check the NA box and proceed to 14G.

i. Rating: Working from top to bottom, use the matrix below to select the functional point and rating. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see manual for further definitions of these terms].

Estimated Maximum Acre Feet of Water Contained in Wetlands within the AA that are Subject to Periodic Flooding or Ponding	☒ **>5 acre feet**			☐ **1.1 to 5 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 **≥ 5 out of 10 years**	---	.9H	---	---	---	---	---	---	---
Wetlands in AA flood or pond **< 5 out of 10 years**	---	---	---	---	---	---	---	---	---

Comments: Depressional area and portions of slope wetlands maintain water seasonally/intermittently. Adaptive management in 2017 resulted in an increased score for this function.

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

Applies to wetland with potential to receive 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 the NA box and proceed to 14H.

i. Rating: Working from top to bottom, use the matrix below to select the functional point and rating.

Sediment, Nutrient, and Toxicant Input Levels within AA	**AA receives or surrounding land use has potential to deliver sediments, nutrients, or compounds at levels such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.**				**Waterbody is 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 / Ponding in AA	☒ **Yes**	☐ **No**	☐ **Yes**	☐ **No**	☐ **Yes**	☐ **No**	☐ **Yes**	☐ **No**
AA contains **no or restricted outlet**	1H	---	---	---	---	---	---	---
AA contains **unrestricted outlet**	---	---	---	---	---	---	---	---

Comments: More than 80 percent of the non-open water area is covered with wetland vegetation. A restricted outlet is located on the depressional area as a constructed overflow channel.

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

Applies only if AA occurs on or within the banks of a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action.
If 14H does not apply, check the NA box and proceed to 14I.

% Cover of Wetland Streambank or Shoreline by Species with Stability Ratings of ≥6 (see Appendix F).	**Duration of Surface Water Adjacent to Rooted Vegetation**		
	☐ **Permanent / Perennial**	☒ **Seasonal / Intermittent**	☐ **Temporary / Ephemeral**
☒ **≥ 65%**	---	.9H	---
☐ **35-64%**	---	---	---
☐ **< 35%**	---	---	---

Comments: AA supports open water areas subject to wave action.

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

i. Level of Biological Activity: Synthesis of wildlife and fish habitat rates (select).

General Fish Habitat Rating (14Diii)	**General Wildlife Habitat Rating (14Ciii)**		
	☐ **E/H**	☒ **M**	☐ **L**
☐ **E/H**	---	---	---
☐ **M**	---	---	---
☐ **L**	---	---	---
☒ **NA**	---	M	---

ii. Rating: Working from top to bottom, use the matrix below to select the functional point and rating. Factor A = acreage of vegetated wetland component in the AA; Factor B = level of biological activity rating from above (14Ii); Factor C = whether or not the AA contains a surface or subsurface outlet; the final three rows pertain to the duration of surface water in the AA, where P/P, S/I, and T/E were previously defined, and A = "absent" [see manual for further definitions of these terms].

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	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
P/P	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
S/I	---	---	.7M	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
T/E/A	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Wetland/Site #(s): Rostad Mitigation Site

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT (continued)

iii. Modified Rating: Note: Modified score cannot exceed 1.0 or be less than 0.1.

Vegetated Upland Buffer: Area with ≥ 30% plant cover, ≤ 15% noxious weed or ANVS cover, AND that is not subjected to periodic mechanical mowing or clearing (unless for weed control).
Is there an average ≥ 50-foot wide vegetated upland buffer around ≥ 75% of the AA's perimeter? ☒ **YES**, add 0.1 to score in **ii** = 0.80 ☐ **NO**

iv. Final Score and Rating: .8H **Comments:** Moderate biologial activity; no fish habitat; vegetative component >5 acres with a upland buffer.

14J. GROUNDWATER DISCHARGE / RECHARGE
Check the appropriate indicators in i and ii below.

i. Discharge Indicators
- ☒ The AA is a slope wetland.
- ☒ Springs or seeps are known or observed.
- ☒ Vegetation growing during dormant season/drought.
- ☒ Wetland occurs at the toe of a natural slope.
- ☐ Seeps are present at the wetland edge.
- ☒ AA permanently flooded during drought periods.
- ☒ Wetland contains an outlet, but no inlet.
- ☐ Shallow water table and the site is saturated to the surface.
- ☐ Other: _____

ii. Recharge Indicators
- ☐ Permeable substrate present without underlying impeding layer.
- ☐ Wetland contains inlet but no outlet.
- ☐ Stream is a known 'losing' stream. Discharge volume decreases.
- ☐ Other: _____

iii. Rating: Use the information from i and ii above and the table below to select the functional point and rating.

Criteria	Duration of Saturation at AA Wetlands ***FROM GROUNDWATER DISCHARGE*** or ***WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM*** ☐ P/P	☒ S/I	☐ T	☐ None
☒ **Groundwater Discharge or Recharge**	---	.7M	---	---
☐ **Insufficient Data/Information**	---			

Comments: Seasonal water regime within AA.

14K. UNIQUENESS

i. Rating: Working from top to bottom, use the matrix below to select the functional point and rating.

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 (#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: PEM and PSS wetlands of this type are common in the area. Structural diversity is not high and there are no bogs, fens, or forested wetlands.

14L. RECREATION / EDUCATION POTENTIAL ☐ NA (proceed to Overall Summary and Rating page)
Affords 'bonus' points if AA provides a recreational or educational opportunity.

i. Is the AA a known or potential recreational or educational site? ☒ **YES**, go to ii. ☐ **NO**, check the NA box.

ii. Check categories that apply to the AA: ☐ Educational/Scientific Study ☐ Consumptive Recreational ☒ Non-consumptive recreational ☐ Other: _____

iii. Rating: Use the matrix below to select the functional point and rating.

Known or Potential Recreational or Educational Area	Known	Potential
Public ownership or public easement with general public access (no permission required)	---	---
Private ownership with general public access (no permission required)	---	---
Private or public ownership without general public access, or requiring permission for public access	---	.05L

Comments: Currently no recreation/education occurs at the site.

15. GENERAL SITE NOTES: _____

Wetland/Site #(s): Rostad Mitigation Site

Function & Value Variables	Rating – Actual Functional Points	Possible Functional Points	Functional Units: Actual Points x Estimated AA Acreage	Indicate the Four Most Prominent Functions with an Asterisk
A. Listed / Proposed T&E Species Habitat	low 0.00	1.00	0	
B. MT Natural Heritage Program Species Habitat	high 0.90	1.00	25.97	*
C. General Wildlife Habitat	mod 0.50	1.00	14.43	
D. General Fish Habitat	NA	NA	0	
E. Flood Attenuation	NA	NA	0	
F. Short and Long Term Surface Water Storage	high 0.90	1.00	25.97	
G. Sediment / Nutrient / Toxicant Removal	high 1.00	1.00	28.86	*
H. Sediment / Shoreline Stabilization	high 0.90	1.00	25.97	*
I. Production Export / Food Chain Support	high 0.80	1.00	23.09	*
J. Groundwater Discharge / Recharge	mod 0.70	1.00	20.20	
K. Uniqueness	low 0.30	1.00	8.66	
L. Recreation / Education Potential (bonus point)	low 0.05		1.44	
Total Points	**6.05**	**9**	**175.59 Total Functional Units**	
Percent of Possible Score 67% (round to nearest whole number)				

Category I Wetland: (must satisfy **one** of the following criteria; otherwise go 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 possible score > 80% (round to nearest whole #).

Category II Wetland: (Criteria for Category I not satisfied **and** meets any **one** of the following criteria; otherwise go to Category IV)
- ☐ Score of 1 functional point for MT Natural Heritage Program Species Habitat; **or**
- ☐ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
- ☐ Score of .9 or 1 functional point for General Fish 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 possible score > 65% (round to nearest whole #).

☐ **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 go to Category III)
- ☐ "Low" rating for Uniqueness; **and**
- ☐ Vegetated wetland component < 1 acre (do not include upland vegetated buffer); **and**
- ☐ Percent of possible score < 35% (round to nearest whole #).

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

☐ **I** ☒ **II** ☐ **III** ☐ **IV**

APPENDIX C
PROJECT AREA PHOTOGRAPHS

MDT Wetland Mitigation Monitoring
Rostad Ranch Mitigation Site
Meagher County, Montana

Rostad Ranch: Photo Point Photographs



Photo Point 1 – Panorama; Location: Northeast Corner; Bearing 200 degrees; Year 2013



Photo Point 1 – Panorama; Location: Northeast Corner; Bearing 200 degrees; Year 2016



Photo Point 1 – Panorama; Location: Northeast Corner; Bearing 200 degrees; Year 2017



Photo Point 1 – Panorama; Location: Northeast Corner; Bearing 200 degrees; Year 2018

Rostad Ranch: Photo Point Photographs



Photo Point 2 – Panorama; Location: East Fence Corner; Bearing 125 degrees; Year 2013



Photo Point 2 – Panorama; Location: East Fence Corner; Bearing 125 degrees; Year 2016



Photo Point 2 – Panorama; Location: East Fence Corner; Bearing 125 degrees; Year 2017



Photo Point 2 – Panorama; Location: East Fence Corner; Bearing 125 degrees; Year 2018

Rostad Ranch: Photo Point Photographs



Photo Point 3 – Panorama; Location: East Fence Line; Bearing 280 degrees; Year 2013



Photo Point 3 – Panorama; Location: East Fence Line; Bearing 280 degrees; Year 2016



Photo Point 3 – Panorama; Location: East Fence Line; Bearing 280 degrees; Year 2017



Photo Point 3 – Panorama; Location: East Fence Line; Bearing 280 degrees; Year 2018

Rostad Ranch: Photo Point Photographs



Photo Point 4 – Panorama; Location: SE Fence Corner; Bearing 240 degrees; Year 2013



Photo Point 4 – Panorama; Location: SE Fence Corner; Bearing 240 degrees; Year 2016



Photo Point 4 – Panorama; Location: SE Fence Corner; Bearing 240 degrees; Year 2017



Photo Point 4 – Panorama; Location: SE Fence Corner; Bearing 240 degrees; Year 2018

Rostad Ranch: Photo Point Photographs



Photo Point 5 – Panorama; Location: SW Fence Corner; Bearing 200 degrees; Year 2013



Photo Point 5 – Panorama; Location: SW Fence Corner; Bearing 200 degrees; Year 2016



Photo Point 5 – Panorama; Location: SW Fence Corner; Bearing 200 degrees; Year 2017



Photo Point 5 – Panorama; Location: SW Fence Corner; Bearing 200 degrees; Year 2018

Rostad Ranch: Photo Point Photographs



Photo Point 6 Location: West Fence Line
Bearing: 30 degrees Year: 2013



Photo Point 6 Location: West Fence Line
Bearing: 30 degrees Year: 2014



Photo Point 6 Location: West Fence Line
Bearing: 30 degrees Year: 2015



Photo Point 6 Location: West Fence Line
Bearing: 30 degrees Year: 2016



Photo Point 6 Location: West Fence Line
Bearing: 30 degrees Year: 2017



Photo Point 6 Location: West Fence Line
Bearing: 30 degrees Year: 2018

Rostad Ranch: Photo Point Photographs



Photo Point 6 Location: West Fence Line
Bearing: 100 degrees Year: 2013



Photo Point 6 Location: West Fence Line
Bearing: 100 degrees Year: 2014



Photo Point 6 Location: West Fence Line
Bearing: 100 degrees Year: 2015



Photo Point 6 Location: West Fence Line
Bearing: 100 degrees Year: 2016



Photo Point 6 Location: West Fence Line
Bearing: 100 degrees Year: 2017



Photo Point 6 Location: West Fence Line
Bearing: 100 degrees Year: 2018

Rostad Ranch: Photo Point Photographs



Photo Point 7 – Panorama; Location: West Fence Corner; Bearing 90 degrees; Year 2013



Photo Point 7 – Panorama; Location: West Fence Corner; Bearing 90 degrees; Year 2015



Photo Point 7 – Panorama; Location: West Fence Corner; Bearing 90 degrees; Year 2017



Photo Point 7 – Panorama; Location: West Fence Corner; Bearing 90 degrees; Year 2018

Rostad Ranch: Photo Point Photographs



Photo Point 8 Location: West Central
Bearing: 90 degrees Year: 2017



Photo Point 8 Location: West Central
Bearing: 90 degrees Year: 2018



Photo Point 9 Location: East Fence Line
Bearing: 240 degrees Year: 2017



Photo Point 9 Location: East Fence Line
Bearing: 240 degrees Year: 2018



Photo Point 10 Location: West Central
Bearing: 80 degrees Year: 2017



Photo Point 10 Location: West Central
Bearing: 80 degrees Year: 2018

Rostad Ranch: Transect Photographs



Transect 1: Start
Bearing: 290 degrees
Location: NE Branch of site
Year: 2013



Transect 1: Start
Bearing: 290 degrees
Location: NE Branch of site
Year: 2014



Transect 1: Start
Bearing: 290 degrees
Location: NE Branch of site
Year: 2015



Transect 1: Start
Bearing: 290 degrees
Location: NE Branch of site
Year: 2016



Transect 1: Start
Bearing: 290 degrees
Location: NE Branch of site
Year: 2017

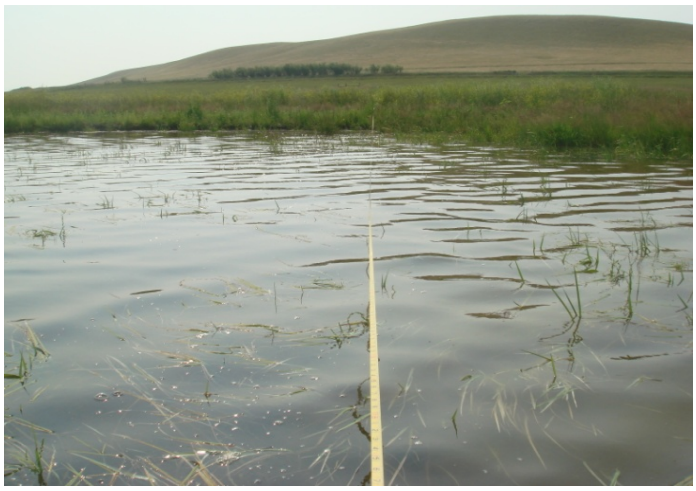


Transect 1: Start
Bearing: 290 degrees
Location: NE Branch of site
Year: 2018

Rostad Ranch: Transect Photographs



Transect 1: End
Bearing: 110 degrees
Location: NE Branch of site
Year: 2013



Transect 1: End
Bearing: 110 degrees
Location: NE Branch of site
Year: 2014



Transect 1: End
Bearing: 110 degrees
Location: NE Branch of site
Year: 2015



Transect 1: End
Bearing: 110 degrees
Location: NE Branch of site
Year: 2016

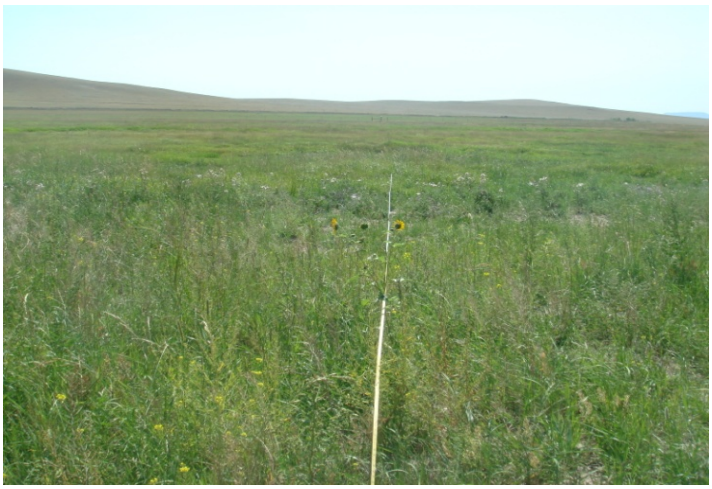


Transect 1: End
Bearing: 110 degrees
Location: NE Branch of site
Year: 2017



Transect 1: End
Bearing: 110 degrees
Location: NE Branch of site
Year: 2018

Rostad Ranch: Transect Photographs



Transect 2: Start
Bearing: 130 degrees
Location: North Central
Year: 2013



Transect 2: Start
Bearing: 130 degrees
Location: North Central
Year: 2014



Transect 2: Start
Bearing: 130 degrees
Location: North Central
Year: 2015



Transect 2: Start
Bearing: 130 degrees
Location: North Central
Year: 2016



Transect 2: Start
Bearing: 130 degrees
Location: North Central
Year: 2017



Transect 2: Start
Bearing: 130 degrees
Location: North Central
Year: 2018

Rostad Ranch: Transect Photographs



Transect 2: End
Bearing: 310 degrees
Location: North Central
Year: 2013



Transect 2: End
Bearing: 310 degrees
Location: North Central
Year: 2014



Transect 2: End
Bearing: 310 degrees
Location: North Central
Year: 2015



Transect 2: End
Bearing: 310 degrees
Location: North Central
Year: 2016



Transect 2: End
Bearing: 310 degrees
Location: North Central
Year: 2017



Transect 2: End
Bearing: 310 degrees
Location: North Central
Year: 2018

Rostad Ranch: Transect Photographs



Transect 3: Start
Bearing: 30 degrees
Location: South Portion of site
Year: 2013



Transect 3: Start
Bearing: 30 degrees
Location: South Portion of site
Year: 2014



Transect 3: Start
Bearing: 30 degrees
Location: South Portion of site
Year: 2015



Transect 3: Start
Bearing: 30 degrees
Location: South Portion of site
Year: 2016

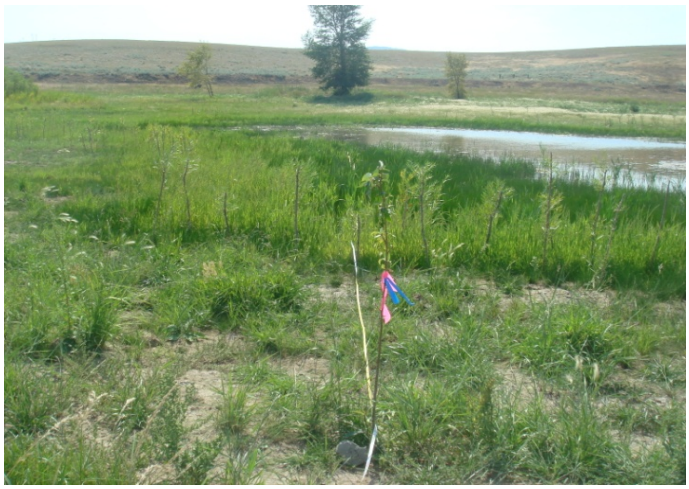


Transect 3: Start
Bearing: 30 degrees
Location: South Portion of site
Year: 2017

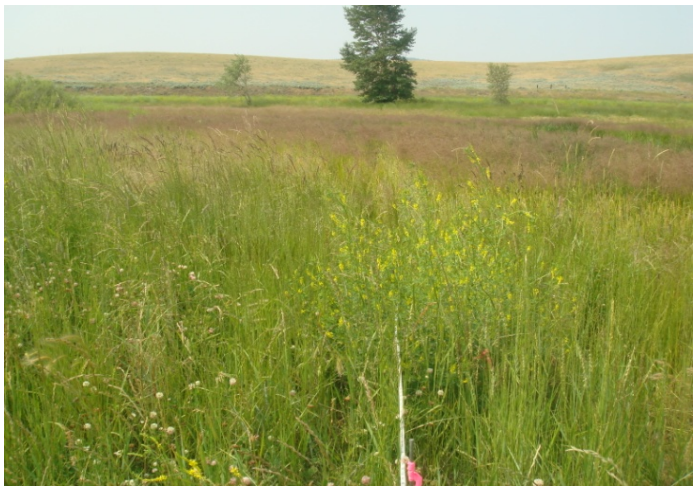


Transect 3: Start
Bearing: 30 degrees
Location: South Portion of site
Year: 2018

Rostad Ranch: Transect Photographs



Transect 3: End
Bearing 30: degrees
Location: South Portion of site
Year: 2013



Transect 3: End
Bearing: 30 degrees
Location: South Portion of site
Year: 2014



Transect 3: End
Bearing: 30 degrees
Location: South Portion of site
Year: 2015



Transect 3: End
Bearing: 30 degrees
Location: South Portion of site
Year: 2016



Transect 3: End
Bearing: 30 degrees
Location: South Portion of site
Year: 2017



Transect 3: End
Bearing: 30 degrees
Location: South Portion of site
Year: 2018

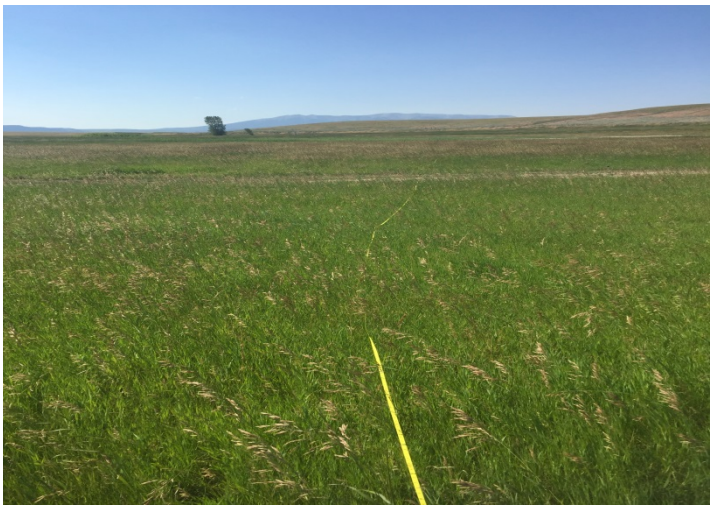
Rostad Ranch: Transect Photographs



Transect 4: Start
Bearing: 0 degrees
Location: Northwest Portion
Year: 2017



Transect 4: Start
Bearing: 0 degrees
Location: Northwest Portion
Year: 2018



Transect 4: End
Bearing: 180 degrees
Location: Northwest Portion
Year: 2017



Transect 4: End
Bearing: 180 degrees
Location: Northwest Portion
Year: 2018

Rostad Ranch: Data Point Photographs



Data Point: DP-1W Location: South portion of site
Year: 2018



Data Point: DP-1U Location: South portion of site
Year: 2018



Data Point: DP-2W Location: NE Branch of site
Year: 2018



Data Point: DP-2U Location: NE Branch of site
Year: 2018



Data Point: DP-3W Location: North Central
Year: 2018



Data Point: DP-3U Location: North Central
Year: 2018

APPENDIX D
PROJECT PLAN SHEETS

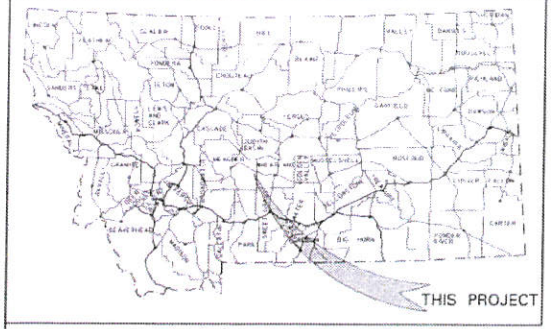
MDT Wetland Mitigation Monitoring
Rostad Ranch Mitigation Site
Meagher County, Montana

