FOSTER CREEK WETLAND MITIGATION BANK INSTRUMENT

CLACKAMAS COUNTY, OREGON

Wetland Systems Restoration and Conservation, LLC

7860 SW 83rd Avenue

Portland, Oregon 97223

March 8, 2006

With May 28, 2006 revisions

REPLACE THIS PAGE WITH THE SIGNED MEMORANDUM OF AGREEMENT WHEN IT BECOMES AVAILABLE

Table of Contents

List of Tables

List of Figures

List of Appendices

1. INTRODUCTION

The Foster Creek Wetland Mitigation Bank will serve the Johnson Creek basin, Abernathy Creek basin, portions of the Clackamas River basin, and limited portions of the Willamette basin (around Oregon City and Milwaukie). Urban areas served by this bank include Damascus, Oregon City, portions of Gresham, Milwaukie, Portland, and Sandy, and unincorporated Clackamas County. The bank site is a disturbed remnant wet prairie on a glacial age terrace of the Clackamas River that is underlain by hydric soils.

Bank Location

Foster Creek Wetland Mitigation Bank is located along Eaden Road six miles east of Oregon City and five miles southeast of Damascus, Oregon in northwestern Clackamas County as shown in Figure 1. Phase 1 is 72.4 acres. The property is owned by Hermann Stepberger, and Wetland Systems Restoration and Conservation, LLC has negotiated an option to buy the property. There is potential to expand the mitigation bank to approximately 230 acres depending on future demand.

The site is found on a large terrace overlain by hydric soils above the west bank of the Clackamas River (Figure 1). The bank site is a disturbed wet prairie on a glacial age terrace of the Clackamas River formed in response to Lake Allison in the Willamette Valley during the last glaciation. Hydric soils (Dayton silt loam) cover the terrace at approximately elevation 340 feet (mean sea level). The Bonneville Power Administration Ostrander Substation is immediately to the north. Foster Creek lies just west of the Phase 1 portion of the site. Metro owns several parcels extending from the BPA property to the river. Key site information is presented in Table 1.

Service Area

The Foster Creek Wetland Mitigation Bank will serve the Johnson Creek basin, Abernathy Creek basin, portions of the Clackamas River basin, and limited portions of the Willamette basin (around Oregon City and Milwaukie). No wetland mitigation bank currently exists for northwest Clackamas County or southeast Multnomah County, and these areas are experiencing growth that is resulting in unavoidable wetland impacts. Metro proposed development of a town center at Damascus through the 2040 planning process, and voters approved incorporation of the City of Damascus in November 2004. Establishment of the City of Damascus will create additional future demand for wetland mitigation.

The Service Area map is shown on Figure 2A. The Service Area will include a total of 340 square miles with Oregon City and Damascus anchoring the west end of the Service Area. The City of Sandy and unincorporated Clackamas County will fill in the east end of the Service Area. Portions of the Springwater Development southeast of Gresham, a portion of Multnomah County, and portions of Clackamas County west of the Clackamas River Service Area and east of the Willamette River would be included in the Service Area.

Approximately 85-90% of the service area is located within 10 miles of the Foster Creek Wetland Mitigation Bank site. Virtually 100% of the service area is within 15 miles of the bank site.

The Service Area is composed of a number of "watersheds" (The USGS hydrologic hierarchy does not continue subdividing or providing terms for areas smaller than the Subbasin, or Fourth Field Hydrologic Unit Code (HUC)). The watersheds that make up the Service Area are located within and adjacent to the Fourth Field HUC Clackamas River Subbasin up to an elevation of 1200 feet mean sea level. The Service Area includes 186 square miles within the fourth field HUC Clackamas River subbasin. The Service Area also includes 141 square miles within watersheds that drain directly to the Fourth Field HUC Middle and Lower Willamette River subbasins. A list of the watersheds (sometimes referred to a Fifth Field HUC) included in the service area is contained in Table 2. Credits will be available from the bank for the mitigation of wetland impacts throughout the Service Area under the normal DSL and COE guidelines and approval process. Under the current guidelines, the descending prioritized order of avoiding and mitigating wetland impacts will be:

1. Avoid impacts
2. Minimize impacts,
3. Mitigate impacts,
4. Purchase mitigation bank credits,
5. Pay to provide (fee in-lieu).

There are sound ecological reasons to include the Clackamas River, Johnson Creek, Abernathy Creek, and the smaller adjacent watersheds in the Service Area for the Foster Creek Wetland Mitigation Bank. The most compelling reasons for including these watersheds in the Service Area include:

1. They are all within the same ecoregions of "Prairie Terrace" and "Valley Foothills",
2. They share many hydrologic similarities, i.e. location of confluence with Willamette River, precipitation, soils, and elevation,
3. They are ecologically connected by water, land, and air travel corridors,
4. Wetland impacts within the Service Area can all be mitigated within 5-15 miles.

The hydrologic relationships between Johnson Creek, Abernathy Creek, and the Clackamas River are quite strong. The confluence of Abernathy Creek with the Willamette River is currently less than one mile from the confluence of the Clackamas River with the Willamette River. Careful review of topographic maps indicates that the existing location of the lower Clackamas River is quite different than its historical location as shown in Figure 2B.

The Clackamas River in Clackamas, Oregon flows to the southwest toward its confluence with the Willamette River. It appears that the lower Clackamas River historically flowed to the northwest toward the Willamette River, from what is now Clackamas, Oregon to what is now Milwaukie, Oregon. Oregon Highway 224 is located roughly in the center of the old floodplain of the Clackamas River. At the time the Clackamas River flowed to the northwest, Johnson Creek would have been a tributary to it. It appears that Johnson Creek was historically a watershed within the Clackamas River subbasin, sharing fish runs and wildlife corridors. At some point in time, the Clackamas River was diverted to the southwest toward Abernathy Creek, but its old floodplain continued to provide a wildlife corridor between Johnson Creek and the Clackamas River until its recent development to urban land use. When the diversion of the Clackamas River occurred, it likely expanded the wildlife corridor between Johnson Creek and Abernathy Creek.

The Foster Creek Wetland Mitigation Bank is located within the Clackamas River subbasin (fourth order HUC). It has been suggested that wetland impacts within the Service Area but outside the Clackamas River subbasin should be required to pay a surcharge to purchase credits from the Foster Creek Bank. The priority of mitigation options as described in the mitigation rules eliminates the benefit or need to require a surcharge to purchase credits from the mitigation bank for wetland impacts outside of the fourth order HUC that the mitigation bank is located in. The philosophy behind the application of a surcharge is to discourage mitigating out of the subbasin or watershed the impacts are located in. But the requirement that all reasonable attempts to mitigate wetland impacts within the subbasin or watershed, prior to purchasing credits from a neighboring subbasin, meets the intent of the rules for in-basin mitigation. A surcharge would not improve upon this approach and would not provide ecological benefits.

The Service Area boundary is based on subbasin and watershed boundaries in the Service Area. Primary demand is anticipated to come from Damascus and unincorporated Clackamas County. Additional and initial demand is anticipated to come from development of eastern Oregon City, southeast Gresham and other portions of southeast Multnomah County.

The Service Area contains many areas with similar geomorphic and ecological conditions as the Foster Creek Wetland Mitigation Bank. Two ecoregions are found in the Service Area. The Foster Creek Wetland Mitigation Bank Site is located in the upper zone of a lower elevation ecoregion known as "Prairie Terraces". The Prairie Terraces ecoregion extends up the major river valleys to approximately

elevation 400 feet. This ecoregion includes the floodplains and terraces of these systems. The other ecoregion is called "Valley Foothills". The Valley Foothills ecoregion includes the rolling hills of alluvial origins in Damascus, Boring, Oregon City, and south Gresham, extending up to approximately elevation 1200 feet.

Table 3 is a summary of geomorphic conditions in the Service Area. The Bornstedt silt loam is the soil most prevalent through the proposed Service Area. Other soils among the top five most prevalent soils are the Cascade silt loam, Jory silt loam, Xerochrepts and Haploxerolls, and Cazadero silty clay loam.

The Bornstedt silt loam is found on high terraces and rolling uplands of mixed old alluvium. Elevation typically ranges from 250 to 1,400 feet. It is a Hydrologic Soil Group C soil prone to wetness and slow permeability.

The Cascade silt loam is found on rolling uplands in somewhat poorly drained silty material. Elevation typically ranges from 400 to 650 feet. It is a Hydrologic Soil Group C soil prone to wetness.

The Jory silt loam is found on rolling uplands of colluvium. Elevation typically ranges from 250 to 1,250 feet. It is a Hydrologic Soil Group C soil with moderately slow permeability.

Xerochrepts and Haploxerolls are terrace escarpments formed mostly from colluvium. Elevation typically ranges from 50 to 1,000 feet. This soil group is not rated by Hydrologic Soil Group, but is described as having moderately slow permeability and being deep and well drained.

The Cazadero silty clay loam is found on high terraces of mixed old alluvium. Elevation typically ranges from 600 to 900 feet. It is a Hydrologic Soil Group C soil with moderately slow permeability.

The Dayton silt loam underlying most of the Foster Creek Wetland Mitigation Bank site is found on broad terraces in stratified glaciolacustrine deposits. Elevation typically is 150 to 400 feet. It is a Hydrologic Soil Group D soil with very slow permeability, wetness, and a potential for shrinking and swelling.

The terrace and alluvial origins shared by the soils in the Service Area indicate that similar ancient fluvial processes have been at work in soil genesis. The differences in terms of texture and permeability appear to be a function of proximity to Clackamas River, Willamette River, and Johnson Creek, elevation, adjacent topography and landforms.

Approximately 57 percent of the Service Area is in the Clackamas River subbasin. Approximately 43 percent of the Service Area lies in the Middle and Lower Willamette River subbasins, and approximately 12 percent of that is in the Johnson Creek watershed. Portions of the Johnson Creek basin are in an area of similar terrace soils with proposed industrial development that lacks access to a wetland mitigation bank. Borges silty clay loam, Cascade silt loam, and Cazadero silt loam are primary soils in this portion of the proposed Service Area. These are Hydrologic Soil Group D and C soils. Approximately 3 percent of the proposed Service Area drains directly to the Willamette River basin.

Needs Analysis

Metro manages the urban growth boundary (UGB) for the Portland, Oregon metropolitan region's 24 cities and three counties (Clackamas, Multnomah, and Washington). The UGB is the legal boundary separating urban land from rural land. Under Oregon land use laws, each metropolitan area has an urban growth boundary. The boundary controls urban expansion onto farm, forest and resource lands, and allows for more efficient distribution of land, roads, and urban services within the urban boundary. Under Oregon state law, Metro is responsible for maintaining a 20-year supply of residential land within the UGB to accommodate urban activity and growth for the Portland metropolitan area. Metro reviews the boundary at least every five years to determine the need for an expansion to maintain the required 20-year supply of land.

Metro started its most recent analysis and review of the UGB in 2000, with the objective to make a recommendation for the size and locations of the next expansion of the boundary. As a result of its

analysis, Metro produced a forecast population increase of 525,000 people and 355,000 new jobs by the year 2022. To accommodate the estimated population growth, Metro determined a need to provide for 220,700 new dwelling units. Capacity of the UGB prior to any expansion was estimated to be 183,300 dwelling units, or 37,400 less than needed.

Metro met that need by adding 15,047 acres to the UGB for housing. Metro determined that accommodation of the regional employment need will require approximately 14,240 acres of land; 4,870 acres of commercial land and 9,370 acres of industrial land. On December 5, 2002 the Metro Council adopted a package of ordinances to create a significant expansion of the UGB to accommodate most of the estimated need. This 18,700-acre expansion was planned with 16,300 acres for future housing and 2,400 acres for employment purposes.

All of the UGB in the vicinity of Damascus, near Oregon City, and South Gresham/Springwater Community are expected to be developed within the next twenty years. Development will be a mix of residential, commercial, and industrial land uses.

Damascus Town Center
Of the total 16,300 acres included in the UGB for housing, approximately 13,000 acres were added in the Damascus area of Clackamas County. Approximately 14,900 acres of the UGB expansion is centered in the Damascus area. The cost to urbanize the Damascus area is estimated to be $250,000 per developable acre. The high cost of the raw land and high costs to provide urban services to the area will combine to create very high value land.

Oregon City
Some of the residential need was addressed with a 703-acre addition just east of Oregon City.

South Gresham/Springwater Community
Over 1,100 acres of the expansion was added in the South Gresham area to provide industrial land for job growth. Of the 2,400 acres added for employment purposes, approximately 1,170 acres were added to South Gresham. The City of Gresham has combined the newly added acreage to nearly 400 acres of land that were previously within the UGB to create an area of approximately 1,500 acres that is known as the "Springwater Area". The Springwater Area borders south Gresham, from the western limits near Hogan Road east to 282nd Avenue and south to the Multnomah County line. The City of Gresham is currently managing the long range (20 year) planning process for the area that will result in the Springwater Community Plan.

Gresham is working with Multnomah County, Metro, and the state to assure early success for this major new jobs center. The Springwater Community Plan will focus on future development that will include industrial areas, residential areas, and redevelopment opportunities, and will set the direction for land use, transportation, annexation, new target industries, public-private partnerships, and infrastructure. The plan will guide when and where development could occur, what type of development would be permitted, and how development will be paid for. The goal of the City is to complete the Springwater Community Plan in time so that developable sites will be ready for annexation in 2005.

Service Area-wide
Land values are expected to be high, and the demand for new development is also expected to be high. These development pressures will limit the ability of developers to avoid and reduce potential impacts to wetlands, which is anticipated to create a substantial demand for wetland mitigation. Wetland Systems Restoration and Conservation, LLC has quantified several parameters that would provide an indication of the potential wetland mitigation demand for areas within the UGB and the Clackamas River basin (the area that would be served by the Foster Creek Mitigation Bank). The parameters quantified included the acreage of hydric soils, National Wetland Inventory (NWI) wetlands, and land within a 100-foot stream buffer. Acreages for the three parameters within each of the distinct additions to the UGB are presented in Table 4.

The "maximum demand" listed in Table 4 is the absolute upper limit of the potential wetland mitigation demand. The upper limit could only be realized if there was no overlap between the three classes and all classes were fully converted to other land uses. Actual demand will be some fraction of the "maximum demand". If actual demand is assumed to be 10 percent of "maximum demand", potential demand within the service area proposed for the Foster Creek Wetland Mitigation Bank is 274 credits.

Another way of estimating demand is to assume that it is some fraction of the total wetlands within the portion of the service area within the UGB. Gresham and Oregon City Local Wetland Inventories found that approximately 1% of the UGB acreage is wetland. Applying the 1% to the UGB acreage in the service area produces an estimate of 381 acres of potential impacts. This is based on a total UGB area within the service area of 38,188 acres. Of the total acreage, 25,610 are within the Portland-Gresham area, 11,840 are within the Damascus area, and 738 are within the Oregon City area. If it is assumed that 50% of the wetlands within the UGB will be impacted, then it is estimated that there will be a demand for 191 credits.

Demand was also estimated for wetland mitigation needed as a result of the Clackamas County transportation capital improvements plan (CIP). The estimate was calculated by examining the total value of 20-year CIP within the Clackamas County portion of the proposed service area and assuming that 0.3 percent of the CIP budget will go toward wetland mitigation. The estimate also assumes that the cost for each mitigation credit will be $75,000. Based on the CIP budget and the stated assumptions, the 0- to 5-year wetland mitigation demand from Clackamas County transportation projects will be approximately 7 credits. The demand for the 5- to 20-year period will be approximately 13 credits, for a total 20-year CIP related demand of 20 credits. The CIP demand for mitigation is a subset of the totals shown in Table 4, and is therefore not in addition to those numbers. CIP demand does indicate that much of the demand for a significant percentage of the credits in the Foster Creek Wetland Mitigation Bank may come from Clackamas County government. Additional demand will be created through the development of private land.

