MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2016

JTX – TUNNICLIFF RANCH MITIGATION SITE
BIG HORN COUNTY, MONTANA



Prepared for:

MONTANA DEPARTMENT OF TRANSPORTATION

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December 2016

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INITIAL CONSTRUCTION: 2015

MDT Project Number STPX STWS (056)
Control Number 7286

USACE: NWO-2010-01938-MTH

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TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 METHODS 6

2.1 HYDROLOGY 6
2.2 VEGETATION 6
2.3 SOIL 7
2.4 WETLAND DELINEATION 7
2.5 WILDLIFE 8
2.6 FUNCTIONAL ASSESSMENT 8
2.7 PHOTOGRAPHIC DOCUMENTATION 8
2.8 GLOBAL POSITIONING SYSTEM DATA 9
2.9 MAINTENANCE NEEDS 9

3.0 RESULTS 9

3.1 HYDROLOGY 9
3.2 VEGETATION 10
3.3 SOIL 16
3.4 WETLAND DELINEATION 17
3.5 WILDLIFE 17
3.6 FUNCTIONAL ASSESSMENT 18
3.7 PHOTOGRAPHIC DOCUMENTATION 19
3.8 MAINTENANCE NEEDS 19
3.9 CURRENT CREDIT SUMMARY 19

4.0 REFERENCES 23

LIST OF TABLES

TABLE PAGE

1-1 Wetland Credit Determination for the JTX – Tunnicliff Ranch Site 3
3-1 Vegetation Species Observed in 2016 at the JTX – Tunnicliff Ranch Site 11
3-2 Data Summary for T-1 in 2016 at the JTX – Tunnicliff Ranch Site 13
3-3 Data Summary for T-2 in 2016 at the JTX – Tunnicliff Ranch Site 14
3-4 Woody Planting Survival at the JTX – Tunnicliff Ranch Site in 2016 16
3-5 Wildlife Species Observed in 2016 at the JTX – Tunnicliff Ranch Site 18
3-6 Wetland Mitigation Credits Estimated for the JTX – Tunnicliff Ranch Site in 2016 20
3-7 Summary of Performance Standards and Success Criteria Compared to Existing Site Conditions (Page 1 of 2) 21

LIST OF FIGURES

FIGURE PAGE

1-1 Project Location of the JTX – Tunnicliff Ranch Site..... 2

LIST OF CHARTS

CHART PAGE

3-1 Transect Map Showing Community Types on T-1 From Start (0 Feet) to Finish (792 Feet) at the JTX – Tunnicliff Ranch Site in 2016..... 13

3-2 Length of Habitat Types Within T-1 in 2016 at the JTX – Tunnicliff Ranch Site 14

3-3 Transect Map Showing Community Types on T-2 From Start (0 Feet) to Finish (900 Feet) at the JTX – Tunnicliff Ranch Site in 2016..... 15

3-4 Length of Habitat Types Within T-2 in 2016 at the JTX – Tunnicliff Ranch Site 15

LIST OF APPENDICES

APPENDIX A. PROJECT AREA MAPS A-1

APPENDIX B. MONITORING FORMS B-1

APPENDIX C. PROJECT AREA PHOTOGRAPHS C-1

APPENDIX D. PROJECT PLAN SHEETS..... D-1

Cover: View looking east from Photo Point 3.

1.0 INTRODUCTION

The JTX – Tunnicliff Ranch 2016 Wetland Mitigation Monitoring Report presents the results of the first year of postconstruction monitoring at the JTX – Tunnicliff Ranch mitigation area after project construction in 2015. The first year of monitoring is intended to establish baseline conditions by which subsequent monitoring of the site can be compared to. This Montana Department of Transportation (MDT) wetland mitigation project is located in Sections 10 and 15, Township 1 North, Range 33 East, Big Horn County, Montana. This privately owned property is located approximately 4.8 miles north of Hardin, Montana, and is adjacent to the western boundaries of the Montana Fish, Wildlife, and Parks (MFWP) Grant Marsh Wildlife Management Area (WMA) and Fishing Access Site (FAS) along the Bighorn River, as illustrated in Figure 1-1. The site is intended to provide 29.60 acres of compensatory wetland mitigation credits for wetland impacts associated with the proposed Hardin North project and to serve as a mitigation bank for future transportation projects in Watershed #13 – Upper Yellowstone. The US Army Corps of Engineers (USACE) permit #NWO-2010-01938-MTH approved the JTX – Tunnicliff project and proposed crediting that was presented in the *JTX-Tunnicliff Final Wetland Mitigation Plan, Watershed #14 – Middle Yellowstone River Basin, Big Horn County, Montana* [MDT, 2015]. The objectives of this project includes establishing (creating) emergent and scrub/shrub wetlands, riparian floodplain habitat, and a 100-foot wide upland buffer.

The JTX – Tunnicliff Ranch site is a 50-acre parcel of land within the larger JTX – Tunnicliff Ranch property. The landowner contacted MDT with an interest in possibly using a portion of his ranch to serve as a compensatory wetland mitigation site. MDT staff met with the landowner in the fall of 2011. MDT staff then conducted some on-site field investigations in the spring of 2012 with the staff from the USACE's Billings office to assess the potential for developing a wetland mitigation site on the ranch. This proposed mitigation area is approximately 50 acres in size, and topographically, the property was previously graded for agricultural production, and a series of irrigation and lateral ditches had been constructed across the site. Three irrigation supply ditches formerly ran through the site before construction along with as many as nine lateral distribution ditches. The entire parcel is fenced and has access gates in the northeastern and southeastern corners of the site.

The intent of the project is to create and restore the site similar to a riparian floodplain wetland ecosystem that has relic river channel depressional wetlands and woody riparian buffer habitat found within the southern portions of the JTX – Tunnicliff Ranch site and at the Grant Marsh FAS/WMA within the Bighorn River valley. Specifically, the wetland project was designed to restore the riparian wetland habitat that had been converted to farmland; improve wildlife habitat diversity within the property; increase potential flood and stormwater retention within the Bighorn River floodplain; and increase the wetland/riparian floodplain habitats within the Bighorn River Watershed.

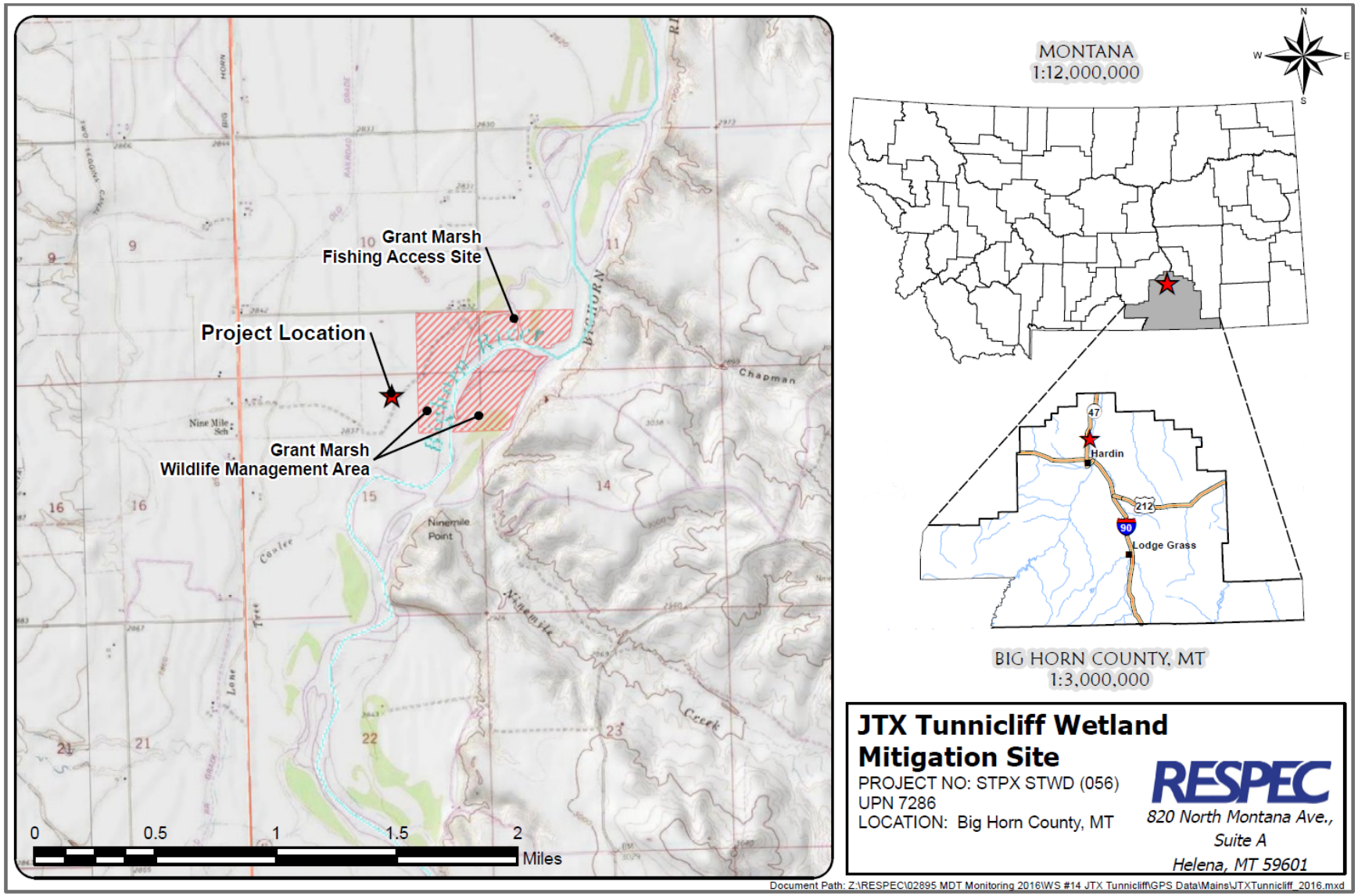


Figure 1-1. Project Location of the JTX – Tunnicliff Ranch Site.

The project objectives as described in the *JTX-Tunnicliff Final Wetland Mitigation Plan, Watershed #14 – Middle Yellowstone River Basin, Big Horn County, Montana* include creating the following:

- 26.85 acres of depressional emergent and scrub/shrub wetlands that will be seasonally inundated by groundwater and flood events from the adjacent Bighorn River. Thirteen small excavated depressions, which range in surface area from 0.33 to 1.50 acres, were designed to mimic relic river/flood channels that are found along many natural riverine systems. Average water depths within these excavated depressions is anticipated to be between 0.0 and 1.0 foot, with some small, deeper 1.0–2.0 foot pools. A variety of emergent hydrophytes is expected to establish in these depressions and along the seasonally inundated and saturated margins adjacent to the depressions.
- 2.73 acres of scrub/shrub wetland and riparian habitat is anticipated to develop around the drier perimeter of these excavated depressions that will be subject to seasonal high-water levels in the spring, as a result of late-summer irrigation, and during flood events along the Bighorn River. As part of the project, eight woody plant enclosures are planned for areas adjacent to the created wetlands cells in an effort to promote woody plant development within the site.
- 10.98 acres of upland buffer will be developed along the entire perimeter of the site; this area will also be planted with native herbaceous species commonly found within the riparian areas in the Bighorn River valley.

Table 1-1 provides a breakdown of the compensatory credits by mitigation type, including a brief description of each credit type, approved mitigation ratios, and anticipated mitigation credits, assuming that the site develops to full potential. A maximum 29.60 mitigation credits would be anticipated at the JTX – Tunnicliff Ranch site.

Table 1-1. Wetland Credit Determination for the JTX – Tunnicliff Ranch Site

Compensatory Mitigation Type	Mitigation Area Description	Proposed Wetland Type[(a)]	Mitigation Surface Area (acres)	USACE-Approved Mitigation Ratios	Anticipated Mitigation Credit (acres)
Base Bid Credits					
Creation (Establishment)	Depressional wetland	Palustrine emergent and palustrine scrub/shrub	26.85	1:1	26.85
Creation (Reestablishment)	Woody plant enclosures	N/A	2.73	5:1	0.55
Upland buffer	100-foot wide perimeter	N/A	10.98	5:1	2.20
Temporary impacts	N/A	N/A	0.00	None	0.00
Total Mitigation Credit					**29.60**

(a) Cowardin et al. [1979].

Project construction began in the fall of 2015 and finished in the winter of 2016. Revegetation efforts were completed in the spring of 2016. Project construction consisted of excavating a series of 13 cells that range in size from 0.33 to 1.50 acres. Eight woody plant enclosures were constructed around the periphery of excavated cells to establish scrub/shrub wetland and riparian habitat in these areas. Approximately 1,600 containerized woody plantings were planted within the eight enclosures.

The USACE-approved performance standards for the JTX – Tunnicliff Ranch wetland mitigation site are listed below.

1. **Wetland Characteristics** for 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 Regional Supplement) [USACE, 2010]. The 1987 Wetland Manual's methodology was used to establish baseline wetland conditions on site.
    a. **Wetland Hydrology Success** will be achieved where wetland hydrology is present as per the technical guidelines in the 1987 Wetland Manual and the 2010 Regional Supplement. Wetland hydrology will be confirmed by periodically observing surface water across the site and saturated soil conditions during the annual mid-season monitoring event. Soil saturation will be determined based on primary and secondary hydrology indicators as provided in Table 10 of Chapter 4 of the 2010 Regional Supplement. The presence of primary indicators observed during fieldwork will be used to make a formal determination as to hydrologic success within the established wetland.
    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 determined by delineating the developing wetlands by using the technical guidelines established in the 1987 Wetland Manual and the 2010 Regional Supplement. Hydrophytic vegetation success will be achieved where combined relative areal cover of facultative or wetter species is 70 percent or greater and state-listed noxious weeds do not exceed 5 percent cover. The hydrophytic vegetation indicator procedures established in the 2010 Regional Supplement will be used to determine dominance. These procedures will be applied during future routine wetland determinations in the created/restored wetlands and results will be documented on the Wetland Determination Data forms (Appendix B). Vegetation communities will be identified according to their strata (i.e., trees, sapling/shrub, herbaceous, and woody

vine), and the percent aerial coverage of each plant species within those stratum will be recorded.

   d. **Woody Plants** will be considered successful where they exceed 50 percent survival after 5 years. Natural colonization of woody plant species from nearby sources is anticipated after construction activities are complete. The rate and extent of natural woody plant colonization will depend on factors such as planting locations, habitat availability, animal activity, seed sources, and other natural selection factors. The site must possess the potential to support the species that will be initially planted and in the planned enclosure locations. This site will not be considered a failure if the hydrology changes over the time and/or if the planted woody species are subject to excessive saturation or drying that reduces their numbers.

2. **Open-Water Areas** are intended to be provided by the project to provide seasonal open water during the spring and early summer within excavated depressions. Open water will, therefore, be considered successful and creditable as wetland vegetation establishes in the form of either emergent, floating, and/or submerged hydrophytes.
3. **Upland Buffer** success will be achieved when noxious weeds do not exceed 5 percent cover within the buffer area on site. Any area within the creditable buffer area that is disturbed by project construction must have at least 50 percent aerial cover of non-noxious weed species by the end of the monitoring period.
4. **Weed Control** will be implemented based on annual monitoring of the site to determine weed species and the degree of infestation within the site. Control measures based on the monitoring results will be implemented by MDT to minimize and/or eliminate the intrusion of state-listed noxious weed species within the site. Success will be achieved where less than 5 percent absolute cover of noxious weed species occurs across the site.
5. **Fencing** on the proposed mitigation site has been installed along the easement boundaries to protect the integrity of the wetland from disturbance that may be detrimental to the site. Fencing installed along the south and east perimeter of the site has been designed to be wildlife-friendly to allow for wildlife movement into and out of the wetland complex. Fence along the north and west side of the property are not wildlife friendly at the landowners request.
6. **Monitoring** this MDT site will be based on the MDT standard monitoring protocols that are used for all of the MDT sites for a minimum period of 5 years (or longer as determined by the USACE Montana Regulatory Office's review of annual monitoring reports for the site and whether or not the site has met the wetland success criteria). The site will be monitored annually beginning with the first full growing season after construction.

Figures A-2 and A-3 (Appendix A) of this report show the site monitoring activity locations and mapped site features, respectively. The MDT Wetland Mitigation Site Monitoring form, USACE Wetland Determination Data forms [USACE, 2010], and the 2008 MDT Montana Wetland Assessment Method (MWAM) forms [Berglund and McEldowney, 2008] are included in Appendix B. Project area photographs are included in Appendix C, and the MDT plan sheets for the JTX – Tunnicliff Ranch site are provided in Appendix D.

2.0 METHODS

An initial site visit with MDT staff was completed on June 15, 2016. During this site visit, the vegetation transects and photo-point locations were established for the first time. Additional site observations were made regarding overall site conditions, soil saturation, plant species present, wildlife observations, condition of woody plantings, birdbox use, and fence condition. Monitoring crews revisited the site on July 8, 2016, to conduct a variety of other monitoring activities that were not completed during the initial site visit. Information for the Wetland Mitigation Site Monitoring form and Wetland Determination Data forms was recorded in the field during the site investigations (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.

2.1 HYDROLOGY

The presence of hydrological indicators as outlined on the Wetland Determination Data forms was assessed at two data points established within the project area. The hydrologic indicators were evaluated according to features observed in situ during the site visit. The data were recorded on the Wetland Determination Data forms (Appendix B). Hydrologic assessments allow evaluation of mitigation goals that address inundation and saturation requirements.

Technical criteria for wetland hydrology guidelines have been established as “permanent or periodic inundation, or soil saturation within 12 inches of the ground surface for a significant period (12.5 percent of the growing season) during the growing season” [USACE, 2010]. Systems with continuous inundation or saturation for greater than 12.5 percent of the growing season are considered jurisdictional wetlands. The growing season is defined for purposes of this report as the number of days when a 50 percent probability exists that the minimum daily temperature is greater than or equal to 28.5 degrees Fahrenheit [Environmental Laboratory, 1987]. Temperature data recorded for the meteorological station at the Hardin, Montana (243915), which is located approximately 8 miles south of the JTX – Tunnicliff Ranch site, have a median (5 years in 10) growing season length of 156 days. Areas that are defined as wetlands would require 19.5 days of inundation or saturation within 12 inches of the ground surface to meet the hydrology criteria.

Soil pits that were excavated during the wetland delineation were used to evaluate groundwater levels within 18–20 inches of the ground surface. The data were recorded on the Wetland Determination Data forms (Appendix B). Additionally, the US Geological Survey (USGS) is conducting periodic groundwater level monitoring at two on-site wells (Figure A-2, Appendix A). One monitoring well is monitored in real time and can be tracked online.

2.2 VEGETATION

The boundaries of general dominant-species-based vegetation communities were determined in the field during the active growing season and subsequently delineated on the 2016 aerial photographs.

The percent cover of dominant species within a community type was estimated and recorded using the following values: 0 (< 1 percent), 1 (1–5 percent), 2 (6–10 percent), 3 (11–20 percent), 4 (21–50 percent), and 5 (> 50 percent) (Appendix B). Community types were named based on the predominant vegetation species that characterized each mapped polygon (Figure A-3, Appendix A).

Vegetation composition was assessed and recorded along two vegetation belt transects (T-1 and T-2) that are approximately 10 feet wide and 792 and 900 feet long, respectively (Figure A-2, Appendix A). The transect endpoints were recorded with a resource-grade GPS unit. Spatial changes in the dominant vegetation communities were recorded along the stationed transect. The percent aerial cover of each vegetation species within the belt transect was estimated using the same values and cover ranges that were used for the vegetation community polygon data (Appendix B). Photographs were taken at the transect endpoints during the monitoring event (Appendix C).

The *Montana Noxious Weed List* (July 2015), prepared by the Montana Department of Agriculture [2015], was used to categorize weeds identified within the site. The location of noxious weeds was noted in the field during the investigation and mapped on the 2016 aerial photos (Figures A-3, Appendix A). The noxious weed species that were identified are color-coded. The locations are denoted with the symbol "**x**", "▲," or "■," which represent 0.0–0.1 acres, 0.1–1.0 acres, or greater than 1.0 acre in extent, respectively. The letters T, L, M, and H represent the cover classes and stand for less than 1 percent, 1–5 percent, 6–25 percent, and 26–100 percent, respectively.

Eight woody plant enclosures (labeled planting area [PA] 1 through 8) are shown on Figure A-3 (Appendix A) and were monitored for woody plant survival in 2016. Each PA was walked while recording live and dead woody stems by species if known. Total estimated survival was calculated for each PA.

2.3 SOIL

Soil information was obtained from the *Web Soil Survey for Big Horn County, Montana* and in situ soil descriptions accessed from the NRCS official soil description website [US Department of Agriculture (USDA), 2016]. Soil cores were excavated by using a Montana sharpshooter shovel and evaluated according to procedures outlined in the 1987 Wetland Manual and the 2010 Regional Supplement. A description of the soil profile, including hydric soil indicators when present, was recorded on the Wetland Determination Data form for each profile (Appendix B).

2.4 WETLAND DELINEATION

Waters of the US, including special aquatic sites and jurisdictional wetlands, were delineated throughout the project area in accordance with criteria established in the 1987 Wetland Manual and the 2010 Regional Supplement. The technical criteria for hydrophytic vegetation, hydric soil, and wetland hydrology described in the 2010 Regional Supplement must be satisfied to delineate a representative area as jurisdictional. The name and indicator status of plant species was derived from the 2016 national wetland plant list (NWPL) [Lichvar et al., 2016]. A routine level-2 on-site determination method [Environmental Laboratory, 1987] was used to delineate jurisdictional areas

within the project boundaries. The information was recorded onto Wetland Determination Data forms (Appendix B).

The wetland boundary was determined in the field based on changes in plant communities and/or hydrology and changes in soil characteristics. Topographic relief boundaries within the project area were also examined and cross-referenced with soil and vegetation communities as supportive information for this delineation. Vegetation composition, soil characteristics, and hydrology were assessed at likely wetland and adjacent upland locations. If all three parameters met the criteria, the area was designated as wetland and mapped by vegetation community type. If any one of the parameters did not exhibit positive wetland indicators, the area was determined to be upland unless the site was classified as an atypical situation, potential problem area, or special aquatic site (i.e., mudflat). The wetland boundary was surveyed with global positioning system (GPS) technology and identified on the 2016 aerial photographs. Wetland areas were estimated using GIS methods.

2.5 WILDLIFE

Observations and other positive indicators of use by mammal, reptile, amphibian, and bird species were recorded on the Wetland Mitigation Site Monitoring forms during each of the site visits. Indirect-use indicators, including tracks, scat, burrows, eggshells, skins, and bones, were also recorded. These signs were recorded while traversing the site for other required activities. Direct sampling methods, such as snap traps, live traps, and pitfall traps, were not used. A comprehensive list of wildlife species observed on the sites each year is compiled and updated annually in each report.

2.6 FUNCTIONAL ASSESSMENT

The MDT MWAM [Berglund and McEldowney, 2008] will be used to evaluate functions and values at this site. This method provides an objective means of assigning an overall rating to wetlands and provides regulators with a means of assessing mitigation success based on wetland functions. Functions are self-sustaining properties of a wetland ecosystem that exist in the absence of society and relate to ecological significance without regard to subjective human values [Berglund and McEldowney, 2008]. Field data for this assessment were collected during the site visit. Because no wetlands had developed on this site at the time of the July field survey, no assessment areas (AAs) were present; therefore, no MWAM was completed for the site. An MWAM is expected to be completed after the second year of monitoring, assuming that wetlands develop at the site. In order to show the projected functions and values of the site following construction, MDT prepared an MWAM form for the site in 2014. The pre-project form is included in Appendix B.

2.7 PHOTOGRAPHIC DOCUMENTATION

Monitoring at photo points provided supplemental information that documented wetland, upland, and transect conditions; site trends; and current land uses that surround the site. Photographs were taken at established photo points throughout the mitigation site during the site visit (Appendix C). Photo-point locations were recorded with a resource-grade GPS unit (Figure A-2, Appendix A).

2.8 GLOBAL POSITIONING SYSTEM DATA

Site features and survey points were collected by using a resource-grade (± 1 meter) Trimble R1 GNSS GPS receiver and companion Android tablet during the 2016 monitoring season. The collected data were then transferred to a personal computer, imported into GIS, and projected in Montana State Plane Single Zone NAD 83 (units in meters). Site features and survey points that were located with GPS included wetland boundaries, fence boundaries, plant enclosures, photographic points, transect endpoints, noxious weed infestations, and wetland data points.

2.9 MAINTENANCE NEEDS

Channels, engineered structures, fencing, and other man-made features were examined during the site visit for obvious signs of breaching, damage, or other problems. This examination was cursory and did not constitute an engineering-level structural inspection.

3.0 RESULTS

3.1 HYDROLOGY

Climate data from the meteorological station at Hardin, Montana (243915) [Western Regional Climate Center, 2016], which is located approximately 8 miles south of the site, recorded an average annual precipitation rate of 12.52 inches from 1948 to 2015. Annual precipitation in recent years was 17.02 inches (2010), 15.86 inches (2011), 6.19 inches (2012), 15.3 inches (2013), 11.7 inches (2014), and 12.06 inches (2015). These data indicate that 2012, 2014, and 2015 were below the long-term average for precipitation, and 2010, 2011, and 2013 were above average. Through August 2016, precipitation totaled 9.82 inches at this site, which is approximately 1 inch above the long-term average (8.85 inches) for this time.

