MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2015

Silicon Mountain
Silver Bow County, Montana



Prepared for:

MONTANA DEPARTMENT OF TRANSPORTATION

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December 2015

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WETLAND MITIGATION MONITORING REPORT:

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Silicon Mountain
Silver Bow County, Montana
Site-wide Construction: 2014

MDT Project Number MT-STPX 47(24)
Control Number 6044000

Corps #: NWO-2012-01822-MTH
SPA MDT-R2-74-2012

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CCI Project No: MDT.006

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1. INTRODUCTION

The Silicon Mountain Aquatic Resource Mitigation 2015 Monitoring Report presents the results the first year of post-construction monitoring at the Silicon Mountain mitigation area. Butte Silver Bow County (BSBC) and the Montana Department of Transportation (MDT) partnered in 2011 to provide compensatory mitigation for both stream and wetland impacts associated with the BSBC proposed Silicon Mountain Tech Park and Port road realignment project and to serve as a mitigation bank for future transportation projects within Watershed #2 – Upper Clark Fork of the Columbia River.

The MDT Silicon Mountain mitigation project is located south of Interstate I-90 and west of Interstate I-15, approximately five miles west of Butte, MT within Township 3 North, Range 9 West, Section 24 Silver Bow County, Montana (Figure 1). The 50.1-acre site lies within the boundaries of Watershed #2 – Upper Clark Fork of the Columbia River. In 2011, BSBC purchased land Parcels 1 (18.91 acres) and 2 (26.1 acres) from the Ueland family, located north of the new roadway alignment. BCBS partnered with MDT and placed the property under a perpetual conservation easement to protect the wetland and stream resource attributes established and restored within the site. This conservation easement was extended to include approximately 0.96 acres of property previously owned by BCBS, in the immediate vicinity of the new roadway alignment. The MDT secured a construction permit on approximately 2.04 acres of privately owned property south of the realignment project. The construction permit facilitated the relocation and restoration of the Sand Creek channel south of the new roadway for alignment with the new bridge.

This site comprises a diversity of ecosystems, including upland meadow, sagebrush steppe, emergent/scrub-shrub wetland, and riparian. Sand Creek, a small intermittent tributary to Silver Bow Creek, flows for a short duration each year during the spring runoff period and heavy precipitation events. Due to the intermittent flow and severe impacts from past land management practices, the channel exhibits a wide variation of aggradation and degradation characteristics, is deeply incised or loses all channel dimensions in some areas, and flows subsurface for extended reaches. Deeply incised segments and scoured pools retain surface water year round through a connection to elevated groundwater level throughout the project area. In addition to Sand Creek, Parcel 2 receives perennial surface flow from a well defined spring that originates south of the mitigation area and flows north through the parcel into Silver Bow Creek. This spring supports a large emergent/scrub-shrub wetland complex (6.64 acres) in the eastern portion of Parcel 2.

The goals of the mitigation project include preservation, restoration and establishment of wetland, riparian, and upland habitats. Specifically, MDT plans to establish 6.77 acres of emergent and scrub-shrub wetland through the

excavation and creation of six wetland cells; protect the existing 10.06 acres of emergent and scrub-shrub wetland; restore upland, wetland, and riparian areas impacted by the new roadway alignment through seeding and planting of mostly native graminoids, shrubs, and trees; restore and reconstruct approximately 3,250 linear feet of the Sand Creek channel to its historic natural condition; and to relocate and restore approximately 650 linear feet of the Sand Creek channel on privately owned property south of the realignment project.

The project credit ratios for the wetland mitigation within the Silicon Mountain project area are shown in Table 1. BSBC must mitigate for impacts (2.16 acres) from the Silicon Tech Park and Port project at a 2:1 ratio because the mitigation will occur concurrently with the impact. Thus, BSBC needs 4.33 acres of compensatory wetland mitigation credit for the new road alignment project. The remaining wetland and stream mitigation credits generated by this project will be held in reserve for MDT against future highway projects in the Upper Clark Fork Watershed. The proposed wetland mitigation credits generated by this project have been approved by the US Army Corps of Engineers (USACE) and are presented below.

Table 1. Wetland credit determination for the Silicon Mountain mitigation site.

BSBC Permittee-Responsible Credit Summary					
Wetland Number	**Location**	**Mitigation Type**	**Anticipated Acres**	**Crediting Ratio**	**Credits (Acres)**
1	Parcel 1	Establishment	1.57	1:1	1.57
2	Parcel 1	Establishment	1.52	1:1	1.52
6	Parcel 1	Establishment	0.34	1:1	0.34
WL-5	Parcel 1	Preservation	3.1	4:1	0.78
WL-6	Parcel 1	Preservation	0.05	4:1	0.01
WL-7	Parcel 1	Preservation	0.22	4:1	0.06
WL-10	Parcel 2	Preservation	0.05	4:1	0.01
WL-11	Parcel 2	Preservation	0.16	4:1	0.04
				Total	**4.33**
MDT Reserve Credit Summary					
Wetland Number	**Location**	**Mitigation Type**	**Anticipated Acres**	**Creding Ratio**	**Credits (Acres)**
3	Parcel 1	Establishment	0.86	1:1	0.86
4	Parcel 2	Establishment	1.27	1:1	1.27
5	Parcel 2	Establishment	1.21	1:1	1.21
WL-12	Parcel 2	Preservation	0.44	4:1	0.11
WL-13	Parcel 2	Preservation	6.04	4:1	1.51
	Both Parcels	Upland Buffer	10.8	5:1	2.16
				Total	7.12

The construction of the Silicon Mountain mitigation project was authorized under the authority of Section 404 of the Clean Water Act via permit NWO-2012-01822-MTH and in accordance with Montana Department of Fish, Wildlife, and Parks (FWP) Preconstruction Stream Protection Act (SPA) # MDT-R2-74-2012. The MDT anticipates the development of 11.45 wetland credit acres from the Silicon Mountain wetland and stream restoration project. The plan included establishment, preservation, upland buffer, and restoration credits. The entire Silicon Mountain mitigation project encompassed the creation (establishment) of emergent and scrub-shrub wetland cells, preservation of existing emergent and scrub-shrub wetland, creation of an upland buffer around all existing and created wetlands, and restoration of the Sand Creek channel. The crediting objectives of the Silicon Mountain stream and wetland restoration project include the following:

Wetland Mitigation

- **Establishment:** Create 6.77 credit acres through the excavation of six wetland cells, including three on Parcel 1, two on Parcel 2, and one small cell west of the railroad tracks. Wetland establishment in Cells 1, 2, and 6, totaling 3.43 credit acres, will be credited to BSBC for mitigating impacts from the new road alignment, while the remaining 3.34 credit acres from Cells 3, 4, and 5 will be held in reserve by MDT. All created wetlands areas will be seeded with a native wetland graminoid seed mix and planted with native willow cuttings and containerized trees and shrubs;
- **Preservation:** Preserve 10.06 acres of existing emergent marsh and scrub-shrub wetland on Parcels 1 and 2. Wetland preservation credits totaling 0.90 acres will be credited to BSBC for mitigating impacts from the new road alignment, while the remaining 1.62 credit acres will be held in reserve by MDT. The existing wetlands south of the new roadway will also be preserved within the easement area, but are not included in the crediting total;
- **Upland Buffer:** Provide approximately 2.16 wetland credit acres through the development of upland buffers, totaling 10.80 acres (at a 5:1 ratio), around the created and preserved wetlands on both parcels. The entire upland buffer credit will be assigned to MDT. The upland buffer areas disturbed during construction will be seeded with an upland seed mix comprising mostly native grass species;
- **Crediting Summary:** Establish an overall total of 11.45 acres of wetland mitigation credits from the proposed project. BSBC will be required to mitigate for impacts (2.16 acres) from the Silicon Tech Park and Port project at a 2:1 ratio as mitigation will occur concurrently with the impact. Thus, BSBC needs 4.33 acres of compensatory wetland

mitigation credit for this project. The remaining 7.12 acres will be held in reserve by MDT; and

Stream Mitigation

- **Restore** approximately 4,400 linear feet of the Sand Creek channel through restoration, relocation, and enhancement of approximately 3,400 linear feet north of the new roadway, and approximately 1,000 linear feet south of the new roadway. Of the 4,400 feet of channel, MDT is seeking credit on 3,900 linear feet. Stream banks and riparian areas along the enhanced Sand Creek channel, both within Parcels 1 and 2 and upstream near the new road alignment, will be seeded with a mostly native riparian graminoid species mix and planted with native shrubs/trees and willow cuttings.
- **Crediting Summary:** The proposed roadway project will impact less than 300 linear feet of the Sand Creek channel and will not likely require mitigation. Thus, all 12,369.5 stream mitigation credits generated from the project will be held in reserve by MDT to offset stream impacts resulting from future highway projects within Watershed # 2 – Upper Clark Fork River basin.

The approved performance standards for the mitigation activities are listed below (MDT 2013).

1. **Wetland Characteristics:** All 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 2010 Regional Supplement to the US Army Corps of Engineers Wetland Delineation Manual for the Western Mountains, Valleys and Coast Region (USACE 2010), as an update to the 1987 method (Environmental Laboratory 1987) that was used to establish baseline wetland conditions at the site.
    a. **Wetland Hydrology Success** will be achieved where wetland hydrology is present as per the technical guidelines in the Regional Supplement to the 1987 US Army Corps of Engineers Wetland Delineation Manual for the Western Mountains, Valleys and Coast Region. Soil saturation will be present for at least 12.5 % of the growing season.
    b. **Hydric Soil Success** will be achieved where hydric soil conditions are present (per the most recent Natural Resource Conservation Service (NRCS) criteria for hydric soils) or appear to be forming, the soil is sufficiently stable to prevent erosion and the soil is able to support plant cover. Since typical hydric soil indicators may require long periods to form, a lack of distinctive hydric soil features

will not be considered a failure if hydrologic and vegetation success is achieved.

c. **Hydrophytic Vegetation Success** will be achieved where combined absolute cover of facultative or wetter species is ≥70% and Montana State-listed noxious weeds do not exceed 10% relative cover. The following concept of "dominance", as defined in the Regional Supplement to the 1987 US Army Corps of Engineers Wetland Delineation Manual for the Western Mountains, Valleys and Coast Region, will be applied during future routine wetland determinations in the created/restored wetlands: *"Subjectively determine the dominant species by estimating those having the largest relative basal area (woody overstory), greatest height (woody understory), greatest percentage of aerial coverage (herbaceous understory) and/or greatest number of stems (woody vines)."*

2. **Channel Restoration Success** will be evaluated in terms of re-vegetation success and reactivation of the historic channel. Due to the ephemeral nature of Sand Creek, success will be judged primarily on the success of re-vegetation and historic channel restoration efforts and the ability of Sand Creek to naturally pass flows in the newly created channel sections and restored sections on Parcels 1 and 2.
    a. Re-vegetation along the new Sand Creek channel corridor will be considered successful when banks are vegetated with a majority of deep-rooting riparian and wetland herbaceous and woody plant species.
    b. The intent of the stream restoration is to allow for the stream to naturally migrate within the floodplain and to give it enough room to move and stabilize itself within the site.
    c. Head cut stabilization sections will be evaluated to ensure measures are working as intended to stop further head cuts upstream.
    d. Bank stabilization sections will be evaluated through yearly inspection to determine stability of these sections in the prevention of wetland cell and stream channel intercept.
3. **Vegetation along the stream banks** will be considered successful when banks are vegetated with a majority of deep-rooting riparian plant species having root stability indexes ≥6 according to Winward (2000).
4. **Open Water:** It is the intent of the project to provide seasonal open water during the early spring and summer within excavated depressions. As the growing season progresses and the groundwater levels recede, it is anticipated that emergent vegetation will germinate within the majority of these depressions. Open water with submerged and floating vegetation is not anticipated at this site but could develop and will therefore be considered creditable.

5. **Upland Buffer Success** will be achieved when noxious weeds do not exceed 10% relative cover within the buffer areas on site. Any area within the creditable buffer area disturbed by the project construction must have at least 50% aerial cover of non-weed species by the end the monitoring period.
6. **Weed Control** will be based upon annual monitoring of the site to determine weed species and degree of infestation within the site, and control measures based upon the monitoring results will be implemented by MDT to minimize and/or eliminate the intrusion of State Listed Noxious weed species within the site. Due to long term grazing and disturbance at this site, weed infestations including spotted knapweed, Canada thistle and leafy spurge are prevalent on the site. Weed control in select areas will be implemented prior to construction to minimize the further spread of noxious weeds. MDT will monitor the wetland and upland areas for noxious weeds as part of our annual wetland monitoring program. Considering the elevated level of existing weed infestation on the site, a goal of 10 percent relative cover is considered obtainable following construction.

The restoration efforts within the Silicon Mountain mitigation site aim to re-establish a naturally sustaining aquatic ecosystem and reinstate the holistic dynamics of the Sand Creek channel and its adjacent habitat. Following site construction and monitoring the Silicon Mountain mitigation project will improve wildlife and fisheries habitat within wetland and riparian areas; improve the diversity of riparian, emergent and scrub-shrub vegetation communities through topographic and hydrologic manipulation and planting; and restore historic wetland and stream functions to the altered landscape within the site.

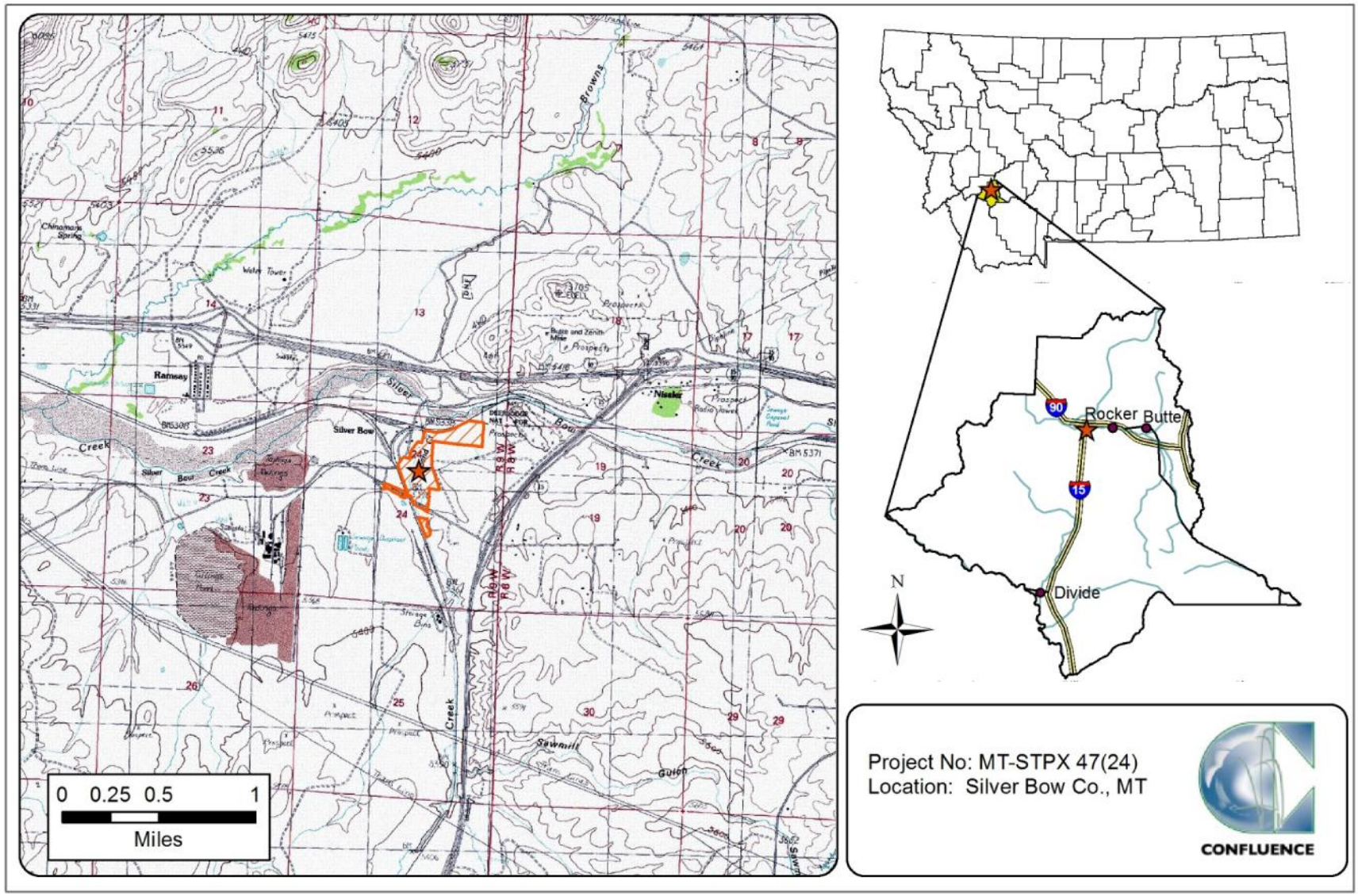


Figure 1. Project location for Silicon Mountain Mitigation Site.

2. METHODS

Set up for the first year of monitoring at the Silicon Mountain aquatic mitigation site was completed on April 29, 2015. During this visit, MDT and Confluence personnel established permanent photo points and vegetation transects within the site. The first annual monitoring event was conducted on June 23, 2015 (wetlands) and August 11, 2015 (streams). Information for the Mitigation Monitoring Form and Wetland Determination Data Forms was recorded during the site investigation (Appendix B). Monitoring activity locations were mapped using a global positioning system (GPS) (Figure 2, Appendix A). Data collection activities included completion of a wetland delineation; wetland/open water/aquatic habitat boundary mapping; vegetation community mapping; vegetation transect monitoring; soils, hydrology, and bird and wildlife use documentation; photograph documentation; stream cross-sections at eight established stations; functional assessments; and a non-engineering examination of the infrastructure established within the mitigation project area.

2.1 Hydrology

The presence of hydrologic indicators as outlined on the Wetland Determination Data Form was assessed at five 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 Form (Appendix B). Hydrologic assessments allow evaluation of mitigation criteria addressing 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 (usually 14 days or 12.5 percent or more during the growing season)" (USACE 2010). Systems with continuous inundation or saturation for greater than 12.5 percent of the growing season are considered wetlands. The growing season is defined for purposes of this report as the number of days where there is a 50 percent probability that the minimum daily temperature is greater than or equal to 28.5 degrees Fahrenheit (Environmental Laboratory 1987). The growing season recorded for the meteorological station at Butte FAA Arpt, Montana (1318), located approximately 10.5 miles east of the project, extends from May 26 to September 13 for a total of 110 days (NRCS 2010). Areas defined as wetlands would require 14 consecutive days of inundation or saturation within 12 inches of the ground surface to meet the hydrology criteria and performance standards.

Soil pits excavated during the wetland delineation were used to evaluate groundwater levels within 18 inches of the ground surface. The data were recorded on the Wetland Determination data form (Appendix B).

2.2 Vegetation

The boundaries of dominant species-based vegetation communities were determined in the field during the active growing season and subsequently

delineated on the 2015 aerial photographs. Community types were named based on the predominant vegetation species that characterized each mapped polygon (Figure 3, Appendix A). Percent cover of all species within a community type was estimated and recorded on the monitoring form using the following classification values: 0 (less than 1 percent), 1 (1 to 5 percent), 2 (6 to 10 percent), 3 (11 to 20 percent), 4 (21 to 50 percent), and 5 (greater than 50 percent) (Appendix B).

Temporal changes in vegetation were evaluated through annual assessments of static belt transects established in 2015 (Figure 2, Appendix A). Vegetation composition was assessed and recorded along two approximately 10-foot wide belt transects, 564 feet long (T-1) and 219 feet long (T-2) (Figure 2, Appendix A). The transect endpoint locations were recorded with a resource-grade GPS unit. Spatial changes in the vegetation communities were recorded along the stationed transects. The percent aerial cover of each plant species within the belt transects were estimated using the same cover classes listed above (Appendix B). Photographs were taken at the endpoints of each transect during the monitoring event (Appendix C)

The Montana State Noxious Weed List (July 2015), prepared by the Montana Department of Agriculture, was used to categorize weeds identified within the site. The location of noxious weeds was noted in the field and mapped on the aerial photo (Figure 3, Appendix B). The noxious weed species identified are color-coded. The locations are denoted with the symbol "**x**", "▲", or "■" representing 0 to 0.1 acre, 0.1 to 1.0 acre, or greater than 1 acre in extent, respectively. Cover classes are represented on Figure 3 (Appendix A) by T, L, M, or H, for less than 1 percent, 1 to 5 percent, 6 to 25 percent, and 26 to 100 percent, respectively.

2.3 Soil

Soil information was obtained from the *Soil Survey for Silver Bow County Area* (USDA 2014) and *in situ* soil descriptions. Soil cores were excavated using a shovel and evaluated according to procedures outlined in the 1987 Manual and 2010 Regional Supplement. A description of the soil profile, including hydric indicators when present, was recorded on the Wetland Determination Data form for each profile (Appendix B).

2.4 Wetland Delineation

Waters of the U.S. including jurisdictional wetlands and special aquatic sites were delineated throughout the project area in accordance with criteria established in the 1987 Manual and the 2010 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (USACE 2010). 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 2014 National Wetland Plant List (NWPL) (Lichvar et al. 2014). Following USACE guidance, the 2014

NWPL scientific and common plant names were used in this report. 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 on the Wetland Determination Data Form (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 a special aquatic site, an atypical situation, or a problem area. The wetland boundary was surveyed using a resource-grade GPS unit and imported into Geographic Information System (GIS) format. Wetland areas were calculated using GIS spatial quantification methodology.

2.5 Wildlife

Observations of use by mammal, reptile, amphibian, and bird species were recorded on the Mitigation Monitoring form during the site visit. Indirect use indicators, including tracks, scat, burrows, eggshells, skins, feathers, 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 wildlife species list for the entire site is maintained and reported each year.

2.6 Functional Assessment

The 2008 MDT Montana Wetland Assessment Method (MWAM) was used to evaluate functions and values on the site during the 2015 site visit. This method provides an objective means of assigning wetlands an overall rating and provides regulators 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. Wetland Assessment Forms were completed for two separate assessment areas (AA) within the mitigation site (Appendix B).

2.7 Photo Documentation

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

2.8 Stream Monitoring

2.8.1 Channel Cross-Sections

The Silicon Mountain monitoring plan required the establishment of at a minimum, one transect per 1,000 feet of assessed stream reach, for the purpose of monitoring channel form and function, natural channel migration, channel vertical stability (down-cutting), sediment build-up, and stream bank vegetation development. The mitigation plan included relocating, restoring, or enhancing approximately 4,400 linear feet of Sand Creek; therefore a minimum of four transects were necessary for monitoring purposes. Eight monitoring cross sections were established within the project reach to document conditions in each of the relocation, restoration, and enhancement reaches of Sand Creek as outlined in Table 2.

Table 2. Monitoring cross sections established at the Silicon Mountain Mitigation Site in 2015.

Monitoring Cross Section	Mitigation Action	Habitat Type
1	Relocation / Restoration	Pool
2	Relocation / Restoration	Riffle
3	Restoration of historic channel	Stabilized Pool
4	Restoration of historic channel	Stabilized Pool
5	Restoration of historic channel	Riffle
6	Restoration of historic channel	Stabilized Pool
7	Enhancement of existing channel	Riffle
8	Enhancement of existing channel	Riffle

Endpoints of each cross section were marked with wooden stakes and flagging to facilitate location of cross-sections during summer months when vegetation cover is high. Each cross section was surveyed using a survey-grade global positioning system (GPS) with a base station established on site to improve accuracy.

2.8.2 Parallel Vegetation Belt Transects

Belt transects were established parallel to the stream at each of the monitoring cross sections to document riparian vegetation development and community diversity within the streamside and buffer areas. The parallel belt transects were 5 feet wide and extended 12.5 feet upstream and downstream of each cross section for a total length of 25 feet. Belt transects were established on both sides of the channel. The vegetation inventory at each transect included compiling a list of all planted, seeded, and volunteer species observed, and assigning a cover class to each species. Percent cover of all species within each belt transect was estimated and recorded using the following classification values: 0 (less than 1 percent), 1 (1 to 5 percent), 2 (6 to 10 percent), 3 (11 to 20 percent), 4 (21 to 50 percent), and 5 (greater than 50 percent). Vegetation community types were

assigned to each belt transect based on one or more dominant species observed. Bank stability indices were assigned to the stream bank community types using Winward (2000) stability scores.

2.8.3 Documentation of High Water Events

Stream monitoring included documentation of high water event observations located in the adjacent floodplain. Any debris, drift lines, or sediment deposition beyond the active channel was photo-documented.

2.8.4 Inspection of Stabilized Headcuts

Stream monitoring also included inspection of two stabilized headcuts located between constructed wetland cell 1 and the restored Sand Creek channel. Inspection of these headcuts included photo-documentation at each stabilized area.

2.8.5 Inspection of Stabilized Banks

In an attempt to maintain bank stability along the outside meanders of Sand Creek adjacent to the created wetland cells, portions of the restored channel alignment were constructed by stacking and vegetating two coir encapsulated soil lifts. Stabilized banks were inspected to document any lateral erosion or bank failure that could eventually lead to wetland cell intercept by the stream channel. In addition to visual inspections, three of the monitoring cross sections were established at the apex of the stabilized meander bend to record any lateral migration at these locations.

2.9 GPS Data

Site features and survey points were collected with a resource grade Thales Pro Mark III GPS unit and a Trimble GeoHX GPS unit during the 2015 monitoring season. The collected data were then transferred to a personal computer, imported into GIS, and presented in Montana State Plane Single Zone NAD 83 meters. Site features and survey points that were located with GPS included photographic points, transect endpoints, wetland boundaries, and wetland data points.

2.10 Maintenance Needs

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

3. RESULTS

3.1 Hydrology

Climate data from the meteorological station at Butte FAA Airport, Montana (1318), located approximately 10.5 miles east of the site, recorded an average annual precipitation rate of 12.8 inches from January 1904 to November 2015 (NRCS 2015). Average monthly precipitation totals from January to August for

the period of record was 9.9 inches. Total precipitation recorded from January to August was 6.81 inches in 2015. These data indicate the region received below-average precipitation during the 2015 growing season.

Approximately nine percent of the entire site was inundated during the 2015 field survey. The average depth of surface water across the site was estimated at 1 foot with depths ranging from 0.5 to 2 feet. The surface water depth at the emergent vegetation and open water boundary was estimated at 0.5 feet. Open water was present in more than 50 percent of constructed wetland cells 1 and 5, at a depth of approximately 2 feet. There was open and standing water present in wetland cells 2, 3, and 4 during the June 2015 site visit. Sand Creek is designated by the USGS as an intermittent stream. During the 2015 survey there was little to no water present in the channel of Sand Creek. Other site-wide indicators of wetland hydrology included saturation, saturation visible on aerial imagery, hydrogen sulfide odor, positive FAC-neutral test, and geomorphic position. Surface water runoff, direct precipitation and a high seasonal groundwater table provide the majority of water driving wetland hydrology within the site. The north-eastern portion of the site also receives perennial surface flow from a well defined spring that originates south of the mitigation area and flows north through Parcel 2 into Silver Bow Creek.

Four data points, SP-01, SP-02, SP-03, and SP-04 (Figure 2, Appendix A), were sampled to determine the wetland and upland boundaries. Data points SP-01 and SP-03 were located in areas that met the wetland criteria. SP-01 was located in constructed wetland cell 3 near the western project boundary and SP-03 was located in constructed wetland cell 5 near the northern project boundary. Evidence of positive wetland hydrology at SP-01 included saturation to ground surface, hydrogen sulfide odor, geomorphic position, and a positive FAC-neutral test. Wetland hydrology indicators at SP-03 included surface water to a depth of 24 inches, saturation to ground surface, hydrogen sulfide odor, saturation visible on aerial imagery, geomorphic position, and a positive FAC-neutral test. No primary or secondary indicators of wetland hydrology were observed at SP-02 or SP-04, located upslope of data points SP-01 and SP-03, respectively.

3.2 Vegetation

A comprehensive list of 93 plant species identified on the site in 2015 is presented in Table 3. Vegetation communities were identified by species composition and their associated cover classes. The community composition is provided on the Mitigation Monitoring form (Appendix B) and the community boundaries shown on Figure 3 (Appendix A). Nine vegetation community types were observed in 2015, including four upland community types and five wetland community types. The communities were upland Type 1 – *Artemisia tridentata/Bromus inermis*, upland Type 2 – *Descurainia sophia/Thlaspi arvense*, upland Type 3 – *Bromus inermis/Poa pratensis*, upland Type 5 – *Elymus repens/Bromus inermis*, wetland Type 4 – *Carex* spp./*Juncus balticus*, wetland Type 6 – *Puccinellia nuttalliana/Deschampsia caespitosa*, wetland Type 7 – Open Water/Aquatic Macrophytes, wetland Type 8 – *Salix exigua/Juncus*

balticus, and wetland Type 9 – *Juncus balticus/Elymus repens*. These community types are discussed below.

Upland community Type 1 – *Artemisia tridentata/Bromus inermis* was observed across 7.3 acres in the northeastern portion of the project area. Twenty species were identified in this community, including big sagebrush (*Artemisia tridentata)*, smooth brome (*Bromus inermis*), spotted knapweed (*Centaurea stoebe*), wild rye (*Elymus* sp.), leafy spurge (*Euphorbia esula*), Rocky Mountain juniper (*Juniperus scopulorum*), western-wheat grass (*Pascopyrum smithii*), Kentucky bluegrass (*Poa pratensis*), meadow false rye grass (*Schedonorus pratensis*) and 11 other species observed at less than five percent cover.

Upland community Type 2 – *Descurainia sophia/Thlaspi arvense* represented upland areas that were disturbed by construction at the mitigation site in 2014. This community type occupied approximately 8.2 acres. The community was found predominantly on the north end of the site in the vicinity of the area bisected by the Butte/Anaconda bicycle path, within the footprint of the reclamation of the old road on the south side of the site adjacent to wetland cell #2, and on the west side of the railroad within the footprint of the reclamation of the old road that includes wetland cell #6. Seventeen species were identified within upland Type 2. Herb sophia (*Descurainia sophia*) and field pennycress (*Thlaspi arvense*) dominated this community, with lesser cover provided by Mexican-fireweed (*Bassia scoparia*), Canadian thistle (*Cirsium arvense*), western-wheat grass, meadow false rye grass, tall hedge-mustard (*Sisymbrium altissimum*), Japanese brome (*Bromus japonicus*), Nuttall's alkali grass (*Puccinellia nuttalliana*), and nine other species. Overall, this community was represented by primarily non-native and noxious weed species commonly found in recently disturbed and/or degraded landscapes. It is expected that these disturbed areas will transition to domination by native grasses over time.