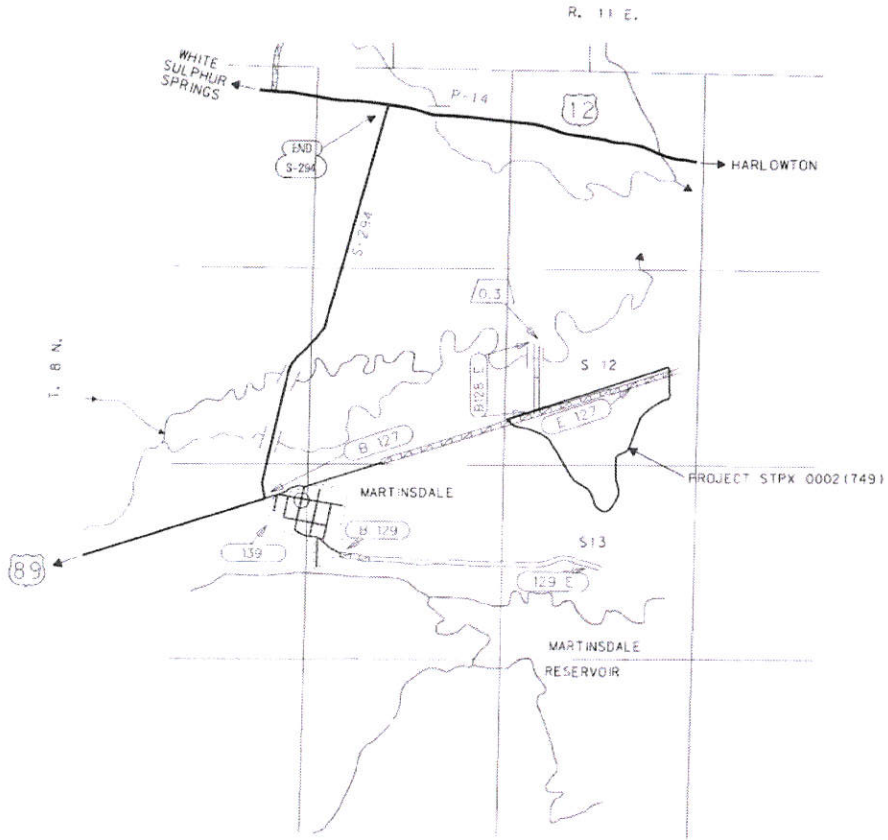
MONTANA DEPARTMENT OF TRANSPORTATION

FEDERAL AID PROJECT NO. STPX 0002(749)

ROSTAD RANCH WETLAND

MEAGHER COUNTY





PLANS PREPARED BY
MORRISON-MAIERLE, INC. 1 ENGINEERING PLACE P.O. BOX 6147 HELENA, MT 59604 PHONE (406) 442-3050 FAX (406) 442-7887

RELATED PROJECTS

ASSOCIATED PROJECT AGREEMENT NUMBERS	
R / W & C	STPX 0002(749)
P. E.	STPX 0002(749)

MORRISON-MAIERLE, INC.

BY Phillip J Forbes

DATE 05.11.12

PHILLIP J FORBES 9112 PE REGISTERED PROFESSIONAL ENGINEER

MONTANA DEPARTMENT OF TRANSPORTATION

RECEIVED

BY CONSULTANT DESIGN ENGINEER

MAY 14, 2012 DATE

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

APPROVED

DIVISION ADMINISTRATOR DATE

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\d065002-stsct1.sgn	DESIGNED BY			ROSTAD MITIGATION	
2		5/17/2012	REVIEWED BY			MEAGHER COUNTY	
1		9:42:00 AM CPS - U2183	CHECKED BY				

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NOTES

TEMPORARY EROSION AND SEDIMENT CONTROL

REFER TO SECTION 208 OF THE MDT DETAILED DRAWINGS FOR EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES. INSTALL TEMPORARY EROSION CONTROL MEASURES AS DEEMED NECESSARY BY THE ENGINEER. PAYMENT TO BE DETERMINED BY USING THE EROSION AND SEDIMENT CONTROL RATE SCHEDULE AND PAID FOR UNDER MISCELLANEOUS WORK. ALL INSTALLED TEMPORARY EROSION CONTROL BLANKETS MUST BE COMPOSED AND CONSTRUCTED OF 100% BIODEGRADABLE FIBERS, NETTING, AND STITCHING.

SOILS INFORMATION

TO OBTAIN THE COMPLETE SOILS INFORMATION CONTACT THE MDT GEOTECHNICAL SECTION AT (406) 444-6281.

UTILITIES

CONTACT THE UTILITIES UNDERGROUND LOCATION CENTER (1-800-424-5555) OR OTHER NOTIFICATION SYSTEM FOR THE MARKING AND LOCATION OF ALL LINES AND SERVICES BEFORE EXCAVATING.

CLEARING AND GRUBBING

CLEAR AND GRUB TO STAKED GRADING LIMITS. INCLUDE THE COST OF CLEARING AND GRUBBING IN THE UNIT PRICE BID FOR UNCLASSIFIED EXCAVATION.

TOPSOIL SALVAGING AND PLACING

TOPSOIL QUANTITIES SHOWN IN THE PLANS ARE SUFFICIENT TO RE-TOPSOIL IN AREAS WHERE CUTS OR FILLS EXCEED 1.8 DOT. ALL REMAINING GRADING IS CONSIDERED UNCLASSIFIED EXCAVATION.

PIEZOMETER REMOVAL

SEE SHEET 10 FOR LOCATIONS OF PIEZOMETERS ON THE PROJECT. ABANDON WELLS IN ACCORDANCE WITH ARM 36.21.810.

WETLANDS

ONLY WETLANDS WITHIN THE PROJECT LIMITS HAVE BEEN DELINEATED. WETLANDS MAY EXIST BEYOND THE PROJECT LIMITS AND ANY ACTION AFFECTING SUCH WETLANDS IS THE RESPONSIBILITY OF THE CONTRACTOR.

WETLANDS LEGEND

DELINEATED WETLANDS

IMPACTED WETLANDS

COMBINATION SCALE FACTOR

ALL SURVEY AND STAKING WILL REQUIRE THE USE OF A COMBINATION SCALE FACTOR (CSF) 0.99922160. ALL DIMENSIONS ON THE PLANS ARE GRID DIMENSIONS AND MUST BE DIVIDED BY THE CSF TO ARRIVE AT GROUND DIMENSIONS.

SURVEY DATA

DTM FILES FORMATTED FOR TRIMBLE, LEICA, AND TOPCON SURVEY CONTROLLERS ARE AVAILABLE UPON REQUEST. CONTACT WADE SALYARDS, MDT WETLAND ENGINEER, AT 444-0451.

LINEAR & LEVEL DATA

BEARING SOURCE

NAD 83 (1992)

LEVEL DATUM SOURCE

NAVD 88

BENCH MARKS

SEE CONTROL ABSTRACT FOR BENCHMARK INFORMATION

MORRISON MAIERLE, INC.

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	L:\dgn\566500\ntts01.dgn	DESIGNED BY			WETLAND PLANS		PROJECT NO. STPX 0002(749)
2		5/31/2012	REVIEWED BY			MEAGHER COUNTY	ROSTAD RANCH WETLAND	
1		10:31:40 AM CDS: 12.16	CHECKED BY				CSF = 0.99922160 UPN NUMBER 5565	SHEET 2 OF 19

CONTROL DIAGRAM

Control marks 1 through 7 were established to provide control in the areas of future wetlands mitigation. MDT secondary control procedures were used to establish the state plane coordinates and GPS derived orthometric heights of the new control.

Coordinates shown hereon are referenced to the Montana Coordinate System NAD83(1992), International feet. Elevations are referenced to NAVD88, U.S. feet (Geoid03). Redundant GPS RTK methods of survey were used to tie this survey to MDT control survey CN 4889, which was tied to the National Spatial Reference System through first-order order or better control points "A 295", "880RESET" and "KB12", using GPS static procedures with dual-frequency GPS receivers.

In order to maintain a relative accuracy of 1:50,000, one Combination Scale Factor can be used for this project: .99922160, which is the Combination Scale Factor for CN 4889.

CONTROL MARK ABSTRACT

POINT NAME/NUMBER	N OR Y COORDINATE	E OR X COORDINATE	POINT ELEVATION	LOCATION AND DESCRIPTION
2JEB	820116.709	1765843.913	4837.13	FOUND USCG BENCHMARK "2" FROM THE JUNCTION OF HIGHWAY 294 AND 12, GO 2 MILES WEST ALONG HIGHWAY 12. THE MARK IS 95' NORTHWEST OF AND 68' SOUTHWEST OF A 17' ROAD GOING NORTH OFF OF HIGHWAY 12, 21' WEST OF AN IRRIGATION DITCH CROSSING HIGHWAY 12, 1' NORTH OF SOUTH R/W FENCE AND POST WITH SURVEY MARKER SIGN. BRASS CAP STAMPED "2" JEB, 1972.
7TE	815622.843	1771445.444	4735.58	FOUND MDT CONTROL CAP AT MP 17.55. A STANDARD MDT CONTROL CAP ON 5/8" REBAR 0.05M BELOW GROUND STAMPED "7TE 2003". CAP IS 25' NORTH OF THE PTA, 19' NORTH OF CORNER IN NORTH R/W FENCE WEST OF THE NORTH ROAD TO MARTINSDALE INTERSTATE COLONY, 62' WEST OF WEST FENCE ALONG THE ROAD, 42' WEST OF AN IRRIGATION DITCH, 15' EAST OF A POWER POLE "TAP 6", AND ON HIGH POINT ABOVE AN IRRIGATION DITCH. WITNESS POSTS SET 7' NORTH AND SOUTH.
1	807908.594	1767815.256	4781.01	SET MDT CONTROL CAP, FLUSH WITH GROUND, STAMPED "1 2008". MARK IS 2.6' NORTH OF THE SOUTH R/W FENCE OF MARTINSDALE ROAD, 15' WEST OF AN APPROACH, AND 2.6' NORTH OF A WITNESS POST.
2	808455.543	1769626.308	4770.8	SET MDT CONTROL CAP, FLUSH WITH GROUND, STAMPED "2 2008". MARK IS 2' SOUTH OF THE SOUTH R/W FENCE OF MARTINSDALE ROAD, 1.1' WEST OF A FENCE CORNER, 35' WEST OF AN APPROACH, AND 2' SOUTH OF A WITNESS POST.
3	808076.674	1771875.668	4715.16	SET MDT CONTROL CAP, FLUSH WITH GROUND, STAMPED "3 2008". MARK IS 100' SOUTH OF THE SOUTH R/W FENCE OF MARTINSDALE ROAD, AND 2' NORTH OF A WITNESS POST.
4	807613.353	1756864.291	4787.83	SET MDT CONTROL CAP, FLUSH WITH GROUND, STAMPED "4 2008". MARK IS 1' SOUTH OF THE SOUTH R/W FENCE OF MARTINSDALE ROAD, 150' EAST OF A DIVERSION STRUCTURE, AND 2' SOUTH OF A WITNESS POST.
5	807432.042	1765572.531	4808.98	SET MDT CONTROL CAP, FLUSH WITH GROUND, STAMPED "5 2008". MARK IS 2' NORTH OF AN EAST-WEST FENCE AND 2' SOUTH OF A WITNESS POST.
6	806616.942	1768550.886	4806.07	SET MDT CONTROL CAP, FLUSH WITH GROUND, STAMPED "6 2008". MARK IS IN AN OPEN FIELD, 30' EAST OF AN IRRIGATION CANAL, AND 2' SOUTH OF A WITNESS POST.
7	805935.671	1768185.498	4817.40	SET MDT CONTROL CAP, FLUSH WITH GROUND, STAMPED "7 2008". MARK IS ON TOP OF THE EAST BANK OF CANAL, 80' NORTH OF AN EAST-WEST FENCE, 120' SOUTHEAST OF CONCRETE DIVERSION STRUCTURE, AND 2' SOUTH OF A WITNESS POST.

NOTE: CONTROL DIAGRAM NOT TO SCALE



3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	DESIGNED BY			WETLAND PLANS	ROSTAD RANCH WETLAND		PROJECT NO. STPX 0002(749)
2		REVIEWED BY						
1	5/17/2012	CHECKED BY			MEAGHER COUNTY	CSF = 0.99922160	UPN NUMBER 5565	SHEET 3 OF 19
	NO SCALE AM GPS USE							

SUMMARY

GRADING

TOTAL	cubic yards: UNCL EXC	EXCESS EXCAVATION	EMB *	REMARKS
	9,400	9,400		SITE GRADING
	500		500	KEYED BERM
TOTAL	9,900	# 9,400	# 500	

FOR INFORMATION ONLY

NOTE: 20% SHRINK FACTOR APPLIED TO GRADING

REVEGETATION

STATION FROM	STATION TO	lump sum: REVEGETATION	lump sum: TREE & SHRUB PLANTING **	cubic yards: TOPSOIL SALVAGING & PLACING	acres: WETLAND SEEDING	REMARKS
		1	1	22,235	35.83	
TOTAL		1	1	22,235		

* FOR INFORMATION ONLY

** SEE SHEET 17 FOR CONCEPTUAL REVEGETATION PLAN

ABANDON PIEZOMETER

STATION	ITEM DESCRIPTION	square yards	cubic yards	each	REMARKS
	ABANDON WELL			4	SEE SHEET 10 FOR LOCATIONS
TOTAL				4	

CULVERTS (INCLUDED IN CULVERT SUMMARY RECAP)

CULVERT	BASIC BID ITEMS: linear feet: CULVERT PIPE in	LENGTH OF PIPE	RELAY CULVERT	CLEAN CULVERT	REMOVE CULVERT	cubic yards: CULVERT EXC. **	FOUND-ATION MATERIAL	BEDDING MATERIAL	CLASS "DD" CONCRETE	CULVERT RIPRAP CLASS	square yards: GEOTEX-TILE #	PIPE OPTIONS in: CONCRETE STEEL - 2 2/3 x 1/2 CORR ALUMINUM - 2 2/3 x 1/2 CORR	CLASS OR TYPE	COATING *	END SECTIONS: LEFT	END SECTIONS: RIGHT	cubic yards: FOUND-ATION MATERIAL	BEDDING MATERIAL	CLASS "DD" CONCRETE	CULVERT RIPRAP CLASS	square yards: GEOTEX-TILE #	linear feet: HEIGHT OF COVER	SKEW ANGLE	CULVERT IN PL. in x ft	REMARKS
CULVERT A					23.0																			18 X 23.0 CMP	REMOVE
CULVERT B					75.0																			18 X 75.0 CMP	REMOVE
CULVERT C					22.0																			18 X 22.0 CMP	REMOVE
CULVERT D					42.0																			18 X 42.0 CMP	REMOVE
TOTAL					162.0																				

BROAD-CRESTED WEIR

STATION FROM	STATION TO	cubic yards: BANK PROTECTION	square yards: TURF REINFORCEMENT MAT	each: CANAL GATE	each: HEAD GATE	each: TRASH GUARD	each: CHECK	each: TURNOUT	each: REMOVE IRRIGATION STRUCTURE	REMARKS
		TYPE 3	TYPE C350	1	1					BROAD-CRESTED WEIR
TOTAL		35	120							

CULVERT SUMMARY RECAP

BASIC BID	linear feet: NEW PIPE (TOTAL)	linear feet: RELAY CULVERT	linear feet: CLEAN CULVERT	linear feet: REMOVE CULVERT	cubic yards: FOUND-ATION MATERIAL	cubic yards: BEDDING MATERIAL	cubic yards: CLASS "DD" CONCRETE	cubic yards: CULVERT RIPRAP CLASS	square yards: GEOTEXTILE	square yards: PERM EROS CNTRL CLASS
				162.0						SURV
TOTAL				162.0						

FENCING

STATION FROM	STATION TO	linear feet: WILDLIFE FRIENDLY 1 UNCL TYPE 1 - FM	linear feet: WILDLIFE FRIENDLY 1 UNCL TYPE 1 - FW	linear feet: REMOVE FENCE	each: WILDLIFE FRIENDLY FENCE PANEL SINGLE	each: WILDLIFE FRIENDLY FENCE PANEL DOUBLE	each: DEADMAN	linear feet: FARM GATE* TYPE G2	linear feet: FARM GATE* TYPE G3	REMARKS
		2,592.4		2,592.4	4	1		12		
		495.2			1	1		12		
		974.6			1	2				
		379.2			1	1				
		838.9				2				
		2,156.8			1	4		12		
		530.3				1				
		99.9			1	1				
		2,271.7			4					
TOTAL		8,397.5		# 2,592.4	12	14		36		

FOR INFORMATION ONLY

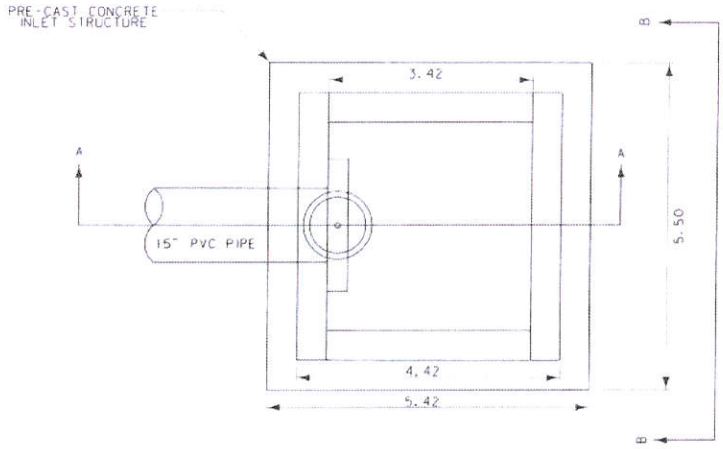
DIVERSION STRUCTURE

DIVERSION	cubic yard: CLASS "DD" CONC.	cubic yard: BANK PROTECTION TYPE 3	square yard: TURF REINFORCEMENT MAT TYPE C350	each: CANAL GATE 15 in	each: HEAD GATE 15 in	feet: PVC PIPE 15 in	lump sum: TOTAL	REMARKS
	4			1		28.0	1	SEE DETAIL
		20	70					SEE DETAIL
		20	70				1	

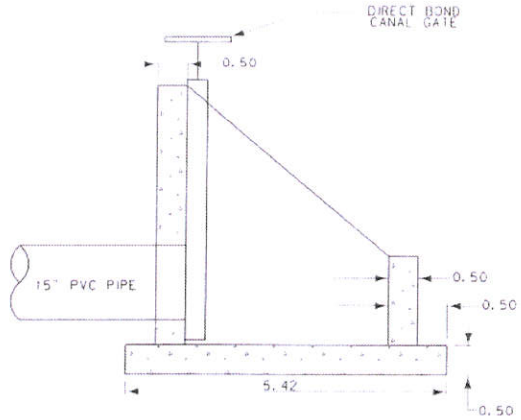
MORRISON MAIERLE, INC.