Ground water is expected to be the primary hydrologic source for wetland development across the site, with precipitation and periodic overbank flooding from the nearby Big Horn River supplementing hydrology at the site. The Big Horn River near this project did not overtop its bank at any point during the 2016 calendar year. Groundwater monitoring completed by the USGS in 2016 shows groundwater levels between 4.25 and 6.74 feet below ground surface at Well 1 in the southern part of the site and between 4.58 and 6.94 feet below ground surface at Well 7A in the northern part of the site. Neither well is located within a constructed wetland excavation; distance to groundwater in each cell varies depending on excavation depth. Data from the continuous ground water monitor installed at the site will be compared to ground surface elevations in the bottom of the excavated cells in future years to analyze the depth to groundwater in these areas.

During the initial site visit on June 10, standing surface water was noted in small pools or puddles across most of the 13 excavated wetland cells. Precipitation data [US Climate Data, 2016] for nearby Hardin, Montana, shows that 0.07 inch of precipitation were received June 9, the day before the site visit. Whether the standing water observed on June 10 was a result of elevated groundwater or precipitation that had not infiltrated the ground or evaporated is unknown. During the July 8 site visit, no standing surface water or inundation was noted in any of the 13 excavated wetland cells. During the July site visit, a sharpshooter shovel was used to dig shallow pits in several of the excavated

cells. Saturation to within 12 inches of the ground surface was noted in small pockets within several of the excavated wetland cells, which indicates that groundwater was reaching the root zones in select areas where excavation was deep enough.

Two data points were established at the site in 2016 to monitor wetland development at the site. DP-1W is located in a low spot within excavated Cell 4, and DP-1U is located in the upland adjacent to Cell 4. Soils were moist to the surface at DP-1W; however, no saturation was noted in the upper 18 inches. Soils associated with DP-1U were very dry and crumbly to 18 inches.

Future site monitoring will indicate whether created wetland cells were excavated deep enough to allow saturation in the root zone. The saturation in the root zone must have a long enough duration during the growing season to allow hydrophytic plants to colonize.

3.2 VEGETATION

Monitoring year 2016 marked the first year of monitoring at the JTX – Tunnicliff Ranch site. A total of 34 plant species were noted in 2016 and are listed Table 3-1. Five upland community types and zero wetland community types were identified and mapped at the site in 2016 (Figure A-3, Appendix A). Two very small wetlands were identified within the monitoring area but, because of their small size (< 0.02 acre), are not described below as their own community type. Dominant plant species that were observed within each community are listed on the Wetland Mitigation Site Monitoring form (Appendix B). The vegetation community types identified on the site in 2016 are as follows:

- Upland Type 1 – *Bassia scoparia/Bromus arvensis*
- Upland Type 2 – *Thinopyrum intermedium*
- Upland Type 3 – *Lepidium perfoliatum/Elymus* spp.
- Upland Type 4 – *Lepidium perfoliatum*
- Upland Type 5 – *Elaeagnus angustifolia/Bromus inermis*.

Upland community Type 1 – *Bassia scoparia*/*Bromus arvensis* was mapped across 2.7 acres of the project area along the north and west site boundaries. After project construction, the previous site fence was moved back onto the property line. This edge area was formerly overgrazed pasture and is dominated by Mexican-fireweed (*Bassia scoparia*) and field brome (*Bromus arvensis*). This area was left undisturbed during site construction and is expected to remain as an upland community moving forward. Over time and in the absence of grazing, more desirable grasses may out-compete the Mexican-fireweed.

Upland community Type 2 – *Thinopyrum intermedium* was mapped across 16.5 acres of preexisting upland grassland that remained relatively undisturbed during the 2015/2016 construction. Intermediate wheatgrass (*Thinopyrum intermedium*) dominated this community with lesser amounts of false meadow rye (*Schedonorus pratensis*), smooth brome (*Bromus inermis*), curly blue grass (*Poa secunda*), and several other species.

Table 3-1. Vegetation Species Observed in 2016 at the JTX – Tunnicliff Ranch Site

Scientific Names	Common Names	GP Indicator Status[(a)]
Acer negundo	Box Elder	FAC
Agropyron cristatum	Crested Wheatgrass	NL
Alopecurus arundinaceus	Creeping Meadow-Foxtail	FACW
Bassia scoparia	Mexican-Fireweed	FACU
Beckmannia syzigachne	American Slough Grass	OBL
Brassica sp.		
Bromus arvensis (japonicus)	Field Brome	FACU
Bromus inermis	Smooth Brome	UPL
Carex sp.	Sedge	
Cirsium arvense	Canadian Thistle	FACU
Convolvulus arvensis	Field Bindweed	NL
Crataegus douglasii	Douglas Hawthorne	FAC
Cynoglossum officinale	Gypsy-Flower	FACU
Elaeagnus angustifolia	Russian-Olive	FACU
Elaeagnus commutata	Silverberry	UPL
Elymus repens	Creeping Wild Rye	FACU
Elymus trachycaulus	Slender Wild Rye	FACU
Fraxinus pennsylvanica	Green Ash	FAC
Hordeum jubatum	Fox-Tail Barley	FACW
Lepidium perfoliatum	Clasping Pepperwort	FAC
Leynus cinereus	Great Basin Lyme Grass	UPL
Medicago lupulina	Black Medick	FACU
Pascopyrum smithii	Western Wheatgrass	FACU
Poa secunda	Curly Blue Grass	FACU
Populus deltoides	Eastern Cottonwood	FAC
Prunus virginiana	Common Chokecherry	FACU
Quercus macrocarpa	Bur Oak	FACU
Rosa woodsii	Wood's Rose	FACU
Rumex crispus	Curly Dock	FAC
Schedonorus pratensis	False Meadow Rye	FACU
Shepherdia argentea	Silver Buffalo-berry	UPL
Symphoricarpos albus	Common Snowberry	UPL
Taraxacum officinale	Common Dandelion	FACU
Thinopyrum intermedium	Intermediate Wheatgrass	NL
Tragopogon dubius	Meadow Goat's-beard	NL
Typha sp.	Cattail	OBL

(a) 2016 NWPL [Lichvar et al., 2016].

Upland community Type 3 – *Lepidium perfoliatum/Elymus spp.* was mapped across 28.3 acres of the site and occupies a majority of the construction site, including the excavated cells and ground in between the cells. In this first year after construction, clasping pepperwort (*Lepidium perfoliatum*), which is an invasive annual in the mustard family, dominated across the site. This community type also includes slender wild rye (*Elymus trachycaulus*), creeping wild rye (*Elymus repens*), and Mexican-fireweed. As the site develops, the clasping pepperwort will be replaced with more desirable upland and wetland species in excavated areas.

Upland community Type 4 – *Lepidium perfoliatum* was mapped across 1.5 acres of site and is similar in composition to Type 3 but with a greater dominance of Mexican-fireweed in 2016. This type occurs near the edges of the excavation around the site and will likely develop differently than areas mapped as Type 3 in the future because the ground surface is close to preconstruction levels and inundation is not expected to occur there. Grass-dominated uplands are expected to develop in this area in the future.

Upland community Type 5 – *Elaeagnus angustifolia/Bromus inermis* was mapped across 1.1 acres of the site in 2016. This community type supports mature Russian-olive (*Elaeagnus angustifolia*) in the overstory and is dominated by smooth brome (*Bromus inermis*) in the understory. This community type follows a historic irrigation ditch that runs across the southeast corner end of the project area. This community type was not disturbed during construction and is expected to remain the same throughout the 5-year monitoring period. Two very small emergent wetlands in the bottom of the existing ditch were mapped by MDT before construction and were confirmed in the first year of monitoring. Because of the very small size of these wetlands (< 0.02 acre), they were not broken out as their own community but rather included in Type 5. Species associated with these two small wetlands include creeping meadow-foxtail (*Alopecurus arundinaceus*) and sedge (*Carex sp.*).

Vegetation cover was measured along two transects (T-1 and T-2) at the JTX – Tunnicliff Ranch site for the first time in 2016 (Figure A-2, Appendix A). Photographs of the transect end points are provided in Appendix C. Table 3-2 and Charts 3-1 and 3-2 summarize the data for T-1 (Wetland Mitigation Site Monitoring form, Appendix B). T-1 is 792 feet long and intersected upland vegetation community Types 2 and 3. No wetland community types have yet developed along this transect. Some or all of community Type 3 is expected to develop into wetland over time.

Data collected on T-2 (Wetland Mitigation Site Monitoring form, Appendix B) are summarized in tabular and graphical formats in Table 3-3 and Charts 3-5 and 3-6, respectively. T-2 is 900 feet long and intersects upland community Types 3 and 4. No wetland community types have yet developed on the site; therefore, no wetland communities are represented in the transect in 2016. Some or all of community Type 3 is expected to develop into wetland over time.

Table 3-2. Data Summary for T-1 in 2016 at the JTX – Tunnicliff Ranch Site

Monitoring Year	2016
Transect Length (feet)	**792**
Vegetation Community Transitions Along Transect	1
Vegetation Communities Along Transect	2
Hydrophytic Vegetation Communities Along Transect	0
Total Vegetative Species	10
Total Hydrophytic Species	2
Total Upland Species	8
Estimated % Total Vegetative Cover	75
Estimated % Unvegetated	25
% Transect Length Comprising Hydrophytic Vegetation Communities	0
% Transect Length Comprising Upland Vegetation Communities	100
% Transect Length Comprising Unvegetated Open Water	0
% Transect Length Comprising Mudflat	0

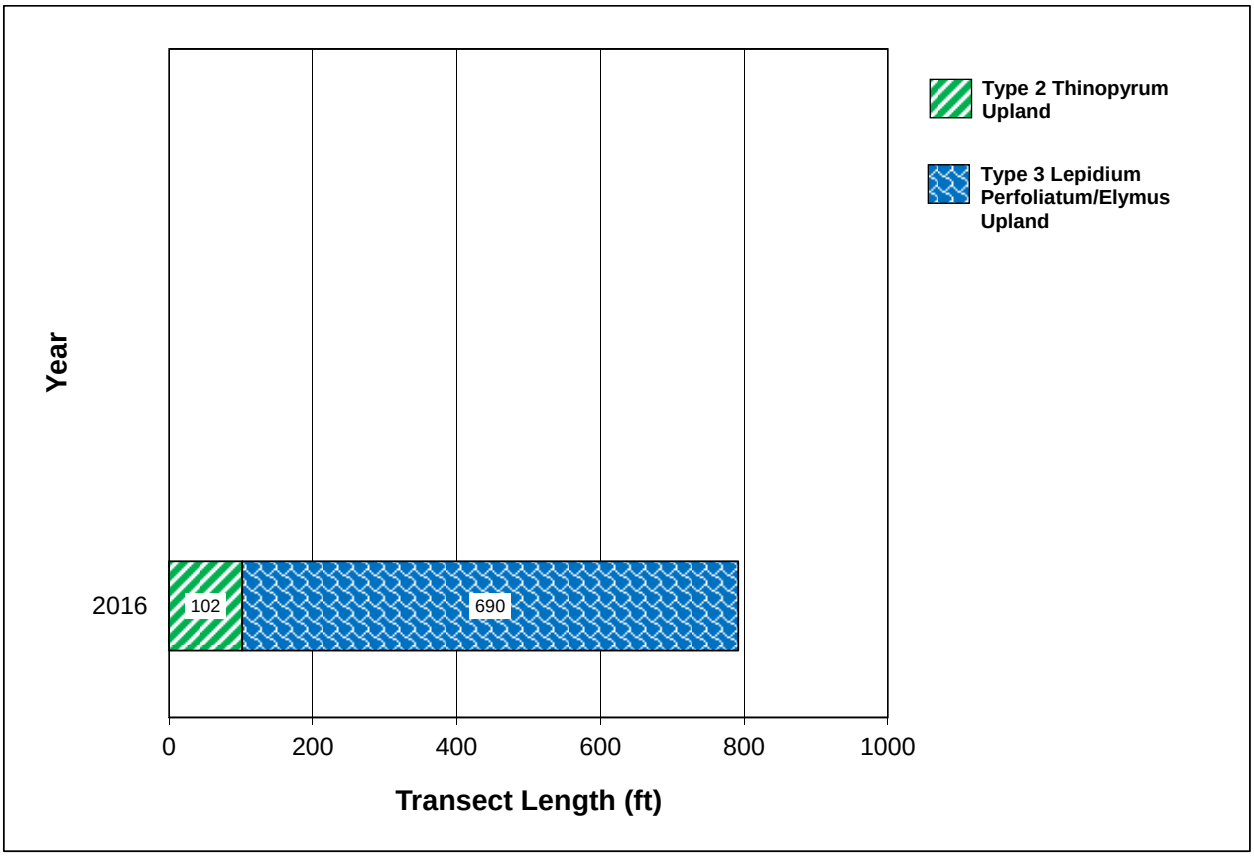


Chart 3-1. Transect Map Showing Community Types on T-1 From Start (0 Feet) to Finish (792 Feet) at the JTX – Tunnicliff Ranch Site in 2016.

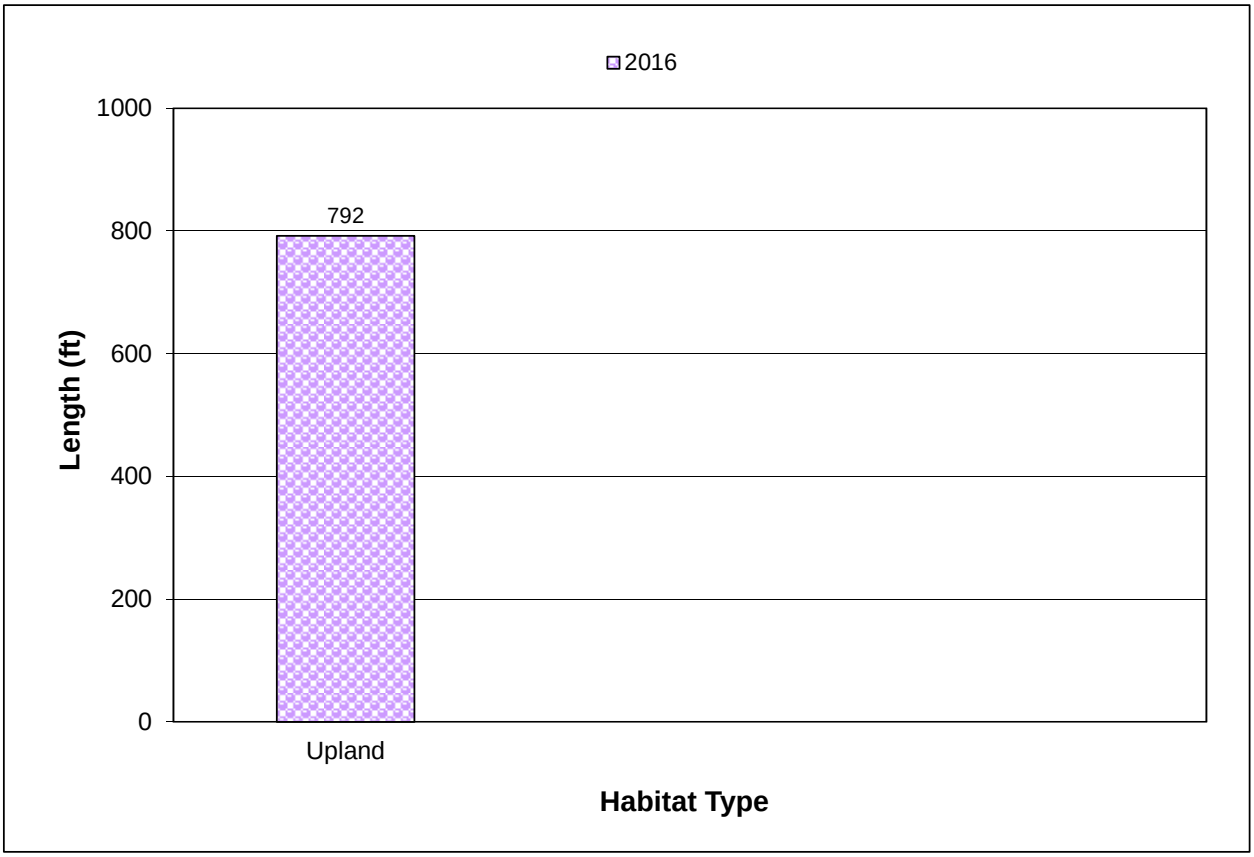


Chart 3-2. Length of Habitat Types Within T-1 in 2016 at the JTX – Tunnicliff Ranch Site.

Table 3-3. Data Summary for T-2 in 2016 at the JTX – Tunnicliff Ranch Site

Monitoring Year	2016
Transect Length (feet)	**900**
Vegetation Community Transitions Along Transect	1
Vegetation Communities Along Transect	2
Hydrophytic Vegetation Communities Along Transect	0
Total Vegetative Species	12
Total Hydrophytic Species	0
Total Upland Species	12
Estimated % Total Vegetative Cover	60
Estimated % Unvegetated	40
% Transect Length Comprising Hydrophytic Vegetation Communities	0
% Transect Length Comprising Upland Vegetation Communities	100
% Transect Length Comprising Unvegetated Open Water	0
% Transect Length Comprising Mudflat	0

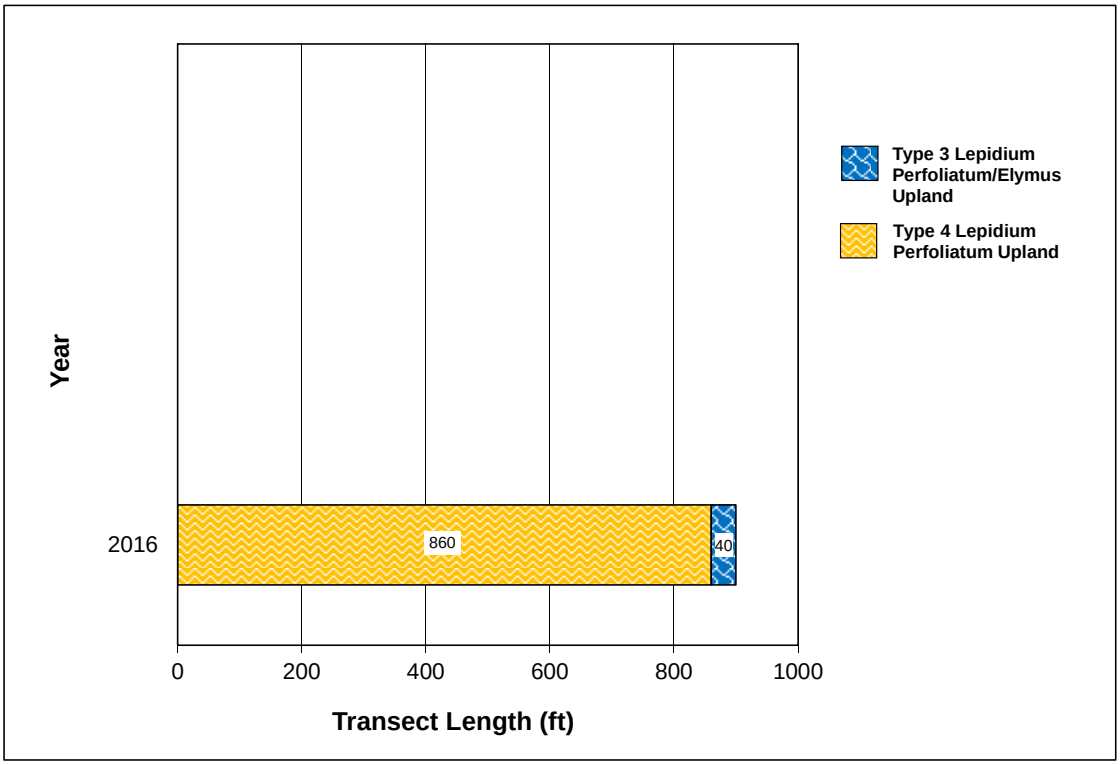


Chart 3-3. Transect Map Showing Community Types on T-2 From Start (0 Feet) to Finish (900 Feet) at the JTX – Tunnicliff Ranch Site in 2016.

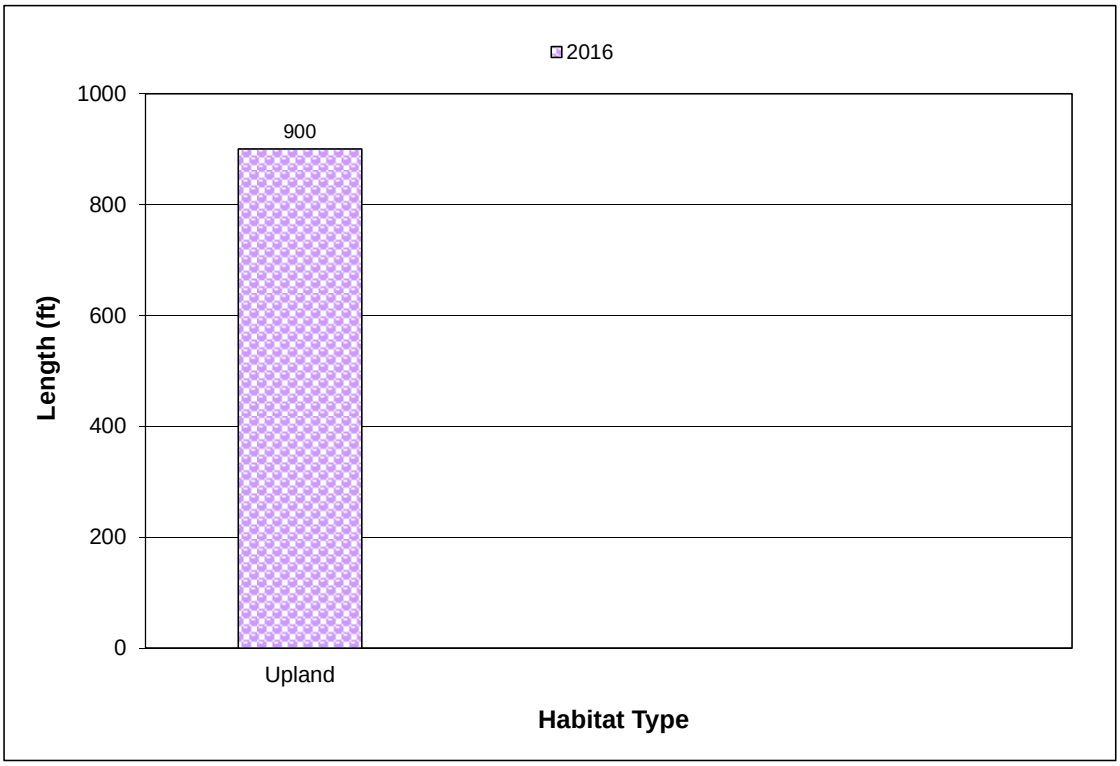


Chart 3-4. Length of Habitat Types Within T-2 in 2016 at the JTX – Tunnicliff Ranch Site.

A total of 14 infestations of state-listed Priority 2B noxious weeds were identified and mapped at the JTX – Tunnicliff Ranch site in 2016 (Figure A-3, Appendix A). Noxious species observed in 2016 include Canada thistle (*Cirsium arvence*), houndstongue (*Cynoglossum officinale*), and field bindweed (*Convolvulus arvensis*). A majority of the identified infestations were located in undisturbed portions of the site and likely occurred there before project initiation. Weeds will be surveyed and reported back to MDT during each subsequent year's monitoring event. In 2016, noxious weeds did not exceed 5 percent cover site-wide. Because of the sensitivity of new seedlings and woody plantings to herbicide treatment, MDT will initiate weed spraying and control in the spring/summer of 2017.

Eight woody plant enclosures (labeled PA-1 through PA-8) are shown on Figure A-3 (Appendix A) and were monitored for woody plant survival in 2016. Each PA was walked while recording live and dead woody stems by species if known. 1,650 containerized woody plants were installed in the eight plant enclosures. Woody species planted at the site include silver buffalo-berry (*Sheperdia argentea*), Douglas hawthorne (*Crataegus douglasii*), silverberry (*Elaeaganus commutate*), common chokecherry (*Prunus virginiana*), plains cottonwood (*Populus deltoids*), box elder (*Acer negundo*), and bur oak (*Quercus macrocarpa*). All plantings were in 1-gallon containers except for cottonwood, which were in 5-gallon containers. Table 3-4 lists each PA, the number of alive and dead stems counted, and percent survival. An individual planting was considered dead if no live leaves were observed on the stem and no resprouting from the base was observed. Because 2016 was the first growing season after installation, some plants that showed no sign of life above ground may still have been alive in the stem and roots. Future monitoring will determine which woody plants survived the first year. A total of 1,251 stems were counted, and overall survival is estimated to be 36 percent. Wildlife fencing around each enclosure was effective in keeping deer away from plantings; no other signs of browse from rabbits or other small mammals was noted. Despite weed fabric being installed, various grasses and forbs appeared to be competing with many of the plantings.

Table 3-4. Woody Planting Survival at the JTX – Tunnicliff Ranch Site in 2016

Planting Area	Number of Live Stems	Number of Dead Stems	Percent Survival
PA-1	12	101	11
PA-2	35	117	23
PA-3	21	104	17
PA-4	70	66	51
PA-5	91	83	52
PA-6	78	92	46
PA-7	41	152	21
PA-8	100	88	53
Total	**448**	**803**	**36**

3.3 SOIL

The project site was mapped in the soil survey for Big Horn County [USDA, 2016]. Two soil series were mapped within the monitoring area and include the Haverson and Lohmiller soils, wet (Hh) and

Kyle Clay, saline (Kw) series. The Haverson and Lohmiller series is a well-drained soil while the Kyle Clay is rated as moderately well-drained. Undisturbed soil profiles in the project area typically are represented by a shallow surface organic layer underlain by sand, silt, clay, and gravels/cobbles several feet below the surface. The entire wetland development area was disturbed during construction with excavated wetland cells that had bottom elevations several feet below the surrounding terrain. A common occurrence in excavated areas is the presence of gypsum crystals in the soil, which is precipitated out at the surface because of seasonally elevated groundwater in the area.