Upland community Type 3 – *Bromus inermis/Poa pratensis* was identified across 14.8 acres of upland north of the new road alignment. Thirty-three species were identified within upland Type 3. Dominant species included smooth brome and Kentucky bluegrass, with lesser cover provided by common yarrow (*Achillea millefolium*), spotted knapweed, leafy spurge, yellow sweet-clover (*Melilotus officinalis*), Great Basin wild rye (*Elymus cinereus*), creeping wild rye (*Elymus repens*), slender wild rye (*Elymus trachycaulus*), prairie junegrass (*Koeleria macrantha*), narrow-leaf willow (*Salix exigua*), meadow false rye grass, and field pennycress.

Upland community Type 5 – *Elymus repens/Bromus inermis* was observed on 1.7 acre south of the new roadway. Twenty-four species were identified in this community, including smooth brome, Canadian thistle, herb sophia, creeping wild rye, leafy spurge, Baltic rush (*Juncus balticus*), Canadian goldenrod (*Solidago canadensis*), field pennycress, and 16 other species observed at less than five percent cover.

Wetland community Type 4 – *Carex* spp./*Juncus balticus* characterized 10.1 acres of pre-existing wetland that remained relatively undisturbed during construction in 2014. Twenty one species were identified in this community, including sedge (*Carex* sp.), leafy tussock sedge (*Carex aquatilis*), Nebraska sedge (*Carex nebrascensis*), Northwest Territory sedge (*Carex utriculata*), bluejoint (*Calamagrostis canadensis*), tufted hair grass (*Deschampsia caespitosa*), creeping wild rye, Baltic rush, silverweed (*Potentilla anserina*), American wild mint (*Mentha arvensis*), fowl bluegrass (*Poa palustris*), Kentucky bluegrass, and eight other species observed at less than one percent cover.

Wetland community Type 6 – *Puccinellia nuttalliana/Deschampsia caespitosa* was identified on 3.1 acres of wetland within constructed wetland cells 2 and 3 near the western project boundary. The vegetation was dominated by tufted hair grass, Nuttall's alkali grass, silverweed, and 37 other species observed at less than five percent cover.

Wetland community Type 7 – Open Water/Aquatic Macrophytes characterized 3.1 acres of wetland within constructed wetland cells 1 and 5. Open water represented more than 50 percent of this community. Common duckweed (*Lemna minor*) and green algae dominated this community, with lesser cover from Nuttall's alkali grass, field pennycress, and broad-leaf cat-tail (*Typha latifolia*).

Wetland community Type 8 – *Salix exigua/Juncus balticus* represented 0.2 acres of pre-existing wetland that remained relatively undisturbed from construction in 2014. This existing wetland community, adjacent to the western project boundary, was dominated by narrow-leaf willow, Baltic rush, Nebraska sedge, spreading bent (*Agrostis stolonifera*), field meadow-foxtail (*Alopecurus pratensis*), and seven other species observed at less than five percent cover.

Wetland community Type 9 – *Juncus balticus/Elymus repens* characterized 0.04 acres south of the new roadway in a pre-existing wetland area. Eleven species were observed in this community, including creeping wild rye, Baltic rush, Canadian thistle, fowl bluegrass, silverweed, Canadian goldenrod, white panicled American-aster (*Symphyotrichum lanceolatum*), and four other species identified at less than one percent cover.

Table 3. Vegetation species observed in 2015 at the Silicon Mountain Mitigation Site.

Scientific Name	Common Name	WMVC Indicator Status[1]
Achillea millefolium	Common Yarrow	FACU
Agropyron cristatum	Crested Wheatgrass	NL
Agrostis stolonifera	Spreading Bent	FAC
Algae, green	Algae, green	NL
Alopecurus aequalis	Short-Awn Meadow-Foxtail	OBL
Alopecurus pratensis	Field Meadow-Foxtail	FAC
Alyssum alyssoides	Pale Alyssum	NL
Artemisia campestris	Pacific Wormwood	FACU
Artemisia frigida	Fringed Sage	NL
Artemisia tridentata	Big Sagebrush	NL
Aster sp.	Aster	NL
Astragalus cicer	Chickpea Milkvetch	NL
Astragalus sp.	Milkvetch	NL
Bassia scoparia	Mexican-Fireweed	FAC
Beckmannia syzigachne	American Slough Grass	OBL
Bromus inermis	Smooth Brome	FAC
Bromus japonicus	Japanese Brome	NL
Calamagrostis canadensis	Bluejoint	FACW
Carex aquatilis	Leafy Tussock Sedge	OBL
Carex nebrascensis	Nebraska Sedge	OBL
Carex sp.	Sedge	NL
Carex utriculata	Northwest Territory Sedge	OBL
Catabrosa aquatica	Water Whorl Grass	OBL
Centaurea stoebe	Spotted Knapweed	NL
Chenopodium album	Lamb's-Quarters	FACU
Chenopodium sp.	Goosefoot	NL
Cicuta douglasii	Western Water-Hemlock	OBL
Cirsium arvense	Canadian Thistle	FAC
Cirsium scariosum	Meadow Thistle	FAC
Crepis tectorum	Narrowleaf Hawksbeard	NL
Deschampsia caespitosa	Tufted Hair Grass	FACW
Descurainia sophia	Herb Sophia	NL
Eleocharis palustris	Common Spike-Rush	OBL
Elymus cinereus	Great Basin Wildrye	NL
Elymus repens	Creeping Wild Rye	FAC
Elymus sp.	Wild Rye	NL
Elymus trachycaulus	Slender Wild Rye	FAC
Epilobium ciliatum	Fringed Willowherb	FACW
Equisetum arvense	Field Horsetail	FAC
Erigeron sp.	Fleabane	NL
Euphorbia esula	Leafy Spurge	NL
Geum macrophyllum	Large-Leaf Avens	FAC
Glyceria grandis	American Manna Grass	OBL
Hordeum jubatum	Fox-Tail Barley	FAC
Hyoscyamus niger	Black Henbane	NL
Iris missouriensis	Rocky Mountain Iris	FACW

[1]2014 NWPL (Lichvar et al., 2014)

Table 3. (continued). Vegetation species observed in 2015 at the Silicon Mountain Mitigation Site.

Scientific Name	Common Name	WMVC Indicator Status[1]
Juncus balticus	Baltic Rush	FACW
Juncus bufonius	Toad Rush	FACW
Juncus mertensianus	Mertens' Rush	OBL
Juniperus scopulorum	Rocky Mountain Juniper	NL
Koeleria macrantha	Prairie Junegrass	NL
Lemna minor	Common Duckweed	OBL
Lepidium campestre	Field Pepper-grass	NL
Lepidium perfoliatum	Clasping Pepperwort	FACU
Linaria vulgaris	Butter-and-eggs	NL
Linum lewisii	Prairie Flax	NL
Melilotus officinalis	Yellow Sweet-Clover	FACU
Mentha arvensis	American Wild Mint	FACW
Orthocarpus tenuifolius	Thin-leaved Owl's-clover	NL
Pascopyrum smithii	Western-Wheat Grass	FACU
Penstemon nitidus	Wax-leaf Beardtongue	NL
Phacelia hastata	Silverleaf Scorpion-weed	NL
Phalaris arundinacea	Reed Canary Grass	FACW
Phleum pratense	Common Timothy	FAC
Plantago major	Great Plantain	FAC
Poa palustris	Fowl Blue Grass	FAC
Poa pratensis	Kentucky Blue Grass	FAC
Polemonium pulcherrimum	Showy Jacob's-ladder	NL
Polygonum aviculare	Yard Knotweed	FAC
Potentilla anserina	Silverweed	OBL
Puccinellia nuttalliana	Nuttall's Alkali Grass	FACW
Ranunculus sp.	Buttercup	NL
Ribes aureum	Golden Currant	FAC
Rumex crispus	Curly Dock	FAC
Rumex sp.	Dock	NL
Salix exigua	Narrow-Leaf Willow	FACW
Schedonorus pratensis	Meadow False Rye Grass	FACU
Scirpus microcarpus	Red-Tinge Bulrush	OBL
Sisymbrium altissimum	Tall Hedge-Mustard	FACU
Solidago canadensis	Canadian Goldenrod	FACU
Sonchus arvensis	Field Sow-Thistle	FACU
Sphaeralcea coccinea	Scarlet globemallow	NL
Stipa comata	Needle-and-Thread	NL
Symphyotrichum ascendens	Western American-Aster	FACU
Symphyotrichum lanceolatum	White Panicled American-Aster	OBL
Taraxacum officinale	Common Dandelion	FACU
Thlaspi arvense	Field Pennycress	UPL
Tragopogon dubius	Meadow Goat's-beard	NL
Trifolium pratense	Red Clover	FACU
Trifolium repens	White Clover	FAC
Typha latifolia	Broad-Leaf Cat-Tail	OBL
Verbascum thapsus	Great Mullein	FACU
Veronica anagallis-aquatica	Blue Water Speedwell	OBL

[1]2014 NWPL (Lichvar et al., 2014)

Baseline conditions for vegetation community composition were documented along two transects (T-1 and T-2) established during initial monitoring at the site in 2015 (Figure 2, Appendix A). The data recorded on Transect T-1 (Monitoring Form, Appendix B) are summarized in tabular and graphical formats in Table 4 and Charts 1 and 2, respectively. Transect T-1 extends 564 feet from south to north across constructed wetland cells 2 and 3. The transect intervals alternated between upland community Types 2 – *Descurainia sophia/Thlaspi arvense* and 3 – *Bromus inermis/Poa pratensis*, and wetland community Type 6 – *Puccinellia nuttalliana/Deschampsia caespitosa*. Hydrophytic vegetation comprised approximately 80.5 percent of the transect during the 2015 survey. A total of 51 species were identified, including 30 hydrophytes and 21 upland species.

Table 4. Data summary for Transect 1 (T-1) in 2015 at the Silicon Mountain Mitigation Site.

Monitoring Year	**2015**
Transect Length (feet)	**564**
Vegetation Community Transitions along Transect	4
Vegetation Communities along Transect	3
Hydrophytic Vegetation Communities along Transect	1
Total Vegetative Species	51
Total Hydrophytic Species	30
Total Upland Species	21
Estimated % Total Vegetative Cover	90
Estimated % Unvegetated	10
% Transect Length Comprising Hydrophytic Vegetation Communities	80.5
% Transect Length Comprising Upland Vegetation Communities	19.5
% Transect Length Comprising Unvegetated Open Water	0
% Transect Length Comprising Mudflat	0

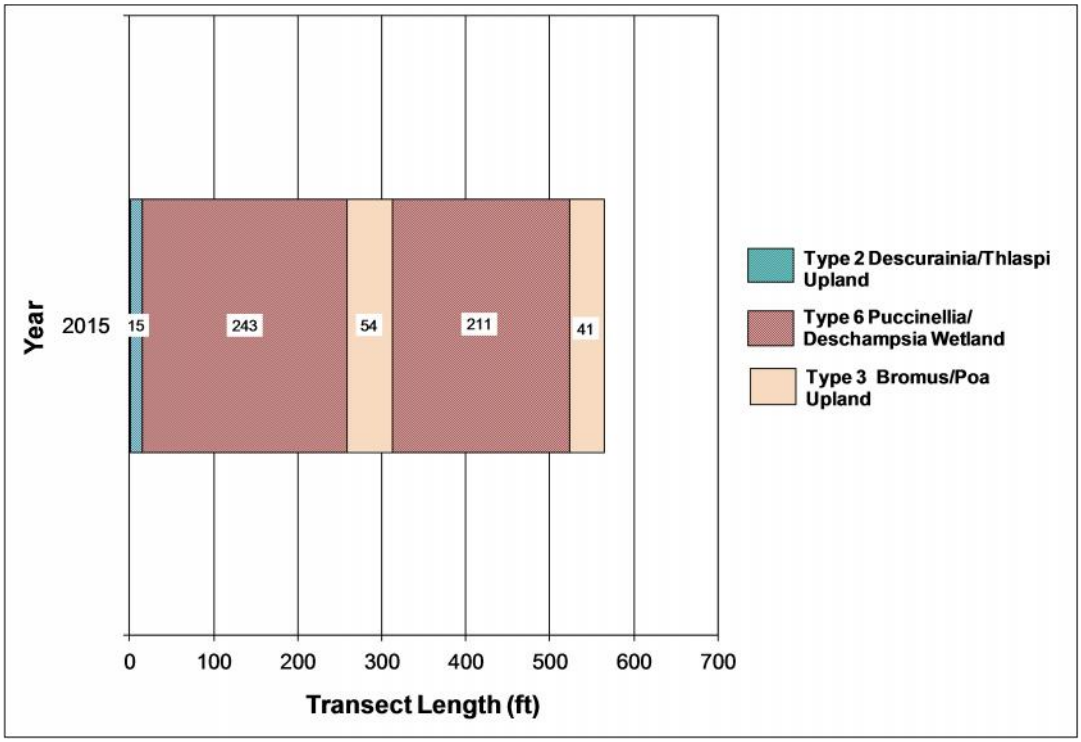


Chart 1. Transect map showing community types on Transect T-1 in 2015 from start (0 feet) to end (564 feet) at the Silicon Mountain Mitigation Site.

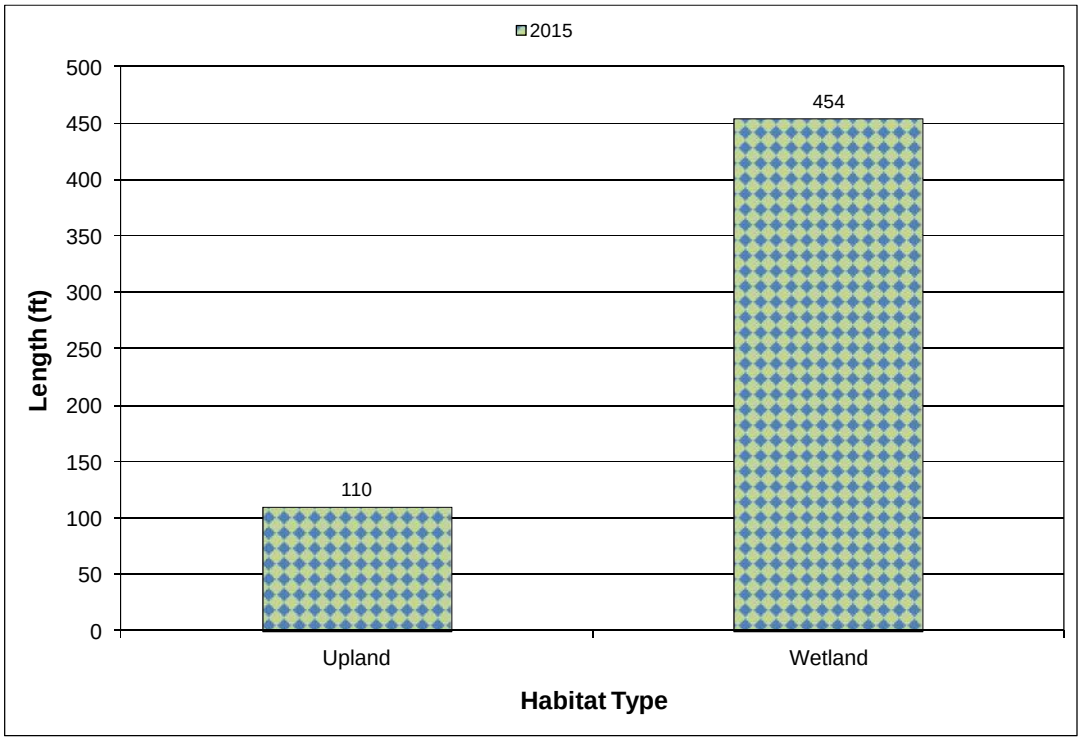


Chart 2. Length of habitat types within Transect T-1 in 2015 at the Silicon Mountain Mitigation Site.

Data collected on Transect T-2 (Monitoring Form, Appendix B) are summarized in tabular and graphic formats in Table 5 and Charts 3 and 4, respectively. This 219-foot transect began in upland community Type 2 – *Descurainia sophia/Thlaspi arvense*, intersected constructed wetland cell 4 and wetland community Type 6 – *Puccinellia nuttalliana/Deschampsia caespitosa*, and ended in upland community Type 2. Hydrophytic vegetation comprised approximately 88.1 percent of the transect during the 2015 survey. A total of 9 species were identified, including 5 hydrophytes and 4 upland species. Bare ground represented 70 percent of the transect, likely due to the recent excavation and seeding of wetland cell 4 in 2014. Vegetation cover and species composition is expected to increase as the site recovers from construction.

Table 5. Data summary for Transect T-2 in 2015 at the Silicon Mountain Mitigation Site.

Monitoring Year	**2015**
Transect Length (feet)	**219**
Vegetation Community Transitions along Transect	2
Vegetation Communities along Transect	2
Hydrophytic Vegetation Communities along Transect	1
Total Vegetative Species	9
Total Hydrophytic Species	5
Total Upland Species	4
Estimated % Total Vegetative Cover	30
Estimated % Unvegetated	70
% Transect Length Comprising Hydrophytic Vegetation Communities	88.1
% Transect Length Comprising Upland Vegetation Communities	11.9
% Transect Length Comprising Unvegetated Open Water	0
% Transect Length Comprising Mudflat	0

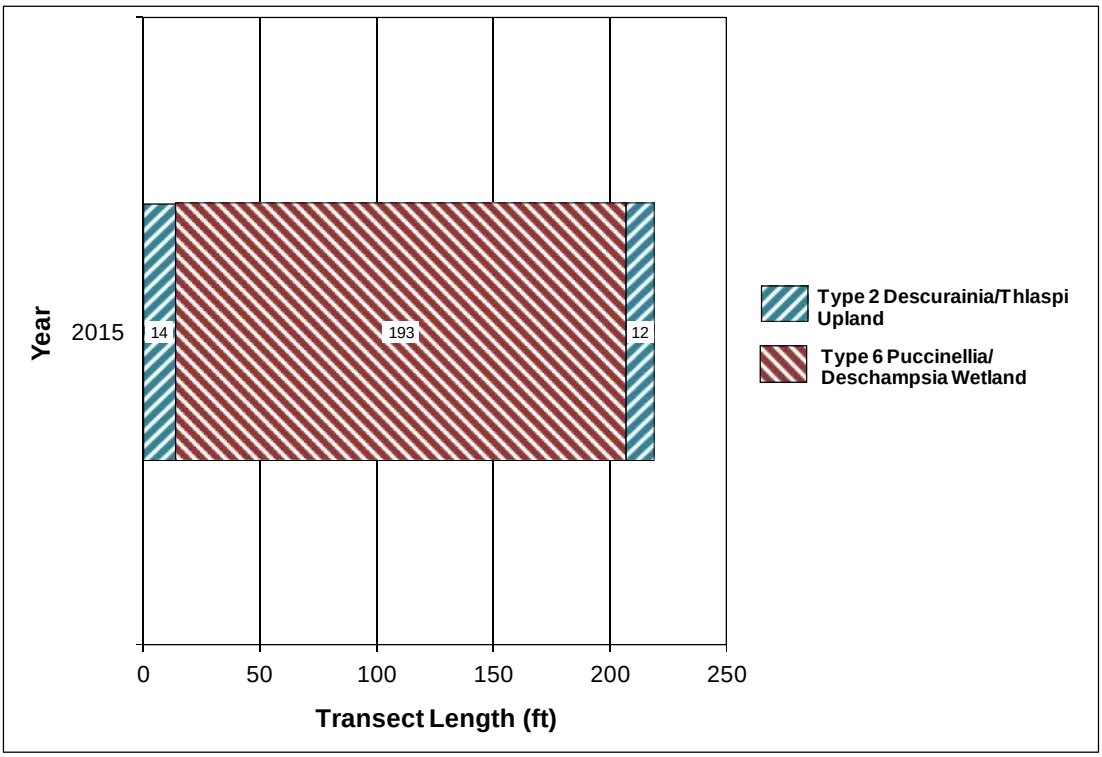


Chart 3. Transect map showing community types on Transect T-2 in 2015 from start (0 feet) to end (219 feet) at the Silicon Mountain Mitigation Site.

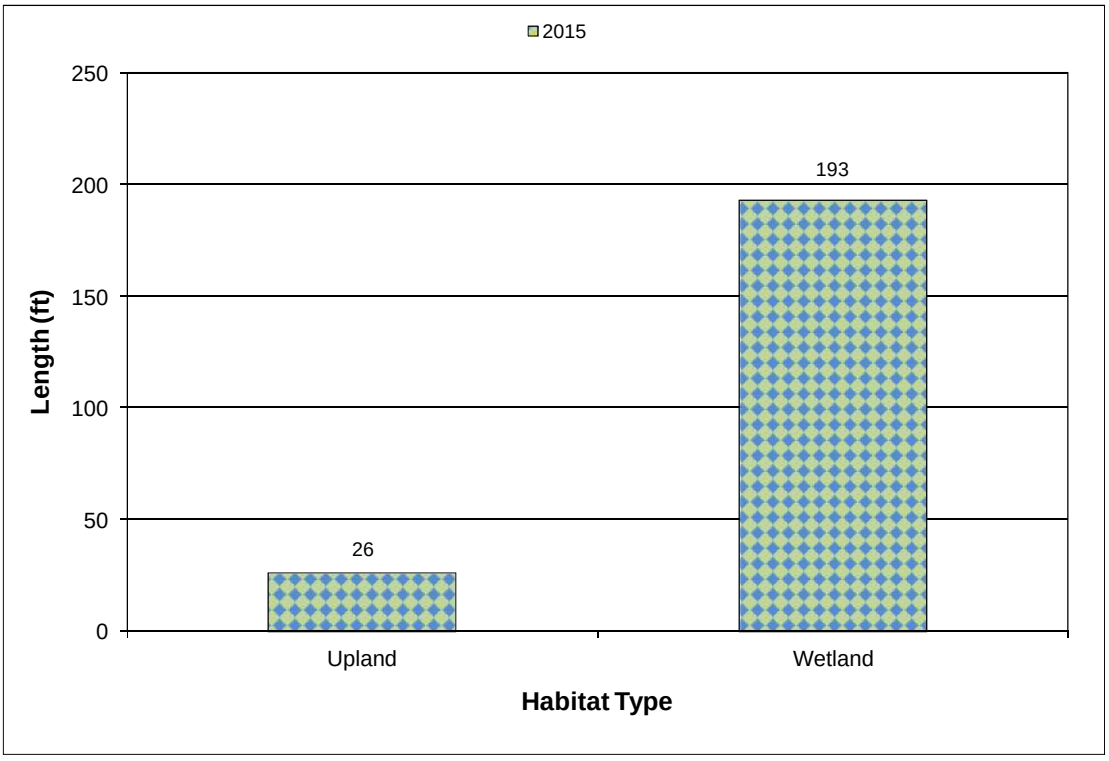


Chart 4. Length of habitat types within Transect T-2 in 2015 at the Silicon Mountain Mitigation Site.

Thirty-six infestations of Montana Listed Priority 2B noxious weeds were mapped at the Silicon Mountain mitigation site (Figure 3, Appendix A). Seven infestations of spotted knapweed, 14 infestations of Canadian thistle, 14 infestations of leafy spurge, and one infestation of butter-and-eggs (*Linaria vulgaris*) were identified in areas less than 1.0 acre in size with cover classes ranging from trace (less than 1 percent) to high (greater than 26 percent). The MDT has an ongoing weed control program for their mitigation sites that includes an annual assessment of weeds identified at each location and treatment to contain and control identified populations. MDT will initiate weed control measures in 2016 based upon the findings of this monitoring report.

MDT planted an estimated 30,000 willow cuttings, and 350 containerized shrubs and trees along the stream banks of the Sand Creek channel, in riparian areas, and in small clusters around the perimeter of the excavated wetland cells (Appendix E). An estimated 13 percent of the containerized woody plantings had survived through the 2015 survey.

3.3 Soil

The project site was mapped in the *Silver Bow County Soil Survey* (NRCS 2014). Four soil series were mapped within the monitoring area and include the Riverrun, occasionally flooded-Mannixlee complex, Varney-Anaconda loam, Mannixlee-Bonebasin complex, and Varney loam. The primary map unit on the site (approximately 65 percent) and the soil series identified for all four sample points was the Riverrun, occasionally flooded-Mannixlee complex. This dominant soil series consists of occasionally to frequently flooded, deep, poorly drained, loamy soils that occur in floodplains. The Varney-Anaconda loam was mapped across the far northern portion of the project area, and consists of deep, well drained soils that occur on stream terraces and alluvial fans. The Varney loam was mapped across the northeastern project area and consists of deep, well drained soils that occur in alluvial fans. The Mannixlee-Bonebasin complex was also mapped across the northeastern project area and consists of deep, poorly drained soils that occur on floodplains. The Riverrun-Mannixlee complex and Mannixlee-Bonebasin complex are included on the Montana Hydric Soils List (NRCS 2014b).

Soil test pits were excavated at four locations (Figure 2, Appendix A). Data points SP-01 and SP-02 were located near the western project boundary and constructed wetland cell 3 while data points SP-03 and SP-04 were located near the northern project boundary and constructed wetland cell 5. The soil profile at SP-01, located in wetland Type 6, revealed a very dark gray (10YR 3/1) sandy loam. The soil profile at SP-03, located in wetland Type 7, exhibited a very dark grayish brown (10YR 3/2) sandy loam. No hydric soil indicators were observed for SP-01 or SP-03, likely due to their location in recently constructed wetland cells where soils may be too young to have formed hydric indicators (Problematic Hydric Soils: Recently Developed Wetlands, USACE 2010). The soil profile at SP-02, located in upland Type 3, exhibited a very dark grayish brown (10YR 3/2) sandy loam, with no hydric soil indicators observed. The soil profile at SP-04,

located in upland Type 2, revealed a very dark grayish brown (10 YR 3/2) loam, with no hydric soil indicators observed.

3.4 Wetland Delineation

Four data points were evaluated to confirm the wetland boundary determination in 2015 (Figure 2, Appendix A). The completed Wetland Determination Data Forms are located in Appendix B. Data points SP-01 and SP-03 were located in areas that were classified as wetlands. The total wetland acreage surveyed within the Silicon Mountain mitigation area in 2015 was 16.5 acres. The delineation confirmed 6.2 acres of created wetland in the excavated cells and 10.3 acres in the preserved wetland areas (Table 6). Uplands accounted for approximately 32 acres of the mitigation site, with the remaining 1.8 acres represented by the restored Sand Creek channel. Wetland Cell #6 does not appear to be developing wetland characteristics. No wetland vegetation communities or supporting hydrology were noted in this area.

Table 6. Wetland acres delineated in 2015 at the Silicon Mountain Mitigation Site.

Wetland Habitat Type	2015 Acreage
Project Area	50.1
Establishment (Creation)	6.2
Preservation	10.3
Total Wetland Habitat	**16.5**

3.5 Wildlife

A list of animal species observed directly or indirectly in 2015 is presented in Table 7 and noted on the Mitigation Monitoring form (Appendix B). Twenty-three bird species were identified on site in 2015. Birds observed using open water areas included Canada geese (*Branta canadensis*), gadwall (*Anas strepera*), cinnamon teal (*Anas cyanoptera*), a duckling, mallard (*Anas platyrhynchos*), and ruddy ducks (*Oxyura jamaicensis*). Other wildlife observed directly included one mule deer (*Odocoileus hemionus*), one vole, and one red fox (*Vulpes vulpes*). Deer (*Odocoileus* sp.) and coyote (*Canis latrans*) tracks and an inactive ground squirrel burrow were also observed during the 2015 site visit.

Table 7. Wildlife species observed in 2015 at the Silicon Mountain Mitigation Site.

COMMON NAME	SCIENTIFIC NAME
BIRD	
American Crow	*Corvus brachyrhynchos*
American Robin	*Turdus migratorius*
Black-billed Magpie	*Pica hudsonia*
Canada Goose	*Branta canadensis*
Cinnamon Teal	*Anas cyanoptera*
Common Grackle	*Quiscalus quiscula*
Gadwall	*Anas strepera*
Gray Partridge	*Perdix perdix*
Green-winged Teal	*Anas crecca*
House Sparrow	*Passer domesticus*
Killdeer	*Charadrius vociferus*
Lesser Scaup	*Aythya affinis*
Mallard	*Anas platyrhynchos*
Mourning Dove	*Zenaida macroura*
Red-winged Blackbird	*Agelaius phoeniceus*
Ruddy Duck	*Oxyura jamaicensis*
Sandhill Crane	*Grus canadensis*
Tree Swallow	*Tachycineta bicolor*
Unknown duckling	
Vesper Sparrow	*Pooecetes gramineus*
Western Meadowlark	*Sturnella neglecta*
Wilson's Snipe	*Gallinago delicata*
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*
MAMMAL	
Coyote	*Canis latrans*
Deer sp.	*Odocoileus* sp.
Ground squirrel sp.	
Mule Deer	*Odocoileus hemionus*
Rabbit sp.	
Red Fox	*Vulpes vulpes*
Vole sp.	

3.6 Functional Assessment

The 2008 MDT MWAM was used to evaluate the functional values of the created wetlands in 2015. Two assessment areas (AA) were assessed in 2015 that included created wetland cells 2, 3, and 4, and created wetland cells 1 and 5 (Table 8 and Appendix B). The created wetland cells were classified into separate AAs based on perennial hydrology and open water observed during the 2015 site visit in cells 1 and 5, and seasonal hydrology and saturation observed in cells 2, 3, and 4. As hydrology stabilizes at the site, these AAs will likely shift in subsequent monitoring years.