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	C:\dgn\SS\500\Sum01.dgn	DESIGNED BY		WETLAND PLANS	ROSTAD RANCH WETLAND MITIGATION	PROJECT NO. STPX 0002(749)
2		5/21/2012	DETAILED BY		MEAGHER COUNTY	CSF - 0.99922160 / UPN NUMBER 5565	SHEET 4 OF 19
1		10:31:49 AM CPS J2168	CHECKED BY				

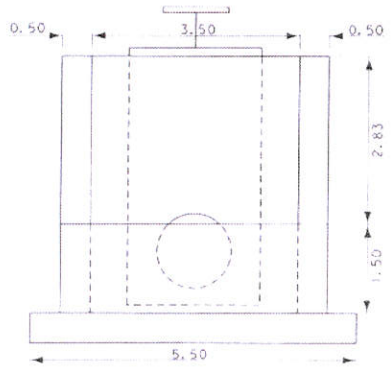
DETAIL



PLAN VIEW



SECTION A-A



SECTION B-B

DIVERSION INLET STRUCTURE

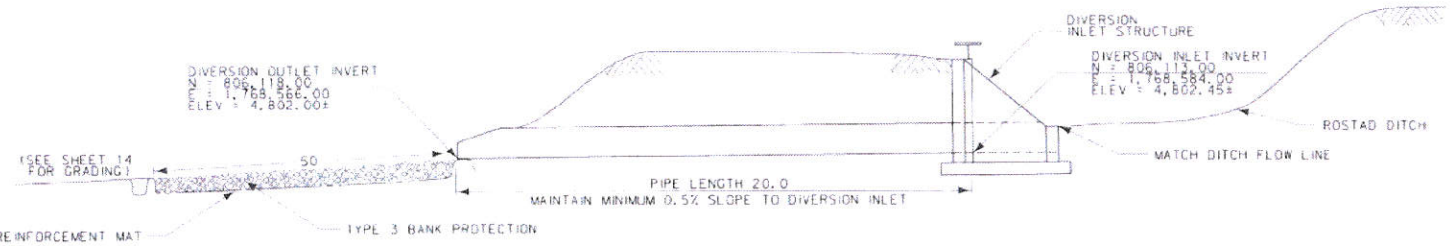
NTS

NOTE: ALL DIMENSION IN FEET UNLESS OTHERWISE NOTED

MDT MONTANA DEPARTMENT OF TRANSPORTATION		DESIGNED BY		WETLAND PLANS		ROSTAD RANCH WETLAND		PROJECT NO. STPX 0002(749)
	5/21/2012	REVISED BY		MEAGHER COUNTY		CSF = 0.99922160	UPN NUMBER 5565	SHEET 5 OF 19
	10:31:57 AM	CHECKED BY						

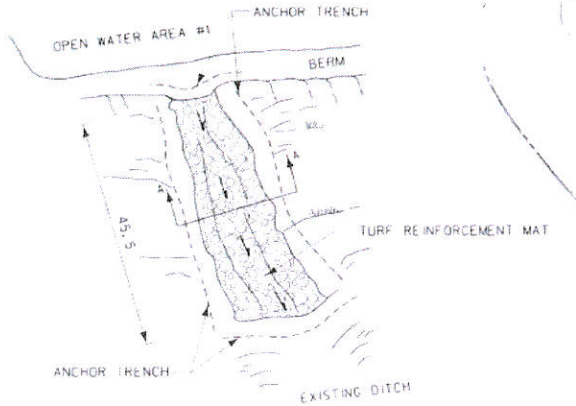
MORRISON MAIERLE, INC.

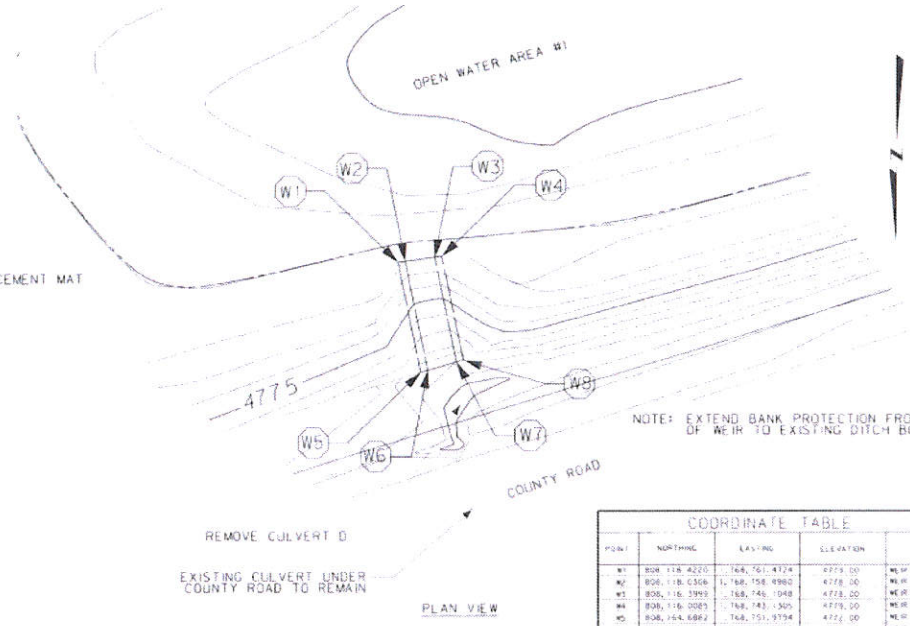
DETAIL



DIVERSION STRUCTURE CROSS SECTION

NTS







SECTION A-A

COORDINATE TABLE

POINT	NORTHING	EASTING	ELEVATION	REMARKS
W1	806,118.4220	1,768,761.4724	4779.00	WEIR
W2	806,118.0306	1,768,758.8980	4778.00	WEIR
W3	806,116.3999	1,768,746.1048	4778.00	WEIR
W4	806,116.0085	1,768,743.5305	4779.00	WEIR
W5	806,164.6882	1,768,751.9794	4774.00	WEIR
W6	806,163.8578	1,768,749.0815	4771.00	WEIR
W7	806,160.2978	1,768,737.0578	4771.00	WEIR
W8	806,159.5674	1,768,734.1453	4772.00	WEIR

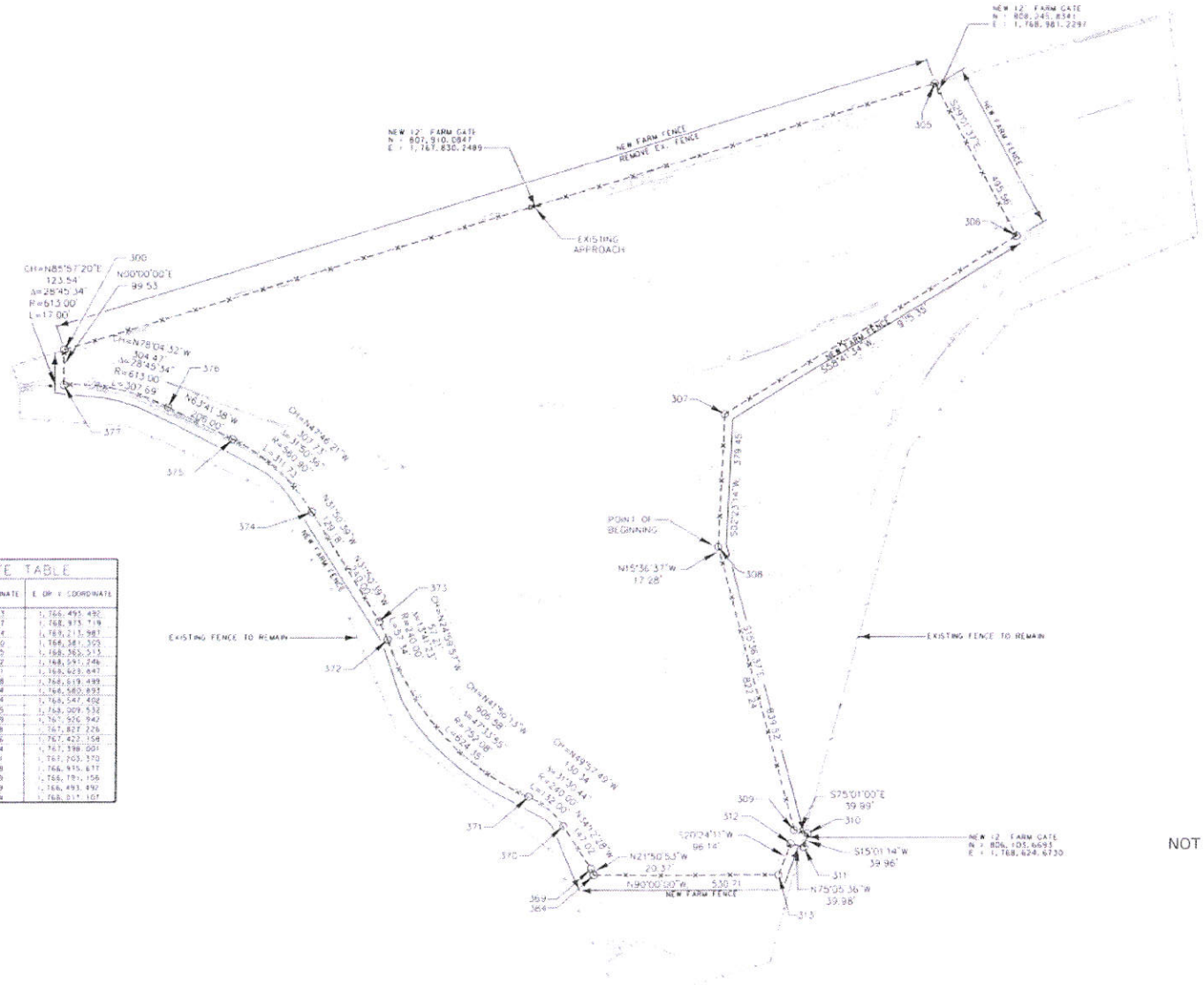
BROAD-CRESTED WEIR

NTS

NOTE: ALL DIMENSION IN FEET UNLESS OTHERWISE NOTED

MDT MONTANA DEPARTMENT OF TRANSPORTATION			WETLAND PLANS		ROSTAD RANCH WETLAND		PROJECT NO. STPX 0002(749)
			MEAGHER COUNTY		CSF = 0.99922160	UPN NUMBER 5585	SHEET 6 OF 16

FENCING DETAIL



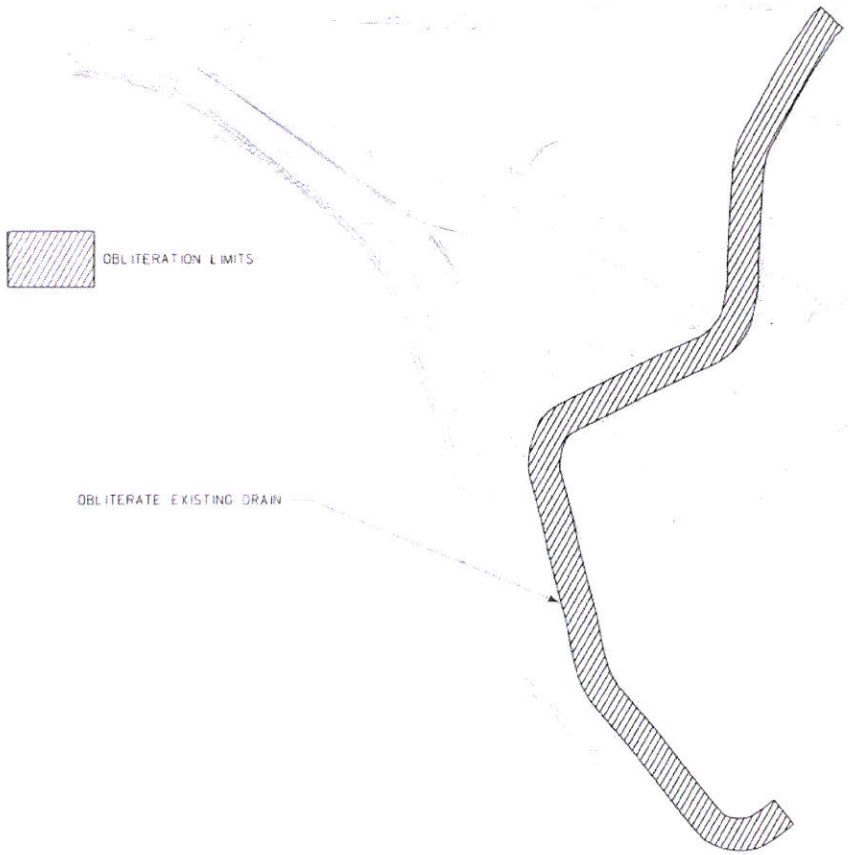
COORDINATE TABLE

POINT #	N OR Y COORDINATE	E OR X COORDINATE
300	807,505.823	1,768,495.482
305	808,259.427	1,768,975.719
306	807,828.454	1,769,215.987
307	807,320.936	1,768,381.305
308	806,941.205	1,768,363.513
309	806,133.292	1,768,591.246
310	806,122.953	1,768,623.647
311	806,084.388	1,768,619.489
312	806,094.684	1,768,583.895
313	806,084.524	1,768,547.402
369	806,023.515	1,768,909.532
370	806,145.009	1,767,926.942
371	806,228.788	1,767,827.226
372	806,679.656	1,767,422.158
373	806,731.464	1,767,398.001
374	807,044.831	1,767,703.370
375	807,251.488	1,766,935.617
376	807,342.709	1,768,178.156
377	807,405.549	1,766,493.492
384	806,084.624	1,768,617.167

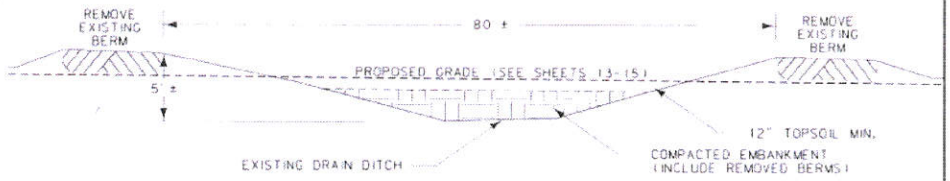
NOTE: THE CSF HAS BEEN APPLIED TO ALL DIMENSIONS ON THIS SHEET.

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dp\roads\000\dpfig\v3.dgn				WETLAND PLANS	ROSTAD RANCH WETLAND MITIGATION	PROJECT NO STPX 0002(749)
2		5/23/2012				MEAGHER COUNTY	CSF = 0.99922160 UPN NUMBER 5565	SHEET 7 OF 19
1		10:32:17 AM CPS_U216						

DETAIL



NOT TO SCALE



TYPICAL SECTION

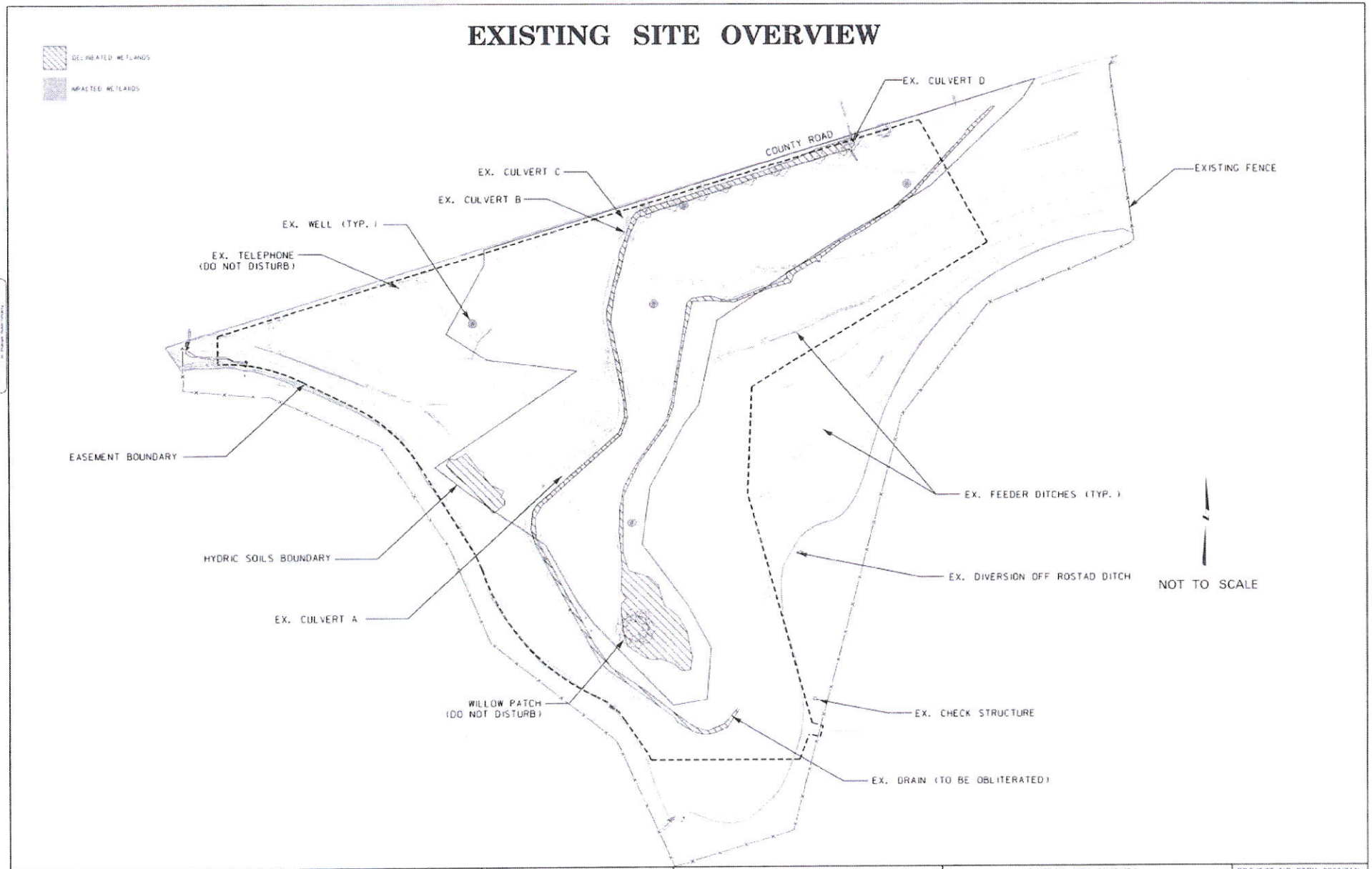
NOTES:

COMPACT PROPOSED EMBANKMENT AS SPECIFIED BY STD SPEC 203.03.3 TO 90% COMPACTION (OPTIMUM MOISTURE CONTENT MAY VARY).

OBLITERATE DRAIN
NTS

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\5665009\dist002.dgn	DESIGNED BY			WETLAND PLANS	ROSTAD RANCH WETLAND		PROJECT NO. STPX 0002(749)
2		5/23/2012	REVIEWED BY						
1		10:32:21 AM CDS - 12.05	CHECKED BY			MEAGHER COUNTY	CSF = 0.99922160	UPN NUMBER 5565	SHEET 8 OF 19

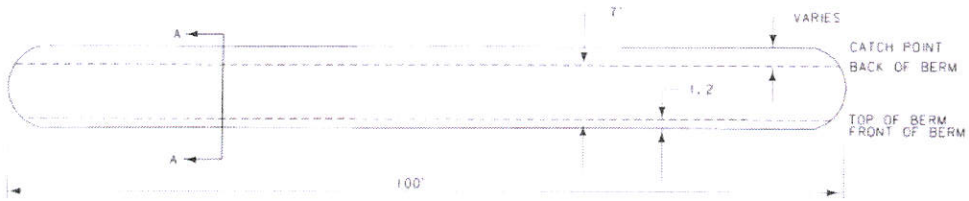
EXISTING SITE OVERVIEW



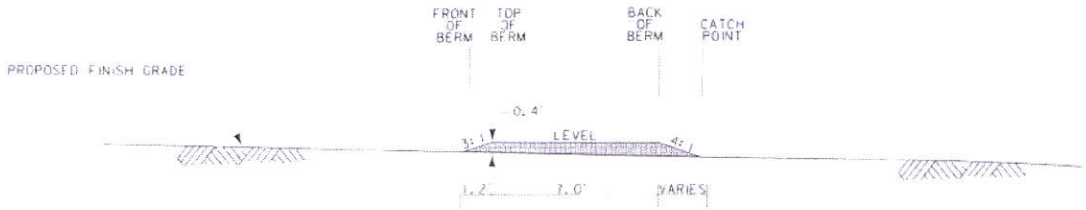
MORRISON MAIERLE, INC.

