Attachment J-1: Draft Removal-Fill Compensatory Wetland and Non-Wetland Mitigation Plan

Boardman to Hemingway Transmission Line Project

Compensatory Wetland and Non-Wetland Mitigation Plan

Prepared for:



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April 2018

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ACRONYMS

ASC	Application for Site Certificate
CWNWMP	Compensatory Wetland and Non-Wetland Mitigation Plan
DSL	Oregon Department of State Lands
ESA	Endangered Species Act
GRMW	Grande Ronde Model Watershed
HGM	hydrogeomorphic
HMS	Hassinger Mitigation Site
HUC	Hydrologic Unit Code
IPC	Idaho Power Company
JPA	Joint Permit Application
ODOE	Oregon Department of Energy
ORWAP	Oregon Rapid Wetland Assessment Protocol
PEM	Palustrine Emergent
PFO	Palustrine Forested
PSS	Palustrine Scrub-Shrub
Project	Boardman to Hemingway Transmission Line Project
USACE	U.S. Army Corps of Engineers

1.0 COMPENSATORY WETLAND AND NON-WETLAND MITIGATION PLAN OVERVIEW

1.1 Introduction and Background

Idaho Power Company (IPC) proposes to construct the Boardman to Hemingway Transmission Line Project (Project). In Oregon, Project will extend 296.6 miles from near Boardman, in Morrow County, Oregon, to the vicinity of the City of Nyssa, in Malheur County, Idaho. The Oregon portion of the Project is 270.8 miles in length. As described in detail in IPC's Application for Site Certificate (ASC) to the Oregon Energy Facility Siting Council, IPC anticipates small-scale wetland and non-wetland impacts from the Project across various wetland and waterway types, and in a number of hydrologic units. IPC is preparing a Joint Permit Application (JPA) for submission to the Oregon Department of State Lands (DSL) and the U.S. Army Corps of Engineers (USACE) to obtain removal/fill permits for impacts to wetland and non-wetland features associated with the Project.

The Project is anticipated to permanently impact approximately 0.538 acres of wetlands at 32 locations, and 5,914 linear feet (0.72 acres) of stream frontage at 175 locations. A summary of the wetland and non-wetland impact sites is provided in Appendix A.

See Figure 1, Location and Vicinity Maps; Figure 2, Tax Lot Map; Figure 3, Aerial Photograph; Figure 4, Site Photographs; and Figure 5, Oregon Rapid Wetland Assessment Protocol (ORWAP) Sites Location Map.

1.2 Description of Compensatory Wetland and Non-Wetland Mitigation Plan

The purpose of this Compensatory Wetland and Non-Wetland Mitigation Plan (CWNWMP) is to provide mitigation for wetland and non-wetland impacts, which will occur at various sites along the Project's Proposed Route, through the creation of similar functioning wetlands and enhancement of existing wetlands at a single mitigation site in Union County, Oregon, referred to as the Hassinger Mitigation Site (HMS). A portion of the HMS area will be graded to increase hydrologic connectivity with Catherine Creek, covered with topsoil, seeded, and planted with native wetland species such as grasses, sedges, rushes, and woody wetland/riparian species adapted to site physical properties, soils, and hydrologic conditions.

Non-wetland habitat will be enhanced by constructing a high flow side channel between Catherine Creek and the existing oxbow located adjacent to the new wetlands, and by installing wood habitat structures in the oxbow. The side channel will allow for increased flow into the oxbow and will provide an off-channel velocity refuge during high flows, while the woody material structures will create additional fish habitat. The entire 8.54 acres will be protected from grazing and farming under a conservation easement.

1.3 Ecological Goals and Objectives

The HMS encompasses approximately 8.54 acres adjacent to Catherine Creek in Union County, Oregon (see Figure 1, Location and Vicinity Maps). The HMS will involve creation of approximately 4.76 acres of seasonally flooded wetland habitat immediately adjacent to 1,080 linear feet of Catherine Creek, enhancement of 1.51 acres of existing wetland habitat, and construction of 810 linear feet of side channel that will provide an additional intermittent connection between Catherine Creek and the oxbow. Four woody debris structures will be

strategically located and constructed along approximately 432 feet of the existing oxbow to provide instream fish habitat.

The HMS will increase local wetland and non-wetland habitat, giving 3.66 acres of wetland mitigation credit and 2,322 linear feet (0.90 acres) of stream mitigation credit. These habitats are critical to many wetland and freshwater aquatic species, including Endangered Species Act (ESA)-listed spring Chinook salmon, summer steelhead, and bull trout that utilize the channel at various stages of their life cycles. Juvenile Chinook salmon and steelhead utilize Catherine Creek reaches for overwintering habitat where the HMS is located. Overwintering habitat has been identified in the *Draft Northeast Oregon Management Unit Plan for Spring/Summer Chinook and Steelhead Recovery Plan (2010)* as a habitat limitation. Due to their low survival rates during the winter months, overwintering habitat for juvenile Chinook salmon in Catherine Creek has recently become a high priority for the Grande Ronde Model Watershed (GRMW), which coordinates habitat restoration projects on both public and private lands within the Grande Ronde Basin. The reach of Catherine Creek for the HMS is also a migratory corridor for juvenile and adult fish of all three ESA-listed fish species.

The HMS will provide backwater and rearing habitat for aquatic species, an off-channel velocity refuge, and critical wetland habitat for a variety of bird species that utilize wetland habitat for breeding, rearing, nesting, and migratory rest stops. Local aquatic and terrestrial biodiversity will increase, improving resilience of the local ecosystem in response to disturbance (e.g., invasive species).

Ecological goals and objectives are categorized as wetland or non-wetland, and are summarized on Table 1.

Table 1. Wetland and Non-Wetland Mitigation Goals and Objectives

Component	Goal(s)	Objectives
Wetland	Create at least 4.76 acres of wetland and enhance approximately 1.45 acres of wetland at the HMS to replace lost functions and values of impacted wetlands.	Create a channel between Catherine Creek and the oxbow through the HMS to provide hydrologic connection at 1.5-year flow events and greater.
		Excavate the HMS to the specified grade of the engineered site design to increase floodplain connectivity.
		Plant the HMS with a wetland seed mix and wetland shrub and tree species to mitigate erosion, enhance sediment trapping, provide future recruitment of large wood and cover, and provide shading to reduce stream temperature.
Non-Wetland	1) Increase fish habitat. 2) Reduce stream temperature at or near the HMS. 3) Mitigate sedimentation of Catherine Creek.	Create a channel through the HMS connecting Catherine Creek and the oxbow, providing a high flow refuge for juvenile fish.
		Install four large wood structures in the oxbow to increase habitat complexity.
		Plant the HMS with a wetland seed mix and wetland shrub and tree species to mitigate erosion, enhance sediment trapping, provide future recruitment of large wood and cover, and provide shading to reduce stream temperature. This is also anticipated to increase volume and duration of cool water release during low flow periods typically observed during the late summer season, mitigating warmer stream temperatures.

1.4 Summary of Impacts and Mitigation

This section summarizes the anticipated impacts to wetland and non-wetland resources occurring from construction and operation of the Project. Impacts associated with the Project will also be described in the JPA. Wetland mitigation associated with this CWNWMP is intended to meet federal and state regulatory requirements developed under the guidance of the DSL. As stated in *Chapter 8: Compensatory Mitigation for Wetlands and Tidal Waters of DSL's Guide to the Removal/ Fill Permit Process*, DSL rules and regulations meet USACE standards for wetland mitigation, which are based on the 2008 federal mitigation rule (33 Code of Federal Regulations). Oregon's stream mitigation regulations are currently under development by the USACE, U.S. Environmental Protection Agency, and Willamette Partnership. Non-wetland mitigation associated with this CWNWMP is intended to meet the DSL's interim draft guidance standards for stream mitigation.

1.4.1 Summary of Wetland Impacts and Mitigation

The Project is anticipated to permanently impact approximately 0.538 acres of wetland habitat, encompassing 32 different sites ranging in size from approximately 0.001 acres to approximately 0.15 acres, averaging approximately 0.015 acres per site, thus requiring compensatory mitigation of this impact by creation, enhancement, and/or restoration of wetland habitat at another location (see Appendix A for impacted wetland data). Temporary wetland impacts associated with the Project are anticipated to be rectified within 24 months from the initial impact date and, therefore, are presumed not to require mitigation.

To mitigate for permanent impacts, approximately 6.21 total acres of wetlands will be created and enhanced adjacent to Catherine Creek in the Grande Ronde Basin of Union County, Oregon. This total will consist of creation of approximately 0.57 acres of Palustrine Forested (PFO), 1.69 acres of Palustrine Scrub-Shrub (PSS), and 2.50 acres of Palustrine Emergent (PEM) wetlands, and enhancement of approximately 1.45 acres of existing PEM wetland. Additionally, the construction of a side-channel between Catherine Creek and the oxbow will improve hydrologic connectivity, and the removal of invasive species is anticipated to improve the wetlands. Utilizing DSL's compensatory wetland mitigation ratios for created and enhanced wetlands, the combined acreages equate to 3.66 acres of wetland mitigation credit. Table 2 summarizes impacted wetland site acreages by hydrogeomorphic (HGM) and Cowardin classifications, along with mitigation acreages and credits.

Currently, the existing wetlands within the HMS have an over-abundance of weedy species such as reed canarygrass (*Phalaris arundinacea*), and a decreased presence of woody species. Establishment of surface flow hydrologic processes will reverse degraded hydrology and allow self-sustaining recruitment of native woody species at the site. These processes, in combination with invasive species removal and control measures, as well as planting and seeding of native wetland stock, will enhance the site by increasing wetland functions and values (see Section 6.0 for a functions and values assessment).

Table 2. Wetland Mitigation Summary

	Permanent Impact			Mitigation					
Site	**Cowardin**	**HGM**	**Acres**	**Mitigation Method**	**Cowardin**	**HGM**	**Acres**	**Mitigation Ratio**	**Credits Gained**
Impact Sites	PABFh	Unknown	0.029						
	PUSCh	Unknown	0.016						
		Unknown	0.049						
		RFT	0.016						
		Slope	0.162						
		Unknown	0.049						
	PEMA	Unknown	0.020						
	PEMB	Slope	0.029						
		Unknown	0.005						
	PEMC	Unknown	0.156						
	PEMFh	Depressional	0.004						
	PEMKx	Unknown	0.007						
	PFOA	Unknown	0.034*						
	PFOC	Unknown	0.011*						
HMS				create	PEM	RI	2.50	1.5:1	1.67
					PSS	RFT	1.69	1.5:1	1.13
					PFO	RFT	0.57	1.5:1	0.38
				enhance	PEM	RI	1.45	3:1	0.48
Total			0.538				6.21		3.66

PABFh = Palustrine Aquatic Bed, Semipermanently Flooded, Diked/Impounded
PEM=Palustrine Emergent
PEMA=Palustrine Emergent, Temporarily Flooded
PEMB=Palustrine Emergent, Saturated
PEMC=Palustrine Emergent, Seasonally Flooded
PEMKx=Palustrine Emergent, Artificially Flooded, Excavated
PFOA=Palustrine Forested, Temporarily Flooded
PFOC=Palustrine Forested, Seasonally Flooded
PSS=Palustrine Scrub-Shrub
PUSCh = Palustrine Unconsolidated Shoreline, Seasonally Flooded, Diked/Impounded
RFT = Riverine Flow-Through
RI = Riverine Impounding
*Note, PFO wetland impact acreages are based on NWI mapping for two sites that have not been delineated on the ground. Based on desktop analysis, it is likely that these sites do not contain PFO wetlands, and that they will not be impacted.

1.4.2 Summary of Non-Wetland Impacts and Mitigation

The Project construction and implementation is anticipated to permanently impact approximately 5,914 linear feet (0.72 acres) of stream habitat at 175 sites throughout the entire project corridor and associated transmission line access infrastructure (see Appendix A for impacted stream data).

To mitigate for these anticipated impacts, the HMS will incorporate in-stream aquatic habitat improvements along approximately 432 linear feet of stream channel within the oxbow at the

project site to create additional fish habitat, riparian planting along approximately 1,080 feet of Catherine Creek, and a high flow side channel (810 linear feet, 0.19 acres) will be constructed between Catherine Creek and the oxbow.

Table 3 provides a summary of permanently impacted non-wetland sites, and Appendix A provides specific site summary information for non-wetland impacts.

Table 3. Non-Wetland Mitigation Summary

	Permanent Impact				Mitigation			
Site	Stream Type	Number of Sites	Acres	Linear Feet	Stream Type		Acres[1]	Linear Feet
Project	Ephemeral	39	0.09	1402.48				
	Intermittent	111	0.47	3516.49				
	Perennial	25	0.16	994.95				
HMS					Intermittent		0.19	810
					Perennial	In-stream	0.71	432
						Riparian	n/a	1,080
Total		175	0.72	5914			0.90	2,322

[1] Assumed width of 10 feet for created intermittent side channel

The side channel will allow for increased connectivity between Catherine Creek, the oxbow, and the wetlands, as well as providing an off-channel velocity refuge for fish during high flows. The engineered log jams will be constructed of appropriately sized trees along with other woody debris, and will be designed to withstand flood flow events. The structures will protrude into the channel and create cover for fish from predators and will act as a food supply for fish by providing an environment in which macroinvertebrates can thrive. Trees will be pinned together and anchored with ballast rocks to ensure stability (see Plan Sheets in Appendix B for further details).

In addition to the direct physical improvements of in-stream habitat, the forested/scrub-shrub wetlands paralleling approximately 1,080 linear feet of Catherine Creek and the oxbow will improve the existing riparian habitat and provide additional shading and terrestrial nutrient inputs to the aquatic system.

These habitat improvements will provide essential habitat for ESA-listed spring Chinook salmon, summer steelhead, and bull trout. Adults and/or juveniles of all three species utilize the Catherine Creek system for spawning, overwintering habitat, and as a migratory corridor.

1.5 Summary of Functions and Values Gains and Losses

This section summarizes the function and value gains and losses anticipated for both wetland and non-wetland components of the Project construction and operation.

1.5.1 Summary of Wetland Functions and Values Gains and Losses

The project traverses four Hydrologic Unit Code (HUC) 6 basins, each having ORWAP data collected at a representative impacted wetland site. The HMS was also evaluated using ORWAP (see Appendix C). There will be a loss of wetland functions and values as a result of the proposed construction of the Project, with these losses offset by the anticipated gain in functions and values from the HMS.

The anticipated outcome of the HMS is to have no net loss of wetland function as a result of the proposed construction. The impacted sites total approximately 0.538 acres of wetland and 5,914

linear feet (0.72 acres) of non-wetland. The HMS provides approximately 3.66 acres of wetland mitigation credit and 2,322 linear feet (0.90 acres) of stream mitigation credit. For details of each attribute's function and value, please see Section 5.0.

1.5.2 Summary of Non-Wetland Functions and Values Gains and Losses

There will be a loss of stream functions and values as a result of the proposed construction of the Project, with these losses offset by the anticipated gain in functions and values from the HMS. A draft functional assessment of streams proposed for permanent impacts is included in Appendix D. The anticipated outcome of the HMS is to have no net loss of stream function as a result of the proposed construction.