Soil test pits were excavated at two locations (Figure A-2). DP-1U and DP-1W were located adjacent to and within excavated Cell 4 respectively. Cell 4 is located in an area mapped in the Kyle Clay, saline (Kw) series. The soil profile at DP-1W, which is located in Cell 4, revealed a brown (10YR 4/3), fine, silty sand underlain by sand and small gravels. The soil in this area was moist to the surface during the July monitoring event but was not saturated in the upper 18 inches. No hydric soil indicators were observed for DP-1W. Wetland habitat is expected to develop in Cell 4 and changing soil characteristics will be monitored at this location during future monitoring events. The soil profile at DP-1U revealed a dark grayish-brown (10 YR 4/2) silty clay loam and was very dry throughout the monitoring event. No hydric soil indicators were observed for DP-1U.

3.4 WETLAND DELINEATION

During the July monitoring event, all of the excavated wetland cells and graded areas that connect the cells were surveyed for developing wetland habitat. In this first year after construction, no wetland habitat had developed in the study area. Vegetation communities across the site were dominated by upland communities (Figure A-3, Appendix A). Soils within the excavated cells were mostly moist to the surface, which could have been a result of recent rains in the area before monitoring or a sign of groundwater influence in these areas. Continued monitoring will show whether wetland characteristics begin to develop as anticipated. Precipitation, nearby irrigation practices, and overbank flows from the Big Horn River will play an important role in wetland development at the site. Figure A-3 (Appendix A) shows the bottom footprint of each of the 13 excavated cells where wetlands are expected to develop in the future. Additional wetland habitat is expected to develop in low-lying areas between cells but is largely depends on seasonally high groundwater.

Before construction, MDT had identified two small wetlands that totaled 0.02 acre in the southeastern corner of the site. These small wetlands were identified and mapped during the 2016 monitoring event (Figure A-3, Appendix A). These wetlands will be preserved and maintained by MDT. MDT may seek to obtain preservation credits for these wetlands in future crediting negotiations with the USACE.

3.5 WILDLIFE

A comprehensive list of bird and other wildlife species that were directly or indirectly observed in 2016 is presented in Table 3-5 and noted on the Wetland Mitigation Site Monitoring form (Appendix B). Twelve bird species were identified in 2016, including American goldfinch (*Spinus tristus*), American kestrel (*Falco sparverius*), American robin (*Turdus migratorius*), brown thrasher

(*Toxostoma rufum*), European starling (*Sturnus vulgaris*), house wren (*Troglodytes aedon*), red-tailed hawk (*Buteo jamaicensis*), ring-necked pheasant (*Phasianus colchicus*), tree swallow (*Tachycineta bicolor*), western kingbird (*Tyrannus verticalis*), western meadowlark (*Sturnella neglecta*), yellow warbler (*Dendroica petechia*). Four of the seven bird boxes that had been installed around the perimeter of the site were being used in 2016 by house wrens and tree swallows.

Table 3-5. Wildlife Species Observed in 2016 at the JTX – Tunnicliff Ranch Site

Common Name	Scientific Name
Birds	
American Goldfinch	*Spinus tristus*
American Kestrel	*Falco sparverius*
American Robin	*Turdus migratorius*
Brown Thrasher	*Toxostoma rufum*
European Starling	*Sturnus vulgaris*
House Wren	*Troglodytes aedon*
Red-tailed Hawk	*Buteo jamaicensis*
Ring-necked Pheasant	*Phasianus colchicus*
Tree Swallow	*Tachycineta bicolor*
Western Kingbird	*Tyrannus verticalis*
Western Meadowlark	*Sturnella neglecta*
Yellow Warbler	*Dendroica petechia*
Mammals	
Coyote (tracks)	*Canis latrans*
Deer (tracks)	*Odocoileus sp.*
Striped Skunk	*Mephitis mephitis*

Species that were identified in 2016 are **bolded.**

Coyote (*Canis latrans)* and deer (*Odocoileus sp.*) tracks were observed at the site in 2016, and one striped skunk (*Mephitis mephitis*) was observed during the initial June 15 site visit. No amphibians or reptiles were seen during the 2016 monitoring.

3.6 FUNCTIONAL ASSESSMENT

Site construction was completed in the winter of 2016. At the time of the July 2016 monitoring, no new wetland habitat or other waters of the US had developed at this site. The 2008 MDT MWAM [Berglund and McEldowney, 2008] will be used in future monitoring events to evaluate the mitigation site and wetland habitat that develops there. During the planning and design phase of this project, MDT completed an MWAM form to show the potential function and value of wetlands that will eventually develop at the site (Appendix B). Over time, project wetlands are expected to rate moderate or high for several functions and values, including general wildlife habitat, short- and long-term surface-water storage, flood attenuation, sediment/nutrient/toxicant removal, groundwater discharge/recharge, and production export/food chain support.

3.7 PHOTOGRAPHIC DOCUMENTATION

Photographs that were taken at Photo Points 1–4 (PP1 to PP4) and transect endpoints are provided in Appendix C.

3.8 MAINTENANCE NEEDS

No man-made water-control structures were installed within the JTX – Tunnicliff Ranch site. The perimeter fence that was installed around the site was in good condition at the time of the 2016 investigation. Seven bluebird boxes were installed on the site, and all appeared to be in good condition.

As noted in the vegetation section of this report, 14 infestations of state-listed Priority 2B noxious weeds were mapped at the JTX – Tunnicliff Ranch site (Figure A-3, Appendix A). MDT has an ongoing weed-control program for their mitigation sites that includes an annual assessment of weeds that were identified at each location and treatment to contain and control identified populations. Weed treatment will begin in 2017, as none was conducted in 2016 in an effort to allow seeding and plantings to develop and mature without herbicide influences. This site will be incorporated into MDT's weed control program for mitigation sites across the state.

3.9 CURRENT CREDIT SUMMARY

As discussed, the JTX – Tunnicliff Ranch site did not develop any wetlands during the first growing season after construction, which concluded during the winter of 2016. Continued monitoring will document wetland development at the site, and wetland mitigation credits will be tracked accordingly. Table 3-6 summarizes the current estimated wetland credits based on the USACE-approved credit ratios [USACE, 2005] and the wetland delineation that was completed in July 2016.

Table 3-7 provides a summary of the site conditions in relation to the established performance standards and success criteria. Because the site had not yet develop wetland characteristics in this the first year following construction, several of the performance standards related to wetland development have not been met. 2016 represents the baseline conditions at the site for comparison with future monitoring events. Success criteria related to weeds, the upland buffer, and perimeter fencing were being met in the first year of monitoring. All of the performance standards and success criteria will continue to be monitored annually.

Table 3-6. Wetland Mitigation Credits Estimated for the JTX – Tunnicliff Ranch Site in 2016

Compensatory Mitigation Type	Mitigation Area Description	Wetland Type[(a)]	Anticipated Mitigation Surface Area (acres)	USACE-Approved Mitigation Ratios	Anticipated Mitigation Credit (acres)	2016 Delineated Acres	2016 Mitigation Credit (acres)
Creation (Establishment)	Depressional wetlands	Palustrine emergent and palustrine scrub/shrub	26.85	1:1	26.9	0.0	0.0
Creation (Reestablishment)	Woody plant enclosures	N/A	2.73	5:1	0.6	2.3	0.5
Upland Buffer	100-foot wide upland perimeter	N/A	10.98	5:1	2.2	0.0	0.0
Totals			**40.6**		**29.6**	**2.3**	**0.5**

(a) Cowardin et al. [1979].

Table 3-7. Summary of Performance Standards and Success Criteria Compared to Existing Site Conditions (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 Regional Supplement.	N	No wetlands have yet developed at the JTX – Tunnicliff Ranch site.
Wetland Hydrology	Soil saturation is present for at least 12.5 percent of the growing season.	N	Because no wetlands have developed, soil saturation for a minimum 12.5 percent of growing season was assumed to have not occurred in 2016.
Hydric Soil	Hydric soil conditions are present or appear to be forming.	N	The recently constructed mitigation site does not exhibit hydric soil development after just a few months of development.
	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	Wetlands are delineated as hydrophytic by using technical guidelines.	N	Very few hydrophytic vegetation species (OBL, FACW, and FAC) were identified across the site during the first year of monitoring.
	Noxious weeds do not exceed 5 percent cover.	Y	Noxious weeds are scattered across the site but do not exceed 5 percent cover in the excavation areas or the surrounding undisturbed habitat in 2016.
	Hydrophytic vegetation success will include achieving a minimum overall vegetation cover of 80 percent in created wetland areas within 5 years after site construction.	N	No wetland development at the site in 2016. This feature will be tracked in future years.
Woody Plants	Plantings exceed 50 percent survival after 5 years.	N	Approximately 36 percent of the observed woody plantings appeared to be alive in 2016, which does not meet the 50 percent survival criteria. Woody plants were stressed after planting in spring 2016. Future monitoring will be required to determine survival.

Table 3-7. Summary of Performance Standards and Success Criteria Compared to Existing Site Conditions (Page 2 of 2)

Performance Standards	Success Criteria	Criteria Achieved Y/N	Discussion
Upland Buffer	Noxious weeds do not exceed 5 percent cover within the buffer areas on site.	Y	Noxious weed cover does not exceed 5 percent cover in the upland buffer in 2016. MDT will need to implement weed-control measures to ensure that the site continues to meet these criteria.
	Any disturbed area within the creditable buffer zone must have at least 50 percent aerial cover of nonweed species by the end of the monitoring period.	Y	Upland buffers that surround the developing wetland areas within the site exhibited greater than 50 percent aerial cover of nonweed species.
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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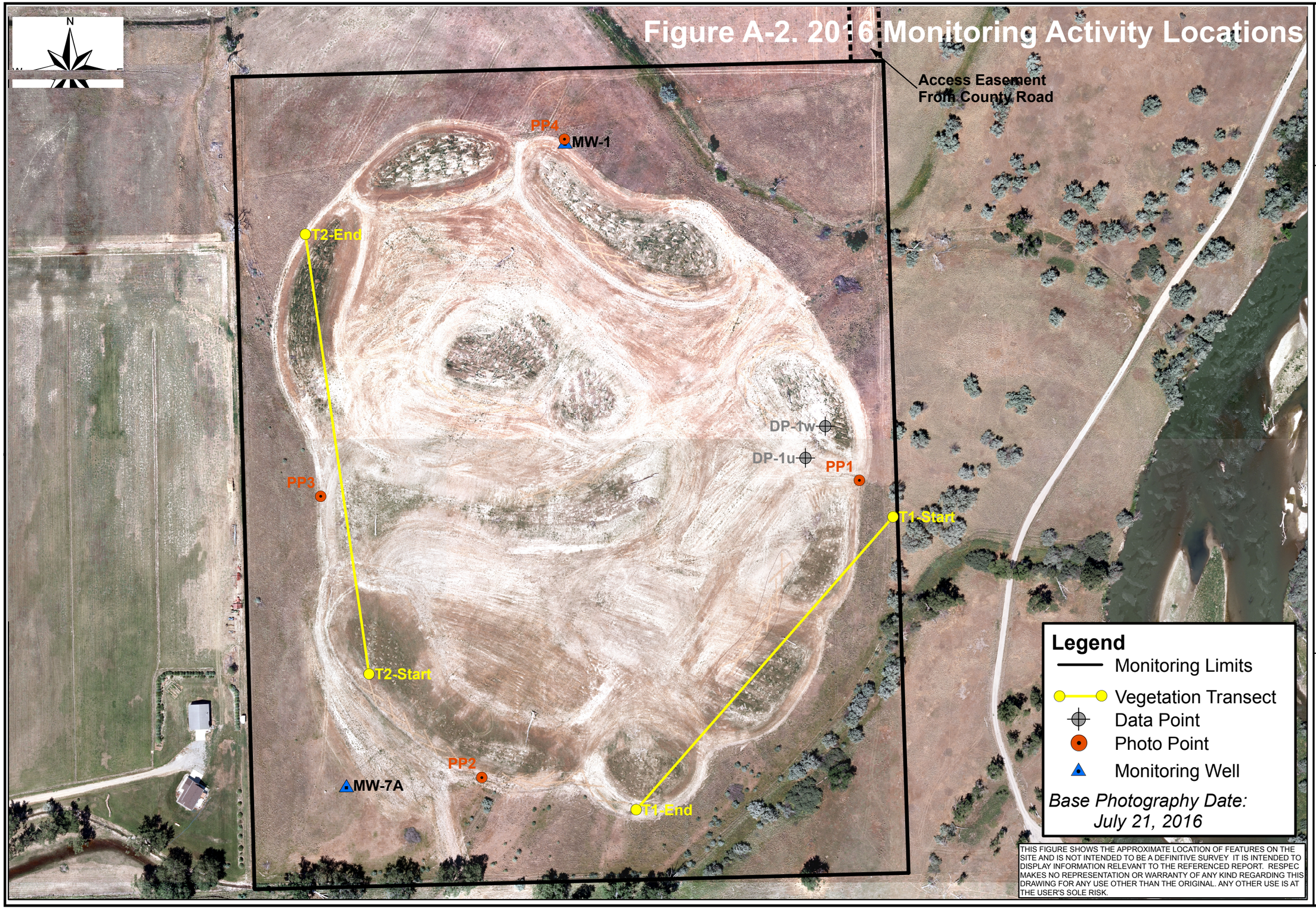
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APPENDIX A
PROJECT AREA MAPS

MDT Wetland Mitigation Monitoring
JTX – Tunnicliff Ranch
Big Horn County, Montana

Figure A-2. 2016 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.

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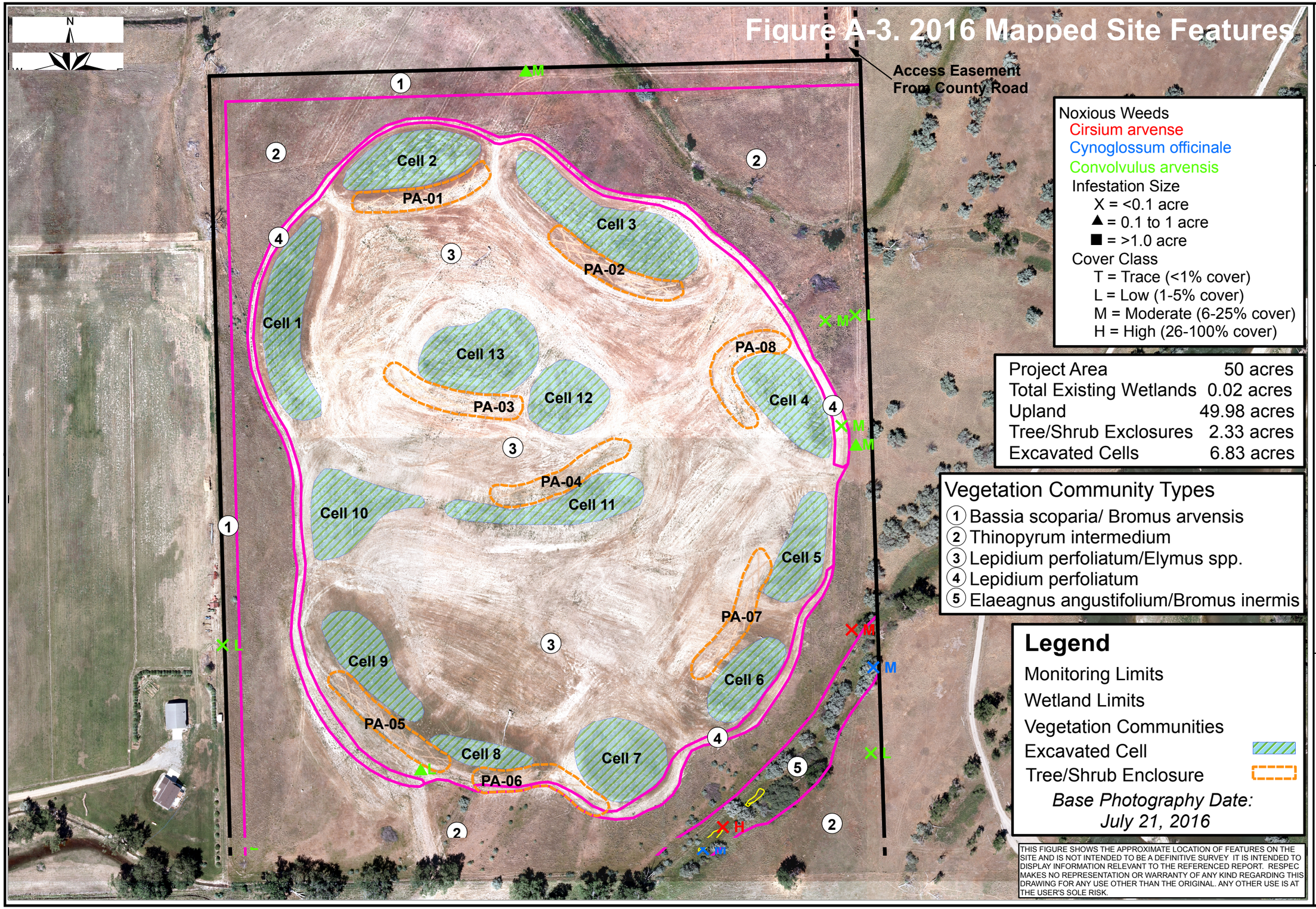
JTX Tunnicliff Wetland Mitigation Site
2016 Monitoring Activity Locations

0 80 160 320 480 640 800 Feet

Project:	STPX STWD(056) UPN7286
Location:	Big Horn Co., Montana
Date:	December 2016
Project Manager:	M. Traxler
Drawn By:	J. Rosenbaum

File: Z:\RESPEC\02895 MDT Monitoring 2016\WS #14 JTX Tunnicliff\GPS Data\Mains\Monitor2016.mxd

Figure A-3. 2016 Mapped Site Features



Noxious Weeds
- Cirsium arvense
- Cynoglossum officinale
- Convolvulus arvensis

Infestation Size
- X = <0.1 acre
- ▲ = 0.1 to 1 acre
- ■ = >1.0 acre

Cover Class
- T = Trace (<1% cover)
- L = Low (1-5% cover)
- M = Moderate (6-25% cover)
- H = High (26-100% cover)

Project Area	50 acres
Total Existing Wetlands	0.02 acres
Upland	49.98 acres
Tree/Shrub Exclosures	2.33 acres
Excavated Cells	6.83 acres

Vegetation Community Types
1. Bassia scoparia/ Bromus arvensis
2. Thinopyrum intermedium
3. Lepidium perfoliatum/Elymus spp.
4. Lepidium perfoliatum
5. Elaeagnus angustifolium/Bromus inermis

Legend
- Monitoring Limits
- Wetland Limits
- Vegetation Communities
- Excavated Cell
- Tree/Shrub Enclosure

Base Photography Date: July 21, 2016

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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JTX Tunnicliff Wetland Mitigation Site
2016 Mapped Site Features

0 80 160 320 480 640 800 Feet

Project: STPX STWD(056) UPN7286
Location: Big Horn Co., Montana
Date: December 2016
Project Manager: M. Traxler
Drawn By: J. Rosenbaum

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APPENDIX B
MONITORING FORMS

MDT Wetland Mitigation Monitoring
JTX – Tunnicliff Ranch
Big Horn County, Montana

RESPEC/MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: **JTX-Tunnicliff** Project Number: **STPX STWD (056)**
Assessment Date: **July 8, 2016** Person(s) conducting the assessment: **T. Traxler and M. Taxler**
Location: **Hardin** MDT District: **Billings** Milepost: _____
Legal Description: T **1N** R **33E** Section **10** **T** **1N** **R** **33E** Section **15**
Weather Conditions: **Sunny and hot** Time of Day: **Afternoon**
Initial Evaluation Date: **June 15, 2016** Monitoring Year: **1** # Visits in Year: **1**
Size of evaluation area: **50 acres** Land use surrounding wetland: **Rural agricultural and Big Horn RiverFloodplain.**

HYDROLOGY

Surface Water Source: **Groundwater**
Inundation: **Absent** Average Depth: _____ Range of Depths: _____
Percent of assessment area under inundation: **0%**
Depth at emergent vegetation-open water boundary: _____**feet**
If assessment area is not inundated then are the soils saturated within 12 inches of surface: **No**
Other evidence of hydrology on the site (ex. – drift lines, erosion, stained vegetation, etc.):

_____

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

Well Number	Depth	Well Number	Depth	Well Number	Depth
1	**6.48**				
7A	**4.58**				

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:
No surface water or inundation noted during July site visit. Well depths are from USGS monitoring on July 11, 2016.

VEGETATION COMMUNITIES

Community Number: **1** Community Title (main spp): **Bassia scoparia / Bromus arvensis**

Dominant Species	% Cover	Dominant Species	% Cover
Bassia scoparia	5 = > 50%		
Bromus arvensis	4 = 21-50%		
Elymus trachycaulus	3 = 11-20%		
Lepidium perfoliatum	2 = 6-10%		
Alopecurus arundinaceus	1 = 1-5%		
Hordeum jubatum	1 = 1-5%		

Comments / Problems: **edge around fields where fence was moved back onto property line; this edge was formerly overgrazed by neighboring properties**

Community Number: **2** Community Title (main spp): **Thinopyrum intermedium**

Dominant Species	% Cover	Dominant Species	% Cover
Thinopyrum intermedium	5 = > 50%	Symphoricarpos albus	1 = 1-5%
Schedonorus pratensis	2 = 6-10%	Concolvulus arvensis	1 = 1-5%
Populus deltoides	1 = 1-5%	Poa secunda	1 = 1-5%
Bromus inermis	1 = 1-5%	Taraxacum officinale	1 = 1-5%
Tragonpogon dubius	1 = 1-5%	Elaeagnus angustifolium	1 = 1-5%
Cirsium arvense	1 = 1-5%		

Comments / Problems: **Undisturbed meadow adjacent to excavated areas.**

Community Number: **3** Community Title (main spp): **Lepidium perfoliatum/Elymus spp.**

Dominant Species	% Cover	Dominant Species	% Cover
Lepidium perfoliatum	4 = 21-50%	Brassica sp.	1 = 1-5%
Elymus trachycaulus	2 = 6-10%	Hordeum jubatum	1 = 1-5%
Elymus repens	2 = 6-10%	Rumex crispus	1 = 1-5%
Bromus arvensis	2 = 6-10%	Medicago lupulina	1 = 1-5%
bare	2 = 6-10%	Typha sp.	+ = < 1%
Bassia scoparia	2 = 6-10%		

Comments / Problems: **This CT is dominant within excavated areas**

Community Number: **4** Community Title (main spp): **Lepidium perfoliatum**

Dominant Species	% Cover	Dominant Species	% Cover
Lepidium perfoliatum	5 = > 50%		
Bassia scoparia	2 = 6-10%		
Elymus repens	2 = 6-10%		
Brassica sp.	2 = 6-10%		
bare	2 = 6-10%		
Elymus trachycaulus	1 = 1-5%		

Comments / Problems: **Differentiated from CT 3 by having lower percentage of Elymus.**

VEGETATION COMMUNITIES (continued)

Community Number: **5** Community Title (main spp): **Elaeagnus angustifolium/Bromus inermis**

Dominant Species	% Cover	Dominant Species	% Cover
Elaeagnus angustifolia	5 = > 50%	Fraxinus pennsylvanica	1 = 1-5%
Bromus inermis	4 = 21-50%	Carex sp.	1 = 1-5%
Symphoricarpos albus	2 = 6-10%	Alopecurus arundinaceus	1 = 1-5%
Thinopyrum intermedium	2 = 6-10%		
Sheperdia argentea	2 = 6-10%		
Cynoglossum officinale	1 = 1-5%		

Comments / Problems: _____

Community Number: ___ Community Title (main spp): _____

Dominant Species	% Cover	Dominant Species	% Cover

Comments / Problems: _____

Community Number: ___ Community Title (main spp): _____

Dominant Species	% Cover	Dominant Species	% Cover

Comments / Problems: _____

Community Number: ___ Community Title (main spp): _____

Dominant Species	% Cover	Dominant Species	% Cover

Comments / Problems: _____

PLANTED WOODY VEGETATION SURVIVAL

Plant Species	Number Originally Planted	Number Observed	Mortality Causes
Sheperdia argentea	400		
Crataegus douglasii	400		
Elaeaganus commutate	400		
Prunus virginiana	400		
Populus deltoids	25		
Acer negundo	10		
Quercus macrocarpa	15		

Comments / Problems: 1,650 containerized woody plants were installed in the 8 planting areas. All planting were in 1 gallon containers except for cottonwood which were in 5 gallon containers. A total of 1,251 stems were counted and overall survival is estimated to be 36 percent. Wildlife fencing around each enclosure was effective in keeping deer away from plantings and no other signs of browse from rabbits or other small mammals was noted. In spite of weed fabric being installed, various grasses and forbs appeared to be competing with many of the plantings.