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\5565003h\gen01.dgn	DESIGNED BY			WETLAND PLANS	EXISTING SITE OVERVIEW	PROJECT NO. STPX 0002(749)
2		5/21/2012	REVIEWED BY			MEAGHER COUNTY	CSF = 0.99922160 UPN NUMBER 5565	SHEET 10 OF 19
1		10:32:38 AM CPS 12160	CHECKED BY					

DETAIL



PLAN VIEW



SECTION A-A

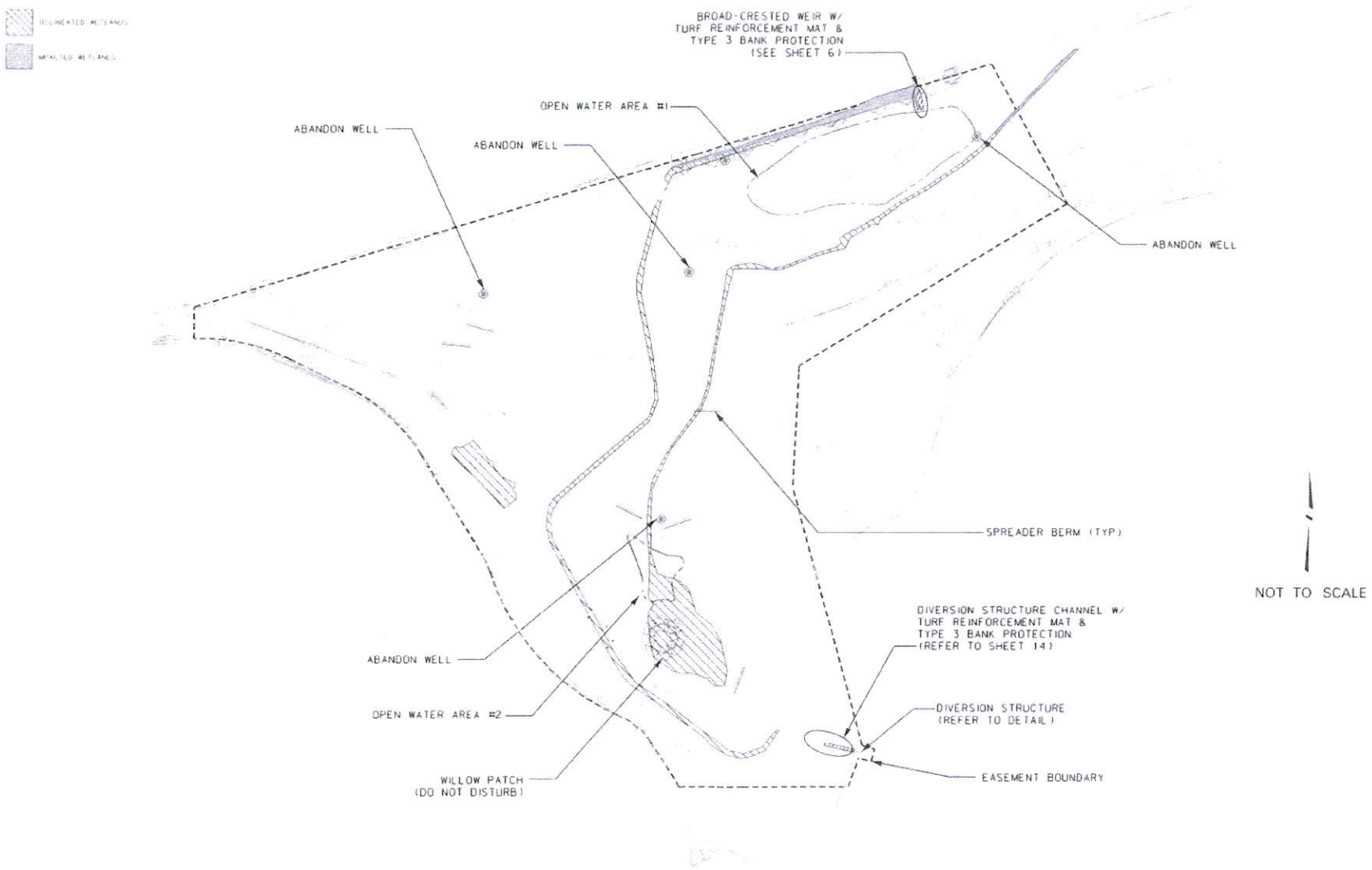
SPREADER BERM

NTS

NOTE: SEE POINTS B1 THROUGH B36 ON SHEETS 14 AND 15.

MDT MONTANA DEPARTMENT OF TRANSPORTATION	DESIGNED BY			WETLAND PLANS		ROSTAD RANCH WETLAND MITIGATION		PROJECT NO. STPX 0002(749)
	DRAWN BY			MEAGHER COUNTY		CSF = 0.99922160	UPN NUMBER 5565	SHEET 9 OF 19
	CHECKED BY							

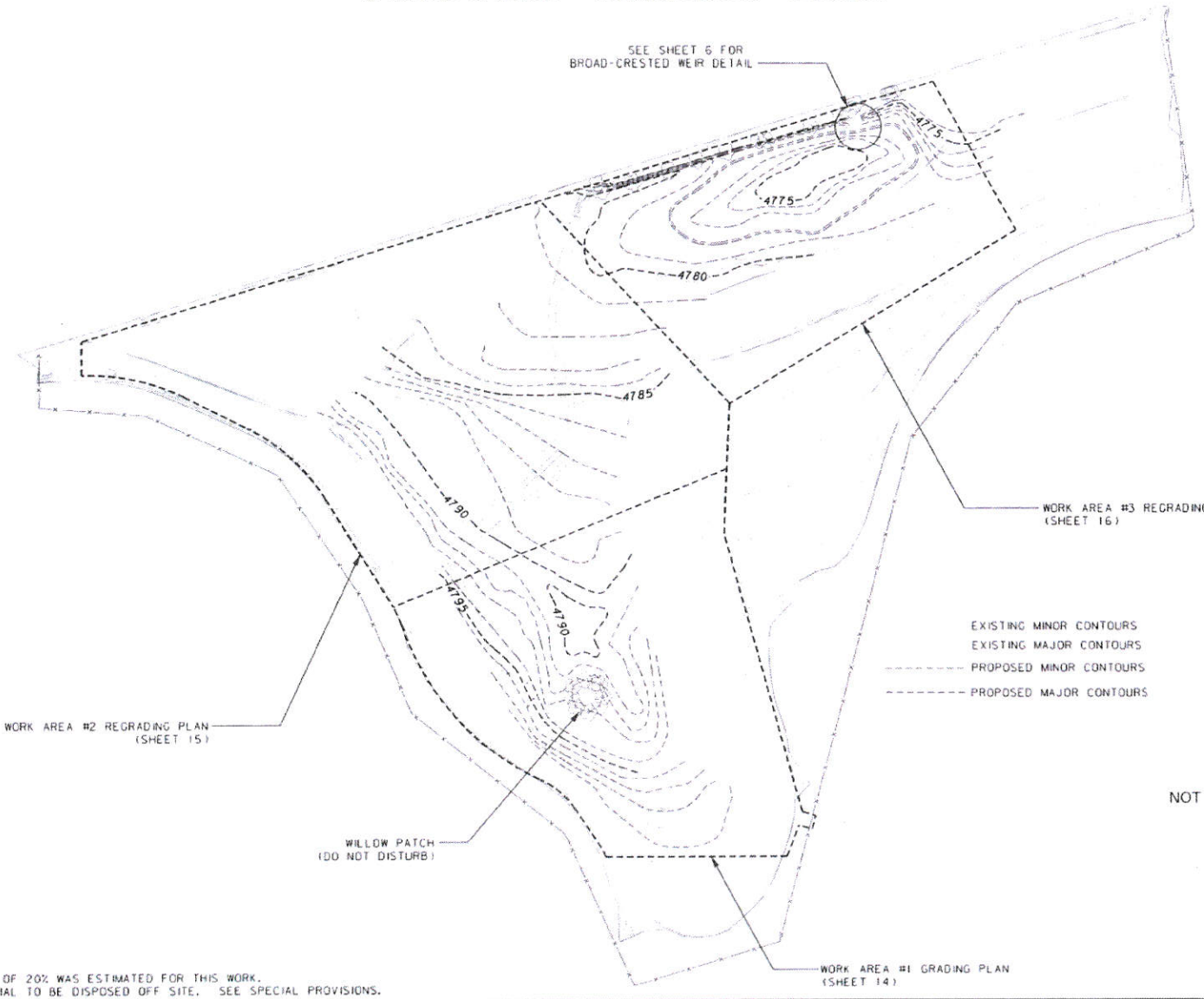
PROPOSED SITE OVERVIEW



MORRISON MAIERLE, INC.

MDT MONTANA DEPARTMENT OF TRANSPORTATION				WETLAND PLANS	ROSTAD RANCH WETLAND		PROJECT NO. STPX 0002(749)
				MEAGHER COUNTY	CSF # 0.99922160	UPN NUMBER 5565	SHEET 11 OF 19

PROPOSED GRADING PLAN



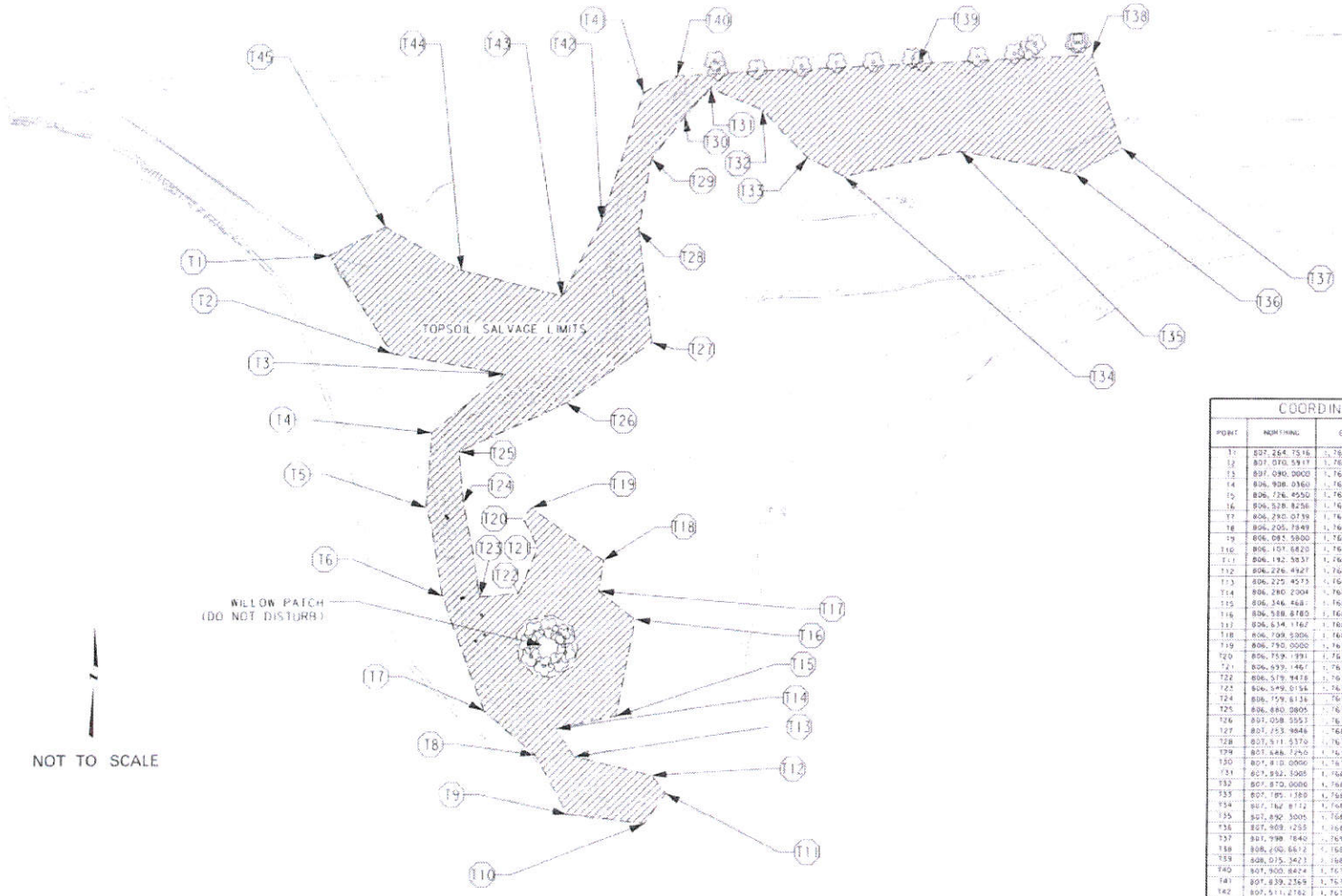
NOTE: A SHRINK FACTOR OF 20% WAS ESTIMATED FOR THIS WORK.
ALL WASTE MATERIAL TO BE DISPOSED OFF SITE. SEE SPECIAL PROVISIONS.

MORRISON MAIERLE, INC.

MDT MONTANA DEPARTMENT OF TRANSPORTATION

3	L:\dgn\536000\dgn\s01-3d.dgn				WETLAND PLANS	ROSTAD RANCH WETLAND		PROJECT NO. STPX 0002(749)
2	5/21/2012				MEAGHER COUNTY	CSF = 0.99922160	UPN NUMBER 5565	SHEET 12 OF 19
1	10:02:47 AM CPS - 1/2							

TOPSOIL SALVAGE PLAN



NOT TO SCALE

COORDINATE TABLE

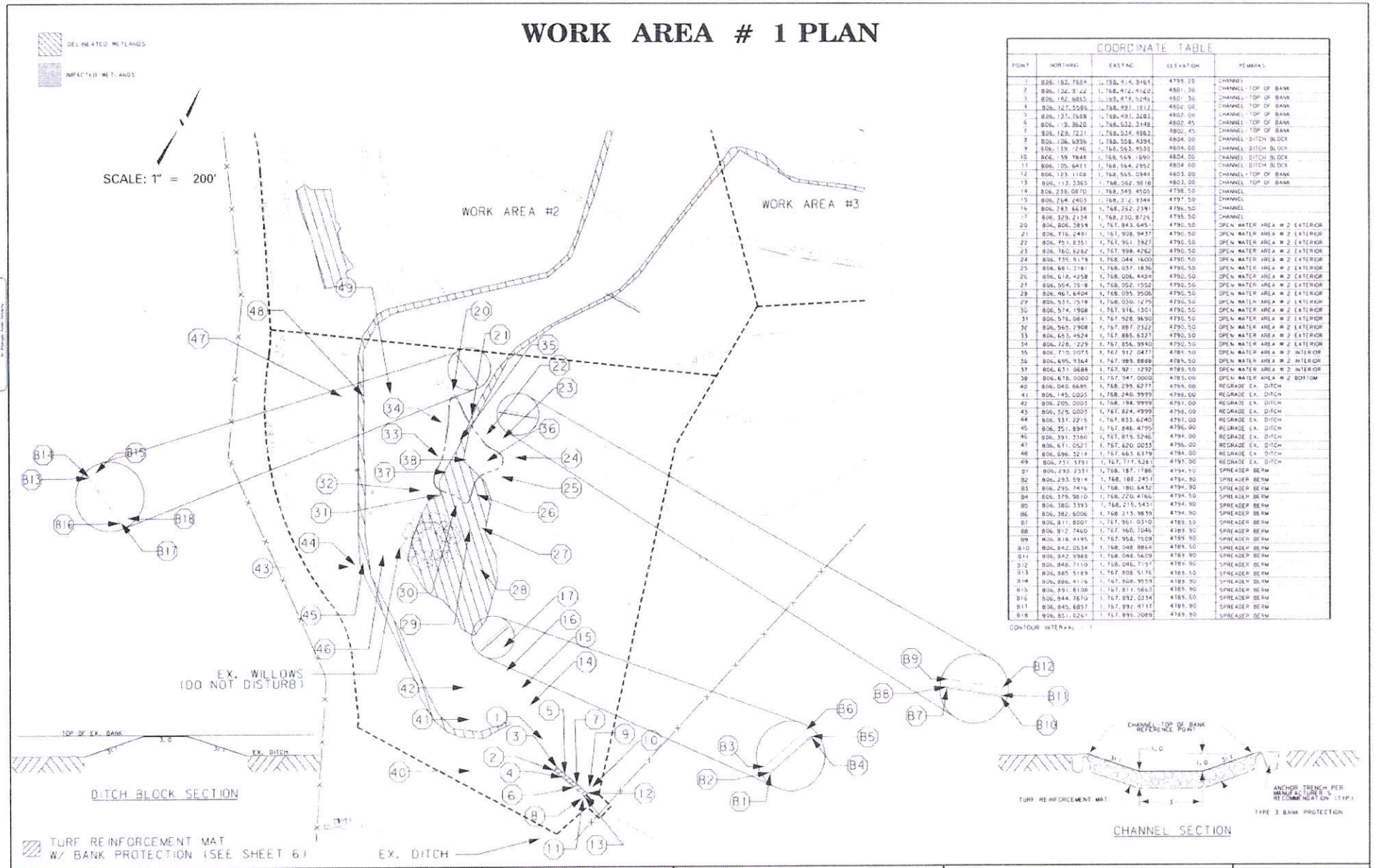
POINT	NORTHING	EASTING	REMARKS
T1	807,264.7516	1,767,491.8279	TOPSOIL SALVAGE LIMIT
T2	807,070.5917	1,767,413.5161	TOPSOIL SALVAGE LIMIT
T3	807,090.0000	1,767,880.0000	TOPSOIL SALVAGE LIMIT
T4	806,908.0360	1,767,556.9172	TOPSOIL SALVAGE LIMIT
T5	806,726.4550	1,767,583.5919	TOPSOIL SALVAGE LIMIT
T6	806,528.8256	1,767,683.0355	TOPSOIL SALVAGE LIMIT
T7	806,290.0739	1,767,853.0918	TOPSOIL SALVAGE LIMIT
T8	806,205.7349	1,768,002.1935	TOPSOIL SALVAGE LIMIT
T9	806,085.5800	1,768,115.3939	TOPSOIL SALVAGE LIMIT
T10	806,107.6820	1,768,303.4900	TOPSOIL SALVAGE LIMIT
T11	806,192.5837	1,768,334.8135	TOPSOIL SALVAGE LIMIT
T12	806,226.4927	1,768,290.2898	TOPSOIL SALVAGE LIMIT
T13	806,225.4573	1,768,096.1548	TOPSOIL SALVAGE LIMIT
T14	806,280.2004	1,768,055.9230	TOPSOIL SALVAGE LIMIT
T15	806,346.4681	1,768,170.3144	TOPSOIL SALVAGE LIMIT
T16	806,588.8780	1,768,154.1365	TOPSOIL SALVAGE LIMIT
T17	806,634.1167	1,768,051.8970	TOPSOIL SALVAGE LIMIT
T18	806,709.5006	1,768,043.1501	TOPSOIL SALVAGE LIMIT
T19	806,790.0000	1,767,840.0000	TOPSOIL SALVAGE LIMIT
T20	806,759.1991	1,767,824.9835	TOPSOIL SALVAGE LIMIT
T21	806,693.1467	1,767,878.9826	TOPSOIL SALVAGE LIMIT
T22	806,579.9478	1,767,881.6397	TOPSOIL SALVAGE LIMIT
T23	806,549.8154	1,767,771.9493	TOPSOIL SALVAGE LIMIT
T24	806,759.8136	1,767,615.1932	TOPSOIL SALVAGE LIMIT
T25	806,680.0805	1,767,635.4664	TOPSOIL SALVAGE LIMIT
T26	807,058.5553	1,767,851.1570	TOPSOIL SALVAGE LIMIT
T27	807,253.9848	1,768,023.4775	TOPSOIL SALVAGE LIMIT
T28	807,311.5370	1,767,920.3979	TOPSOIL SALVAGE LIMIT
T29	807,668.7250	1,767,906.1007	TOPSOIL SALVAGE LIMIT
T30	807,810.0000	1,767,960.0000	TOPSOIL SALVAGE LIMIT
T31	807,992.5905	1,768,004.5937	TOPSOIL SALVAGE LIMIT
T32	807,870.0000	1,768,140.0000	TOPSOIL SALVAGE LIMIT
T33	807,785.1380	1,769,277.8063	TOPSOIL SALVAGE LIMIT
T34	807,762.8112	1,768,318.2353	TOPSOIL SALVAGE LIMIT
T35	807,892.5005	1,768,638.4386	TOPSOIL SALVAGE LIMIT
T36	807,909.1255	1,768,923.8465	TOPSOIL SALVAGE LIMIT
T37	807,998.1840	1,769,020.8917	TOPSOIL SALVAGE LIMIT
T38	808,200.6612	1,768,890.6318	TOPSOIL SALVAGE LIMIT
T39	808,075.3423	1,768,483.4974	TOPSOIL SALVAGE LIMIT
T40	807,900.8424	1,767,915.2210	TOPSOIL SALVAGE LIMIT
T41	807,839.2369	1,767,845.5912	TOPSOIL SALVAGE LIMIT
T42	807,511.2782	1,767,828.2488	TOPSOIL SALVAGE LIMIT
T43	807,310.0000	1,767,780.3244	TOPSOIL SALVAGE LIMIT
T44	807,310.0000	1,767,545.1211	TOPSOIL SALVAGE LIMIT
T45	807,366.8868	1,767,318.9862	TOPSOIL SALVAGE LIMIT

CONTOUR INTERVAL = 1'

NOTE: SALVAGE TOPSOIL A MINIMUM OF 10 INCHES IN THE AREA SHOWN.
ALL REMAINING GRADING IS CONSIDERED UNCLASSIFIED EXCAVATION.