Stream function at the HMS is anticipated to be improved over the existing condition and provide a net gain in function on a regional scale. This improvement and gain is anticipated to be achieved by the following:

- Improved in-stream habitat, specifically benefiting ESA-listed spring Chinook salmon, summer steelhead, and bull trout.
- Improved hydrologic function of Catherine Creek with reconnection of the stream and floodplain, improved sediment trapping, surface water filtration, and riparian/wetland species recruitment to the site.
- Mitigation of sedimentation due to enhancement and creation of forested and scrub-shrub wetlands, thereby improving riparian function and bank stability.
- Improved thermal regulation of the stream channel due to increased channel shading provided from wetland tree and shrub species.

The Project traverses four HUC 6 basins and benefits of the above-listed functions are anticipated to be of greater ecological value than what would be produced with comparatively small, spatially isolated stream improvement projects completed over the large landscape of eastern Oregon. Stream values, such as the ecological benefit to ESA-listed spring Chinook salmon, summer steelhead, and bull trout, are also anticipated to increase. Again, values of the overall stream mitigation are likely to be greater than the net change in value associated with relatively small, isolated stream improvement and restoration projects. Additionally, since anadromous fish species do not occur in many of the impacted streams, the HMS is anticipated to provide a substantial net gain in both function and value of the non-wetland component for the region as a whole.

2.0 COMPENSATORY WETLAND AND NON-WETLAND MITIGATION SITE INFORMATION

2.1 Site Landowner Information

The HMS is located on Tax Lot 3200 of Township 2 South, Range 40 East, Section 19 NW/SW in Union County, Oregon, (see Figure 1, Location and Vicinity Maps, and Figure 2, Tax Lot Map). Landowner information is as follows:

Owner: John and Trudy Hassinger
68333 Kerns Loop
Cove, Oregon 97824
Phone: (541) 975-5600

IPC will enter into a long-term (perpetual) lease with the owner for the use of the property as part of IPC's long-term maintenance plan (see Section 9.3). Based on a cooperative agreement, GRMW or another non-profit or non-governmental organization will be responsible for operation of the site and maintenance of the mitigation area. Contact information for IPC is as follows:

Contact: Zach Funkhouser
Phone: 208-388-5375
Fax: 208-388-6902
E-mail: zfunkhouser@idahopower.com

2.2 Physical Location Information

The HMS is located approximately 6.5 miles east of Oregon State Route 82, and 0.8 mile north of Booth Lane. The legal description is Township 2 South, Range 40 East, Section 19 NW/SW, in Tax Lot 3200. The center of the mitigation wetland is latitude 45.3775 and longitude -117.8878. Location and vicinity maps are shown on Figure 1, and an aerial photo of the proposed project site is shown on Figure 3.

3.0 DESCRIPTION OF HOW THE CWNWMP ADDRESSES THE PRINCIPAL OBJECTIVES

3.1 Functions and Values Replacement

The HMS will provide similar functions and values as the impacted wetlands and provide critically valuable habitat for ESA-listed spring Chinook salmon, summer steelhead, and bull trout. This section describes the replacement of impacted wetlands and non-wetland functions and values with the construction of the HMS.

3.1.1 Wetland Function and Value Replacement

The impacted wetlands are classified in the Cowardin system as Palustrine (Emergent, , Forested, Aquatic Bed, and Unconsolidated Shore) and in the HGM system as Depressional, Riverine, Slope, and unknown. Refer to Table 2 in Section 1 for a summary of specific impact site classifications and acreages.

The functions and values of the HMS are anticipated to be generally similar to the impacted areas, as the proposed created and enhanced wetlands at the HMS will be Palustrine (PES, PSS, and PFO), and Riverine. Refer to Table 2 for HMS wetland type and acreage summaries. The hydrologic regime under the proposed CWNWMP is anticipated to produce a period of inundation of at least 14 days, occurring approximately between April and June, during high flow and water table periods typically observed in early spring during the growing season.

3.1.2 Non-Wetland Function and Value Replacement

A total of 175 stream sites will be permanently impacted by the Project construction. Of these, 39 are ephemeral (0.09 acre, 1,402.48 linear feet), 111 are intermittent (0.47 acre, 3,516.49 linear feet), and 25 are perennial (0.16 acre, 994.95 linear feet), for a total impact of approximately 0.72 acres and 5914 linear feet.

The HMS will provide approximately 0.90 acres and 2,322 linear feet of stream mitigation to Catherine Creek, which is a perennial anadromous fish-bearing stream and a major tributary of the Grande Ronde River. ESA-listed spring Chinook salmon, summer steelhead, and bull trout are known to inhabit this stream system.

3.2 Local Replacement of Locally Important Functions and Values

While the mitigation site is not located at the site of the wetland and non-wetland impacts, it is expected that improvements to stream habitat and wetland function of the HMS will provide greater benefit to the region in terms of overall watershed and stream health.

By consolidating the mitigation features into one larger site, the overall gain in value for the proposed wetland and non-wetland mitigation is likely to be greater than the net change in value that would occur with individual, relatively small and isolated mitigation projects along the Project alignment. Additionally, anadromous fish species do not occur in some of the impacted streams; thus, the HMS is anticipated to provide a substantial net gain for the region, in both function and value of the non-wetland component.

3.3 Self-Sustaining/Minimum Maintenance Needs

This section describes the maintenance needs and requirements of wetland and non-wetland CWNWMP components.

3.3.1 Wetland Self-Sustaining/Minimum Maintenance Needs

The HMS will receive water input that currently sustains the existing wetlands; it will be graded so it will receive adequate surface and subsurface water to be self-sustaining. Additionally, the excavated channel between Catherine Creek and the oxbow through the HMS will provide a hydrologic connection at 1.5-year flow events and greater, providing for natural wetland vegetation recruitment and appropriate hydrology (seasonal flooding) for the created wetland types at the HMS during seasonal high flow events. Future maintenance needs may include periodic weed control.

3.3.2 Non-Wetland Self-Sustaining/Minimum Maintenance Needs

Stream and aquatic habitat improvements will require no maintenance, as the woody debris structures are designed to be maintenance-free and long-lasting. The excavated channel between Catherine Creek and the oxbow through the HMS will also be maintenance-free and will re-establish surface hydrologic connectivity that will provide for natural riparian vegetation recruitment. Future maintenance needs may include periodic weed control.

3.4 Siting Considerations

The HMS has been sited and designed to maximize stream and wetland processes, functions, and existing ecological enhancement to the extent possible at a comparatively large mitigation site relative to impact sites.

IPC explored several mitigation options available to them, including an 80-acre parcel located in the Middle Snake HUC 4 watershed, a parcel located in Baker County, Oregon, and multiple restoration opportunities with the GRMW in the Upper Grande Ronde River Subbasin. The 80-acre parcel located in the Middle Snake HUC 4 watershed had potential as a floodplain restoration and water quality improvement project. The Baker County parcel is located in the Lower Snake HUC 4 watershed near Baker City, Oregon. Both of these properties are privately owned and mitigation plan development would lack the needed guidance of watershed scale needs, planning, and project implementation experience, such as that provided by an organization like the GRMW. In addition, neither site would provide benefit for ESA-listed fish species due to their location upstream of the Oxbow Dam on the Snake River. The Oxbow Dam blocks migration corridors historically utilized by native ESA-listed fish species.

The GRMW began coordinating restoration projects in 1994 within the Grande Ronde Basin. Projects have addressed nearly every component of watershed health including water quality, water quantity, in-stream habitat complexity, riparian condition, streambank stability, and fish passage. With this valuable resource available to aid in project planning, implementation, and management, IPC selected one of several mitigation project options through the GRMW. The preferred alternative was selected based on stream habitat and water quality enhancement potential and cost/benefit returns. This site provides ample mitigation opportunities for both wetland and non-wetland impacts associated with the construction of the Project and it will be implemented and managed with local watershed knowledge and experience provided by the GRMW.

3.5 Minimize Temporal Loss

The mitigation area is anticipated to be created prior to or concurrently with construction of the Project, thereby, minimizing temporal loss of wetlands as a result of the project.

Within the HMS, impacts to existing wetlands that are to remain undisturbed will be minimized by marking existing wetland boundaries to limit equipment intrusion during excavation of created and enhanced wetlands. If existing wetlands outside the creation/enhancement mitigation area are temporarily disturbed, they will be restored by returning them to original contours and reseeding.

Construction of the wood habitat structures will occur prior to the creation and enhancement of the wetlands, and live stakes will be planted within the structures to restore the disturbed PSS wetland. No long-term adverse impacts are anticipated to the existing wetlands in the vicinity of the wood habitat structures.

4.0 COMPENSATORY WETLAND AND NON-WETLAND MITIGATION SITE EXISTING CONDITIONS

4.1 Wetland Delineation or Determination Results

Wetland delineations were conducted on the HMS on August 27 and 28, 2015, and October 21, 2015. A draft wetland delineation report describing 11 wetlands totaling 2.79 acres, and two waterways (Catherine Creek and an oxbow), was prepared on October 13, 2016. This final wetland delineation report was be submitted in 2017 to the DSL for review. DSL issued a letter of concurrence dated November 1, 2017, regarding the findings of the 2015 wetland delineation.

4.2 Existing HGM and Cowardin Classes On-Site

There are 11 existing wetlands in the wetland delineation study area, classified as PEM and PSS using the Cowardin classification system, and Depressional and Riverine using the HGM classification system.

Photographs of existing site conditions are shown on Figure 4.

4.3 Description of Existing and Proposed Hydrology

The existing site receives hydrologic input from Catherine Creek as well as from precipitation. The site is currently inundated at approximately the 2-year flood event when the water over-tops the banks of Catherine Creek. Catherine Creek parallels the north edge of the site, running generally east before turning south into the oxbow that parallels the east edge of the site. The proposed wetland mitigation area is on the south side of Catherine Creek and west of the

oxbow. Catherine Creek is a perennial stream and a main tributary of the Grande Ronde River in the Upper Grande Ronde Subbasin, providing year-round surface flow and seasonal flooding potential, conducive to wetland habitat construction and restoration.

The HMS will enhance the hydrologic regime, as the site will have direct connection to the main creek channel during periods of high flow. A portion of the HMS area will be graded to create hydrologic connectivity through the site, and a high flow side channel between Catherine Creek and the existing oxbow will be constructed. The side channel will allow for increased flow into the oxbow and will provide an off-channel velocity refuge during high flows. The HMS will be graded to elevations similar to the existing wetlands on site to produce a wetland hydrologic regime for the newly created wetlands. The hydrologic regime under the proposed CWNWMP is anticipated to produce a period of inundation, on average, of at least 14 days, occurring approximately between April and June, during high flow and water table periods typically observed in early spring during the growing season.

4.4 Existing Site Conditions

4.4.1 Existing Plant Communities

The majority of the HMS area is currently unfarmed grassland. The existing upland and wetland plant communities identified in IPC's wetland delineation report consists of a variety of herbaceous, grass, and shrub species, both native and invasive. The predominant existing plant community identified in the wetland delineation consists of herbaceous vegetation across most of the site, including primarily reed canarygrass (*Phalaris arundinacea*), meadow foxtail (*Alopecurus pratensis*), and Sheldon's sedge (*Carex sheldonii*). A narrow band of woody vegetation, including willows (*Salix amygdaloides, S. exigua*) and red osier (*Cornus alba*) is located in the riparian zone along Catherine Creek and the oxbow.

4.4.2 Existing Aquatic Communities

The site borders Catherine Creek, a major perennial tributary of the Grande Ronde River, in the Upper Grande Ronde River Subbasin. This stream, along with the Grande Ronde River, is classified as Essential Salmonid Habitat by the Oregon Department of Fish and Wildlife and Essential Fish Habitat under the Magnuson-Stevens Act. Additionally, Catherine Creek, along with much of the Grande Ronde River Basin, is designated critical habitat for bull trout, spring Chinook salmon, and summer steelhead. Anadromous salmonid species and bull trout are protected under the ESA. Recovery plans for listed bull trout and salmonid species have been developed that seek to restore fish populations and their habitat to sustainable levels.

The *Draft Northeast Oregon Management Unit Plan for Spring/Summer Chinook and Steelhead* and the *Grande Ronde Subbasin Plan* both identify lower Catherine Creek as an important reach for overwintering juvenile spring Chinook salmon and summer steelhead. Habitat quantity and quality are both considered key limiting factors in lower Catherine Creek, where the HMS is located. Overwintering juvenile spring Chinook salmon prefer deep, slow velocity water near cover. This type of habitat is lacking in lower Catherine Creek due to anthropogenic influences. Historical accounts by early settlers indicate that lower Catherine Creek was a slow, deep, and meandering river with abundant riparian cover for fish. These accounts will help to guide stream mitigation efforts at the proposed mitigation site.

Existing non-wetland site conditions are summarized on Table 4; the concept is derived from Oregon's stream mitigation framework currently under development by USACE, the Environmental Protection Agency, and the Willamette Partnership. Table 4 was developed using Oregon Department of State Land's *Guidance for Assessing Stream Functions and Values*

under the Oregon Removal/Fill Program. Absence of an attribute status indicator in specific function rows indicates the attribute is not associated with that specific function.

Catherine Creek is a perennial stream system, and as such, the inclusion of this attribute in the summary is intended to indicate its effect on stream systems and the functions with which it corresponds. The base flow of the system will not change with the implementation of the proposed CWNWMP.

Table 4. Summary of Existing Non-Wetland Attributes, Functions, and Status

Function Attribute		Overbank Flow	Effective Discharge	Base Flow	Groundwater Flux	Bed Mobility	Sediment Character	Bank Stability	Hydraulic Variability	Stream Habitat	Riparian Structure and Composition	Aquatic Species' Structure and Composition	Water Quality	Water Temperature	Sedimentation
Functional Group	**Function**	**Status**													
Hydrologic Functions	Surface water storage	L		P							L				
	Sub/surface transfer				A						L				
	Flow variation	L	A	P	A						L				
Geomorphic Function	Sediment continuity	L	A			L		L							
	Substrate mobility	L	A			L	L		L						
Biological Functions	Maintain biodiversity										L	A			
	Create habitat	L	A	P		L	L	L	L	L	L	A			L
	Sustain trophic structure										L	A	L		
Chemical and Nutrient Functions	Nutrient cycling	L			A			L			L		L		
	Chemical regulation												L		
	Thermal regulation		A								L			L	

A = Adequate; L = Limited; P = Perennial

The following is an explanation of the "Adequate" status ratings for effective discharge, groundwater flux, and aquatic species structure and composition attributes indicated on Table 4:

- Effective discharge is currently produced by the stream, indicated by the seasonal variation in stream flow where spring flows generally transport the greatest volume of sediment. The functions of sediment continuity, substrate mobility, creation of habitat, and thermal regulation are limited by anthropogenic modifications of the channel, while natural flow variations remain relatively undisturbed.
- Groundwater flux of the system is currently adequate to sustain perennial flow of the stream, meeting both anthropogenic demands and wildlife habitat requirements, and contributes to nutrient cycling, flow variations, and subsurface transfer.
- Aquatic species, structure, and composition are adequately maintained within the local system, as the functions of biodiversity, trophic structure, and habitat are influenced to a greater degree by regional anthropogenic impacts, such as dam construction.

It is anticipated the attributes currently considered "Adequate", as well as the attributes shown as "Limiting", will be improved upon with the implementation of the proposed CWNWMP, thus contributing to the improved function of the stream system as a whole.