Figure 3 shows Phase 1 with the potential Phase 2 in relation to adjacent features and in relation to Oregon City and Damascus. Phase 2 could add 156 acres along Foster Creek. This stream system is degraded and offers excellent enhancement and restoration opportunities. Restoration of wetland hydrology through plugging of existing drainage ditches and removal of culverts would have to be the first step in developing the ecological lift for the site. Revegetation could include wet riparian, wet savannah, and wet forest systems.

Wetland Systems Restoration and Conservation, LLC currently has no interest in the property nor contractual rights to buy the property indicated as the potential Phase 2.

Adjacent Property Owners

Adjacent property owners for each adjacent parcel are listed in Table 5. Owners are listed by tax lot identification numbers that match those depicted on Figure 4: Adjacent Property Owners.

Adjacent land uses to the north of the proposed Foster Creek Wetland Mitigation Bank include the Bonneville Power Administration (BPA) Ostrander Substation for electrical power transmission. The site contains buildings, structures, power lines, and power line towers. Parcel 23E35 00601 is also owned by BPA and is currently in agricultural use. Land use to the east of the proposed mitigation bank is single family residential (2 parcels), rural residential (1 parcel), and forestry (2 parcels). Adjacent land use to the south of the mitigation bank is rural residential (1 parcel), single family residential (2 parcels), and agricultural (2 parcels). To the west of the mitigation bank the land use includes forestry (1 parcel) and vacant (1 parcel).

Site Dedication

Wetland Systems Restoration and Conservation, LLC has negotiated an option to buy the Phase 1 property with the current landowner. A letter confirming this agreement is shown in Appendix A.

2. EXISTING AND PROPOSED CONDITIONS

Existing Conditions Site Plan

The Foster Creek Wetland Mitigation Bank occupies a portion of an extensive glacial terrace above the west bank of Clackamas River at an elevation of approximately 340-feet MSL. The site is underlain primarily by the Dayton silt loam hydric soil. This moderately dense and poorly drained soil overlays a gravel and cobble stratum found 30-60 inches below the ground surface. Site topography and vegetation has been modified through agricultural development, and the site is currently used for haying. The gently undulating hay field has simplified topography when compared to surrounding forested and non-forested areas.

The site includes roughly a dozen large Oregon white oaks and a large population of common camas lilies, narrow-leafed montia, fragrant popcorn flower, meadow barley, tufted hairgrass, various sedges and rushes are also found on-site. Sweet vernal grass, Queen Anne's lace, common dandelion, velvet grass, and reed canarygrass are major non-natives found on-site. Reed canarygrass is present on-site, and appears to be present in less than 25 percent of the site. Appendix B includes site photos.

A vegetation survey was conducted in spring 2005 that found 126 species including 64 natives. The vegetation survey is included in Appendix C. Table 6 lists the existing native plants, and Table 7 lists the existing non-native plants. General Land Office (GLO) survey notes were reviewed as part of the botanical assessment by John Christy. He found the description of vegetation for the section lines immediately adjacent to the site describing the vegetation as "timber scattering fir and oak". Christy points out that description applies to oak and fir woodland with shrubby to open understory that may have been wet prairie.

Wetland Systems Restoration and Conservation installed ten shallow monitoring wells on-site in spring 2005 to assess hydrology conditions. These monitoring wells were installed in early March during a long winter dry spell of several weeks. Water levels in the wells responded quickly to rainfall that resumed in mid-March continuing into June, and slowly dropped through the spring and early summer. Well layout is shown on Figure 10. The well configuration allows for seven comparative groundwater transects.

Dominant common camas lilies found at the site would have been part of that wetland plant community. The hummocky topography on the federal land northwest of the site may also correlate with prior wet prairie. Aerial photos from the 1930s and 1950s indicate woodland or shrubland that may have become dense after a long period without fire management used by Native Americans.

Thus by elevation, soils, hydrology, topography, and vegetation this site could be described as a Prairie Terrace ecotype. Land management changes over the last 150 years appear to have altered the landscape in terms of the vegetation particularly. Ditches adjacent to the site to promote agricultural drainage, and roadside ditches along Eaden Road demonstrate that surface flows have been altered in terms of distribution and duration as well.

Foster Creek flows directly to the Lower Clackamas River. This area has been studied at a watershed level by the Clackamas River Watershed Technical Work Group. This group has established the following watershed goals in decreasing priority:

- Native fish restoration,
- Water quality improvement,
- Water supply protection,
- Natural areas conservation.

The Lower Clackamas River supports a strong native fishery despite a Section 303(d) listing for high stream temperatures and habitat modifications. Foster Creek is designated as essential salmon habitat. The salmonid distribution in the Foster Creek system includes:

- Coho spawning and rearing,
- Winter steelhead spawning and rearing.

Foster Creek has road crossing fish passage obstructions, and is a Section 303(d) listed stream where nutrient loading and sediment loading are of concern.

Existing Hydrology

Precipitation, surface water runoff, and groundwater all contribute to the wetland hydrology of the site. Groundwater plays a relatively small role in supporting the hydrology of the site. Surface water from the offsite 116-acre drainage basin contributes a significant amount of water to the swales that run through the site and helps to recharge the subsurface water in the vicinity of the swales. **Direct precipitation is the primary driving force of the overall site hydrology.**

The Phase I Foster Creek Wetland Mitigation Bank site includes a total of 73.75 acres. Of the total acreage, 1.36 acres is upland northeast of Eaden Road and is separated from the contiguous 72.39 acres of land southwest of Eaden Road. It is located near the drainage basin divide that runs along the nearby stretch of Eaden Road and receives no significant contributions of surface water or groundwater. Within the 72.39 contiguous acres is approximately 5 acres of land in the southeast corner of the site that drains away from the remaining 67 plus acres and is separated from it by a north-south running watershed divide through that corner of the site. It receives surface water and groundwater from an offsite area that is approximately 5 acres in size. Both the 1.36-acre and the 5-acre portions of the site drain directly to the Clackamas River through a small, unnamed tributary.

The remaining approximately 67 acres of the project site lies within the Foster Creek Drainage Basin and drains to Foster Creek. Foster Creek is located approximately 1400 feet west of the Phase I western project boundary. This 67-acre portion of the site receives groundwater and surface water from 116 acres of land to the south that is primarily zoned for agricultural and forestry uses. The surface water from offsite flows onsite entirely across the southern project boundary through several swales that carry the water through the site.

The underlying soil for most of the site is the Dayton silt loam. The surface and subsurface layers consist of silt loam and silty clay loam and are underlain by a subsoil of clay. The clay subsoil enables rapid saturation of the surface and near-surface soils with the onset of the wet season resulting in a perched groundwater. Soil saturation is maintained by the combined effect of the restrictive clay layer which limits percolation of subsurface water, the site's gentle topography which slows lateral flow, and the regular rainfall of the wet season that keeps the subsurface water replenished.

Average monthly and annual precipitation for the Estacada 2SE and Oregon City rain gages is included in Table 8 and Table 9 respectively. Monthly and annual precipitation is also included in the Tables 8 and 9 for all of 2003 and 2004, and for the available data for 2005. These tables provide a comparison of historic monthly and annual means with those of recent years to enable correlations between actual rainfall distributions and the wetland hydrology of the site. Because the record for the Estacada 2 SE gage is more complete, the gage location is at nearly the same elevation of the project site, and the gage is located more closely to the site than the Oregon City gage, the Estacada 2 SE is considered more representative of the project site than the Oregon City gage.

Wetland hydrology was evaluated during the wetland delineation conducted in Mid-March of 2004. To obtain a more detailed understanding of the site hydrology, Wetland Systems Restoration and Conservation, LLC installed ten shallow groundwater wells in early March of 2005. The wells were installed after a near record dry January and February, and before a significant wet period started in mid March. Each of the wells was equipped with a water level data logger that records absolute pressure and temperature twice a day. An eleventh well and data logger was installed above ground to measure

barometric pressure. Absolute pressure readings from the data loggers were corrected for barometric pressure using the data set from the eleventh data logger and the data management software. The data was plotted as water depth versus calendar date.

Plots of water depth for each well were examined for the highest water depth that was consistent over a period of 15 days during the growing season. Peak sustained water depths for each well were manually transferred to Table 10 to calculate the depth of the water below ground and the elevation of the water surface. Of the ten monitoring wells, well number 6 was unusable, well 8 is probably unusable, and well 7 had some inconsistencies in the data. The data inconsistencies for well 7 appear to have occurred after the data was gathered that was used to calculate the maximum 15 day depth, and it is felt that the data is valid for this well.

For the eight wells with good data, 6 indicate subsurface water levels within 12 inches of the surface, and two indicate water levels within 18 inches of the surface. For wells 1 and 2 the peak sustained water surface elevation occurred in early April 2005. This period was preceded by some heavy rain in late March that brought the rainfall for the month to 6 percent greater than the average for the month. The previous months of January and February experienced rainfall amounts that were only 32 percent and 21 percent of average respectively. Prior to the onset of the rains during this very dry winter, the water levels in wells 1 and 2 were 21 inches and 26 inches below the ground surface. As a result of 2 days of heavy rain in late March, the water levels in wells 1 and 2 came within 4 inches and 3 inches of the surface respectively within days of the rainfall occurrence. This data demonstrates the direct and rapid response of the site soils to precipitation.

For wells 3, 4, 5, 7, 9, and 10 the peak sustained water surface elevation occurred in mid May 2005. Mid May precipitation included a series of storms that brought moderate amounts of precipitation on a daily basis. Overall precipitation for the month of May was 41 percent above normal. Well 3 had fairly consistent water levels over the previous 6 weeks. Water levels in Well 4, 5, 9 and 10 had greater fluctuations in water levels but had much higher water levels than the one reported below over the preceding 6 weeks, but with shorter durations. Well 7 had very consistent water levels similar to the one reported below over the previous 6 weeks after the rains started in mid March.

Water level data for the monitoring wells indicate a very close relationship between precipitation frequency and amount of rainfall and the water levels in the shallow subsurface. Site soils appear to respond rapidly to precipitation, saturating quickly under the influence of precipitation. Some portions of the site appear to dry out almost as rapidly as they saturate based on data from wells 4, 5, 9, and 10. These wells are located primarily along ridge lines and do not benefit hydrologically from close proximity to an on-site swale. Some wells, such as numbers 1, 2, 3, and 7 indicate that large portions of the site will saturate and hold the water for many weeks. These swales demonstrate the hydrologic benefit of proximity to the surface water carried by the swales.

The influence of surface water is a secondary but significant driving force on the site hydrology. Surface water from offsite adds water to the site that is in addition to the precipitation that falls on the site, and it provides a temporal extension to the precipitation. The precipitation from a given storm may last for several days and then stop. The surface water may flow for many days after the precipitation has stopped, providing a longer duration to the hydrologically modifying influence of the storm on the site.

The natural and historic flow of surface water to the Foster Creek Mitigation Bank site has been disrupted by the construction of ditches along the south project boundary. These ditches were constructed to intercept the flow of surface water and possibly very shallow groundwater from the 116 acre drainage basin to the south of the project site. Large portions of the southwest corner of the site were historically fed by several small swales that drained the land to the south down to Foster Creek. The supply of surface water to these swales has been cut off by the ditch along the south project boundary. This is also an area of the site that contains patches of upland that were probably not present historically. A high concentration of non-native invasive species can also be found in this area.

Existing Wetlands Classification
Wetlands were delineated on the site in March 2004 by Wetlands Systems Restoration and Conservation, LLC. Approximately 65 acres of wetlands were identified along with approximately 9 acres of upland islands. Figure 5 shows the wetlands and upland islands that were delineated. A delineation report is in process and will be submitted shortly to DSL and the Corps for review and confirmation of its findings.

Hydrogeomorphic
An assessment of site wetland functions was performed using the Hydrogeomorphic method (HGM) based on the Willamette Valley slopes wetland subclass (DSL 2002). Functions were assessed for the existing habitat, and for anticipated conditions following the successful completion of the 5th monitoring year. Table 11 summarizes the findings for the ten reference-based functions. Data sheets for existing and proposed conditions are included in Appendix D.

The results indicate that gains can be anticipated with most functions, while none of the functions are expected to decrease. The largest gains for both a highest functioning site (HFR) and a least altered site (LAR) are found in water storage and delay and support of characteristic vegetation. This is expected with the increase in shallow ponding due to grading, and the conversion of a non-native dominated habitat to a native dominated one. Primary production along with wintering and migrating water bird support will also strongly increase relative to both kinds of sites according to the assessment.

Cowardin
The wetland portions of the site would be classified as a Palustrine Emergent Marsh – persistent, seasonally flooded/saturated (PEM1E). Forested wetlands are found southwest of the site, and a scrub-shrub hedgerow borders the north boundary and the northern most western boundary. The National Wetlands Inventory does not indicate wetlands for this agricultural site.

Former or Current Uses
A Phase I Environmental Site Assessment (ESA) was conducted in April 2004 for the properties that would likely be included in the Foster Creek Wetland Mitigation Bank. A search of available environmental records was conducted by Environmental Data Resources, Inc. (EDR). EDR prepared a report that meets the government records search requirements of ASTM Standard Practice for Environmental Site Assessments, E 1527-00. Search distances are per ASTM standards.

Only one site was listed as being within the ASTM search distances and up-gradient from the proposed mitigation bank. It is listed as a leaking underground storage tank (LUST). Cleanup of the LUST was completed in February 2002. Because cleanup of the site has been completed, this LUST site is not considered to pose any environmental threat to the proposed wetland mitigation bank.

Proposed Conditions Site Plan
Proposed site conditions focus on wet prairie habitat with a minor amount of forested wetland islands. The rarity of wet prairie, especially in the Clackamas region, coupled with the site soils (primarily Dayton silt loam) and hydrology (seasonal ponding) influence the decision to focus on prairie habitat. Forested islands are included to increase the vegetative structure diversity for wildlife utilization.

The majority of the site will be targeted as wet prairie habitat. Most of the enhancement to wet prairie will result from weed control efforts followed by revegetation with select native species focusing on signature wet prairie grasses. Introduction of native wet prairie forbs, sedges, and rushes will be nominal at first with more species to be introduced as weed control becomes less intensive later in the project.

Proposed site modifications consist of a number of fairly subtle changes in grading. Figure 6 is a conceptual site plan that shows 13 low berms used to detain surface water in three existing swales before leaving the site. This sketch also shows three leader swales to capture runoff currently intercepted by the 2000 foot ditch along the south property line and then distribute flows for longer residence time. Additional new shallow swales are indicated along the intermediate swale. Several shallow swales are also planned for the main swale.

Several shallow pools and terraces will be excavated where existing wetlands are found as shown in Figure 6. Typical depths will be about 0.5 feet, with a few high points cut as much as 1.5 feet. Soil compaction will be used to assist in creating ponding in these shallow depressions when within upland soils. Figure 7 shows the grading plan in detail. Figures 8A and 8B show sections across the site. Figure 9, the Planting Plan, shows the proposed wet prairie and forested wetland habitats.

Ecological Goals and Objectives

The ecological goal for the Foster Creek Wetland Mitigation Bank is the enhancement of an existing hay field surrounded by agricultural ditches and dominated by non-native grasses in order to achieve a functional wet prairie wetland dominated by native species. Ecological enhancement of the site will result in its conversion from a mesic to wet depression/flat hay field dominated by non-native species (some invasive) to a native-dominated wet prairie mosaic with wet forested and upland inclusions and buffers.