MDT MONTANA DEPARTMENT OF TRANSPORTATION	L:\dgn\SS\5030\roadx53.dgn	DESIGNED BY			WETLAND PLANS	ROSTAD RANCH WETLAND MITIGATION		PROJECT NO. STPX 0002(749)
	5/21/2012	DRAWN BY						
	10:32:56 AM CDT v21.6	CHECKED BY			MEAGHER COUNTY	CSF = 0.99922160	UPN NUMBER 5565	SHEET 13 OF 19

WORK AREA # 1 PLAN



COORDINATE TABLE

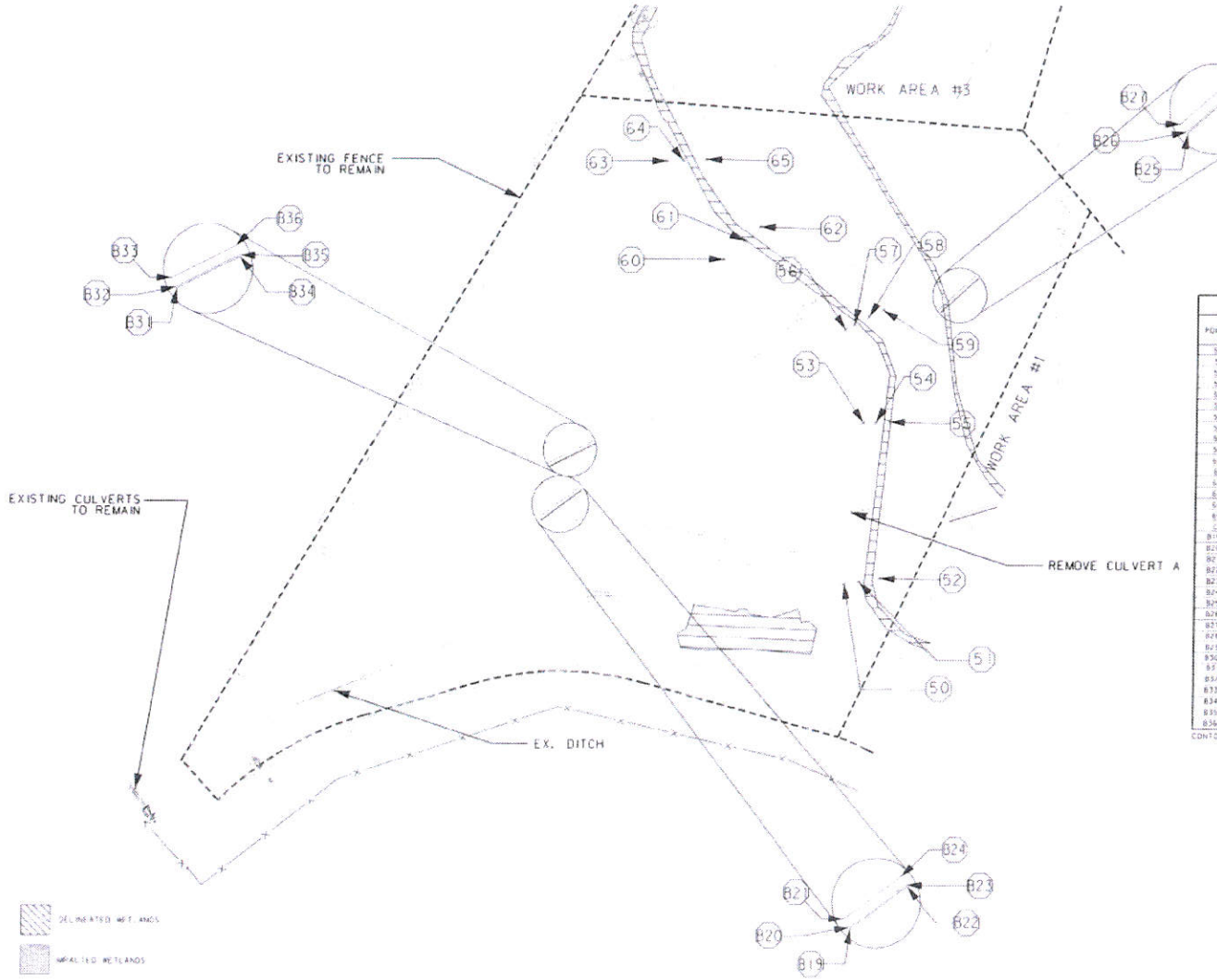
POINT	NORTHING	EASTING	ELEVATION	REMARKS
1	806,182.7884	1,768,414.3161	4799.28	CHANNEL
2	806,124.9122	1,768,472.4129	4801.36	CHANNEL - TOP OF BANK
3	806,162.6855	1,768,474.5246	4801.36	CHANNEL - TOP OF BANK
4	806,127.5586	1,768,493.1812	4802.08	CHANNEL - TOP OF BANK
5	806,131.7688	1,768,491.3283	4802.00	CHANNEL - TOP OF BANK
6	806,119.3620	1,768,532.3148	4802.45	CHANNEL - TOP OF BANK
7	806,123.7231	1,768,534.4862	4802.45	CHANNEL - TOP OF BANK
8	806,106.6359	1,768,558.4394	4804.00	CHANNEL - DITCH BLOCK
9	806,139.7246	1,768,563.4538	4804.00	CHANNEL - DITCH BLOCK
10	806,139.7846	1,768,559.1890	4804.00	CHANNEL - DITCH BLOCK
11	806,105.6421	1,768,564.2952	4804.00	CHANNEL - DITCH BLOCK
12	806,123.1108	1,768,565.0944	4803.00	CHANNEL - TOP OF BANK
13	806,113.3365	1,768,562.9818	4803.00	CHANNEL - TOP OF BANK
14	806,238.0870	1,768,349.4505	4798.50	CHANNEL
15	806,264.2405	1,768,314.9344	4797.50	CHANNEL
16	806,283.6638	1,768,292.2391	4796.50	CHANNEL
17	806,329.2134	1,768,230.8726	4795.50	CHANNEL
20	806,806.3859	1,767,843.6451	4790.50	OPEN WATER AREA # 2 EXTERIOR
21	806,776.2491	1,767,908.9437	4790.50	OPEN WATER AREA # 2 EXTERIOR
22	806,751.8351	1,767,961.3927	4790.50	OPEN WATER AREA # 2 EXTERIOR
23	806,760.6282	1,767,998.4262	4790.50	OPEN WATER AREA # 2 EXTERIOR
24	806,735.9179	1,768,044.1600	4790.50	OPEN WATER AREA # 2 EXTERIOR
25	806,681.3161	1,768,037.1636	4790.50	OPEN WATER AREA # 2 EXTERIOR
26	806,618.4258	1,768,006.4426	4790.50	OPEN WATER AREA # 2 EXTERIOR
27	806,554.3918	1,768,052.1552	4790.50	OPEN WATER AREA # 2 EXTERIOR
28	806,467.6404	1,768,095.9506	4790.50	OPEN WATER AREA # 2 EXTERIOR
29	806,511.7518	1,768,030.1275	4790.50	OPEN WATER AREA # 2 EXTERIOR
30	806,574.1908	1,767,976.1301	4790.50	OPEN WATER AREA # 2 EXTERIOR
31	806,576.0641	1,767,928.9690	4790.50	OPEN WATER AREA # 2 EXTERIOR
32	806,565.2908	1,767,897.2322	4790.50	OPEN WATER AREA # 2 EXTERIOR
33	806,663.4524	1,767,885.6327	4790.50	OPEN WATER AREA # 2 EXTERIOR
34	806,728.2229	1,767,856.3940	4790.50	OPEN WATER AREA # 2 EXTERIOR
35	806,710.2071	1,767,912.0471	4789.50	OPEN WATER AREA # 2 INTERIOR
36	806,695.9364	1,767,989.8868	4789.50	OPEN WATER AREA # 2 INTERIOR
37	806,631.0688	1,767,921.1292	4789.50	OPEN WATER AREA # 2 INTERIOR
38	806,678.0000	1,767,947.0000	4789.00	OPEN WATER AREA # 2 BOTTOM
40	806,040.6685	1,768,299.6277	4796.00	REGRADE EX. DITCH
41	806,145.0005	1,768,240.9999	4796.00	REGRADE EX. DITCH
42	806,205.0005	1,768,194.9999	4797.00	REGRADE EX. DITCH
43	806,525.0005	1,767,824.4999	4796.00	REGRADE EX. DITCH
44	806,337.2215	1,767,853.6240	4797.00	REGRADE EX. DITCH
45	806,351.8947	1,767,846.4795	4796.90	REGRADE EX. DITCH
46	806,391.3380	1,767,819.5246	4794.00	REGRADE EX. DITCH
47	806,671.0521	1,767,620.0035	4796.00	REGRADE EX. DITCH
48	806,696.2214	1,767,663.6379	4794.00	REGRADE EX. DITCH
49	806,731.5791	1,767,717.5281	4795.00	REGRADE EX. DITCH
B1	806,293.2331	1,768,187.1186	4794.50	SPREADER BERM
B2	806,293.5814	1,768,186.2451	4794.90	SPREADER BERM
B3	806,295.7416	1,768,180.6432	4794.90	SPREADER BERM
B4	806,379.9810	1,768,270.4766	4794.50	SPREADER BERM
B5	806,380.3393	1,768,215.5437	4794.90	SPREADER BERM
B6	806,382.5006	1,768,221.3859	4794.90	SPREADER BERM
B7	806,811.8001	1,767,961.0310	4789.50	SPREADER BERM
B8	806,812.7409	1,767,960.7846	4789.90	SPREADER BERM
B9	806,818.4195	1,767,958.7509	4789.90	SPREADER BERM
B10	806,842.0534	1,768,048.8864	4789.50	SPREADER BERM
B11	806,842.9988	1,768,048.5609	4789.90	SPREADER BERM
B12	806,848.7110	1,768,046.7197	4789.90	SPREADER BERM
B13	806,885.5189	1,767,808.5176	4789.50	SPREADER BERM
B14	806,886.4176	1,767,808.9559	4789.90	SPREADER BERM
B15	806,891.8108	1,767,811.5863	4789.90	SPREADER BERM
B16	806,844.7670	1,767,892.0334	4789.50	SPREADER BERM
B17	806,845.6857	1,767,892.4717	4789.90	SPREADER BERM
B18	806,851.0267	1,767,895.2089	4789.90	SPREADER BERM

CONTOUR INTERVAL = 1'

MORRISON MAIERLE, INC.

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	C:\legm\56\5000\dgn\ref02.dgn	DESIGNED BY		WETLAND PLANS	ROSTAD RANCH WETLAND	PROJECT NO. STPX 0002(749)
2		5/21/2012	REVIEWED BY		MEAGHER COUNTY	SCALE: 1" = 200' UPN NUMBER 5565	SHEET 14 OF 19
1		10:33:09 AM CDS - v21	CHECKED BY				

WORK AREA # 2 PLAN



COORDINATE TABLE

POINT	NORTHING	EASTING	ELEVATION	REMARKS
50	806,931.8339	1,767,592.3423	4791.00	REGRADE EX. DITCH
51	806,916.3833	1,767,616.0035	4791.00	REGRADE EX. DITCH
52	806,895.3234	1,767,646.8357	4791.00	REGRADE EX. DITCH
53	807,126.7381	1,767,812.8243	4788.00	REGRADE EX. DITCH
54	807,109.8829	1,767,830.1321	4788.00	REGRADE EX. DITCH
55	807,093.9179	1,767,849.3584	4788.00	REGRADE EX. DITCH
56	807,273.8762	1,767,592.2887	4786.00	REGRADE EX. DITCH
57	807,288.2018	1,767,920.7793	4786.00	REGRADE EX. DITCH
58	807,280.2565	1,767,948.6334	4786.00	REGRADE EX. DITCH
59	807,252.2965	1,767,976.8148	4786.00	REGRADE EX. DITCH
60	807,516.1005	1,767,824.8136	4782.00	REGRADE EX. DITCH
61	807,516.1005	1,767,872.8364	4782.00	REGRADE EX. DITCH
62	807,516.1005	1,767,910.8656	4782.00	REGRADE EX. DITCH
63	807,711.4136	1,767,896.1615	4781.00	REGRADE EX. DITCH
64	807,698.7240	1,767,888.6568	4781.00	REGRADE EX. DITCH
65	807,672.1920	1,767,909.8252	4781.00	REGRADE EX. DITCH
5	807,915.0297	1,767,697.4613	----	CULVERT A
B18	807,388.4659	1,767,761.7566	4788.50	SPREADER BERM
B20	807,385.4603	1,767,741.8611	4788.50	SPREADER BERM
B21	807,395.4218	1,767,762.4882	4788.50	SPREADER BERM
B22	807,378.7545	1,767,354.1668	4788.50	SPREADER BERM
B23	807,379.7489	1,767,354.2713	4788.90	SPREADER BERM
B24	807,385.7040	1,767,355.0367	4788.90	SPREADER BERM
B25	807,777.9251	1,768,051.3420	4786.50	SPREADER BERM
B26	807,178.9248	1,768,051.3595	4786.90	SPREADER BERM
B27	807,184.9243	1,768,051.4641	4786.90	SPREADER BERM
B28	807,176.3048	1,768,144.2470	4786.50	SPREADER BERM
B29	807,177.3024	1,768,144.3834	4786.90	SPREADER BERM
B30	807,183.3019	1,768,144.4880	4786.90	SPREADER BERM
B31	807,450.3915	1,767,338.9824	4785.50	SPREADER BERM
B32	807,451.3526	1,767,339.2580	4785.90	SPREADER BERM
B33	807,457.1206	1,767,340.9119	4785.90	SPREADER BERM
B34	807,424.7838	1,767,428.3026	4785.50	SPREADER BERM
B35	807,425.7091	1,767,428.6923	4785.90	SPREADER BERM
B36	807,431.4271	1,767,430.1867	4785.90	SPREADER BERM

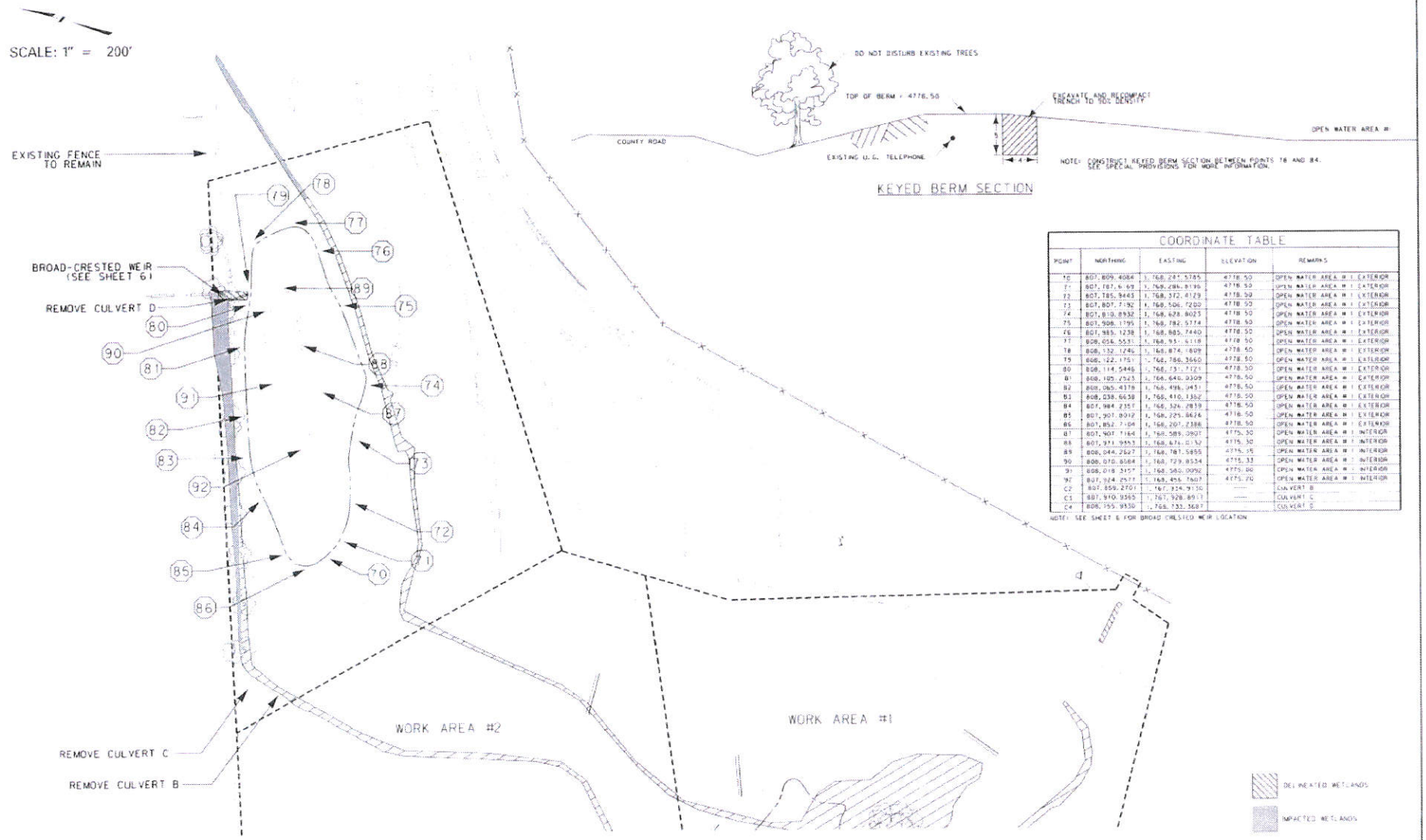
CONTOUR INTERVAL: 1'

MORRISON MAIERLE, Inc.

MDT MONTANA DEPARTMENT OF TRANSPORTATION

3				WETLAND PLANS	ROSTAD RANCH WETLAND
2	3/21/2012	DESIGNED BY		MEAGHER COUNTY	SCALE: 1" = 200' UPN NUMBER 5565
1	10:33:17 AM CPS: 02164	DRAWN BY / CHECKED BY			PROJECT NO. STPX 0002(249) SHEET 15 OF 19

WORK AREA # 3 PLAN



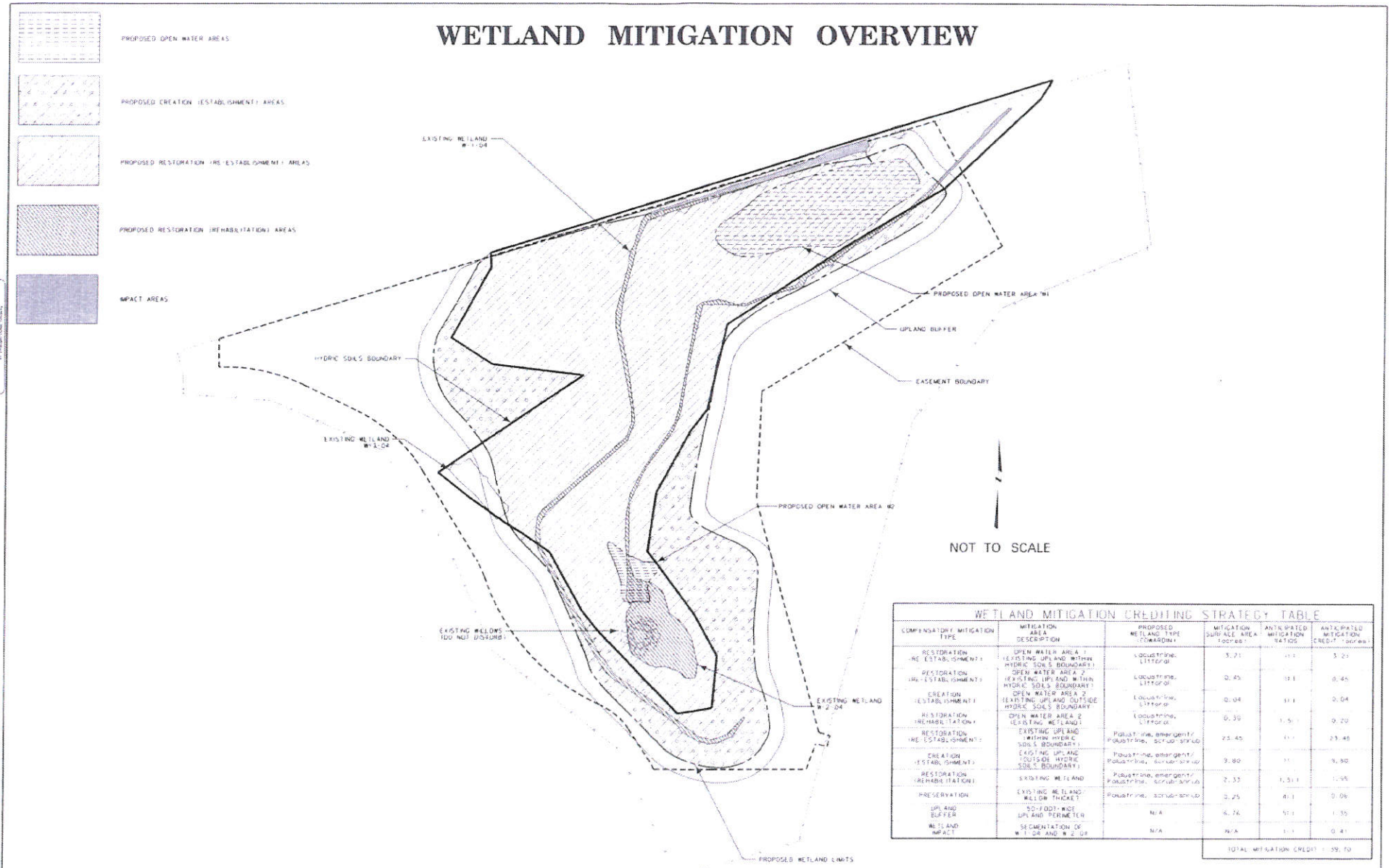
COORDINATE TABLE

POINT	NORTHING	EASTING	ELEVATION	REMARKS
70	807,809.4084	1,768,281.5785	4778.50	OPEN WATER AREA #1 EXTERIOR
71	807,787.6.93	1,768,286.8196	4778.50	OPEN WATER AREA #1 EXTERIOR
72	807,785.9443	1,768,372.8129	4778.50	OPEN WATER AREA #1 EXTERIOR
73	807,807.7192	1,768,506.7200	4778.50	OPEN WATER AREA #1 EXTERIOR
74	807,810.8932	1,768,628.8023	4778.50	OPEN WATER AREA #1 EXTERIOR
75	807,908.1795	1,768,782.5774	4778.50	OPEN WATER AREA #1 EXTERIOR
76	807,985.1238	1,768,885.7440	4778.50	OPEN WATER AREA #1 EXTERIOR
77	808,056.5531	1,768,951.6118	4778.50	OPEN WATER AREA #1 EXTERIOR
78	808,132.1245	1,768,874.1809	4778.50	OPEN WATER AREA #1 EXTERIOR
79	808,122.1751	1,768,786.3660	4778.50	OPEN WATER AREA #1 EXTERIOR
80	808,114.5445	1,768,731.7121	4778.50	OPEN WATER AREA #1 EXTERIOR
81	808,105.2523	1,768,648.8309	4778.50	OPEN WATER AREA #1 EXTERIOR
82	808,065.4378	1,768,498.0431	4778.50	OPEN WATER AREA #1 EXTERIOR
83	808,038.6658	1,768,410.1382	4778.50	OPEN WATER AREA #1 EXTERIOR
84	807,984.2357	1,768,326.2839	4778.50	OPEN WATER AREA #1 EXTERIOR
85	807,907.8012	1,768,225.8676	4778.50	OPEN WATER AREA #1 EXTERIOR
86	807,852.7104	1,768,207.2388	4778.50	OPEN WATER AREA #1 EXTERIOR
87	807,907.7164	1,768,589.0907	4775.30	OPEN WATER AREA #1 INTERIOR
88	807,971.9553	1,768,674.0132	4775.30	OPEN WATER AREA #1 INTERIOR
89	808,044.2627	1,768,787.5855	4775.15	OPEN WATER AREA #1 INTERIOR
90	808,070.8084	1,768,729.8534	4775.33	OPEN WATER AREA #1 INTERIOR
91	808,018.3157	1,768,580.0092	4775.00	OPEN WATER AREA #1 INTERIOR
92	807,924.2577	1,768,456.7607	4775.70	OPEN WATER AREA #1 INTERIOR
C2	807,859.2701	1,767,924.9756	------	CULVERT B
C3	807,970.9365	1,767,928.8913	------	CULVERT C
C4	808,755.9530	1,768,733.3687	------	CULVERT D