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Tunnicliff** Date: **June 15, 2016** Examiner: **RESPEC (L. Bacon)**
Transect Number: **1** Approximate Transect Length: **792 feet** Compass Direction from Start: **200˚** Note: _____

Transect Interval Length: **102 feet (Station 0-102)**	
Vegetation Community Type: 2 - Thinopyrum intermedium	
Plant Species	**Cover**
Thinopyrum intermedium	5 = > 50%
Schedonorus pratensis	3 = 11-20%
Taraxacum officinale	2 = 6-10%
Medicago lupulina	2 = 6-10%
bare	1 = 1-5%
Total Vegetative Cover:	95%

Transect Interval Length: **690 feet (Station 102-792)**	
Vegetation Community Type: 3 – Lepidium perfoliatum/Elymus spp.	
Plant Species	**Cover**
Lepidium perfoliatum	5 = > 50%
Elymus trachycaulus	4 = 21-50%
Rumex crispus	2 = 6-10%
Hordeum jubatum	2 = 6-10%
Bromus sp	1 = 1-5%
bare	1 = 1-5%
Total Vegetative Cover:	90%

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: **Tunnicliff** Date: **June 15, 2016** Examiner: **RESPEC (L. Bacon)**
Transect Number: **2** Approximate Transect Length: **900 feet** Compass Direction from Start: **330˚** Note: _____

Transect Interval Length: **860 feet (Station 0-860)**	
Vegetation Community Type: 3 – Lepidium perfoliatum/Elymus spp.	
Plant Species	**Cover**
Elymus trachycaulus	5 = > 50%
Lepidium perfoliatum	3 = 11-20%
Bassia scoparia	2 = 6-10%
Brassica sp.	2 = 6-10%
bare	2 = 6-10%
Total Vegetative Cover:	75%

Transect Interval Length: **40 feet (Station 860-900)**	
Vegetation Community Type: 4 – Lepidium perfoliatum	
Plant Species	**Cover**
Bromus ciliatus	5 = > 50%
Lepidium perfoliatum	4 = 21-50%
Brassica sp.	2 = 6-10%
bare	2 = 6-10%
Total Vegetative Cover:	90%

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): **0%**

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: _____

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
Deer tracks	0	☒	☒	☐	
Coyote	0	☒	☒	☐	
Striped Skunk	1	☒	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	

Additional Activities Checklist:
NA Macroinvertebrate Sampling (if required)

Comments / Problems: bird houses 1, 2, and 7 have nesting House Wrens, #6 has a nesting Tree Swallow.

BIRD SURVEY – FIELD DATA SHEET

Site: **Tunnicliff** Date: **6/15/16**
Survey Time: **10 am** to **3 pm**

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
American Robin	1	BD	UP				
American Goldfinch	1	BD	UP				
American Kestrel	1	BD	UP				
Brown Thrasher	1	BD	UP				
European Starling	1	FO	UP				
House Wren	5	BD N	UP				
Red-tailed Hawk	1	F	UP				
Ring-necked Pheasant	1	BD	UP				
Tree Swallow	3	F BD N	UP				
Western Kingbird	1	F	UP				
Western Meadowlark	1	BD	UP				
Yellow Warbler	1	BD	UP				

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: **warm, sunny**

Notes: **Wrens and swallows were using bird boxes for nesting. All other species observed in upland meadow, upland SS or upland FO (cottonwood trees).**

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, Photo 1: 45.83945617/-107.5966157	320
PP-1		Photo Point 1, Photo 2: 45.83945617/-107.5966157	270
PP-1		Photo Point 1, Photo 3: 45.83945617/-107.5966157	220
PP-2		Photo Point 2, Photo 1: 45.83785325/-107.5996803	315
PP-2		Photo Point 2, Photo 2: 45.83785325/-107.5996803	0
PP-2		Photo Point 2, Photo 3: 45.83785325/-107.5996803	45
PP-3		Photo Point 3, Photo 1: 45.83943906/-107.6009084	140
PP-3		Photo Point 3, Photo 2: 45.83943906/-107.6009084	100
PP-3		Photo Point 3, Photo 3: 45.83943906/-107.6009084	45
PP-4		Photo Point 4, Photo 1: 45.84139478/-107.5988983	105
PP-4		Photo Point 4, Photo 2: 45.84139478/-107.5988983	160
PP-4		Photo Point 4, Photo 3: 45.84139478/-107.5988983	240
T-1 start		Transect 1 start: 45.8392488/-107.5963573	200
T-1 end		Transect 1 end: 45.83765226/-107.5984577	50
T-2 start		Transect 2 start: 45.83844422/-107.6005579	330
T-2 end		Transect 2 end: 45.84089981/-107.6009804	160

Comments / Problems: _____

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: **Bird nest box data lost in file transfer - need to recollect data in 2017**

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: **Only wetland surveyed was small existing wetland south of excavation**

FUNCTIONAL ASSESSMENT

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

Comments / Problems: **No Form completed in 2016 as no wetland had developed yet.**

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? **NA**
If yes, are the structures working properly and in good working order? **NA**
If no, describe the problems below.

Comments / Problems:

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: JTX - Tunnicliff **City/County:** Hardin.Big Horn **Sampling Date:** 08-Jul-16

Applicant/Owner: Montana Department of Transportation **State:** MT **Sampling Point:** DP-1U

Investigator(s): RESPEC - Traxler **Section, Township, Range:** S 10 T 1N R 33E

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

Subregion (LRR): LRR G **Lat.:** 45.83958855 **Long.:** -107.5970423 **Datum:** WGS84

Soil Map Unit Name: Kyle Clay, saline (Kw) **NWI classification:** NA

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:
Upland pit adjacent to excavated Cell 4

VEGETATION - Use scientific names of plants

FWS Region: GP

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐		
2.	0	☐		
3.	0	☐		
4.	0	☐		
	0	= Total Cover		
Sapling/Shrub Stratum (Plot size:)				
1.	0	☐		
2.	0	☐		
3.	0	☐		
4.	0	☐		
5.	0	☐		
	0	= Total Cover		
Herb Stratum (Plot size: 5')				
1. Lepidium perfoliatum	25	☑	31.3%	FAC
2. Elymus repens	25	☑	31.3%	FACU
3. Elymus trachycaulus	25	☑	31.3%	FACU
4. Bassia scoparia	5	☐	6.3%	FACU
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	80	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐		
2.	0	☐		
	0	= Total Cover		

% Bare Ground in Herb Stratum 20

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	0	x 2 =	0
FAC species	25	x 3 =	75
FACU species	55	x 4 =	220
UPL species	0	x 5 =	0
Column Totals:	80	(A)	295 (B)

Prevalence Index = B/A = 3.688

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:
recently graded and seeded site.

*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
0-16	10YR 4/2	100					Silty 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:

Very dry throughout profile. Soil moistened to obtain color. No Hydric soil indicators

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:

Soil dry to 16". No signs of inundation at this data point.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: JTX - Tunnicliff **City/County:** Hardin.Big Horn **Sampling Date:** 08-Jul-16

Applicant/Owner: Montana Department of Transportation **State:** MT **Sampling Point:** DP-1W

Investigator(s): RESPEC - Traxler **Section, Township, Range:** S 10 T 1N R 33E

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

Subregion (LRR): LRR G **Lat.:** 45.83976269 **Long.:** -107.596878 **Datum:** WGS84

Soil Map Unit Name: Kyle Clay, saline (Kw) **NWI classification:** NA

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 in bottom of excavated Cell 4. Area of potential wetland development.

VEGETATION - Use scientific names of plants

FWS Region:

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐		
2.	0	☐		
3.	0	☐		
4.	0	☐		
	0	= Total Cover		
Sapling/Shrub Stratum (Plot size:)				
1.	0	☐		
2.	0	☐		
3.	0	☐		
4.	0	☐		
5.	0	☐		
	0	= Total Cover		
Herb Stratum (Plot size: 5')				
1. Lepidium perfoliatum	30	☑	35.3%	FAC
2. Elymus repens	25	☑	29.4%	FACU
3. Elymus trachycaulus	25	☑	29.4%	FACU
4.	5	☐	5.9%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	85	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐		
2.	0	☐		
	0	= Total Cover		

% Bare Ground in Herb Stratum 20

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	0	x 2 =	0
FAC species	30	x 3 =	90
FACU species	50	x 4 =	200
UPL species	0	x 5 =	0
Column Totals:	80 (A)		290 (B)

Prevalence Index = B/A = 3.625

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:
recently excavated, graded and seeded.

*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
0-16	10YR 4/3	100					Silt	very fine sand in upper 16"

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:

Soil below 16" included fine gravels. Surface of soil showed faint saline conditions.

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:

Soil moist to surface but no saturation in upper 16".

MDT Montana Wetland Assessment Form (revised March 2008)

1. **Project Name:** Watershed # 14 - JTX-Tunnicliff Ranch Mitigation Site **2. MDT Project #:** STPX STWD (056) **Control #:** 7286000

3. **Evaluation Date:** 12/28/2014 **4. Evaluator(s):** Lawrence J. Urban **5. Wetlands/Site #(s):** JTX-Tunnicliff Ranch Wetlands

6. **Wetland Location(s):** i. **Legal:** T1N, R33E, S1/2 of Section 10 and N1/2 Section 15;
   ii. Approx. Stationing or Mileposts: N/A
   iii. Watershed: 10080015 **Watershed Name, County:** Middle Yellowstone, Big Horn

7. a. **Evaluating Agency:** MDT
   b. **Purpose of Evaluation:**
   1. __ Wetlands potentially affected by MDT project
   2. __ Mitigation wetlands; pre-construction
   3. X Mitigation wetlands; post-construction
   4. __ Other:

8. **Wetland size:** 14.49 acres (estimated)

9. **Assessment area (AA):** 14.49 acres (estimated)

10. **Classification of Wetland and Aquatic Habitats in AA**

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% of AA
D	AB	E	SI	10
D	EM	E	SI	75
D	SS	E	TE	15

Abbreviations: (*see manual for definitions*)

HGM Classes: Riverine (**R**), Depressional (**D**), Slope (**S**), Mineral Soil Flats (**MSF**), Organic Soil Flats (**OSF**), Lacustrine Fringe (**LF**);

Cowardin Classes: Rock Bottom (**RB**), Unconsolidated bottom (**UB**), Aquatic Bed (**AB**), Unconsolidated Shore (**US**), Moss-lichen Wetland (**ML**), Emergent Wetland (**EM**), Scrub-Shrub Wetland (**SS**), Forested Wetland (**FO**)

Modifiers: Excavated (**E**), Impounded (**I**), Diked (**D**), Partly Drained (**PD**), Farmed (**F**), Artificial (**A**)

Water Regimes: Permanent / Perennial (**PP**), Seasonal / Intermittent (**SI**), Temporary / Ephemeral (**TE**)

11. Estimated relative abundance: (of similarly classified sites within the same Major Montana Watershed Basin see definitions)

COMMON

12. **General condition of AA:**

i. Disturbance: (use matrix below to determine [circle] appropriate response – see instructions for Montana-listed noxious weed and aquatic nuisance vegetation species (**ANVS**) 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%.	low disturbance	low disturbance	moderate disturbance
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	moderate disturbance	high 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%.	high disturbance	high disturbance	high disturbance

Comments: (types of disturbance, intensity, season, etc.): Farming occurs in the surrounding areas to the north and west of the site for hay production. The area to the east is managed in a natural state as it is part of the Grant Marsh FAS/WMA.

ii. Prominent noxious, aquatic nuisance, & other exotic vegetation species: None are currently present within the site, although leafy spurge, spotted knapweed and salt cedar are found elsewhere in the ranch and on adjacent properties.

iii. Provide brief descriptive summary of AA and surrounding land use/habitat: The current AA is an old agriculture field/pasture that has been converted to wetland and riparian floodplain areas. Residential houses and farm buildings are located to the southeast and northwest corners of the AA. The majority of the area consists of pastures and farm fields and a public fishing area owned by MFWP called Grants Marsh. To the south are farm fields and pastures associated with the remainder of the JTX-Tunnicliff Ranch.

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 1 is forested) classes	H	NA	NA	NA
2 (or 1 if forested) classes	M	NA	NA	NA
1 class, but not a monoculture	M	←NO	YES→	L
1 class, monoculture (1 species comprises ≥90% of total cover)	L	NA	NA	NA

Comments: It is anticipated that the proposed project will have at least two vegetated classes of vegetation at a minimum, aquatic bed and emergent wetland communities. There is the possibility of a third vegetation community in the form of a scrub/shrub wetland habitat with the survival of woody tree/shrub plantings and the natural recruitment of volunteer woody species as the site develops.

SECTION PERTAINING to FUNCTIONS & VALUES ASSESSMENT

14A. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals:

i. AA is Documented (D) or Suspected (S) to contain (circle one based on definitions contained in instructions):
Primary or critical habitat (**list species**)
Secondary habitat (**list species**)
Incidental habitat (**list species**)
No usable habitat S

ii. Rating (use the conclusions from i above and the matrix below to arrive at [circle] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
Functional Points and Rating	1H	.9H	.8M	.7M	.3L	.1L	0L

Sources for documented use (e.g. observations, records, etc.): Although not present in the area now, there is no anticipated introduction of T&E species to the AA.

14B. Habitat for plant or animals rated S1, S2, or S3 by the Montana Natural Heritage Program: (not including species listed in14A above)

i. AA is Documented (D) or Suspected (S) to contain (circle one based on definitions contained in instructions):
Primary or critical habitat (**list species**) Plains Spadefoot Toad (S);
Secondary habitat (**list species**)
Incidental habitat (**list species**) Spiny Soft-shell Turtle (S);
No usable habitat

ii. Rating (use the conclusions from i above and the matrix below to arrive at [circle] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
S1 Species: *Functional Points and Rating*	1H	.8H	.7M	.6M	.2L	.1L	0L
S2 and S3 Species: *Functional Points and Rating*	.9H	.7M	.6M	.5M	.2L	.1L	0L

Sources for documented use (e.g. observations, records, etc.): Plains Spadefoot toads have a tendency to move into areas containing small marshes and depressional wetlands once developed. The design of this site may attract this species to the site over time.
The Spiny soft-shell turtle is currently found within the adjacent Big Horn River and could potentially migrate into this site if permanent water establishes within the site. Other species that could potentially utilize the site include Great Blue Herons, shorebirds and waterfowl.

14C. General Wildlife Habitat Rating:

i. Evidence of overall wildlife use in the AA (circle 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
_ interviews with local biologists 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
_ interviews with local biologists with knowledge of the AA

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

ii. Wildlife habitat features (Working from top to bottom, circle 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 instructions 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)	E	E	E	H	E	E	H	H	E	H	H	M	E	H	M	M	E	H	M	M
Moderate disturbance at AA (see #12i)	H	H	H	H	H	H	H	M	H	H	M	M	H	M	M	L	H	M	L	L
High disturbance at AA (see #12i)	M	M	M	L	M	M	L	L	M	M	L	L	M	L	L	L	L	L	L	L

iii. Rating (use the conclusions from i and ii above and the matrix below to arrive at [circle] the functional points and rating)

Evidence of wildlife use (i)	*Wildlife habitat features rating (ii)*			
	Exceptional	High	Moderate	Low
Substantial	1E	.9H	.8H	.7M
Moderate	.9H	.7M	.5M	.3L
Minimal	.6M	.4M	.2L	.1L

Comments: Once the site begins to develop and vegetation communities develop across the site, wildlife usage will increase substantially. The structural diversity of trees and shrubs will greatly enhance wildlife habitat throughout the site with increased usage by neotropical migrant birds and small mammal species.

14D. **General Fish Habitat Rating:** (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, etc.]. 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 mark _X_ **NA** and proceed to 14E.)
Type of Fishery: Cold Water (**CW**)_____ Warm Water (**WW**) _____ **Use the CW or WW guidelines in the user manual to complete the matrix**

i. Habitat Quality and Known / Suspected Fish Species in AA (use matrix to arrive at [circle] the functional points 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	1E	.9H	.8H	.7M	.6M	.5M	.9H	.8H	.7M	.6M	.5M	.4M	.7M	.6M	.5M	.4M	.3L	.3L
FWP Tier II or Native Game fish species	.9H	.8H	.7M	.6M	.5M	.5M	.8H	.7M	.6M	.5M	.4M	.4M	.6M	.5M	.4M	.3L	.2L	.2L
FWP Tier III or Introduced Game fish	.8H	.7M	.6M	.5M	.5M	.4M	.7M	.6M	.5M	.4M	.4M	.3L	.5M	.4M	.3L	.2L	.2L	.1L
FWP Non-Game Tier IV or No fish species	.5M	.5M	.5M	.4M	.4M	.3L	.4M	.4M	.4M	.3L	.3L	.2L	.2L	.2L	.2L	.1L	.1L	.1L

Sources used for identifying fish sp. potentially found in AA:
ii. Modified Rating (**NOTE:** Modified score cannot exceed 1 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? ____ If yes, reduce score in* ***i*** *above by 0.1.*

b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ____ If yes, add 0.1 to the adjusted score in ***i*** *or* ***iia.***
iii. Final Score and Rating: NA **Comments:** Not applicable as the site is not being designed for fish due to the seasonal intermittent hydrology anticipated within the site.

14E. Flood Attenuation: (Applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA are not flooded from in-channel or overbank flow, mark ___ **NA** and proceed to 14F.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points 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		
% 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**	1H	.9H	.6M	.8H	.7M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.8H	.5M	.7M	.6M	.4M	.3L	.2L	.1L

Entrenchment ratio (ER) estimation – see User's 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.

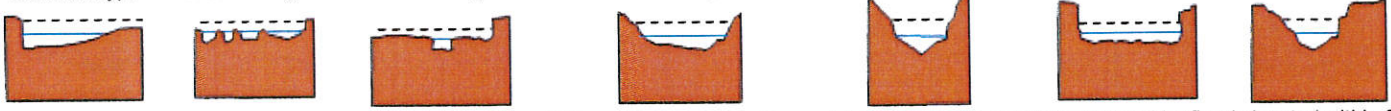
175 /	100 =	1.75
Flood-prone width	*Bankfull width*	*Entrenchment ratio (ER)*



Slightly Entrenched **ER = >2.2**
C stream type D stream type E stream type

Moderately Entrenched **ER = 1.41 – 2.2**
B stream type

Entrenched **ER = 1.0 – 1.4**
A stream type F stream type G stream type



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 (circle)? ___ **Comments:** Area is located within the 100-year floodplain of the adjacent Bighorn River, and it is anticipated that flood events will inundate this area via surface flows during flood events.

14F. Short and Long Term Surface Water Storage: (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, mark ___ **NA** and proceed to 14G.)

i. Rating (Working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see instructions 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**	1H	.9H	.8H	.8H	.6M	.5M	.4M	.3L	.2L
Wetlands in AA flood or pond **< 5 out of 10 years**	.9H	.8H	.7M	.7M	.5M	.4M	.3L	.2L	.1L

Comments: Groundwater is the predominant source of water for this wetland mitigation site as it will rise and fall based upon seasonal input. At full pool, the groundwater should be within 1 foot of the surface for approximately 90% of the site.

14G. Sediment/Nutrient/Toxicant Retention and Removal: (Applies to wetlands 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, mark ___ **NA** and proceed to 14H.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low])

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver levels of 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 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 with 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	.8H	.7M	.5M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.7M	.6M	.4M	.4M	.3L	.2L	.1L

Comments: It is anticipated that the site will receive input from groundwater and surface sources over time, including; flood events, precipitation, irrigation runoff from adjacent fields, etc. As it does not contain an outlet, the site will collect all of the nutrients, sediments, etc. to be stored within the wetland.

14H Sediment/Shoreline Stabilization: (Applies only if AA occurs on or within the banks or a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action. If 14H does not apply, mark _X_ **NA** and proceed to 14I.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating)

*% 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%	1H	.9H	.7M
35-64%	.7M	.6M	.5M
< 35%	.3L	.2L	.1L

Comments: This will not be applicable as the vegetation will be allowed to establish as the water table driven by groundwater will be seasonal in nature and no waves anticipated.

14I. Production Export/Food Chain Support:

i. Level of Biological Activity (synthesis of wildlife and fish habitat ratings [circle])

General Fish Habitat Rating (14D.iii.)	**General Wildlife Habitat Rating (14C.iii.)**		
	E/H	M	L
E/H	H	H	M
M	H	M	M
L	M	M	L
N/A	H	M	L

ii. Rating (Working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating. Factor A = acreage of vegetated wetland component in the AA; Factor B = level of biological activity rating from above (14I.i.); Factor C = whether or not the AA contains a surface or subsurface outlet; the final three rows pertain to duration of surface water in the AA, where P/P, S/I, and T/E are as previously defined, and A = "absent" [see instructions 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	1H	.7M	.8H	.5M	.6M	.4M	.9H	.6M	.7M	.4M	.5M	.3L	.8H	.6M	.6M	.4M	.3L	.2L
S/I	.9H	.6M	.7M	.4M	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7M	.5M	.5M	.3L	.3L	.2L
T/E/A	.8H	.5M	.6M	.3L	.4M	.2L	.7M	.4M	.5M	.2L	.3L	.1L	.6M	.4M	.4M	.2L	.2L	.1L

iii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1.) **Vegetated Upland Buffer (VUB)**: 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).
a) Is there an average ≥ 50 foot-wide vegetated upland buffer around ≥ 75% of the AA circumference? _X_ *If yes, add 0.1 to the score in **ii** above.*
iv. Final Score and Rating: 0.7M **Comments:** The AA is surrounded by a minimum width of 50-feet for the upland buffer.

14J. Groundwater Discharge/Recharge: (check the appropriate indicators in i & 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
- X Wetland contains an outlet, but no inlet
- X Shallow water table and the site is saturated to the surface
- ___ Other:

ii. Recharge Indicators
- X 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 arrive at [circle] the functional points 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	1H	.7M	.4M	.1L
Insufficient Data/Information	N/A			

Comments: The system is driven by rising and falling groundwater tables at various times of the year. It has the potential to be a recharge area during high water / flood events from the adjacent Bighorn River.

14K. Uniqueness:

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points 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)	1H	.9H	.8H	.8H	.6M	.5M	.5M	.4M	.3L
Moderate disturbance at AA (#12i)	.9H	.8H	.7M	.7M	.5M	.4M	.4M	.3L	.2L
High disturbance at AA (#12i)	.8H	.7M	.6M	.6M	.4M	.3L	.3L	.2L	.1L

Comments: Not a unique wetland in any sense of the matter as it is going to be reclaimed from excavation to develop into a wetland ecosystem.

14L. Recreation/Education Potential: (affords "bonus" points if AA provides recreation or education opportunity)

i. Is the AA a known or potential rec./ed. site: (circle) ___ (if 'Yes' continue with the evaluation; if 'No' then mark _X_ **NA** and proceed to the overall summary and rating page)

ii. Check categories that apply to the AA: ___ Educational/scientific study; ___ Consumptive rec.; ___ Non-consumptive rec.; ___Other

iii. Rating (use the matrix below to arrive at [circle] the functional points and rating)

Known or Potential Recreation or Education Area	Known	Potential
Public ownership or public easement with general public access (no permission required)	.2H	.15H
Private ownership with general public access (no permission required)	.15H	.1M
Private or public ownership without general public access, or requiring permission for public access	.1M	.05L

Comments: The landowner may want to allow school groups to utilize the wetland conservation area for school studies once it develops, but currently it is not allowed.