Both hydrology and vegetation will be manipulated in order to increase the hydroperiod and to establish native-dominated wet prairie. The following goals and objectives for the Foster Creek Wetland Mitigation Bank have been developed based on Wetland Systems Restoration and Conservation's (WSR&C) knowledge of the bank site, a site meeting in early May 2004 with the Mitigation Bank Review Team, and through subsequent discussions with The Wetlands Conservancy, Oregon Natural Heritage Information Center, John Christy, The Nature Conservancy, Oregon Department of State Lands, and the US Fish and Wildlife Service.

Hydrology Goals and Objectives

Enhancing site hydrology is one of the main goals for the project. This goal will include three subgoals:

1. Extend the hydroperiod by retaining and capturing surface water flows,
2. Capturing and retaining precipitation,
3. Redirecting existing ditch flows to on-site surface flows.

Grading modifications associated with this goal are depicted in Figure 7. Nearly all grading will be within the upper 12 inches of the surface. Great care will be taken to avoid penetrating the subsoil clay layer. Site hydrology will be monitored with shallow groundwater wells strategically located to verify changes that result from the site grading.

The objectives for enhancing wetland hydrology include the following measures of ecological lift:

1. Selective partial filling the 2000-foot ditch along the south boundary to disrupt interception and bypassing of surface flows coming from the south. Swale leaders will be excavated into the existing ditch to direct water that enters the ditch out onto the site as overland and swale flow. Portions of the ditch will be filled to prevent flow down the ditch to the west. Grading will be done to capture all surface water flow approaching the south project boundary without increasing the hydrology of the properties to the south.
2. Redistribute surface flows by creating at least five swales to redirect surface flows away from ditches or to new shallow depressions in existing upland islands.
3. Adding low berms at terminal and intermediate locations along the main swale, intermediate swale, and east swale outfalls to slow the discharge of surface flows and to increase the depth of water by as much as 0.5 feet. Constructing berms that will be approximately 0.5 feet high across these swales at regular intervals will impound some of the water and increase the local subsurface water levels by approximately 0.5 feet. Berms will also positively impact the hydrology of in-swale and adjacent areas by extending the hydroperiod and creating numerous shallow depressions. Berms have been designed to avoid increasing the water level and hydroperiod on adjacent properties by placing them inside the project site far enough that their influence will not extend beyond the site boundaries.
4. Adding shallow depression features varying from 2,500 square feet to 10,000 square feet (natural polygon shapes) of no greater than one-foot depth to capture precipitation or to selectively create wetlands from existing upland islands. This type of modification will be employed extensively

in the southeast corner of the site that receives little or no surface water and contains the steepest slopes on the site. Typical slopes in this area proposed for grading are about 1%. The proposed terracing will use balanced cuts and fills to reduce the slope of most of the area to 0.25%. Surface roughening may also be used to capture more precipitation. In some of the upland areas, very shallow depressions will be created to capture 100% of the precipitation landing on the area. Terracing modifications will alter the hydrology of the terraced areas and areas a short distance down slope. Terracing will include a down slope buffer to avoid altering the hydrology of adjacent property.

5. Adding swale features varying from 100 to 300 feet long and 40 to 60 feet wide to capture and hold precipitation and provide backwater functions adjacent to the existing swales,
6. Not impacting adjacent properties with flooding or increased saturation.

These measures will collectively enhance the existing perched water table to extend the hydroperiod without off-site impacts.

Vegetation Goals and Objectives

There are four goals for enhancing the wetland vegetation. The first vegetation goal is to reduce the areal cover and to the extent practical the number of non-native species prior to revegetation. Table 12 shows the proposed shift in dominance from mostly non-native plants to primarily native plants. The objectives for this goal include following measures of ecological lift:

1. Reducing the areal coverage by non-native species to less than 20 percent of the site by selectively applying appropriate herbicides to attack non-native populations,
2. Reducing the areal coverage by non-native species to less than 20 percent of the site by using mechanical methods and controlled burns as appropriate to attack non-native populations.

These combined efforts are intended to reduce non-native vegetation to less than 20 percent cover.

The second vegetation goal is to establish native wet prairie species that are suitable for site conditions during and after construction/revegetation. The objectives for this goal include the following measures of ecological lift:

1. Increase the areal cover of the native species to 80 percent of the site at the end of the 5-year monitoring period,
2. Select native species based on habitat requirements and availability of seed; and utilize the most suitable seeding technique.
3. Focus on establishing a dominant native grass matrix consisting of tufted hairgrass, spike bentgrass, and meadow barley to compete with persisting and aggressive non-native species.
4. Add compatible associate/cohort native species (example: checkermallow, lomatium, sidalcea, clarkia, etc.) to increase the number of native species to approximately 75 species,

The intention is to increase the dominance of native species so that 80 percent or more of the site is dominated by native wet prairie species while achieving this efficiently.

The third vegetation goal is to establish native forested wetland species that are suitable for site conditions during and after site construction/revegetation. The objectives for this goal include the following measures of ecological lift:

1. Increase the areal cover of the native forested wetland habitat to approximately 13 percent of the site at the end of the 5-year monitoring period,
2. Select native species based on habitat requirements
3. Focus on establishing a native forested wetland dominated by Oregon ash and slough sedge with a minor shrub component of red-osier dogwood and snowberry.

The fourth vegetation goal is to maintain a dominance of native species throughout the site after construction. The objectives for this goal include the following measures of ecological lift:

1. Maintaining native plant coverage goals throughout the maintenance and monitoring period by implementing post-construction management based on monitoring and adaptive management,
2. Using controlled burns periodically (anticipated every three to five years) within the wet prairie habitat to control weeds and to promote native wet prairie species.
3. Explore the potential of introducing locally rare native species that may be suitable for site conditions.

Collectively, the vegetation goals are intended to establish sustainable, diverse wetland habitat consisting of wet prairie and forested wetland.

Wildlife Goals and Objectives

Enhancing existing wildlife utilization of the site is another goal for the bank. The objectives for this goal include the following measures of ecological lift:

1. Replace agricultural non-native plant community with a prevalence of native species focusing on locally rare wet prairie and ash/slough sedge forested wetland habitat,
2. Increasing wildlife usage of the site by providing a contrast of open (wet prairie) and closed (wet forest) wetland habitat within the site, four snags in the prairie for perching posts for native songbirds, and approximately 15 depressions in the forested wetland with a maximum depth of 2 feet to typically hold standing water through late spring.

The goal is intended to attract more wildlife such as deer, coyotes, red-legged frogs, Pacific tree frogs, Pacific salamander, red-tailed hawks, peregrine falcons, northern harriers, and great blue herons.

Providing some partial screening of the site from some incompatible adjacent land uses is another goal for the bank. The objectives for this goal include the following measures of ecological lift:

1. Limit disturbance to wildlife by establishing native-dominated upland buffers to screen approximately half of the eastern roadway boundary and a portion of the southern boundary where residential use occurs.
2. Add habitat diversity through the juxtapositioning of upland and wetland plant communities.

The upland buffering goal is intended to support increased plant and wildlife diversity.

Lastly, sustaining the enhanced character of the site beyond the life of the bank is a goal. The objectives for this goal include the following measures of ecological lift:

1. Managing and maintaining wetland functions by establishing a long-term maintenance and management plan with adequate funding to manage the site beyond the bank's monitoring period.
2. Assuring long-term stewardship by transferring ownership to an appropriate land trust or other conservation entity following completion of all permit conditions.

Sustaining the wetland functions is key to supporting the no net loss of wetlands policy.

Anticipated Wetland, Upland and Buffer Habitat

Habitat enhancement at the Foster Creek Mitigation Bank will focus on establishment on two wetland types: Willamette Valley wet prairie and Oregon ash/slough sedge forested wetland. The existing site soils, landscape setting, hydrology, and remnant wet plant species present at the site are the primary influences to follow this path. Additionally, wet prairie habitat is quite rare in the Willamette Valley, and even rarer still in this region of Clackamas County. It is an important opportunity to establish this wetland habitat in Clackamas County. In a similar vein, Oregon ash/slough sedge forested wetland is uncommon due to the destruction of historic bottomland forests along with displacement of sedge by invasive reed canarygrass.

John Christy's work in identifying the plant species present on the site, while also providing insight on the likely historical plant communities and exploring potential enhancement opportunities, is very enlightening and utilized here in the preparation of proposed site enhancement (Appendix C). It is hoped that many of the species identified for potential establishment at the site will become readily available and their establishment needs in revegetation sites better understood.

The Foster Creek Wetland Mitigation Bank team has not only worked with wet prairie and forested wetland habitat in their professions, but have also assessed the recent and quite extensive body of work that others have produce in working with these habitats. The bank team recognizes the work of the City of Eugene, Oregon State University, The Nature Conservancy, The Natural Resource Conservation Service, and the Oregon Native Plant Society in restoration of native wet prairie. The team will track additional on-going studies and retain the established dialog with the wet prairie restoration "community" to keep abreast of the latest conclusions.

Wet Prairie

Wet prairie is proposed for approximately 60.7 acres of the site (approximately 85 percent). Prairie establishment will focus on the swale portions of the site. The enhanced wet prairie will undergo one to two years of selective weed control using herbicides to reduce the existing non-native grasses and forbs (dominants include velevtgrass, reed canarygrass, tall fescue, sweet vernalgrass, Queen Ann's Lace, and spotted cat's ear). We anticipate beginning herbicide applications when soil conditions firm in late spring following the camas bloom. Spraying will be repeated as necessary during the growing season. Seeding will be conducted in the fall and drilled to minimize soil disturbance. Revegetation will favor native wet prairie grasses that establish readily and are aggressive in competing against non-native species. Grass species include tufted hairgrass, spike bentgrass, and meadow barley as dominants with lesser amounts of annual and slender hairgrass for early germination. Some forbs will be incorporated into the initial mix, with additional forb establishment anticipated for later in the project, tentatively after the first maintenance control burn. Initial wet prairie forb species have been selected that are commercially available and known to readily germinate in field conditions: one-sided sedge, slender rush, sawbeak sedge, popcorn flower, and dense spike primrose. The proposed seed list (Table 15) may be modified/expanded depending on availability and additional information that becomes available for appropriate species. Figure 9 shows the planting plan.

Forested Wetland

Forested wetland is proposed for approximately 9.4 acres of the site (approximately 13 percent). Plant species for both establishment and density of species is based on remnant habitats found in the service area (ex.: Oregon City High School site) and literary reference such as Christy's *Native Freshwater Wetland Plant Associations in Northwestern Oregon* (2004). Oregon ash and slough sedge will be the dominant species for establishment. Oregon ash will be established with bare-root stock at a density of approximately 240 stems per acre. Slough sedge will be planted in numerous groupings of bare-root plugs (6-inch centers within groups) and seeded in the remaining area. A sparse shrub layer with a density of approximately 320 stems per acre will include bare-root plantings red-osier dogwood, snowberry, and trace amounts of twinberry. Camas will also be a component of the herb layer, and false hellebore of lesser frequency. Both camas and hellebore will be seeded for establishment.

There will also be limited number of sub-habitats within the ash/sedge-forested wetland. Some isolated companion plantings of red alder and western red cedar will be established at select micro-topographic high points. The plantings will exist of 4 alder to 1 cedar. In addition, approximately 15 small depressions will be excavated to retain shallow water to provide amphibian reproductive habitat. The depressions (or pools) will typically be 100 to 200 square feet, up to 2-feet deep, and planted with slough sedge plugs. Standing water at least 1-foot deep will be targeted to remain through May to accommodate amphibian egg and tadpole development.

Reed Canarygrass Areas
The project recognizes the inherent difficulties of attaining adequate control of reed canarygrass prior to revegetation. Therefore, areas of the site that contain significant densities of reed canarygrass (visual ground estimate of >30% cover) will be placed into a separate enhancement category. These areas located primarily in the western portion of the site will receive 2 years of control with herbicides prior to revegetating. Following control, enhancement will focus on a grass-dominated community to offer the most competition to the reed canarygrass' inevitable attempt to recolonize the area. The revegetation seed mix is anticipated to be similar to that used for the enhanced wet prairie area; however the seeding establishment (success) of the enhanced wet prairie area will be evaluated in order to adjust species, rates, and seeding methodology as necessary for the reed canarygrass areas.

Created Wet Prairie
Approximately 8 acres of wet prairie will be created from existing uplands by grading select areas in order to achieve the desired wetland hydrology. Grading depth will range from 0.2 to 1.5 feet, but generally be less than one foot (based on available groundwater elevation monitoring) in order to capture wet prairie hydrology. The anticipated weed colonization within graded areas is anticipated to be light, so focusing on native grasses is not necessary for competitive advantage. This allows an opportunity to focus on establishing a matrix of wet prairie forb species that are often out-competed by the taller and more aggressive grasses. Seeding will focus on wet prairie forbs, sedges, and rushes with grasses comprising of only a minor portion of the seed mix. Species such as toad rush, daggerleaf rush, greensheathed sedge, dense sedge, rose checkermallow, Douglas and Hall's aster, large-leaved lupine, and others will be incorporated into the mix (based on availability at the time of seeding) with a minor percent of annual hairgrass and meadow barley. Seed will be broadcast, or possibly hydroseeded in some of the areas to evaluate its usefulness (hydroseeding has not been used much as a seeding tool for native wet prairie).

Upland Buffer
Approximately 1.6 acres of upland buffer will be installed at strategic locations along the eastern and southern perimeter of the site to provide off-site screening of adjacent roads and enhance site habitat diversity. Buffer width will average 50 feet. Tree plantings will include Oregon white oak, red alder, quaking aspen, western red cedar, and big-leaf maple at a density of approximately 450 stems per acre (average 10" on-center). Shrub plantings will include snowberry, Oregon grape, red elderberry, and peafruit rose at a density of approximately 2,700 stems per acre (average 4 feet on-center). The herbaceous layer will be seeded grasses and forbs including blue wild rye, Sitka brome annual hairgrass, yarrow, gilla, self-heal, collomia, lomatium, and possibly other appropriate showy forbs depending on availability and/or cost of seed.

Reference Site Description
A suitable reference site is not available for the Bank's proposed wet prairie habitat. Wetland Systems Restoration and Conservation, LLC has performed extensive searches and corresponded with persons familiar with prairie habitats in the region. There does not appear to be any remaining wet prairie remnant habitat within the Service Area. Although wet prairie exists elsewhere in the Willamette Valley, the similarities and/or dissimilarities are not well known between the Valley and prairie historically found in the site area.

A reference ash/slough sedge forested wetland located adjacent to the Oregon City High School was assessed for establishment of species composition and establishment density at the bank site. Though small in size, the wetland is intact with mature trees, robust herbaceous layer, and few invasives. Oregon ash was determined to have a density of approximately 210 stems /acre at the reference site. Shrub density was difficult to assess due to the numerous stems typically associated with snowberry, the dominant shrub. Slough sedge dominated the herbaceous strata with greater than 90% cover.

Hydrogeomorphic Method Assessment of Future Conditions
The results indicate that gains can be anticipated with most functions for both habitats, while none of the functions are expected to decrease.

For wet prairie, the largest gains for both a highest functioning site (HFR) and a least altered site (LAR) are found in water storage and delay and support of characteristic vegetation. This is expected with the increase in shallow ponding due to grading, and the conversion of a non-native dominated habitat to a native dominated one. Primary production along with wintering and migrating water bird support will also strongly increase relative to both kinds of sites according to the assessment.