NOTE: SEE SHEET 6 FOR BROAD CRESTED WEIR LOCATION

MDT MONTANA DEPARTMENT OF TRANSPORTATION	DESIGNED BY			WETLAND PLANS	ROSTAD RANCH WETLAND		PROJECT NO. STPX 0002(749)
	DRAWN BY			MEAGHER COUNTY	SCALE: 1" = 200'	UPN NUMBER 5565	SHEET 18 OF 19
	CHECKED BY						

WETLAND MITIGATION OVERVIEW



WETLAND MITIGATION CREDITING STRATEGY TABLE

COMPENSATORY MITIGATION TYPE	MITIGATION AREA DESCRIPTION	PROPOSED WETLAND TYPE (COWARDIN)	MITIGATION SURFACE AREA (acres)	ANTICIPATED MITIGATION RATIO	ANTICIPATED MITIGATION CREDIT (acres)
RESTORATION (RE-ESTABLISHMENT)	OPEN WATER AREA 1 (EXISTING UPLAND WITHIN HYDRIC SOILS BOUNDARY)	Lacustrine, Littoral	3.21	1:1	3.21
RESTORATION (RE-ESTABLISHMENT)	OPEN WATER AREA 2 (EXISTING UPLAND WITHIN HYDRIC SOILS BOUNDARY)	Lacustrine, Littoral	0.45	1:1	0.45
CREATION (ESTABLISHMENT)	OPEN WATER AREA 2 (EXISTING UPLAND OUTSIDE HYDRIC SOILS BOUNDARY	Lacustrine, Littoral	0.04	1:1	0.04
RESTORATION (REHABILITATION)	OPEN WATER AREA 2 (EXISTING WETLAND)	Lacustrine, Littoral	0.39	1.5:1	0.29
RESTORATION (RE-ESTABLISHMENT)	EXISTING UPLAND (WITHIN HYDRIC SOILS BOUNDARY)	Palustrine, emergent/ Palustrine, scrub-shrub	23.45	1:1	23.45
CREATION (ESTABLISHMENT)	EXISTING UPLAND (OUTSIDE HYDRIC SOILS BOUNDARY)	Palustrine, emergent/ Palustrine, scrub-shrub	9.90	1:1	9.90
RESTORATION (REHABILITATION)	EXISTING WETLAND	Palustrine, emergent/ Palustrine, scrub-shrub	2.33	1.5:1	1.55
PRESERVATION	EXISTING WETLAND WILLOW THICKET	Palustrine, scrub-shrub	0.25	4:1	0.06
UPLAND BUFFER	50-FOOT-WIDE UPLAND PERIMETER	N/A	6.76	5:1	1.35
WETLAND IMPACT	SEGMENTATION OF W-1-04 AND W-2-04	N/A	N/A	1:1	0.41
				TOTAL MITIGATION CREDIT =	39.70

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	E:\dgn\5565Sheet1.dgn	DESIGNED BY		WETLAND PLANS	ROSTAD RANCH WETLAND MITIGATION	PROJECT NO. STPX 0002(749)
2		5/21/2013	DRAWN BY		MEAGHER COUNTY	CSF = 0.99922160 UPN NUMBER 5565	SHEET 17 OF 19
1		10:33:26 AM GPS: UNK	CHECKED BY				

CONCEPTUAL REVEGETATION PLAN

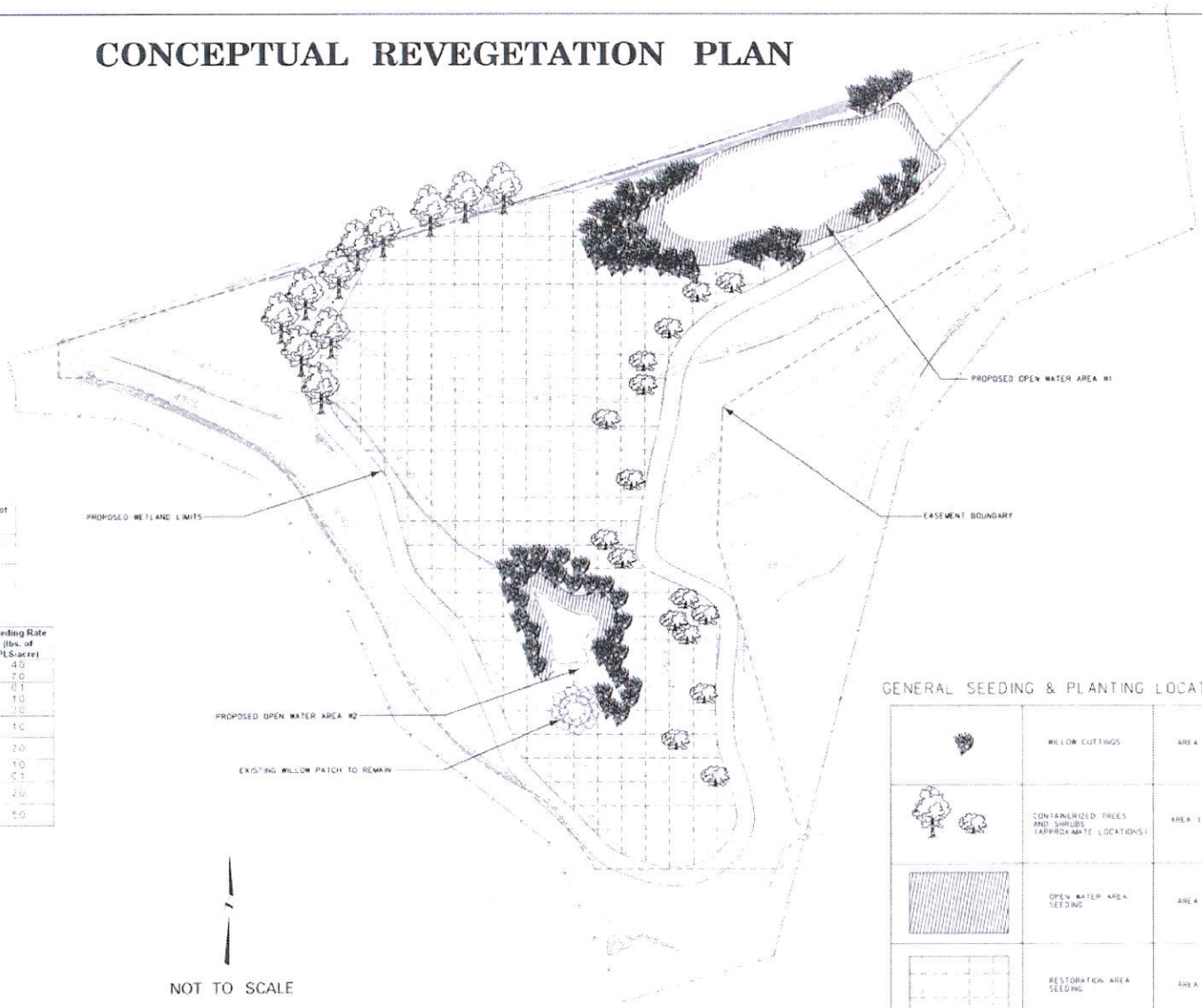


Table 1. Live Plantings

Area Descriptions 16A	Species – Common Name	Species – Scientific Name	Planting Methodology	Number of Plants*
2	Willows**	Salix species	Cuttings	2,000
1, 3	quaking aspen	Populus tremuloides	Containerized trees (5 gallon)	100
	black cottonwood	Populus balsamifera	Containerized trees (5 gallon)	100

*Plant locations to be provided in the field by MDT personnel
** Willow cuttings should be from a variety of species found in the region

Table 2. Seed Mixtures

Area Descriptions 16A	Species – Common Name	Species – Scientific Name	Seeding Rate (lbs. of PLS/acre)
Wetland Seed Mixture – Open Water Areas (2)	American mannagrass	*Glyceria grandis*	4.0
	American sloughgrass	*Beckmannia syzigachne*	7.0
	Baltic rush	*Juncus balticus*	0.1
	Hooked sedge	*Carex atherodes*	1.0
	Nebraska sedge	*Carex nebrascensis*	1.0
Wetland Seed Mixture – Restoration Area (1)	Northern tufted hairgrass	*Deschampsia cespitosa*	1.0
	Northern tufted hairgrass	*Deschampsia cespitosa*	2.0
	Bluejoint reedgrass	*Calamagrostis canadensis*	1.0
	Baltic rush	*Juncus balticus*	0.1
	Pearl slender wheatgrass	*Elymus trachycaulus*	2.0
	Rosana western wheatgrass	*Pascopyrum smithii*	5.0

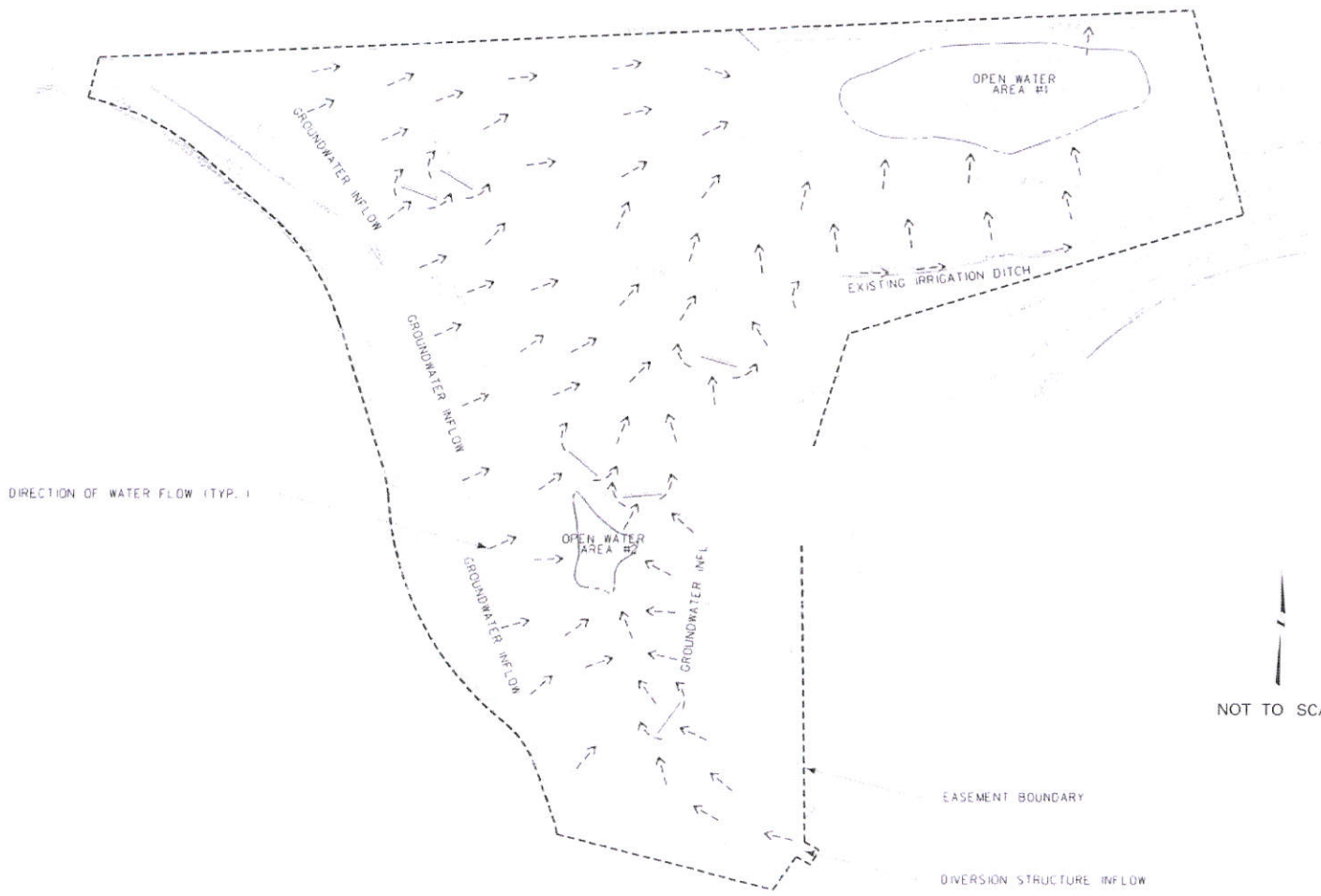
Seed application rate by drill seeding (rates double for broadcast seeding)

GENERAL SEEDING & PLANTING LOCATIONS

	WILLOW CUTTINGS	AREA 2
	CONTAINERIZED TREES AND SHRUBS (APPROXIMATE LOCATIONS)	AREA 1 & 3
	OPEN WATER AREA SEEDING	AREA 2
	RESTORATION AREA SEEDING	AREA 1

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\665500\dgn\d0.dgn	DESIGNED BY			WETLAND PLANS	ROSTAD RANCH WETLAND MITIGATION	PROJECT NO. STPX 0002(749)
2		5/1/2012	DRAWN BY			MEAGHER COUNTY	CSF = 0.99922160 / UPN NUMBER 5565	SHEET 18 OF 19
1		10:30:36 AM	CHECKED BY					

WATER DISTRIBUTION OVERVIEW

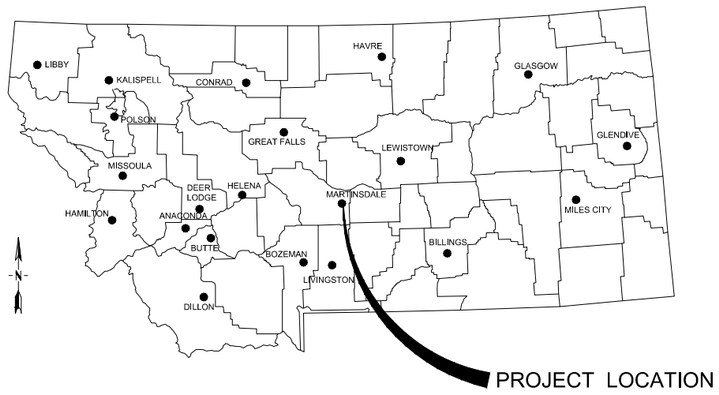


NOTE: FOR INFORMATION PURPOSES ONLY

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION		DESIGNED BY			WETLAND PLANS	ROSTAD RANCH WETLAND MITIGATION		PROJECT NO. STPX 0002(749)
2		5/21/2012	REVIEWED BY						
1		10:33:39 AM CDT	CHECKED BY			MEAGHER COUNTY	CSF = 0.99922160	UPN NUMBER 5565	SHEET 18 OF 19

ROSTAD RANCH
WETLAND MITIGATION SITE
MARTINSDALE, MONTANA

AUGUST 2016



LOCATION MAP

NO SCALE

RECORD DRAWINGS

MAY 2017

PREPARED BY:

Morrison Maierle

engineers ▪ surveyors ▪ planners ▪ scientists

1 Engineering Place, Helena, MT 59602
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PREPARED FOR:

MDT MONTANA DEPARTMENT OF TRANSPORTATION

2701 Prospect Ave, Helena, MT 59601



VICINITY MAP

NO SCALE

SHEET INDEX

SHEET TITLE	DRAWING NO.	SHEET NO.
COVER SHEET, VICINITY MAP, LOCATION MAP AND SHEET INDEX	-	-
OVERALL PRE-EXISTING SITE PLAN	C-1	1
OVERALL SITE PLAN	C-2	2
SHEET INDEX PLAN	C-3	3
SPREADER BERM 1 PLAN AND PROFILE	C-4	4
SPREADER BERM 2 PLAN AND PROFILE	C-5	5
SPREADER BERM 3 PLAN AND PROFILE	C-6	6
SPREADER BERM 4 PLAN AND PROFILE	C-7	7
WETLANDS PLAN	C-8	8
BERM, DITCH AND PLUG DETAILS	D-1	9

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PHILLIP J. FORBES
Project Manager

MMI PROJECT NO. 0275.112

R:\0275\112 ROSTAD MITIGATION\ACAD\SHEETS\AS-BUILT\COVER.DWG PLOTTED BY:DAVID A. HALLSTEN ON Jun/21/2017



NOTE:

1. SOURCE OF AERIAL PHOTOGRAPHY IS AERIAL PHOTOS OF MONTANA, 2013, DOWNLOADED FROM HTTP://GEOINFO.MSL.MT.GOV/DATA/AERIAL PHOTOS/NAIP 2013 ON MARCH 3,13,2016.