General Site Notes

FUNCTION & VALUE SUMMARY & OVERALL RATING FOR WETLAND/SITE #(S): JTX-Tunnicliff Ranch Wetlands

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	L	0.0	1	0.00	
B. MT Natural Heritage Program Species Habitat	M	0.7	1	10.14	
C. General Wildlife Habitat	H	0.9	1	13.04	*
D. General Fish Habitat	NA				
E. Flood Attenuation	M	0.5	1.0	7.24	
F. Short and Long Term Surface Water Storage	H	0.9	1.0	13.04	*
G. Sediment/Nutrient/Toxicant Removal	H	1.0	1.0	14.49	*
H. Sediment/Shoreline Stabilization	NA				
I. Production Export/Food Chain Support	M	0.7	1	10.14	
J. Groundwater Discharge/Recharge	M	0.7	1.0	10.14	*
K. Uniqueness	M	0.6	1	8.69	
L. Recreation/Education Potential (bonus points)	NA		NA		
Totals:		6.00	9.0	86.94	
Percent of Possible Score			67%		

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**
__X__ 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**
__X__ 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; otherwise 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 RATING: II

APPENDIX C
PROJECT AREA PHOTOGRAPHS

MDT Wetland Mitigation Monitoring
JTX – Tunnicliff Ranch
Big Horn County, Montana

JTX – Tunnicliff: Photo Point Photos



Photo Point: 1 Location: East side of Property
Bearing: 320 degrees Year: 2016



Photo Point: 1 Location: East side of Property
Bearing: 270 degrees North Year: 2016



Photo Point: 1 Location: East side of Property
Bearing: 220 degrees Year: 2016



Photo Point: 2 Location: South side of Property
Bearing: 315 degrees Year: 2016



Photo Point: 2 Location: South side of Property
Bearing: 0 degrees Year: 2016



Photo Point: 2 Location: South side of Property
Bearing: 45 degrees Year: 2016

JTX – Tunnicliff: Photo Point Photos



Photo Point: 3 Location: West Side of Property
Bearing: 140 degrees Year: 2016



Photo Point: 3 Location: West Side of Property
Bearing: 100 degrees Year: 2016



Photo Point: 3 Location: West Side of Property
Bearing: 45 degrees Year: 2016



Photo Point: 4 Location: North Side of Property
Bearing: 105 degrees Year: 2016



Photo Point: 4 Location: North Side of Property
Bearing: 160 degrees Year: 2016



Photo Point: 4 Location: North Side of Property
Bearing: 240 degrees Year: 2016

JTX – Tunnicliff: Transect Photos



Transect 1: Start Location: SE Corner of Property
Bearing: 200 degrees Year 2016



Transect 1: End Location: SE Corner of Property
Bearing: 50 degrees Year 2016



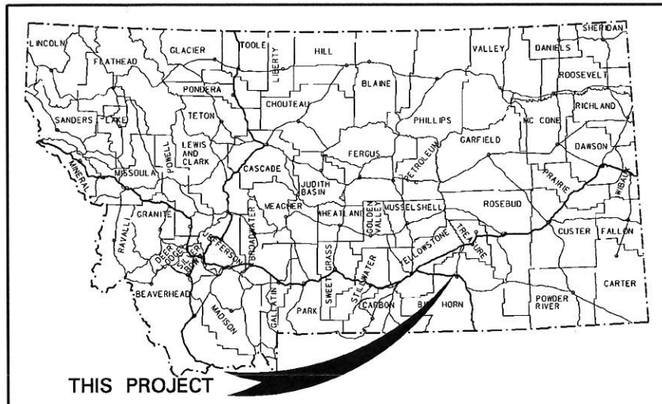
Transect 2: Start Location: West Side of Property
Bearing: 330 degrees Year 2016



Transect 2: End Location: West Side of Property
Bearing: 160 degrees Year 2016

APPENDIX D
PROJECT PLAN SHEETS

MDT Wetland Mitigation Monitoring
JTX – Tunnicliff Ranch
Big Horn County, Montana

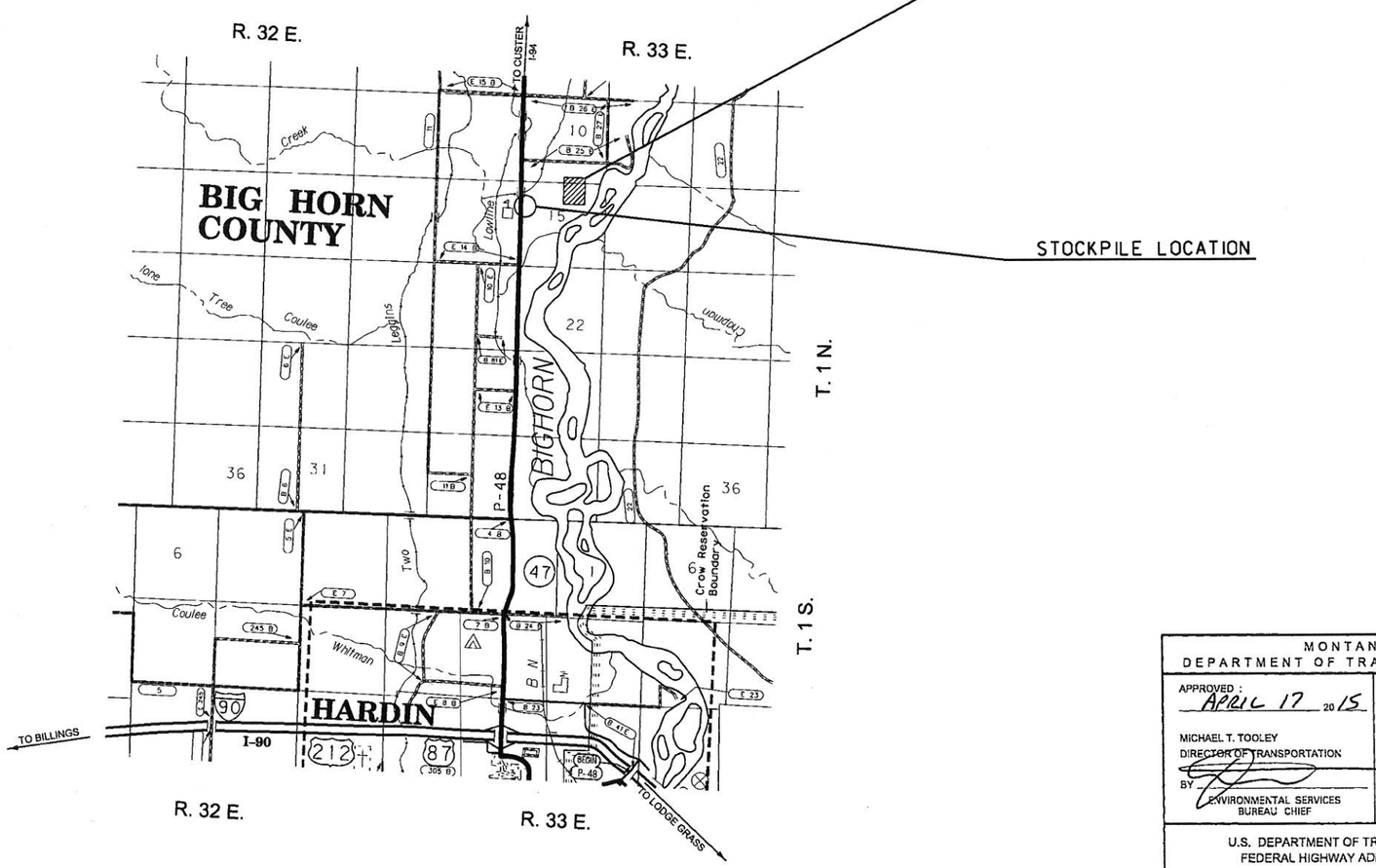


MONTANA DEPARTMENT OF TRANSPORTATION

FEDERAL AID PROJECT NO. STPX STWD(56)

WS #14 – AQUATIC MITIGATION

BIG HORN COUNTY



R. 32 E. R. 33 E.

MONTANA DEPARTMENT OF TRANSPORTATION

APPROVED : APRIL 17 20 15

MICHAEL T. TOOLEY
DIRECTOR OF TRANSPORTATION

BY _____
ENVIRONMENTAL SERVICES BUREAU CHIEF

THOMAS S. MARTIN 11228PE
REGISTERED PROFESSIONAL ENGINEER

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED :

_____ _____
DIVISION ADMINISTRATOR DATE

ASSOCIATED PROJECT AGREEMENT NUMBERS	
R / W & I.C.	STPX STWD(302)
P. E.	STPX STWD(56)

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\7286000enttl001.dgn	DESIGNED BY	WADE SALYARDS, PE	3/18/2015	WETLAND PLANS
2		5/6/2015	REVIEWED BY			
1		1:25:01 PM CPS - U2623	CHECKED BY			UPN NUMBER 7286000

TABLE OF CONTENTS

ROAD PLANS	SHEET NO.
TITLE SHEET	1
TABLE OF CONTENTS	2
NOTES	2
LEVEL DATA	2
CONTROL DIAGRAM	3
CONTROL ABSTRACT	3
SUMMARIES	4-5
GRADING	4
SURFACING	4
TOPSOIL AND SEEDING	4
ABANDON WELL	4
CULVERTS	5
CULVERT SUMMARY RECAP	5
FENCING	5
CLEARING AND GRUBBING	5
DETAILS	6-15
SITE PLAN	6
SEEDING AND REVEGETATION PLAN	7
STOCKPILE LOCATION	8
STOCKPILE APPROACH DETAIL	9
STAKEOUT POINTS WL-1 & WL-2	10
STAKEOUT POINTS WL-3 & WL-4	11
STAKEOUT POINTS WL-5, WL-6 & WL-7	12
STAKEOUT POINTS WL-8 & WL-9	13
STAKEOUT POINTS WL-10 & WL-11	14
STAKEOUT POINTS WL-12, WL-13 & BM-1	15

NOTES

UTILITIES

CALL THE UTILITIES UNDERGROUND LOCATION CENTER (811) OR OTHER NOTIFICATION SYSTEM FOR THE MARKING AND LOCATION OF ALL LINES AND SERVICE BEFORE EXCAVATING. ALL CLEARANCES OR DEPTHS PROVIDED FOR UTILITIES ARE FROM EXISTING GROUND LINE.

WETLANDS

WETLANDS EXIST ADJACENT TO THE PROJECT AND MAY EXIST BEYOND THE PROJECT LIMITS. WETLAND AREAS WITHIN THE PROJECT LIMITS HAVE BEEN DELINEATED AND ARE SHOWN ON THE PLANS. NO PERMITS HAVE BEEN OBTAINED FOR WORK OUTSIDE OF THE PROJECT CONSTRUCTION LIMITS. ANY ACTION IMPACTING WETLAND AREAS OUTSIDE OF THE PERMANENT IMPACT AREAS SHOWN IS THE RESPONSIBILITY OF THE CONTRACTOR.



DELINEATED WETLAND AREAS

WETLAND DELINEATION TABLE

WETLAND DESIGNATION	WETLAND AREA (ACRES)		REMARKS
	DELINEATED AREA	IMPACTED AREA (PERM.)	
EWL-1	0.01	0.00	
EWL-2	0.04	0.00	
TOTAL	0.05	0.00	

** TEMPORARY WETLAND IMPACTS ASSOCIATED WITH CONTRACTOR OPERATIONS ARE TO BE PERMITTED BY CONTRACTOR.

MONITOR WELLS

SEE SITE PLAN FOR LOCATIONS OF MONITOR WELLS ON THE PROJECT. DO NOT DISTURB ON-SITE MONITOR WELLS UNLESS NOTED OTHERWISE . WELLS THAT ARE ABANDONED AND THEN REPLACED ARE NOT MEASURED FOR PAYMENT. (SEE SPECIAL PROVISIONS)

DESIGN CHANGES

ANY DESIGN CHANGES MADE DURING CONSTRUCTION MUST BE APPROVED BY THE MDT AQUATIC MITIGATION ENGINEER (406-444-7273)

SOILS INFORMATION

SOILS INFORMATION IS INCLUDED WITH THE SPECIAL PROVISIONS FOR THIS PROJECT.

PERMANENT APPROACHES - COUNTY ROAD & STOCKPILE

CONSTRUCT APPROACHES TO A 48' FINISHED TOP ON A 58' SUBGRADE UNLESS NOTED OTHERWISE IN THE PLANS.

PROVIDE THE FOLLOWING SURFACING:
0.75' CRUSHED AGGREGATE COURSE

TEMPORARY ACCESS ROAD

PROVIDE A TEMPORARY ACCESS ROAD TO ENSURE ADEQUATE CAPACITY AND WIDTH FOR EQUIPMENT ACCESS TO AND FROM THE SITE. SEE SPECIAL PROVISIONS.

SURVEY DATA

DTM FILES FORMATTED FOR TRIMBLE, LEICA AND TOPCON SURVEY CONTROLLERS ARE AVAILABLE UPON REQUEST. MDT DOES NOT GUARANTEE THE ACCURACY AND COMPLETENESS OF THE SUPPLIED DTM FILES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT THE FINISHED GRADES MATCH THE GRADES AND ELEVATIONS INDICATED IN THE PLANS.
CONTACT THE MDT AQUATIC MITIGATION ENGINEER (406-444-7273)

DO NOT DISTURB

DO NOT DISTURB EXISTING WETLANDS, EXISTING IRRIGATION SUPPLY DITCHES AND MONITORING WELLS UNLESS NOTED OTHERWISE.

HIGH GROUNDWATER ELEVATIONS

HIGH GROUNDWATER ELEVATIONS SHOWN ON THE PLANS ARE BASED ON MONITORING WELL DATA AND ARE FOR INFORMATIONAL PURPOSES ONLY. THE CONTRACTOR IS RESPONSIBLE FOR INTERPRETING THE GROUNDWATER DATA AND DETERMINING THE PROBABLE GROUNDWATER ELEVATION FOR THE TIME PERIOD OF CONSTRUCTION. (SEE SPECIAL PROVISIONS)

LEVEL DATA

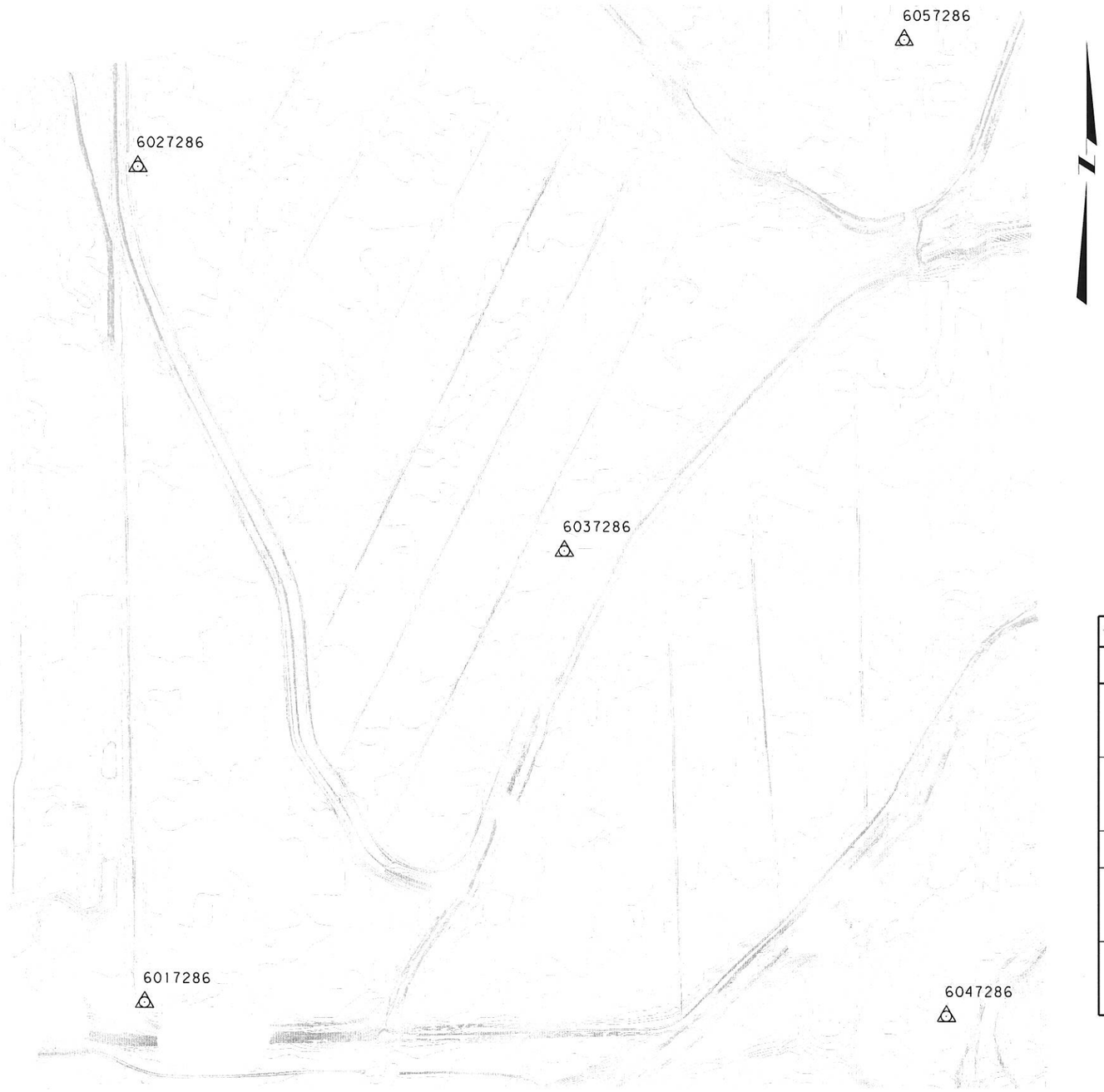
BEARING SOURCE

GRID -- MONTANA COORDINATE SYSTEM NAD83-2011.
THE HARDIN - NORTH (NORTH SECTION) PROJECT NO. STPP 48-1(31)2 IS ON A SEPARATE AND DIFFERENT COORDINATE SYSTEM.

LEVEL DATUM SOURCE

NAVD88 (GNSS DERIVED ELEVATIONS USING GEOID 12 AND HOLDING BMS BIL1A, V487, WR28, AND Z487

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\7286000entll001.dgn	DESIGNED BY	WADE SALYARDS, PE	3/18/2015	WETLAND PLANS	WS #14 AQUATIC MITIGATION	PROJECT NO. STPX STWD (56)
2		6/10/2015	REVIEWED BY					
1		11:35:37 AM CPS - U2623	CHECKED BY			BIG HORN COUNTY	CSF = 0.99946705 UPN 7286000	SHEET 2 OF 15



CONTROL DIAGRAM

SCALE: N/A

NOTE:
THIS PROJECT IS ON THE MONTANA COORDINATE SYSTEM NAD83-2011.
NORTHING AND EASTING COORDINATES ARE EXPRESSED IN UNITS OF INTERNATIONAL FEET AND ELEVATIONS ARE IN UNITS OF U.S. SURVEY FEET.

DIMENSIONS SHOWN ON THE PLANS ARE GRID. ALL SURVEY AND STAKING REQUIRE THE USE OF A COMBINATION SCALE FACTOR (CSF) TO CONVERT GRID DIMENSIONS TO GROUND DIMENSIONS (GRID DISTANCE / CSF = GROUND DISTANCE).
THE CSF FOR THIS PROJECT IS 0.99946705.

CONTROL ABSTRACT

POINT NAME/NUMBER	N OR Y COORDINATE	E OR X COORDINATE	POINT ELEVATION	LOCATION AND DESCRIPTION
6017286	584,661.165	2,452,173.344	2837.83	SET A 2 INCH ALUMINUM CAP ON A 5/8 INCH BY 30 INCH REBAR FLUSH WITH GROUND STAMPED 6017286 2012 NORTH OF HARDIN, ACCESS AT MP 7.84 ON US HWY 47 0.35 MILES EAST ON GRANT MARSH ROAD 0.44 MILES SOUTH ON COTTONWOOD ROAD TO DRIVEWAY TO TWO STORY GREY HOUSE APPROX 200.0 FT EAST OF GREY HOUSE 24.2 FT EAST OF WITNESS POST IN N/S FENCE SET 26 MAR 2012
6027286	586,024.605	2,452,159.552	2836.55	SET A 2 INCH ALUMINUM CAP ON A 5/8 INCH BY 30 INCH REBAR FLUSH WITH GROUND STAMPED 6027286 2012 WALK IN ACCESS FROM POINT 6017286, SET IN NW CORNER OF PASTURE 33.0 FT EAST OF FENCE CORNER 9.0 FT SOUTH OF WITNESS POST IN E/W FENCE SET 26 MAR 2012
6037286	585,399.115	2,452,856.386	2836.88	SET A 2 INCH ALUMINUM CAP ON A 5/8 INCH BY 30 INCH REBAR FLUSH WITH GROUND STAMPED 6037286 2012 APPROX 1000.0 FT NE OF CONTROL POINT 6017286 IN CENTER OF PASTURE 3.2 FT EAST OF WITNESS POST SET 26 MAR 2012
6047286	584,642.907	2,453,479.262	2837.64	SET A 2 INCH ALUMINUM CAP ON A 5/8 INCH BY 30 INCH REBAR FLUSH WITH GROUND STAMPED 6047286 2012 ACCESS AT MP 7.84 ON US HWY 47 0.98 MILES EAST ON GRANT MARSH ROAD 0.54 MILES SOUTH ON FISHING ACCESS TO END OF ROAD APPROX 200.0 FT WEST OF END OF FISHING ACCESS ROAD 15.0 FT NORTH OF FENCE CORNER 15.0 FT NORTH OF E/W FENCE 3.6 FT WEST OF WITNESS POST IN N/S FENCE SET 26 MAR 2012
6057286	586,235.362	2,453,410.658	2835.13	SET A 2 INCH ALUMINUM CAP ON A 5/8 INCH BY 30 INCH REBAR FLUSH WITH GROUND STAMPED 6057286 2012 WALK IN ACCESS FROM POINT 6017286, SET IN NE CORNER OF PASTURE 7.7 FT SW OF WESTERN BRACE POST 25.0 FT WEST OF N/S FENCE 5.2 FT SOUTH OF WITNESS POST IN E/W FENCE SET 26 MAR 2012

SUMMARY

GRADING

STATION	cubic yards			REMARKS
	UNCL. EXC.	EXCESS EXC.	EMB.+	
	107,401			
			15	WETLAND BERM
			24,150	TOPSOIL REPLACEMENT - WETLAND & BERM AREAS
	30		220	FARM FIELD APP. - ACCESS ROAD
	30		420	FARM FIELD APP. - STOCKPILE ACCESS
			5	DITCH BLOCK - NW CORNER
TOTAL	107,461	# 82,651	# 24,810	

FOR INFORMATION ONLY

SURFACING

linear feet				FOR	AGGREGATE cubic yards			REMARKS
GROSS	NET	+	-		CR. TOP SURF. TY. B GR. 3	CRUSHED AGG. COURSE	TRAFFIC GRAVEL	
				COUNTY RD APPROACH		107		
				STOCKPILE APPROACH		218		
0.00	0.00	~	~		~	325	~	

TOPSOIL & SEEDING

FOR	cubic yards	acres			lump sum		REMARKS
		SEED					
	TOPSOIL SALVAGING & PLACING	WETLAND SEEDING - UPLAND	WETLAND SEEDING - WETLAND	SUPPLEMENTAL WETLAND MIX #	REVEGETATION	TREE & SHRUB PLANTING	
WETLAND CELLS & BERM AREAS	24,150					1.0	SALVAGE TOPSOIL TO DEPTH OF 0.5 FT.
STOCKPILE					1.0		INCLUDES MULCH
SEEDING AT ELEV. 2832 & LOWER			4.7	4.7			
SEEDING BETWEEN ELEV. 2832 & ELEV. 2835.5			22.1				
SEEDING ABOVE ELEV. 2835.5		1.1					
TOTAL	24,150	1.1	26.8	~	1.0	1.0	

FOR INFORMATION ONLY - INCLUDED IN OTHER ITEMS

ABANDON WELL

ABANDON WELL	REMARKS
EACH	
5	Project Site

SUMMARY

CULVERTS (INCLUDED IN CULVERT SUMMARY RECAP)

LOCATION	BASIC BID ITEMS		PIPE OPTIONS in			END SECTIONS		linear feet	SKEW ANGLE	CULVERT IN PL. in x ft	REMARKS
	CULVERT PIPE in	linear feet LENGTH OF PIPE	STEEL - 2 2/3 x 1/2 CORR. CONCRETE ALUMINUM - 2 2/3 x 1/2 CORR.	CLASS OR THK.	COATING #	LEFT	RIGHT	HEIGHT OF COVER			
COUNTY ROAD APPROACH	18	68	18 CSP 18 RCP 18 CAP	0.079 CL. 3 0.075	NONE NONE NONE	FETS FETS FETS	FETS FETS FETS	1.5			
STOCKPILE ACCESS APPROACH	18	68	18 RCP	CL. 3	NONE	SQ.	SQ.	0.5			
TOTAL	~	~	~	~	~	~	~	~	~	~	

FENCING

LOCATION	linear feet			each			linear feet		REMARKS
	FARM FENCE TYPE F5W	FENCE SPECIAL DESIGN	FENCE WILDLIFE FRIENDLY FW	FARM FENCE PANEL SINGLE	FARM FENCE PANEL DOUBLE	DEADMAN	FARM GATE TYPE G2	FARM GATE TYPE G3	
WETLAND AREA			2,977.3	5	3	1	16		SOUTH AND EAST SIDE ONLY
WETLAND AREA	2,972.7			4		1	16		NORTH AND WEST SIDE ONLY
ACCESS ROAD	1,041.8			7	1			*16	
STOCKPILE APPROACH	66.2			*2			*16		
EXCLOSURES		5,100.0							
TOTAL	4,080.7	5,100.0	2,977.3	18	4	2	48	16	

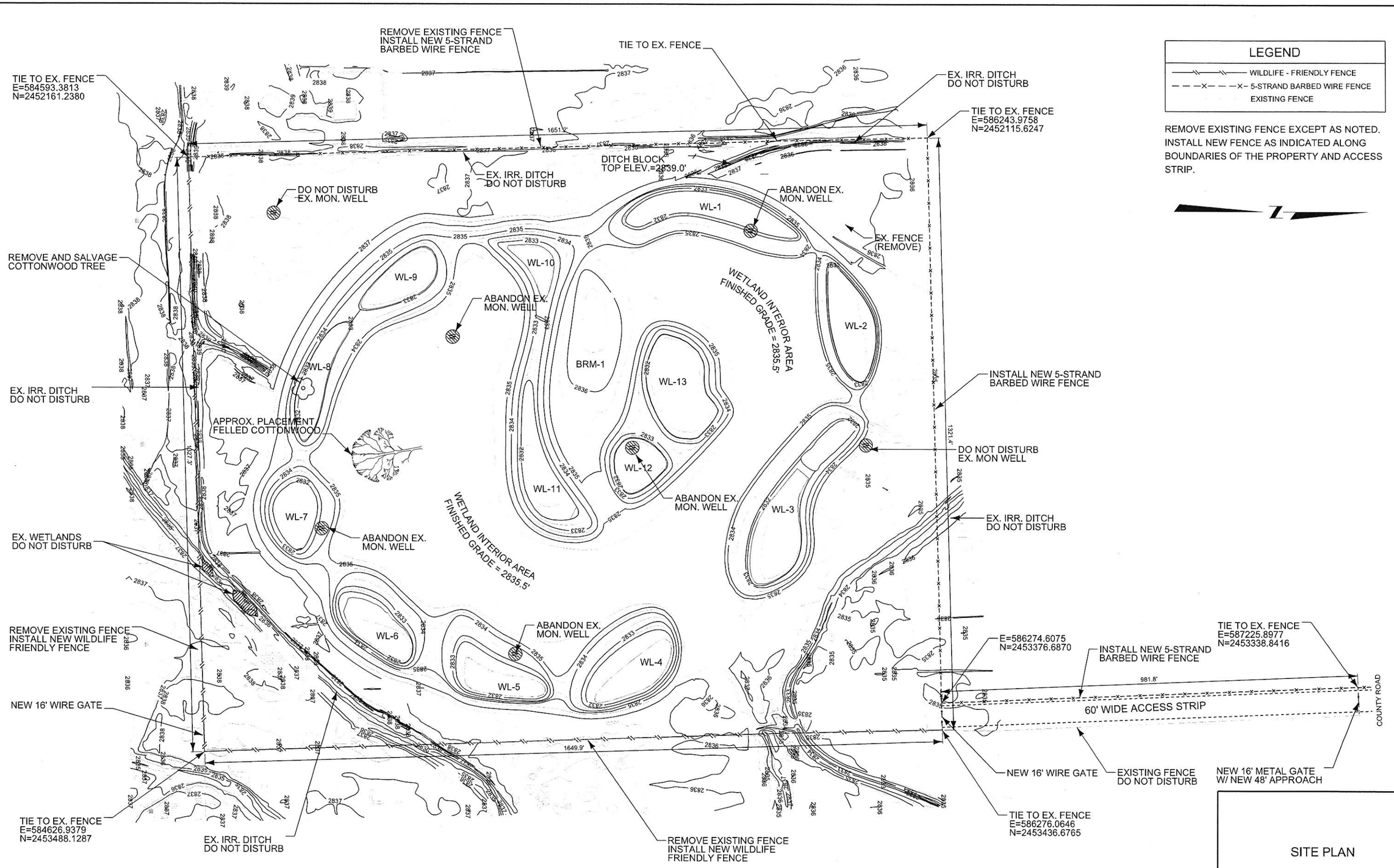
* INSTALL WHEN HAULING IS COMPLETE

CULVERT SUMMARY RECAP

BASIC BID	linear feet NEW PIPE (TOTAL)
18"	68
18" RCP CL 3	68
TOTAL	~

CLEARING & GRUBBING

STATION FROM	STATION TO	acres CLEARING AND GRUBBING	REMARKS
		31.7	Project Site
TOTAL		31.7	