4.5 Site Constraints or Limitations

There are few constraints to performing habitat enhancement at the mitigation site. Much of the land around the site is actively managed for agriculture; however, the site itself has not been used for active agricultural purpose for several years. Other potential constraints are related to habitat, such as the persistent local threat of invasive species such as reed canarygrass and the potential browsing impact on new plantings from the existing wildlife population in the area.

Site preparation, including mechanical and chemical treatments, should significantly reduce the existing weed population. As part of the mitigation plan requirement, the site will no longer be used for farming practices. Browsing is anticipated to be a challenge to overcome; however, with the myriad of deer repellent products available, some of these could potentially be utilized in concert with adaptive management strategies.

5.0 FUNCTIONS AND VALUES ASSESSMENT

This section describes the rationale behind functions and values assessments of wetland and non-wetland components of this CWNWMP.

5.1 Rationale for Method Used in Wetland Assessment

Since the project area is not tidal or located in the Willamette Valley, ORWAP was used, as required by the DSL.

This analysis was conducted by IPC on representative wetland sites within the Project site boundary during 2011-2013 wetland delineations. Table 5 provides a summary of representative wetland sites where ORWAP data were gathered. See Appendix C for representative impact and mitigation sites ORWAP data. See Figure 5, ORWAP Site Locations.

Table 5. Representative ORWAP Wetland ID

ORWAP ID	Delineated Acres	Cowardin	HGM
BAPRO_594	0.5	PEM	Riverine Flow-through
MAL1-Alkaline	0.6	PEM	Slope
MAWLLCK-370	0.02	PSS	Riverine
BA_G_115&117	0.15	PEM	Riverine
BA_G_145	0.10	PEM	Slope
BA_G_148	0.15	PEM	Riverine
BA_G_210.1	0.03	PEM	Riverine
CloverCreek_2012	4.50	PEM	Slope
MA_G_207	1.90	PEM	Depressional
MA_G_228	0.03	PFO	Slope
MA_G_232.2	0.10	PEM	Riverine
MA_G_269	0.01	PFO	Riverine; Slope Valley
MA_G_269.2	0.01	PEM	Riverine
UM_G_82	0.20	PEM	Riverine
UM_G_105	2.00	PEM	Slope

5.2 Summary of Expected Wetland Functions and Values Gains and Losses

The functions and values of the existing wetlands and the predicted condition were evaluated using ORWAP. Table 6 presents a summary of the expected wetland functions and values gains and losses for the representative impact sites and the mitigation site.

Table 6. Summary of Expected Wetland Functions and Values Gains and Losses

Grouped Services		Impact Sites		Hassinger Mitigation Site (HMS)				
		PEM Representative Sites	PFO/PSS Representative Sites	PEM				PSS/PFO
						Net Change		Net
		Net Change[1]	Net Change[1]	Existing	Predicted[2]	Create[3]	Enhance	Change[4]
Hydrologic Function	Function	-2.1	-0.9	3.8	3.5	3.5	-0.3	3.8
	Value	-3.3	-3.4	2.7	2.7	2.7	0.0	2.7
Water Quality	Function	-7.1	-7.6	5.3	5.1	5.1	-0.2	5.1
	Value	-5.5	-5.5	7.5	8.7	8.7	1.2	8.7
Carbon Sequestration	Function	-2.5	-2.6	2.4	2.8	2.8	0.4	2.8
Fish Support	Function	-3.7	-4.1	0.7	5.8	5.8	5.1	5.8
	Value	-4.1	-3.7	10.0	10.0	10.0	0.0	10.0
Aquatic Support	Function	-6.6	-6.8	7.3	7.6	7.6	0.3	7.7
	Value	-8.1	-8.0	8. 7	8.7	8.7	0.0	8.7
Terrestrial Support	Function	-5.8	-5.6	4.9	5.5	5.5	0.6	6.9
	Value	-7.7	-7.9	8.0	10.0	10.0	2.0	10.0
Public Use and Recognition	Value	-1.6	-1.5	0.5	1.9	1.9	1.4	1.9
Provisioning Services	Value	-2.0	-2.00	0.0	0.0	0.0	0.0	0.0

[1] Predicted functions and values of the representative wetland impact sites are assumed to be 0, as the impacted sites they represent will no longer be wetlands. Many of the representative sites, as with the actual impact sites, are very small portions of larger wetlands, which will continue to function at current levels.
[2]Predicted values for created and enhanced PEM wetlands are assumed to be similar.
[3]Existing functions and values associated with the **created** PEM wetlands at the HMS are assumed to be 0 since these areas are currently upland.
[4]Existing functions and values associated with the **created** PSS and PFO wetlands at the HMS are assumed to be 0 since these areas are currently upland.

The apparent net loss of functions for hydrologic function and water quality is a result of the construction of the side channel within the mitigation site, causing the scores for water retention and sediment retention and stabilization to decrease. That the overall outcome of the proposed mitigation project is expected to increase the function and value of the site as a whole.

5.3 Rationale for Method Used in Non-Wetland Assessment

Oregon's stream mitigation framework is currently under development by USACE, Environmental Protection Agency, and Willamette Partnership. As such, the professional judgment and local expertise provided by the GRMW were utilized in assessing the stream function and values of the impact sites and HMS.

5.4 Summary of Expected Non-Wetland Gains and Losses

A quantification of stream impacts compared to stream mitigation is summarized on Table 7. This provides a basis for comparison and assessment of non-wetland impacts and mitigation.

Table 7. Summary of Permanent Non-Wetland Impact and Mitigation

Stream Type	Impact Sites		HMS	
	Total Area (acres)	**Total Length (feet)**	**Area (acres)**	**Length (feet)**
Ephemeral	0.09	1,402.48	n/a	n/a
Intermittent	0.47	3,516.49	810	0.19
Perennial	0.16	994.95	432	0.71
Total	**0.72**	**5,914**		

Impact sites associated with the Project construction and operation are comparatively small and occur predominantly on intermittent stream systems that are non-fish bearing. Conversely, the HMS equates to approximately 2,322 linear feet (0.90 acres) of enhanced and created stream habitat in a major anadromous fish habitat watershed. Many of the impact sites occur above a point where anadromous fish passage is blocked by the Oxbow Dam on the Snake River. Tributaries above this point of the Snake River system cannot provide for endangered anadromous fish migration. The volume of enhanced and created habitat and its location provide a major benefit to endangered species.

Stream functional groups, including hydrologic, geomorphic, biological, and chemical/nutrient functions, and their associated attributes, will be impacted predominantly on a temporary basis and subsequently restored to at least pre-disturbance function. The permanent impacts to stream function and value will be mitigated by implementation of best management practices, and construction practices involving work below the ordinary high water elevation will follow Oregon Department of Fish and Wildlife's in-water work guidelines. The Draft Stream Functional Analysis for the Project, prepared by IPC, is provided in Appendix D. This document was developed under the DSL's interim stream mitigation framework and summarizes the analysis of anticipated permanent stream impacts associated with the Project.

In summary, the losses to stream function and value will be minimal at the impact sites, all of which have low functional ratings. The magnitude of stream mitigation relative to stream impacts of the Project, along with the benefits provided for ESA-listed spring Chinook salmon, summer steelhead, and bull trout, equates to a net gain in ecological process and function in the region.

5.5 Considerations to Address Expected Wetland and Non-Wetland Losses

All expected losses to the functions and values of the impacted wetlands and streams will be addressed at the HMS, through the creation and enhancement of similar wetland areas and enhancement of an anadromous fish-bearing stream.

6.0 COMPENSATORY WETLAND AND NON-WETLAND MITIGATION CONSTRUCTION MAPS AND DRAWINGS

6.1 Grading Plan Objectives

The Grading Plan's objectives are to grade HMS to an elevation sufficient to produce wetland hydrology, support wetland vegetation, and allow hydric soil preservation and development; and to construct a side channel to increase hydrologic connectivity between Catherine Creek, the oxbow, and the wetlands. A draft of the HMS design plans is provided in Appendix B. See Plan Sheet 3 for the wetland types, locations, and areas.

6.2 Planting List and Rationale

A planting plan has been prepared and includes seeding and various types of permanent plantings to restore the site. Methods used will include woody species plantings (live stakes and container plants), wetland area seeding, and upland area seeding. Using a variety of species will ensure a diverse community.

Full details about the planting list are in the Planting Plan (Appendix B).

6.3 Construction Schedule

The Project construction will begin once federal and state permitting processes have been completed. Project construction is anticipated to begin in 2020. The mitigation area is anticipated to be created prior to construction of the Project, or at the least, concurrently with construction impacts associated with transmission line wetland impacts.

Excavation of the HMS will be completed with excavators, dump trucks, and other heavy equipment, as appropriate, with excavated material stockpiled at an upland site for later use. Topsoil will be stockpiled separately to be reapplied before planting and seeding. Excess material will be disposed of on-site in an adjacent upland field as directed by the project engineer and landowner. The created wetlands will have substantial micro-topography to enhance biodiversity. A varied topography creates micro-habitat areas more suited to specific wetland vegetation.

When the desired subgrade elevation is achieved, the site will be covered with a minimum of 12 inches of topsoil, then seeded and planted. Site excavation will likely occur in the fall when water tables are at their lowest elevations to mitigate impacts of heavy equipment in saturated soil conditions, followed by seeding of grasses and planting of woody species. Sedge and rush species will be seeded in spring after high flows begin to subside.

Wood habitat structures will be constructed in the fall to coincide with lowest annual surface water elevations and the Oregon Department of Fish and Wildlife-recommended in-stream work window (July 1 to October 15) and before construction of the wetlands.

7.0 MONITORING PLAN

7.1 Proposed Performance Standards

The following criteria will be used to evaluate the success of the mitigation site:

PEM Wetlands

- The cover of native herbaceous species is at least 60 percent.
- The cover of invasive herbaceous species is no more than 10 percent.
- Bare substrate represents no more than 20 percent cover.
- By Year 3 and thereafter, there are at least 6 different native species. To qualify, a species must have at least 5 percent average cover in the habitat class and occur in at least 10 percent of the plots sampled.
- The Prevalence Index total for all strata is less than 3.0.

PSS and PFO Wetlands

- The cover of native herbaceous species is at least 60 percent.
- The cover of invasive herbaceous species is no more than 10 percent. After the site has matured to the stage when desirable canopy species reach 50 percent cover, the cover of invasive understory species may increase but may not exceed 30 percent.
- The cover of invasive shrub or tree species is no more than 10 percent.
- Bare substrate represents no more than 20 percent cover.
- By Year 3 and thereafter, there are at least 6 different native species. To qualify, a species must have at least 5 percent average cover in the habitat class, and occur in at least 10 percent of the plots sampled.
- Prevalence Index total for all strata is less than 3.0.
- The cover of native woody vegetation on the site is at least 50 percent. Native species volunteering on the site may be included, dead plants do not count.

By the end of the fifth year following construction, a minimum of 6.21 acres of created/enhanced wetlands should be present on the site, as determined using the criteria stated in the 1987 USACE *Wetland Delineation Manual* and 2008 *Arid West Regional Supplement*.

7.2 Monitoring Methods

The following methods will be used to assess the condition of the mitigation site each year:

1. Permanent photo points will be established to provide an overall assessment of the created wetland. Additional photos may be taken as needed and included in the monitoring report.
2. Created and enhanced emergent wetland mitigation areas will be sampled using three 100-meter transects, each with ten 1-meter square meter plots. Plots will be evaluated for percent cover of all species present (Table 8).
3. Created scrub-shrub and forested wetland mitigation areas will be sampled with two 100-meter transects, each with five 50-square meter plots. Each of these large plots will also contain two additional randomly selected 1-square meter plots for sampling of herbaceous vegetation. Plots will be evaluated for percent cover of all species present.

4. Each year, a minimum of four test pits will be dug in the mitigation area (two in the emergent wetland area, and two in the created scrub-shrub and forested wetlands) and examined for the presence of saturation within the upper 12 inches, inundation, soil oxidation-reduction characteristics and other indicators of hydric soils and wetland hydrology, as outlined in the 1987 USACE *Wetland Delineation Manual* and the 2008 *Arid West Regional Supplement*.
5. The site will be delineated by the end of the fifth growing season following construction, to verify the size of the created/enhanced wetlands. This delineation will be conducted in accordance with the 1987 USACE *Wetland Delineation Manual* and the 2008 *Arid West Regional Supplement*.

Table 8. Sample Plot Summary

Vegetation Type	Acres	Number of Samples
Emergent	3.95	30
Shrub/Forested	2.26	10 plus 20 herbaceous

In addition to the above steps, an unobtrusive monitoring method of observation will be utilized to evaluate the use of created/restored habitat for ESA-listed spring Chinook salmon, summer steelhead, and bull trout fish species. Observations shall be conducted by the GRMW or other appropriate non-profit or non-governmental organization, who will prepare an annual report for submission to the Oregon Department of Fish and Wildlife and DSL on utilization and trends for a period of five years following project completion.

7.3 Monitoring Schedule

A post-construction report will be provided, documenting the as-built condition of the site and establishing permanent photo points.

A minimum 5-year monitoring program is proposed for the HMS. Once annually, during the spring or early summer, the site will be visited and the conditions will be compared to the success criteria. The vegetation and notable conditions of the overall site will be recorded, and an annual monitoring report will be submitted to the DSL and USACE by December 31 of each year.

To determine whether the minimum acreage of wetlands has been created/enhanced, the site will be delineated no later than the fifth growing season following construction.

7.4 Rationale for Plot and Photo-Documentation Locations

The sample plots will be located to provide a representative sampling of the vegetation in the mitigation areas, and the photo point locations will be placed to provide good views of the mitigation site as a whole, with closer details as needed. Chosen sampling methods, described in Section 7.2, meet the DSL Routine Monitoring Guidance for Vegetation standards for sample size based on vegetation type.

8.0 LONG-TERM PROTECTION AND FINANCIAL SECURITY INSTRUMENTS

8.1 Description of Proposed Protection Instrument

IPC will ensure long-term protection of the HMS through a conservation easement to provide perpetual protection and conservation of the mitigation wetlands' and waterways' functions and

values, and wetland habitat improvement management of the property. IPC is currently in negotiations with the Site Landowner (Section 2.1) for a possible option agreement.

8.2 Description of Proposed Financial Security Instruments

IPC's ASC for the Project includes evidence demonstrating that IPC has both the organizational expertise (ASC Exhibit D) and the financial capability (ASC Exhibit M) to construct and operate the facility in compliance with the terms of its Site Certificate, which will include a condition requiring implementation of the CWNWMP as approved by the Oregon Department of Energy (ODOE) and DSL. The GRMW or other appropriate non-governmental organization will provide for the long-term maintenance of the site with funding provided by IPC.

8.3 Long-Term Maintenance Plan

The HMS will be maintained and monitored by the GRMW or other appropriate non-profit or non-governmental organization as part of its agreement with IPC. As the site certificate holder, IPC is responsible for site certificate compliance, and will review the ongoing maintenance and monitoring activities at the HMS. IPC will review annual monitoring reports for completeness and will submit the reports to ODOE. IPC would reserve the right to terminate the arrangement with the non-profit organization if maintenance and monitoring activities are not in compliance with permit requirements.

The responsible third-party organization will be responsible for weed control or other remedial measures required at the HMS.

The restoration seeding and planting of the HMS is designed to mimic site conditions of local wetlands. It is expected the natural seed band will establish in Years 1 and 2 following construction.