The AA for created wetland cells 2, 3, and 4 encompassed 3.1 acres of excavated wetland cells, characterized by wetland community Type 6 – *Puccinellia nuttalliana/Deschampsia caespitosa*. This AA was rated as a Category III wetland with 47 percent of the total possible points in 2015. The AA received a high functional rating for sediment/nutrient/toxicant removal and moderate ratings for short and long term surface water storage, production export/food chain support, groundwater discharge/recharge, and MTNHP species habitat. The rating for this AA is expected to increase as the disturbed areas recover when desirable vegetation cover increases and hydrology stabilizes at the site.

The AA for created wetland cells 1 and 5 encompassed 3.1 acres of excavated wetland cells, characterized by wetland community Type 7 – Open Water/Aquatic Macrophytes. This AA was rated as a Category III wetland with 54.5 percent of the total possible points in 2015. The AA received high functional ratings for short and long term surface water storage and groundwater discharge/recharge. Moderate ratings for were assessed for sediment/nutrient/toxicant removal, flood attenuation, production export/food chain support, general wildlife habitat, and MTNHP species habitat. The rating for this AA is expected to increase as the disturbed areas recover and as desirable vegetation cover increases.

Table 8. Functions and Values of the Silicon Mountain Mitigation Site in 2015.

Function and Value Parameters 2008 MDT Montana Wetland Assessment Method[1]	2015 AA 1 (Created Wetland Cells 2, 3, and 4)	2015 AA 2 (Created Wetland Cells 1 and 5)
Listed/Proposed T&E Species Habitat	Low (0.0)	Low (0.0)
MTNHP Species Habitat	Mod (0.5)	Mod (0.5)
General Wildlife Habitat	Low (0.3)	Mod (0.5)
General Fish/Aquatic Habitat	NA	NA
Flood Attenuation	NA	Mod (0.6)
Short and Long Term Surface Water Storage	Mod (0.6)	High (0.8)
Sediment/Nutrient/Toxicant Removal	High (0.8)	Mod (0.7)
Sediment/Shoreline Stabilization	NA	Low (0.3)
Production Export/Food Chain Support	Mod (0.7)	Mod (0.7)
Groundwater Discharge/Recharge	Mod (0.7)	High (1.0)
Uniqueness	Low (0.1)	Low (0.3)
Recreation/Education Potential	Low (0.05)	Low (0.05)
Actual Points / Possible Points	**3.75 / 8**	**5.45 /10**
% of Possible Score Achieved	**47%**	**55%**
Overall Category	**III**	**III**
Total Acreage of Assessed Wetlands within Site Boundaries (ac)	**3.1**	**3.1**
Functional Units (acreage x actual points)	**11.63**	**16.90**

[1]Berglund and McEldowney 2008

3.7 Photo Documentation

Seven wetland photo points and ten stream photo points were initially established in the project area in 2015 (PP-1 through PP-17; Figure 2 Appendix A). Photographs of all surveyed channel cross-sections, wetland determination data points, and vegetation transect endpoints (T-1 and T-2) are provided in Appendix C.

3.8 Stream Monitoring

3.8.1. Channel Cross Sections

Results from each of the eight cross sections surveyed within the project reach include bankfull width, maximum depth, cross sectional area, mean depth, and width/depth ratios, and are summarized in Table 9. Bankfull widths ranged from 20.3 to 28.8 feet in the restored and relocated segments of the channel, and between 32.8 and 35.7 feet in enhanced segments of the channel. Plots of each surveyed cross section are provided in Appendix D. Continued monitoring of these cross sections will document lateral or vertical adjustments over time.

Table 9. Summary of Sand Creek cross sections at the Silicon Mountain Site

Cross Section	Mitigation Action	Habitat Type	Bankfull Width (ft)	Maximum Depth (ft)	XS Area (ft^2)	Mean Depth (ft)	W/D Ratio
1	Relocation / Restoration	Pool	23.3	2.2	29.4	1.3	18.4
2	Relocation / Restoration	Riffle	20.3	1.1	17.4	0.9	23.6
3	Restoration of historic channel	Stabilized Pool	22.2	3.0	49.7	2.2	9.9
4	Restoration of historic channel	Stabilized Pool	26.4	2.5	46.1	1.7	15.1
5	Restoration of historic channel	Riffle	27.2	2.5	47.5	1.7	15.6
6	Restoration of historic channel	Stabilized Pool	28.8	1.9	36.2	1.3	22.9
7	Enhancement of existing channel	Riffle	32.8	1.8	40.1	1.2	26.9
8	Enhancement of existing channel	Riffle	35.7	0.8	14.8	0.4	86.4

3.8.2. Vegetation Belt Transects

Vegetation communities and their associated Winward (2000) stability ratings are provided for all stream bank belt transects in Table 10. The Winward stability ratings are based on vegetation communities rather than individual species; therefore, a vegetation community was assigned to each stream bank belt transect based on one or more dominant species. If a range of stability ratings was provided for a specific community, the lowest rating was included in Table 10. Success criteria outlined in the monitoring plan state the vegetation along the stream banks will be considered successful when banks are vegetated with a majority of deep-rooting riparian plant species having root stability indices ≥6. Eleven of the 16 belt transects (69%) monitored exhibit vegetation communities with stability ratings of 6 or higher. In all cases where the vegetation within a belt transect did not achieve a stability rating of 6 or higher, vegetation on the opposite bank did meet the success criteria (i.e. none of the cross sections failed to meet the stream bank vegetation criteria on both sides of the channel).

Table 10. Stream bank vegetation communities and their associated stability ratings along Sand Creek in 2015.

Stream Bank Transect (L/R)	Dominant Stream Bank Community	Community Type [1] Stability Rating
1L	*Melilotus officinalis/Trifolium* spp.	4
1R	*Salix lutea/* Bare Ground	6
2L	*Trifolium repens*	4
2R	*Salix geyeriana*	7
3L	*Salix lutea/Trifolium* spp.	6
3R	*Salix geyeriana/Epilobium ciliatum*	7
4L	*Eleocharis palustris*	6
4R	*Melilotus officinalis*	4
5L	*Eleocharis palustris*	6
5R	*Salix lutea*	6
6L	*Salix* spp./*Epilobium ciliatum*	7
6R	*Melilotus officinalis/Trifolium* spp.	4
7L	*Salix exigua/Eleocharis palustris*	7
7R	*Melilotus officinalis/Trifolium* spp.	4
8L	*Carex nebrascensis*	9
8R	*Carex aquatilis/Agrostis stolonifera*	9

1. After Winward (2000).

1

3.8.3. Documentation of High Water Events

Evidence of an out-of-bank event included sand deposits at the upstream extent of the project reach. Sandy deposits extended above the bankfull elevation where the channel transitions from a channelized segment upstream of the project reach to the reconstructed alignment away from the rail line. The sandy deposit was documented at PP-8 (C-10; Appendix C) Sandy deposits were observed along the top of the banks near the willow cuttings throughout much of the project site, indicating the channel received a bankfull or slightly higher flow sometime in 2014 or 2015 prior to the monitoring event.

3.8.4. Inspection of Stabilized Headcuts

Two headcuts located between the west side of wetland cell 1 and the restored stream channel were stabilized to prevent the wetland cell from draining. Stabilization efforts included re-sloping the face of the headcut to a 3:1 slope, installing rock in a trench at the base of the headcut, and installing containerized plants and cuttings at the top and bottom of the headcuts. Inspection of the two stabilized headcuts revealed no soil loss or advancing headcutting in the stabilized areas. Photo-documentation of the stabilized areas is included in Appendix C.

3.8.5. Inspection of Stabilized Banks

The stabilized bank inspection did not reveal any lateral bank erosion toward the constructed wetland cells. Three cross sections were established along the banks adjacent to the wetland cells to document any future lateral erosion. To date, the restored stream channel is not in jeopardy of intercepting the wetland cells.

3.9 Maintenance Needs

There are no diversions or nesting structures currently installed at the site. Fences installed around the site were in good condition at the time of the 2015 investigation. Wetland Cell #6 does not appear to be developing wetland characteristics. No wetland vegetation communities or supporting hydrology were noted in this area. The likely cause is lack of groundwater intercept from too shallow an excavation, but MDT may wish to investigate further.

3.9.1. Noxious Weeds

Thirty-six infestations of Montana Listed Priority 2B noxious weeds were mapped at the Silicon Mountain mitigation site (Figure 3, Appendix A). Seven infestations of spotted knapweed, 14 infestations of Canadian thistle, 14 infestations of leafy spurge, and one infestation of butter-and-eggs (*Linaria vulgaris*) were identified in areas less than 1.0 acre in size with cover classes ranging from trace (less than 1 percent) to high (greater than 26 percent). The MDT has an ongoing weed control program for their mitigation sites that includes an annual assessment of weeds identified at each location and treatment to contain and control identified populations.

3.9.2. Erosion control

The straw/coir erosion control blanket installed on the east side of the bridge embankment wasn't secured well and the soil beneath the blanket does not appear to be revegetating successfully. It is possible wind has stripped away any seeds applied to this area. Securing a new layer of fabric may be necessary to prevent soil erosion in this area.

3.9.3. Willow Installation Technique

In accordance with the mitigation plans and specifications, several thousand willow sprigs were installed with approximately 18 inches below ground level, and 18 to 24 inches of the stems exposed. Exposing this sprig length may result in higher mortality as they tend to generate a large amount of above ground new growth and leaves during the first two growing seasons that ultimately outpaces the root growth of the plant. To date, willow sprig survival is excellent, with approximately 95 percent of stems showing new root, stem, shoots and leaf growth. MDT may wish to consider trimming approximately 75 percent of the new growth, a practice recommended by NRCS to reduce leaf production and allow the plant to focus its energy primarily on producing roots during the next two growing seasons.

3.10 Current Credit Summary

3.10.1. Wetland Mitigation Credit

Table 9 summarizes the current estimated wetland credits based on the USACE approved credit ratios (USACE 2005) and the wetland delineation completed in June 2015. A total of 27.2 creditable acres were delineated at the Silicon Mountain site in 2015, including 6.2 acres of wetland creation, 10.2 acres of wetland preservation, and 13.8 acres of upland buffer. Applying the USACE approved ratios to these values, a total of 10.9 acres of mitigation credit have been estimated in 2015, a value very close to the targeted 11.45 acres anticipated at this site. The attainment of the full target value of 11.45 credit acres is likely in subsequent monitoring years, as wetland vegetation and hydrology develop further within the site. Accounting for the 4.33 credit acres that Butte Silverbow is seeking from the project, a net of approximately 6.6 credit acres are available for MDT to utilize as mitigation reserve within Watershed # 2 - Upper Clark Fork River basin.

Table 11. Wetland mitigation credits estimated for the Silicon Mountain Mitigation Site in 2015.

Compensatory Mitigation Type	Mitigation Area Description	Wetland Type (Cowardin)	Anticipated Mitigation Surface Area (Acres)	USACE Approved Mitigation Ratios	Anticipated Mitigation Credit (Acres)	2015 Delineated Acres	2015 Mitigation Credit (Acres)
Creation (Establishment)	Wetland Cells 1, 2, 3, 4 & 5	Palustrine emergent, aquatic bed	6.77	1:1	6.77	6.19	6.19
Preservation	Existing Wetland Areas	Palustrine emergent, scrub-shrub	10.06	4:1	2.52	10.24	2.56
Upland Buffer	50-foot wide upland perimeter	N/A	10.80	5:1	2.16	10.8*	2.16
		Totals	**27.6**		**11.45**	**16.43**	**10.91**

*Actual delinated acres exceeded the creditable acres therefore only the requested acreage is reported.

3.10.2. Stream Mitigation Credit

Anticipated mitigation credits produced by the Silicon Mountain Aquatic Resource Mitigation Project were calculated following guidelines provided in the USACE 2010 *Montana Stream Mitigation Procedure* (MTSMP). Approximately 4,300 feet of Sand Creek was addressed as part of the project, and MDT is seeking to obtain credit for 3,900 feet as outlined in Table 12. MDT is not seeking to obtain mitigation credits for 400 of the 4,300 feet of channel addressed within the project reach, including 100 feet that lies within the railroad right-of-way, and 300 feet that was riprapped under the newly constructed bridge. MDT anticipates a total of 12,369.5 stream and riparian mitigation credits if all success criteria are met.

Table 12. Summary of anticipated stream mitigation credits from the Silicon Mountain Aquatic Resource Mitigation Project.

Mitigation Reach	Linear Feet	Sum of Mitigation Factors[1]	Mitigation Credits
Reach 1	3,250	3.20	10,400
Reach 2	650	3.03	1,969.5
Total	**3,900**		**12,369.5**

[1] From Table 7 of Silicon Mountain Aquatic Resource Mitigation Project Mitigation Plan

To date, the project is meeting the two success criteria established for stream mitigation components of the project. Stream mitigation criteria include channel restoration and vegetation along the stream banks. Subsequent monitoring events will document whether the site continues to achieve success as defined by these standards, or if additional maintenance is needed.

3.10.3. Performance Standard Summary

Table 13 provides a summary of the site conditions in relation to the established performance standards and success criteria. This site meets the established performance standards with the exception of the success criteria that measure soil stability and its ability to support vegetation cover, and noxious weed cover. Although hydrophytic vegetation criteria are being met, the side slopes of wetland cell 5 currently exhibit low cover of species that provide soil stability which has caused some rilling to occur along the shoreline. All wetlands delineated within the Silicon site in 2015 met the three criteria outlined in the 1987 Manual and 2010 Regional Supplement. Upland buffer areas exhibited more 10 percent cover of noxious weed infestations. The MDT implements weed control measures based on the results of field surveys to minimize and/or eliminate the intrusion of State Listed Noxious weed species within the site. MDT will initiate weed control measures in 2016 based upon the findings of this monitoring report. Comprehensive site monitoring has occurred for one year and will be conducted for a minimum period of five years as determined by the USACE Montana Regulatory Office's review of annual monitoring reports for the site and attainment of wetland and stream success criteria.

Table 13. Summary of Performance Standards and Success Criteria at the Silicon Mountain mitigation site in 2015.

Performance Standards	Success Criteria	Criteria Achieved Y/N	Discussion
Wetland Characteristics	Meet the three parameter criteria for hydrology, vegetation, and soils as outlined in the 1987 Wetland Delineation Manual and 2010 Mountains, Valleys, Coast Region.	Y	Areas identified as wetland habitat within the mitigation site meet the three parameter criteria.
Wetland Hydrology	Soil saturation present for at least 12.5 percent of the growing season.	Y	Areas identified as wetland habitat within the mitigation site exhibit soil saturation for a minimum 12.5 percent of growing season.
Hydric Soil	Hydric soil conditions present or appear to be forming.	Y	Hydric soil characteristics are developing throughout a majority of the constructed wetlands.
	Soil is sufficiently stable to prevent erosion.	N	Disturbed soil is not yet stable and does exhibit minor signs of erosion around wetland cell 5.
	Soil is able to support plant cover.	N	Plant cover is establishing slowly across recently disturbed soils.
Hydrophytic Vegetation	Achieved where combined absolute cover of facultative or wetter species is ≥70 percent	Y	Created wetland cells support 70% or greater cover of hydrophytic vegetation (OBL, FACW, and FAC).
	Montana State-listed noxious weeds do not exceed 10 percent absolute cover.	Y	Montana State-listed noxious weeds is estimated below 10 percent absolute cover within wetland areas.
Channel Restoration Success	Revegetation along the new Sand Creek channel corridor will be considered successful when banks are vegetated with a majority of deep-rooting riparian and wetland herbaceous and woody plant species.	Y	The majority of stream bank vegetation along the constructed Sand Creek channel corridor is dominated by vegetation communities with stability ratings greater than 6.
	The intent of the stream restoration is to allow for the stream to naturally migrate within the floodplain and to give it enough room to move and stabilize itself within the site.	Y	The stream has plenty of space within the floodplain for natural migration. The stream currently appears stable with no lateral adjustment observed following construction.
Stream Bank Vegetation	Considered successful when banks are vegetated with a majority of deep-rooting riparian plant species having root stability indexes ≥6 .	Y	The majority of stream bank vegetation along the constructed Sand Creek channel corridor is dominated by vegetation communities with stability ratings greater than 6.
Open Water	It is the intent of the project to provide seasonal open water during the spring and early summer within excavated depressions. As the growing season progresses and the groundwater levels recede, it is anticipated that vegetation will germinate within the majority of the depressions. Open water with submerged and/or floating vegetation will therefore be considered successful and creditable.	Y	Wetland Cells 2, 3, and 4 experience seasonal drawdown and rooted hydrophytic vegetation development has been observed, while Wetland Cells 1 and 5 appear to support perennial inundation and a developing aquatic macrophyte community.
Upland Buffer	Noxious weeds do not exceed 10 percent cover within upland buffer area.	N	Noxious weed cover is more than 10 percent within the upland buffer.
	Any area disturbed within creditable buffer zone must have at least 50 percent aerial cover of non-weed species by end of monitoring period.	Y	Disturbed areas have established greater than 50 percent cover by non-weed species.
Weed Control	Will be based upon annual monitoring of the site to determine weed species and degree of infestation within the site, and control measures based upon the monitoring results will be implemented by MDT to minimize and/or eliminate the intrusion of State Listed Noxious weed species within the site.	Y	State-listed noxious weed species across the site have been monitored and mapped during each post-construction monitoring event. MDT administers an on-going weed-control program.

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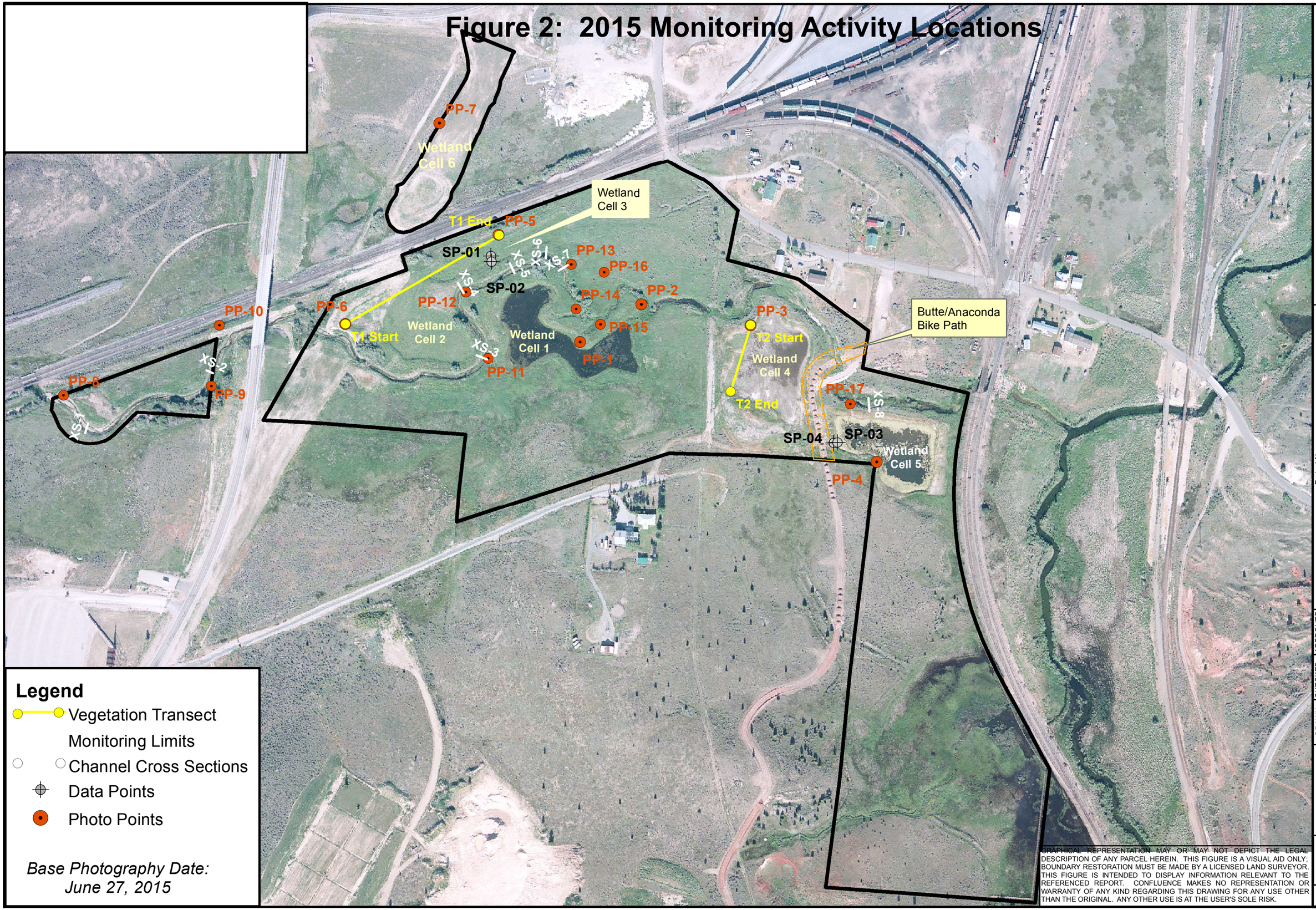
http://wcc.sc.egov.usda.gov/reportGenerator/view/customSingleStationReport/monthly/1318.

Appendix A

Project Area Maps – Figures 2, 3, and 4

MDT Wetland Mitigation Monitoring
Silicon Mountain
Silver Bow County, Montana

Figure 2: 2015 Monitoring Activity Locations



Legend

- Vegetation Transect
- Monitoring Limits
- Channel Cross Sections
- Data Points
- Photo Points

Base Photography Date: June 27, 2015

GRAPHICAL REPRESENTATION MAY OR MAY NOT DEPICT THE LEGAL DESCRIPTION OF ANY PARCEL HEREIN. THIS FIGURE IS A VISUAL AID ONLY; BOUNDARY RESTORATION MUST BE MADE BY A LICENSED LAND SURVEYOR. THIS FIGURE IS INTENDED TO DISPLAY INFORMATION RELEVANT TO THE REFERENCED REPORT. CONFLUENCE 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.

LOCATION: Silver Bow Co., MT

PROJECT NO: MT-STPX 47(24)

FILE: Silicon/Monitor2015.mxd

Project Name
Silicon Mountain Mitigation Site

Drawing Title
2015 Monitoring Activity Locations

DRAWN	CHECKED	APPROVED
FM	JJ	JJ

SCALE: As Shown

Drawn: August 20, 2015

PROJ MGR: J Johnson

CONFLUENCE
consulting incorporated

Figure 2

REV -

Figure 3: 2015 Mapped Site Features

Butte/Anaconda Bike Path

Noxious Weeds

Centaurea stoebe
Cirsium arvense
Euphorbia esula
Linaria vulgaris

Infestation Size
- X = <0.1 acre
- ▲ = 0.1 to 1 acre
- ■ = 1 to 5 acre

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

Vegetation Community Types

1. Artemisia tridentata/Bromus inermis
2. Descurainia sophia/Thlaspi arvense
3. Bromus inermis/Poa pratensis
4. Carex spp./Juncus balticus
5. Elymus repens/Bromus inermis
6. Puccinellia nuttalliana/Deschampsia caespitosa
7. Open Water/Aquatic Macrophytes
8. Salix exigua/Juncus balticus
9. Juncus balticus/Elymus repens

Acreages

Project Area	50.1 acres
Created Wetland	6.2 acres
Preserved Wetland	10.3 acres
Total Wetlands	16.5 acres
Uplands	32 acres
Stream Component	1.8 acres

GRAPHICAL REPRESENTATION MAY OR MAY NOT DEPICT THE LEGAL DESCRIPTION OF ANY PARCEL HEREIN. THIS FIGURE IS A VISUAL AID ONLY; BOUNDARY RESTORATION MUST BE MADE BY A LICENSED LAND SURVEYOR. THIS FIGURE IS INTENDED TO DISPLAY INFORMATION RELEVANT TO THE REFERENCED REPORT. CONFLUENCE 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.

LOCATION: Silver Bow Co., MT
PROJECT NO: MT-STPX 47(24)
FILE: Silicon/Veg2015.mxd

Project Name: Silicon Mountain Mitigation Site
Drawing Title: 2015 Mapped Site Features

DRAWN FM | CHECKED JJ | APPROVED JJ
SCALE: As Shown
Drawn: August 20, 2015
PROJ MGR: J Johnson

CONFLUENCE consulting incorporated

Figure 3

REV -

Figure 4: 2015 Wetland Credit Areas

0 190 380 760

Feet

Credit Types

- Creation (potential)
- Preservation
- Stream Buffer (stream credit)
- Butte/Anaconda Bike Path (no credits)

GRAPHICAL REPRESENTATION MAY OR MAY NOT DEPICT THE LEGAL DESCRIPTION OF ANY PARCEL HEREIN. THIS FIGURE IS A VISUAL AID ONLY; BOUNDARY RESTORATION MUST BE MADE BY A LICENSED LAND SURVEYOR. THIS FIGURE IS INTENDED TO DISPLAY INFORMATION RELEVANT TO THE REFERENCED REPORT. CONFLUENCE 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.

LOCATION: Lincoln Co., MT

PROJECT NO: STPX-NH27(17)

FILE: Silicon/2015CreditAcres.mxd

Project Name
Silicon Mountain Mitigation Site

Drawing Title
2015 Wetland Credit Areas

DRAWN	CHECKED	APPROVED
JJ	JJ	JJ

SCALE: As Shown

Drawn: December 2015

PROJ MGR: J Johnson

CONFLUENCE consulting incorporated

Figure 4

REV -

Appendix B

2015 MDT Wetland Mitigation Site Monitoring Form
2015 USACE Wetland Determination Data Forms
2015 MDT Wetland Assessment Forms

MDT Wetland Mitigation Monitoring
Silicon Mountain
Silver Bow County, Montana

MDT WETLAND MITIGATION SITE MONITORING FORM

Project Site: Silicon Mountain Assessment Date/Time 6/23/2015

Person(s) conducting the assessment: RRM, FMM, AP

Weather: Clear, 65F, light breeze Location: 5 miles west of Butte

MDT District: Butte Milepost: MP 119 on I15

Legal Description: T 3N R 9W Section(s) 24

Initial Evaluation Date: 6/23/2015 Monitoring Year: 1 #Visits in Year: 1

Size of Evaluation Area: 50.1 (acres)

Land use surrounding wetland:

The property sits south of a rail yard and is surrounded by private properties containing homes and businesses.

HYDROLOGY

Surface Water Source: Sand Creek and a well defined spring

Inundation: ☑ Average Depth: 1 **(ft)** Range of Depths: 0.5-2 **(ft)**

Percent of assessment area under inundation: 9 %

Depth at emergent vegetation-open water boundary: 0.5 **(ft)**

If assessment area is not inundated then are the soils saturated within 12 inches of surface: Yes

Other evidence of hydrology on the site (ex. – drift lines, erosion, stained vegetation, etc**:**

Open and standing water present in cells 1,4, and 5. Water present in Sand Creek channel. Saturation, H2S odor, FAC-neutral test, geomorphic position, saturation visible on aerial imagery

Groundwater Monitoring Wells

Record depth of water surface below ground surface, in feet.

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.

Hydrology Notes:

Cells 2 and 3 had very small areas of inundation (3ft wide). Lower than average rain fall in June.

VEGETATION COMMUNITIES

Site Silicon Mountain

(Cover Class Codes **0** = < 1%, **1** = 1-5%, **2** = 6-10%, **3** = 11-20%, **4** = 21-50% , **5** = >50%)

,

Community # 1 **Community Type:** Artemisia tridentata / Bromus inermis **Acres** 7.3

Species	Cover class	Species	Cover class
Achillea millefolium	0	Agropyron cristatum	1
Alyssum alyssoides	0	Artemisia frigida	1
Artemisia tridentata	4	Astragalus sp.	1
Bromus inermis	4	Centaurea stoebe	3
Elymus cinereus	0	Elymus sp.	3
Euphorbia esula	2	Juncus balticus	1
Juniperus scopulorum	2	Koeleria macrantha	0
Linum lewisii	0	Pascopyrum smithii	3
Poa pratensis	2	Schedonorus pratensis	3
Sphaeralcea coccinea	0	Stipa comata	1

Comments:

Upland community dominated by big sagebrush.

Community # 2 **Community Type:** Descurainia sophia / Thlaspi arvense **Acres** 8.2

Species	Cover class	Species	Cover class
Bare Ground	1	Bassia scoparia	2
Bromus inermis	0	Bromus japonicus	1
Chenopodium album	0	Chenopodium sp.	0
Cirsium arvense	2	Descurainia sophia	4
Elymus repens	0	Epilobium ciliatum	0
Euphorbia esula	0	Lepidium perfoliatum	0
Pascopyrum smithii	1	Polygonum aviculare	0
Puccinellia nuttalliana	1	Schedonorus pratensis	1
Sisymbrium altissimum	1	Thlaspi arvense	5

Comments:

Upland community, composed of mostly early successional, non-native species commonly found on disturbed landscapes.

Community # 3 **Community Type:** Bromus inermis / Poa pratensis **Acres** 14.8

Species	Cover class	Species	Cover class
Achillea millefolium	1	Alopecurus pratensis	0
Beckmannia syzigachne	0	Bromus inermis	5
Centaurea stoebe	1	Cirsium arvense	0
Elymus cinereus	1	Elymus repens	1
Elymus trachycaulus	1	Equisetum arvense	0
Euphorbia esula	1	Hordeum jubatum	0
Hyoscyamus niger	0	Juncus balticus	0
Koeleria macrantha	1	Lepidium perfoliatum	0
Linaria vulgaris	0	Melilotus officinalis	1
Orthocarpus tenuifolius	0	Pascopyrum smithii	0
Plantago major	0	Poa pratensis	2
Polemonium pulcherrimum	0	Potentilla anserina	0
Ribes aureum	0	Rumex crispus	0
Salix exigua	1	Schedonorus pratensis	1
Sisymbrium altissimum	0	Taraxacum officinale	0
Thlaspi arvense	1	Tragopogon dubius	0
Trifolium pratense	0		

Comments:

Upland community, dominated by graminoid species.