For forested wetland, there are substantial gains (>.20) for both HFR and LAR sites in the categories for water storage and delay, amphibian & turtle habitat, wintering and migrating waterbird support, and support of characteristic vegetation. The addition of native vegetative structure for the wet forest provides significant ecological lift over the existing hay field. "Minor" improvements such as incorporating random pieces of imported downed wood and excavating shallow pools for extended ponding provides additional lift. Table 11 compares existing and future conditions for wet prairie and forested wetland using the HGM assessment.

Ecological Baseline
The ecological baseline of the site corresponds to an agricultural hay field dominated by non-native grasses and forbs. The agricultural activities disturb habitat functions ordinarily associated with grass-dominated fields. Presently, site conditions provide habitat for mice and other small prey of raptors and terrestrial predators including coyotes. The removal of vegetation from the site as hay likely impacts this relationship and that of resident birds, although the typical summer timing may allow adequate time for fledging of young to take place. Remnant native plants likely provide food and shelter for a limited population of wildlife. The undeveloped nature of the site allows connectivity with adjacent natural landscapes.

Proposed Ecological Lift
The bank will provide compensatory mitigation through enhancement of the existing wetland and creation of new wetlands from upland islands within the mosaic. Table 12 shows how some of the ecological lift will be provided by a shift in dominance from non-native plants to native plants. Grading to create swales and shallow pools, and hydrology manipulations by filling ditches and terracing will increase the hydroperiod to create new wetlands and to enhance existing wetlands. Table 13 shows how the bank credits are calculated for the site.

Within the site a palette of plants is proposed that fits with the wet prairie nature of the site. Table 15 indicates the proposed seeding and planting species. Performance criteria for wet prairie and forested portions of the site are described in Table 16 and Table 17 respectively.

3. BANK ECONOMICS

Credit Availability

The Department of State Lands (DSL) and the US Army Corps of Engineers (ACOE) determine whether an applicant can use the Foster Creek Wetlands Mitigation Bank. However, the following criteria have been proposed based on a meeting with the MBRT in May 2004:

- The Service Area for the bank will include the Johnson Creek basin, Abernathy Creek basin, lower Clackamas River basin up to the 1200-foot elevation, including Oregon City, Damascus, and Sandy, and all of the areas that drain directly to the Willamette River south of the Johnson Creek watershed boundary on the north, north of the Mollala River watershed boundary on the south, east of the Willamette River and below the 1200-foot elevation. These areas share a similar physiography and need for a wetland bank.
- Entities that could have access to the bank will include:
    - Regional, County, and Local government (Metro, Clackamas County, Multnomah County, Oregon City, Damascus, Boring, Gresham),
    - Public agencies (Oregon Department of Transportation (ODOT), Federal Highways Administration (FHWA), Bonneville Power Administration (BPA), Trimet,
    - Regional and local utilities,
    - Private companies,
    - Private citizens.

Itemized Project Costs

Significant project costs are presented in Table 14. Major costs include the cost of purchasing land and the financing of that purchase, the costs of initial site construction, site maintenance costs for the first five years, monitoring costs, endowment costs for perpetual maintenance, and construction financing costs. A detailed task effort and assumptions summary can be found in Appendix E.

Demonstration of Financial Resources

Wetland Systems Restoration and Conservation, LLC is working with ShoreBank Pacific bank to develop a financial package that will provide for the high capital needs of the project in the initial five years. Funds for the purchase of land and to cover the cost of site preparation, grading, planting, and maintenance will be provided by ShoreBank Pacific or the lending institution recommended by them. It is projected that the Bank will be able to pay off all of its debt and be self-supporting through credit sales during its fifth year of operation. This estimate is based on conservative estimates of costs and credit sales.

Accounting Procedures

Up to 30 percent of the mitigation credits can be made available for sale upon the completion of construction grading at the discretion of DSL and ACOE. Since grading will be secondary to weed control in terms of level of effort, a prorated credit release is proposed. The proposed credit release would be 15 percent after the initial weed control, and another 15 percent upon completion of grading.

Demonstrating saturated soils (during a "normal" water year with precipitation ≥85 percent of historic mean) across the wetland portions of the site will allow up to 50 percent of the mitigation credits to be released. The existing 10 groundwater observation tubes will be maintained and used to document wetland hydrology along with field verification during wetland delineation. Soils must be saturated in the upper 12 inches for a minimum 11 days during the growing season to meet this criterion.

Demonstrating that performance criteria are being met at the 4-year milestone will allow up to 87.5 percent of the mitigation credits to be released. Weeds must show an overall level or downward trend in their percent cover.

Demonstrating that performance criteria are being met at the 5-year milestone will allow up to 95 percent of the mitigation credits to be released. Weeds must show an overall level or downward trend for two

consecutive years in their percent cover. MBRT approval of the long-term steward will allow 100 percent of the mitigation bank credits to be released.

Table 18 summarizes the credit release schedule.

4. WETLAND MITIGATION BANK DESIGN

The site is a wetland/upland mosaic that is mostly wetland as indicated by a wetland determination performed in March 2004 (Delineation report submittal separate from Instrument), and as indicated in Figure 5. Surrounding off-site depressional wetland areas include mosaic wetlands that include forested, scrub-shrub, and emergent classes (Cowardin, 1981). The area to the west is a tree farm that has recently been cleared, and additional ditching and culverting has been added. The area to the south includes homes on large rural lots and a small subdivision.

The site will be modified to hold more water longer and to replace existing non-native vegetation with native species. Wet prairie landforms and vegetation will be added to increase wetland functions.

Hydrology Source and Supporting Structures

Site hydrology is driven primarily by direct precipitation interacting with a shallow subsurface soil restrictive layer (clay). A perched winter groundwater table is responsible for extended seasonal saturation. Well data collected on-site in 2005 is summarized in Table 10. Seasonal surface water flows onto the site from the south during periods of extended rainfall. The flows are generally confined within two shallow swale systems.

Site Conditions and Constraints

- The existing population of non-native species will require weed control management to be implemented prior to revegetation. Some species may persist to warrant additional control to be implemented during the project. Weed control using herbicides may involve loss of desirable species from using non-selective herbicides. Wetland habitat limits the type of herbicide that can be used.
- Areas with significant populations of invasive reed canarygrass will require two seasons of control (instead of one) prior to revegetation. Even so, reed canarygrass will likely attempt to recolonize from the seed bank and adjacent off-site sources.
- Site hydrology is generally dependent on rainfall being perched near the soil surface due to a confining subsurface clay layer. Multiple low-water years could challenge some wetland species.
- The relatively small watershed (approximately 120 acres) that provides surface water onto the site during extended periods of rainfall limits the total amount of runoff that can enter the site and affect surface hydrology.
- The presence of the soil-confining layer (clay) constrains the depth of excavation that will capture runoff to generally 2 feet or less.
- Any excavation in the vicinity of existing trees will be constrained to areas outside the tree's drip line.
- Creating wetland hydrology within upland areas will require mechanical compaction of the excavated surface. The upland soils are primarily silt loams in the subsurface horizons and will require compaction to take place at just below field moisture capacity.

Construction Methods

Construction will involve weed control, grading, and revegetation. Site preparation will be key to successful revegetation of the site with native species. In dealing with an agricultural grass field, that translates to successful weed control. Agricultural grass/hay fields typically contain numerous non-native species and the Foster Creek bank site is no different (refer to John Christy's report). We have based our site prep program on both our professional experience, and on discussions over the past two years with numerous other professionals involved in habitat restoration, specifically those familiar with wet prairie restoration. It is our belief that using repeated tillage to expose and exhaust the seed bank of an agricultural grass field of the type at the bank site is futile. Therefore, our approaches to site prep concentrates on selective herbicide use with minimal soil disturbance. This, in effect, isolates the

majority of the seed bank and lets "sleeping dogs lay" while only the near-surface seed bank is exposed and treated.

The Foster Creek bank's site prep will involve multiple applications of non-selective herbicide in order to eliminate as much of the existing vegetation as practical in order to obtain a "clean" site for revegetation. This will likely eliminate temporarily some of the remnant native species currently on the site, but we feel site prep cannot "dance around" these interspersed natives while effectively controlling the aggressive and more numerous non-natives (most of the impacted native species are included in the reveg seed mix). A non-selective herbicide (glyphosate) will be applied over the entire site as necessary during the first growing season. As the site's weed population becomes more manageable, we anticipate using a combination of spot spraying for smaller isolated trouble areas with continued boom spraying for larger areas.

The areas of the site that contain high densities of reed canarygrass will receive two seasons of treatment, recognizing the difficulty in controlling this invasive specie. Other areas of the site will receive one season of treatment prior to revegetation in these areas. Obviously, specific site conditions and the plant community's response to control activities will dictate actual herbicide use and timing. A typical scenario for weed control would be:

- Spray entire site with glyphosate (Rodeo) in early May when soil moisture and potential compaction from equipment decreases.
- Repeat site spray in June/July as summer germinants emerge.
- Final spray in fall to target cool weather germinants and species that translocate (store) carbohydrates into their root systems.
- Non-reed canarygrass areas will be revegetated (seeded/planted) following the fall spray where control is adequate.
- Reed canarygrass and other troublesome areas will be left to over-winter, followed by a repeat of herbicide applications the following year on an as-needed basis.
- Revegetation will resume in the fall after the second season of treatment.

Grading will be performed using a small dozer to lower elevations and shape created low berms, a front-end loader to load excavated soils, dump trucks to transport excavated soils, and a sheep's foot roller or other means to densify upland soil surfaces within created wetland areas.

Revegetation will consist of seeding and planting nursery stock. Seeding may take place using either a seed drill or broadcast seeder pulled behind a tractor, or possibly some by hydroseeding. Minor seeding will take place by hand broadcasting. We anticipate using bare-root nursery stock for trees and shrubs (except conifers) and installing during the dormant season (December-March). Nursery stock will be planted using a crew familiar with typical planting techniques.

Proposed Grading Concept and Plan

The proposed mitigation bank grading concept intends to selectively grade portions of the site to create wetlands from uplands, create shallow berms to retard surface flows in some areas, and excavate shallow secondary swales that extend laterally off the main swales to increase the hydroperiod of these areas (Figure 7). Grading will be shallow (generally less than 1.5 feet) which will stay above the site soil's confining clay layer and remain in concert with the site's overall prairie landform. Site prep to facilitate grading will consist of summer mowing or sod removal to reduce above-ground biomass followed by a late summer herbicide application.

Upland areas graded to wetland will be in three configurations: shallow terraces, a broad shallow pool, and shallow depressions. Shallow terraces will be excavated within uplands in the southeast corner of the site. These terraces will be sloped gently to the north and surface-compacted to retard infiltration. A

shallow pool will be excavated within upland at the northeast corner of the site and also be surface-compacted to retard infiltration.

Approximately 17 shallow berms approximately 0.5 feet in height will be constructed in strategic locations of the site to slow surface flows and increase the hydroperiod in these areas. The berms will connect existing topographic contours to blend in with the landform. Figure 8A shows a centerline section through the main swale and Figure 8B shows a section through an existing upland island converted to wet prairie by terracing.

Shallow swales generally excavated less than 0.5 feet will extend outward from the main swales to redirect a portion of surface flows in order to retain swale water longer and within a larger area. The subtle nature of these secondary swale features will blend seamlessly into the landscape once vegetated.

Approximately 15 small depressions will be excavated within the forested wetland to retain shallow water to provide amphibian reproductive habitat. The depressions (or pools) will typically be 100 to 200 square feet, up to 2-feet deep. Standing water at least 1-foot deep will be targeted to remain through May to accommodate amphibian egg and tadpole development.

The timing of revegetation will be influenced by the extent of weed control necessary in different areas. Graded areas will be revegetated as soon as practical to compete with potential recruitment from off-site weeds. The majority of the site will be ready for revegetation following one year of control, while the reed canarygrass areas will be revegetated following two years of control.

As-Built Documentation

As-built conditions will be documented following completion of construction. This will identify any field-initiated changes or modifications to the Instrument that may take place during construction due to unforeseen circumstances. An as-built report will be presented to the MBRT within 90 days following the completion of construction. The report will include a site plan that shows as-built grading conditions, resultant habitat areas, discussion of changes or modifications that took place, and representative photographic documentation of site conditions.

Performance Criteria

Performance criteria have been established for the mitigation bank in order to assess the bank's status towards establishing the targeted habitat. Performance criteria has been developed that both applies for all site wetland habitats (percent invasive species and wetland hydrology), and also applies to an individual habitat where vegetation criteria differ amongst wet prairie and forested wetland Additionally, the time period may vary for an individual criterion to reflect the anticipated maturation of the respective habitat.

All vegetation criterion will be assessed at the time of annual monitoring by extrapolating data collected from habitat-specific monitoring transects to represent the overall site habitat area. Hydrology criteria will be assessed using data collected over an extended period of time during the monitoring year's growing season using electronic data loggers placed in groundwater observation tubes located within the respective habitats. Due to the sensitive relationship between site hydrology and precipitation, rainfall recorded at the nearby Estacada reporting station will be used to evaluate site hydrology as it compares to the rainfall quantity in the early portion of the growing season.

Table 16 summarizes wetland prairie performance criteria.

Table 17 summarizes forested wetland performance criteria.

5. MONITORING AND CONTINGENCY PLANS

General Monitoring Protocol

Monitoring will be performed to assess hydrology and vegetation conditions within the mitigation bank site. Monitoring will occur annually for a minimum of five consecutive years following the completion of initial revegetation (seeding/planting), or grading in areas where revegetation is to occur naturally. Monitoring will be reported yearly generally.

Hydrology Monitoring

Hydrology monitoring will assess groundwater elevations at the site by collecting groundwater elevation data from at least 10 groundwater observation tubes placed strategically throughout the site as shown in Figure 10. The groundwater observation tubes are 1.5-inch diameter PVC tubes that are approximately 36 inches in total length. Approximately 12 inches of slotted casing are located beneath the ground surface (typical). Electronic data loggers have been placed within each observation tube and programmed to record groundwater elevations within the tube at 12-hour intervals beginning in March 2005. It is anticipated groundwater data will be graphed to approximately half-year time frames for reporting purposes. Observation wells will be relocated as needed to obtain the most complete data.

A wetland delineation will be performed within a 3-year window following site construction. The delineation will take place in the early growing season (April-May) in a year with precipitation within 90% of normal (based on rainfall totals at the Estacada recording station). The delineation will focus on grade areas of the site to demonstrate that adjacent existing wetlands have not been "de-watered", and to document that wetland creation has been achieved within the graded areas.

Vegetation Monitoring

Vegetation monitoring will take place within each habitat present at the site: wet prairie and forested wetland; as well as buffers. It is anticipated that vegetation monitoring will be conducted in mid-to-late spring of each monitoring year, but may vary depending on the timing of plant growth for the particular year. Approximate monitoring transect locations are shown on Figure 10.

Line transects for vegetation monitoring will be located off a site baseline and permanently marked. East/west oriented transects will be located approximately every 350 feet from the baseline. Monitoring plots for either wet prairie or forested wetland habitat as appropriate will be located approximately every 100 feet along the transect.

Vegetation monitoring within wet prairie habitat will use one-meter plots at each monitoring point for a total of approximately 67 plots. Within each plot, all species present will be identified as well as total percent cover, percent cover native species, and percent cover invasive species. Vegetation monitoring within forested wetland habitat will be conducted within circular plots each 30 feet in diameter. Within each forested plot the density and percent survival of trees and shrubs will be calculated by counting individual stems. Percent survival calculations will be based a species' original planting quantity. The herbaceous strata within the forested wetland plots will be visually assessed for percent cover, and percent cover invasive species. There will be approximately 25 forested wetland plots on the site.