LEGEND

WILDLIFE - FRIENDLY FENCE

5-STRAND BARBED WIRE FENCE

EXISTING FENCE

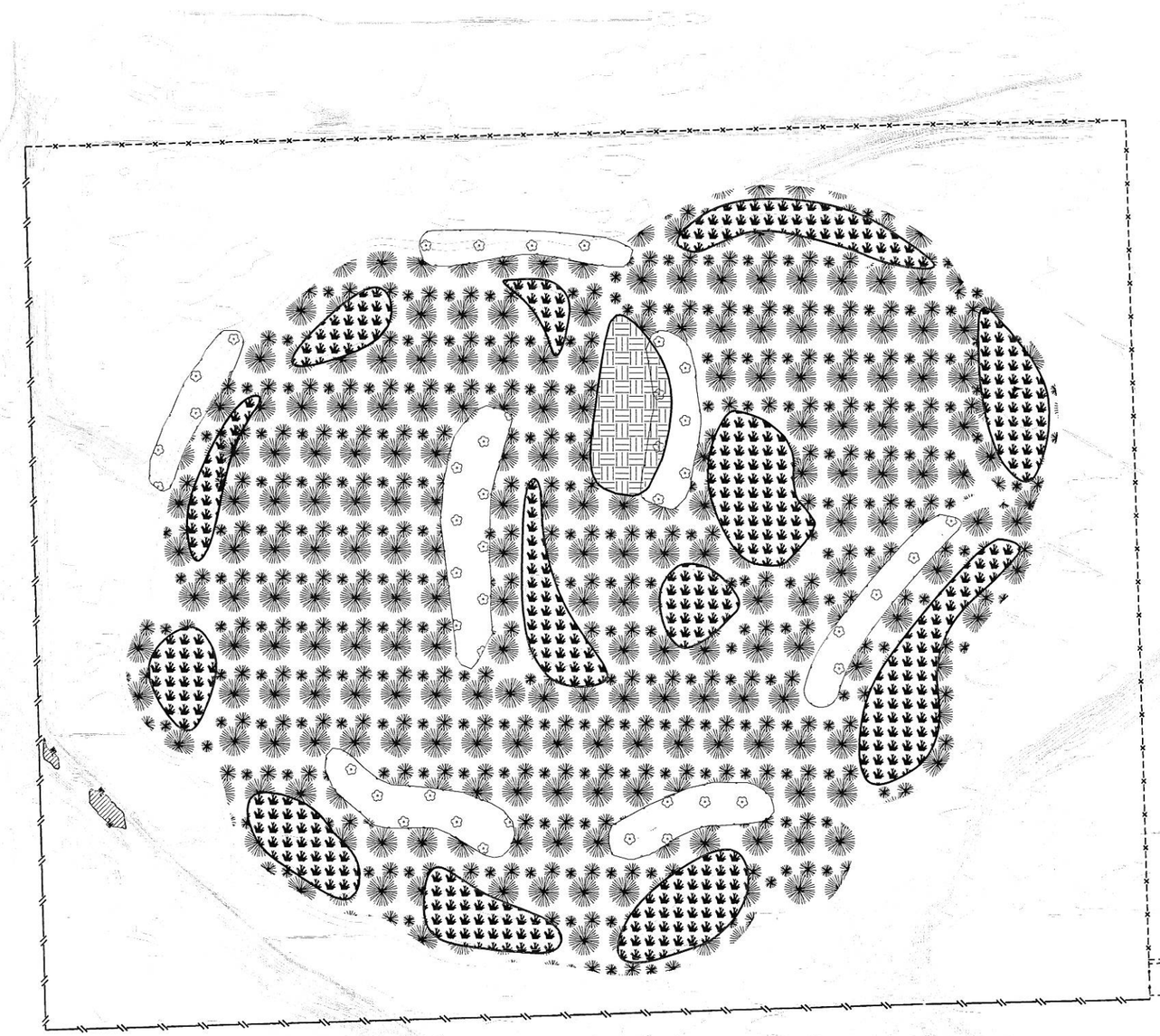
REMOVE EXISTING FENCE EXCEPT AS NOTED. INSTALL NEW FENCE AS INDICATED ALONG BOUNDARIES OF THE PROPERTY AND ACCESS STRIP.

NOTE: ENSURE PROPERTY BOUNDARIES ARE FENCED TO PREVENT THE NEIGHBORING LIVESTOCK FROM ACCESSING THE PROJECT SITE.

SITE PLAN

NO SCALE

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\7286000enpln001.dgn	DESIGNED BY	WADE SALYARDS, PE	3/18/2015	WETLAND PLANS	WS #14 AQUATIC MITIGATION / PROJECT NO. STPX STWD (56)
2		6/10/2015	REVIEWED BY				CSF = 0.99946705 / UPN 7286000 / SHEET 6 OF 15
1		11:36:43 AM CPS - U2623	CHECKED BY			BIG HORN COUNTY	



WETLAND AND SUPPLEMENTAL WETLAND MIX
4.725 ACRES

WETLAND MIX
22.126 ACRES

UPLAND SEED MIX
1.102 ACRES

TREE & SHRUB PLANTING AREAS (SEEDING ALSO INCLUDED IN THIS AREA) (EXCLOSURES) *
2.725 ACRES

DELINEATED WETLAND AREAS

*NOTE: THE PERIMETER OF THE EXCLOSURES SHOWN ARE APPROXIMATE LOCATIONS. THE FINAL BOUNDARIES WILL BE MARKED IN THE FIELD BY THE PM/BOTANIST. EXCLOSURES TO BE ERECTED IN THE SPRING DURING TREE AND SHRUB PLANTING.

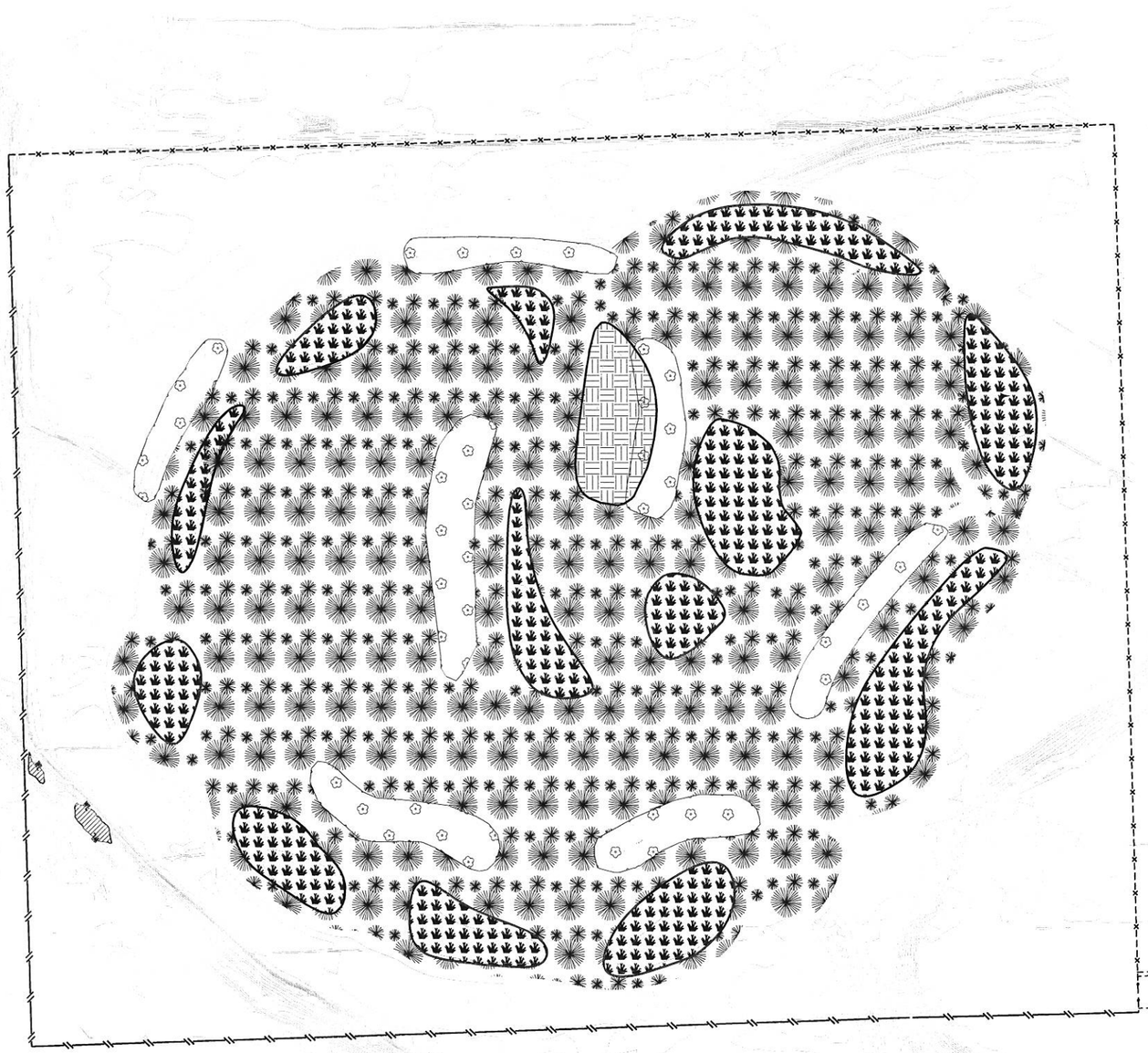
NOTE: REVEGETATE AND RE-SEED AREAS DISTURBED OUTSIDE THE CONSTRUCTION LIMITS.

N

SEEDING AND
REVEGETATION PLAN

(NO SCALE)

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\7286000enpln001.dgn	DESIGNED BY	LOUISE STONER	12/22/2014	WETLAND PLANS	WS #14 AQUATIC MITIGATION	PROJECT NO. STPX STWD (56)
2		6/10/2015	REVIEWED BY	WADE SALYARDS, PE	3/18/2015			
1		11:36:48 AM CPS - U2623	CHECKED BY			BIG HORN COUNTY	CSF = 0.99946705 UPN 7286000	SHEET 7 OF 15



WETLAND AND SUPPLEMENTAL WETLAND MIX
4.725 ACRES

WETLAND MIX
22.126 ACRES

UPLAND SEED MIX
1.102 ACRES

TREE & SHRUB PLANTING AREAS (SEEDING ALSO INCLUDED IN THIS AREA)
(EXCLOSURES) *
2.725 ACRES

DELINEATED WETLAND AREAS

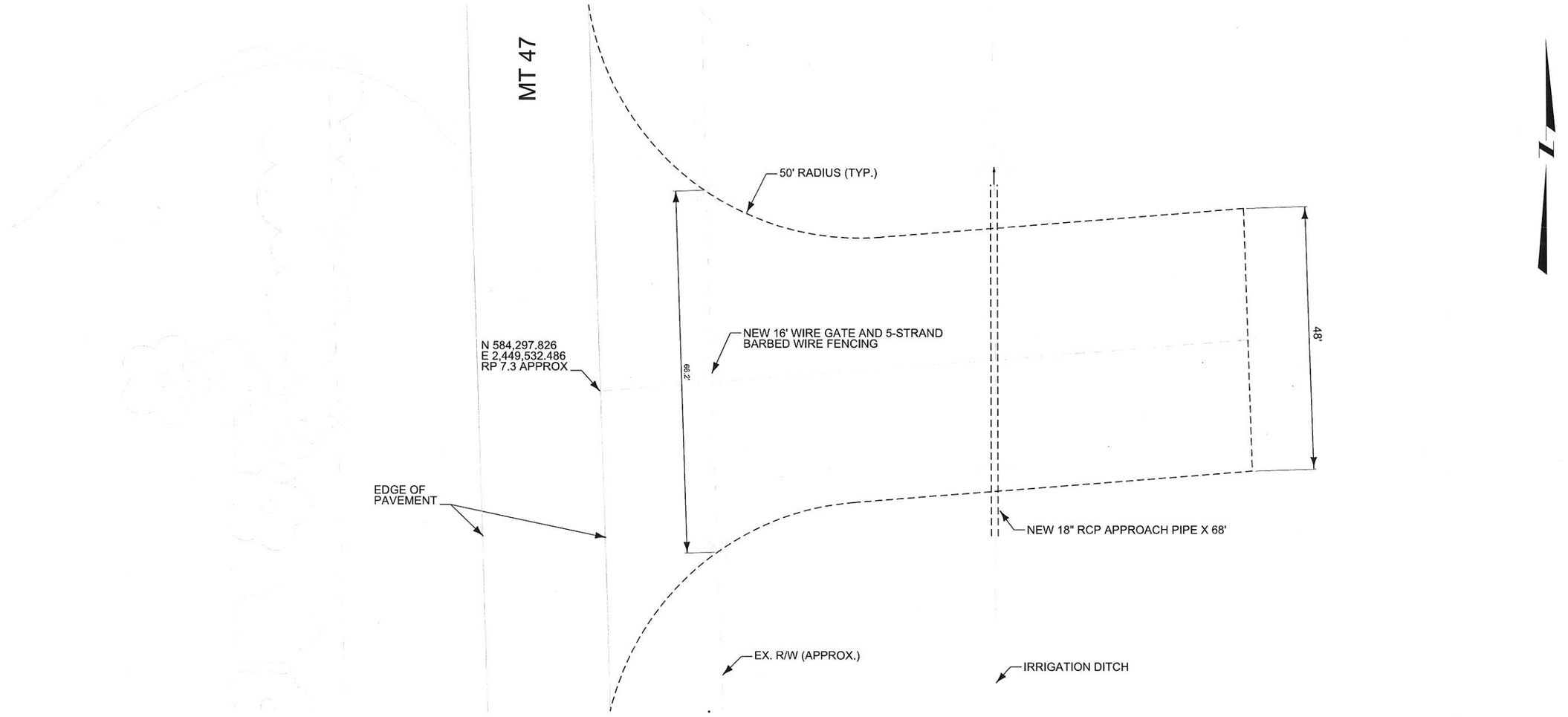
*NOTE: THE PERIMETER OF THE EXCLOSURES SHOWN ARE APPROXIMATE LOCATIONS.
THE FINAL BOUNDARIES WILL BE MARKED IN THE FIELD BY THE PM/BOTANIST.
EXCLOSURES TO BE ERECTED IN THE SPRING DURING TREE AND SHRUB PLANTING.

NOTE: REVEGETATE AND RE-SEED AREAS DISTURBED OUTSIDE THE CONSTRUCTION LIMITS.

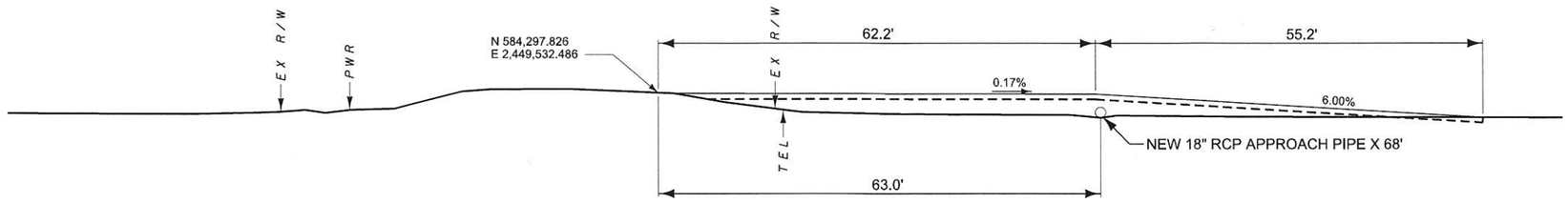
SEEDING AND
REVEGETATION PLAN

(NO SCALE)

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\7286000enpln001.dgn	DESIGNED BY	LOUISE STONER	12/22/2014	WETLAND PLANS	WS #14 AQUATIC MITIGATION	PROJECT NO. STPX STWD (56)
2		6/10/2015	REVIEWED BY	WADE SALYARDS, PE	3/18/2015		CSF = 0.99946705 UPN 7286000	SHEET 7 OF 15
1		11:36:48 AM CPS - U2623	CHECKED BY			BIG HORN COUNTY		



PLAN VIEW



SECTION VIEW

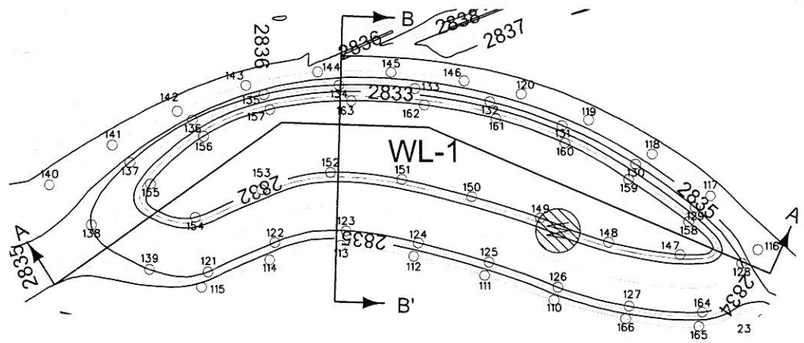
NOTE: STOCKPILE APPROACH LOCATION IS APPROXIMATELY AT RP 7.3 OR STATION 390+65 OF THE HARDIN-NORTH PROJECT (STPP 48-1(30)1).

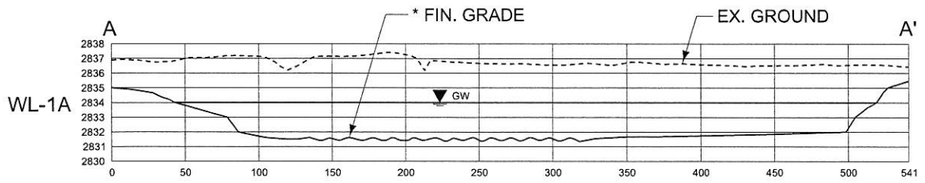
STOCKPILE SITE APPROACH DETAIL

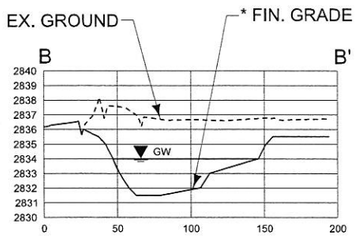
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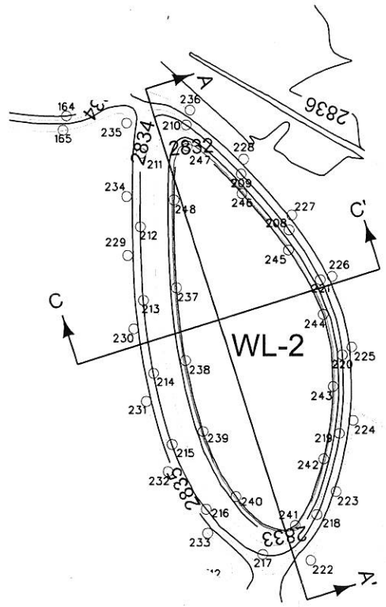
3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\7286000enpln001.dgn	DESIGNED BY	LOUISE STONER	10/20/2014	WETLAND PLANS	WS #14 AQUATIC MITIGATION	PROJECT NO. STPX STWD (56)
2		6/10/2015	REVIEWED BY	WADE SALYARDS, PE	3/18/2015			
1		11:44:17 AM CPS - U2623	CHECKED BY			BIG HORN COUNTY	CSF = 0.99946705 / UPN 7286000	SHEET 9 OF 15

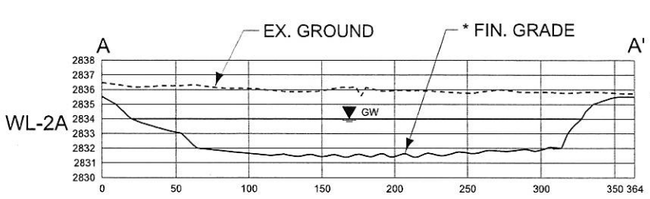
NOTE: GW DESIGNATES DESIGN HIGH WATER ELEVATION.
FOR INFORMATIONAL PURPOSES ONLY.

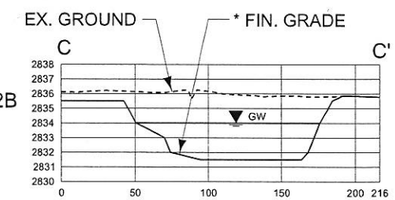












CELL WL-1 COORDINATES			
Point	North	East	Elevation
110	585,845.986	2,452,369.844	2,835.50
111	585,798.850	2,452,353.200	2,835.50
112	585,750.594	2,452,340.255	2,835.50
113	585,701.180	2,452,332.992	2,835.50
114	585,652.560	2,452,342.843	2,835.50
115	585,606.143	2,452,361.423	2,835.50
116	585,984.132	2,452,335.571	2,835.50
117	585,952.005	2,452,299.078	2,835.50
118	585,912.515	2,452,270.662	2,835.50
119	585,869.690	2,452,247.517	2,835.50
120	585,824.330	2,452,229.909	2,835.50
121	585,610.530	2,452,351.070	2,834.00
122	585,656.097	2,452,331.011	2,834.00
123	585,704.737	2,452,323.074	2,834.00
124	585,753.808	2,452,331.060	2,834.00
125	585,801.830	2,452,344.205	2,834.00
126	585,848.620	2,452,361.186	2,834.00
127	585,896.647	2,452,374.022	2,834.00
128	585,972.997	2,452,344.852	2,834.00
129	585,941.476	2,452,306.964	2,834.00
130	585,901.362	2,452,277.517	2,834.00
131	585,851.813	2,452,251.453	2,834.00
132	585,802.778	2,452,235.203	2,834.00
133	585,751.898	2,452,226.210	2,834.00
134	585,700.279	2,452,224.106	2,834.00
135	585,649.059	2,452,230.524	2,834.00
136	585,600.449	2,452,247.789	2,834.00
137	585,557.731	2,452,276.701	2,834.00
138	585,531.539	2,452,319.053	2,834.00
139	585,570.896	2,452,349.334	2,834.00

CELL WL-1 COORDINATES			
Point	North	East	Elevation
140	585,503.584	2,452,291.840	2,835.50
141	585,545.725	2,452,264.959	2,835.50
142	585,590.069	2,452,241.923	2,835.50
143	585,636.772	2,452,224.253	2,835.50
144	585,685.832	2,452,215.109	2,835.50
145	585,735.777	2,452,215.161	2,835.50
146	585,785.408	2,452,220.885	2,835.50
147	585,931.081	2,452,338.953	2,832.00
148	585,882.948	2,452,330.631	2,832.00
149	585,836.930	2,452,314.195	2,832.00
150	585,790.249	2,452,299.704	2,832.00
151	585,742.771	2,452,288.072	2,832.00
152	585,694.217	2,452,283.403	2,832.00
153	585,647.120	2,452,295.060	2,832.00
154	585,602.064	2,452,313.965	2,832.00
155	585,571.793	2,452,291.296	2,832.00
156	585,607.972	2,452,258.875	2,832.00
157	585,653.077	2,452,240.742	2,832.00
158	585,936.973	2,452,316.686	2,832.00
159	585,896.585	2,452,287.927	2,832.00
160	585,853.612	2,452,263.299	2,832.00
161	585,806.961	2,452,246.637	2,832.00
162	585,758.271	2,452,237.425	2,832.00
163	585,708.787	2,452,234.613	2,832.00
164	585,946.158	2,452,377.984	2,834.00
165	585,943.733	2,452,387.680	2,835.50
166	585,894.307	2,452,382.583	2,835.50