Community # 4 **Community Type:** Carex spp. / Juncus balticus **Acres** 10.1

Species	Cover class	Species	Cover class
Calamagrostis canadensis	1	Carex aquatilis	1
Carex nebrascensis	1	Carex sp.	3
Carex utriculata	1	Catabrosa aquatica	0
Cicuta douglasii	0	Cirsium arvense	0
Deschampsia caespitosa	1	Descurainia sophia	0
Elymus repens	1	Epilobium ciliatum	0
Iris missouriensis	0	Juncus balticus	3
Mentha arvensis	1	Poa palustris	1
Poa pratensis	1	Potentilla anserina	2
Rumex crispus	0	Thlaspi arvense	1
Veronica anagallis-aquatica	0		

Comments:

Existing wetland

Community # 5 **Community Type:** Elymus repens / Bromus inermis **Acres** 1.7

Species	Cover class	Species	Cover class
Artemisia campestris	0	Astragalus cicer	1
Bromus inermis	3	Carex sp.	1
Cirsium arvense	2	Descurainia sophia	2
Elymus cinereus	1	Elymus repens	4
Elymus trachycaulus	1	Euphorbia esula	2
Juncus balticus	2	Lepidium campestre	0
Lepidium perfoliatum	0	Penstemon nitidus	0
Phacelia hastata	0	Potentilla anserina	0
Rumex crispus	0	Salix exigua	0
Sisymbrium altissimum	1	Solidago canadensis	2
Sonchus arvensis	1	Symphyotrichum ascendens	0
Thlaspi arvense	2	Verbascum thapsus	0

Comments:

Upland community south of new road alignment.

Community # 6 **Community Type:** Puccinellia nuttalliana / Deschampsia caespitosa **Acres** 3.1

Species	Cover class	Species	Cover class
Alopecurus aequalis	0	Alopecurus pratensis	0
Aster sp.	0	Bare Ground	1
Beckmannia syzigachne	1	Bromus inermis	0
Carex nebrascensis	0	Centaurea stoebe	0
Cicuta douglasii	0	Cirsium arvense	0
Cirsium scariosum	0	Crepis tectorum	0
Deschampsia caespitosa	3	Descurainia sophia	0
Eleocharis palustris	0	Elymus repens	1
Epilobium ciliatum	0	Equisetum arvense	0
Erigeron sp.	0	Euphorbia esula	0
Juncus balticus	0	Juncus bufonius	0
Juncus mertensianus	0	Melilotus officinalis	0
Mentha arvensis	0	Orthocarpus tenuifolius	0
Phalaris arundinacea	1	Phleum pratense	0
Plantago major	0	Poa palustris	0
Poa pratensis	1	Potentilla anserina	2
Puccinellia nuttalliana	3	Ranunculus sp.	1
Rumex sp.	0	Solidago canadensis	0
Sonchus arvensis	0	Thlaspi arvense	0
Trifolium pratense	1	Trifolium repens	1
Typha latifolia	0		

Comments:

Wetland community in constructed wetland cells 2 and 3.

Community # 7 Community Type: Open Water / Aquatic macrophytes **Acres** 3.1

Species	Cover class	Species	Cover class
Algae, green	3	Lemna minor	2
Open Water	5	Puccinellia nuttalliana	1
Thlaspi arvense	1	Typha latifolia	1

Comments:

Created wetland cells 1 and 5.

Community # 8 Community Type: Salix exigua / Juncus balticus **Acres** 0.2

Species	Cover class	Species	Cover class
Agrostis stolonifera	2	Alopecurus pratensis	2
Bromus inermis	0	Calamagrostis canadensis	1
Carex nebrascensis	2	Cicuta douglasii	0
Glyceria grandis	0	Hordeum jubatum	1
Juncus balticus	3	Salix exigua	4
Scirpus microcarpus	1	Symphyotrichum lanceolatum	0

Comments:

Existing wetland.

Community # 9 Community Type: Juncus balticus / Elymus repens **Acres** 0.04

Species	Cover class	Species	Cover class
Cirsium arvense	1	Elymus repens	4
Epilobium ciliatum	0	Geum macrophyllum	0
Hordeum jubatum	0	Juncus balticus	4
Poa palustris	1	Potentilla anserina	1
Rumex crispus	0	Solidago canadensis	1
Symphyotrichum lanceolatum	1		

Comments:

Total Vegetation Community Acreage **48.54**

(Note: some area within the project bounds may be open water or other non-vegetative ground cover.)

VEGETATION TRANSECTS

Site: Silicon Mountain Date: 6/23/2015

Transect Number: 1 **Compass Direction from Start:** 332

Interval Data:

Ending Station 15 **Community Type:** Descurainia sophia / Thlaspi arvense

Species	Cover class	Species	Cover class
Bare Ground	4	Bromus inermis	1
Chenopodium album	0	Descurainia sophia	3
Elymus repens	1	Epilobium ciliatum	0
Euphorbia esula	0	Polygonum aviculare	0
Thlaspi arvense	4		

Ending Station 258 **Community Type:** Puccinellia nuttalliana / Deschampsia caespitosa

Species	Cover class	Species	Cover class
Alopecurus aequalis	0	Beckmannia syzigachne	1
Bromus inermis	0	Centaurea stoebe	0
Cirsium arvense	0	Cirsium scariosum	0
Crepis tectorum	0	Deschampsia caespitosa	3
Eleocharis palustris	0	Elymus repens	1
Euphorbia esula	0	Juncus balticus	0
Juncus bufonius	0	Orthocarpus tenuifolius	0
Phalaris arundinacea	1	Plantago major	0
Poa pratensis	1	Potentilla anserina	2
Puccinellia nuttalliana	3	Ranunculus sp.	1
Sonchus arvensis	0	Thlaspi arvense	0
Trifolium pratense	1	Trifolium repens	1
Typha latifolia	0		

Ending Station 312 **Community Type:** Bromus inermis / Poa pratensis

Species	Cover class	Species	Cover class
Alopecurus pratensis	0	Bromus inermis	4
Cirsium arvense	1	Elymus cinereus	1
Elymus cinereus	0	Euphorbia esula	1
Hyoscyamus niger	0	Lepidium perfoliatum	1
Melilotus officinalis	0	Pascopyrum smithii	1
Poa pratensis	0	Polemonium pulcherrimum	1
Potentilla anserina	0	Tragopogon dubius	0
Trifolium pratense	1		

Ending Station 523 **Community Type:** Puccinellia nuttalliana / Deschampsia caespitosa

Species	Cover class	Species	Cover class
Alopecurus aequalis	0	Alopecurus pratensis	0
Aster sp.	0	Beckmannia syzigachne	3
Bromus inermis	0	Carex nebrascensis	1
Cicuta douglasii	0	Cirsium arvense	0
Cirsium scariosum	0	Deschampsia caespitosa	2
Descurainia sophia	0	Eleocharis palustris	1
Elymus repens	0	Epilobium ciliatum	0
Equisetum arvense	0	Erigeron sp.	0
Juncus balticus	0	Juncus mertensianus	0
Melilotus officinalis	0	Mentha arvensis	0
Orthocarpus tenuifolius	0	Phleum pratense	0
Plantago major	0	Poa palustris	2
Potentilla anserina	3	Puccinellia nuttalliana	3
Ranunculus sp.	2	Rumex sp.	0
Solidago canadensis	0	Sonchus arvensis	0
Thlaspi arvense	1	Trifolium pratense	3
Typha latifolia	1		

Ending Station 564 **Community Type:** Bromus inermis / Poa pratensis

Species	Cover class	Species	Cover class
Achillea millefolium	0	Beckmannia syzigachne	0
Bromus inermis	2	Cirsium arvense	0
Elymus repens	4	Elymus trachycaulus	0
Euphorbia esula	0	Hordeum jubatum	0
Hyoscyamus niger	0	Orthocarpus tenuifolius	0
Poa pratensis	1	Polemonium pulcherrimum	1
Potentilla anserina	1	Rumex crispus	0
Thlaspi arvense	0	Trifolium pratense	2

Transect Notes:

Highly disturbed.

Transect Number: 2 **Compass Direction from Start:** 288

Interval Data:

Ending Station 14 **Community Type:** Descurainia sophia / Thlaspi arvense

Species	Cover class	Species	Cover class
Bare Ground	5	Cirsium arvense	2
Descurainia sophia	2	Thlaspi arvense	1

Ending Station 207 **Community Type:** Puccinellia nuttalliana / Deschampsia caespitosa

Species	Cover class	Species	Cover class
Bare Ground	5	Carex nebrascensis	0
Descurainia sophia	0	Epilobium ciliatum	0
Poa palustris	0	Puccinellia nuttalliana	4
Ranunculus sp.	1	Thlaspi arvense	1

Ending Station 219 **Community Type:** Descurainia sophia / Thlaspi arvense

Species	Cover class	Species	Cover class
Bare Ground	4	Descurainia sophia	4
Thlaspi arvense	2		

Transect Notes:

Traverses wetland cell #4. 288 degrees from start

PLANTED WOODY VEGETATION SURVIVAL

Silicon Mountain

Planting Type	#Planted	#Alive	Notes
Alnus incana		2	
Dead		3	
Salix eriocephala		12	
Salix exigua		13	
Salix geyeriana		11	
Shepherdia argentea		9	

Comments

Silicon Mountain

WILDLIFE

Birds

Were man-made nesting structures installed? No

If yes, type of structure: _____

How many? _____

Are the nesting structures being used? No

Do the nesting structures need repairs? No

Nesting Structure Comments:

Species	#Observed	Behavior	Habitat
American Crow	1		
Black-billed Magpie	1		
Canada Goose	4		OW,
Cinnamon Teal	2		MA, OW,
Common Grackle	1		SS,
Gadwall	2		MA, OW,
Green-winged Teal	5		MA,
House Sparrow	3		UP,
Killdeer	8		MA,
Lesser Scaup	2		MA,
Mallard	1		
Mourning Dove	4		SS,
Red-winged Blackbird	13		MA,
Ruddy Duck	1		MA,
Sandhill Crane	2		UP,
Tree Swallow	4		MA, SS,
unknown duckling	1		OW,
Vesper Sparrow	2		UP,
Western Meadowlark	2		UP,
Wilson's Snipe	2		MA,
Yellow-headed Blackbird	7		

Bird Comments

BEHAVIOR CODES

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

HABITAT CODES

AB = Aquatic bed **SS** = Scrub/Shrub **FO** = Forested **UP** = Upland buffer **I** = Island

WM = Wet meadow **MA** = Marsh **US** = Unconsolidated shore **MF** = Mud Flat **OW** = Open Water

Mammals and Herptiles

Species	# Observed	Tracks	Scat	Burrows	Comments
Deer sp.	3	Yes	Yes	No	Deer tracks present in dry mud areas
Ground squirrel sp.	1	No	No	Yes	Burrow inactive
Red Fox	1	No	No	No	
Vole sp.	1	No	No	No	Live, ran past too fast for ID

Wildlife Comments:

Silicon Mountain

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.

Photo #	Latitude	Longitude	Bearing	Description
4083				PP1-1
4084				PP1-2
4085				PP1-3
4086				PP1-4
4087				PP1-5
4088				PP2-1
4089				PP2-2
4090				PP2-3
4091				PP3-1
4092				PP3-2
4093				PP3-3
4094				PP3-4
4095				PP4-1
4096				PP4-2
4097				PP4-3
4098				PP4-4
4099				PP4-5
4100				PP5-1
4101				PP5-2
4102				PP6-1
4103				PP6-2
4104				PP7-1
7971				u/s at u/s end of restored channel
				u/s at u/s end of restored channel

7972				d/s (N) at u/s side of road bridge
				d/s (N) at u/s side of road bridge
7973				d/s at stream under road bridge
7974				corsto plantings d/s of bridge
7975				w end of wetland transect 01
7976	45.999517	-112.662108		PP1-1 333d, orange gas post
7977	45.999517	-112.662108		PP1-2 26d, NE corner
7978	45.999517	-112.662108		PP1-3 86d, powerpole at house
7979	45.999517	-112.662108		PP1-4 166d, grainary super structure above road
7980	45.999517	-112.662108		PP1-5 202d, pole in willow clump
7981	46.000037	-112.662613		PP2-1 40d, hill knob with junipers
7982	46.000037	-112.662613		PP2-2 86d, house
7983	46.000037	-112.662613		PP2-3 113d, powerpole
7984				locked well housing
7985				locked well housing
7986	46.000846	-112.66157		Transect 2 from E end
7987	46.000994	-112.662408		Transect 2 from W end
7988	46.000994	-112.662406	314	PP3-1 playground equip
7989	46.000994	-112.662406	343	PP3-2 billboard on hwy
7990	46.000994	-112.662406	66	PP3-3 juniper past pond corner
7991	46.000994	-112.662406	114	PP3-4 powerpole
7992	46.002139	-112.660761	220	PP4-1 pond corner
7993	46.002139	-112.660761	268	PP4-2 powerpole with transformer
7994	46.002139	-112.660761	321	PP4-3 E side of bridge
7995	46.002139	-112.660761	24	PP4-4 poerpole on farside of RR tracks
7996				locked well p-2
7997	46.002139	-112.660761	56	PP4-5 Red billboard on hwy
7998	45.99877	-112.663406	145	PP5-1 notch in horizon
7999	45.99877	-112.663406	345	PP5-2 , corner of white house
8000	45.997469	-112.662218	326	PP6-1 water tower
8001	45.997469	-112.662218	352	PP6-2 willow clump
8002	45.998217	-112.664771	95	PP7-1 powerpole on farside of tracks
8318	45.998774	-112.663399		ESE from T-01 End
8319	45.9974696	-112.662216		NNW from T-01 Start
8325	45.9987145	-112.663142		Close up SP-01
8326	45.9987145	-112.663142		SE at SP-01
8327	45.9987198	-112.663073		Close up SP-02
8328	45.9987198	-112.663073		SE at SP-02
8329	46.000846	-112.66157		Transect 2 from start
8330	46.0009944	-112.662408		Transect 2 from End
8331	46.0017937	-112.660988		SP-03

8332	46.0017937	-112.660988	W at SP-03 Wetland
8333	46.0017632	-112.660978	SP-04
8334	46.0017632	-112.660978	W at SP-04 Upland
8336			S at Fen-in Lt. GRN
8338			W at wetland cell W of RR Tracks
8339			W at wetland cell W of RR Tracks

Comments:

Silicon Mountain

ADDITIONAL ITEMS CHECKLIST

Hydrology

☑ Map emergent vegetation/open water boundary on aerial photos.
☑ Observe extent of surface water. Look for evidence of past surface water elevations (e.g. drift lines, vegetation staining, erosion, etc).

Photos

☐ One photo from the wetland toward each of the four cardinal directions
☐ One photo showing upland use surrounding the wetland.
☐ One photo showing the buffer around the wetland
☐ One photo from each end of each vegetation transect, toward the transect

Vegetation

☑ Map vegetation community boundaries

☑ Complete Vegetation Transects

Soils

☑ Assess soils

Wetland Delineations

☐ Delineate wetlands according to applicable USACE protocol (1987 form or Supplement)
☐ Delineate wetland – upland boundary onto aerial photograph.

Wetland Delineation Comments

Functional Assessments

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

Functional Assessment Comments:

Maintenance

Were man-made nesting structure installed at this site? No

If yes, do they need to be repaired?

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? No

If yes, are the structures in need of repair?

If yes, describe the problems below.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Silicon Mountain | City/County: Silver Bow | Sampling Date: 6/23/2015

Applicant/Owner: MDT | State: Montana | Sampling Point: SP-01

Investigator(s): RRM, FMM, AP | Section, Township, Range: S 24 T 3N R 9W

Landform (hillslope, terrace, etc.): Valley bottom | Local relief (concave, convex, none): concave | Slope (%):

Subregion (LRR): LRR E | Lat: 45.9987145 | Long: -112.663142 | Datum: WGS84

Soil Map Unit Name: Riverrun, occasionally flooded-Mannixlee, frequently flooded complex | NWI classification: PEM

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

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

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

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

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

Remarks:

VEGETATION - Use scientific names of plant

Tree Stratum Plot size (30 Foot Radius)

	Absolute % Cover:	Domiant Species?	Indicator Status

Sapling/Shrub Stratum Plot size (15 Foot Radius)

Herbaceous Stratum Plot size (5 Foot Radius)

Beckmannia syzigachne	30	☑	OBL
Deschampsia caespitosa	15	☐	FACW
Juncus balticus	1	☐	FACW
Potentilla anserina	2	☐	OBL
Puccinellia nuttalliana	20	☑	FACW
Ranunculus sp.	20	☑	NL
Typha latifolia	3	☐	OBL

Woody Vine Stratum Plot size (30 Foot Radius)

Percent Bare Ground 10

Dominance Test worksheet

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7 % (A/B)

Prevalence Index worksheet

Total % Cover of:			Multiply by:
OBL species	35	X 1	35
FACW species	36	X 2	72
FAC species	0	X 3	0
FACU species	0	X 4	0
UPL species	20	X 5	100
Column Totals	91 (A)		207 (B)

Prevalence Index = B/A = 2.27473

Hydrophytic Vegetation Indicators

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is <= 3.0
- ☐ 4 - Morphological Adaptations (Provide supporting data in remarks or on separate sheet.
- ☐ 5 - Wetland Non-Vascular Plants
- ☐ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric sil and wetland hydrology must be present, unless disturbed or problematic for #3, 4, 5.

Hydrophytic Vegetation Present? Yes ☑ NO ☐

Remarks:

SOIL

Sampling Point: SP-01

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 3/1	100					Sandy Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: 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)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ 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:

Recently constructed wetland. Soils may be too young to have formed hydric indicators (Problematic Hydric Soils: Recently Developed Wetlands, USACE 2010).

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)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☑ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

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): 0

Wetland Hydrology Present? Yes ☑ No ☐

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

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Silicon Mountain | City/County: Silver Bow | Sampling Date: 6/23/2015

Applicant/Owner: MDT | State: Montana | Sampling Point: SP-02

Investigator(s): RMM, FMM, AP | Section, Township, Range: S 24 T 3N R 9W

Landform (hillslope, terrace, etc.): Valley bottom | Local relief (concave, convex, none): flat | Slope (%): 10

Subregion (LRR): LRR E | Lat: 45.9987198 | Long: -112.663073 | Datum: WGS84

Soil Map Unit Name: Riverrun, occasionally flooded-Mannixlee, frequently flooded complex | NWI classification: PEM

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

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

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

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

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

Remarks:
Mapped as PEM on NWI however site is highly disturbed and hydrology has been altered to a constructed wetland. Field data indicate a non-wetland at this sample point.

VEGETATION - Use scientific names of plant

Tree Stratum Plot size (30 Foot Radius)

	Absolute % Cover:	Domiant Species?	Indicator Status

Sapling/Shrub Stratum Plot size (15 Foot Radius)

Herbaceous Stratum Plot size (5 Foot Radius)

Elymus repens	30	☑	FAC
Elymus trachycaulus	30	☑	FAC
Poa pratensis	1	☐	FAC
Polemonium pulcherrimum	1	☐	NL
Potentilla anserina	5	☐	OBL
Trifolium cyathiferum	1	☐	FAC

Woody Vine Stratum Plot size (30 Foot Radius)

Percent Bare Ground 35

Dominance Test worksheet

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 % (A/B)

Prevalence Index worksheet

Total % Cover of:			Multiply by:
OBL species	5	X 1	5
FACW species	0	X 2	0
FAC species	62	X 3	186
FACU species	0	X 4	0
UPL species	1	X 5	5
Column Totals	68 (A)		196 (B)

Prevalence Index = B/A = 2.88235

Hydrophytic Vegetation Indicators

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is <= 3.0
- ☐ 4 - Morphological Adaptations (Provide supporting data in remarks or on separate sheet.
- ☐ 5 - Wetland Non-Vascular Plants
- ☐ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric sil and wetland hydrology must be present, unless disturbed or problematic for #3, 4, 5.

Hydrophytic Vegetation Present? Yes ☑ NO ☐

Remarks:

SOIL

Sampling Point: SP-02

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

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: 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)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☑

Remarks:

No hydric soil indicators. Side slope of wetland.

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)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

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, monitoring well, aerial photos, previous inspections), if available:

No evidence of hydrology. No hydric soil indicators. Side slope of wetland cell. 10% slope.

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Silicon Mountain | City/County: Silver Bow | Sampling Date: 6/23/2015

Applicant/Owner: MDT | State: Montana | Sampling Point: SP-03

Investigator(s): RMM, FMM, AP | Section, Township, Range: S 24 T 3N R 9W

Landform (hillslope, terrace, etc.): Valley bottom | Local relief (concave, convex, none): concave | Slope (%): 1

Subregion (LRR): LRR E | Lat: 46.0017937 | Long: -112.660988 | Datum: WGS84

Soil Map Unit Name: Riverrun, occasionally flooded-Mannixlee, frequently flooded complex | NWI classification: Upland

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

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

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

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

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

Remarks:
NWI indicates upland, however this is a newly constructed wetland site.

VEGETATION - Use scientific names of plant

Tree Stratum Plot size (30 Foot Radius)

	Absolute % Cover:	Domiant Species?	Indicator Status

Sapling/Shrub Stratum Plot size (15 Foot Radius)

Herbaceous Stratum Plot size (5 Foot Radius)

Puccinellia nuttalliana	40	☑	FACW
Thlaspi arvense	5	☐	UPL

Woody Vine Stratum Plot size (30 Foot Radius)

Percent Bare Ground 55

Dominance Test worksheet

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 % (A/B)

Prevalence Index worksheet

Total % Cover of:			Multiply by:
OBL species	0	X 1	0
FACW species	40	X 2	80
FAC species	0	X 3	0
FACU species	0	X 4	0
UPL species	5	X 5	25
Column Totals	45 (A)		105 (B)

Prevalence Index = B/A = 2.33333

Hydrophytic Vegetation Indicators

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is <= 3.0
- ☐ 4 - Morphological Adaptations (Provide supporting data in remarks or on separate sheet.
- ☐ 5 - Wetland Non-Vascular Plants
- ☐ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric sil and wetland hydrology must be present, unless disturbed or problematic for #3, 4, 5.

Hydrophytic Vegetation Present? Yes ☑ NO ☐

Remarks:
PEM.

SOIL

Sampling Point: SP-03

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 3/2	100					Sandy Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: 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)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ 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:

Recently constructed wetland. Soil saturated to surface. Soils may be too young to have formed hydric indicators (Problematic Hydric Soils: Recently Developed Wetlands, USACE 2010).

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)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☑ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☑ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☑ No ☐ Depth (inches): 24

Water Table Present? Yes ☐ No ☑ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☑ No ☐ Depth (inches): 0

Wetland Hydrology Present? Yes ☑ No ☐

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

Remarks:

Soil saturated to surface.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Silicon Mountain City/County: Silver Bow Sampling Date: 6/23/2015

Applicant/Owner: MDT State: Montana Sampling Point: SP-04

Investigator(s): RMM, FMM, AP Section, Township, Range: S 24 T 3N R 9W

Landform (hillslope, terrace, etc.): Valley bottom Local relief (concave, convex, none): flat Slope (%): 5

Subregion (LRR): LRR E Lat: 46.0017632 Long: -112.660978 Datum: WGS84

Soil Map Unit Name: Riverrun, occasionally flooded-Mannixlee, frequently flooded complex NWI classification: Upland

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 ☑	Is the Sampled Area within a Wetland? Yes ☐ No ☑
Wetland Hydrology Present?	Yes ☐	No ☑	

Remarks:

VEGETATION - Use scientific names of plant

Tree Stratum Plot size (30 Foot Radius)

	Absolute % Cover:	Domiant Species?	Indicator Status

Sapling/Shrub Stratum Plot size (15 Foot Radius)

Herbaceous Stratum Plot size (5 Foot Radius)

Cirsium arvense	1	☐	FAC
Descurainia sophia	25	☑	NL
Grass sp.	7	☐	
Thlaspi arvense	45	☑	UPL

Woody Vine Stratum Plot size (30 Foot Radius)

Percent Bare Ground 23

Dominance Test worksheet

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 % (A/B)

Prevalence Index worksheet

Total % Cover of:			Multiply by:
OBL species	0	X 1	0
FACW species	0	X 2	0
FAC species	1	X 3	3
FACU species	0	X 4	0
UPL species	77	X 5	385
Column Totals	78 (A)		388 (B)

Prevalence Index = B/A = 4.97436

Hydrophytic Vegetation Indicators

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is <= 3.0
- ☐ 4 - Morphological Adaptations (Provide supporting data in remarks or on separate sheet.
- ☐ 5 - Wetland Non-Vascular Plants
- ☐ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric sil and wetland hydrology must be present, unless disturbed or problematic for #3, 4, 5.

Hydrophytic Vegetation Present? Yes ☐ NO ☑

Remarks:
Highly disturbed.

SOIL

Sampling Point: SP-04

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

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: 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)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ 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 moist. No hydric indicators observed.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

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, monitoring well, aerial photos, previous inspections), if available:

No evidence of hydrology. Side slope of excavated cell.

Remarks:

MDT Montana Wetland Assessment Form (revised March 2008)

1. Project name Silicon Mountain **2. MDT project#** MT-STPX 47(24) **Control#** 6044000

3. Evaluation Date 6/23/2015 **4. Evaluators** McEldowney **5. Wetland/Site# (s)** Created Cells 1 and 5

6. Wetland Location(s): T 3N **R** 9W **Sec1** 24 **T** **R** **Sec2**

Approx Stationing or Mileposts N/A

Watershed 17010201 **Watershed/County** Watershed #2 - Upper Clark Fork of the Columbia River Silverbow County, MT

7. Evaluating Agency Confluence

8. Wetland size acres 3.1

Purpose of Evaluation

How assessed: Measured e.g. by GPS

☐ **Wetlands potentially affected by MDT project**

9. Assesssment area (AA) size (acres) 3.1

☐ **Mitigation Wetlands: pre-construction**

How assessed: Measured e.g. by GPS

☑ **Mitigation Wetlands: post construction**

☐ **Other**

10. Classification of Wetland and Aquatic Habitats in AA

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% of AA
Depressional	Aquatic Bed	Excavated	Permanent/Perennial	95
Depressional	Emergent Wetland	Excavated	Seasonal/Intermittent	5

11. Estimated Relative Abundance 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)

This is year 1 (2015) following construciton so the site is heavily disturbed. The level of disturbance will decrease over time as the site stabilizes and becomes more vegetated.

ii. Prominent noxious, aquatic nuisance, other exotic species:

iii. Provide brief descriptive summary of AA and surrounding land use/habitat

The site is a mitigation site comprised of two separate wetland cells (1 & 5) that are designed to intercept groundwater, and that appear to have a more perennial water source. They have no surface connection to one another. Cell 1 does drain into Sand Creek, but is outside of Sand Creek's active floodplain area, and so is not subject to overbank flooding.

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: PAB, PEM

SECTION PERTAINING to FUNCTIONS VALUES ASSESSMEN

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

i. AA is Documented (D) or Suspected (S) to contain (check one based on definitions contained in instructions):

Primary or critical habitat (list species) ○ D ◉ S

Secondary habitat (list Species) ◉ D ◉ S

Incidental habitat (list species) ◉ D ◉ S

No usable habitat ☑ S

ii. Rating (use the conclusions from i above and the matrix below to arrive at [check] 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	.8H	.7M	.3L	.1L	0L

Sources for documented use USFWS, MTNHP

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 (check one based on definitions contained in instructions):

Primary or critical habitat (list species) ◉ D ◉ S

Secondary habitat (list Species) ○ D ◉ S Hoary bat (S3), Preble's shrew (S3)

Incidental habitat (list species) ◉ D ◉ S

No usable habitat ☐ S

ii. Rating (use the conclusions from i above and the matrix below to arrive at [check] 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 MTNHP

14C. General Wildlife Habitat Rating:

i. Evidence of overall wildlife use in the AA (check substantial, moderate, or low based on supporting evidence): Moderate

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]):

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

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

Structural diversity (see #13)	High								Moderate								Low			
Class cover distribution (all vegetated classes)									Even				Uneven							
Duration of surface water in ñ 10% of AA	P/P					S/I	T/E		P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I		A
Low disturbance at AA (see #12i)	E	E	E	H	E	E	H	H	E	H	H	M		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 [check] 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	

Comments

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 check ☑ **NA** here and proceed to 14E.)

i. Habitat Quality and Known / Suspected Fish Species in AA (use matrix to arrive at [check 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		.3L	.4M	.4M	.4M	.3L	.3L	.2L	.2L	.2L	.2L		.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?* **Y** ○ **N** ◉ *If yes, reduce score in* ***i*** *above by 0.1:* **Modified Rating**

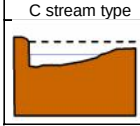
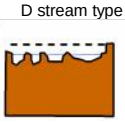
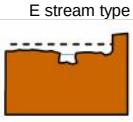
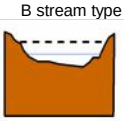
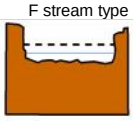
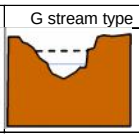
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ○ **Y** ◉ **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating

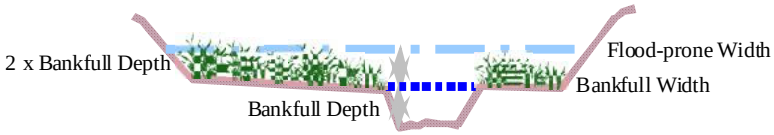
iii. Final Score and Rating: 0 NA **Comments:**

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, click ☐ **NA** here and proceed to 14F.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] 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

Slightly Entrenched ER = >2.2			**Moderately Entrenched ER = 1.41 – 2.2**	**Entrenched ER = 1.0 – 1.4**		
C stream type	D stream type	E stream type	B stream type	A stream type	F stream type	G stream type
						



Floodprone width 75 **/** **Bankfull width** 32 **=** **Entrenchment ratio** 2.34375

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 (check)? **Y** ○ **N** ◉

Comments: AA is <10 acres. Wetland cell impounds water restricting return to Sand Creek. Floodprone width is greater than 75 and entrenchment ratio greater than 2.2.

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, click ☐ **NA** here and proceed to 14G.)

i. Rating (Working from top to bottom, use the matrix below to arrive at [check] 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 ñ **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:

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, click ☐ **NA** here and proceed to 14H.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] 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:

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, click ☐ **NA** here and proceed to 14I.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] 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
ñ **65%**	1H	.9H	.7M
35-64%	.7M	.6M	.5M
< 35%	.3L	.2L	.1L

Comments:

14I. Production Export/Food Chain Support:

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

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 [check] 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	1E	.7H	.8H	.5M	.6M	.4M	.9H	.6M	.7H	.4M	.5M	.3L	.8H	.6M	.6M	.4M	.3L	.2L
S/I	.9H	.6M	.7H	.4M	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7H	.5M	.5M	.3L	.3L	.2L
T/E/A	.8H	.5M	.6M	.3L	.4M	.2L	.7H	.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? **Y** ○ **N** ○ *If yes, add 0.1 to the score in **ii** above and adjust rating accordingly:* **Modified Rating** .7M

Comments: Vegetated component may increase as the site develops.