Hydrology of the HMS will be the same as the flow that sustains the existing wetlands but will be enhanced by grading a portion of the site to create hydrologic connectivity through the site and by constructing a high flow side channel between Catherine Creek and the oxbow. Beneficial uses and functions of the site, including wildlife habitat and water quality, are anticipated to improve as a result of this project.

8.3.1 Noxious Weed and Invasive Species Management

The GRMW or other appropriate non-profit or non-governmental organization will be responsible for controlling weeds in the HMS. Each year the site will be monitored for noxious and invasive species. The responsible organization will follow the recommendations of a licensed applicator to control weeds within the area.

8.3.2 Compatible Uses/Protection

Due to the isolation and private ownership of the site, it will be accessible only to the landowner, the GRMW, and others with explicit landowner permission. There will be limited, if any, public access. Limited access provides protection from potential damage from trespassing. The landowner will maintain control of access to the site but will grant the DSL and ODOE access to the site to conduct review and monitoring activities when requested.

The landowner may use the site for general enjoyment, but may not use the HMS area for agricultural activities. This includes livestock grazing or any other activities not consistent with the goals of this CWNWMP. The site will provide ecological benefits including those related to water quality and wildlife habitat.

8.3.3 Maintenance and Monitoring

The GRMW or other appropriate non-profit or non-governmental organization will be responsible for all monitoring activities of the HMS, including providing annual monitoring reports (up to five years) to the DSL and Oregon Department of Fish and Wildlife and the delineation of the HMS area no later than Year 5. The Monitoring Plan and associated methods are outlined in Section 7.0 of this CWNWMP.

Similarly, the GRMW or other appropriate non-profit or non-governmental organization will be responsible for all maintenance activities at the HMS. Maintenance activities may include reseeding, replanting, and weed control.

All costs associated with maintenance activities that pertain to the HMS area are the responsibility of IPC.

8.4 Contingency Plan

In the event post-construction monitoring finds the HMS is not meeting identified restoration goals, corrective action will be implemented. IPC will be responsible for financing and implementing contingency plans in the event that wetland and non-wetland establishment is not meeting anticipated Project goals.

An investigation of the Project will be conducted to identify causes and appropriate mitigation action to meet Project goals. Analysis will include site factors and conditions such as soil, hydrology, variable climatic factors of the preceding year, stream flow characteristics, water table characteristics, and design and construction review including seeding and planting methods, condition of selected seed crop and planting sources, planting and seeding plan, and construction design and oversight during Project implementation. Corrective actions may include, but are not limited to:

1. Identifying limiting factor(s) in meeting Project goals.
2. Implementing appropriate mitigation measures to improve the Project's success, including but not limited to:
    a. Grading the site to a lower elevation to create hydrologic connectivity through the site.
    b. Constructing an additional high flow side channel between Catherine Creek and the existing oxbow to enhance hydrology.
    c. Replanting and/or seeding areas not meeting vegetation cover parameters.
    d. Implementing an irrigation system to improve successful wetland vegetation establishment.
    e. Implementing aggressive weed control methods.
    f. Constructing a water control structure between the oxbow and the main creek channel to sustain adequate water table elevations for wetland hydrology to persist throughout the growing season and during low flow periods.
3. Increasing the monitoring frequency to identify lingering issues and Project success after mitigation action has been implemented.

8.4.1 Possible Modes of Failure

Possible modes of failure include natural events beyond the control and liability of parties involved in the CWNWMP and implementation. An example of such an event would be

catastrophic flooding associated with extreme precipitation and/or spring snow melt (e.g., 25- to 100-year event) that could potentially scour all planted wetland vegetation or damage wood structures. Seasonal climatic factors such as extreme cold, heat, and/or precipitation during the growing season or post planting and seeding could cause irreparable damage to the seed and planting crop.

An appropriate budget strictly for the purpose of implementing contingency plans, developed in cooperation between the GRMW and IPC, will be included in the overall project budget. Financial assurance for contingency planning is from the same source as the entire Project.

FIGURES

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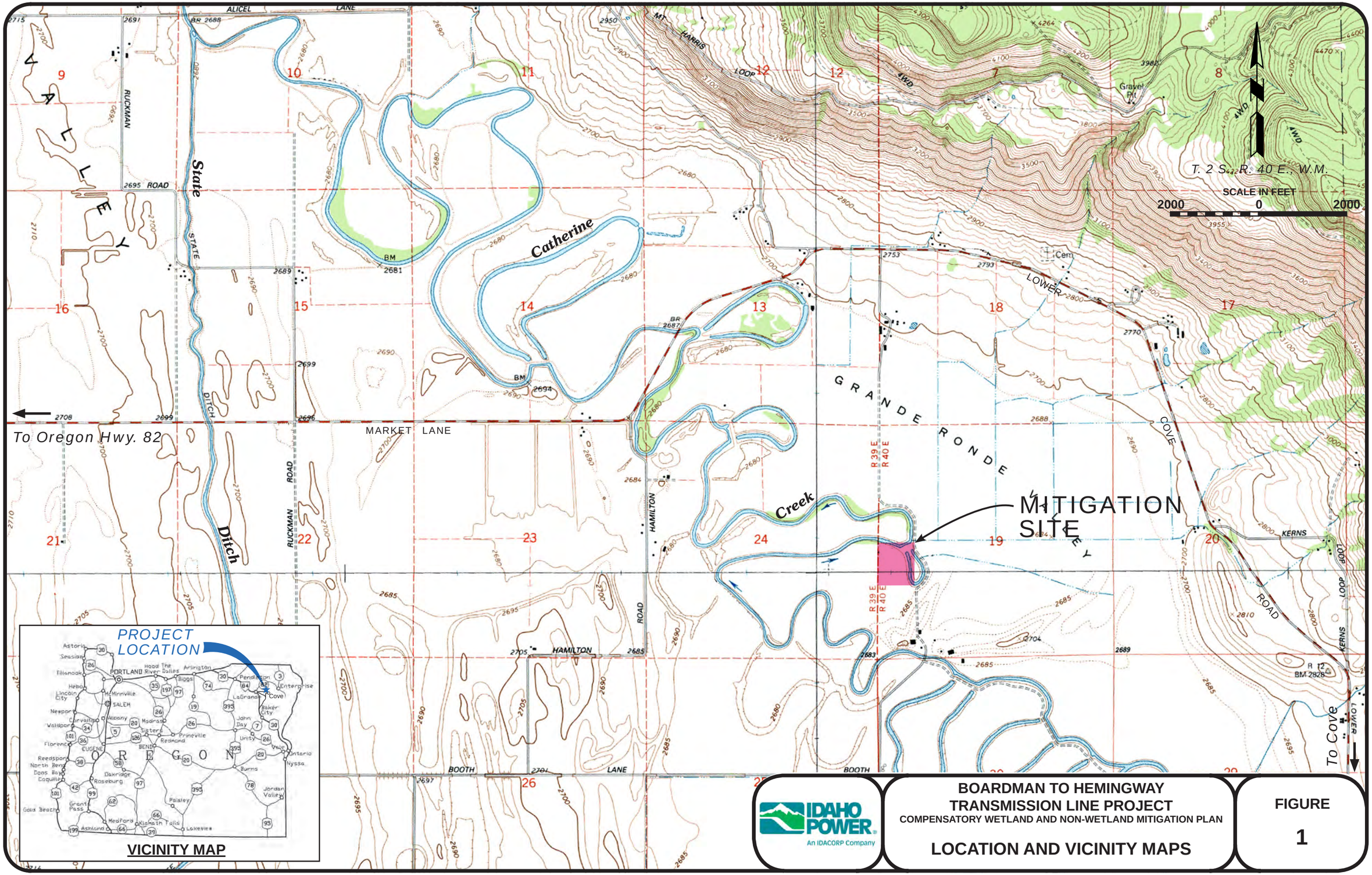

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BOARDMAN TO HEMINGWAY TRANSMISSION LINE PROJECT
COMPENSATORY WETLAND AND NON-WETLAND MITIGATION PLAN

LOCATION AND VICINITY MAPS

FIGURE
1

Job# 81-47-224 Jan. 20, 2017 lbauer

THIS MAP WAS PREPARED FOR ASSESSMENT PURPOSE ONLY

0 1,000 2,000 3,000 4,000 Feet

T.2S. R.40E. W.M.
UNION COUNTY

02S40E

Cancelled
101
102
300
703
900
900T2
1000
1200
1500U1 & U2
1600T2
1800
1800T1
1900
1900T1
2100
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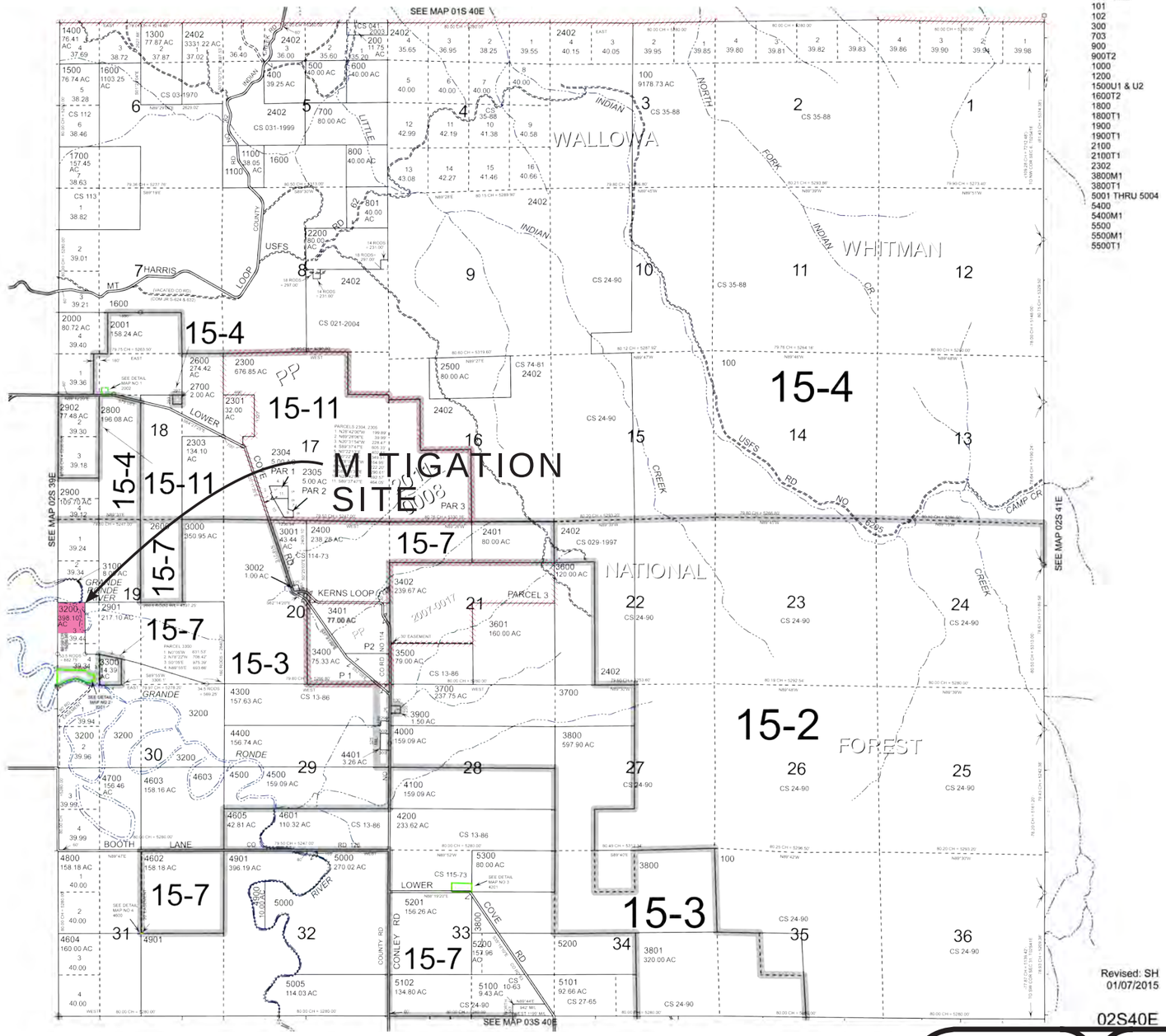

Revised: SH
01/07/2015

02S40E

T. 2 S., R. 40 E., W.M.

SCALE IN FEET
4000 0 4000

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BOARDMAN TO HEMINGWAY TRANSMISSION LINE PROJECT
COMPENSATORY WETLAND AND NON-WETLAND MITIGATION PLAN

TAX LOT MAP

FIGURE 2

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Catherine Creek

HASSINGER MITIGATION SITE

T. 2 S., R. 40 E., W.M.

SCALE IN FEET

200 0 200

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BOARDMAN TO HEMINGWAY TRANSMISSION LINE PROJECT

COMPENSATORY WETLAND AND NON-WETLAND MITIGATION PLAN

AERIAL PHOTOGRAPH

FIGURE 3

Job# 81-47-224 Dec. 13, 2016 lbauer



PHOTOGRAPH 1 - Looking north to south. Photograph taken by Will Rice on October 23, 2015.



PHOTOGRAPH 2 - Looking east to west across the proposed mitigation site. Photograph taken by Will Rice on October 23, 2015.



PHOTOGRAPH 3 - Looking south to north along the west side of the oxbow. Photograph taken by Will Rice on October 23, 2015.



PHOTOGRAPH 4 - Looking northwest at the south bank of Catherine Creek. Photograph taken by Will Rice on October 23, 2015.



PHOTOGRAPH 5 - Monitoring Well No. 1. Photograph taken by Sue Brady on October 23, 2015.