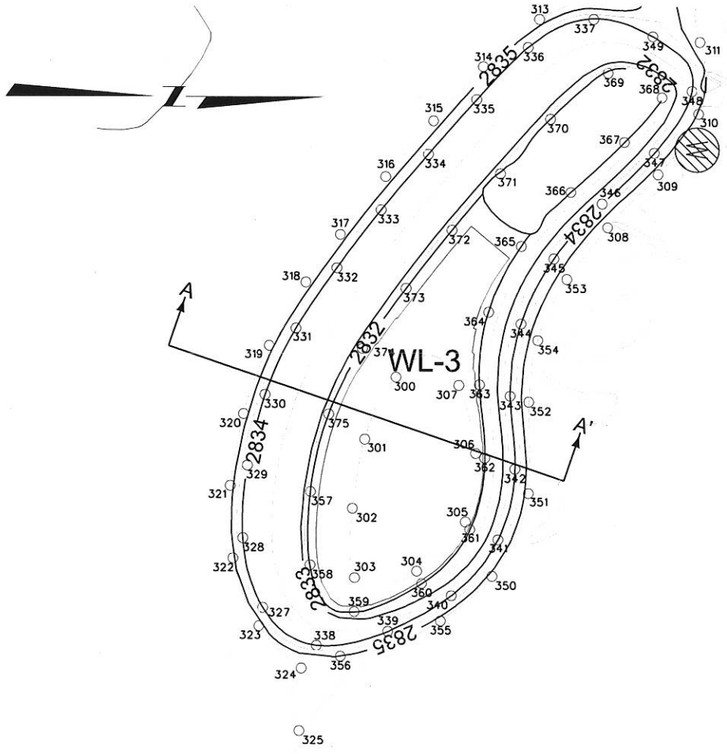
CELL WL-2 COORDINATES			
Point	North	East	Elevation
208	586,097.595	2,452,455.275	2,834.00
209	586,065.218	2,452,417.198	2,834.00
210	586,027.997	2,452,383.959	2,834.00
211	585,997.391	2,452,403.284	2,834.00
212	585,996.678	2,452,453.266	2,834.00
213	585,998.591	2,452,503.215	2,834.00
214	586,005.439	2,452,552.705	2,834.00
215	586,017.993	2,452,601.053	2,834.00
216	586,041.126	2,452,645.064	2,834.00
217	586,079.410	2,452,675.689	2,834.00
218	586,116.305	2,452,648.571	2,834.00
219	586,132.071	2,452,593.386	2,834.00
220	586,133.964	2,452,540.018	2,834.00
221	586,118.987	2,452,489.014	2,834.00
222	586,112.157	2,452,679.723	2,835.50
223	586,129.592	2,452,632.875	2,835.50
224	586,141.359	2,452,584.452	2,835.50

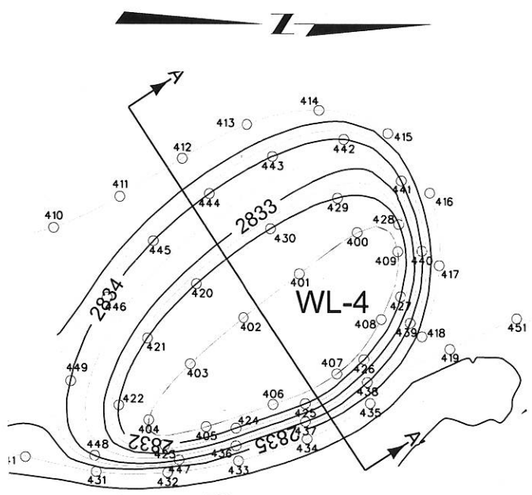
CELL WL-2 COORDINATES			
Point	North	East	Elevation
225	586,140.334	2,452,534.579	2,835.50
226	586,127.047	2,452,486.737	2,835.50
227	586,099.559	2,452,445.068	2,835.50
228	586,067.033	2,452,407.122	2,835.50
229	585,987.975	2,452,472.757	2,835.50
230	585,991.996	2,452,522.577	2,835.50
231	586,000.510	2,452,571.834	2,835.50
232	586,015.316	2,452,619.533	2,835.50
233	586,042.059	2,452,661.405	2,835.50
234	585,987.297	2,452,432.766	2,835.50
235	585,987.384	2,452,382.783	2,835.50
236	586,030.807	2,452,373.810	2,835.50
237	586,021.049	2,452,494.624	2,832.00
238	586,027.128	2,452,543.930	2,832.00
239	586,039.032	2,452,592.160	2,832.00
240	586,061.228	2,452,636.395	2,832.00
241	586,101.616	2,452,655.918	2,832.00
242	586,120.973	2,452,610.642	2,832.00
243	586,127.612	2,452,561.483	2,832.00
244	586,120.830	2,452,512.476	2,832.00
245	586,097.172	2,452,468.927	2,832.00
246	586,065.736	2,452,430.444	2,832.00
247	586,028.725	2,452,398.284	2,832.00
248	586,019.637	2,452,434.922	2,832.00

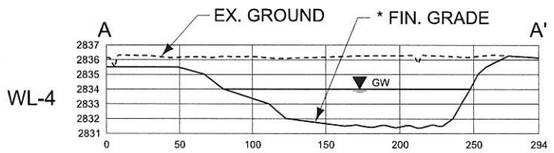
* FINISHED GRADE ELEVATIONS DO NOT INCLUDE TOPSOIL PLACEMENT. ROUGHEN AND UNDULATE THE BOTTOM.

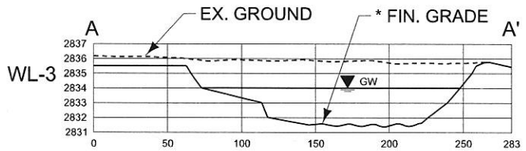
3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\7286000enplp001.dgn	DESIGNED BY	LOUISE STONER	10/24/2014	WETLAND PLANS	WS #14 AQUATIC MITIGATION	PROJECT NO. STPX STWD (56)
2		6/10/2015	REVIEWED BY	WADE SALYARDS, PE	3/18/2015			
1		11:44:52 AM CPS - U2623	CHECKED BY			BIG HORN COUNTY	CSF = 0.99946705 UPN 7286000	SHEET 10 OF 15

NOTE: GW DESIGNATES DESIGN HIGH WATER ELEVATION.
FOR INFORMATIONAL PURPOSES ONLY.









CELL WL-4 COORDINATES			
Point	North	East	Elevation
400	585,641.446	2,453,239.196	2,831.50
401	585,602.429	2,453,267.291	2,831.50
402	585,564.581	2,453,296.996	2,831.50
403	585,528.112	2,453,328.355	2,831.50
404	585,499.686	2,453,366.445	2,831.50
405	585,538.898	2,453,371.092	2,831.50
406	585,584.583	2,453,356.024	2,831.50
407	585,627.679	2,453,335.177	2,831.50
408	585,657.671	2,453,298.180	2,831.50
409	585,668.948	2,453,252.110	2,831.50
410	585,434.708	2,453,235.881	2,835.50
411	585,479.902	2,453,214.683	2,835.50
412	585,522.736	2,453,188.900	2,835.50
413	585,567.031	2,453,165.842	2,835.50
414	585,615.755	2,453,156.304	2,835.50
415	585,662.278	2,453,171.991	2,835.50
416	585,690.712	2,453,212.381	2,835.50
417	585,697.129	2,453,261.625	2,835.50
418	585,685.221	2,453,309.916	2,835.50
419	585,704.316	2,453,318.444	2,835.50
420	585,532.337	2,453,273.979	2,832.00
421	585,498.873	2,453,310.974	2,832.00
422	585,479.024	2,453,356.372	2,832.00
423	585,510.609	2,453,383.519	2,832.00
424	585,559.189	2,453,372.154	2,832.00
425	585,606.325	2,453,355.489	2,832.00
426	585,645.879	2,453,325.483	2,832.00
427	585,670.761	2,453,282.719	2,832.00
428	585,669.658	2,453,233.703	2,832.00
429	585,628.226	2,453,215.869	2,832.00
430	585,583.010	2,453,236.699	2,832.00
431	585,463.545	2,453,401.695	2,835.50
432	585,512.521	2,453,402.318	2,835.50
433	585,560.898	2,453,394.409	2,835.50
434	585,607.581	2,453,379.447	2,835.50
435	585,650.087	2,453,355.275	2,835.50
436	585,559.197	2,453,384.108	2,834.00
437	585,606.431	2,453,367.724	2,834.00
438	585,648.161	2,453,340.905	2,834.00
439	585,677.231	2,453,300.684	2,834.00
440	585,685.264	2,453,251.835	2,834.00
441	585,671.293	2,453,204.130	2,834.00
442	585,632.530	2,453,176.008	2,834.00
443	585,584.371	2,453,187.578	2,834.00
444	585,541.269	2,453,212.779	2,834.00
445	585,502.967	2,453,244.837	2,834.00
446	585,471.151	2,453,283.309	2,834.00
447	585,520.434	2,453,393.738	2,834.00
448	585,462.496	2,453,390.689	2,834.00
449	585,446.214	2,453,339.987	2,834.00
450	585,798.461	2,453,285.614	2,835.50
451	585,749.827	2,453,297.738	2,835.50

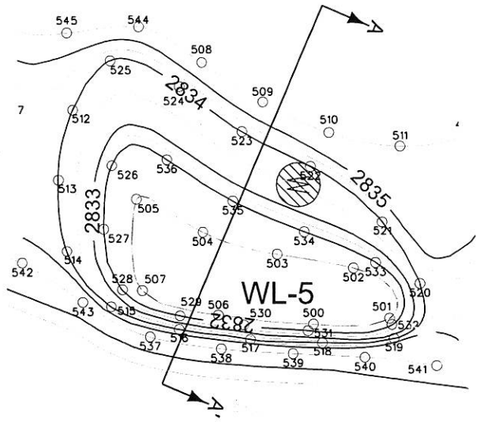
CELL WL-3 COORDINATES			
Point	North	East	Elevation
300	585,900.228	2,452,955.499	2,831.50
301	585,879.003	2,452,997.754	2,831.50
302	585,870.578	2,453,044.713	2,831.50
303	585,872.037	2,453,091.883	2,831.50
304	585,914.009	2,453,087.394	2,831.50
305	585,947.192	2,453,053.971	2,831.50
306	585,954.230	2,453,007.431	2,831.50
307	585,942.865	2,452,961.154	2,831.50
308	586,043.729	2,452,853.901	2,835.50
309	586,078.385	2,452,817.883	2,835.50
310	586,106.260	2,452,776.843	2,835.50
311	586,107.302	2,452,728.012	2,835.50
312	586,044.665	2,452,697.103	2,835.50
313	585,997.714	2,452,712.328	2,835.50
314	585,959.734	2,452,744.612	2,835.50
315	585,925.941	2,452,781.459	2,835.50
316	585,893.376	2,452,819.396	2,835.50
317	585,862.491	2,452,858.710	2,835.50
318	585,839.128	2,452,891.171	2,835.50
319	585,814.331	2,452,934.138	2,835.50
320	585,796.840	2,452,980.528	2,835.50
321	585,787.942	2,453,029.326	2,835.50
322	585,789.712	2,453,078.747	2,835.50
323	585,807.101	2,453,124.810	2,835.50
324	585,835.762	2,453,153.499	2,835.50
325	585,834.156	2,453,195.935	2,835.50

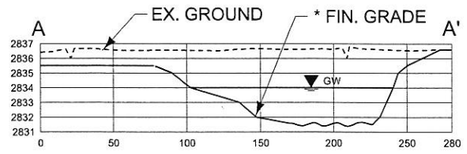
CELL WL-3 COORDINATES			
Point	North	East	Elevation
326	585,824.724	2,453,243.721	2,835.50
327	585,809.804	2,453,112.249	2,834.00
328	585,796.300	2,453,064.947	2,834.00
329	585,799.488	2,453,015.529	2,834.00
330	585,811.521	2,452,967.434	2,834.00
331	585,832.285	2,452,922.450	2,834.00
332	585,860.140	2,452,881.396	2,834.00
333	585,890.288	2,452,841.984	2,834.00
334	585,922.395	2,452,804.148	2,834.00
335	585,955.291	2,452,766.992	2,834.00
336	585,989.953	2,452,731.563	2,834.00
337	586,034.537	2,452,712.306	2,834.00
338	585,845.992	2,453,137.936	2,834.00
339	585,894.310	2,453,128.355	2,834.00
340	585,937.592	2,453,104.025	2,834.00
341	585,969.088	2,453,066.042	2,834.00
342	585,980.547	2,453,018.012	2,834.00
343	585,977.340	2,452,968.383	2,834.00
344	585,984.793	2,452,919.387	2,834.00
345	586,007.220	2,452,875.149	2,834.00
346	586,039.984	2,452,837.806	2,834.00
347	586,075.825	2,452,803.308	2,834.00
348	586,101.691	2,452,761.366	2,834.00
349	586,074.918	2,452,724.099	2,834.00
350	585,965.008	2,453,090.889	2,835.50

CELL WL-3 COORDINATES			
Point	North	East	Elevation
351	585,989.677	2,453,034.593	2,835.50
352	585,990.030	2,452,972.459	2,835.50
353	586,016.000	2,452,889.071	2,835.50
354	585,996.218	2,452,930.557	2,835.50
355	585,930.206	2,453,121.222	2,835.50
356	585,862.281	2,453,145.350	2,835.50
357	585,842.058	2,453,033.402	2,832.00
358	585,841.739	2,453,083.237	2,832.00
359	585,871.755	2,453,115.016	2,832.00
360	585,917.340	2,453,095.828	2,832.00
361	585,950.065	2,453,059.058	2,832.00
362	585,960.209	2,453,010.542	2,832.00
363	585,956.820	2,452,960.699	2,832.00
364	585,963.073	2,452,911.383	2,832.00
365	585,985.096	2,452,866.772	2,832.00
366	586,018.769	2,452,829.988	2,832.00
367	586,055.381	2,452,795.948	2,832.00
368	586,081.170	2,452,765.670	2,832.00
369	586,044.289	2,452,749.004	2,832.00
370	586,005.046	2,452,780.206	2,832.00
371	585,971.051	2,452,817.392	2,832.00
372	585,938.406	2,452,855.770	2,832.00
373	585,907.136	2,452,895.275	2,832.00
374	585,877.567	2,452,936.062	2,832.00
375	585,854.449	2,452,980.692	2,832.00

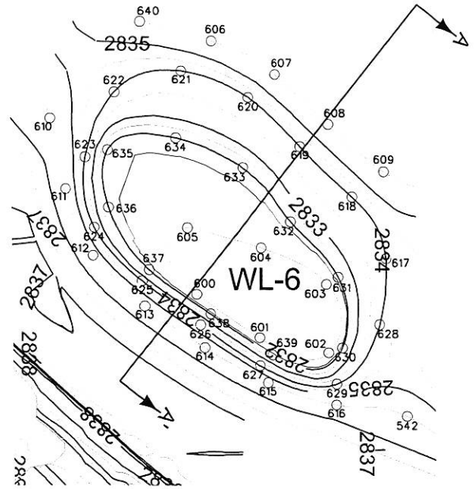
* FINISHED GRADE ELEVATIONS DO NOT INCLUDE TOPSOIL PLACEMENT. ROUGHEN AND UNDULATE THE BOTTOM.

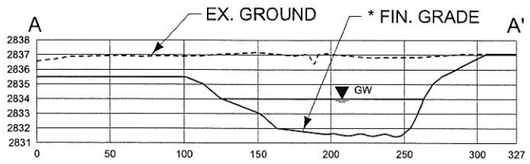
3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\7286000enplp001.dgn	DESIGNED BY	LOUISE STONER	10/24/2014	WETLAND PLANS	WS #14 AQUATIC MITIGATION / PROJECT NO. STPX STWD (56)
2		6/10/2015	REVIEWED BY	WADE SALYARDS, PE	3/18/2015		
1		11:45:00 AM CPS - U2623	CHECKED BY			BIG HORN COUNTY	CSF = 0.99946705 / UPN 7286000 / SHEET 11 OF 15



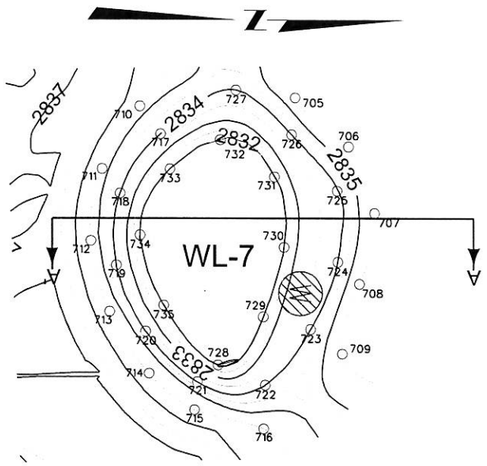


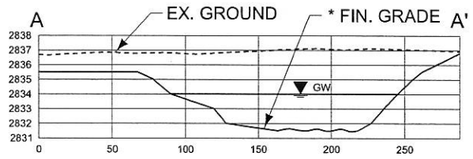
CELL WL-5 COORDINATES			
Point	North	East	Elevation
500	585,331.746	2,453,363.651	2,831.50
501	585,383.760	2,453,359.472	2,831.50
502	585,359.181	2,453,325.499	2,831.50
503	585,307.091	2,453,316.222	2,831.50
504	585,256.589	2,453,301.213	2,831.50
505	585,211.474	2,453,278.838	2,831.50
506	585,267.041	2,453,357.501	2,831.50
507	585,215.201	2,453,340.974	2,831.50
508	585,256.258	2,453,185.555	2,835.50
509	585,297.831	2,453,212.556	2,835.50
510	585,342.748	2,453,233.386	2,835.50
511	585,391.311	2,453,242.382	2,835.50
512	585,168.027	2,453,218.245	2,834.00
513	585,158.110	2,453,265.967	2,834.00
514	585,163.743	2,453,314.363	2,834.00
515	585,193.961	2,453,351.997	2,834.00
516	585,240.237	2,453,367.281	2,834.00
517	585,288.818	2,453,374.098	2,834.00
518	585,337.801	2,453,376.350	2,834.00
519	585,386.621	2,453,373.286	2,834.00
520	585,404.341	2,453,335.736	2,834.00
521	585,378.856	2,453,294.083	2,834.00
522	585,330.065	2,453,256.524	2,834.00
523	585,283.451	2,453,232.772	2,834.00
524	585,241.073	2,453,202.119	2,834.00
525	585,193.915	2,453,184.603	2,834.00
526	585,194.680	2,453,256.059	2,832.00
527	585,188.872	2,453,299.358	2,832.00
528	585,201.599	2,453,340.463	2,832.00
529	585,240.893	2,453,358.085	2,832.00
530	585,284.347	2,453,364.213	2,832.00
531	585,328.043	2,453,368.123	2,832.00
532	585,385.200	2,453,363.660	2,832.00
533	585,374.278	2,453,321.685	2,832.00
534	585,325.710	2,453,300.832	2,832.00
535	585,277.100	2,453,280.033	2,832.00
536	585,232.284	2,453,251.940	2,832.00
537	585,220.440	2,453,372.391	2,835.50
538	585,268.802	2,453,380.440	2,835.50
539	585,317.768	2,453,383.741	2,835.50
540	585,366.793	2,453,386.082	2,835.50
541	585,415.524	2,453,391.613	2,835.50
542	585,133.236	2,453,322.288	2,835.50
543	585,174.460	2,453,349.099	2,835.50
544	585,213.579	2,453,161.230	2,835.50
545	585,164.321	2,453,165.553	2,835.50





CELL WL-6 COORDINATES			
Point	North	East	Elevation
600	584,989.793	2,453,239.741	2,831.50
601	585,032.502	2,453,269.142	2,831.50
602	585,079.779	2,453,279.326	2,831.50
603	585,078.198	2,453,232.906	2,831.50
604	585,033.535	2,453,208.086	2,831.50
605	584,983.503	2,453,194.624	2,831.50
606	584,999.935	2,453,067.330	2,835.50
607	585,043.403	2,453,090.116	2,835.50
608	585,079.489	2,453,124.120	2,835.50
609	585,117.167	2,453,156.274	2,835.50
610	584,890.669	2,453,120.069	2,835.50
611	584,901.275	2,453,168.149	2,835.50
612	584,919.899	2,453,213.416	2,835.50
613	584,954.802	2,453,247.870	2,835.50
614	584,995.260	2,453,275.915	2,835.50
615	585,038.336	2,453,299.704	2,835.50
616	585,085.070	2,453,314.704	2,835.50
617	585,118.766	2,453,215.349	2,834.00
618	585,095.607	2,453,173.443	2,834.00
619	585,060.451	2,453,139.229	2,834.00
620	585,024.767	2,453,105.667	2,834.00
621	584,979.426	2,453,087.955	2,834.00
622	584,934.524	2,453,102.247	2,834.00
623	584,914.657	2,453,146.487	2,834.00
624	584,920.811	2,453,194.328	2,834.00
625	584,953.262	2,453,230.659	2,834.00
626	584,992.222	2,453,260.498	2,834.00
627	585,032.817	2,453,288.034	2,834.00
628	585,114.476	2,453,260.082	2,834.00
629	585,085.366	2,453,300.554	2,834.00
630	585,089.048	2,453,276.055	2,832.00
631	585,086.136	2,453,227.931	2,832.00
632	585,054.002	2,453,190.299	2,832.00
633	585,020.944	2,453,153.552	2,832.00
634	584,975.794	2,453,133.520	2,832.00
635	584,929.990	2,453,141.654	2,832.00
636	584,930.640	2,453,180.746	2,832.00
637	584,957.853	2,453,223.140	2,832.00
638	584,999.109	2,453,252.926	2,832.00
639	585,041.729	2,453,280.773	2,832.00
640	584,952.130	2,453,054.171	2,835.50



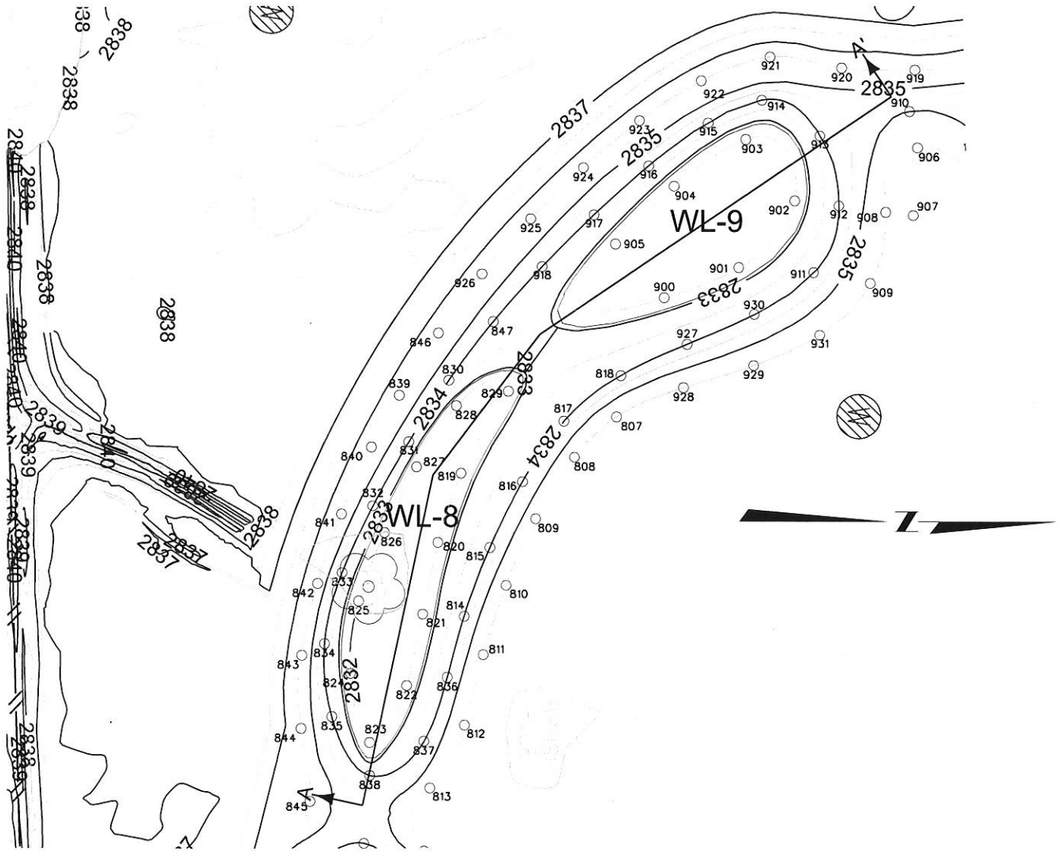


CELL WL-7 COORDINATES			
Point	North	East	Elevation
705	584,886.033	2,452,855.717	2,835.50
706	584,922.279	2,452,889.212	2,835.50
707	584,940.089	2,452,934.393	2,835.50
708	584,929.629	2,452,982.481	2,835.50
709	584,917.928	2,453,029.911	2,835.50
710	584,779.727	2,452,861.483	2,835.50
711	584,754.037	2,452,904.144	2,835.50
712	584,746.261	2,452,953.017	2,835.50
713	584,758.975	2,453,001.121	2,835.50
714	584,785.736	2,453,043.100	2,835.50
715	584,816.634	2,453,067.898	2,835.50
716	584,864.076	2,453,080.754	2,835.50
717	584,793.618	2,452,880.393	2,834.00
718	584,766.147	2,452,920.739	2,834.00
719	584,763.520	2,452,969.643	2,834.00
720	584,783.330	2,453,014.626	2,834.00
721	584,818.619	2,453,048.860	2,834.00
722	584,865.149	2,453,051.163	2,834.00
723	584,896.411	2,453,013.294	2,834.00
724	584,914.861	2,452,967.595	2,834.00
725	584,914.474	2,452,919.155	2,834.00
726	584,883.464	2,452,880.905	2,834.00
727	584,845.269	2,452,850.484	2,834.00
728	584,832.725	2,453,037.450	2,832.00
729	584,863.889	2,453,004.686	2,832.00
730	584,878.161	2,452,957.488	2,832.00
731	584,871.561	2,452,909.644	2,832.00
732	584,834.457	2,452,884.380	2,832.00
733	584,799.975	2,452,904.251	2,832.00
734	584,779.751	2,452,949.139	2,832.00
735	584,795.577	2,452,996.856	2,832.00

NOTE: GW DESIGNATES DESIGN HIGH WATER ELEVATION.
FOR INFORMATIONAL PURPOSES ONLY.