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
- ☐ Wetland contains an outlet, but no inlet
- ☑ Shallow water table and the site is saturated to the surface
- ☐ Other:

ii. Recharge Indicators

- ☐ Permeable substrate present without underlying impeding layer
- ☐ Wetland contains inlet but no outlet
- ☐ Stream is a known 'losing' stream; discharge volume decreases
- ☐ Other:

iii. Rating (use the information from i and ii above and the table below to arrive at [check] the functional points and rating)

	Duration of saturation at AA Wetlands *FROM GROUNDWATER DISCHARGE OR WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM*			
Criteria	P/P	S/I	T	None
Groundwater Discharge or Recharge	1H	.7M	.4M	.1L
Insufficient Data/Information	NA			

Comments: Wetland mitigation cells with perennial water that intercept groundwater.

14K. Uniqueness:

i. Rating (working from top to bottom, use the matrix below to arrive at [check] 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	.7H	.6M	.6M	.4M	.3L	.3L	.2L	.1L

Comments:

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: (check) **Y** ◉ **N** ○ (if 'Yes' continue with the evaluation; if 'No' then click ☐ **NA** here 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 [check] 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:

Site is a mitigation site that could be used for education purposes, but does not have general public access.

General Site Notes

FUNCTION & VALUE SUMMARY & OVERALL RATING FOR WETLAND/SITE #(S): Created Cells 1 and 5

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	1	0	☐
B. MT Natural Heritage Program Species Habitat	M	.5	1	1.55	☐
C. General Wildlife Habitat	M	.5	1	1.55	☑
D. General Fish Habitat	NA	0	0	0	☐
E. Flood Attenuation	M	.6	1	1.86	☐
F. Short and Long Term Surface Water Storage	H	.8	1	2.48	☑
G. Sediment/Nutrient/Toxicant Removal	M	.7	1	2.17	☐
H. Sediment/Shoreline Stabilization	L	.3	1	0.93	☐
I. Production Export/Food Chain Support	M	.7	1	2.17	☑
J. Groundwater Discharge/Recharge	H	1	1	3.1	☑
K. Uniqueness	L	.3	1	0.93	☐
L. Recreation/Education Potential (bonus points)	L	.05	NA	0.155	☐
Totals:		5.45	10	16.895	
Percent of Possible Score			**54.5** %		

Category I Wetland: (must satisfy **one** of the following criteria; otherwise go to Category II)
- ☐ Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; **or**
- ☐ Score of 1 functional point for Uniqueness; **or**
- ☐ Score of 1 functional point for Flood Attenuation **and** answer to Question 14E.ii is "yes"; **or**
- ☐ Percent of possible score > 80% (round to nearest whole #).

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

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

☑

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; 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:
(check appropriate category based on the criteria outlined above)

I	II	III	IV

MDT Montana Wetland Assessment Form (revised March 2008)

1. Project name Silicon Mountain **2. MDT project#** MT-STPX 47(24) **Control#** 6044000

3. Evaluation Date 6/23/2015 **4. Evaluators** McEldowney **5. Wetland/Site# (s)** Created Cells 2,3, and 4

6. Wetland Location(s): T 3N **R** 9W **Sec1** 24 **T** **R** **Sec2**

Approx Stationing or Mileposts N/A

Watershed 17010201 **Watershed/County** Watershed #2 - Upper Clark Fork of the Columbia River Silverbow County, MT

7. Evaluating Agency MDT

8. Wetland size acres 3.1

Purpose of Evaluation

How assessed: Measured e.g. by GPS

☐ **Wetlands potentially affected by MDT project**

9. Assesssment area (AA) size (acres) 3.1

☐ **Mitigation Wetlands: pre-construction**

How assessed: Measured e.g. by GPS

☑ **Mitigation Wetlands: post construction**

☐ **Other**

10. Classification of Wetland and Aquatic Habitats in AA

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% of AA
Depressional	Emergent Wetland	Excavated	Seasonal/Intermittent	100

11. Estimated Relative Abundance Abundant

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)

The site was recently constructed and so has a very high disturbance level. This internal disturbance level should be reduced over time to reflect the recovery and stabilization of the site. The area surrounding the site is primarily rural, but there are roads, a residence, and some commercial activity.

ii. Prominent noxious, aquatic nuisance, other exotic species:

iii. Provide brief descriptive summary of AA and surrounding land use/habitat

The AA consists of wetland cells constructed to intercept groundwater. This AA is comprised of the wetland cells (2,3,4) that have a more seasonal /intermittent water regime. Sand Creek is not included in this AA because it's the berms surrounding the cells do not allow for the creek to access these areas. The surrounding area is comprised of low rolling hills dominated by sagebrush and grasses.

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: PEM

SECTION PERTAINING to FUNCTIONS VALUES ASSESSMEN

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

i. AA is Documented (D) or Suspected (S) to contain (check one based on definitions contained in instructions):

Primary or critical habitat (list species)	○ D ○ S	
Secondary habitat (list Species)	○ D ○ S	
Incidental habitat (list species)	○ D ○ S	
No usable habitat	☑ S	

ii. Rating (use the conclusions from i above and the matrix below to arrive at [check] 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	.8H	.7M	.3L	.1L	0L

Sources for documented use USFWS, MTNHP

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 (check one based on definitions contained in instructions):

Primary or critical habitat (list species)	○ D ○ S	
Secondary habitat (list Species)	○ D ◉ S	Hoary bat (S3), Preble's shrew (S3)
Incidental habitat (list species)	○ D ○ S	
No usable habitat	☐ S	

ii. Rating (use the conclusions from i above and the matrix below to arrive at [check] 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 MTNHP

14C. General Wildlife Habitat Rating:

i. Evidence of overall wildlife use in the AA (check substantial, moderate, or low based on supporting evidence): Moderate

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]):

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

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

Structural diversity (see #13)	High								Moderate								Low			
Class cover distribution (all vegetated classes)									Even				Uneven							
Duration of surface water in ñ 10% of AA	P/P					S/I	T/E		P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I		A
Low disturbance at AA (see #12i)	E	E	E	H	E	E	H	H	E	H	H	M		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 [check] 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	

Comments

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 check ☑ **NA** here and proceed to 14E.)

i. Habitat Quality and Known / Suspected Fish Species in AA (use matrix to arrive at [check 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		.3L	.4M	.4M	.4M	.3L	.3L	.2L	.2L	.2L	.2L		.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?* **Y** ○ **N** ◉ *If yes, reduce score in* ***i*** *above by 0.1:* **Modified Rating**

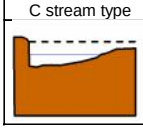
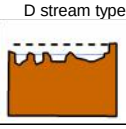
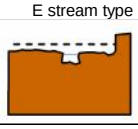
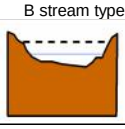
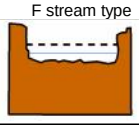
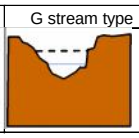
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ○ **Y** ◉ **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating

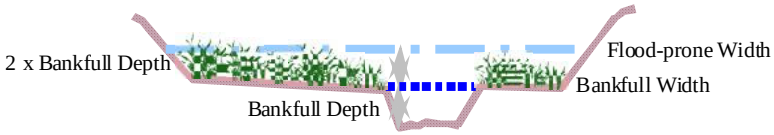
iii. Final Score and Rating: 0 NA **Comments:**

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, click ☑ **NA** here and proceed to 14F.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] 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

Slightly Entrenched ER = >2.2			**Moderately Entrenched ER = 1.41 – 2.2**	**Entrenched ER = 1.0 – 1.4**		
C stream type	D stream type	E stream type	B stream type	A stream type	F stream type	G stream type
						



Floodprone width / **Bankfull width** = **Entrenchment ratio**

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 (check)? **Y** ○ **N** ◉

Comments:

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, click ☐ **NA** here and proceed to 14G.)

i. Rating (Working from top to bottom, use the matrix below to arrive at [check] 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 ñ **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: Wetland cells intercept groundwater.

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, click ☐ **NA** here and proceed to 14H.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] 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: Cells have the potential to receive compounds through groundwater inputs.

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, click ☑ **NA** here and proceed to 14I.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] 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
ñ **65%**	1H	.9H	.7M
35-64%	.7M	.6M	.5M
< 35%	.3L	.2L	.1L

Comments:

14I. Production Export/Food Chain Support:

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

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 [check] 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	1E	.7H	.8H	.5M	.6M	.4M	.9H	.6M	.7H	.4M	.5M	.3L	.8H	.6M	.6M	.4M	.3L	.2L
S/I	.9H	.6M	.7H	.4M	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7H	.5M	.5M	.3L	.3L	.2L
T/E/A	.8H	.5M	.6M	.3L	.4M	.2L	.7H	.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? **Y** ○ **N** ○ *If yes, add 0.1 to the score in **ii** above and adjust rating accordingly:* **Modified Rating** .7M

Comments: Cells contain a subsurface outlet; have vegetated buffers.

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
- ☐ Wetland contains an outlet, but no inlet
- ☑ Shallow water table and the site is saturated to the surface
- ☐ Other:

ii. Recharge Indicators

- ☐ Permeable substrate present without underlying impeding layer
- ☐ Wetland contains inlet but no outlet
- ☐ Stream is a known 'losing' stream; discharge volume decreases
- ☐ Other:

iii. Rating (use the information from i and ii above and the table below to arrive at [check] the functional points and rating)

	Duration of saturation at AA Wetlands *FROM GROUNDWATER DISCHARGE OR WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM*			
Criteria	P/P	S/I	T	None
Groundwater Discharge or Recharge	1H	.7M	.4M	.1L
Insufficient Data/Information	NA			

Comments: Mitigation cells designed to intercept shallow groundwater aquifer.

14K. Uniqueness:

i. Rating (working from top to bottom, use the matrix below to arrive at [check] 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	.7H	.6M	.6M	.4M	.3L	.3L	.2L	.1L

Comments:

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: (check) **Y** ◉ **N** ○ (if 'Yes' continue with the evaluation; if 'No' then click ☐ **NA** here 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 [check] 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:

Site is a mitigation site that could be used for education purposes, but does not have general public access.

General Site Notes

FUNCTION & VALUE SUMMARY & OVERALL RATING FOR WETLAND/SITE #(S): Created Cells 2,3, and 4

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	1	0	☐
B. MT Natural Heritage Program Species Habitat	M	.5	1	1.55	☐
C. General Wildlife Habitat	L	.3	1	0.93	☐
D. General Fish Habitat	NA	0	0	0	☐
E. Flood Attenuation	NA	0	0	0	☐
F. Short and Long Term Surface Water Storage	M	.6	1	1.86	☑
G. Sediment/Nutrient/Toxicant Removal	H	.8	1	2.48	☑
H. Sediment/Shoreline Stabilization	NA	0	0	0	☐
I. Production Export/Food Chain Support	M	.7	1	2.17	☑
J. Groundwater Discharge/Recharge	M	.7	1	2.17	☑
K. Uniqueness	L	.1	1	0.31	☐
L. Recreation/Education Potential (bonus points)	L	.05	NA	0.155	☐
Totals:		3.75	8	11.625	
Percent of Possible Score			**46.88** %		

Category I Wetland: (must satisfy **one** of the following criteria; otherwise go to Category II)
- ☐ Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; **or**
- ☐ Score of 1 functional point for Uniqueness; **or**
- ☐ Score of 1 functional point for Flood Attenuation **and** answer to Question 14E.ii is "yes"; **or**
- ☐ Percent of possible score > 80% (round to nearest whole #).

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

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

☑

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; 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:
(check appropriate category based on the criteria outlined above)

I	II	III	IV

Appendix C

Project Area Photographs

MDT Wetland Mitigation Monitoring
Silicon Mountain
Silver Bow County, Montana

Wetland Project Site Photographs



Photo Point 1 – *Photo 1*

Location: West side of constructed wetland cell 1

Bearing: 333°

Taken in 2015



Photo Point 1 – *Photo 2*

Location: West side of constructed wetland cell 1

Bearing: 26°

Taken in 2015



Photo Point 1 – *Photo 3*

Location: West side of constructed wetland cell 1

Bearing: 86°

Taken in 2015



Photo Point 1 – *Photo 4*

Location: West side of constructed wetland cell 1

Bearing: 166°

Taken in 2015

Wetland Project Site Photographs



Photo Point 1 – *Photo 5*

Location: West side of constructed wetland cell 1

Bearing: 202°

Taken in 2015



Photo Point 2 – *Photo 1*

Location: Outside constructed wetland cell 1

Bearing: 40°

Taken in 2015





Photo Point 2 – *Photo 3*

Location: Outside constructed wetland cell 1

Bearing: 113°

Taken in 2015

Wetland Project Site Photographs



Photo Point 3 – *Photo 1*

Location: west side of constructed wetland cell 4

Bearing: 314°

Taken in 2015



Photo Point 3 – *Photo 2*

Location: west side of constructed wetland cell 4

Bearing: 343°

Taken in 2015



Photo Point 3 – *Photo 3*

Location: west side of constructed wetland cell 4

Bearing: 66°

Taken in 2015



Photo Point 3 – *Photo 4*

Location: west side of constructed wetland cell 4

Bearing: 114°

Taken in 2015

Wetland Project Site Photographs



Photo Point 4 – *Photo 1*

Location: east side of constructed wetland cell 5

Bearing: 220°

Taken in 2015



Photo Point 4 – *Photo 2*

Location: east side of constructed wetland cell 5

Bearing: 268°

Taken in 2015



Photo Point 4 – *Photo 3*

Location: east side of constructed wetland cell 5

Bearing: 321°

Taken in 2015



Photo Point 4 – *Photo 4*

Location: east side of constructed wetland cell 5

Bearing: 24°

Taken in 2015

Wetland Project Site Photographs



Photo Point 4 – *Photo 5*

Location: east side of constructed wetland cell 5

Bearing: 56°

Taken in 2015



Photo Point 5 – *Photo 1*

Location: north end of T-1, constructed wetland cell 3

Bearing: 145°

Taken in 2015



Photo Point 5 – *Photo 2*

Location: north end of T-1, constructed wetland cell 3

Bearing: 345°

Taken in 2015



Photo Point 6 – *Photo 1*

Location: south end of T-1, constructed wetland cell 2

Bearing: 326°

Taken in 2015

Wetland Project Site Photographs



Photo Point 6 – *Photo 2*

Location: south end of T-1, constructed wetland cell 2

Bearing: 352°

Taken in 2015



Photo Point 7 – *Photo 1*

Location: Cell #6, near Project boundary west side of railroad tracks.

Bearing: 95°

Taken in 2015

Wetland Project Site Photographs



Transect 1 – *Start*

Location: south end of wetland cell 2

Taken in 2015



Transect 1 – *End*

Location: west side of wetland cell 3

Taken in 2015



Transect 2 – *Start*

Location: west side of wetland cell 4 facing east

Taken in 2015



Transect 2 – *End*

Location: east side of wetland cell 4 facing west

Taken in 2015

Wetland Project Site Photographs



Data Point – *SP-01*

Location: east side of wetland cell 3

Taken in 2015



Data Point – *SP-01*

Location: east side of wetland cell 3

Taken in 2015



Data Point – *SP-02*

Location: Near wetland cell 3

Taken in 2015



Data Point – *SP-02*

Location: Near wetland cell 3

Taken in 2015

Wetland Project Site Photographs



Data Point – *SP-03*

Location: south end of wetland cell 5

Taken in 2015



Data Point – *SP-03*

Location: south end of wetland cell 5

Taken in 2015



Data Point – *SP-04*

Location: south end of wetland cell 5

Taken in 2015



Data Point – *SP-04*

Location: south end of wetland cell 5

Taken in 2015

Stream Project Site Photographs



Photo Point 8 – *Photo 1*

Location: north facing at southern edge of project. Upstream end.

Taken in 2015



Photo Point 8 – *Photo 2*

Location: north facing at southern edge of project. Upstream end.

Taken in 2015





Stream Project Site Photographs



Photo Point 10 – *Photo 1*

Taken in 2015



Photo Point 10 – *Photo 2*

Taken in 2015



Photo Point 11 – *Photo 1*

Taken in 2015



Stream Project Site Photographs



Photo Point 11 – *Photo 3*

Taken in 2015



Photo Point 12 – *Photo 1* **Location:** south facing

Taken in 2015



Photo Point 12 – *Photo 2* **Location:** southwest facing

Taken in 2015



Stream Project Site Photographs



Photo Point 12 – *Photo 4* **Location:** northwest facing

Taken in 2015



Photo Point 13 – *Photo 1* **Location:** southeast facing

Taken in 2015





Stream Project Site Photographs



Photo Point 15 – *Photo 1* **Location:** eastern headcut

Taken in 2015



Photo Point 16 – *Photo 1* **Location:** headcut

Taken in 2015



Photo Point 17 – *Photo 1* **Location:** west facing

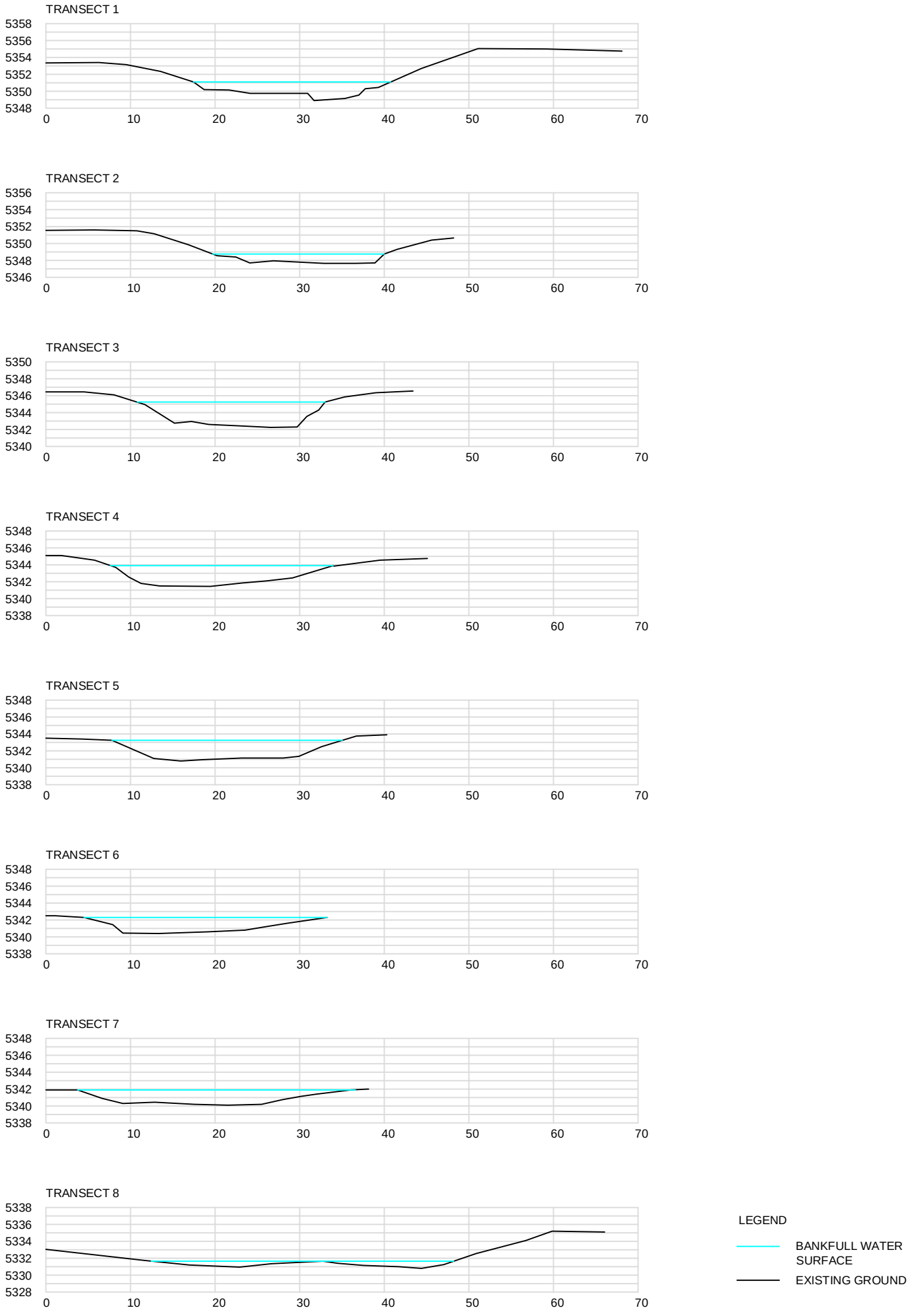
Taken in 2015



Appendix D

Surveyed Stream Cross Sections

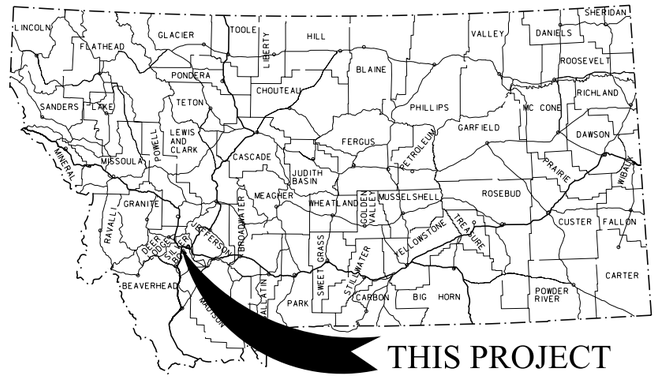
MDT Wetland Mitigation Monitoring
Silicon Mountain
Silver Bow County, Montana


TRANSECT 1
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5356
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5352
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5348
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TRANSECT 2
5356
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TRANSECT 3
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TRANSECT 7
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5342
5340
5338
0 10 20 30 40 50 60 70
TRANSECT 8
5338
5336
5334
5332
5330
5328
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LEGEND
BANKFULL WATER SURFACE
EXISTING GROUND

Appendix E

Project Plan Sheet

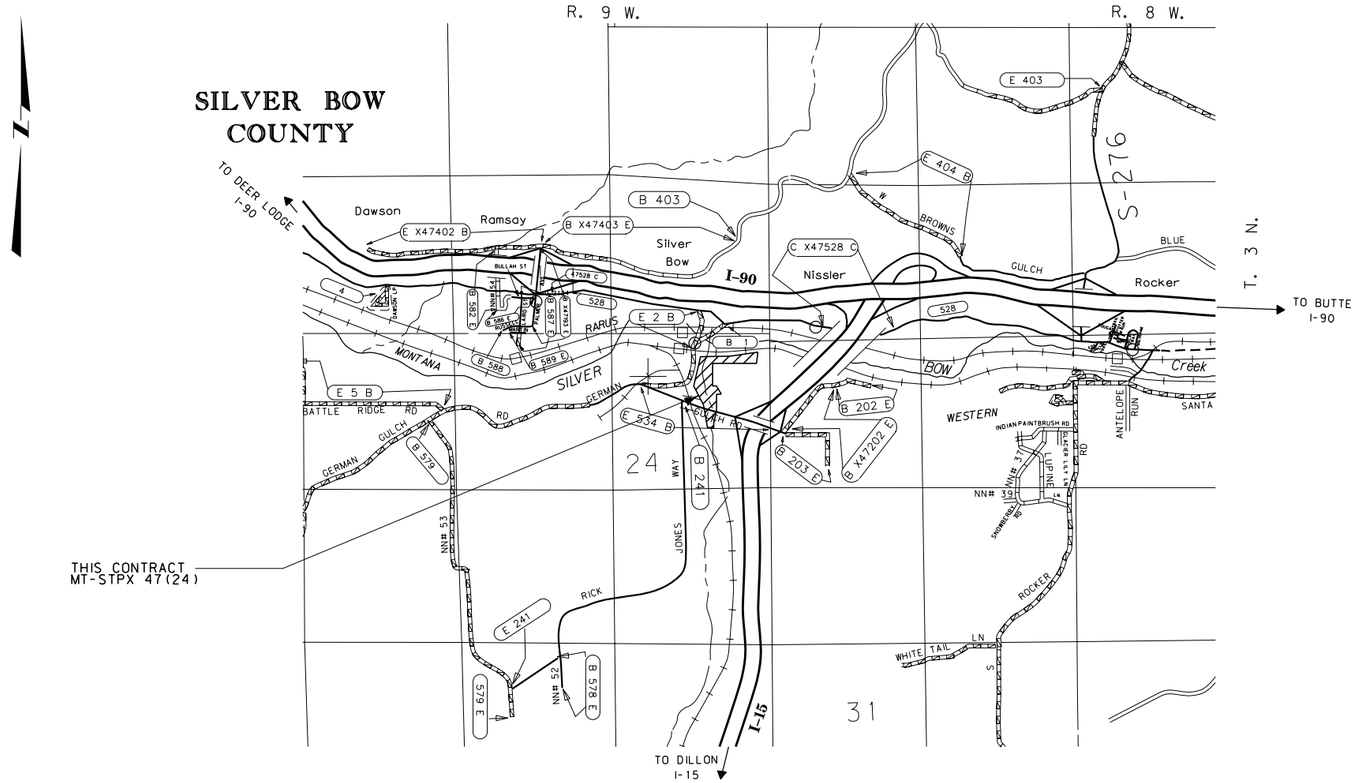
MDT Wetland Mitigation Monitoring
Silicon Mountain
Silver Bow County, Montana



MONTANA DEPARTMENT OF TRANSPORTATION

FEDERAL AID PROJECT MT-STPX 47(24)
STREAM & WETLAND MITIGATION
SILICON MTN AQUATIC RESOURCE MITIGATION SITE
SILVER BOW COUNTY

LENGTH N/A MILES



PLANS PREPARED BY
WETLAND DESIGN: ATKINS NORTH AMERICA 820 NORTH MONTANA AVE. SUITE A HELENA, MT 59601 PH: (406) 495-1377 FAX: (406) 495-1379 PLANS: ROBERT PECCIA & ASSOCIATES 825 CUSTER AVENUE P.O. BOX 5653 HELENA, MONTANA 59601 PH: (406) 447-5000 FAX: (406) 447-5036

ATKINS NORTH AMERICA, INC.	
BY _____ DATE _____	
MONTANA DEPARTMENT OF TRANSPORTATION	
RECEIVED : BY _____ _____ CONSULTANT DESIGN ENGINEER DATE	
U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION	
APPROVED : _____ _____ DIVISION ADMINISTRATOR DATE	

ASSOCIATED PROJECT AGREEMENT NUMBERS	
P. E.	MT-STPX 47(24)

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\6044000rdttlz01.dgn	DESIGNED BY			MITIGATION PLANS	
2		5/9/2013	REVIEWED BY			UPN 6044000	
1		8:25:28 AM CPS - U0208	CHECKED BY				

CSF= 0.99929379

ATKINS

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SAND CREEK	1-9

NOTES

CLEARING AND GRUBBING

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

WETLANDS

WETLANDS EXIST BEYOND THE PROJECT LIMITS. WETLAND AREAS AND PERMITTED WETLAND IMPACT AREAS WITHIN THE PROJECT LIMITS HAVE BEEN DELINEATED AND ARE SHOWN ON THE PLANS. ANY ACTION IMPACTING WETLAND AREAS WITHOUT THE APPROPRIATE PERMITTING IS THE RESPONSIBILITY OF THE CONTRACTOR.

DELINEATED WETLAND AREAS

PERMITTED WETLAND IMPACTED AREAS

MITIGATED WETLAND

UTILITIES

CALL THE UTILITIES UNDERGROUND LOCATION CENTER (1-800-424-5555) 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.

PUBLIC LAND SURVEY MONUMENTS

ALL MONUMENTS TO BE REMOVED AND RELOCATED OR RESET BY STATE FORCES.

LEVEL DATA

BEARING SOURCE

GRID – MONTANA COORDINATE SYSTEM NAD 83–1992

LEVEL DATUM SOURCE

LEVEL DATUM SOURCE IS NAVD 88. ELEVATIONS DERIVED FROM DIFFERENTIAL LEVELS HOLDING BM R314.

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\6044000rdttlz01.dgn	DESIGNED BY			MITIGATION PLANS	SILICON MTN AQUATIC RESOURCE MITIGATION SITE	MT-STPX 47(24)
2		5/9/2013	REVIEWED BY					
1		8:25:31 AM CPS - U0208	CHECKED BY			SILVER BOW COUNTY	CSF= 0.99929379	SHEET 2

CONTROL DIAGRAM

SCALE: 1"=400'

NOTE:
THIS PROJECT IS ON THE MONTANA COORDINATE SYSTEM NAD83-1992.
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 0.99929379.