In addition to the permanent wet prairie and forested wetland monitoring plots, additional monitoring plots may be established when significant populations of invasive weeds are identified outside the monitoring transects. Significant population is defined as singular areas greater than ¼ acre in size (approximately 11,000 square feet) where listed invasive species constitute greater than 30 percent relative cover. These "patch" areas will be incorporated into the annual monitoring program until percent cover is less than 10 percent.

Established upland and wetland buffers will be monitored using block transects for tree and shrub density, percent survival, percent cover of herbaceous strata, and percent cover of invasive species. Monitoring plots will typically be approximately 1,600 square feet in area (40'X40'). There will be approximately 13 buffer plots on the site.

Visual monitoring will be documented using color photographs taken at permanent photo points during monitoring. Additional photos of general site interest will be taken throughout the year during incidental site visits, with select photos included in the annual monitoring report for visual reference.

Photographic Documentation
Photographs will be taken during monitoring at permanent photo points for visual documentation of the site. Photos will typically include views of some monitoring transects and areas of special interest, as well as landscape views from the established photo points. See Figure 10 for anticipated photo point locations (photo point numbers and locations may be modified following site construction).

Monitoring Report
Hydrology and vegetation data will be presented in an annual monitoring report distributed to the MBRT by December 15 of each of the five monitoring years. The December date will allow the report to document activities that occur in the fall, a time when many maintenance tasks as well as supplemental seeding and planting will typically occur. The monitoring report will present a brief narrative of site conditions, a summary of site management activities that took place, whether the site is meeting its performance criteria, and if not, then what corrective action(s) is proposed. Monitoring data in tabular or graph form, as well as representative site photographs will be included as appendices within the report.

The report will also provide a summary of all banking activity that took place during the monitoring year. A Bank Credit Ledger (Table 19) will list total bank credits, bank credits sold, bank credits available, etc.

Contingency Plan
A contingency plan addresses how project deficiencies or performance failures will be corrected. Performance failures will be identified through formal monitoring, while project deficiencies can be identified outside of monitoring. Project deficiencies will be addressed on a case-by-case basis depending on the nature of the deficiency. Project deficiencies will be acted on through adaptive management, with decisions formulated by, and corrective action implemented by WSR&C. Depending on the nature of the problem, the project team could include additional wetland scientists, ecologists, botanists, soil scientists, landscape architects, or civil engineers to develop potential recommendations to address the situation.

Performance failures identified through monitoring will be addressed by WSR&C and detailed in the monitoring report, to be reviewed by the MBRT. Performance failures would be directly tied to project performance criteria (Tables 16 and 17). Proposed corrective action for any performance failure will be detailed in the monitoring report, with approval by DSL and ACOE required prior to implementation. Corrective action could include regrading, addition or modification of hydraulic structures, replanting, reseeding, modification of species, weed control(s), or other measures.

Financial Assurance
Set asides will be made as credits are sold to provide for Bank establishment contingencies, maintenance, monitoring, and for possible catastrophic events. All financial set asides will be consolidated into a single Letter of Credit issued to DSL by a local financial institution and backed by a federally insured account. The amount allocated to each of the assurance categories listed below is based on current cost estimates to complete the work associated with each category.

Wetland Systems Restoration and Conservation, LLC (WSR&C) will provide for the following:

1. The Maintenance and Monitoring Fund shall receive $12, 036 of the cash proceeds from each credit sold. These funds shall be deposited directly into the federally insured bank account that will be part of the Letter of Credit provided to DSL by the Sponsors. If the required monitoring or maintenance is not conducted as specified in Section 5 of this Instrument, then the MBRT, acting through the Chair shall request release of funds to an MBRT agency or its designee from this account sufficient to cover the necessary monitoring or maintenance activities. As long as the required monitoring and maintenance is conducted, one-fifteenth of this fund shall be released to WSR&C on each February 1st after the MBRT reviews and approves the most recently submitted monitoring

report (Instrument Section 5). The last one-fifteenth of the fund shall be held until the final monitoring report is submitted.

2. The Catastrophic Event Fund shall receive $1,786 of the cash proceeds from each credit sold.. These funds shall be deposited in a federally insured bank account that will be part of the Letter of Credit provided to DSL by the Sponsors. In the event of a catastrophic event, as determined by the MBRT, that effects the long term viability of the Mitigation Bank, the MBRT can cause the appropriate corrections to occur by either: (i) directing WSR&C, if the catastrophic event occurs while WSR&C's maintenance period is in effect, to implement corrections which will be funded by a release of money from the Catastrophic Event Fund, (ii) recommend the escrow agent release the necessary funds to the long-term steward of the Mitigation Bank to make necessary corrections and/or manage the property, or (iii)) recommend the escrow agent release the funds to an Agency represented on the MBRT or its designee to implement the necessary corrections. Any unspent funds shall remain in this fund if not utilized to repair the Mitigation Bank from a catastrophic event. This Catastrophic Event Fund will be transferred to the designated long-term steward of the land for use in addressing future catastrophic events or land management requirements once all monitoring has been completed and all credits from the Bank have been debited.

3. Damages from the catastrophic events identified below are permitted to be repaired using the principal and interest accumulated in the Catastrophic Event Fund by either WSR&C or the long-term steward of the land, the funds being provided to whichever entity has title to the Property at the time of catastrophic event and responsibility to repair the resulting damages. Expenditures shall be approved by the MBRT if the damage occurs within the monitoring period associated with Bank establishment. If the damage occurs after that establishment period, the long-term steward of the land shall approve expenditures to address the following issues:

a. Drought, insect damage, animal damage, or infection damages to planted vegetation that occurs at a magnitude such that the vegetation fails to achieve the performance criteria described in Section 4 and after each respective phase of planting has surpassed the contractor's one-year warranty (if a one-year warranty was required).
b. Erosion and/or sediment damages occurring after the site has been fully stabilized and applicable erosion and sediment control bonds required by Clackamas County have been released.
c. Breach of any berms, embankments or spillway and/or damage to outlet structures from a storm event.
d. Damage resulting from fire, flood, hurricane, and other natural disasters;
e. Damage resulting from vandalism.

4. Long-term (5 years after the last credit is sold) Management requirements will be determined on a site-specific basis. However, any such activities shall be the responsibility of the Long-Term Steward. The Catastrophic Event Fund shall provide a partial funding source for any significant repairs necessitated by natural disasters or other catastrophic events as defined above that WSR&C or the long-term steward must address.

5. The objective of the long-term maintenance is to sustain in perpetuity the ecological functions of the mitigation bank as described in the Instrument. Long-term maintenance requirements will be the responsibility of the long-term steward. To support the financial requirements of the long-term maintenance of the bank site, the bank sponsors will provide the long-term steward with a separate escrow account called the long-term Maintenance Endowment. These funds shall be placed in a federally insured financial institution in an interest bearing account. The amount of the endowment will be negotiated with the long-term steward and will be based on estimated costs for long-term maintenance. It is initially estimated that an endowment of $250,000 will be provided to the steward. This is approximately $9,000-$10,000 per credit sold. For each credit sold, an amount of money

equivalent to the total endowment divided by the total number of credits available in the bank will be placed into the Long-Term Maintenance Endowment. The total amount placed in the endowment will be adjusted prior to transferring site ownership to the long-term steward to reflect actual maintenance costs for the bank. Funds in the account will be transferred to the long-term steward after the sale of the last credit.

6. MANAGEMENT AND COORDINATION

Long Term Protection Instrument
Long term protection will be provided by deeding the property over to The Wetlands Conservancy or another similar entity after the bank's credits have been exhausted. Discussions on this topic have been initiated with The Wetland Conservancy and a Memorandum Of Understanding is being negotiated.

Draft Long Term Management Plan
A long-term management plan will be developed during the bank's establishment period and submitted for approval by the MBRT prior to implementation.

Local Government Approval
Clackamas County has found that the Foster Creek Wetlands Mitigation Bank is consistent with the comprehensive plan and land use regulations. The completed Land Use Compatibility Form is included in Appendix F.

Coordination with Mitigation Bank Review Team
The Foster Creek Wetland Mitigation Bank sponsors began coordination with the MBRT in March 2004. The Prospectus was submitted in February 2005. Comments were received from the public comment period. Appendix G is the Response to Public Notice Comments shared with the MBRT in April 2005.

The MBRT asked for a cultural resources investigation to be included in the Instrument based on comments that the historic Chenowith Trail may have crossed the site. Appendix H includes the findings of that cultural resources inventory. No indications of the Chenowith Trail were found in GLO maps or through site reconnaissance in August 2005. However, the old homestead may be eligible for the National Register of Historic Places. An evaluation for traditional cultural properties (TCPs) was not performed. The large camas population, with the bulbs harvested as a staple food of Native Americans, indicates that further study may be warranted.

Appendix I includes the Bank Sponsor's response to the MBRT"s comments on the Draft Instrument submitted in August 2005.

The Letter of Credit requested by the MBRT is found in Appendix J.

Bank Closure and Termination of Conditions
Monitoring and Maintenance will continue as long as credits are available at the Bank. Best management and maintenance activities will continue until five years after the sale of the last whole or partial mitigation credit. At the completion of the sale of credits the Bank, and with the approval of the MBRT, the Bank will be transferred to The Wetlands Conservancy or other appropriate entity. An endowment, currently estimated to be $250,000, will be given for future maintenance required five years hence and continuing.

A Deed Restriction for protecting the conservation functions of the site over the short term is required to terminate the conditions of the Instrument, and is presented in Appendix K. A Conservation Easement as requested by the MBRT will be prepared at such time as the credits are sold out, or possibly sooner.

A Draft Memorandum of Understanding with The Wetlands Conservancy is shown in Appendix L.

7. REFERENCES

Adamus, P. R. and D. Field. 2001. Guidebook for Hydrogeomorphic (HGM)-based Assessment of Oregon Wetland and Riparian Sites. Oregon Division of State Lands, Salem, Oregon.

Alverson, Edward R. 2003. How to Restore a Wet Prairie: Lessons Learned from 20 Years of Managing the Willow Creek Natural Area. Speaker paper abstract. The Nature Conservancy. Eugene, Oregon.

Boyer, Linda. 2004. Native Willamette Valley Oak Habitat and Prairie Restoration Site Preparation and Seeding Information Sheet. Heritage Seedlings, Inc.

Campbell, B. H. Restoring Rare Native Habitats in the Willamette Valley, a Landowner's Guide for Restoring Oak Woodlands, Wetlands, Prairies, and Bottomland Hardwood and Riparian Forests. Defenders of Wildlife. West Linn, Oregon

Christy, John. Oregon Natural Heritage Program. November 18, 2004. Personal communication.

Christy, John. Oregon Natural Heritage Program. 2004. *Native Freshwater Wetland Plant Associations of Northwestern Oregon.*

City of Eugene. West Eugene Wetlands Research Documents. Effectiveness of site preparation techniques used during 10 years of wet prairie restoration in Eugene.

City of Eugene. West Eugene Wetlands Research Documents. February 2005. Stratification requirements for selected plant species from the West Eugene Wetlands.

City of Eugene. West Eugene Wetlands Research Documents. September 2000. Reed canarygrass: Distribution and management in the West Eugene Wetlands.

Clark, D. L. and M. V. Wilson. 1998. Fire effects on wetland prairie species. Report to US Fish and Wildlife Service.

Clark, D. L., M. V. Wilson and J. Goodridge. 2001. Increasing the abundance of rare native wetland prairie species. Report to the US Bureau of Land Management.

Curl, A. L. February 18, 2003. *Funds Needed To Develop UGB Lands*, The Daily Journal Of Commerce, Portland, Oregon.

Curl, A.L. March 21, 2003. *LCDC Approves Industrial UGB Land*, The Daily Journal Of Commerce, Portland, Oregon.

Darris, Dale C. 2003. Considerations for Establishing Native Grasses From Seed for Restoration, Revegetation, and Erosion Control in Western Washington and Western Oregon. USDA, NRCS Technical Notes, Plant Materials No.35.

Davis K. J. 2000. The effects of nitrogen manipulations and hydrology on the establishment and competitive abilities of wetland prairie plant species (western Oregon). Ph.D Dissertation, Oregon State University.

Defenders of Wildlife. 2002. A Place For Nature; Willamette Basin Habitat Conservation Priorities.

Fitzpatrick, Greg S. 2004. Techniques for Restoring Native Plant Communities in Upland and Wetland Prairies in the Midwest and West Coast Regions of North America. White Paper prepared for the City of Eugene – Parks and Open Space Division.

Gerig, A.J. November 1985. Soil Survey of Clackamas County Area, Oregon. Soil Conservation Service (NRCS).

Marshall John, US Fish and Wildlife Service. November 23, 2004. Personal communication.

Metro (1997). *Clackamas River Watershed Atlas*, Portland, Oregon.

Metro (1998). *Title 3 Model Ordinance*, Portland, Oregon.

Metro (2002). *Metro Facts*, Portland, Oregon.

Metro (2002). *Metro News Release December 5, 2002: Metro Approves Major Urban Growth Boundary Expansion*, Portland, Oregon.

Metro (2002). *Metro News Release December 13, 2002: Metro Wraps Up Urban Growth Boundary Decision*, Portland, Oregon.

Metro (2002). *2002-2022 Urban Growth Report: A Residential Land Need Analysis*, Portland, Oregon.

Metro (2002). *2002-2022 Urban Growth Report: An Employment Land Need Analysis*, Portland, Oregon.

Oregon Land Conservation and Development Commission. (2003). *Partial Approval And Remand Order 03-WKTASK-001524*, Salem Oregon

Oregon Department of State Lands. October 2000. Wetland Mitigation Banking Guidebook for Oregon.

Oregon State University. 2004. Pacific Northwest Weed Management Handbook. Extension services of Oregon State University, Washington State University, and the University of Idaho.

Pendergrast, Kathy. US Fish and Wildlife Service. December 23, 2004. Personal communication.

Western Regional Climate Center. Precipitation data recorded at the Estacada 2 SE reporting station (352693), 1948-2005.

Wilson M. V. 2004. Patterns of establishment success in West Eugene Wetlands Program restoration sites. Report to the Bureau of Land Management.