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BOARDMAN TO HEMINGWAY
TRANSMISSION LINE PROJECT
COMPENSATORY WETLAND AND NON-WETLAND MITIGATION PLAN

SITE PHOTOGRAPHS

FIGURE
4

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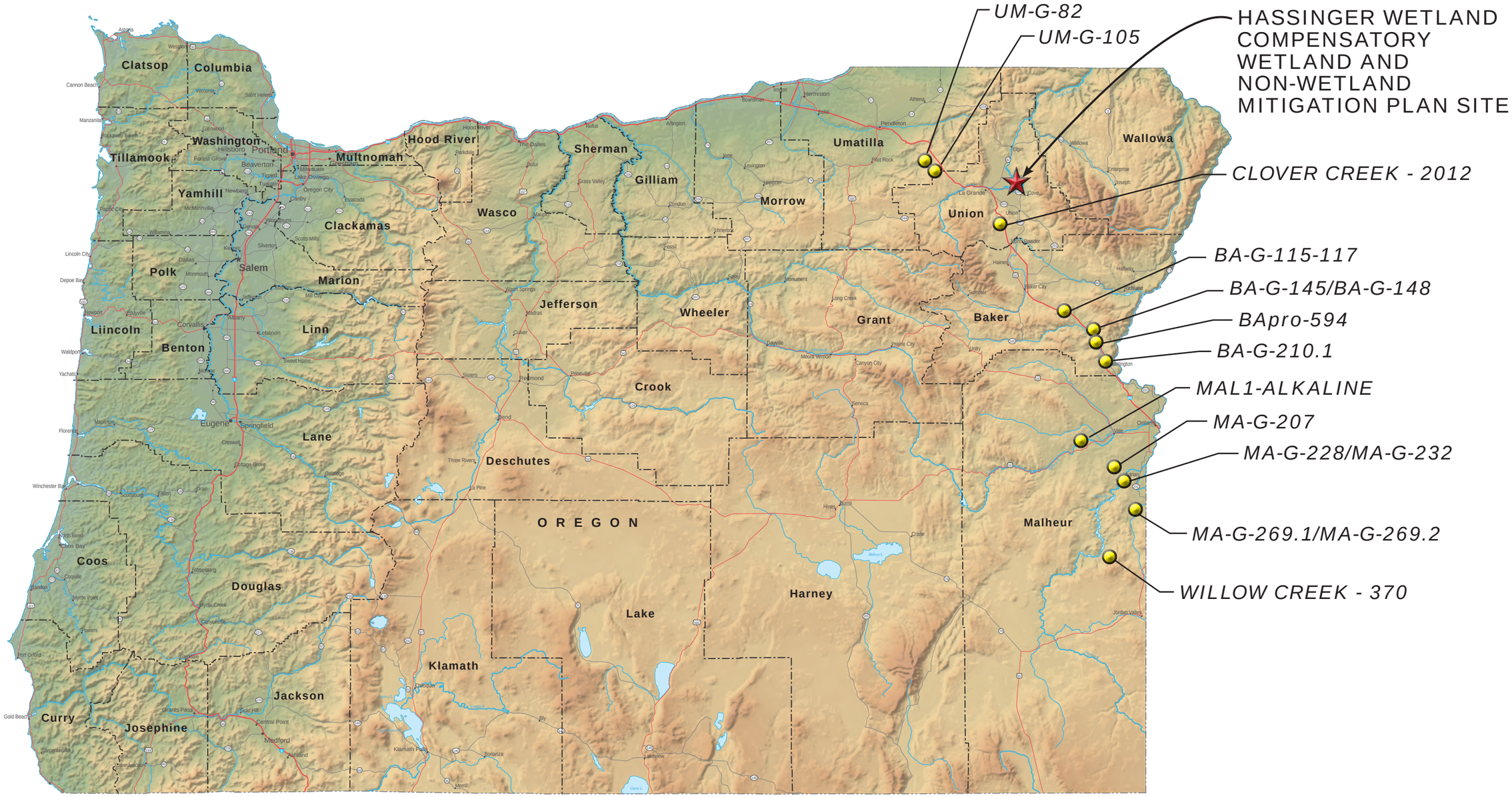

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BOARDMAN TO HEMINGWAY TRANSMISSION LINE PROJECT

COMPENSATORY WETLAND AND NON-WETLAND MITIGATION PLAN

ORWAP SITES LOCATION MAP

FIGURE 5

Job# 81-47-224 Dec. 13, 2016 lbauer

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APPENDIX A
WETLAND AND NON-WETLAND IMPACTS SUMMARY

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Table A-1. Summary of Wetland Impacts

Wetland Type	HGM Class	Disturbance Type	
		Operation (Permanent Impacts)	Construction (Temporary Impacts)
PABFh	Unknown	0.0295	0.0336
PEM	Riverine Flow Through	0.0162	0.0371
	Slope	0.1623	0.2780
	Unknown	0.0486	0.7644
PEMA	Unknown	0.0199	0.4781
PEMB	Slope	0.0294	0.0647
	Unknown	0.0053	0.0061
PEMC	Unknown	0.1559	0.5101
PEMFh	Depressional	0.0030	0.0062
PEMKCx	Unknown	0.0068	0.0078
PFOA	Unknown	0.0339	0.0387
PFOC	Unknown	0.0108	0.0122
PSSA	Unknown	0.0000	25.2027
PUSAh	Unknown	0.0000	0.0552
PUSCh	Unknown	0.0159	0.0180
Grand Total		**0.5375**	**27.5136**

Table A-2. Summary of Permanent Stream Impacts

Flow Duration	Features Impacted	Total Acres	Stream Length Impacts (Feet)
Perennial	25	0.16	1,402.48
Intermittent	111	0.47	3,516.49
Ephemeral	39	0.09	994.95
Grand Total	**175**	**0.72**	**5,913.92**

APPENDIX B
OREGON RAPID WETLAND ASSESSMENT PROTOCOL DATA SHEETS

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BOARDMAN TO HEMINGWAY TRANSMISSION LINE PRO□ECT

COMPENSATORY WETLAND AND NON□WETLAND MITIGATION PLAN

UNION COUNTY□OREGON

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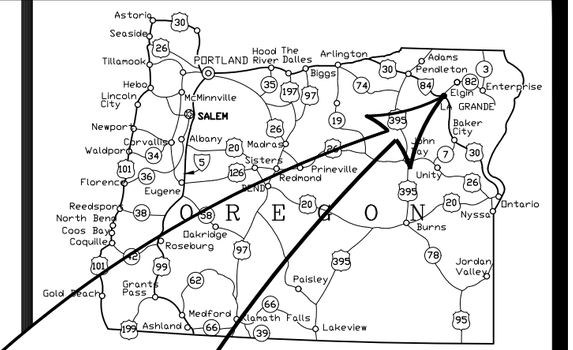
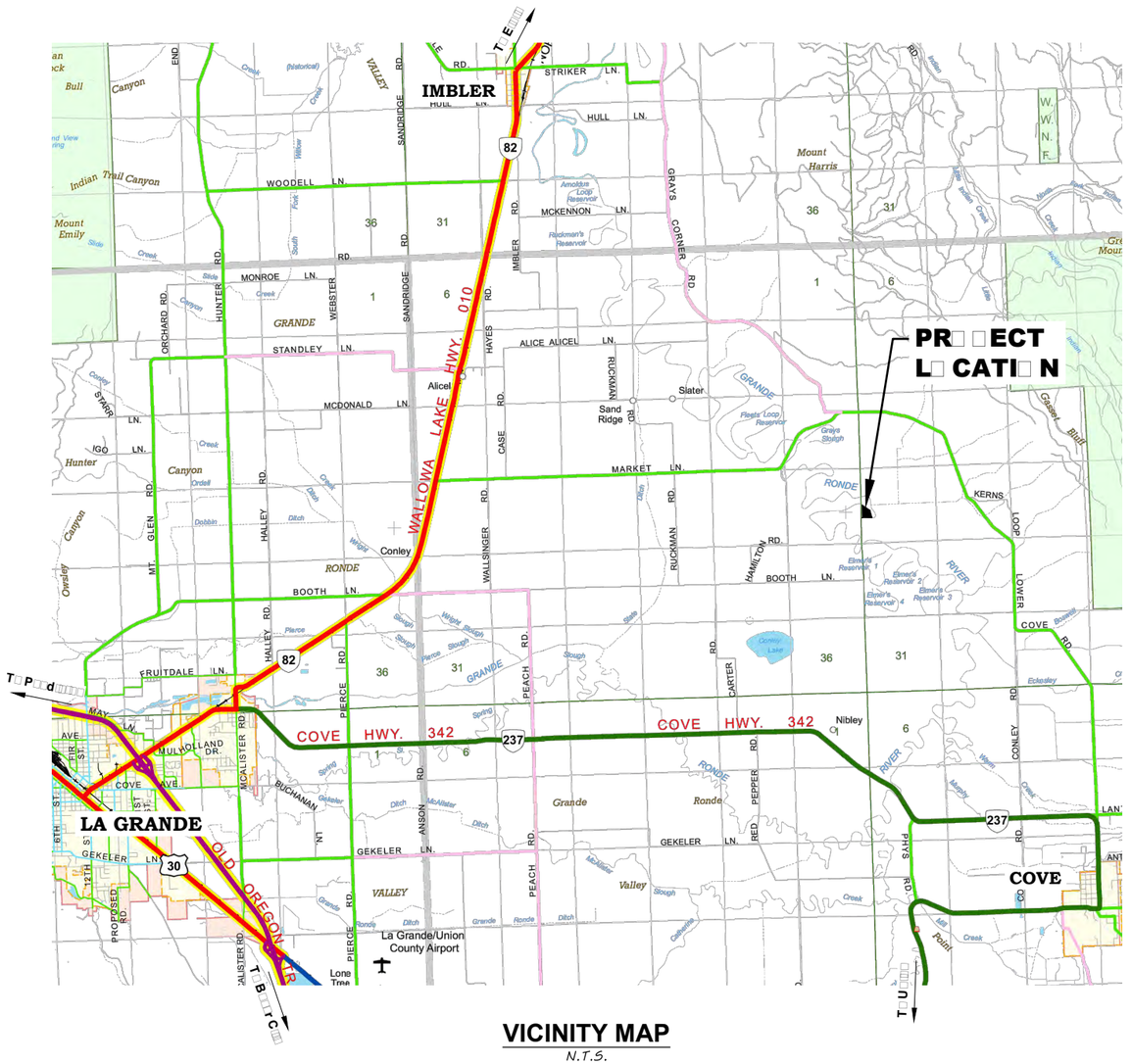
- COVER
1. LEGEND AND EXISTING SITE PLAN
2. PROPOSED SITE PLAN
3. GRADING PLAN
4. WETLAND MITIGATION SECTIONS
5. WOOD HABITAT STRUCTURE
6. PLANTING PLAN
7. PLANTING DETAILS
8. SITE ACCESS AND STAGING PLAN





VICINITY MAP

N.T.S.

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PLAN LEGEND

	EXISTING	PROPOSED
INDEX CONTOUR	750	
INTERMEDIATE CONTOUR	749	
FENCE LINE/GATE		
SIDE CHANNEL CENTERLINE		
ORDINARY HIGH WATER		
CREEK CENTERLINE		
EDGE OF GRAVEL		
STUDY AREA		
TAX LOT BOUNDARY		
MONITORING WELL	W	
CULVERT		
PALUSTRINE EMERGENT WETLAND		
PALUSTRINE FORESTED WETLAND		
PALUSTRINE SCRUB-SHRUB WETLAND		
ENHANCED PALUSTRINE EMERGENT WETLAND		
WOOD HABITAT STRUCTURE		
FILL AREA		
CUT AREA		

DRAFTING

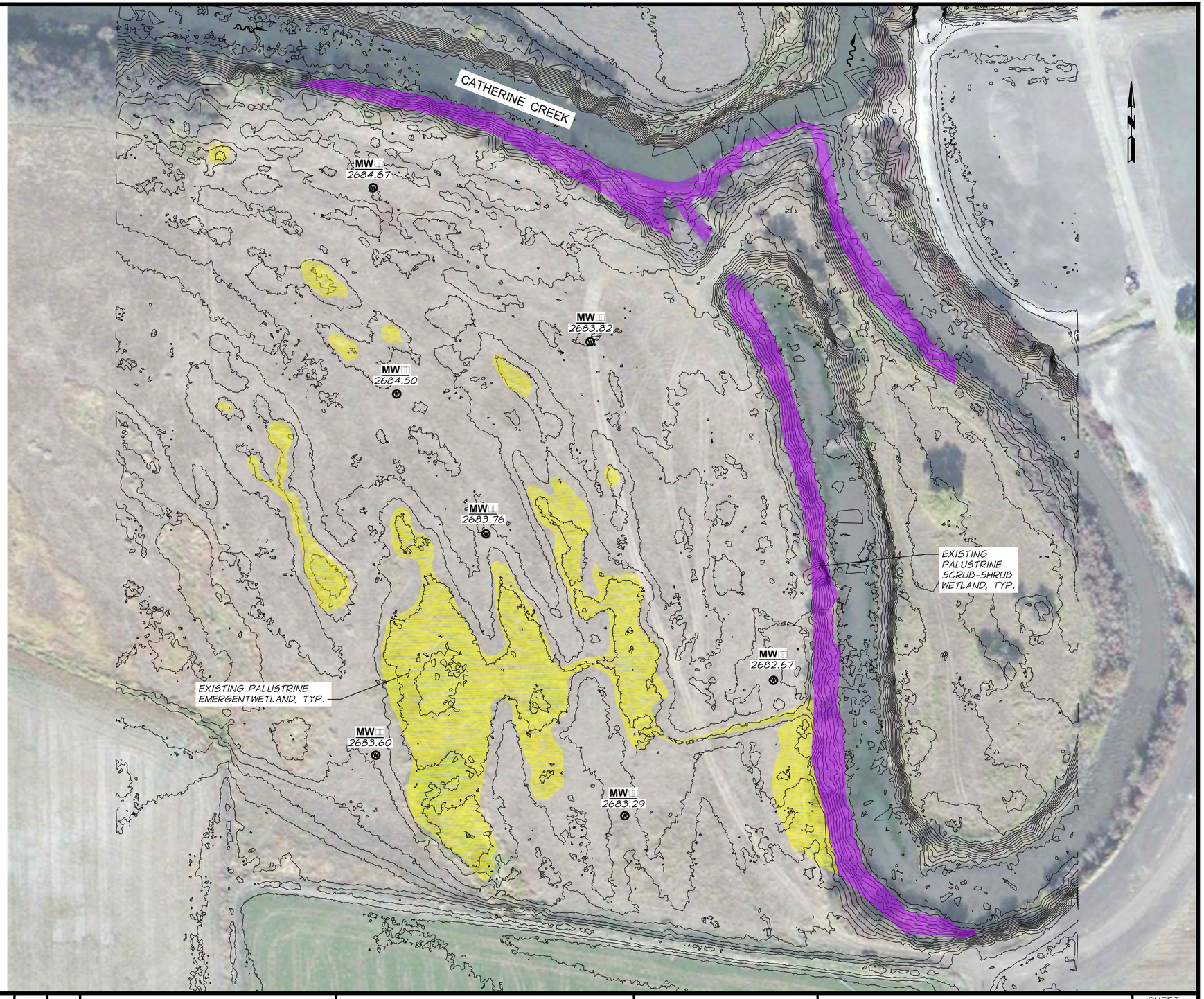
A/2 — SECTION DESIGNATION; SHEET WHERE SECTION WAS TAKEN OR WHERE SECTION IS SHOWN.

WATER SURFACE ELEVATION

DESIGN CRITERIA

GRANDE RONDE RIVER OHW DEPTH* 2685.6

*OHW DEPTH IS BASED ON A HYDRAULIC MODEL PREPARED BY THE BUREAU OF RECLAMATION IN 2011 AND CORRESPONDS TO THE 1.5 YEAR FLOW EVENT.