* FINISHED GRADE ELEVATIONS DO NOT INCLUDE TOPSOIL PLACEMENT. ROUGHEN AND UNDULATE THE BOTTOM.

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\7286000enplp001.dgn	DESIGNED BY	LOUISE STONER	10/24/2014	WETLAND PLANS	
2		6/10/2015	REVIEWED BY	WADE SALYARDS, PE	3/18/2015		WS #14 AQUATIC MITIGATION / PROJECT NO. STPX STWD (56)
1		11:45:07 AM CPS - U2623	CHECKED BY			BIG HORN COUNTY	CSF = 0.99946705 / UPN 7286000 / SHEET 12 OF 15

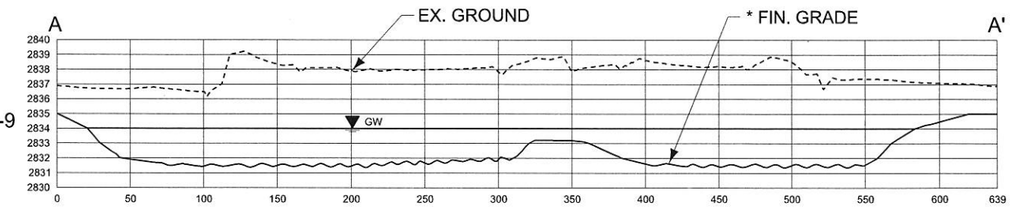


NOTE: GW DESIGNATES DESIGN HIGH WATER ELEVATION.
FOR INFORMATIONAL PURPOSES ONLY.

CELL WL-8 COORDINATES			
Point	North	East	Elevation
807	585,017.344	2,452,560.469	2,835.50
808	584,988.613	2,452,587.941	2,835.50
809	584,962.149	2,452,629.798	2,835.50
810	584,942.030	2,452,675.105	2,835.50
811	584,926.536	2,452,722.229	2,835.50
812	584,913.531	2,452,770.114	2,835.50
813	584,889.966	2,452,812.800	2,835.50
814	584,913.506	2,452,696.176	2,834.00
815	584,931.148	2,452,649.420	2,834.00
816	584,953.253	2,452,604.602	2,834.00
817	584,981.486	2,452,563.444	2,834.00
818	585,020.386	2,452,532.452	2,834.00
819	584,911.587	2,452,598.845	2,832.50
820	584,895.753	2,452,645.981	2,832.50
821	584,885.428	2,452,694.680	2,832.50
822	584,874.341	2,452,743.202	2,832.50
823	584,849.257	2,452,781.942	2,832.50
824	584,836.312	2,452,735.053	2,832.50
825	584,841.929	2,452,685.801	2,832.50
826	584,859.517	2,452,639.281	2,832.50
827	584,881.372	2,452,594.569	2,832.50
828	584,908.469	2,452,552.909	2,832.50
829	584,943.809	2,452,543.140	2,832.50
830	584,903.408	2,452,535.641	2,834.00
831	584,876.128	2,452,577.529	2,834.00
832	584,851.695	2,452,621.140	2,834.00
833	584,830.727	2,452,666.506	2,834.00
834	584,818.774	2,452,714.874	2,834.00
835	584,823.591	2,452,764.406	2,834.00
836	584,901.952	2,452,737.571	2,834.00
837	584,886.029	2,452,781.025	2,834.00
838	584,849.208	2,452,804.383	2,834.00
839	584,869.770	2,452,545.907	2,835.50
840	584,850.765	2,452,581.094	2,835.50
841	584,830.333	2,452,626.706	2,835.50
842	584,814.182	2,452,673.990	2,835.50
843	584,803.539	2,452,722.793	2,835.50
844	584,802.963	2,452,772.515	2,835.50
845	584,808.933	2,452,821.986	2,835.50
846	584,896.335	2,452,503.565	2,835.50
847	584,933.689	2,452,495.873	2,834.00

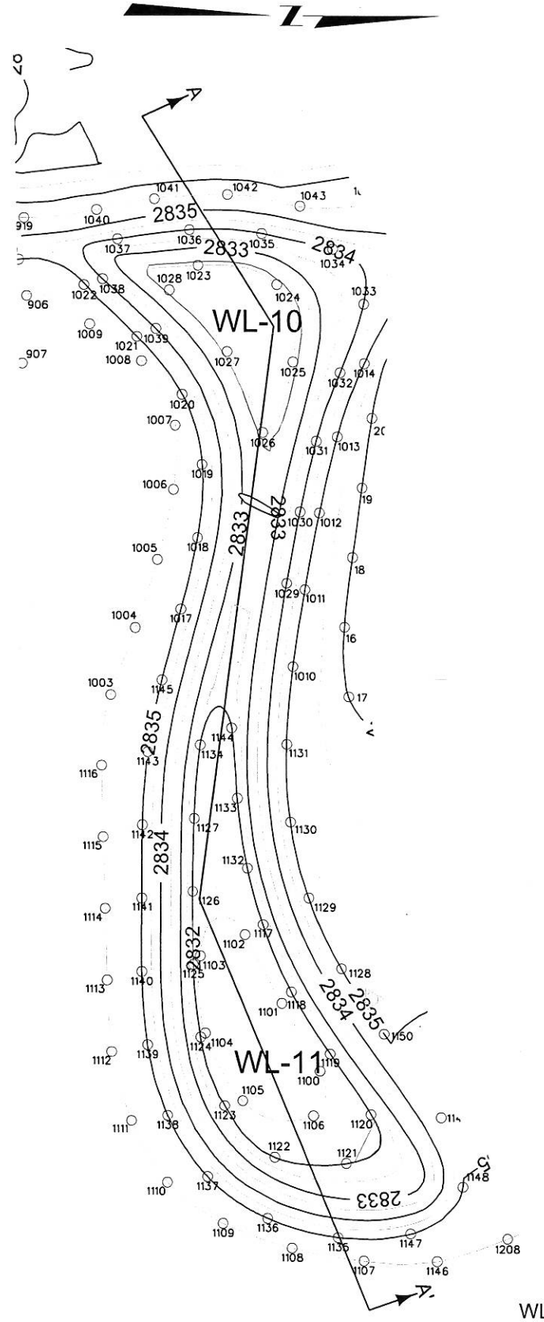
CELL WL-9 COORDINATES			
Point	North	East	Elevation
900	585,050.111	2,452,479.507	2,832.50
901	585,100.744	2,452,459.066	2,832.50
902	585,139.185	2,452,413.658	2,832.50
903	585,105.732	2,452,372.042	2,832.50
904	585,056.935	2,452,403.792	2,832.50
905	585,016.909	2,452,443.084	2,832.50
906	585,223.091	2,452,377.645	2,835.50
907	585,220.094	2,452,423.543	2,835.50
908	585,201.319	2,452,421.373	2,835.50
909	585,190.779	2,452,469.635	2,835.50
910	585,217.774	2,452,352.968	2,835.00
911	585,151.974	2,452,462.270	2,834.00
912	585,169.480	2,452,417.035	2,834.00
913	585,156.581	2,452,369.507	2,834.00
914	585,116.785	2,452,345.270	2,834.00
915	585,080.171	2,452,360.807	2,834.00
916	585,039.728	2,452,390.082	2,834.00
917	585,002.341	2,452,423.262	2,834.00
918	584,966.817	2,452,458.438	2,834.00
919	585,221.536	2,452,324.684	2,835.50
920	585,171.625	2,452,323.344	2,835.50
921	585,122.452	2,452,315.952	2,835.50
922	585,075.476	2,452,332.131	2,835.50
923	585,033.511	2,452,359.191	2,835.50
924	584,995.118	2,452,391.196	2,835.50
925	584,959.196	2,452,425.962	2,835.50
926	584,926.088	2,452,463.403	2,835.50
927	585,065.553	2,452,511.125	2,834.00
928	585,063.005	2,452,540.506	2,835.50
929	585,110.701	2,452,525.521	2,835.50
930	585,111.218	2,452,490.794	2,834.00
931	585,156.120	2,452,504.852	2,835.50

WL-8 & WL-9



* FINISHED GRADE ELEVATIONS DO NOT INCLUDE TOPSOIL PLACEMENT. ROUGHEN AND UNDULATE THE BOTTOM.

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\7286000enplp002.dgn	DESIGNED BY	LOUISE STONER	10/24/2014	WETLAND PLANS		WS #14 AQUATIC MITIGATION / PROJECT NO. STPX STWD (56)
2		6/10/2015	REVIEWED BY	WADE SALYARDS, PE	3/18/2015			
1		11:45:30 AM CPS - U2623	CHECKED BY			BIG HORN COUNTY		CSF = 0.99946705 / UPN 7286000 / SHEET 13 OF 15

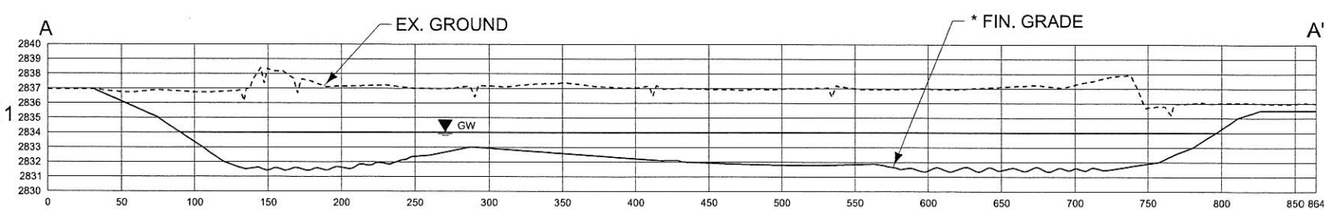


NOTE: GW DESIGNATES DESIGN HIGH WATER ELEVATION.
FOR INFORMATIONAL PURPOSES ONLY.

CELL WL-10 COORDINATES			
Point	North	East	Elevation
1000	585,395.364	2,452,409.205	2,831.50
1001	585,364.513	2,452,367.915	2,831.50
1002	585,372.224	2,452,405.894	2,831.50
1003	585,301.027	2,452,421.705	2,835.50
1004	585,266.115	2,452,396.768	2,835.50
1005	585,453.059	2,452,423.514	2,835.50
1006	585,298.043	2,452,405.151	2,835.50
1007	585,262.331	2,452,370.103	2,835.50
1008	585,340.115	2,452,356.846	2,835.50
1009	585,393.535	2,452,369.832	2,835.50
1010	585,404.362	2,452,422.473	2,835.00
1011	585,359.475	2,452,415.454	2,835.00
1012	585,320.295	2,452,373.675	2,835.00
1013	585,436.536	2,452,429.723	2,835.00
1014	585,452.733	2,452,383.060	2,835.00
1015	585,431.692	2,452,345.824	2,835.00
1017	585,327.496	2,452,590.583	2,835.00
1018	585,339.127	2,452,541.923	2,835.00
1019	585,342.353	2,452,492.149	2,835.00
1020	585,328.755	2,452,444.449	2,835.00
1021	585,298.043	2,452,405.151	2,835.00
1022	585,262.331	2,452,370.103	2,835.00
1023	585,340.115	2,452,356.846	2,832.50
1024	585,393.535	2,452,369.832	2,832.50
1025	585,404.362	2,452,422.473	2,832.50
1026	585,383.588	2,452,470.462	2,832.50
1027	585,359.475	2,452,415.454	2,832.50
1028	585,320.295	2,452,373.675	2,832.50
1029	585,399.622	2,452,573.017	2,834.00
1030	585,408.869	2,452,524.444	2,834.00
1031	585,420.041	2,452,476.280	2,834.00
1032	585,436.536	2,452,429.723	2,834.00
1033	585,452.733	2,452,383.060	2,834.00
1034	585,431.692	2,452,345.824	2,834.00
1035	585,383.386	2,452,335.294	2,834.00
1036	585,334.140	2,452,332.684	2,834.00
1037	585,285.089	2,452,338.875	2,834.00
1038	585,274.878	2,452,366.035	2,834.00
1039	585,311.001	2,452,399.796	2,834.00
1040	585,271.107	2,452,319.041	2,835.50
1041	585,310.360	2,452,311.617	2,835.50
1042	585,360.223	2,452,308.701	2,835.50
1043	585,409.439	2,452,316.541	2,835.50
1044	585,458.819	2,452,313.355	2,835.50

CELL WL-11 COORDINATES			
Point	North	East	Elevation
1100	585,421.552	2,452,905.709	2,831.50
1101	585,395.517	2,452,859.534	2,831.50
1102	585,370.512	2,452,812.781	2,831.50
1103	585,340.172	2,452,827.233	2,831.50
1104	585,343.501	2,452,879.791	2,831.50
1105	585,368.669	2,452,925.896	2,831.50
1106	585,416.941	2,452,936.056	2,831.50
1107	585,451.346	2,453,034.628	2,835.50
1108	585,402.126	2,453,026.034	2,835.50
1109	585,355.113	2,453,009.285	2,835.50
1110	585,317.183	2,452,981.280	2,835.50
1111	585,292.677	2,452,939.215	2,835.50
1112	585,279.340	2,452,892.415	2,835.50
1113	585,276.477	2,452,843.656	2,835.50
1114	585,275.297	2,452,794.806	2,835.50
1115	585,274.003	2,452,745.960	2,835.50
1116	585,273.114	2,452,697.105	2,835.50
1117	585,382.871	2,452,805.923	2,832.00
1118	585,401.994	2,452,851.817	2,832.00
1119	585,428.418	2,452,893.962	2,832.00
1120	585,456.284	2,452,935.196	2,832.00
1121	585,439.358	2,452,968.354	2,832.00
1122	585,390.381	2,452,964.200	2,832.00
1123	585,356.413	2,452,929.246	2,832.00
1124	585,340.294	2,452,882.535	2,832.00
1125	585,335.337	2,452,833.039	2,832.00
1126	585,335.005	2,452,783.269	2,832.00
1127	585,336.256	2,452,733.508	2,832.00
1128	585,436.270	2,452,835.865	2,835.00
1129	585,414.077	2,452,787.604	2,835.00
1130	585,401.806	2,452,735.954	2,835.00
1131	585,399.333	2,452,682.880	2,835.00
1132	585,372.194	2,452,767.407	2,832.00
1133	585,365.475	2,452,719.704	2,832.00
1134	585,340.567	2,452,683.291	2,832.00
1135	585,433.632	2,453,018.809	2,835.00
1136	585,385.486	2,453,005.798	2,835.00
1137	585,344.644	2,452,977.458	2,835.00
1138	585,317.449	2,452,935.734	2,835.00
1139	585,303.818	2,452,887.714	2,835.00
1140	585,299.976	2,452,837.855	2,835.00
1141	585,300.097	2,452,787.811	2,835.00
1142	585,300.664	2,452,737.771	2,835.00
1143	585,304.444	2,452,687.899	2,835.00
1144	585,361.919	2,452,671.646	2,832.00
1145	585,314.419	2,452,638.888	2,835.00
1146	585,501.154	2,453,035.087	2,835.50
1147	585,483.295	2,453,016.267	2,835.00
1148	585,518.526	2,452,984.443	2,835.00
1149	585,503.982	2,452,937.255	2,835.00
1150	585,465.384	2,452,880.383	2,835.00

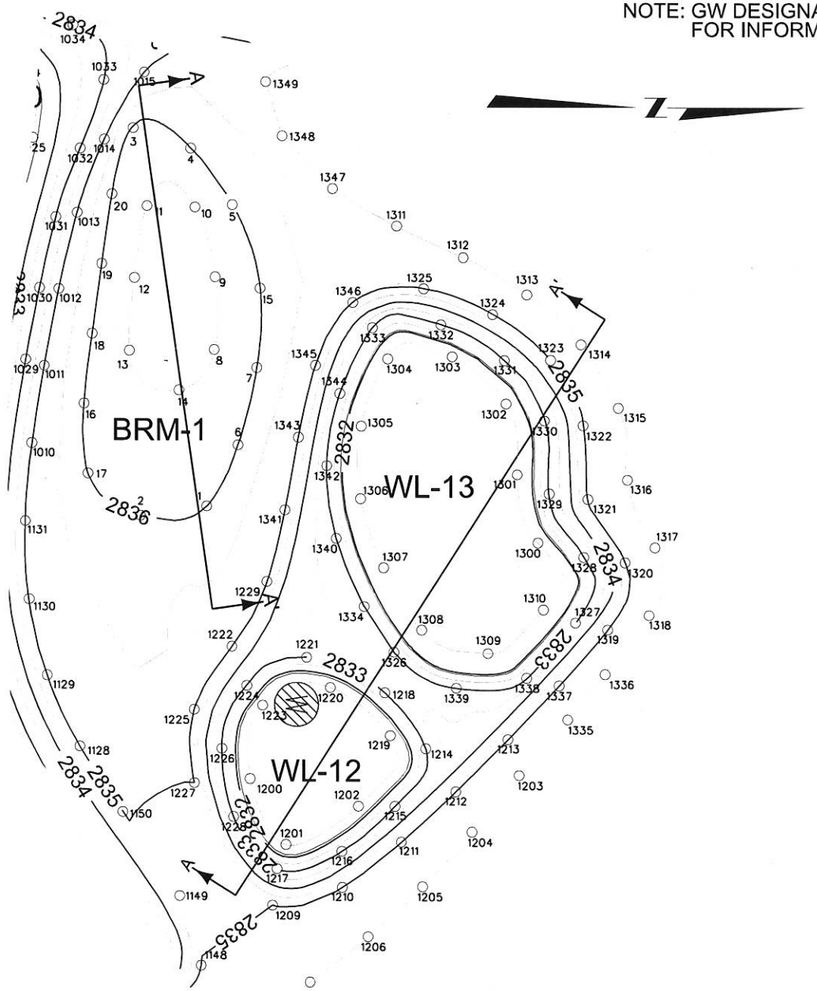
WL-10 & WL-11

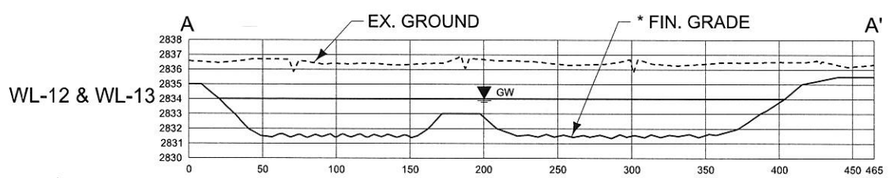


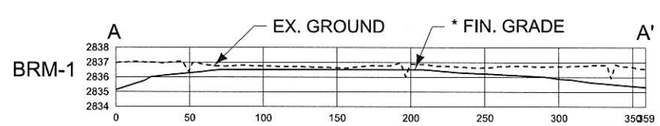
* FINISHED GRADE ELEVATIONS DO NOT INCLUDE TOPSOIL PLACEMENT. ROUGHEN AND UNDULATE THE BOTTOM.

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\7286000enplp002.dgn	DESIGNED BY	LOUISE STONER	10/24/2014	WETLAND PLANS		WS #14 AQUATIC MITIGATION / PROJECT NO. STPX STWD (56)
2		6/10/2015	REVIEWED BY	WADE SALYARDS, PE	3/18/2015			
1		11:45:36 AM CPS - U2623	CHECKED BY			BIG HORN COUNTY		CSF = 0.99946705 / UPN 7286000 / SHEET 14 OF 15

NOTE: GW DESIGNATES DESIGN HIGH WATER ELEVATION.
FOR INFORMATIONAL PURPOSES ONLY.







CELL WL-12 & 13 COORDINATES			
Point	North	East	Elevation
1200	585,551.710	2,452,857.770	2,831.50
1201	585,575.966	2,452,902.503	2,831.50
1202	585,625.179	2,452,876.424	2,831.50
1203	585,733.868	2,452,855.454	2,835.50
1204	585,701.886	2,452,893.886	2,835.50
1205	585,668.384	2,452,930.980	2,835.50
1206	585,631.720	2,452,964.957	2,835.50
1207	585,592.394	2,452,995.817	2,835.50
1208	585,548.676	2,453,019.734	2,835.50
1209	585,566.888	2,452,943.627	2,835.00
1210	585,614.257	2,452,931.498	2,835.00
1211	585,653.976	2,452,900.791	2,835.00
1212	585,690.773	2,452,866.550	2,835.00
1213	585,726.338	2,452,831.027	2,835.00
1214	585,670.515	2,452,837.315	2,833.00
1215	585,649.809	2,452,876.528	2,833.00
1216	585,613.945	2,452,907.062	2,833.00
1217	585,569.950	2,452,918.913	2,833.00
1218	585,643.006	2,452,799.363	2,833.00
1219	585,646.649	2,452,828.472	2,831.50
1220	585,606.259	2,452,795.822	2,831.50
1221	585,590.060	2,452,775.351	2,833.00
1222	585,539.470	2,452,767.891	2,835.00
1223	585,560.230	2,452,807.848	2,831.50
1224	585,549.497	2,452,794.441	2,833.00
1225	585,513.823	2,452,810.791	2,835.00
1226	585,532.649	2,452,837.237	2,833.00
1227	585,513.869	2,452,860.586	2,835.00
1228	585,540.562	2,452,883.555	2,833.00
1229	585,563.106	2,452,723.807	2,835.00
1300	585,746.684	2,452,697.385	2,831.50
1301	585,732.743	2,452,651.069	2,831.50
1302	585,725.228	2,452,602.935	2,831.50
1303	585,688.593	2,452,570.929	2,831.50
1304	585,645.143	2,452,572.368	2,831.50
1305	585,627.220	2,452,618.192	2,831.50
1306	585,626.731	2,452,667.448	2,831.50
1307	585,642.280	2,452,714.425	2,831.50
1308	585,667.799	2,452,756.690	2,831.50
1309	585,712.807	2,452,772.630	2,831.50
1310	585,750.362	2,452,742.943	2,831.50
1311	585,651.121	2,452,482.214	2,835.50
1312	585,696.269	2,452,503.684	2,835.50
1313	585,739.386	2,452,528.860	2,835.50
1314	585,775.798	2,452,562.689	2,835.50
1315	585,801.112	2,452,605.733	2,835.50
1316	585,807.307	2,452,654.656	2,835.50
1317	585,825.981	2,452,700.584	2,835.50
1318	585,821.855	2,452,746.663	2,835.50
1319	585,793.726	2,452,756.478	2,835.00
1320	585,805.625	2,452,710.839	2,835.00
1321	585,780.477	2,452,667.814	2,835.00
1322	585,777.191	2,452,617.689	2,835.00
1323	585,755.360	2,452,573.258	2,835.00
1324	585,716.208	2,452,542.263	2,835.00
1325	585,669.385	2,452,524.815	2,835.00
1326	585,649.072	2,452,771.753	2,833.00
1327	585,771.926	2,452,751.838	2,833.00
1328	585,777.570	2,452,707.201	2,833.00
1329	585,754.363	2,452,664.083	2,833.00
1330	585,751.097	2,452,614.440	2,833.00
1331	585,724.141	2,452,573.488	2,833.00
1332	585,680.985	2,452,549.201	2,833.00
1333	585,634.867	2,452,551.266	2,833.00
1334	585,629.113	2,452,740.797	2,833.00
1335	585,766.606	2,452,817.663	2,835.50
1336	585,792.009	2,452,786.772	2,835.50
1337	585,760.874	2,452,794.503	2,835.00
1338	585,738.963	2,452,789.326	2,833.00
1339	585,691.177	2,452,796.176	2,833.00
1340	585,610.320	2,452,694.479	2,833.00
1341	585,575.425	2,452,675.111	2,835.00
1342	585,603.931	2,452,645.026	2,833.00
1343	585,584.612	2,452,625.690	2,835.00
1344	585,612.768	2,452,595.963	2,833.00
1345	585,596.326	2,452,576.845	2,835.00
1346	585,621.547	2,452,534.150	2,835.00
1347	585,608.041	2,452,456.925	2,835.50
1348	585,573.712	2,452,421.054	2,835.50
1349	585,562.533	2,452,384.268	2,835.50

BERM BRM-1 COORDINATES			
Point	North	East	Elevation
1	585,522.288	2,452,672.581	2,836.00
2	585,477.391	2,452,679.014	2,836.00
3	585,472.484	2,452,415.714	2,836.00
4	585,511.564	2,452,429.542	2,836.00
5	585,539.877	2,452,467.937	2,836.00
6	585,543.718	2,452,630.969	2,836.00
7	585,556.352	2,452,578.442	2,836.00
8	585,527.526	2,452,566.257	2,836.50
9	585,528.184	2,452,516.918	2,836.50
10	585,514.477	2,452,469.504	2,836.50
11	585,481.986	2,452,468.702	2,836.50
12	585,473.363	2,452,517.487	2,836.50
13	585,469.881	2,452,566.954	2,836.50
14	585,503.409	2,452,593.732	2,836.50
15	585,558.653	2,452,524.557	2,835.50
16	585,439.068	2,452,602.880	2,835.50
17	585,441.758	2,452,650.373	2,835.50
18	585,444.643	2,452,555.374	2,835.50
19	585,451.217	2,452,507.983	2,835.50
20	585,458.198	2,452,460.653	2,835.50

* FINISHED GRADE ELEVATIONS DO NOT INCLUDE TOPSOIL PLACEMENT. ROUGHEN AND UNDULATE THE BOTTOM.

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\7286000enplp002.dgn	DESIGNED BY	LOUISE STONER	10/24/2014	WETLAND PLANS	
2		6/10/2015	REVIEWED BY	WADE SALYARDS, PE	5/18/2015		
1		11:45:41 AM CPS - U2623	CHECKED BY			BIG HORN COUNTY	

WS #14 AQUATIC MITIGATION		PROJECT NO. STPX STWD (56)
CSF = 0.99946705	UPN 7286000	SHEET 15 OF 15