Table 1

Key Site Information

Tax Lots (Clackamas County)	23E35 00600 23E35 00690 23E26 01400
Total Size (Phase 1) – Acres	73.75
Effective Bank Size - Acres	72.39
Zoning	Farm
Adjacent Land Use	Farm, Rural Residential
Section, Township, Range	T2S, R3E, Section 35
Lat./Long	45° 21' 33" N 122° 24' 08" W
State Plane XY Coordinates	622794 Northing 7713188 Easting
Potential Future Phases – Acres	Approx. 156

Table 3
Summary of Geomorphic Conditions in the Proposed Service Area

Stream	Basin	Area/Service Area –Ac.	Min. El. – Ft.	Max. El. – Ft.	Primary Soils
Abernethy Cr.	Willamette	14490	10	1200	Jory SiClLm, Xerochrepts & Haploxerolls, Saum SiLm
Beaver Cr.	Willamette	10830	60	820	Jory SiClLm, Cottrell SiClLm, Bornstedt SiLm
Butler Cr.	Johnson	720	260	990	Borges SiLm, Malabon SiClLm, Fernwood-Wilholt
Canfield Cr.	Willamette	1160	130	580	Bornstedt SiLm, Jory SiClLm, Xerochrepts & Haploxerolls,
Charman Cr.	Willamette	460	30	580	Woodburn SiLm, Saum SiLm, Xerochrepts & Haploxerolls
Clackamas\ River	Clackamas	39880	10	1400	Alspaugh ClLm, Mollala CoLm, Bornstedt SiLm
Clear Cr.	Clackamas	26690	90	1300	Bornstedt SiLm, Jory SiClLm, Klickitat StLm
Deep Cr.	Clackamas	10730	140	1200	Cazadero SiClLm, Klickitat StLm, Cottrell SiClLm
Eagle Cr.	Clackamas	61540	200	1400	Alspaugh ClLm , Aschoff CoLm, Kinney CoLm
Goose Cr.	Clackamas	3630	180	950	Salem SiLm, Clackamas SiLm, Concord SiLm
Holcomb Cr.	Willamette	2810	40	820	Bornstedt SiLm, Saum SiLm, Xerochrepts & Haploxerolls
Johnson Cr.	Johnson	8440	240	1100	Borges SiClLm, Cascade SiLm, Cazadero SiLm
Kelley Cr.	Johnson	2380	240	1100	Borges SiClLm, Fernwood-Wilholt, Cascade SiLm,
Martin Cr.	Willamette	660	360	970	Jory SiClLm, Helvetia SiLm, Klickitat StLm
Mitchell Cr.	Johnson	570	320	940	Cascade SiLm , Fernwood-Wilholt, Borges SiClLm
Mt. Scott Cr.	Willamette	1780	260	1000	Cascade SiLm, Powell SiLm, Cascade SiLm
Newell Cr.	Willamette	1660	30	480	Xerochrepts & Haploxerolls, Bornstedt SiLm, Jory SiClLm
N. Fork Deep Cr.	Clackamas	9310	190	1000	Bornstedt SiLm, Cazadero SiLm, Delena SiLm
Noyer Cr.	Clackamas	2040	170	990	Bornstedt SiLm, Cascade SiLm, Delena SiLm
Richardson Cr.	Clackamas	2460	130	880	Bornstedt SiLm, Cascade SiLm, Xerochrepts & Haploxerolls
Rock Cr.	Clackamas	5500	80	1100	Cascade SiLm, Powell SiLm, Cascade SiLm stony substratum
Sunshine Cr.	Johnson	2380	390	1100	Cascade SiLm, Powell SiLm, Cascade SiLm
Thimble Cr.	Willamette	1050	130	600	Jory SiClLm, Bornstedt SiLm, Xerochrepts & Haploxerolls
Tickle Cr.	Clackamas	8520	300	1200	Cazadero SiLm, Cottrell SiClLm, Klickitat StLm
Total		**219700**			
Median			**160**	**1000**	

Table 4
Estimated Wetland Mitigation Demand

	Foster Creek Mitigation Bank Service Areas		
	Oregon City	**Damascus/Clackamas River**	**South Gresham**
Acreage analyzed	738	11,840	1,508
Acreage of Land Within The Following Classes			
Hydric Soils	0	801	323
NWI[1]	0	67	2
100-Foot Stream Buffer	68	1,291	188
Maximum Demand	68	2,159	513
Estimated Demand As 10% Of Maximum Demand	7	216	51
Total		**274**	

1. National Wetland Inventory

Table 5
Adjacent Property Owners

Tax Lot ID	Owner	Owner's Street Address	City, State	Zip Code	Land-Use[1]
23E26 00800	UNITED STATES OF AMERICA	PO BOX 3621	PORTLAND, OR	97208	IND
23E26 01500	CAMPYNOL VERNON G & JANICE E	36124 HWY 26	SEASIDE, OR	97138	SFR
23E26 01601	EDWARDS MARK & LISA PETERSON	17096 S EADEN RD	OREGON CITY, OR	97045	RUR
23E34 00100	SHT CORP	PO BOX 10	SANDY, OR	97055	FOR
23E34 00101	UNITED STATES OF AMERICA	1717 FABRY RD SE	SALEM, OR	97306	VAC
23E34 00200	PAINTER TED & SUE	3859 YAQUINA BAY RD	NEWPORT OR	97365	FOR
23E35 00100	RICHARDSON THOMAS G	17290 S EADEN RD	OREGON CITY, OR	97045	FOR
23E35 00500	REYNOLDS, LARRY K. & MARGARET A.	17261 S. EADEN RD	OREGON CITY, OR	97045	RUR
23E35 00507	CALHOUN DAVID C & CARLA M	17399 S RORY CT	OREGON CITY, OR	97045	VAC
23E35 00508	WILLIAMSON KEVIN & KELLY	17396 S RORY CT	OREGON CITY, OR	97045	RUR
23E35 00521	HOFFMAN GARY W & YVETTE M	17371 S EADEN RD	OREGON CITY, OR	97045	SFR
23E35 00600	STEPBERGER HERMANN W & GERTRAUD	21444 S SPRINGWATER RD	ESTACADA, OR	97023	AGR
23E35 00601	UNITED STATES OF AMERICA	1717 FABRY RD SE	SALEM, OR	97306	VAC
23E35 00700	CALHOUN DAVID C & CARLA M	22551 S EADEN RD	OREGON CITY, OR	97045	AGR
23E35 00701	POWERS LOREN R & M DARCY	6428 SE 33RD WY	GRESHAM, OR	97080	AGR
23E35 00800	SHT CORP	PO BOX 10	SANDY, OR	97055	FOR

1. **LANDUSE CODES**
IND - Industrial
SFR - Single Family Residential
RUR - Rural or Future Urban
FOR – Forestry
VAC - Vacant
AGR – Agriculture

Table 6
Existing Native Plants

Alopecurus geniculatus	Montia fontana
Amelanchier alnifolia	Montia linearis
Carex densa	Myosotis laxa
Carex feta	Oenanthe sarmentosa
Carex obnupta	Plagiobothrys figuratus
Carex pellita	Populus balsamifera ssp. trichocarpa
Carex unilateralis	Prunella vulgaris
Claytonia sibirica	Pseudotsuga menziesii
Cornus sericea	Pteridium aquilinum
Crataegus douglasii	Quercus garryana
Deschampsia caespitosa	Ranunculus flammula
Eleocharis palustris	Ranunculus orthorhynchus
Equisetum arvense	Ranunculus uncinatus
Erigeron sp.	Rorippa curvisiliqua
Frangula purshiana	Rosa pisocarpa
Fraxinus latifolia	Rubus ursinus
Glyceria occidentalis	Rumex salicifolius
Gratiola neglecta	Salix scouleriana
Hordeum brachyantherum	Spiraea douglasii
Juncus acuminatus	Stachys ajugoides var. rigida
Juncus bufonius	Stellaria calycantha
Juncus effusus ssp. pacificus	Symphoricarpos albus
Juncus ensifolius	Thuja plicata
Juncus tenuis	Torreyochloa pallida
Lonicera involucrata	Triteleia hyacinthina
Lupinus polyphyllus	Veronica americana
Mahonia aquifolium	Veronica scutellata
Mentha arvensis	
Mimulus guttatus	

Table 7
Existing Non-Native Plants

Agrostis sp. (cultivar)	Malus sp. (cultivar)
Agrostis stolonifera	Medicago lupulina
Alopecurus pratensis	Parentucellia viscosa
Anthoxanthum odoratum	Phalaris arundinacea
Bromus commutatus	Phleum pratense
Bromus sterilis	Plantago lanceolata
Centaurium erythraea	Plantago major
Cerastium glomeratum	Poa pratensis
Cirsium arvense	Prunus domestica (cultivar)
Cirsium vulgare	Ranunculus repens
Crataegus monogyna	Rubus armeniacus
Cytisus scoparius	Rubus laciniatus
Dactylis glomerata	Rubus leucodermis
Daucus carota	Rumex acetosella
Galium aparine	Rumex crispus
Geranium dissectum	Senecio jacobaea
Hedera helix	Senecio sylvaticus
Holcus lanatus	Sherardia arvensis
Hyacinthoides sp. (cultivar)	Solanum dulcamara
Hypericum perforatum	Sonchus asper
Hypochaeris radicata	Syringa sp. (cultivar)
Juncus effusus ssp. effusus	Taraxacum officinale
Lactuca serriola	Tragopogon pratensis
Lapsana communis	Trifolium hybridum
Lathyrus latifolius	Trifolium pratense
Leucanthemum vulgare	Trifolium repens
Lolium arundinaceum	Veronica arvensis
Lolium perenne	Vicia hirsuta
Lotus corniculatus	Vicia sativa
	Vicia villosa
	Vinca major
	Vulpia bromoides
	Yucca sp. (cultivar)

Table 8
Estacada 2 SE Monthly Precipitation Summary

		PRECIPITATION						
MONTH		Mean	2003	2003/Mean	2004	2004/Mean	2005	2005/Mean
		(Inches)	(Inches)	Ratio	(Inches)	Ratio	(Inches)	Ratio
JAN		8.04	8.56	1.06	9.38	1.17	2.58	0.32
FEB		6.95	5.76	0.83	5.48	0.79	1.49	0.21
MAR		6.18	11.08	1.79	2.66	0.43	6.57	1.06
APR		5.08	8.21	1.62	2.68	0.53	5.11	1.01
MAY		4.04	2.15	0.53	3.75	0.93	5.69	1.41
JUN		2.68	0.6	0.22	2.39	0.89	4.47	1.67
JUL		1.07	0.02	0.02	0.25	0.23	1.06	0.99
AUG		1.28	0.06	0.05	3.65	2.85	0.65	0.51
SEP		2.47	1.64	0.66	3.11	1.26	0.13	0.05
OCT		4.77	3.69	0.77	5.04	1.06	6.02	1.26
NOV		8.45	6.94	0.82	3.66	0.43		
DEC		8.47	11.57	1.37	5.57	0.66		
ANNUAL		59.48	60.28	1.01	47.62	0.80	33.77	0.57

Station Name: Estacada 2 SE
Station Location: Estacada, Oregon
Station Elevation: 410 Feet MSL

Table 9
Oregon City Monthly Precipitation Summary

		PRECIPITATION						
MONTH		Mean	2003	2003/Mean	2004	2004/Mean	2005	2005/Mean
		(Inches)	(Inches)	Ratio	(Inches)	Ratio	(Inches)	Ratio
JAN		6.59	7.69	1.17	5.98	0.91	2.26	0.34
FEB		5.51	3.86	0.70	3.33	0.60	0.78	0.14
MAR		4.7	7.85	1.67	0	0.00	5.43	1.16
APR		3.46	5.58	1.61	1.74	0.50	3.13	0.90
MAY		2.7	0.52	0.19	2.38	0.88	4.57	1.69
JUN		1.83	0.7	0.38	2.15	1.17	2.06	1.13
JUL		0.83	0	0.00	0.15	0.18	0.57	0.69
AUG		1	0	0.00	3.2	3.20	0.5	0.50
SEP		1.93	1.02	0.53	1.67	0.87	1.58	0.82
OCT		3.48	3.02	0.87	5.62	1.61	3.19	0.92
NOV		6.79	6.2	0.91	1.89	0.28		
DEC		7.23	9.3	1.29	4.35	0.60		
ANNUAL		46.05	45.74	0.99	32.46	0.70	24.07	0.52

Station Name: Oregon City
Station Location: Oregon City, Oregon
Station Elevation: 170 Feet MSL

Table 10
Peak Sustained Water Depth

Well #	Water Depth From Hobo (Inches)	Depth To Well Bottom From Casing Top (Inches)	Casing Above Ground (Inches)	Well Bottom Below Ground (Inches)	Water Surface Depth Below Ground (Inches)	Ground Surface Elev. (Ft. MSL)	Water Surface Elev. (Ft. MSL)	Water Depth From Hobo For 12 In. BGS (Feet)	Number Of Days Meeting Hydrology Criteria	Comment
1	21.6	37.5	6.5	31	9.4	336.2	326.8	1.58	67	
2	26.16	37.75	6.75	31	4.8	333.0	328.1	1.58	65	
3	31.2	38.25	3.75	34.5	3.3	337.8	334.5	1.88	68	
4	9.24	37.5	11.5	26	16.8	333.6	316.9	1.17	7	
5	16.56	37.75	8.5	29.25	12.7	337.5	324.8	1.44	11	
6		38	9.5	28.5	28.5	329.1	300.6	1.38		Unuseable data
7	31.2	37.5	5.5	32	0.8	336.8	336.0	1.67	101	Possible data inconsistencies
8	1.8	37.75	8	29.75	28.0	333.2	305.2	1.48		Probable bad data
9	21.96	37.75	7.75	30	8.0	335.9	327.9	1.50	38	
10	16.56	37.75	9.5	28.25	11.7	339.2	327.5	1.35	10	

Note: Insert water level depths from the Hobo data loggers in column #2 to calculate the water surface depth below ground and the water surface elevation.

Note: Water depths are maximum for 15 consecutive days over the 2005 growing season

Table 11
HGM Existing and Proposed Conditions Assessment Summary

		Wet Prairie Habitat		Forested Wetland Habitat	
FUNCTION	**Existing HFR[1]**	**Wet Prairie 5-Year HFR[1]**	**Functional Gain (+) Loss (-)**	**Forested Wetland 5-Year HFR[1]**	**Functional Gain (+) Loss (-)**
Water Storage and Delay	0.03	0.15	(+) 0.12	0.40	(+) 0.37
Sediment Stabilization & Phosporous Retention	0.57	0.62	(+) 0.05	0.67	(+) 0.10
Nitrogen Removal	0.88	0.88	0.00	0.88	0.00
Primary Production	0.46	0.60	(+) 0.14	0.62	(+) 0.16
Invertebrate Habitat Support	0.29	0.35	(+) 0.06	0.35	(+) 0.06
Amphibian and Turtle Habitat	0.69	0.82	(+) 0.13	0.89	(+) 0.20
Breeding Waterbird Support	0.00	0.00	0.00	0.00	0.00
Wintering & Migrating Waterbird Support	0.52	0.67	(+) 0.15	0.76	(+) 0.24
Songbird Habitat Support	0.62	0.62	0.00	0.62	0.00
Support of Characteristic Vegetation	0.58	0.87	(+) 0.29	0.89	(+) 0.31
FUNCTION	**Existing LAR[2]**	**Wet Priaire 5-Year LAR[2]**	**Functional Gain (+) Loss (-)**	**Forested Wetland 5-Year LAR[2]**	**Functional Gain (+) Loss (-)**
Water Storage and Delay	0.06	0.33	(+) 0.27	0.89	(+) 0.83
Sediment Stabilization & Phosporous Retention	0.61	0.66	(+) 0.05	0.72	(+) 0.11
Nitrogen Removal	0.58	0.73	(+) 0.15	0.77	(+) 0.19
Primary Production	0.59	0.74	(+) 0.15	0.76	(+) 0.17
Invertebrate Habitat Support	0.29	0.35	(+) 0.06	0.35	(+) 0.06
Amphibian and Turtle Habitat	0.91	1.08	(+) 0.07	1.17	(+) 0.26
Breeding Waterbird Support	0.00	0.00	0.00	0.00	0.00
Wintering & Migrating Waterbird Support	0.60	0.78	(+) 0.18	0.87	(+) 0.27
Songbird Habitat Support	0.96	0.96	0.00	0.96	0.00
Support of Characteristic Vegetation	0.60	0.90	(+) 0.30	0.92	(+) 0.32

NOTES:

[1] Calculated functional capacity scaled to the highest functioning site of this subclass found by DSL

[2] Calculated functional capacity scaled to the least-altered site of this subclass found by DSL