REVISION	BY	DATE	
DESIGNED BY W. RICE	XREFS: 81-47-060G-TBLOCK.DWG		
DRAWN BY L. WILLHITE			
REVIEWED BY C. HUTCHINS			

60 0 60 120 180
SCALE IN FEET

HORZ. SCALE 1"=60' VERT. SCALE
JOB NUMBER 81-47 DATE 2016
ACAD FILE: 81-40-060C-101xxx.dwg

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BOARDMAN TO HEMINGWAY TRANSMISSION LINE PROJECT
COMPENSATORY WETLAND AND NON-WETLAND MITIGATION PLAN

LEGEND AND EXISTING SITE PLAN

SHEET

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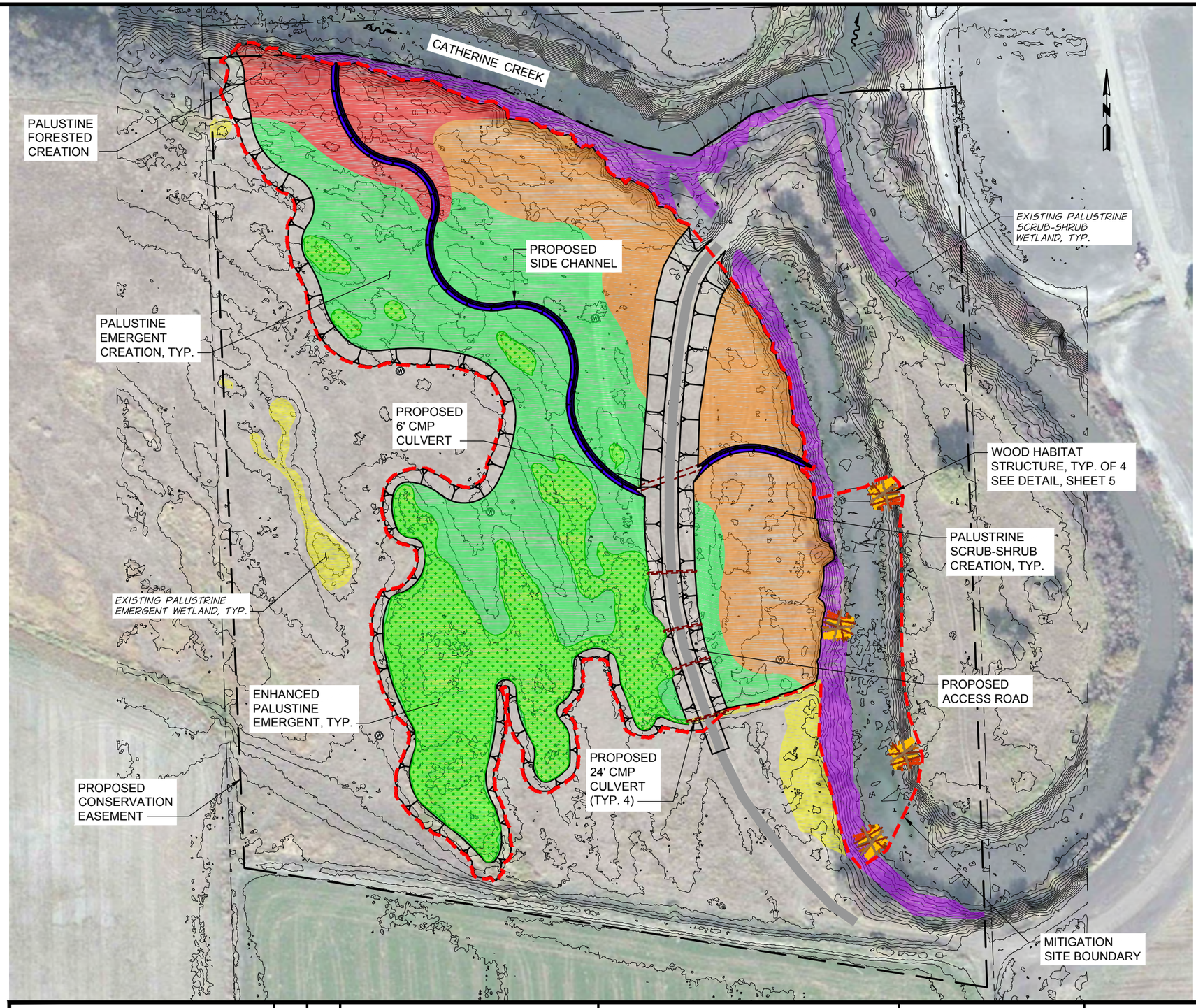

LEGEND

- EXISTING PAULSTRINE EMERGENT WETLAND
- EXISTING PALUSTRINE SCRUB-SHRUB WETLAND
- PALUSTRINE EMERGENT WETLAND
- PALUSTRINE FORESTED WETLAND
- PALUSTRINE SCRUB-SHRUBS WETLAND
- ENHANCED PALUSTRINE EMERGENT WETLAND

PROJECT OBJECTIVE

THE PROJECT OBJECTIVE IS TO PROVIDE MITIGATION FOR WETLAND AND NON-WETLAND IMPACTS THAT OCCUR AT VARIOUS SITES ALONG THE PROPOSED BOARDMAN TO HEMMINGWAY TRANSMISSION LINE PROJECT SITE BOUNDARY THROUGH THE CREATION OF SIMILAR FUNCTIONING WETLANDS AND ENHANCEMENT OF NON-WETLAND HABITAT AT A SINGLE MITIGATION SITE IN THIS REACH OF CATHERINE CREEK.

REVISION	BY	DATE

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SCALE IN FEET

DESIGNED BY	W. RICE	XREFS: 81-47-060G-TBLOCK.DWG	
DRAWN BY	L. WILLHITE		
REVIEWED BY	C. HUTCHINS		
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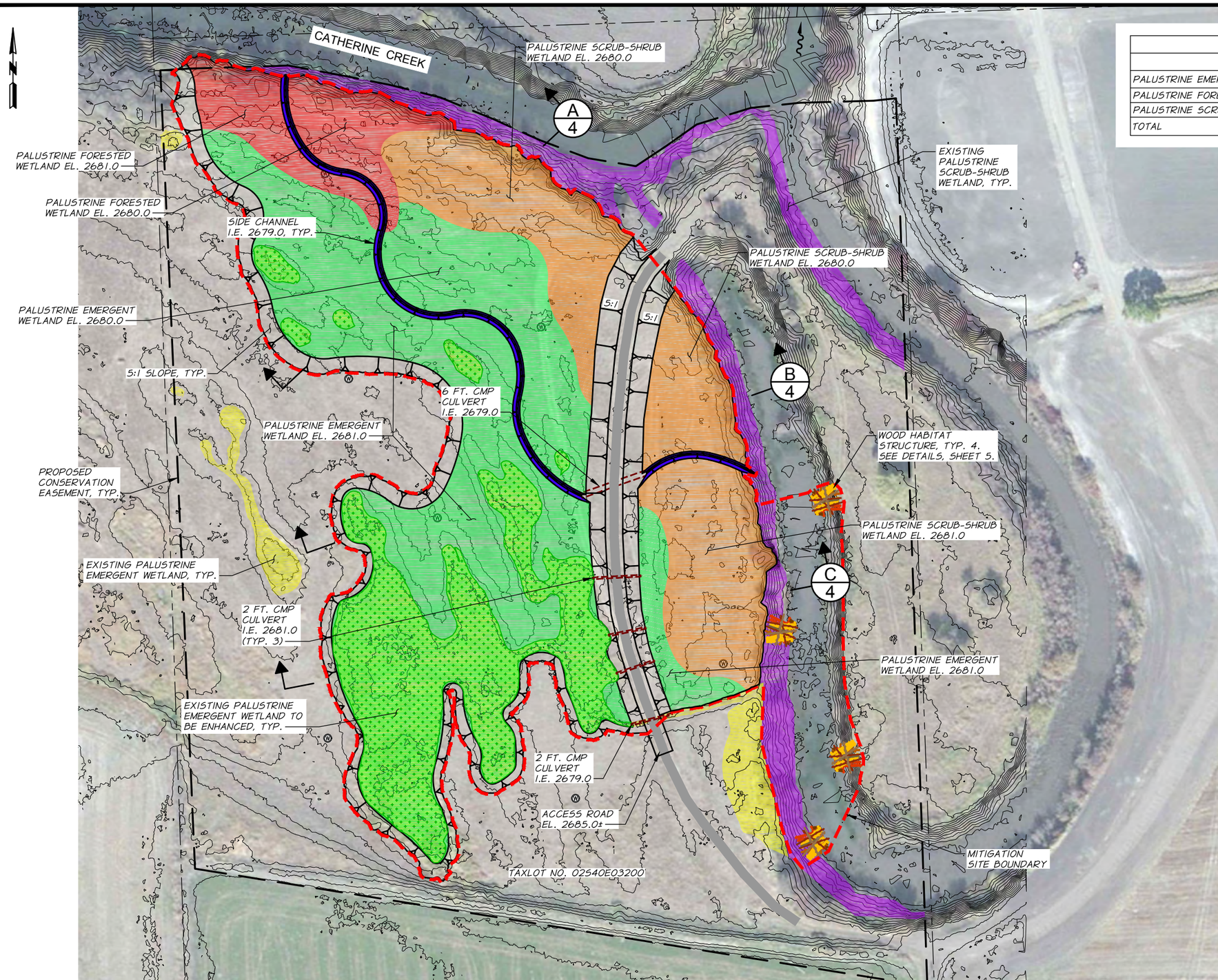
BOARDMAN TO HEMINGWAY TRANSMISSION LINE PRO□ECT

COMPENSATORY WETLAND AND NON□WETLAND MITIGATION PLAN

PROPOSED SITE PLAN

SHEET □



WETLAND AREA (ACRES)			
	EXISTING	CREATED	ENHANCED
PALUSTRINE EMERGENT	0.33	2.50	1.45
PALUSTRINE FORESTED	-	0.57	-
PALUSTRINE SCRUB-SHRUB	1.01	1.69	-
TOTAL	1.34	4.76	1.45

NOTES

1. FINISH GRADES SHALL VARY ±6 INCHES TO CREATE A MICROTOPOLOGY THROUGHOUT THE WETLAND SITE AS DIRECTED BY A WETLAND SPECIALIST DURING CONSTRUCTION.
2. ALL SURPLUS MATERIAL GENERATED ON SITE SHALL BE SPOILED IN ADJACENT LAND OWNER'S FIELD. IT IS NOT ANTICIPATED THAT ANY MATERIAL BE EXPORTED FROM THE SITE.

REVISION	BY	DATE

60 0 60 120 180
SCALE IN FEET

DESIGNED BY	M. LEES	XREFS: 81-47-060G-TBLOCK.DWG	
DRAWN BY	D. CHRISTMAN		
REVIEWED BY	C. HUTCHINS		

HORZ. SCALE 1"=60' VERT. SCALE
JOB NUMBER 81-47 DATE 2016
ACAD FILE: 81-40-060C-120GRAD.dwg

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BOARDMAN TO HEMINGWAY TRANSMISSION LINE PROJECT
COMPENSATORY WETLAND AND NON-WETLAND MITIGATION PLAN

GRADING PLAN

SHEET

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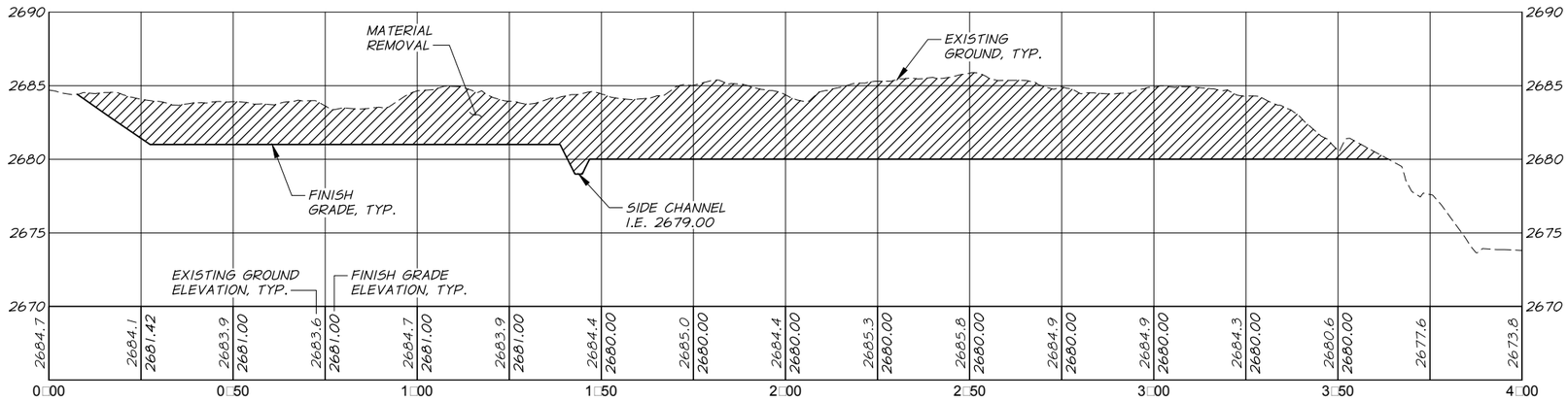
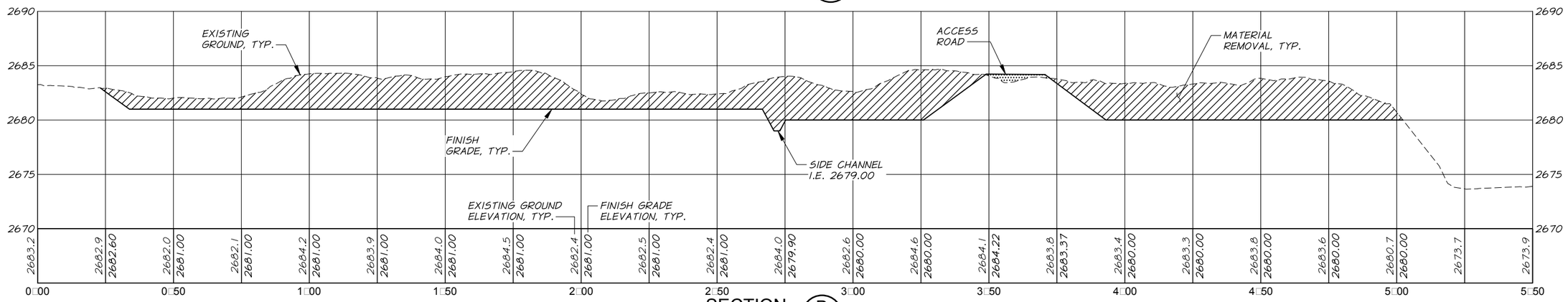
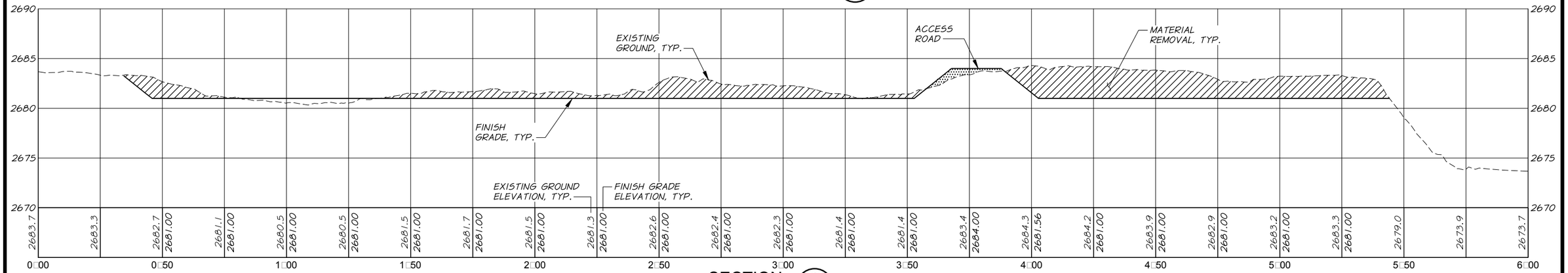


SECTION A 3



SECTION B 3



SECTION C 3

REVISION	BY	DATE

DESIGNED BY	M. LEES
DRAWN BY	D. CHRISTMAN
REVIEWED BY	C. HUTCHINS

XREFS: 81-47-060G-TBLOCK.DWG

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VERT. SCALE IN FEET

HORZ. SCALE	VERT. SCALE
JOB NUMBER 81-47	DATE 2016
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BOARDMAN TO HEMINGWAY TRANSMISSION LINE PROJECT