N

300 150 0 300 600

SCALE IN FEET

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REVISIONS

NO.	DESCRIPTION	BY	DATE

ENGINEER: MARK BROOKE | P.E. NO.: 13384 | DATE: 05/2017

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ROSTAD RANCH
WETLAND MITIGATION SITE

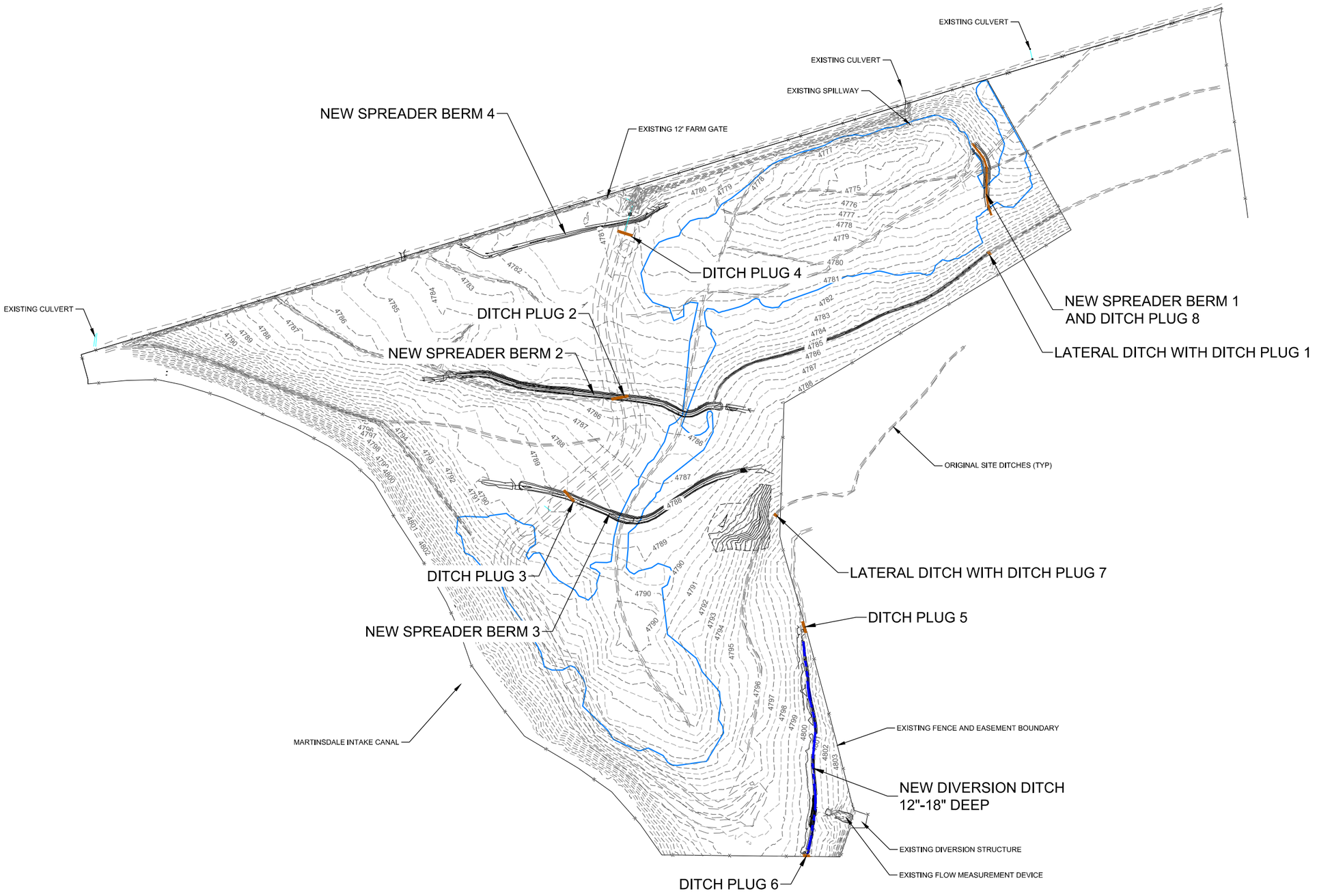
MARTINSDALE MONTANA

OVERALL PRE-EXISTING SITE PLAN

PROJECT NUMBER 0275.112

SHEET NUMBER 1

DRAWING NUMBER C-1



NOTES:

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2. CONTRACTOR SHALL ACCESS SITE THROUGH EXISTING FARM GATE.
3. CONTRACTOR SHALL SEED ALL DISTURBED AREAS BETWEEN APRIL 1ST AND MAY 15TH IN ACCORDANCE WITH THE SEEDING SPECIFICATION ON DWG D-1.
4. MONTANA PUBLIC WORKS SPECIFICATIONS SHALL APPLY WHEN REQUIREMENTS ARE NOT SPECIFICALLY STATED ON THESE PLANS.
5. ALL FILL MATERIAL FOR CONSTRUCTION OF THE BERMS WILL BE OBTAINED FROM AN OFF-SITE SOURCE.
6. ALL FILL MATERIAL FOR CONSTRUCTION OF THE BERMS WILL CONTAIN A MINIMUM OF 20% FINES PASSING A 200 SIEVE.

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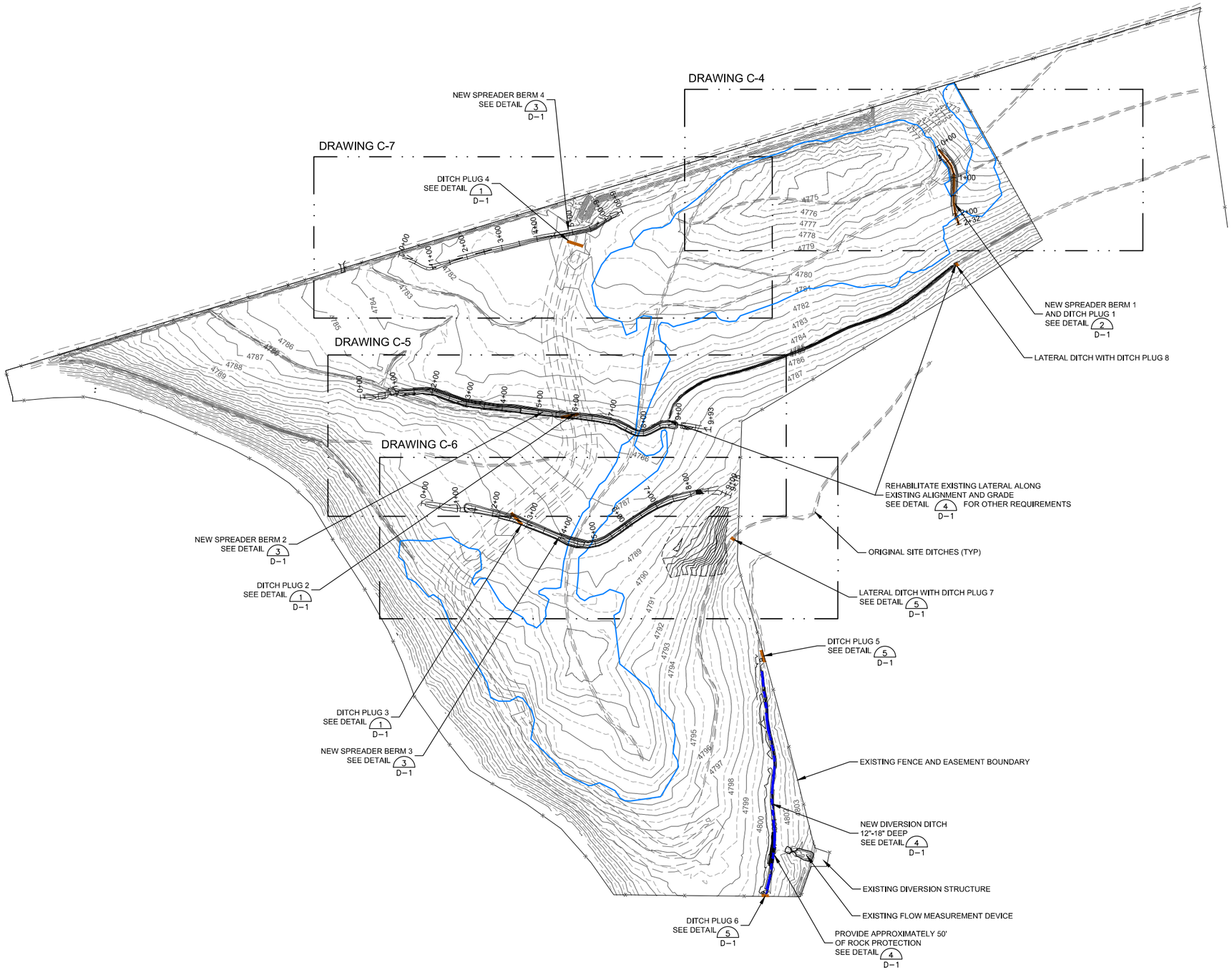
ROSTAD RANCH
WETLAND MITIGATION SITE
MARTINSDALE MONTANA

OVERALL SITE PLAN

PROJECT NUMBER 0275.112
SHEET NUMBER 2
DRAWING NUMBER C-2

NOTES:

1. SEE SHEET D-1 FOR DITCH PLUG AND SPREADER BERM DETAILS.
2. CONTRACTOR SHALL FIELD FIT DESIGN ELEMENTS NOT STAKED IN LOCATIONS SHOWN ON PLANS AS APPROVED BY ENGINEER.



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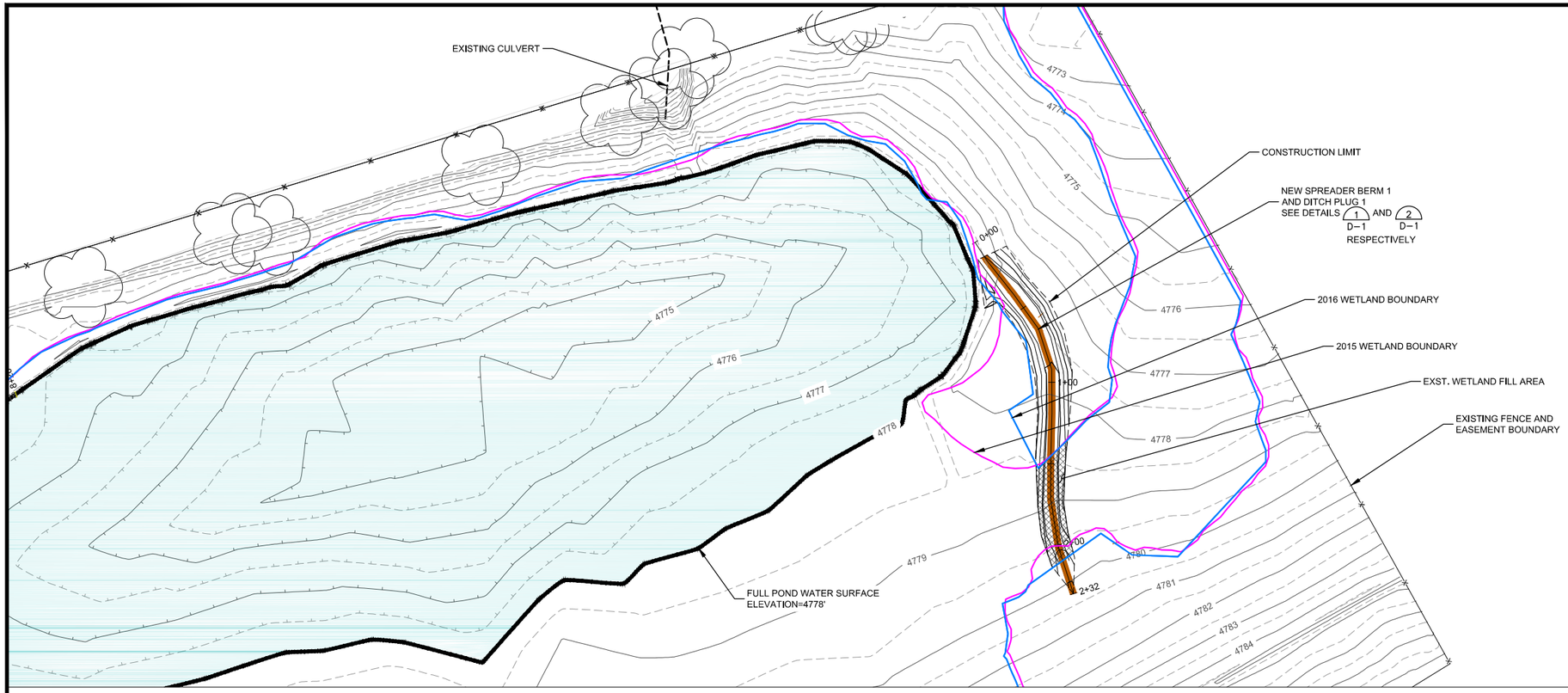
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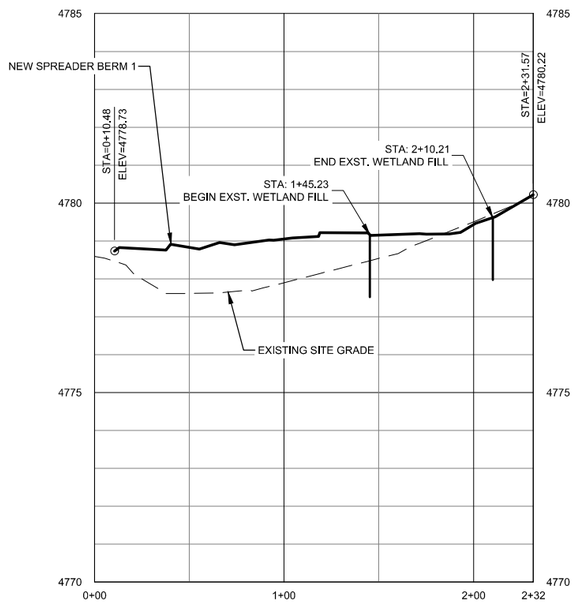
ROSTAD RANCH
WETLAND MITIGATION SITE

MARTINSDALE MONTANA

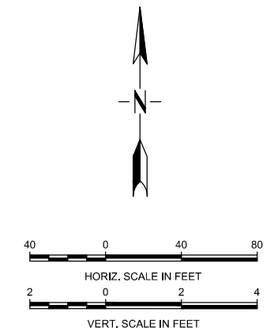
SHEET INDEX PLAN

PROJECT NUMBER 0275.112
SHEET NUMBER 3
DRAWING NUMBER C-3





ASBUILT BERM1 CL



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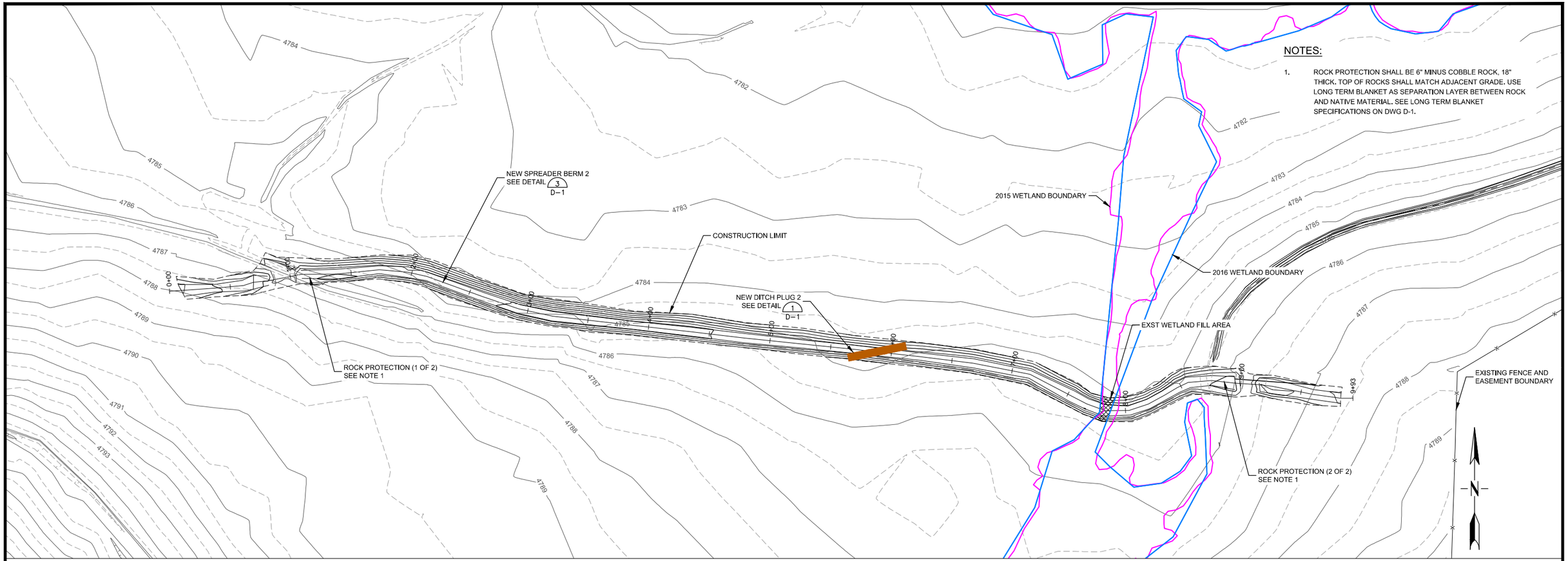
MARTINSDALE MONTANA

SPREADER BERM 1
PLAN AND PROFILE

PROJECT NUMBER
0275.112

SHEET NUMBER
4

DRAWING NUMBER
C-4



ASBUILT BERM2 CL

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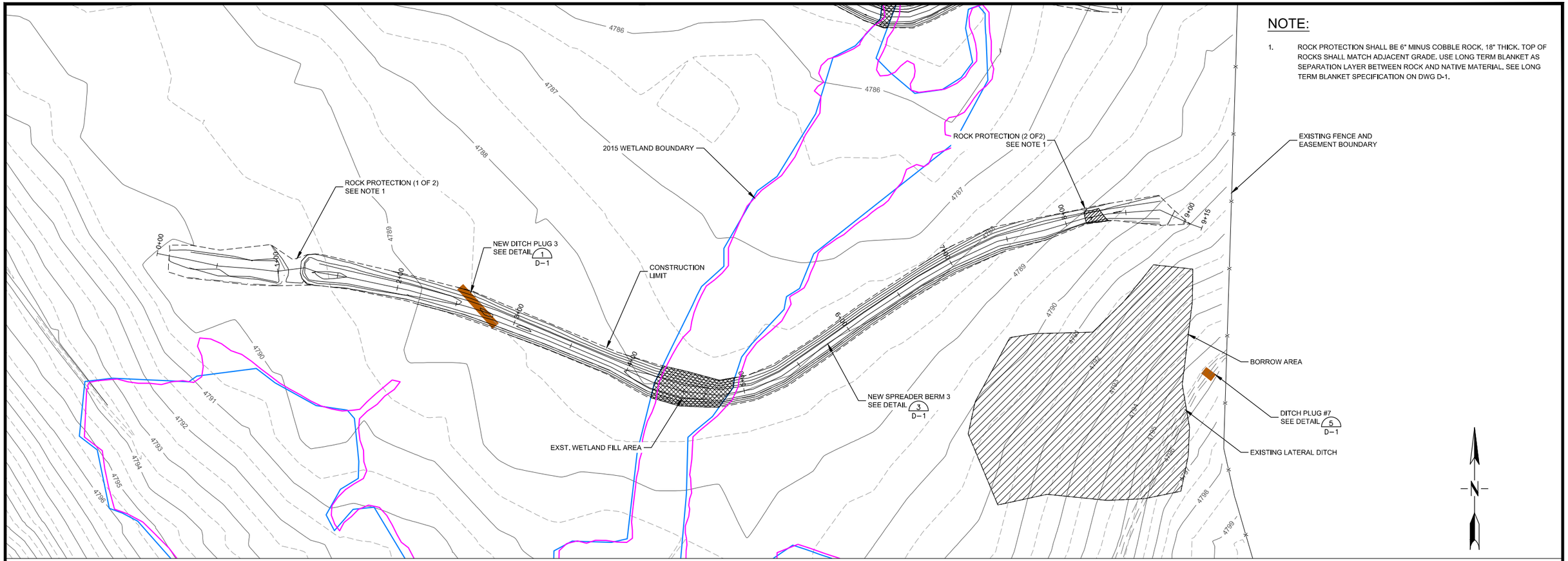
ROSTAD RANCH
WETLAND MITIGATION SITE
MARTINSDALE MONTANA

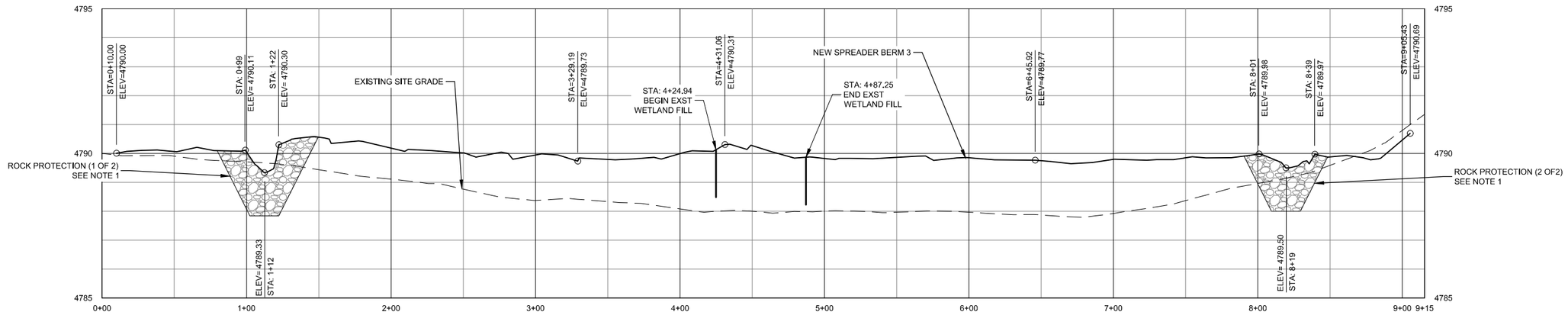
SPREADER BERM 2
PLAN AND PROFILE

PROJECT NUMBER 0275.112
SHEET NUMBER 5
DRAWING NUMBER C-5

NOTE:

1. ROCK PROTECTION SHALL BE 6" MINUS COBBLE ROCK, 18" THICK. TOP OF ROCKS SHALL MATCH ADJACENT GRADE. USE LONG TERM BLANKET AS SEPARATION LAYER BETWEEN ROCK AND NATIVE MATERIAL. SEE LONG TERM BLANKET SPECIFICATION ON DWG D-1.