△G6044

CONTROL ABSTRACT

POINT NAME/NUMBER	N OR Y COORDINATE	E OR X COORDINATE	POINT ELEVATION	LOCATION AND DESCRIPTION
A6044	652,579.438	1,167,123.106	5,391.46	SET 2" ALUMINUM CAP STAMPED "A6044 2007", 3' EAST OF WITNESS POST, AT MP 0.04 ALONG PAVED ROAD L47534, 227' WEST OF WEST BRIDGE END AT VICTOR (SILVERBOW) INTERCHANGE, 192' NORTH OF PTW L47534, 8' WEST OF EDGE OF GRAVEL ROAD.
B6044	652,728.141	1,166,246.962	5,358.81	SET 2" ALUMINUM CAP STAMPED "B6044 2007", 3' NORTH OF WITNESS POST, AT MP 0.21 ALONG PAVED ROAD L47534, 103' SOUTH OF PTW L47534, 20' WEST OF EDGE OF SILVERBOW DRIVE-IN ROAD, 3.8' EAST OF NORTH/SOUTH CROSS FENCE, 6.5' NORTHWEST OF MOVIE THEATER SIGN.
C6044	653,698.175	1,166,091.077	5,352.24	SET 2" ALUMINUM CAP STAMPED "C6044 2007", 3' SOUTH OF WITNESS POST, AT MP 0.32 ALONG PAVED ROAD L47534, 1070' NORTHWEST OF PTW L47534, ALONG DEAD END GRAVEL ROAD, 17' NORTH OF CROSS FENCE CORNER POST, 17' WEST OF PTW OF GRAVEL ROAD, 112' SOUTH OF TELEPHONE POLE.
D6044	653,402.004	1,165,247.842	5,376.68	SET 2" ALUMINUM CAP STAMPED "D6044 2007", 3' NORTH OF WITNESS POST, AT MP 0.43 ALONG PAVED ROAD L47534, 20' SOUTH OF PTW L47534, 17' SOUTHEAST OF SOUTHEAST BRIDGE CORNER OVER TRACKS, 5' SOUTH OF BACK OF GUARD RAIL.
E6044	653,629.471	1,164,448.074	5,363.13	SET 2" ALUMINUM CAP STAMPED "E6044 2007", 3' NORTH OF WITNESS POST, AT MP 0.59 ALONG PAVED ROAD L47534, 140' SOUTH OF PTW L47534, 25' EAST OF EDGE OF PAVEMENT OF RICK JONES WAY, 72' SOUTH OF STOP AHEAD TRAFFIC SIGN, 32' WEST OF FENCE CORNER.
F6044	653,908.161	1,164,457.887	5,362.80	SET 2" ALUMINUM CAP STAMPED "F6044 2007", 3' SOUTH OF WITNESS POST, AT MP 0.61 ALONG PAVED ROAD L47534, 29' NORTH OF PTW L47534, 18' NORTH OF FACE OF GUARD RAIL, 37' NORTHWEST OF STOP SIGN, 42' SOUTH OF GAS LINE (6" WOOD POST).
G6044	654,482.233	1,163,575.353	5,341.86	SET 2" ALUMINUM CAP STAMPED "G6044 2007", 3' NORTH OF WITNESS POST, AT MP 0.80 ALONG PAVED ROAD L47534. 97' NORTH OF PTW L47534, 36' NORTHWEST OF SILVERBOW ROAD PTW, 16' NORTH OF SILVER BOW ROAD SIGN.



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3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\6044000rdtrvz01.dgn	DESIGNED BY			MITIGATION PLANS		SILICON MTN AQUATIC RESOURCE MITIGATION SITE	MT-STPX 47(24)
2		5/9/2013	REVIEWED BY						
1		8:25:44 AM CPS - U0208	CHECKED BY			SILVER BOW COUNTY		CSF= 0.99929379 UPN 6044000	SHEET 3

SUMMARY

GRADING

STATION	cubic yards			REMARKS
	UNCL. EXC. Δ	EXCESS EXC.	EMB.+	
WETLAND 1	14,695			
WETLAND 2	9,985			
WETLAND 3	5,710			
WETLAND 4	15,850			
WETLAND 5	15,125			
CHANNEL	6,355		70	SAND CREEK REALIGNMENT
CHANNEL PLUGS			20	
TOTAL	67,720	# 67,630	# 90	MT FUNDS

FOR INFORMATION ONLY, SEE ROAD PLANS
Δ INCLUDES OVEREXCAVATION FOR TOPSOIL

RANDOM RIPRAP

STATION	cubic yards		square yards			REMARKS
	RANDOM RIPRAP		COIR NETTING			
	CL. 1					
26+10	10		20			HEAD CUT TREATMENT RT., SEE DETAIL
26+65	10		20			HEAD CUT TREATMENT RT., SEE DETAIL
TOTAL	20		#			STPX FUNDS

FOR INFORMATION ONLY, INCLUDED IN COST OF RANDOM RIPRAP

REVEGETATION & CHANNEL RESTORATION

STATION		square yards	cubic yards			lump sum			REMARKS
		COIR NETTING	CHANNEL EXC.	EMB.+		WILLOW CUTTINGS	TREE & SHRUB PLANTING	BIO-ENGINEERED BANK	
FROM	TO								
0+00	24+29	7,708	6,355	70					SAND CREEK CHANNEL
TOTAL		#	*	*		1.0	1.0	1.0	STPX FUNDS

FOR INFORMATION ONLY, INCLUDED IN COST OF BIOENGINEERED BANK
* INCLUDED IN GRADING SUMMARY

MISCELLANEOUS ITEMS

STATION		units	lump sum	each	REMARKS
FROM	TO				
WETLAND SITE		2,000			NOXIOUS WEED CONTROL
			1.0		ABANDON 4 WELLS, SEE SITE PLANS FOR LOCATIONS
				1	ADJUST MONITOR WELL, MODIFY P-3 CASING & REPLACE CAP
TOTAL		2,000	1.0	1	STPX FUNDS

TOPSOIL & SEEDING

STATION		cubic yards		acres				REMARKS
		TOPSOIL SALVAGING & PLACING *	WETLAND SOIL SALVAGE & PLACE	WETLAND SEEDING			CONDITION SEEDBED	
FROM	TO			UPLAND	WETLAND			
WETLAND 1		2,045			1.3			
WETLAND 2		1,870			0.9			
WETLAND 3		1,065			0.8			
WETLAND 4		1,850			1.1			
WETLAND 5		1,565			1.1			
NEW CHANNEL		285	76	0.9			0.9	NEW AND STABILIZED STREAMBANKS
EXISTING WETLANDS			# 2,769					SALVAGE FROM IMPACTED WETLANDS
				4.1			4.1	DISTURBED AREA OUTSIDE NEW WETLANDS, INCL. CHANNEL
TOTAL		8,680	76	5.0	5.2		5.0	STPX FUNDS

* WETLANDS ONLY - 6" TOPSOIL AND 2" WETLAND SOIL SALVAGE AND PLACEMENT DEPTH IN BOTTOM, 6" TOPSOIL ON SIDE SLOPES
# FOR INFORMATION ONLY, SEE ROAD PLANS

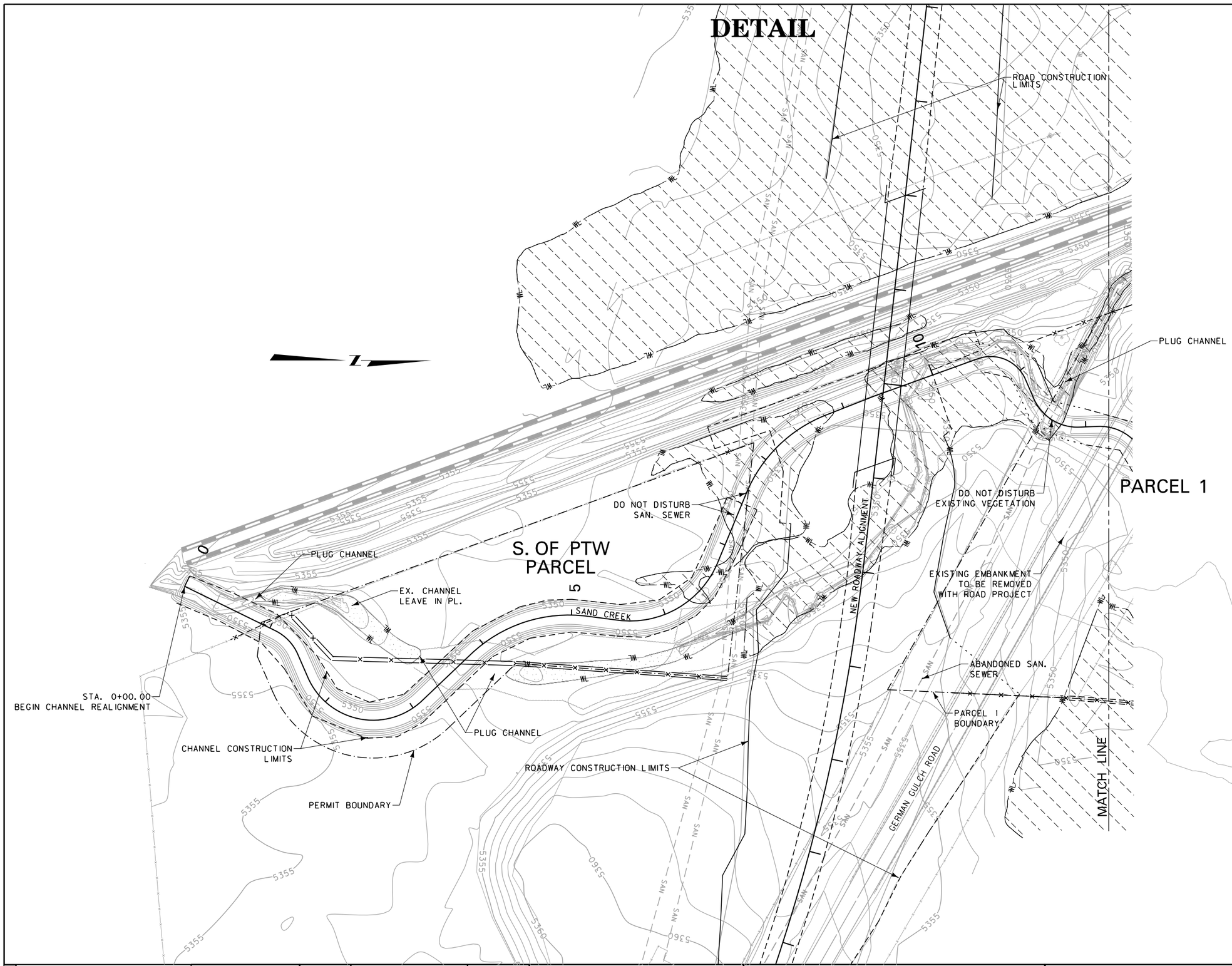
FENCING *

STATION		linear feet				each			linear feet		REMARKS
		FARM FENCE WILDLIFE FRIENDLY		FARM FENCE F4W @	JACKLEG FENCE - POLE	FARM FENCE PANEL - FW		DEADMAN	FARM GATE		
FROM	TO	FW TY. 1	FM TY. 1			SINGLE	DOUBLE			TYPE G3	
PARCEL 1		2,543			620	3	11				
PARCEL 2		5,367			1,035	8	18			36	3 - 12' GATES
S. OF PTW PARCEL			484	110		2	5				
TOTAL		7,910	484	110	1,655	13	34	4		36	STPX FUNDS

* REMOVAL AND DISPOSAL OF EXISTING FENCE INCLUDED IN NEW FENCE BID ITEMS
@ REPLACE DISTURBED FENCE WITH NEW FENCE, MATCH EXISTING

ATKINS

DETAIL



SITE PLAN
S. OF PTW PARCEL

SCALE: 1" = 100'

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3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\6044000rddetz04.dgn	DESIGNED BY			MITIGATION PLANS	SILICON MTN AQUATIC RESOURCE MITIGATION SITE	MT-STPX 47(24)
2		5/9/2013	REVIEWED BY					
1		8:26:10 AM CPS-U0208	CHECKED BY			SILVER BOW COUNTY	CSF= 0.99929379 UPN 6044000	SHEET 5

DETAIL

ATKINS

PROPOSED WETLAND 6
SEE ROAD PLANS

ROAD CONSTRUCTION LIMITS

PARCEL 1

WB9
(DO NOT DISTURB)

BANK STABILIZATION #3

WB8
(TO BE ABANDONED)

PROPOSED WETLAND 3

STA. 24+29.00
END CHANNEL RESTORATION
BEGIN CHANNEL ENHANCEMENT
(NOT THIS CONTRACT)

REVEGETATION
(NOT THIS CONTRACT)

PLUG CHANNEL

GERMAN GULCH ROAD

BANK STABILIZATION #2

REVEGETATION

PROPOSED WETLAND 2

HEAD CUT TREATMENT

PROPOSED WETLAND 1

WB7
(TO BE ABANDONED)

DO NOT DISTURB
EXISTING VEGETATION

EXISTING EMBANKMENT
TO BE REMOVED
WITH ROAD PROJECT

NEW ROADWAY ALIGNMENT

SAND CREEK

WB10
(DO NOT DISTURB)

(DO NOT DISTURB)
WB11

STA. 13+30.75
END CHANNEL REALIGNMENT
BEGIN CHANNEL RESTORATION

BANK STABILIZATION #1

ABANDONED SAN. SEWER

DO NOT DISTURB EXISTING WETLANDS

MATCH LINE

PARCEL BOUNDARY

MATCH LINE
PARCEL 2

A A′ CROSS SECTION LOCATION

STREAM CENTERLINE

PARCEL BOUNDARY

DELINEATED WETLAND

REVEGETATION ZONE

REVEGETATION ZONE
(NOT THIS CONTRACT)

HEAD CUT TREATMENT

BANK STABILIZATION

EXTENT OF CELL SURFACE WATER

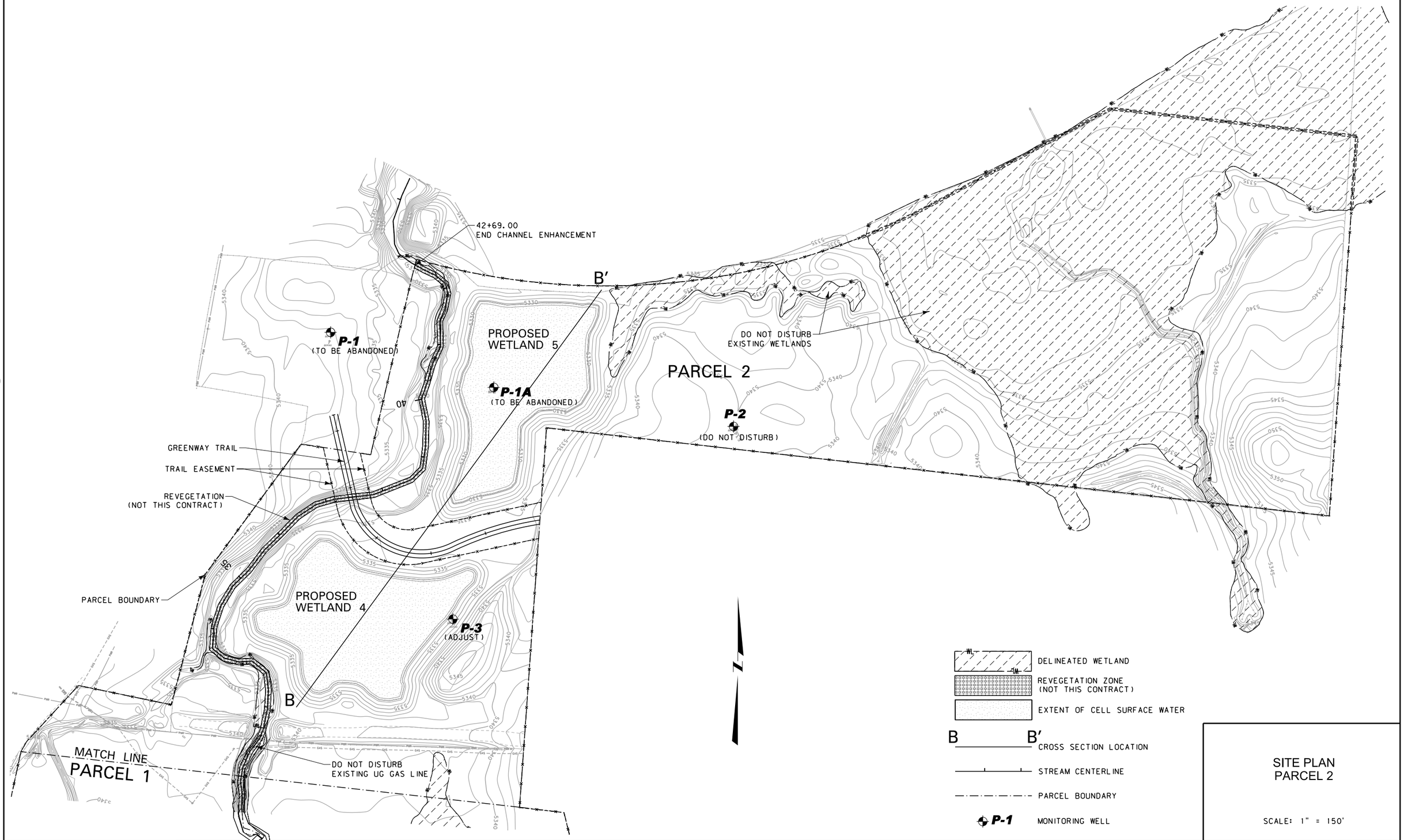
WB11 MONITORING WELL

SITE PLAN
PARCEL 1

SCALE: 1" = 100'

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\6044000rddetz04.dgn	DESIGNED BY		MITIGATION PLANS	SILICON MTN AQUATIC RESOURCE MITIGATION SITE	MT-STPX 47(24)
2		5/9/2013	REVIEWED BY		SILVER BOW COUNTY	CSF= 0.99929379 / UPN 6044000	SHEET 6
1		8:26:15 AM CPS-U0208	CHECKED BY				

DETAIL

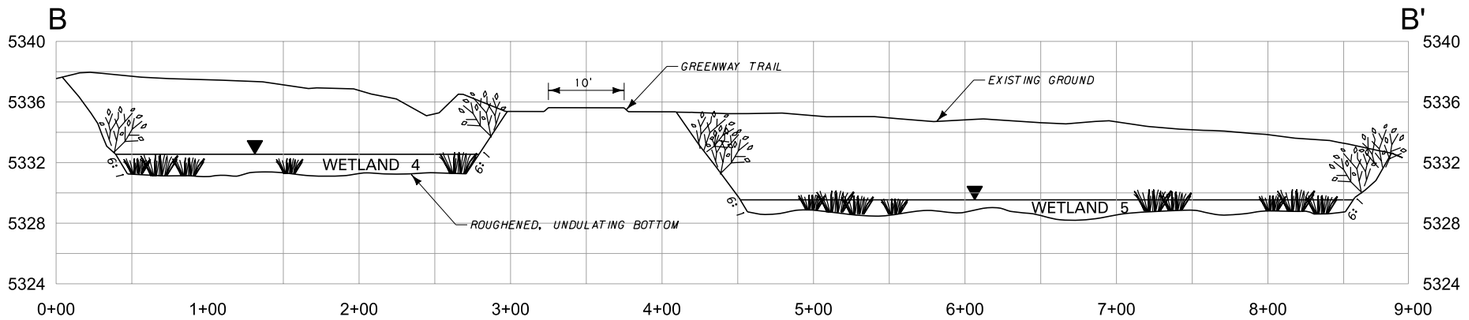


SITE PLAN
PARCEL 2

SCALE: 1" = 150'

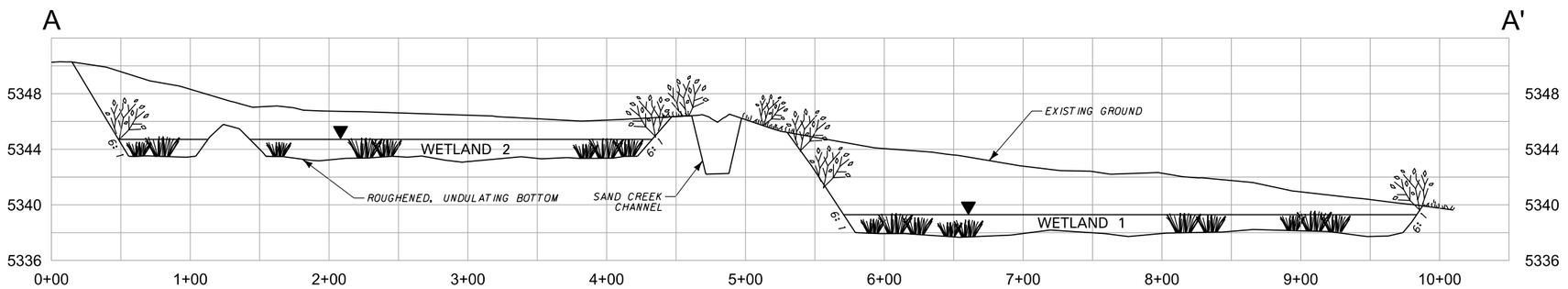
3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\6044000rddetz04.dgn	DESIGNED BY			MITIGATION PLANS	SILICON MTN AQUATIC RESOURCE MITIGATION SITE	MT-STPX 47(24)
2		5/9/2013	REVIEWED BY			SILVER BOW COUNTY	CSF= 0.99929379 / UPN 6044000	SHEET 7
1		8:26:21 AM CPS-U0208	CHECKED BY					

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CROSS SECTION B - B'

SCALE: HORIZONTAL - 1" = 100'
VERTICAL - 1" = 10'



CROSS SECTION A – A'

SCALE: HORIZONTAL - 1" = 100'
VERTICAL - 1" = 10'

NOTES:

1. SEE SHEETS 6 & 7 FOR CROSS SECTION LOCATIONS.
2. FINISHED GROUND IS FINAL GROUND SURFACE AFTER TOPSOIL APPLICATION. DOES NOT REFLECT OVEREXCAVATION.
2. VEGETATION IS SHOWN FOR ILLUSTRATIVE PURPOSES ONLY.

WETLAND
CROSS SECTIONS

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\6044000rddetz01.dgn	DESIGNED BY			MITIGATION PLANS		SILICON MTN AQUATIC RESOURCE MITIGATION SITE	MT-STPX 47(24)
2		5/9/2013	REVIEWED BY			SILVER BOW COUNTY		CSF= 0.99929379 / UPN 6044000	SHEET 8
1		8:26:31 AM CPS - U0208	CHECKED BY						

DETAIL



WETLAND 1 COORDINATE TABLE			
POINT	N OR Y COORDINATE	E OR X COORDINATE	FINISHED BOTTOM ELEVATION
A1	654,261.045	1,165,536.091	5338.00
A2	654,246.196	1,165,538.350	5338.00
A3	654,210.843	1,165,520.152	5338.00
A4	654,191.214	1,165,512.650	5338.00
A5	654,161.759	1,165,519.385	5338.00
A6	654,105.498	1,165,550.485	5338.00
A7	654,089.406	1,165,545.905	5338.00
A8	654,078.392	1,165,527.335	5338.00
A9	654,024.216	1,165,472.773	5338.00
A10	653,985.276	1,165,466.067	5338.00
A11	653,939.580	1,165,488.217	5338.00
A12	653,918.367	1,165,525.345	5338.00
A13	653,893.367	1,165,515.718	5338.00
A14	653,876.808	1,165,516.517	5338.00
A15	653,867.013	1,165,513.838	5338.00
A16	653,861.738	1,165,497.533	5338.00
A17	653,868.330	1,165,448.412	5338.00
A18	653,841.778	1,165,378.466	5338.00
A19	653,841.695	1,165,328.419	5338.00
A20	653,855.561	1,165,305.669	5338.00
A21	653,885.310	1,165,284.868	5338.00
A22	653,952.146	1,165,259.996	5338.00
A23	653,982.105	1,165,271.414	5338.00
A24	653,990.283	1,165,293.148	5338.00
A25	653,967.480	1,165,364.453	5338.00
A26	654,014.062	1,165,392.698	5338.00
A27	654,048.069	1,165,422.176	5338.00
A28	654,078.753	1,165,471.826	5338.00
A29	654,132.318	1,165,464.983	5338.00
A30	654,176.414	1,165,424.442	5338.00
A31	654,214.166	1,165,396.602	5338.00
A32	654,241.328	1,165,402.094	5338.00
A33	654,248.646	1,165,443.314	5338.00
A34	654,232.070	1,165,470.282	5338.00
A35	654,255.732	1,165,499.600	5338.00
A36	654,263.466	1,165,517.311	5338.00

NOTES:

WETLAND 1
DESIGN WATER ELEVATION: 5339.92
MAXIMUM DEPTH BELOW DESIGN WATER ELEVATION: 1.92'
WATER SURFACE AREA: 1.57 ac.

ALL ELEVATIONS ARE FINAL AFTER TOPSOIL REPLACEMENT. OVEREXCAVATE WETLAND BOTTOM TO ALLOW FOR 8" OF TOPSOIL/WETLAND SOIL PLACEMENT. OVEREXCAVATE WETLAND SIDES SLOPES TO ALLOW FOR 6" OF TOPSOIL PLACEMENT.

EXCAVATE ALL WETLAND SIDE SLOPES TO BE 6:1 OR FLATTER. ROUND CUT SLOPES AND BLEND WITH EXISTING TERRAIN. ROUGHEN WETLAND BOTTOM TO PROVIDE AN UNDULATING SURFACE.

WETLAND 1 GRADING PLAN

SCALE: 1" = 100'

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3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\6044000rddetz02.dgn	DESIGNED BY			MITIGATION PLANS	SILICON MTN AQUATIC RESOURCE MITIGATION SITE	MT-STPX 47(24)
2		5/9/2013	REVIEWED BY					
1		8:26:47 AM CPS - U0208	CHECKED BY			SILVER BOW COUNTY	CSF= 0.99929379 UPN 6044000	SHEET 9

DETAIL



WETLAND 2 COORDINATE TABLE			
POINT	N OR Y COORDINATE	E OR X COORDINATE	FINISHED BOTTOM ELEVATION
B1	653,734.687	1,165,473.444	5343.50
B2	653,680.626	1,165,509.361	5343.50
B3	653,563.988	1,165,491.167	5343.50
B4	653,512.343	1,165,500.145	5343.50
B5	653,476.565	1,165,446.140	5343.50
B6	653,434.316	1,165,368.036	5343.50
B7	653,401.835	1,165,368.502	5343.50
B8	653,385.599	1,165,388.451	5343.50
B9	653,349.454	1,165,379.512	5343.50
B10	653,365.577	1,165,332.314	5343.50
B11	653,415.368	1,165,310.180	5343.50
B12	653,433.255	1,165,307.534	5343.50
B13	653,457.534	1,165,275.632	5343.50
B14	653,475.950	1,165,259.950	5343.50
B15	653,511.674	1,165,246.791	5343.50
B16	653,560.112	1,165,220.547	5343.50
B17	653,570.719	1,165,234.956	5343.50
B18	653,560.605	1,165,271.464	5343.50
B19	653,566.979	1,165,310.334	5343.50
B20	653,652.574	1,165,348.397	5343.50
B21	653,697.372	1,165,399.513	5343.50
B22	653,723.155	1,165,435,252	5343.50

NOTES:

WETLAND 2
DESIGN WATER ELEVATION: 5345.17
MAXIMUM DEPTH BELOW DESIGN WATER ELEVATION: 1.67'
WATER SURFACE AREA: 1.34 ac.

ALL ELEVATIONS ARE FINAL AFTER TOPSOIL REPLACEMENT. OVEREXCAVATE WETLAND BOTTOM TO ALLOW FOR 8" OF TOPSOIL/WETLAND SOIL PLACEMENT. OVEREXCAVATE WETLAND SIDES SLOPES TO ALLOW FOR 6" OF TOPSOIL PLACEMENT.

EXCAVATE ALL WETLAND SIDE SLOPES TO BE 6:1 OR FLATTER. ROUND CUT SLOPES AND BLEND WITH EXISTING TERRAIN. ROUGHEN WETLAND BOTTOM TO PROVIDE AN UNDULATING SURFACE.

WETLAND 2 GRADING PLAN

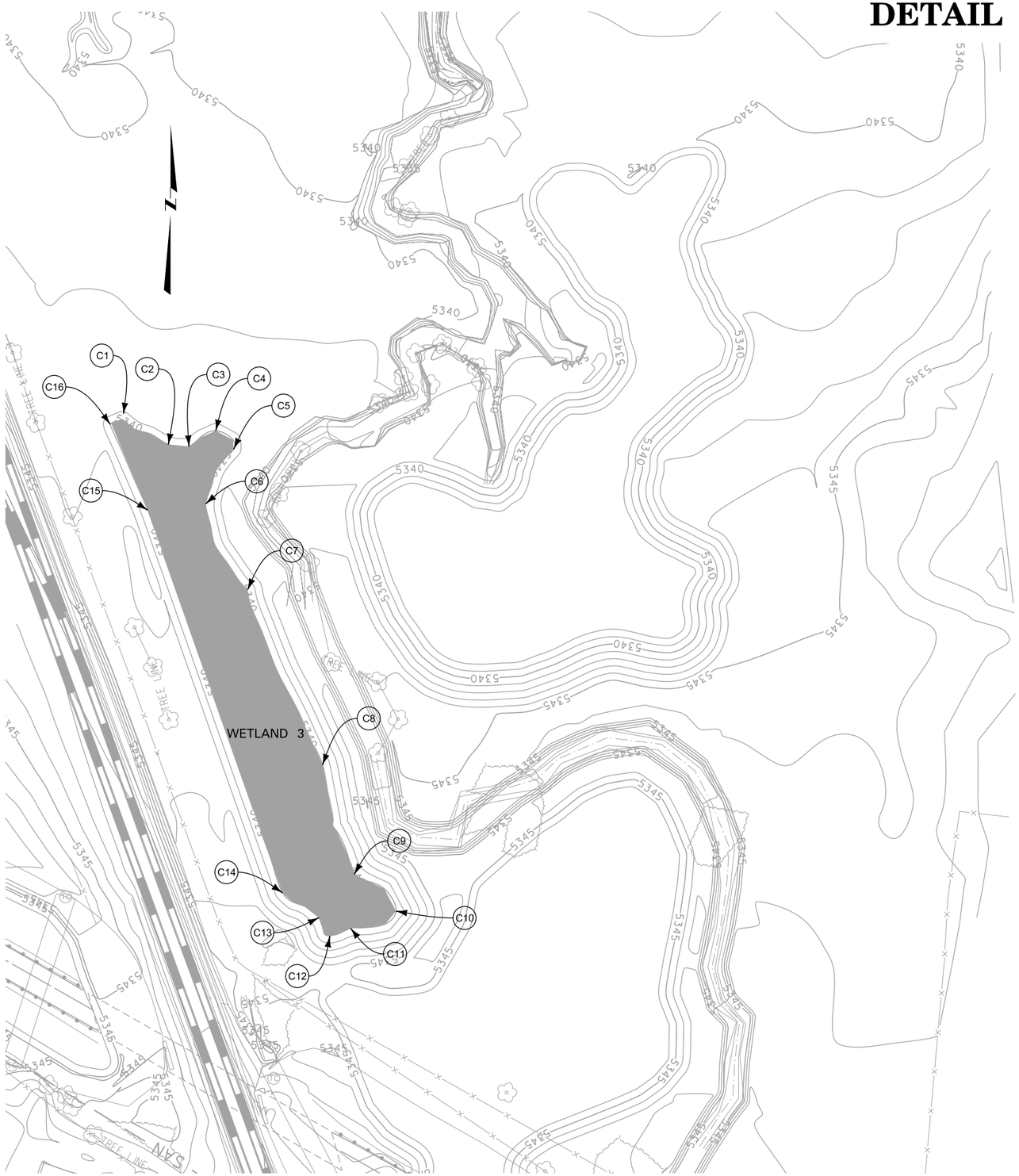
SCALE: 1" = 100'

ATKINS

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\6044000rddetz02.dgn	DESIGNED BY			MITIGATION PLANS	
2		5/9/2013	REVIEWED BY			SILVER BOW COUNTY	
1		8:26:55 AM CPS - U0208	CHECKED BY				

SILICON MTN AQUATIC RESOURCE MITIGATION SITE		MT-STPX 47(24)
CSF: 0.99929379	UPN 6044000	SHEET 10

DETAIL



WETLAND 3 COORDINATE TABLE			
POINT	N OR Y COORDINATE	E OR X COORDINATE	FINISHED BOTTOM ELEVATION
C1	654,044.272	1,165,048.177	5340.00
C2	654,022.724	1,165,086.803	5340.00
C3	654,021.212	1,165,104.081	5340.00
C4	654,034.267	1,165,126.324	5340.00
C5	654,019.044	1,165,141.277	5340.00
C6	653,973.462	1,165,117.896	5340.00
C7	653,902.022	1,165,152.925	5340.00
C8	653,756.071	1,165,215.225	5340.00
C9	653,664.941	1,165,241.634	5340.00
C10	653,634.380	1,165,276.411	5340.00
C11	653,620.116	1,165,238.654	5340.00
C12	653,613.523	1,165,221.257	5340.00
C13	653,628.891	1,165,212.154	5340.00
C14	653,649.655	1,165,181.866	5340.00
C15	653,968.185	1,165,069.696	5340.00
C16	654,039.714	1,165,038.437	5340.00

NOTES:

WETLAND 3
DESIGN WATER ELEVATION: 5341.67
MAXIMUM DEPTH BELOW DESIGN WATER ELEVATION: 1.67'
WATER SURFACE AREA: 0.74 ac.