COMPENSATORY WETLAND AND NON-WETLAND MITIGATION PLAN

WETLAND MITIGATION SECTIONS

SHEET

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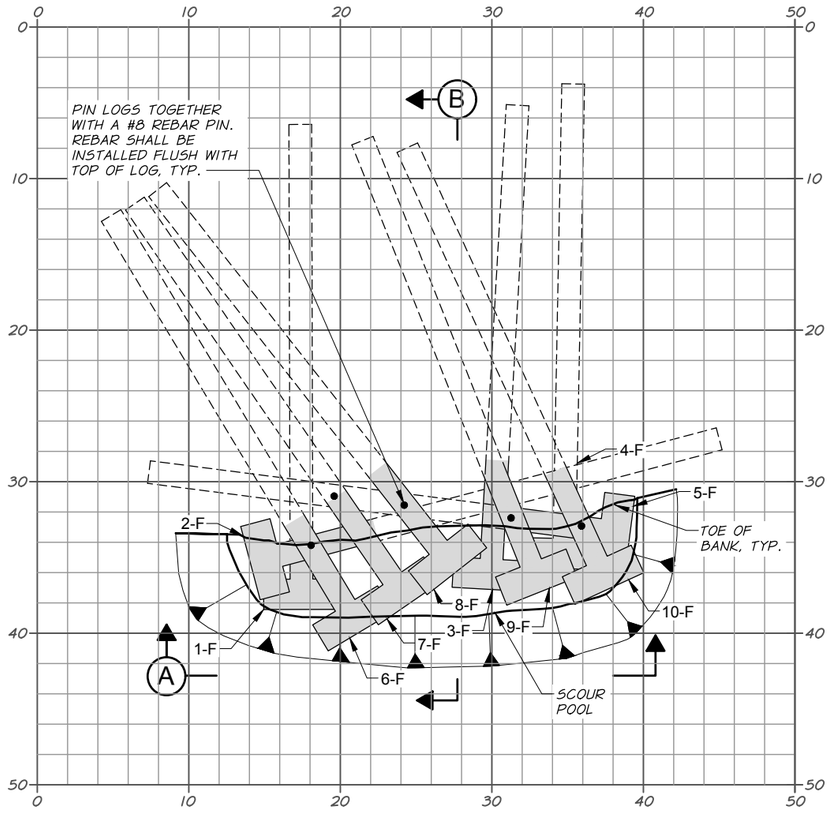
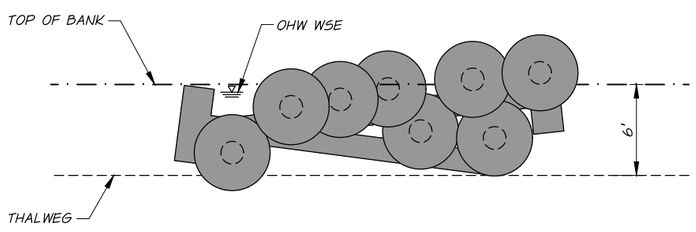


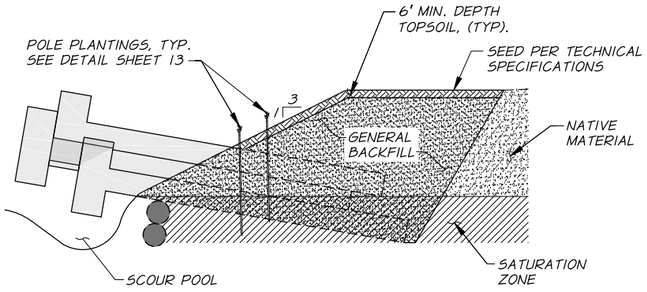
SMALL WOOD HABITAT STRUCTURE

SCALE: 1"=5'



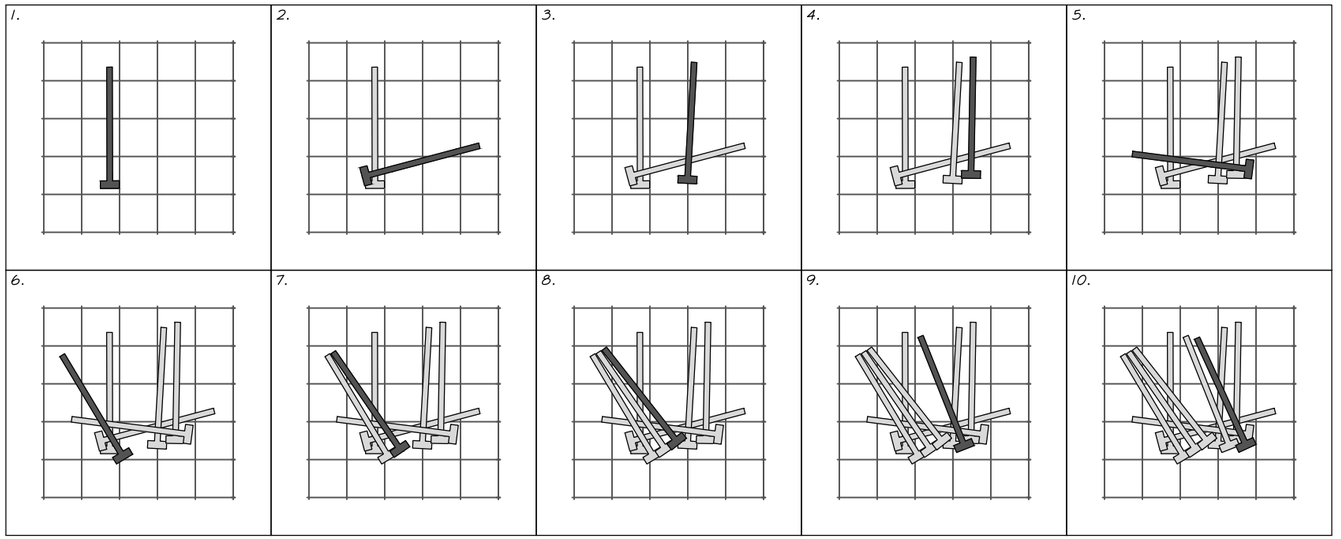
SECTION A

SCALE: 1"=5'



SECTION B

SCALE: 1"=5'



SMALL WOOD HABITAT STRUCTURE LOG PLACEMENT SEQUENCING

SCALE: 1"=20'

SMALL WOOD HABITAT STRUCTURE MATERIAL SCHEDULE			
LOG	DESCRIPTION	QTY. EACH	TOTAL QTY. FOR 4 STRUCURES
TREE TYPE B	JUNIPER 20 FT. X 10"-14" DBH W/ RW	4	16
LOG TYPE F	30 FT. X 18"-24" DBH W/ 5' DIA. RW	10	40
RACKING MATERIAL C	10-20 FT. X 6"-10" DBH	10 *	40
REBAR PIN	#8	5	20

* IN ADDITION TO THE RACKING MATERIAL, THE CONTRACTOR SHALL IMPORT THE TOPS AND LIMBS OF THE LOG TYPES D, AND E, AND USE THIS AS SLASH.

CONSTRUCTION NOTES

1. CONTRACTOR SHALL BACKFILL AROUND LOGS WITH A COMBINATION OF GENERAL BACKFILL AND RACKING MATERIAL.
2. PROVIDE RACKING MATERIAL BETWEEN EACH LAYER AS DIRECTED BY THE ENGINEER.
3. CONTRACTOR SHALL APPLY WATER TO THE BACKFILL PERIODICALLY FOR COMPACTION AND TO FORCE MATERIAL INTO VOIDS.
4. FOR ALL LOGS KEYED INTO BANKS MORE THAN TWO THIRDS OF THE LENGTH MUST BE BURIED.
5. TOP OF BACKFILL AREA SHALL BE COVERED WITH TOPSOIL WITH A MINIMUM THICKNESS OF 6".
6. FINAL INSTALLATION OF THE SMALL WOOD HABITAT STRUCTURE SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.
7. DETAILS SHOWN ARE FOR RIVER RIGHT SITUATION. RIVER LEFT INSTALLATION TO BE MIRRORED.
8. AT REBAR PIN LOCATIONS, THE CONTRACTOR SHALL DRILL A PILOT HOLE APPROXIMATELY 7/8" DIAMETER. THE PIN SHALL BE DRIVEN THROUGH THE HOLE FITTING SNUGLY AND LEAVING NO VOID SPACE BETWEEN THE PIN AND THE PILOT HOLE.
9. ALL SAWCUT ENDS OF LOGS SHALL BE CHEWED OR FRAYED PRIOR TO PLACEMENT.
10. CONTRACTOR SHALL EXCAVATE POOLS SHOWN UNDER THE DIRECTION OF THE ENGINEER.

REVISION	BY	DATE

DESIGNED BY	W. RICE
DRAWN BY	L. WILLHITE
REVIEWED BY	C. HUTCHINS

XREFS: 81-47-0606-TBLOCK.DWG

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SCALE IN FEET
5 0 5 10 15
SCALE IN FEET

HORZ. SCALE	AS SHOWN	VERT. SCALE	AS SHOWN
JOB NUMBER	81-47	DATE	2016
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BOARDMAN TO HEMINGWAY TRANSMISSION LINE PROJECT
COMPENSATORY WETLAND AND NON-WETLAND MITIGATION PLAN

WOOD HABITAT STRUCTURE

SHEET

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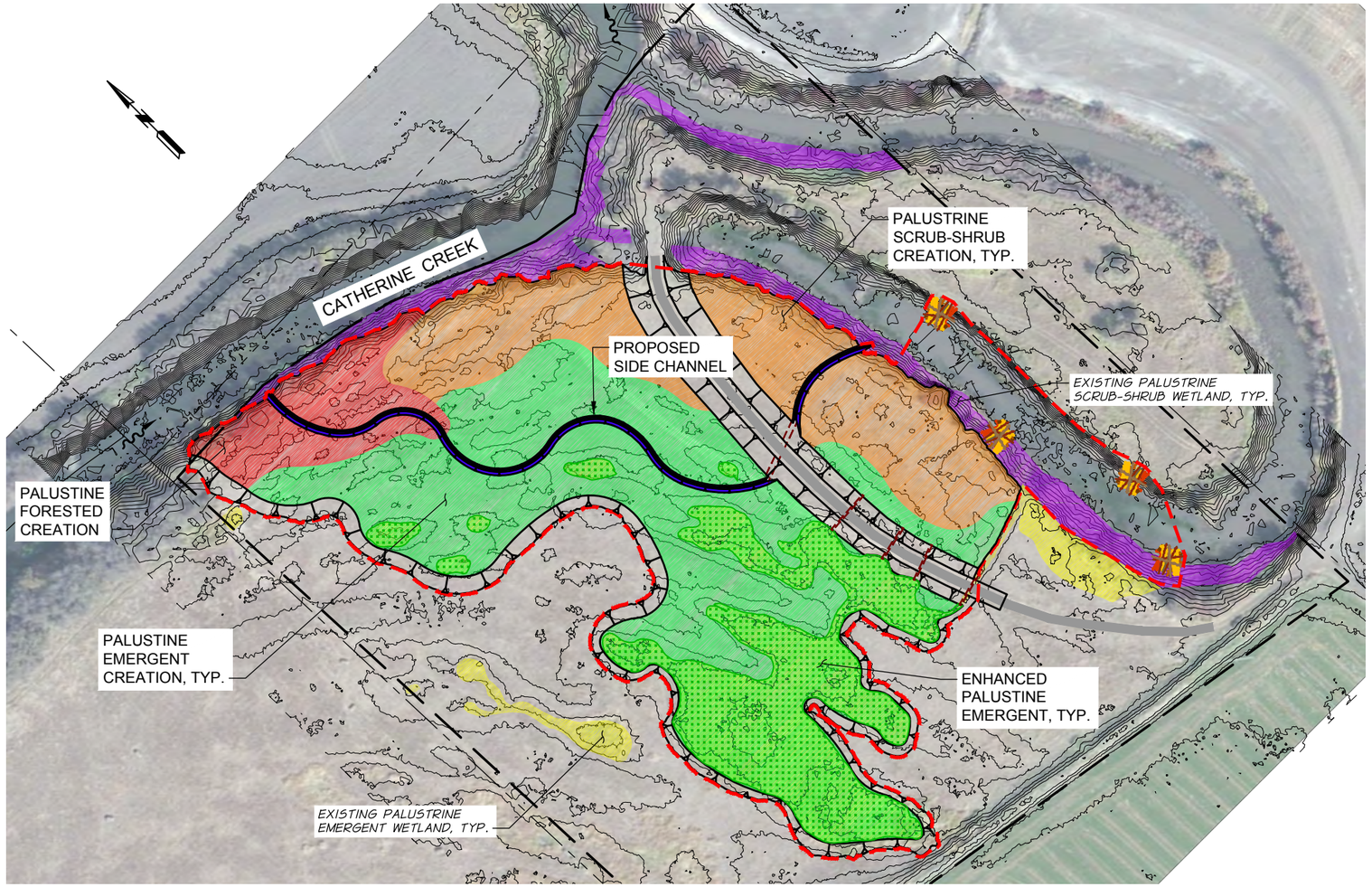

LEGEND

- EXISTING PAULSTRINE EMERGENT WETLAND
- EXISTING PALUSTRINE SCRUB-SHRUB WETLAND
- PALUSTRINE EMERGENT WETLAND
- PALUSTRINE FORESTED WETLAND
- PALUSTRINE SCRUB-SHRUBS WETLAND
- ENHANCED PALUSTRINE EMERGENT WETLAND

NOTES:

1. ALL WETLAND AREAS BETWEEN PLANTINGS SHALL BE BROADCAST SEEDED PER TECHNICAL SPECIFICATIONS.
2. ALL DISTURBED AREAS SHALL BE BROADCAST SEEDED PER TECHNICAL SPECIFICATIONS.