HGM methodology based on reference-based assessment for Willamette Valley Slopes/Flats subclass

see Appendix _ for assessment datasheets

Table 12

Shift in Dominance

	Native Plants	Non-Native Plants
Existing	30%	70%
Proposed	60%	40%

Table 13 - Bank Credits Calculation

	Wetland (Ac.)	Upland (Ac.)	Buffers (Ac.)	Total (Ac.)	Process	Conversion	Credits (Ac.)
Existing Conditions	57.1	14.6	1.6	73.3			0.0
Proposed PEM Wetland	52.7				Enhancement	3:1	17.6
Proposed PEM Wetland		8.0			Creation	1.5:1	5.3
Proposed PFO Wetland	4.4				Enhancement	3:1	1.5
Proposed PFO Wetland		5.0			Creation	1.5:1	3.3
Total Proposed Wetland	57.1	13.0					27.7
Proposed Buffer Enhancement	N/A		3.2	73.3	Enhancement	10:1	0.3
							28.0

Table 14
Projected Itemized Project Costs

Task	Annual	Time	Year														
	Cost	(Years)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Real Estate																	
Acquisition	$72,660	15	$72,660	$72,660	$72,660	$72,660	$72,660	$72,660	$72,660	$72,660	$72,660	$72,660	$72,660	$72,660	$72,660	$72,660	$72,660
Legal Assistance	$5,400	1	$5,400														
Subtotal			**$78,060**	**$72,660**	**$72,660**	**$72,660**	**$72,660**	**$72,660**	**$72,660**	**$72,660**	**$72,660**	**$72,660**	**$72,660**	**$72,660**	**$72,660**	**$72,660**	**$72,660**
Site Construction																	
Mobilization	$2,000	1	$2,000														
Spraying	$3,000	1	$3,000														
Mowing	$3,620	1	$3,620														
Surveying	$5,000	1	$5,000														
Grading	$60,000	1	$60,000														
Erosion Control	$18,000	1	$18,000														
Insall fence	$4,800	1	$4,800														
Seed	$37,643	1	$37,643														
Seeding	$43,434	1	$43,434														
Planting (woody)	$124,800	1	$124,800														
Planting (herb.)	$206,400	1	$206,400														
Subtotal			**$508,696**														
Task	Annual	Time	Year														
	Cost	(Years)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Site Maintenance																	
Spraying	$420	3	$420	$420	$420	$420	$420	$420	$420	$420	$420	$420	$420	$420	$420	$420	$420
Mowing	$350	3	$350	$350	$350												
Burning	$5,639	3					$5,639					$5,639					$5,639
Weeding (minor)	$4,000	5	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000
Reseeding	$20,000	3		$20,000	$20,000	$20,000											
Replanting	$750	3		$750	$750	$750											
Erosion Repair	$800	3		$800	$800	$800											
Fence Repair	$500	4	$500	$500	$500	$500											
Catastrophic	$50,000	1									$50,000						
Subtotal			**$5,270**	**$26,820**	**$26,820**	**$26,470**	**$10,059**	**$4,420**	**$4,420**	**$4,420**	**$54,420**	**$10,059**	**$4,420**	**$4,420**	**$4,420**	**$4,420**	**$10,059**
Monitoring																Total =	**$200,917**
As-built																	
Vegetation	$2,500	5	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500
Hydrology	$2,500	5	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500
Photographic	$400	5	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400
Reporting	$3,000	5	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000
Wet. Delineation	$10,000	1			$10,000												
Subtotal			**$8,400**	**$8,400**	**$18,400**	**$8,400**	**$8,400**	**$8,400**	**$8,400**	**$8,400**	**$8,400**	**$8,400**	**$8,400**	**$8,400**	**$8,400**	**$8,400**	**$8,400**
Miscellaneous	Total Cost															Total =	**$136,000**
Endowment	$250,000	10	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000					
Financial Assur. In	$40,000	10	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000	$4,000					
Subtotal			**$29,000**	**$29,000**	**$29,000**	**$29,000**	**$29,000**	**$29,000**	**$29,000**	**$29,000**	**$29,000**	**$29,000**					
Grand Subtotal			**$629,426**	**$136,880**	**$146,880**	**$136,530**	**$120,119**	**$114,480**	**$114,480**	**$114,480**	**$164,480**	**$120,119**	**$85,480**	**$85,480**	**$85,480**	**$85,480**	**$91,119**
Amount Financed			$629,426	$514,955	$400,181	$264,727	$100,671	$0	$0	$0	$0	$0					
Financing Cost	0.09		$56,648	$46,346	$36,016	$23,825	$9,060										
TOTAL COST			**$686,075**	**$561,301**	**$436,197**	**$288,552**	**$109,732**	**$114,480**	**$114,480**	**$114,480**	**$164,480**	**$120,119**	**$85,480**	**$85,480**	**$85,480**	**$85,480**	**$91,119**

Table 15
Proposed Seeding/Planting Species

Habitat Area		Common Name	Scientific Name	Wetland Indicator
Wet Prairie	Grasses	tufted hairgrass	*Deschampsia cespitosa*	FACW
		spike bentgrass	*Agrostis exarata*	FACW
		meadow barley	*Hordeum brachyantherum*	FACW-
		annual hairgrass	*Deschampsia danthonioides*	FACW-
	Sedges/Rushes	sawbeak sedge	*Carex stipata*	OBL
		one-sided sedge	*Carex unilateralis*	FACW
		slender rush	*Juncus tenuis*	FACW-
	Forbs	popcorn flower	*Plagiobothrys figuratus*	FACW
		common camas	*Camissia quamash*	FACW
		western buttercup	*Ranunculus occidentalis*	FAC
		Hall's aster	*Aster hallii*	FACW
		dense spike primrose	*Epilobium densiflorum*	FACW-
		Oregon sunshine	*Eriophyllum lanatum*	NOL
		lance self-heal	*Prunella vulgaris ssp. Lanceolata*	NOL
		big-leaf lupine	*Lupinus polyphyllus*	FACW+
Forested Wetland	Trees	Oregon ash	*Fraxinus latifolia*	FACW
	Shrubs	red-osier dogwood	*Cornus stolonifera*	FACW
		snowberry	*Symphoricarpos albus*	FACU
		twinberry	*Lonicera involucrata*	FAC+
	Herbs	slough sedge	*Carex obnupta*	OBL
Upland Buffer	Trees	Oregon white oak	*Quercus garryana*	
		Douglas fir	*Pseudotsuga menziesii*	
		red alder	*Alnus rubra*	
		western red cedar	*Thuja plicata*	
	Shrubs	snowberry	*Symphoricarpos albus*	
		Oregon grape	*Berberis aquifolium*	
	Grasses	blue wildrye	*Elymus glaucus*	
		California brome	*Bromus carinatus*	
		Sitka brome	*Bromus sitchensis*	
	Forbs	yarrow	*Achillea millefolium*	
		Spanish clover	*Lotus purshianus*	

Table 16
Wetland Prairie Habitat Performance Criteria[1]

Performance Criteria	Performance Criteria Benchmark	Time Period	Evaluation Method
Percent Cover Native Species*	>50%; with tufted hairgrass/camas >15%	Monitoring Years 1-2	Plot Monitoring
	>60%; with tufted hairgrass/camas >20%	Monitoring Years 3-5	Plot Monitoring
Percent Cover Invasive Species**	<20%; except <15% for reed canarygrass	Monitoring Years 1-5	Plot Monitoring
Percent Cover Trees and Shrubs	<5%	Monitoring Years 1-5	Plot Monitoring
Number of Native Species*	Minimum of 2 native grass species and 1 native forb species with >10% cover	Monitoring Years 1-2	Plot Monitoring
	Minimum of 3 native grass species and 2 native forb species with >10% cover	Monitoring Years 3-5	Plot Monitoring
Wetland Hydrology	Saturation within 12 inches of the soil surface for a minimum of 11 consecutive days area***	Monitoring Years 1-5	On-site Groundwater Data Collection

[1] Within wet prairie management area
* Allows volunteer/colonization of desirable native species
** Includes the following species: meadow foxtail, common velvetgrass, tall fescue, Kentucky bluegrass, spreading bentgrass, reed canarygrass, Queen Ann's lace, creeping buttercup, Canada thistle, common thistle, spotted cats-ear (list may be modified during project based on monitoring and adaptive management)
*** During normal precipitation ($\geq$ 85% of the mean)recorded February – May at the Western Regional Climate Center's Estacada Reporting Station; 11 consecutive days is 5% of a 210-day growing season.

Table 17
Forested Wetland Habitat Performance Criteria[1]

Performance Criteria	Performance Criteria Benchmark	Time Period	Evaluation Method
Number of Native Tree/Shrub Species*	Minimum of 1 native tree and 3 native shrub species	Monitoring Years 1-5	Radius Plot Monitor
Density of Native Tree Species*	Minimum of 240 stems per acre	Monitoring Years 1-5	Radius Plot Monitor
Density of Native Shrub Species*	Minimum of 320 stems per acre	Monitoring Years 1-5	Radius Plot Monitor
Percent Cover Native Herbaceous Species	>50% cover	Monitoring Years 1-5	Radius Plot Monitoring
Percent Cover Invasive Species**	<20%; except <15% reed canarygrass	Monitoring Years 1-5	Radius Plot Monitoring
Wetland Hydrology	Saturation within 12 inches of the soil surface for a minimum of 11 consecutive days ***	Monitoring Years 1-5	On-site Groundwater Data Collection

[1] Within forested wetland management area
* Allows volunteer/colonization of desirable native species
** Includes the following species: meadow foxtail, common velvetgrass, tall fescue, Kentucky bluegrass, spreading bentgrass, reed canarygrass, Queen Ann's lace, creeping buttercup, Canada thistle, common thistle, spotted cats-ear (list may be modified during project based on monitoring and adaptive management).
*** During normal precipitation ($\geq$ 85% of the mean) recorded February – May at the Western Regional Climate Center's Estacada Reporting Station; 11 consecutive days is 5% of a 210-day growing season.

Table 18

Credit Release Schedule

Year	Action	Date	Credit Release
1	Initial Weed Control	June 2006	15%
1	Grading	October 2006	Up to 30%
2	Hydrology	May 2007	Up to 50%
3	Planting Completion	December 2008	Up to 75%
3	Performance Criteria Year 2	December 2008	- - -
4	Performance Criteria Year 3 Release Performance Bond	December 2009	87.5%
5	Performance Criteria Year 5	December 2010	95%
10	Long Term Steward Approved	December 2016	100%

Table 19
Bank Credit Ledger

Party	Date	R/F Permit No.	ACOE Permit No.	Acres Enhc'ed Depress/ Flats HGM 3:1	Acres Created Depress/ Flats HGM 1.5:1	Acres Upland Buffer 10:1	Acres Total	Total Credits	Veg. Control Credit Release 15% Summer 2006	Grading Credit Release 30% Summer 2006	Hydrol. Attained Credit Release 50% Spring 2007	Planting Complete Credit Release 75% Winter 2007	Veg. Perform. Year 3 Credit Release 87.50% Spring 2010	Full Perform. Year 5 Credit Release 95% Spring 2012	Long Term Steward Approval 100% Winter 2016	Total Credits Sold To Date	Credits To Be Sold
MBRT - Draft Instrument	12-Jan-06	N/A	N/A	57.1	13.0	3.1	73.2	28.0	4.2	8.4	14.0	21.0	24.5	28.0		0	
MBRT - Final Instrument	12-Mar-06															0	
MBRT - Rev. Final Instr.	8-May-06															0	
MBRT - MOA	1-Jun-06															0	28.0
DSL R/F Permit	8-Jun-06															0	28.0
ACOE Section 404 Permit	8-Jun-06															0	28.0
Weed Control																	
Damascus Water 123 Main St. Damascus, OR	15-Jun-06	xxx	yyy					0.8								0.8	27.2

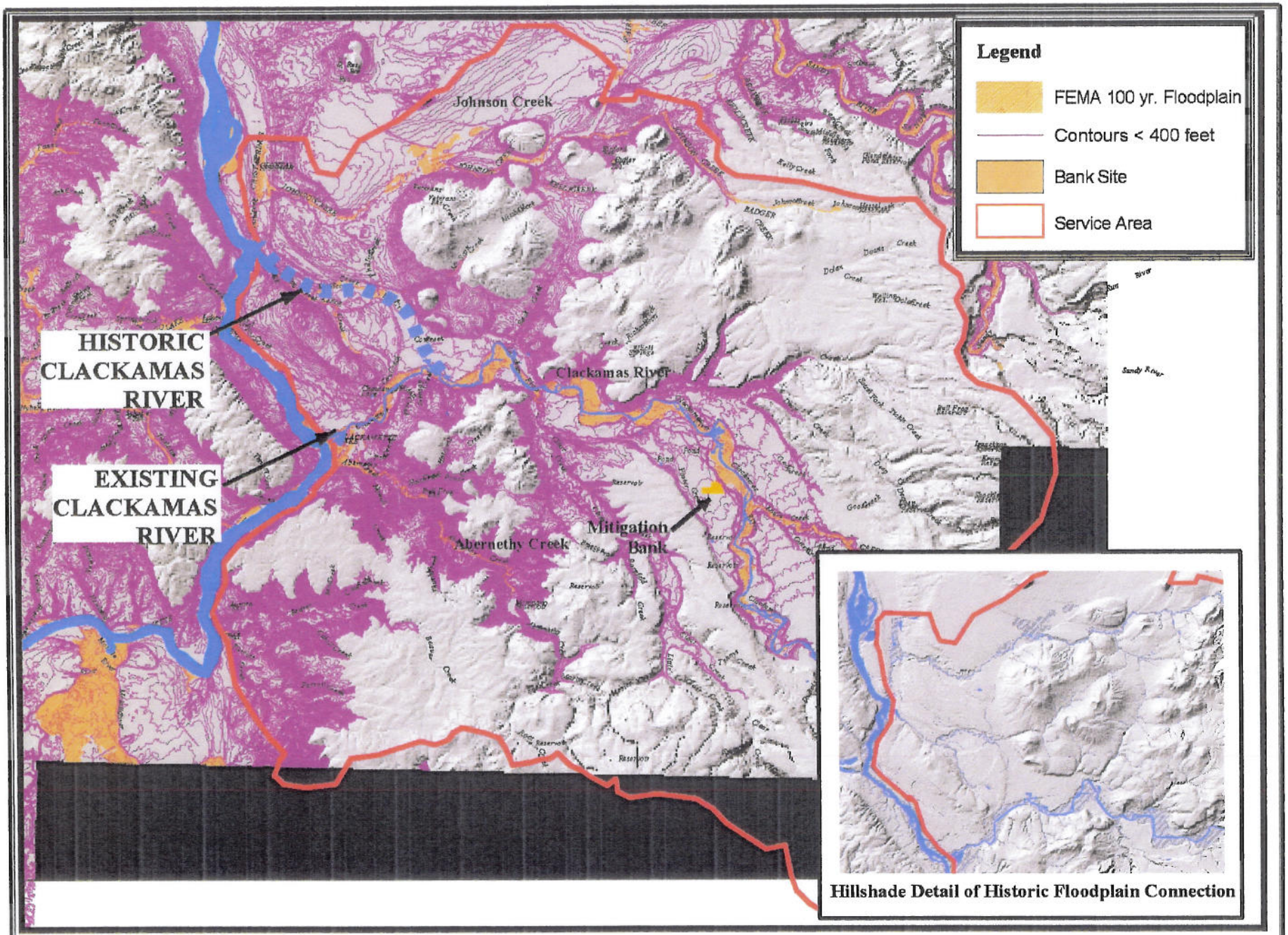


Figure 2B.
Existing and Historic Hydrologic Relationships of Major Drainages Within Service Area