ALL ELEVATIONS ARE FINAL AFTER TOPSOIL REPLACEMENT. OVEREXCAVATE WETLAND BOTTOM TO ALLOW FOR 8" OF TOPSOIL/WETLAND SOIL PLACEMENT. OVEREXCAVATE WETLAND SIDES SLOPES TO ALLOW FOR 6" OF TOPSOIL PLACEMENT.

EXCAVATE ALL WETLAND SIDE SLOPES TO BE 6:1 OR FLATTER. ROUND CUT SLOPES AND BLEND WITH EXISTING TERRAIN. ROUGHEN WETLAND BOTTOM TO PROVIDE AN UNDULATING SURFACE.

WETLAND 3 GRADING PLAN

SCALE: 1" = 100'

ATKINS

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\6044000rddetz02.dgn	DESIGNED BY			MITIGATION PLANS	SILICON MTN AQUATIC RESOURCES MITIGATION SITE	MT-STPX 47(24)
2		5/9/2013	REVIEWED BY			SILVER BOW COUNTY	CSF= 0.99929379 / UPN 6044000	SHEET 11
1		8:27:02 AM CPS - U0208	CHECKED BY					

DETAIL



WETLAND 4 COORDINATE TABLE			
POINT	N OR Y COORDINATE	E OR X COORDINATE	FINISHED BOTTOM ELEVATION
D1	654,762.818	1,165,701.607	5331.25
D2	654,745.678	1,165,684.327	5331.25
D3	654,703.089	1,165,656.647	5331.25
D4	654,659.129	1,165,618.833	5331.25
D5	654,617.522	1,165,587.010	5331.25
D6	654,584.127	1,165,578.271	5331.25
D7	654,565.593	1,165,576.895	5331.25
D8	654,564.123	1,165,547.973	5331.25
D9	654,584.799	1,165,521.801	5331.25
D10	654,593.838	1,165,491.871	5331.25
D11	654,589.318	1,165,462.229	5331.25
D12	654,576.043	1,165,442.572	5331.25
D13	654,590.502	1,165,423.398	5331.25
D14	654,635.394	1,165,418.414	5331.25
D15	654,652.635	1,165,404.820	5331.25
D16	654,671.509	1,165,364.955	5331.25
D17	654,680.624	1,165,342.442	5331.25
D18	654,698.982	1,165,338.198	5331.25
D19	654,703.784	1,165,342.461	5331.25
D20	654,714.713	1,165,388.124	5331.25
D21	654,766.155	1,165,409.718	5331.25
D22	654,780.829	1,165,407.971	5331.25
D23	654,815.773	1,165,436.797	5331.25
D24	654,822.888	1,165,456.950	5331.25
D25	654,802.092	1,165,479.119	5331.25
D26	654,775.642	1,165,503.974	5331.25
D27	654,754.830	1,165,622.075	5331.25
D28	654,758.156	1,165,656.876	5331.25
D29	654,773.706	1,165,695.634	5331.25
D30	654,771.307	1,165,703.687	5331.25

NOTES:

WETLAND 4
DESIGN WATER ELEVATION: 5332.55
MAXIMUM DEPTH BELOW DESIGN WATER ELEVATION: 1.30'
WATER SURFACE AREA: 1.53 ac.

ALL ELEVATIONS ARE FINAL AFTER TOPSOIL REPLACEMENT. OVEREXCAVATE WETLAND BOTTOM TO ALLOW FOR 8" OF TOPSOIL/WETLAND SOIL MIXTURE PLACEMENT. OVEREXCAVATE WETLAND SIDES SLOPES TO ALLOW FOR 6" OF TOPSOIL PLACEMENT.

EXCAVATE ALL WETLAND SIDE SLOPES TO BE 6:1 OR FLATTER. ROUND CUT SLOPES AND BLEND WITH EXISTING TERRAIN. ROUGHEN WETLAND BOTTOM TO PROVIDE AN UNDULATING SURFACE.

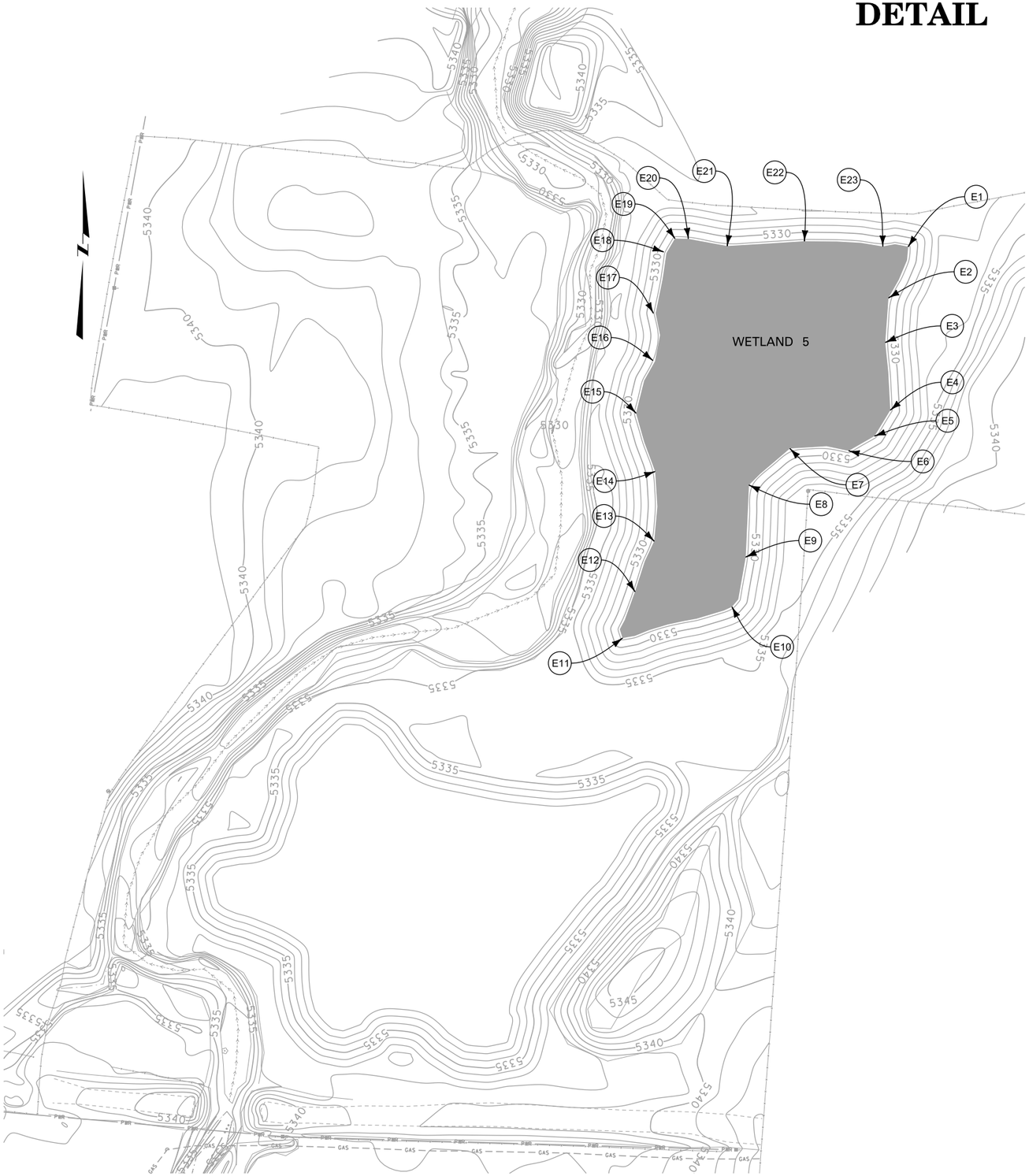
WETLAND 4 GRADING PLAN

SCALE: 1" = 100'

ATKINS

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\6044000rddetz03.dgn	DESIGNED BY		MITIGATION PLANS	SILICON MTN AQUATIC RESOURCE MITIGATION SITE	MT-STPX 47(24)
2		5/9/2013	REVIEWED BY				
1		8:27:15 AM CPS - U0208	CHECKED BY		SILVER BOW COUNTY	CSF= 0.99929379 UPN 6044000	SHEET 12

DETAIL



WETLAND 5 COORDINATE TABLE			
POINT	N OR Y COORDINATE	E OR X COORDINATE	ELEVATION
E1	655,228.583	1,165,916.459	5328.75
E2	655,185.593	1,165,899.933	5328.75
E3	655,148.247	1,165,897.233	5328.75
E4	655,091.528	1,165,901.444	5328.75
E5	655,069.890	1,165,888.316	5328.75
E6	655,057.452	1,165,866.561	5328.75
E7	655,059.409	1,165,817.352	5328.75
E8	655,028.795	1,165,783.053	5328.75
E9	654,968.417	1,165,780.334	5328.75
E10	654,926.774	1,165,768.776	5328.75
E11	654,900.553	1,165,677.123	5328.75
E12	654,939.434	1,165,687.548	5328.75
E13	654,981.750	1,165,703.619	5328.75
E14	655,040.159	1,165,704.434	5328.75
E15	655,089.018	1,165,688.428	5328.75
E16	655,132.517	1,165,704.307	5328.75
E17	655,172.743	1,165,704.863	5328.75
E18	655,223.169	1,165,713.897	5328.75
E19	655,235.361	1,165,721.024	5328.75
E20	655,235.087	1,165,732.316	5328.75
E21	655,229.115	1,165,764.798	5328.75
E22	655,233.111	1,165,829.475	5328.75
E23	655,228.759	1,165,895.123	5328.75

NOTES:

WETLAND 5
DESIGN WATER ELEVATION: 5329.70
MAXIMUM DEPTH BELOW DESIGN WATER ELEVATION: 0.95'
WATER SURFACE AREA: 1.26 ac.

ALL ELEVATIONS ARE FINAL AFTER TOPSOIL REPLACEMENT. OVEREXCAVATE WETLAND BOTTOM TO ALLOW FOR 8" OF TOPSOIL/WETLAND SOIL MIXTURE PLACEMENT. OVEREXCAVATE WETLAND SIDES SLOPES TO ALLOW FOR 6" OF TOPSOIL PLACEMENT.

EXCAVATE ALL WETLAND SIDE SLOPES TO BE 6:1 OR FLATTER. ROUND CUT SLOPES AND BLEND WITH EXISTING TERRAIN. ROUGHEN WETLAND BOTTOM TO PROVIDE AN UNDULATING SURFACE.

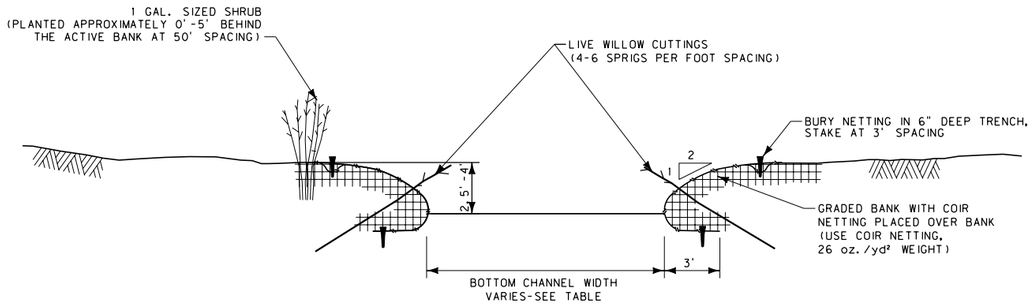
WETLAND 5 GRADING PLAN

SCALE: 1" = 100'

ATKINS

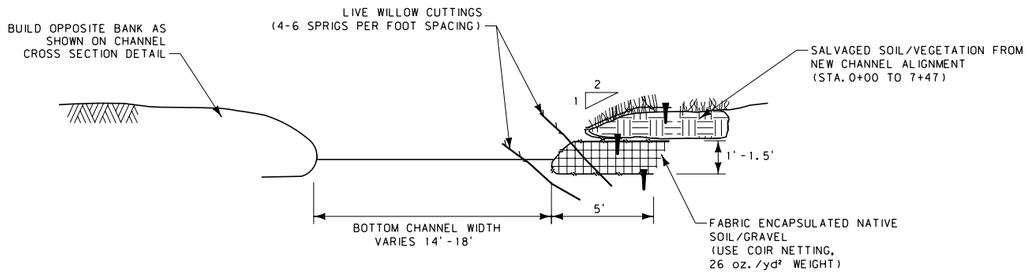
3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\6044000rddetz03.dgn	DESIGNED BY			MITIGATION PLANS	SILICON MTN AQUATIC RESOURCE MITIGATION SITE	MT-STPX 47(24)
2		5/9/2013	REVIEWED BY					
1		8:27:22 AM CPS - U0208	CHECKED BY			SILVER BOW COUNTY	CSF= 0.99929379 UPN 6044000	SHEET 13

DETAIL



CHANNEL
CROSS SECTION

CHANNEL DIMENSIONS			
STATION		CHANNEL BOTTOM WIDTH (ft.)	REMARKS
FROM	TO		
0+00	6+80	18	
6+80	7+47	VARIES	TRANSITION WIDTH
7+47	10+53	22	NOT THIS CONTRACT, DO NOT DISTURB
10+53	11+33	VARIES	TRANSITION WIDTH
11+33	24+29	14	



BANK STABILIZATION
(RIGHT OR LEFT BANK AS INDICATED)

16+68.55 TO 18+64.42 RT.
19+12.75 TO 20+80.04 LT.
22+99.91 TO 23+77.57 LT.

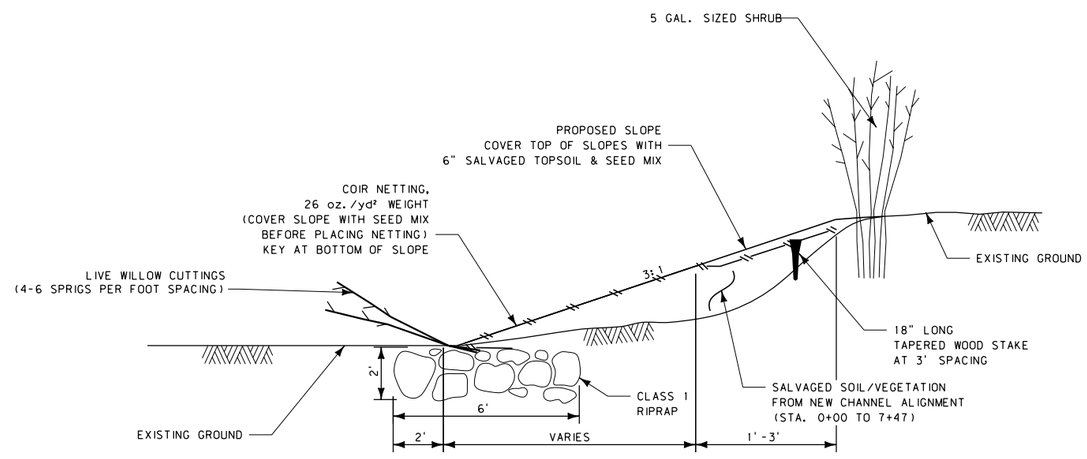
BIOENGINEERED BANK
NEW CHANNEL - 0+00 TO 7+47, 10+53 TO 13+31
EXISTING CHANNEL - 13+31 TO 24+29
NOT TO SCALE

BIOENGINEERED BANK & HEAD CUT TREATMENT QUANTITIES*				
LOCATION	square yards		cubic yards	REMARKS
	COIR NETTING #	COIR NETTING @	RANDOM RIPRAP CL. 1	
TYPICAL CHANNEL BANKS	6,453			
BANK STABILIZATION		1,255		
HEAD CUT TREATMENT	40		20	

* FOR ESTIMATING PURPOSES ONLY
# 13.1' (4 m) WIDE ROLL
@ 9.8' (3 m) WIDE ROLL

PLANTING QUANTITIES**	
SPECIES	each
WILLOW CUTTINGS	30,000
Buffaloberry (Shepherdia argentea) - 1 GALLON	200
Buffaloberry (Shepherdia argentea) - 5 GALLON	10
Black cottonwood (Populus trichocarpa)	50

** FOR ESTIMATING PURPOSES ONLY
SEE DETAILS FOR LOCATIONS



HEAD CUT
TREATMENT DETAIL
26+10 RT. & 26+65 RT.

SECTION C–C', SHEET 6

BIOENGINEERED BANK &
HEAD CUT TREATMENT

NOT TO SCALE

ATKINS

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\6044000rddetz01.dgn	DESIGNED BY			MITIGATION PLANS		SILICON MTN AQUATIC RESOURCE MITIGATION SITE	MT-STPX 47(24)
2		5/9/2013	REVIEWED BY						
1		8:27:31 AM CPS - U0208	CHECKED BY			SILVER BOW COUNTY		CSF= 0.99929379 UPN 6044000	SHEET 14

ATKINS

UTILITY CROSSINGS
7+21.84 SAN. SEWER X-ING, APPROX. 6.5' DEEP
7+62.59 SAN SEWER X-ING, APPROX. 6.5' DEEP

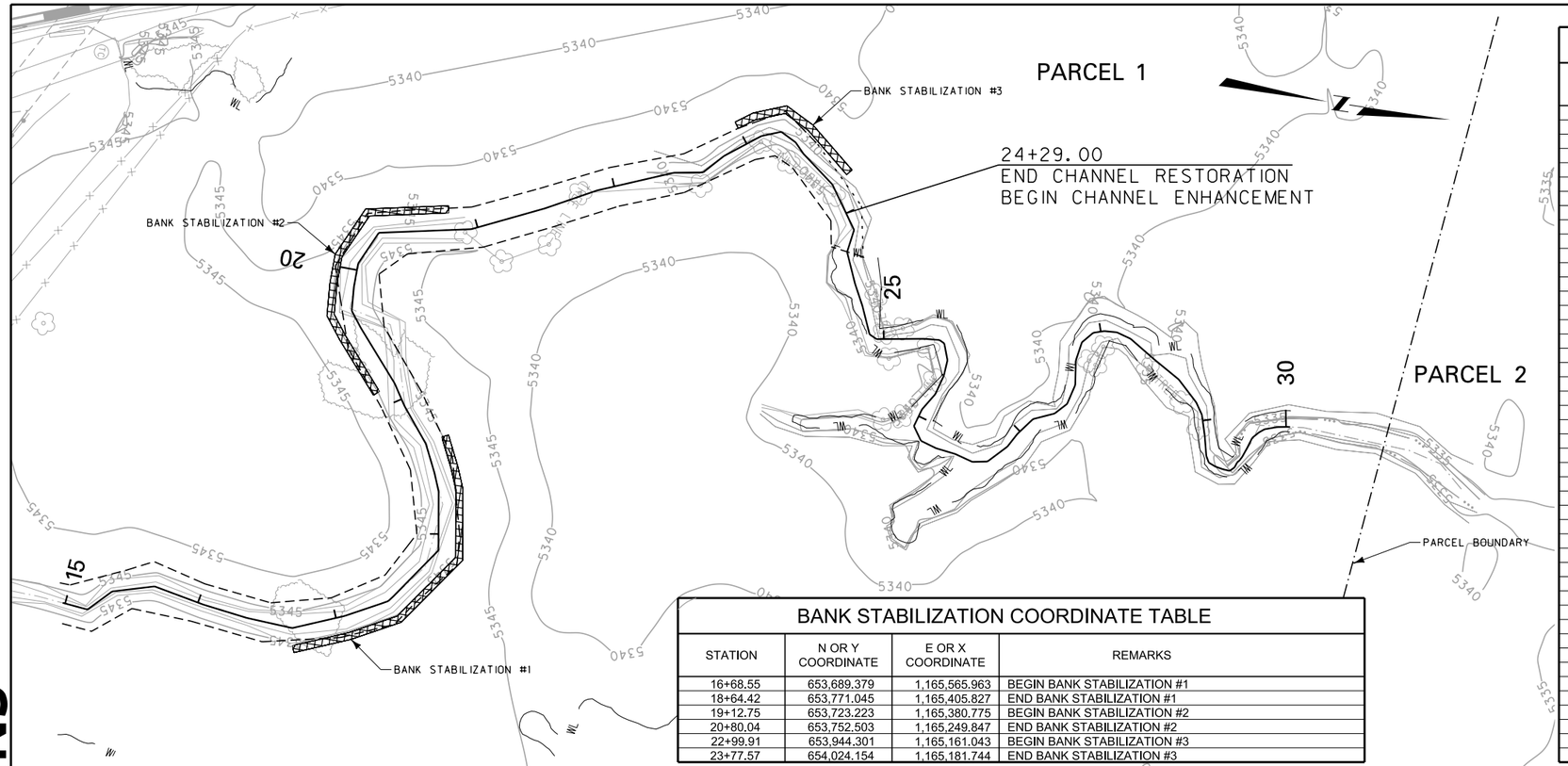
CENTERLINE COORDINATE TABLE				
STATION	DESCRIPTION	N OR Y COORDINATE	E OR X COORDINATE	REMARKS
0+00.00	POT	652,334.708	1,165,585.957	BEGIN CHANNEL REALIGNMENT
1+06.24	PC	652,430.136	1,165,632.646	
1+24.62	PI	652,446.648	1,165,640.725	
1+41.47	PT	652,453.995	1,165,657.575	
1+68.24	PC	652,464.694	1,165,682.113	
2+75.41	PI	652,507.527	1,165,780.350	
3+12.26	PT	652,585.152	1,165,706.461	
3+83.15	PC	652,636.496	1,165,657.588	
4+54.61	PI	652,688.255	1,165,608.321	
5+16.52	PT	652,759.124	1,165,617.472	
5+49.36	PC	652,791.694	1,165,621.678	
6+25.98	PI	652,867.678	1,165,631.489	
6+80.12	PT	652,896.926	1,165,560.676	
7+47.27	POT	652,922.562	1,165,498.607	END CHANNEL REALIGNMENT
7+58.98	PC	652,927.034	1,165,487.782	
8+22.93	PI	652,951.445	1,165,428.679	
8+79.87	PT	653,010.990	1,165,405.367	
9+34.06	PC	653,061.428	1,165,385.563	
9+71.27	PI	653,096.432	1,165,372.938	
10+08.48	PT	653,131.437	1,165,360.315	
10+50.47	PC	653,170.934	1,165,346.071	
10+53.45	POC	653,173.768	1,165,345.156	BEGIN CHANNEL REALIGNMENT
10+88.19	PI	653,206.370	1,165,333.150	
11+10.95	PT	653,221.349	1,165,367.766	
11+32.99	PC	653,230.101	1,165,387.993	
11+67.18	PI	653,243.676	1,165,419.366	
11+92.96	PT	653,277.837	1,165,418.102	
12+13.39	PC	653,298.250	1,165,417.348	
12+50.59	PI	653,335.428	1,165,415.973	
12+77.36	PT	653,347.426	1,165,451.188	
12+93.76	PC	653,352.715	1,165,466.710	
13+13.15	PI	653,358.968	1,165,485.065	
13+30.75	PT	653,375.963	1,165,494.404	END CHANNEL REALIGNMENT

PLUG EXISTING CHANNEL
LEAVE EXISTING CHANNEL IN PLACE
PLUG EXISTING CHANNEL
LEAVE EXISTING CHANNEL IN PLACE
CONSTRUCTION PERMIT BOUNDARY
ROADWAY CONSTRUCTION LIMITS
CHANNEL CONSTRUCTION LIMITS
7+47.27 END CHANNEL REALIGNMENT
S. OF PTW PARCEL
0+00.00 BEGIN CHANNEL REALIGNMENT
NEW ROAD ALIGNMENT
10+53.45 BEGIN CHANNEL REALIGNMENT
LEAVE EXISTING CHANNEL IN PLACE
PLUG EXISTING CHANNEL
DO NOT DISTURB EXISTING VEGETATION
DO NOT DISTURB EXISTING VEGETATION
EXISTING EMBANKMENT TO BE REMOVED WITH ROAD PROJECT
PARCEL BOUNDARY
PARCEL 1
13+30.75 END CHANNEL REALIGNMENT BEGIN CHANNEL RESTORATION

CHANNEL REALIGNMENT
CONSTRUCTED WITH ROAD PROJECT NOT THIS CONTRACT
CHANNEL REALIGNMENT
CHANNEL RESTORATION
BERM REMOVED WITH SILICON MOUNTAIN TECHNOLOGY PARK PROJECT
EXISTING GROUND
PROPOSED CHANNEL PROFILE
7+47.27 EL. 5,347.80
10+53.45 EL. 5,346.75
13+30.75 EL. 5,345.17
-0.310%
-0.343%
-0.570%
CHANNEL SPLIT
DO NOT DISTURB
DO NOT DISTURB

5370 5360 5350 5340 5330
0 5 10 15

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\6044000rdplpz01.dgn	DESIGNED BY			MITIGATION PLANS	SILICON MTN AQUATIC RESOURCE MITIGATION SITE	MT-STPX 47(24)
2		5/9/2013	REVIEWED BY					
1		8:27:44 AM CPS-U0208	CHECKED BY			SILVER BOW COUNTY	CSF= 0.99929379 UPN 6044000	SHEET 15

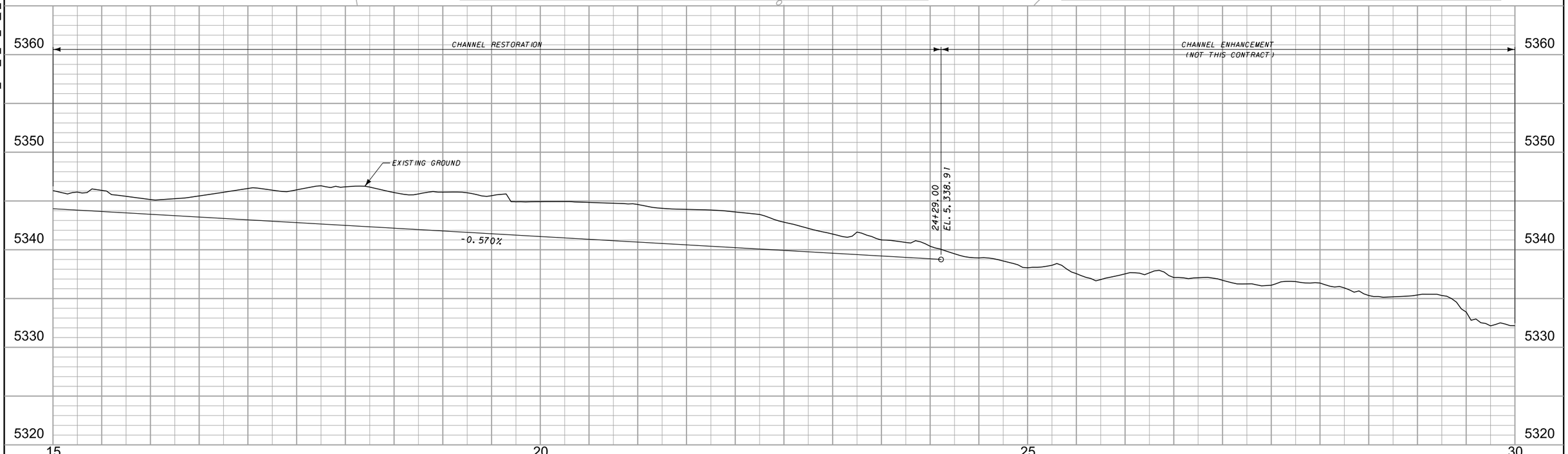


BANK STABILIZATION COORDINATE TABLE

STATION	N OR Y COORDINATE	E OR X COORDINATE	REMARKS
16+68.55	653,689.379	1,165,565.963	BEGIN BANK STABILIZATION #1
18+64.42	653,771.045	1,165,405.827	END BANK STABILIZATION #1
19+12.75	653,723.223	1,165,380.775	BEGIN BANK STABILIZATION #2
20+80.04	653,752.503	1,165,249.847	END BANK STABILIZATION #2
22+99.91	653,944.301	1,165,161.043	BEGIN BANK STABILIZATION #3
23+77.57	654,024.154	1,165,181.744	END BANK STABILIZATION #3