ASBUILT BERM3 CL

40 0 40 80
HORIZ. SCALE IN FEET
2 0 2 4
VERT. SCALE IN FEET

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ROSTAD RANCH
WETLAND MITIGATION SITE

MARTINSDALE MONTANA

SPREADER BERM 3
PLAN AND PROFILE

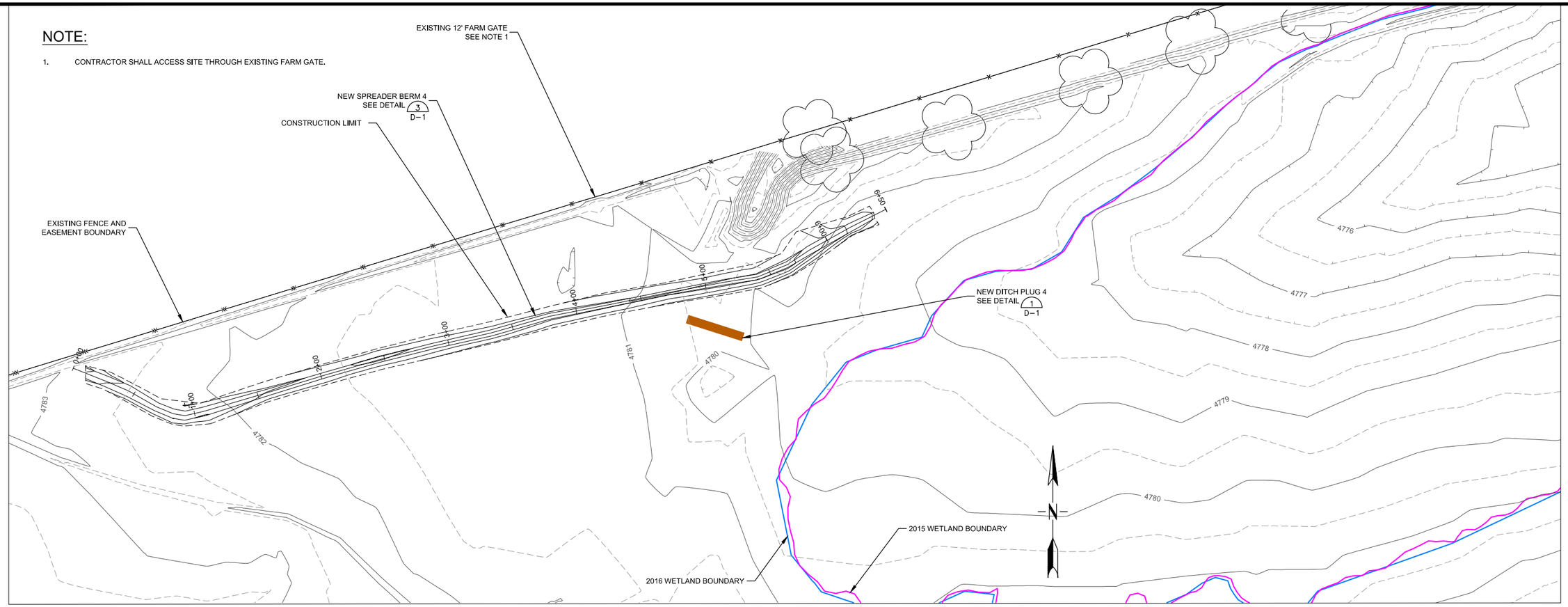
PROJECT NUMBER
0275.112

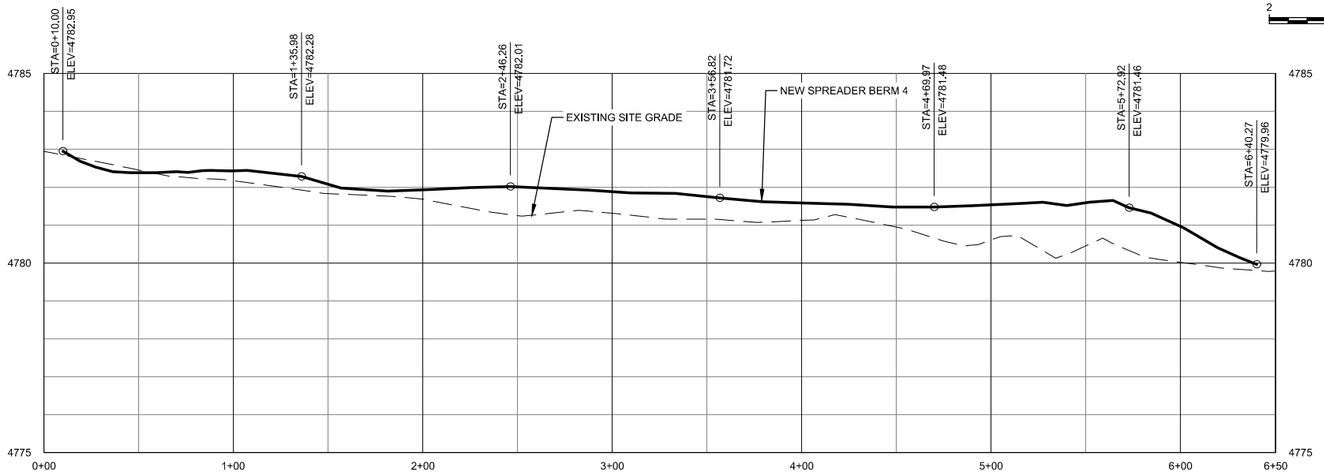
SHEET NUMBER
6

DRAWING NUMBER
C-6

NOTE:

1. CONTRACTOR SHALL ACCESS SITE THROUGH EXISTING FARM GATE.





ASBUILT BERM4 CL

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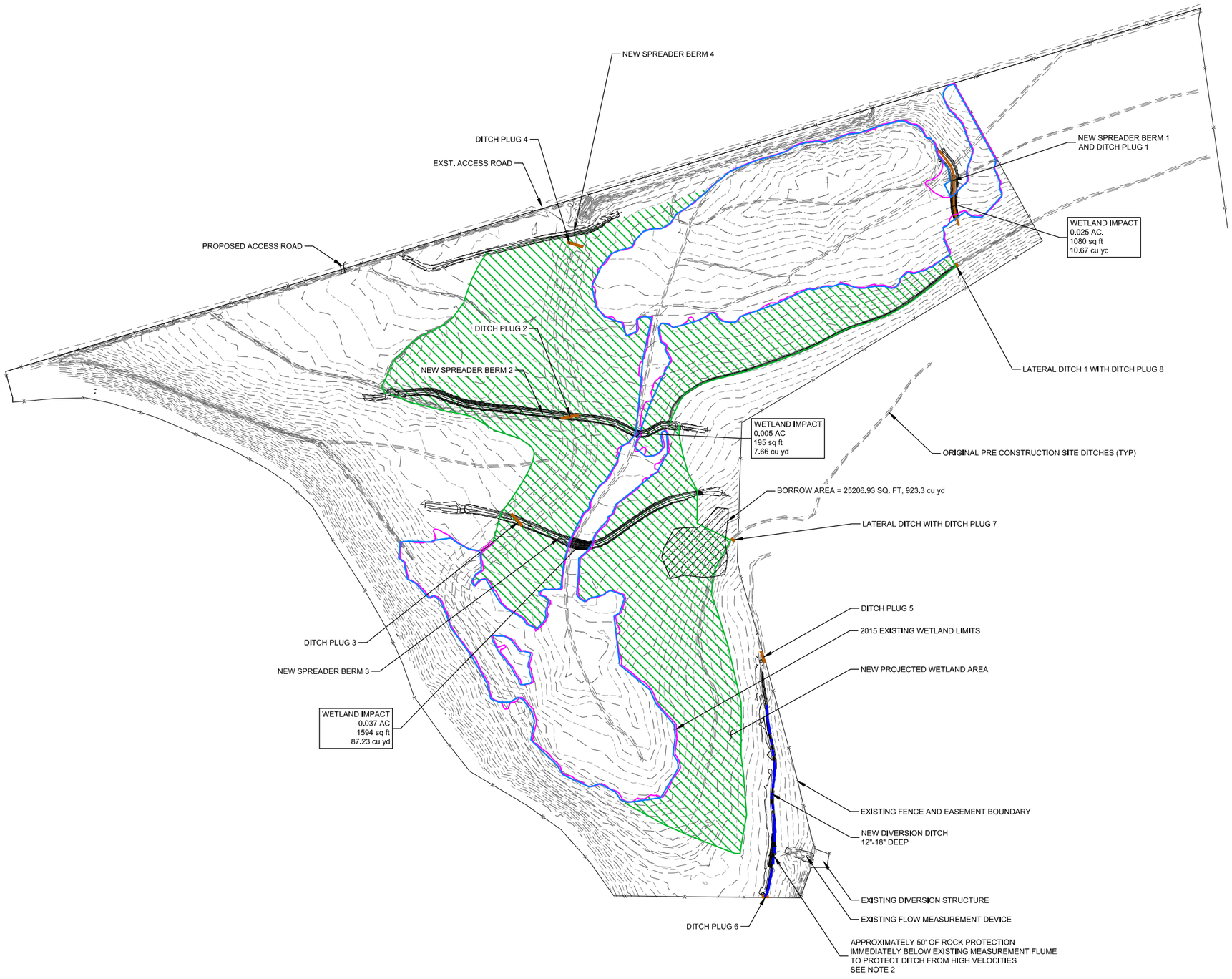
MARTINSDALE MONTANA

SPREADER BERM 4
PLAN AND PROFILE

PROJECT NUMBER
0275.112

SHEET NUMBER
7

DRAWING NUMBER
C-7



NOTES:

1. SEE SHEET D-1 FOR DITCH AND SPREADER BERM DETAILS.
2. ROCK PROTECTION SHALL BE 6" MINUS COBBLE ROCK, 18" THICK, TOP OF ROCKS SHALL MATCH ADJACENT GRADE, USE LONG TERM BLANKET AS SEPARATION LAYER BETWEEN ROCK AND NATIVE MATERIAL. SEE LONG TERM BLANKET SPECIFICATION ON DWG D-1.

LEGEND:

- 2015 WETLAND BOUNDARY
- 2016 WETLAND BOUNDARY
- ADDITIONAL ANTICIPATED WETLAND MITIGATION AREA.
- BORROW AREA

N

150 75 0 150 300

SCALE IN FEET

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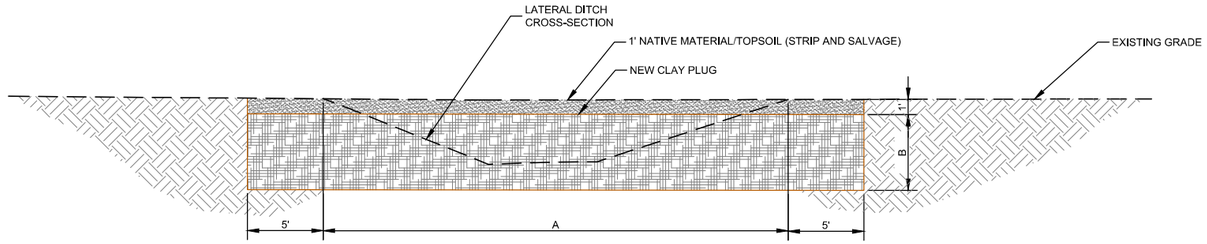
MARTINSDALE MONTANA

WETLANDS PLAN

PROJECT NUMBER 0275.112

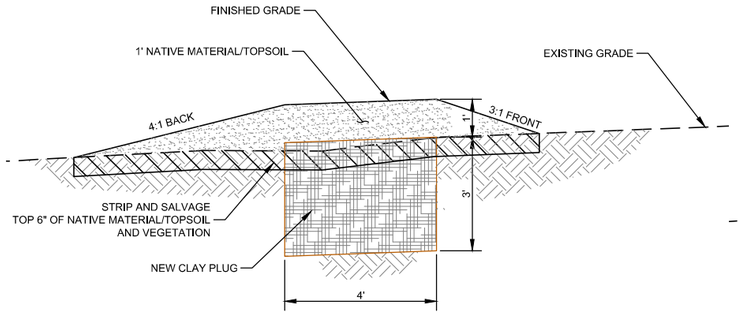
SHEET NUMBER 8

DRAWING NUMBER C-8

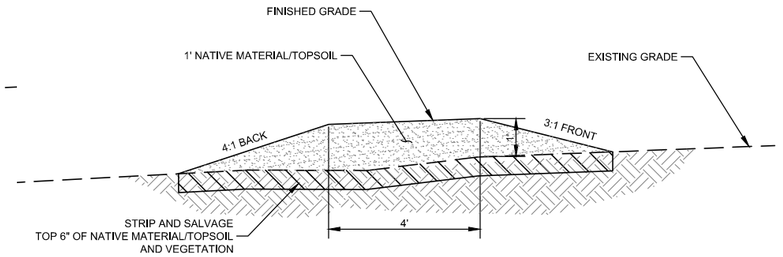


DITCH PLUG	DIMENSION A (FT)	DIMENSION B (FT)	THICKNESS (FT)
3	43	5	4
4	44	5	4
2	48	6	4

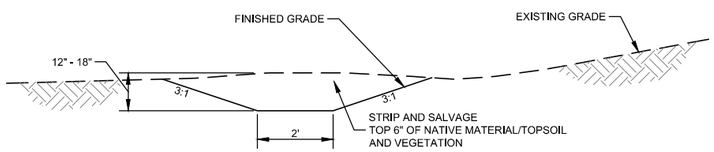
DITCH PLUG DETAIL 1
NTS



SPREADER BERM 1 AND DITCH PLUG 1 DETAIL 2
NTS

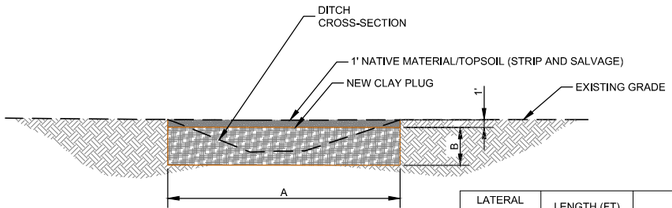


SPREADER BERM 2, 3 AND 4 DETAIL 3
NTS



NOTE:
1. GRADE DIVERSION DITCH TO 0% AND REMOVE SPOILS PILES SO DITCH CAN INTERCEPT AND SPILL WATER EVENLY ALONG ENTIRE LENGTH.
2. SEE C-3 FOR ROCK PROTECTION PLACEMENT AND NOTE 3.
3. ROCK PROTECTION SHALL BE 6" MINUS COBBLE ROCK, 18" THICK. TOP OF ROCKS SHALL MATCH ADJACENT GRADE. USE LONG TERM BLANKET AS SEPARATION LAYER BETWEEN ROCK AND NATIVE MATERIAL. SEE LONG TERM BLANKET SPECIFICATION, THIS SHEET.

DIVERSION DITCH DETAIL 4
NTS



LATERAL DITCH PLUG	LENGTH (FT)	A WIDTH (FT)	B DEPTH (FT)
5	34	11	3
6	17	11	3
7	12	6	3
8	12	6	3

DETAIL FOR LATERAL AND DIVERSION DITCH PLUGS 5, 6, 7, 8 5
NTS

NOTES:
1. CONTRACTOR SHALL WHEEL COMPACT BERMS TO REMOVE VOIDS AND PROVIDE EVEN DENSITY AND LEVEL BEFORE PLACING SALVAGED TOPSOIL AND VEGETATION.
2. SALVAGED TOPSOIL AND VEGETATION SHALL BE PLACED ON TOP OF NEW BERMS.

LONG TERM BLANKET:
AN EROSION CONTROL BLANKET COMPOSED OF ONE OF THE FOLLOWING MATERIALS.
1. PROCESSED SLOW DEGRADING NATURAL OR POLYMER FIBERS MECHANICALLY-BOUND TOGETHER BETWEEN TWO SLOW DEGRADING SYNTHETIC OR NATURAL FIBER NETTINGS TO FORM A CONTINUOUS MATRIX.
2. AN OPEN WEAVE TEXTILE COMPOSED OF PROCESSED SLOW DEGRADING NATURAL OR POLYMER YARNS OR TWINES WOVEN INTO A CONTINUOUS MATRIX. MEET THE REQUIREMENTS FOR TYPE III-B BLANKET IN ACCORDANCE WITH TABLE 713-5.

TABLE 713-5 TEMPORARY ROLLED EROSION CONTROL

PROPERTY	TYPE II				TYPE III		TYPE IV	TEST METHOD
	A	B	C	D	A[1]	B		
TYPICAL FUNCTIONAL LONGEVITY[2] (MONTHS)	12				24		36	N/A
MINIMUM TENSILE STRENGTH[3] LBS/FT^2 (KG/M^2)	5 (24,4)	50 (244,1)		75 (366,2)	25 (122,1)	100 (488,2)	125 (610,3)	ASTM D4595
MAXIMUM "C" FACTOR[4]	0.10 AT 1V:5H	0.10 AT 1V:4H	0.10 AT 1V:3H	0.10 AT 1V:2H	0.10 AT 1V:5H	0.25 AT 1V:1.5H	0.25 AT 1V:1H	ASTM D6459
MINIMUM PERMISSIBLE SHEAR STRESS[5,6] PSF (PA)	.25 (12)	.50 (23,9)	1,5 (71,8)	1.75 (83,8)	.25 (12)	2.00 (95,8)	2.25 (107,7)	ASTM D6460

NOTES:
1. OBTAIN MAX "C" FACTOR AND ALLOWABLE SHEAR STRESS FOR MULCH CONTROL NETTINGS WITH THE NETTING USED IN CONJUNCTION WITH PRE-APPLIED MULCH MATERIAL.
2. FUNCTIONAL LONGEVITIES ARE FOR GUIDANCE ONLY. ACTUAL FUNCTIONAL LONGEVITIES MAY VARY BASED ON SITE AND CLIMATIC CONDITIONS.
3. MINIMUM AVERAGE ROLL VALUES, MACHINE DIRECTION.
4. "C" FACTOR CALCULATED AS RATIO OF SOIL LOSS FROM ROLLED EROSION CONTROL PRODUCT PROTECTED SLOPE (TESTED AT SPECIFIED OR GREATER GRADIENT, V:H) TO RATIO OF SOIL LOSS FROM UNPROTECTED (CONTROL) PLOT IN LARGE-SCALE TESTING. THESE PERFORMANCE TEST VALUES SHOULD BE SUPPORTED BY PERIODIC BENCH SCALE TESTING UNDER SIMILAR TEST CONDITIONS AND FAILURE CRITERIA USING EROSION CONTROL TECHNOLOGY COUNCIL (ECTC) TEST METHOD #2.
5. MINIMUM SHEAR STRESS THE ROLLED EROSION CONTROL PRODUCT (UN-VEGETATED) CAN SUSTAIN WITHOUT PHYSICAL DAMAGE OR EXCESS EROSION (>1/2-INCH (13MM) SOIL LOSS) DURING A 30-MINUTE FLOW EVENT IN LARGE-SCALE TESTING. THESE PERFORMANCE TEST VALUES SHOULD BE SUPPORTED BY PERIODIC BENCH SCALE TESTING UNDER SIMILAR TEST CONDITIONS AND FAILURE CRITERIA USING ECTC TEST METHOD #3.
6. THE PERMISSIBLE SHEAR STRESS LEVELS ESTABLISHED FOR EACH PERFORMANCE CATEGORY ARE BASED ON HISTORICAL EXPERIENCE WITH PRODUCTS CHARACTERIZED BY MANNING'S ROUGHNESS COEFFICIENTS IN THE RANGE OF 0.01 TO 0.05.

SEEDING SPECIFICATION:

SEED MIX	SPECIES-COMMON NAME	SPECIES-SCIENTIFIC NAME	SEEDING RATE (LBS. OF PLS/ACRE)
WETLAND SEED RESTORATION MIXTURE	'NORTRAN' TUFTED HAIRGRASS	*DESCHAMPSIA CESPITOSA*	2.0
	BLUEJOINT REEDGRASS	*CALAMAGROSTIS CANADENSIS*	1.0
	BALTIC RUSH	*JUNCUS BALTICUS*	0.1
	'PRIOR' SLENDER WHEATGRASS	*ELYMUS TRACHYCAULUS*	2.0
	'ROSANA' WESTERN WHEATGRASS	*PASCOPRYUM SMITHII*	5.0
	'NUTTAL' ALKALIGRASS	*PUCCINELLIA NUTTALLIANA*	2.0
	'SHOSHONE' CREEPING WILD RYE	*LEYMUS TRITICOIDES*	4.0

SEED APPLICATION RATE BY DRILL SEEDING.
(RATES DOUBLE FOR BROADCAST SEEDING).

VERIFY SCALE!
THESE PRINTS MAY BE REDUCED. LINE BELOW MEASURES ONE INCH ON ORIGINAL DRAWING.
MODIFY SCALE ACCORDINGLY!

REVISIONS			
NO.	DESCRIPTION	BY	DATE

R:\0275\112 ROSTAD MITIGATION\ACAD\SHEETS\AS-BUILT\D-1.DWG PLOTTED BY:DAVID A. HALLSTEN ON Jun/21/2017

ENGINEER: MARK BROOKE | P.E. NO.: 13384 | DATE: 05/2017

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DSGN. BY: MB
APPR. BY: PJF
DATE: 08/2016
Q.C. REVIEW BY: KWS
DATE: 08/2016

ROSTAD RANCH
WETLAND MITIGATION
MARTINSDALE MONTANA

BERM, DITCH AND PLUG DETAILS

PROJECT NUMBER 0275.112
SHEET NUMBER 9
DRAWING NUMBER D-1