PLANTING PLAN

PALUSTRINE FORESTED WETLAND SPECIES

	Species	Stock Type	Age	Size	Spacing	Number	Wetland Ind. Status
1	Coyote Willow (*Salix exigua* Nsutt.)	Cuttings	2 years	3/4-inch minimum diameter	4x4 feet	300	FACW
2	Peachleaf Willow (*Salix amygdaloides* Anderrs.)	Cuttings	2 years	3/4-inch minimum diameter	10x10 feet	270	FACW
3	Golden Currant (*Ribes aureum* Pursh.)	Seedling	1 to 2 years	18 to 24 inches	6x6 feet	200	FAC
4	Wood's Rose (*Rosa woodsii* Lindl.)	Seedling	1 to 2 years	18 to 24 inches	6x6 feet	200	FACU
5	Black Cottonwood (*Populus balsamifera*)	Cuttings	2 years	3/4-inch minimum diameter	10x10 feet	270	FAC
Total (Approximately 330 Linear Feet of Streambank to be Planted – 0.57 acres)						**1240**	

PALUSTRINE EMERGENT WETLAND SPECIES

Grass, Sedge, and Rush Species Seeding – PLS[1]

Cultivar	Species	% Mix	Rate PLS/Acre	Acres	Lbs. PLS	Wetland Indicator Status
	Tufted Hairgrass *(Deschampsia cespitosa)*	10	1	4.0	4.0	FACW
Magna	Basin Wildrye *(Leymus cinereus)*	40	4	4.0	16.0	FAC
CJ Strike	Creeping Spikerush *(Eleocharis palustris* L.*)*	15	1.5	4.0	6.0	OBL
	Swordleaf Rush (*Juncus ensifolius* Wikstr.*)*	15	1.5	4.0	6.0	FACW
	Water Sedge *(Carex aquatiilis* Wahlenb.*)*	20	2	4.0	8.0	OBL

PALUSTRINE SCRUB-SHRUB WETLAND SPECIES

	Species	Stock Type	Age	Size	Spacing	Number	Wetland Ind. Status
1	Coyote Willow (*Salix exigua* Nsutt.)	Cuttings	2 years	3/4-inch minimum diameter	4x4 feet	5,890	FACW
2	Peachleaf Willow (*Salix amygdaloides* Anderrs.)	Cuttings	2 years	3/4-inch minimum diameter	10x10 feet	1,325	FACW
3	Golden Currant (*Ribes aureum* Pursh.)	Seedling	1 to 2 years	18 to 24 inches	6x6 feet	3,090	FAC
4	Wood's Rose (*Rosa woodsii* Lindl.)	Seedling	1 to 2 years	18 to 24 inches	6x6 feet	3,090	FACU
5	Black Cottonwood (*Populus balsamifera*)	Cuttings	2 years	3/4-inch minimum diameter	10x10 feet	1,325	FAC
Total (Approximately 750 Linear Feet of Streambank to be Planted and 1.69 landlocked acres)						**14,720**	

REVISION	BY	DATE	
DESIGNED BY W. RICE	XREFS: 81-47-060G-TBLOCK.DWG		
DRAWN BY L. WILLHITE			
REVIEWED BY C. HUTCHINS			

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SCALE IN FEET

HORZ. SCALE 1"=80' VERT. SCALE
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BOARDMAN TO HEMINGWAY TRANSMISSION LINE PROJECT
COMPENSATORY WETLAND AND NONWETLAND MITIGATION PLAN

PLANTING PLAN

SHEET

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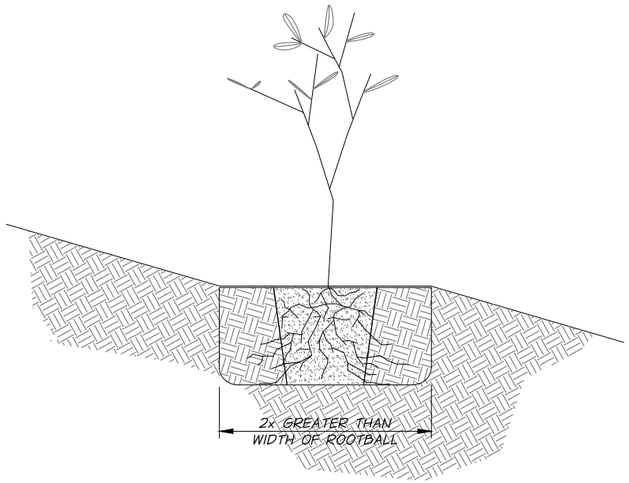
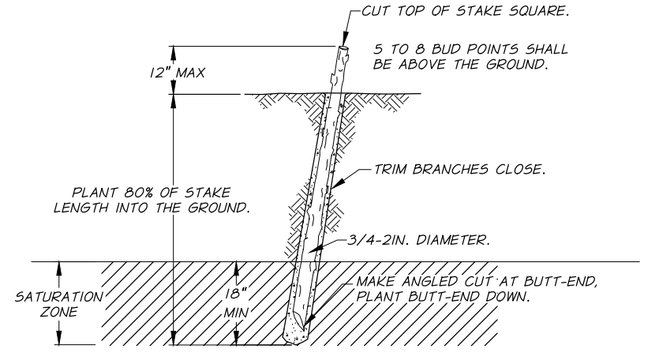


CONTAINER PLANT DETAIL

N.T.S.

CONTAINER PLANT INSTALLATION NOTES

1. PRIOR TO INSTALLATION OF CONTAINER PLANT, CLEANLY PRUNE ANY BROKEN BRANCHES AND SCARIFY OUTER 1" OF ROOTBALL. CLEANLY PRUNE BROKEN, DEAD, OR DISEASED ROOTS. ROOTBOUND PLANTS SHALL BE REJECTED.
2. EXCAVATE CIRCULAR PLANTING HOLE WITH VERTICAL SIDES. SCARIFY SIDES AND BOTTOM OF PLANTING HOLE.
3. PLACE ROOTBALL ON UNDISTURBED NATIVE SOIL AT BASE OF PLANTING HOLE AND SPREAD ROOTS OUT TO SIDES OF HOLE. CLEANLY TRIM ANY ROOTS THAT ARE TOO LONG TO LAY STRAIGHT IN PLANTING HOLE. PLANTS SHALL BE UPRIGHT, PLUMB, AND TOP OF ROOTBALL SHALL BE EVEN WITH FINISH GRADE. WHEN PLANTING ON SLOPES, CREATE LEVEL PLANTING SURFACE TO ENSURE COVER OF ROOTS ON DOWNHILL SIDE OF PLANT.
4. BACKFILL PLANTING HOLE WITH SOIL EXCAVATED FROM PLANTING HOLE AND TAMP SOIL AROUND ROOTS. ANY TRASH OR DEBRIS FOUND IN EXCAVATED SOIL SHALL NOT BE USED TO BACKFILL THE PLANTING HOLE. BACKFILL SOIL SHALL MAKE GOOD CONTACT WITH THE ROOTBALL, LEAVING NO VOIDS.
5. PLANTS SHALL BE PLANTED IN CLUSTERS USING TYPICAL SPACING SHOWN ON THE SCHEDULE WHILE OTHER AREAS ARE LEFT UNPLANTED TO ALLOW FOR DISTRIBUTION OF THE PLANTS THROUGHOUT THE PLANTING AREA.
6. WITHIN 4 HOURS OF PLANT INSTALLATION, THOROUGHLY WATER IN EACH INSTALLED PLANT.



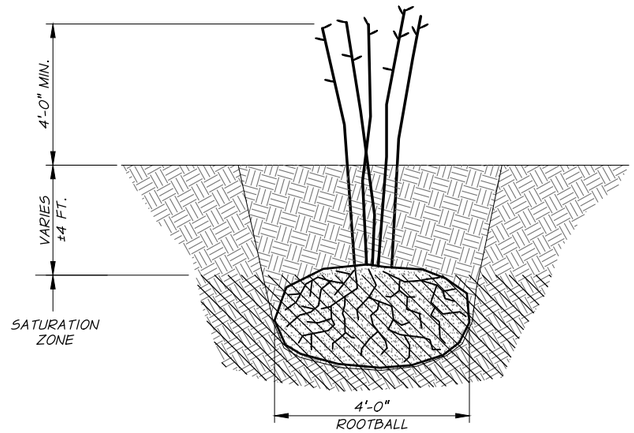
NOTES:
1. HARVEST AND PLANT STAKES DURING THE DORMANT SEASON.
2. USE HEALTHY, STRAIGHT AND LIVE WOOD AT LEAST 1 YEAR OLD.
3. MAKE CLEAN CUTS AND DO NOT DAMAGE STAKES OR SPLIT ENDS DURING INSTALLATION, USE A PILOT BAR OR OTHER APPROVED METHOD IN FIRM SOILS.
4. CUTTINGS HARVESTED FRESH AT THE TIME OF INSTALLATION SHALL BE SOAKED FOR A MINIMUM OF 24 HOURS PRIOR TO INSTALLATION PLANTING. CUTTINGS HARVESTED AND STORED SHALL BE SOAKED FOR A MINIMUM OF 10 DAYS PRIOR TO PLANTING.
5. TAMP THE SOIL AROUND THE STAKE.
6. EXTEND STAKES IN TO WATER SATURATION ZONE.
7. SEE APPROVED SPECIES, THIS SHEET.

TYPICAL PLANTING DETAIL

N.T.S.

APPROVED BRUSH SPECIES

- SALIX EXIGUA (COYOTE WILLOW)
- SALIX LASIOLEPSIS (ARROYO WILLOW)
- CORNUS SERICEA (REDOSIER DOGWOOD)



WILLOW CLUMP INSTALLATION NOTES:

1. WILLOW CLUMPS SHALL BE PLACED AT THE LOCATIONS SHOWN ON FIGURE 1.
2. HARVEST THE ENTIRE LIVE WILLOW CLUMP INCLUDING THE ABOVEGROUND STEMS AND THE BELOWGROUND ROOTS.
3. USE WILLOWS THAT ARE YOUNG AND VIGOROUS, RANGE IN HEIGHT FROM 8 TO 15 FEET, AND ARE APPROXIMATELY THE DIAMETER OF A 4-FOOT BACKHOE BUCKET.
4. START THE HOLE FOR THE WILLOW CLUMP BY DIGGING APPROXIMATELY 10 INCHES AWAY FROM THE STEMS AND DIG DOWN APPROXIMATELY 2 FEET IN ORDER TO GET AS MUCH OF THE ROOT MASS AS POSSIBLE.
5. TRANSPORT THE WILLOW CLUMP TO THE PLANTING LOCATION IMMEDIATELY UPON DIGGING THE WILLOW CLUMP AND PLANT IT SO THE WILLOW CLUMP DOES NOT DRY OUT. TARPING OF THE WILLOW CLUMP MAY BE NECESSARY IF TRANSPORTING THE CLUMP A LONG DISTANCE AND IF THE WEATHER IS SUNNY AND HOT.
6. PRE-DIG THE PLANTING LOCATION FOR THE WILLOW CLUMP AND EXCAVATE DOWN TO THE SOIL SATURATION ZONE BUT NOT INTO THE GROUNDWATER TABLE.
7. PLACE THE WILLOW CLUMP INTO THE PLANTING HOLE AND BACKFILL IN AND AROUND THE WILLOW CLUMP WITH SOIL AND WATER TO REMOVE AIR POCKETS AROUND THE CLUMP.
8. A MINIMUM 4 TO 5 FEET OF THE WILLOW STEMS SHALL PROTRUDE ABOVE THE FINISHED GROUND SURFACE.
9. CUT OFF ABOUT ONE-THIRD TO ONE-HALF OF THE WILLOW TOPS STRAIGHT ACROSS AT THE FINISHED GROUND SURFACE ONCE PLACED AND BACKFILLED.

WILLOW CLUMP DETAIL

N.T.S.

REVISION	BY	DATE

DESIGNED BY	W. RICE	XREFS: 81-47-060G-TBLOCK.DWG	
DRAWN BY	L. WILLHITE		
REVIEWED BY	C. HUTCHINS		

HORZ. SCALE NONE — VERT. SCALE

JOB NUMBER 81-47 — DATE 2016

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THIS DRAWING HAS BEEN REDUCED 50%. ADJUST SCALE ACCORDINGLY. BARSCALE SHOWN IS ACCURATE.

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BOARDMAN TO HEMINGWAY TRANSMISSION LINE PROJECT
COMPENSATORY WETLAND AND NON-WETLAND MITIGATION PLAN

PLANTING DETAILS

SHEET

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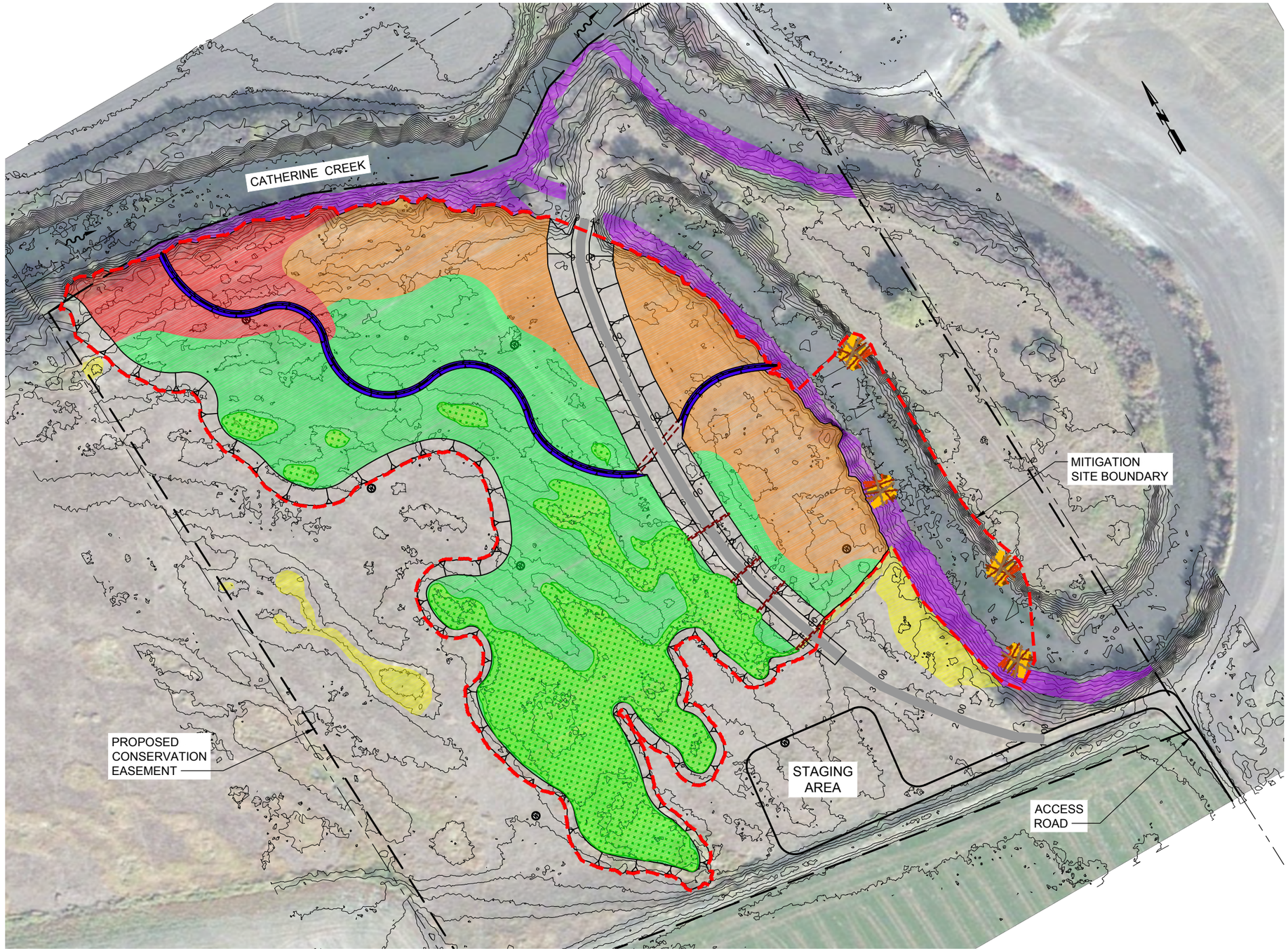

REVISION	BY	DATE	
DESIGNED BY W. RICE	XREFS: 81-47-060G-TBLOCK.DWG		
DRAWN BY L. WILLHITE			
REVIEWED BY C. HUTCHINS			

60 0 60 120 180
SCALE IN FEET

HORZ. SCALE 1"=60'	VERT. SCALE
JOB NUMBER 81-47	DATE 2016
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SITE ACCESS AND STAGING PLAN

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