CENTERLINE COORDINATE TABLE

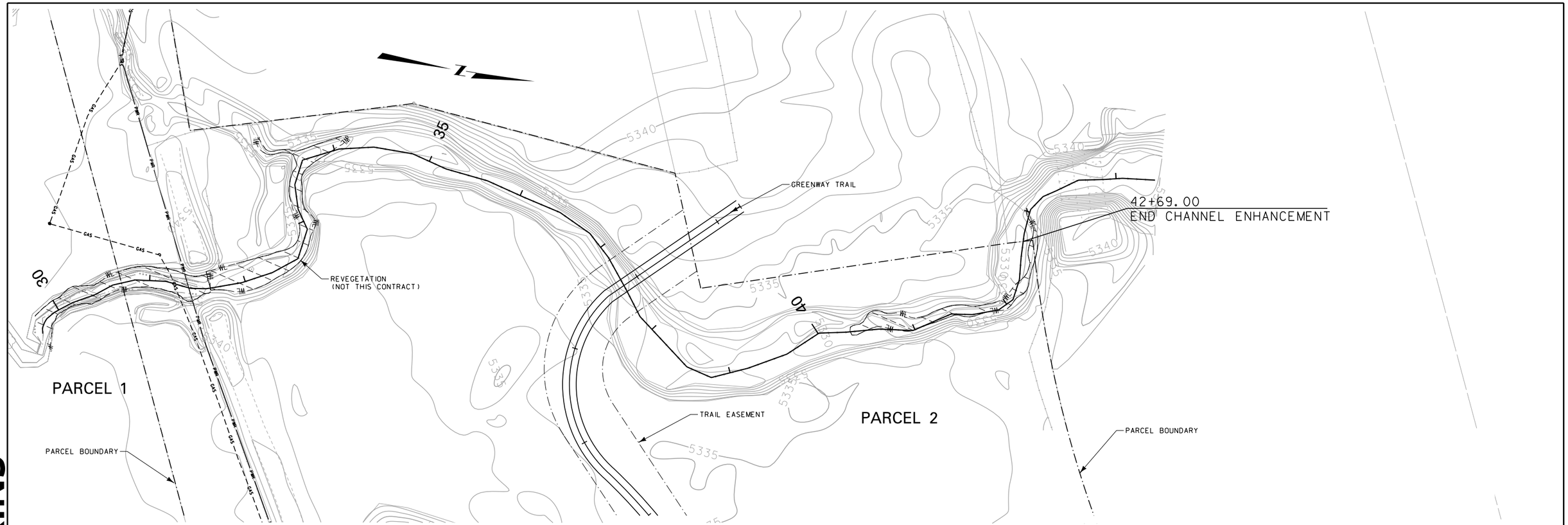
STATION	DESCRIPTION	N OR Y COORDINATE	E OR X COORDINATE	REMARKS
13+30.75	PT	653,375.963	1,165,494.404	BEGIN CHANNEL RESTORATION
13+56.77	POT	653,398.718	1,165,507.005	
13+78.58	POT	653,417.755	1,165,517.659	
14+02.40	POT	653,438.543	1,165,529.293	
14+20.46	POT	653,453.807	1,165,538.940	
14+35.47	POT	653,466.496	1,165,546.960	
14+51.95	POT	653,479.694	1,165,556.833	
14+80.60	POT	653,508.306	1,165,558.282	
15+02.63	POT	653,530.191	1,165,560.804	
15+16.25	POT	653,543.723	1,165,562.363	
15+37.66	POT	653,558.896	1,165,547.256	
15+67.61	POT	653,587.770	1,165,539.313	
15+98.00	POT	653,617.510	1,165,545.579	
16+04.11	POT	653,623.488	1,165,546.839	
16+15.91	POT	653,635.152	1,165,548.575	
16+35.85	POT	653,654.880	1,165,551.512	
16+68.55	POT	653,687.498	1,165,553.801	
16+82.08	POT	653,700.079	1,165,548.821	
17+06.05	POT	653,722.365	1,165,540.000	
17+32.62	POT	653,745.998	1,165,527.846	
17+38.47	POT	653,751.158	1,165,525.098	
17+43.06	POT	653,754.030	1,165,521.512	
17+88.51	POT	653,780.672	1,165,484.695	
18+29.69	POT	653,774.660	1,165,443.957	
18+43.19	POT	653,769.762	1,165,431.371	
18+64.42	POT	653,760.755	1,165,412.149	
18+95.09	POT	653,741.864	1,165,387.994	
19+11.91	POT	653,732.963	1,165,373.715	
19+57.76	POT	653,703.534	1,165,338.564	
19+71.17	POT	653,695.561	1,165,327.783	
19+88.15	POT	653,694.537	1,165,310.829	
20+04.61	POT	653,695.053	1,165,294.376	
20+30.58	POT	653,706.169	1,165,270.905	
20+95.42	POT	653,769.858	1,165,258.752	
21+49.10	POT	653,818.760	1,165,236.621	
21+87.56	POT	653,852.852	1,165,218.818	
22+42.83	POT	653,904.249	1,165,198.499	
22+63.35	POT	653,924.508	1,165,195.201	
22+81.91	POT	653,937.218	1,165,181.680	
23+11.65	POT	653,961.072	1,165,163.920	
23+25.87	POT	653,974.382	1,165,158.904	
23+38.39	POT	653,985.461	1,165,164.736	
23+48.10	POT	653,992.084	1,165,171.840	
23+77.57	POT	654,015.272	1,165,190.028	
24+12.92	POT	654,035.104	1,165,219.288	
24+29.00	POT	654,032.595	1,165,235.170	END CHANNEL RESTORATION



ATKINS

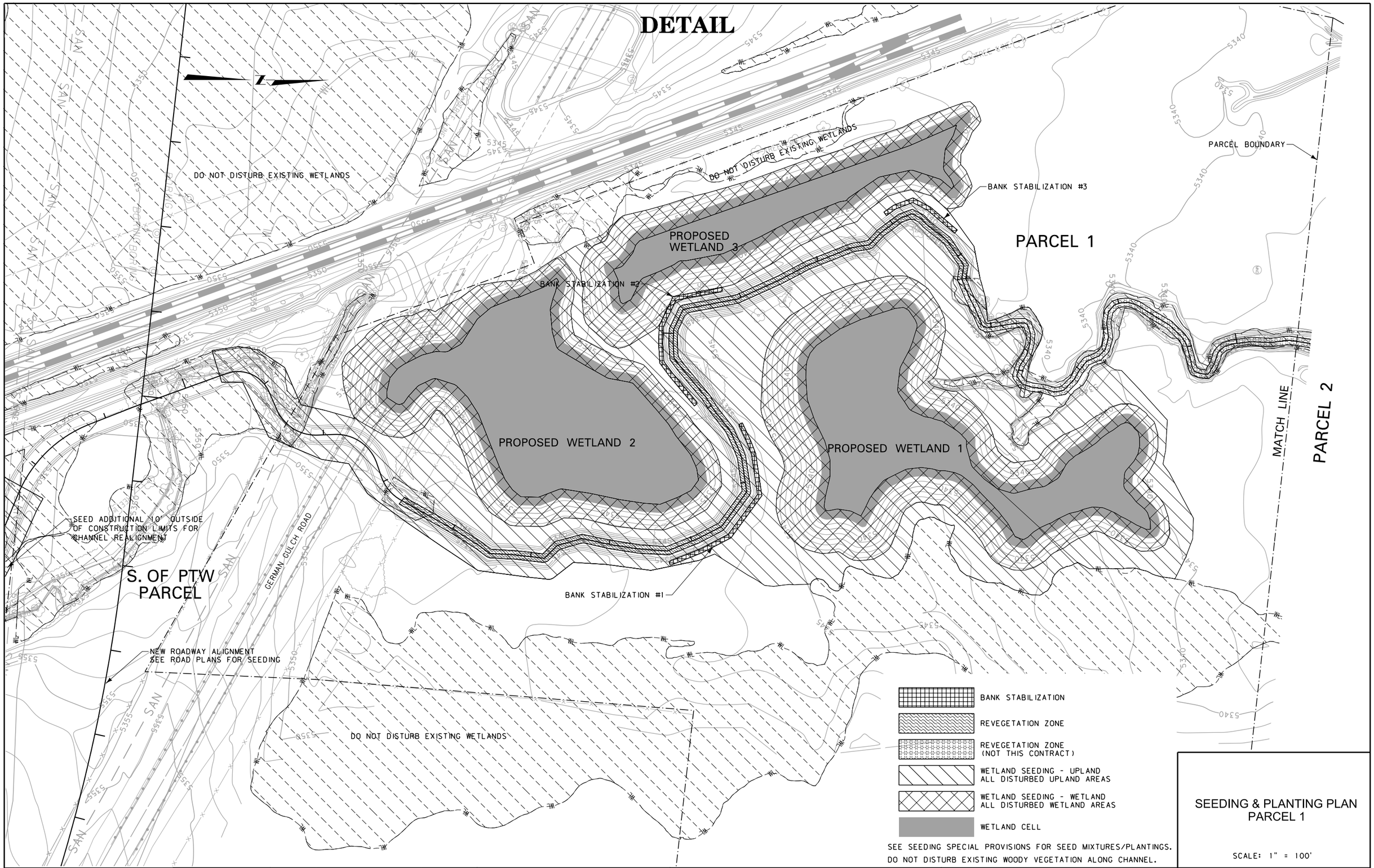
3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\6044000rdplpz01.dgn	DESIGNED BY			MITIGATION PLANS	SILICON MTN AQUATIC RESOURCE MITIGATION SITE / MT-STPX 47(24)
2		5/9/2013	REVIEWED BY			SILVER BOW COUNTY	CSF= 0.99929379 / UPN 6044000 / SHEET 16
1		8:27:49 AM CPS-U0208	CHECKED BY				

ATKINS



3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\6044000rdplpz01.dgn	DESIGNED BY			MITIGATION PLANS	SILICON MTN AQUATIC RESOURCE MITIGATION SITE	MT-STPX 47(24)
2		5/9/2013	REVIEWED BY					
1		8:27:54 AM CPS - U0208	CHECKED BY			SILVER BOW COUNTY	CSF= 0.99929379 UPN 6044000	SHEET 17

DETAIL



SEE SEEDING SPECIAL PROVISIONS FOR SEED MIXTURES/PLANTINGS.
DO NOT DISTURB EXISTING WOODY VEGETATION ALONG CHANNEL.

SEEDING & PLANTING PLAN
PARCEL 1

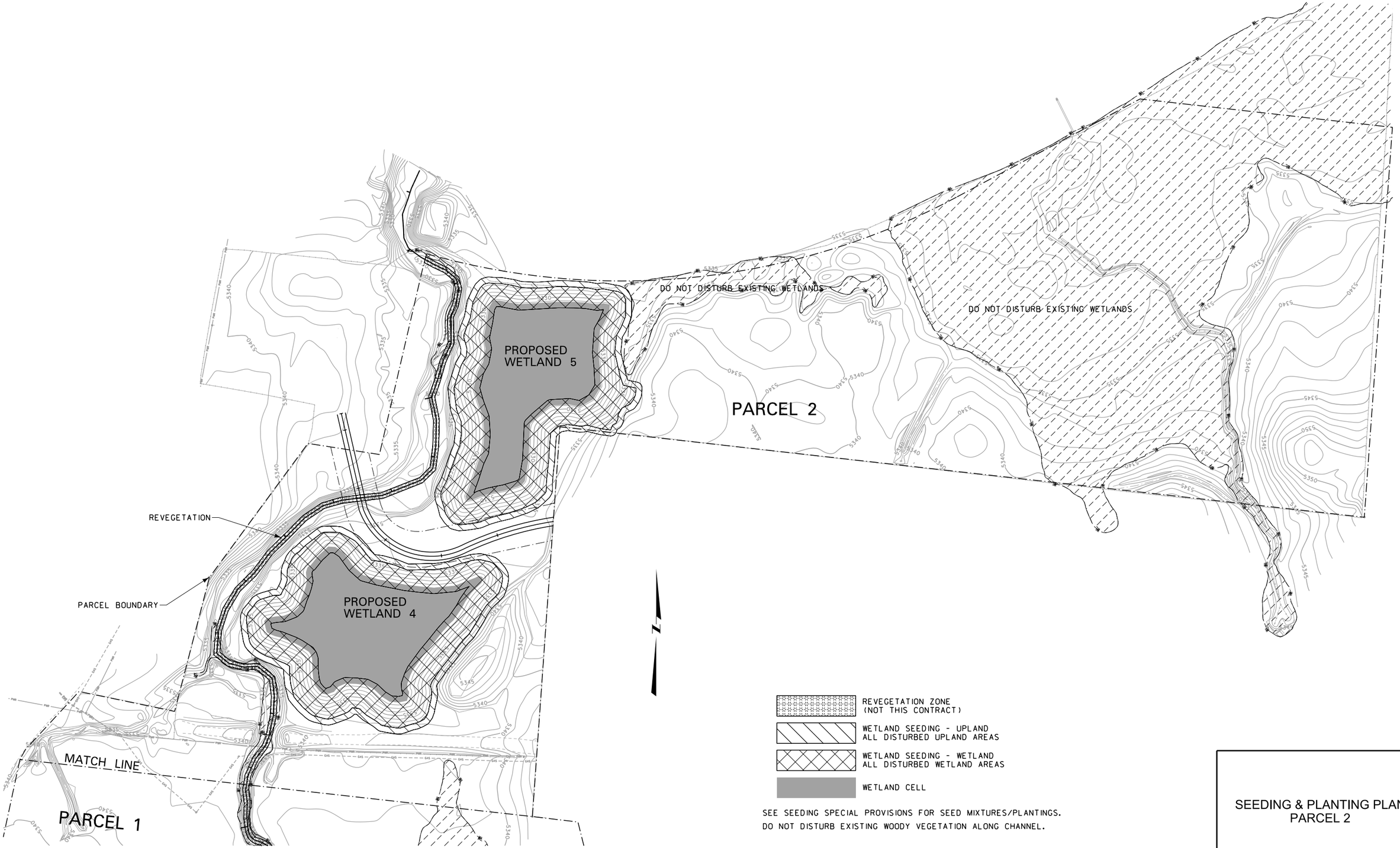
SCALE: 1" = 100'

ATKINS

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\6044000rddetz05.dgn	DESIGNED BY		MITIGATION PLANS	SILICON MTN AQUATIC RESOURCE MITIGATION SITE	MT-STPX 47(24)
2		5/9/2013	REVIEWED BY				
1		8:28:05 AM CPS - U0208	CHECKED BY		SILVER BOW COUNTY	CSF= 0.99929379 UPN 6044000	SHEET 18

DETAIL

ATKINS



SEE SEEDING SPECIAL PROVISIONS FOR SEED MIXTURES/PLANTINGS.
DO NOT DISTURB EXISTING WOODY VEGETATION ALONG CHANNEL.

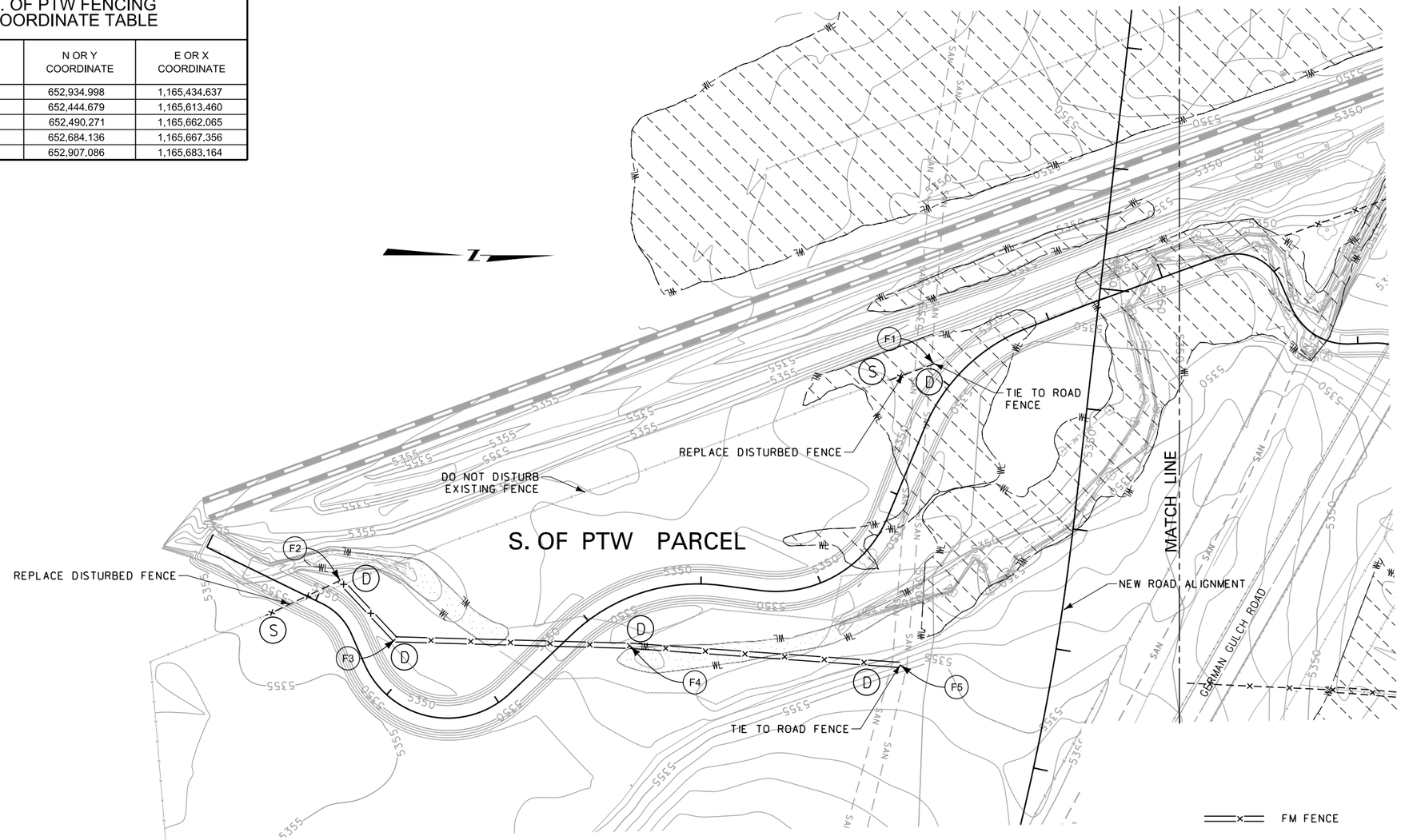
SEEDING & PLANTING PLAN PARCEL 2

SCALE: 1" = 150'

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\6044000rddetz05.dgn	DESIGNED BY		MITIGATION PLANS	SILICON MTN AQUATIC RESOURCE MITIGATION SITE	MT-STPX 47(24)
2		5/9/2013	REVIEWED BY				
1		8:28:10 AM CPS - U0208	CHECKED BY		SILVER BOW COUNTY	CSF= 0.99929379 UPN 6044000	SHEET 19

DETAIL

S. OF PTW FENCING COORDINATE TABLE		
POINT	N OR Y COORDINATE	E OR X COORDINATE
F1	652,934.998	1,165,434.637
F2	652,444.679	1,165,613.460
F3	652,490.271	1,165,662.065
F4	652,684.136	1,165,667.356
F5	652,907.086	1,165,683.164



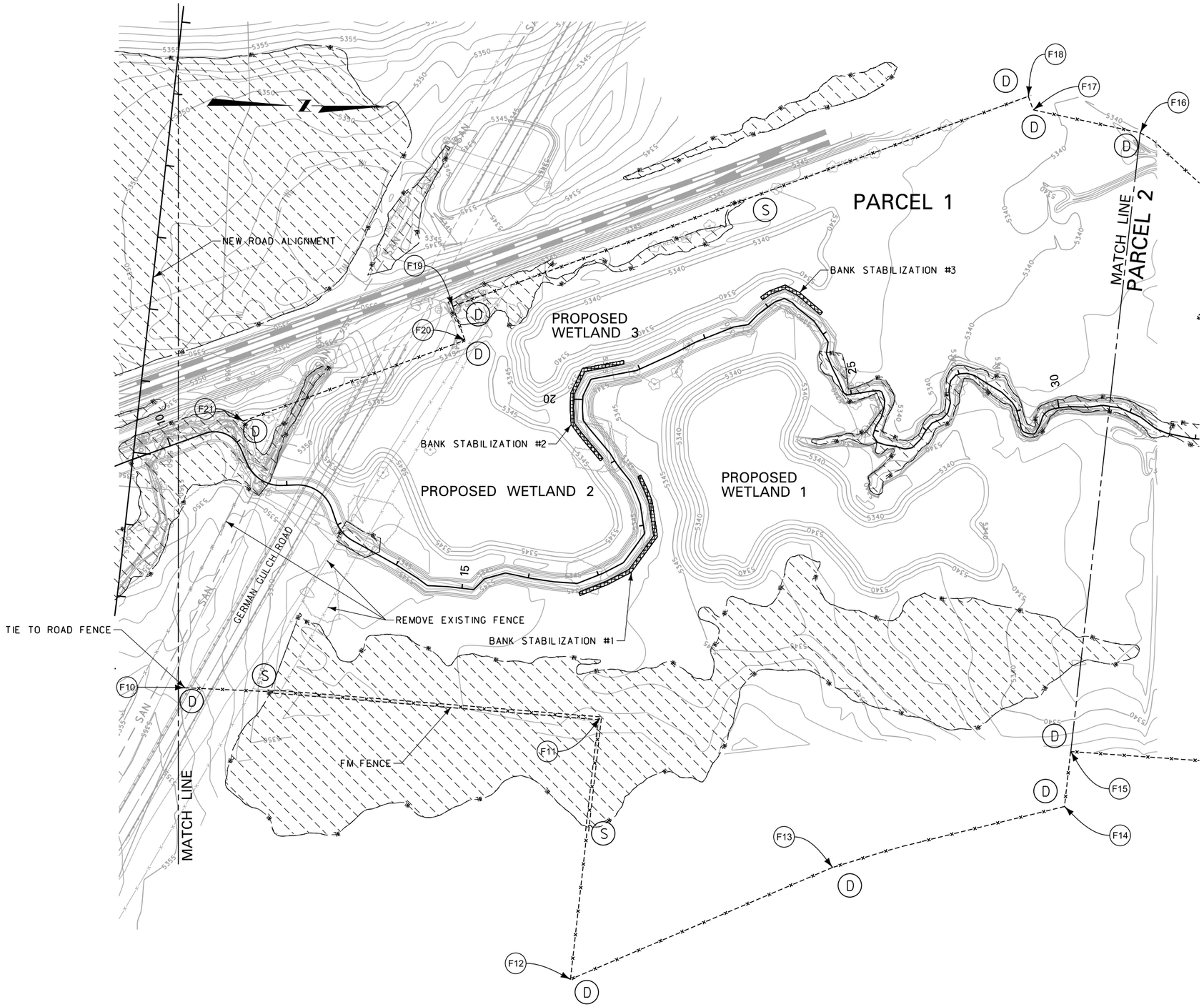
FENCING PLAN
S. OF PTW
PARCEL

SCALE: 1" = 100'

ATKINS

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\6044000rddetz06.dgn	DESIGNED BY			MITIGATION PLANS	SILICON MTN AQUATIC RESOURCES MITIGATION SITE	MT-STPX 47(24)
2		5/9/2013	REVIEWED BY					
1		8:28:21 AM CPS-U0208	CHECKED BY			SILVER BOW COUNTY	CSF= 0.99929379 UPN 6044000	SHEET 20

DETAIL



PARCEL 1 FENCING COORDINATE TABLE

POINT	N OR Y COORDINATE	E OR X COORDINATE
F10	653,143.668	1,165,698.249
F11	653,718.788	1,165,740.637
F12	653,678.126	1,166,102.312
F13	654,041.245	1,165,947.411
F14	654,362.835	1,165,862.880
F15	654,371.289	1,165,786.827
F16	654,467.513	1,164,929.498
F17	654,319.424	1,164,897.740
F18	654,312.576	1,164,878.964
F19	653,514.785	1,165,169.968
F20	653,531.906	1,165,216.908
F21	653,224.501	1,165,329.010

===x===x= JACKLEG FENCE - POLE

---x---x- FW FENCE

(S) SINGLE PANEL

(D) DOUBLE PANEL

FENCING PLAN
PARCEL 1

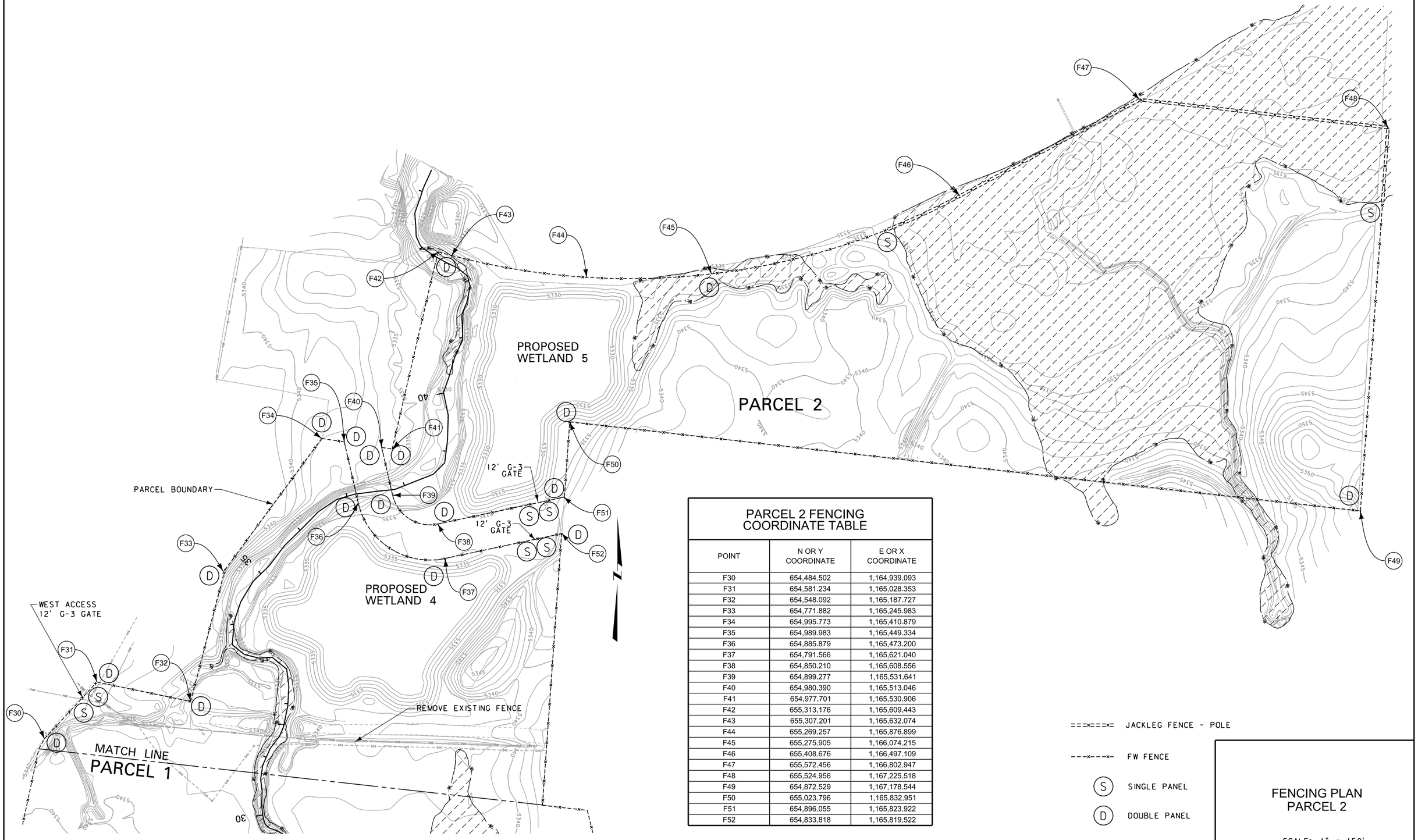
SCALE: 1" = 150'

ATKINS

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\6044000rddetz06.dgn	DESIGNED BY			MITIGATION PLANS	SILICON MTN AQUATIC RESOURCE MITIGATION SITE	MT-STPX 47(24)
2		5/9/2013	REVIEWED BY					
1		8:28:25 AM CPS-U0208	CHECKED BY			SILVER BOW COUNTY	CSF= 0.99929379 / UPN 6044000	SHEET 21

DETAIL

ATKINS



PARCEL 2 FENCING COORDINATE TABLE

POINT	N OR Y COORDINATE	E OR X COORDINATE
F30	654,484.502	1,164,939.093
F31	654,581.234	1,165,028.353
F32	654,548.092	1,165,187.727
F33	654,771.882	1,165,245.983
F34	654,995.773	1,165,410.879
F35	654,989.983	1,165,449.334
F36	654,885.879	1,165,473.200
F37	654,791.566	1,165,621.040
F38	654,850.210	1,165,608.556
F39	654,899.277	1,165,531.641
F40	654,980.390	1,165,513.046
F41	654,977.701	1,165,530.906
F42	655,313.176	1,165,609.443
F43	655,307.201	1,165,632.074
F44	655,269.257	1,165,876.899
F45	655,275.905	1,166,074.215
F46	655,408.676	1,166,497.109
F47	655,572.456	1,166,802.947
F48	655,524.956	1,167,225.518
F49	654,872.529	1,167,178.544
F50	655,023.796	1,165,832.951
F51	654,896.055	1,165,823.922
F52	654,833.818	1,165,819.522

===x===x= JACKLEG FENCE - POLE

---x---x- FW FENCE

(S) SINGLE PANEL

(D) DOUBLE PANEL

FENCING PLAN PARCEL 2

SCALE: 1" = 150'

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\6044000rddetz06.dgn	DESIGNED BY			MITIGATION PLANS	SILICON MTN AQUATIC RESOURCE MITIGATION SITE	MT-STPX 47(24)
2		5/9/2013	REVIEWED BY					
1		8:28:30 AM CPS - U0208	CHECKED BY			SILVER BOW COUNTY	CSF= 0.99929379 UPN 6044000	SHEET 22