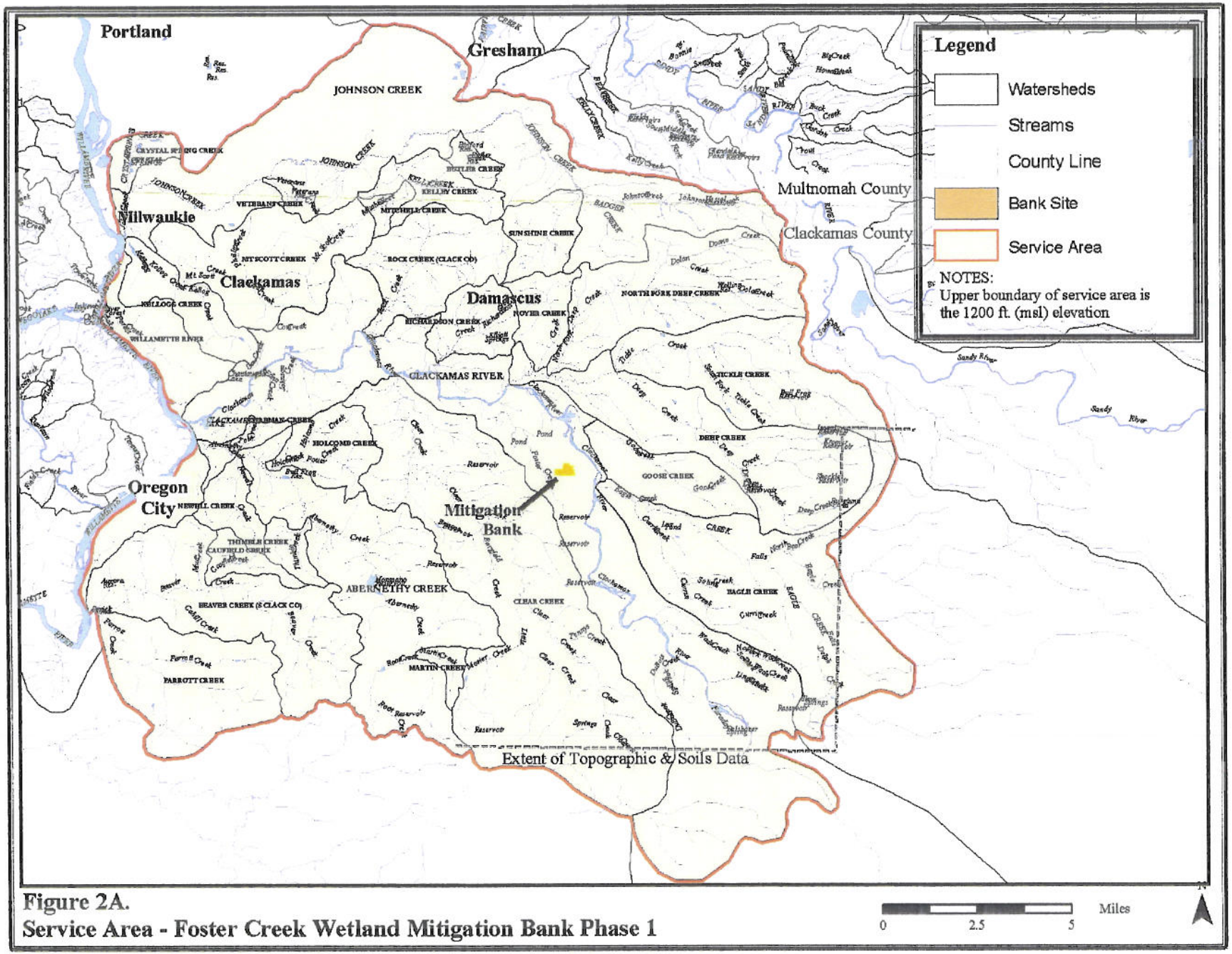


Figure 2A.
Service Area - Foster Creek Wetland Mitigation Bank Phase 1

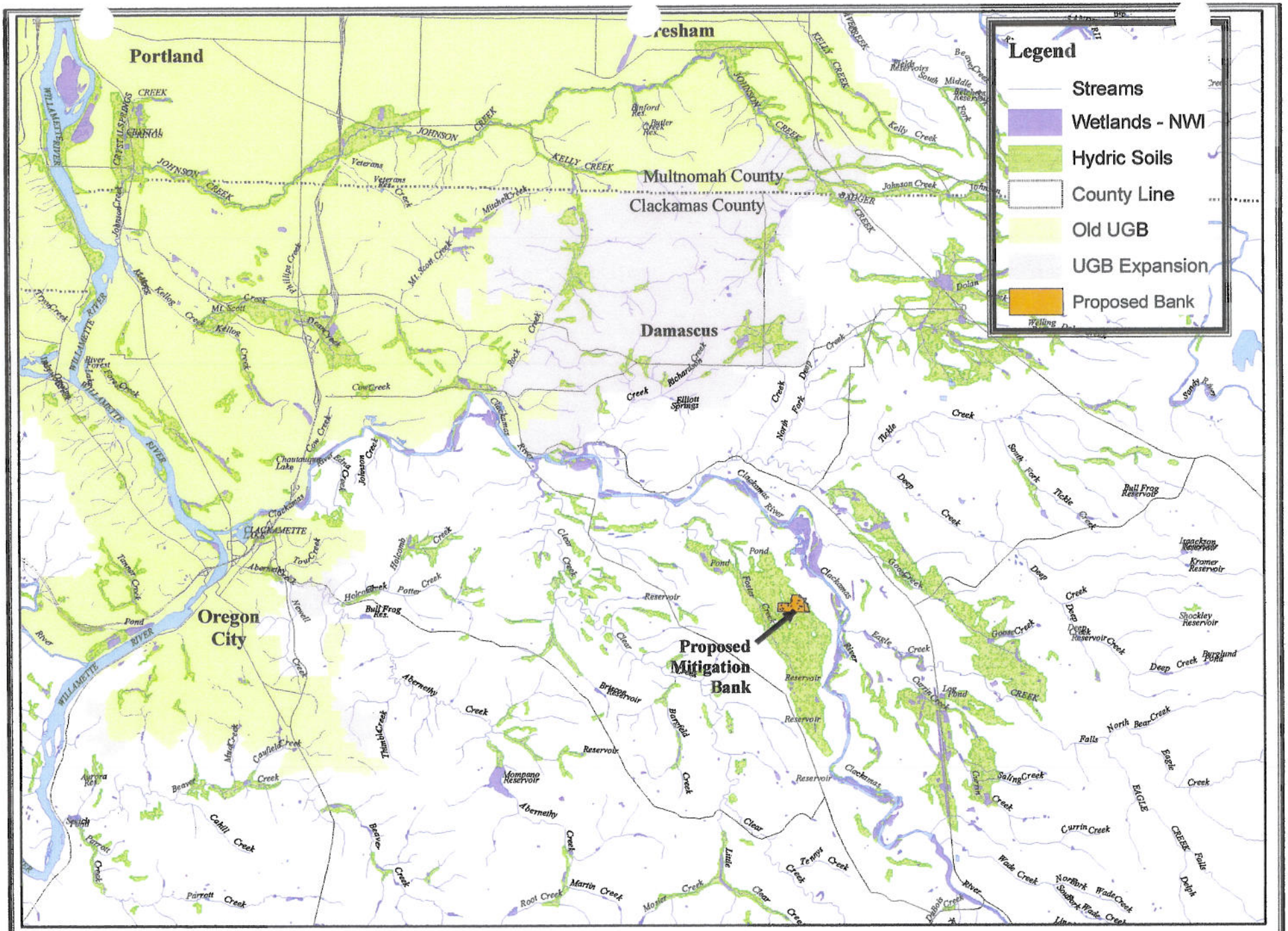


Figure 1.
Bank Location Map - Foster Creek Wetland Mitigation Bank Phase 1

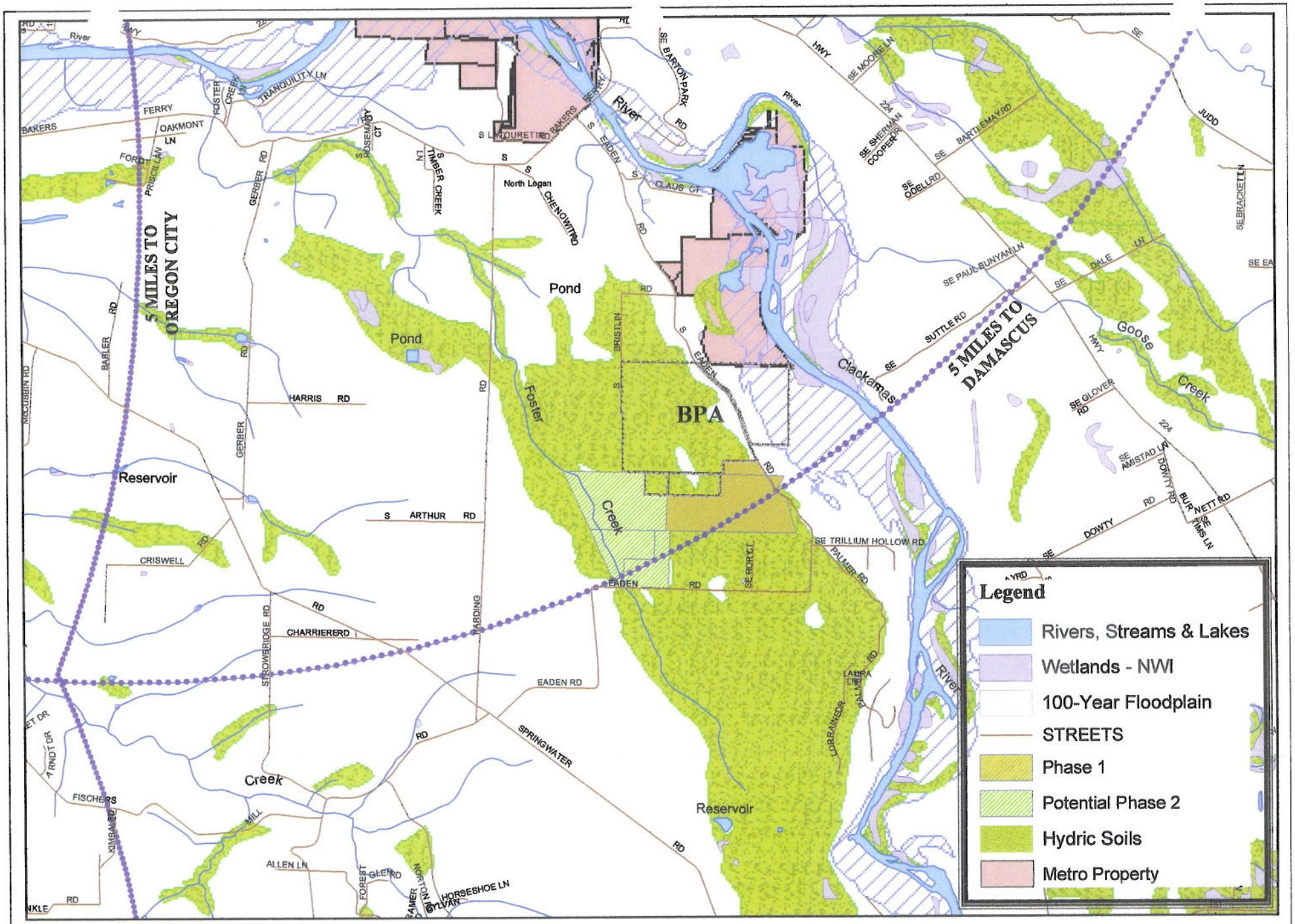


Figure 3.
Proposed Phases and Site Context Map - Foster Creek Wetland Mitigation Bank

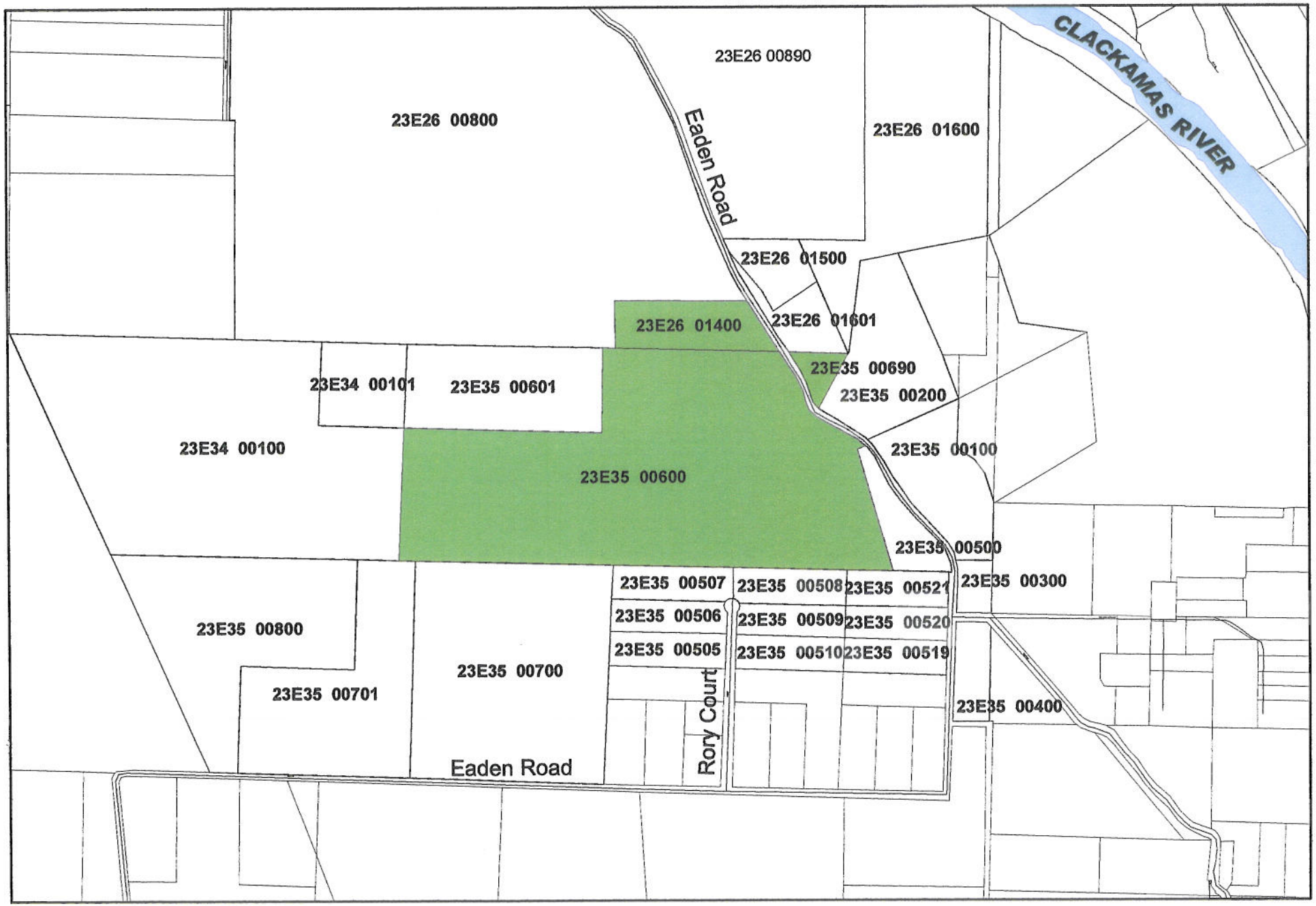


Figure 4.
Adjacent Property Owners Map - Foster Creek Wetland Mitigation Bank Phase 1

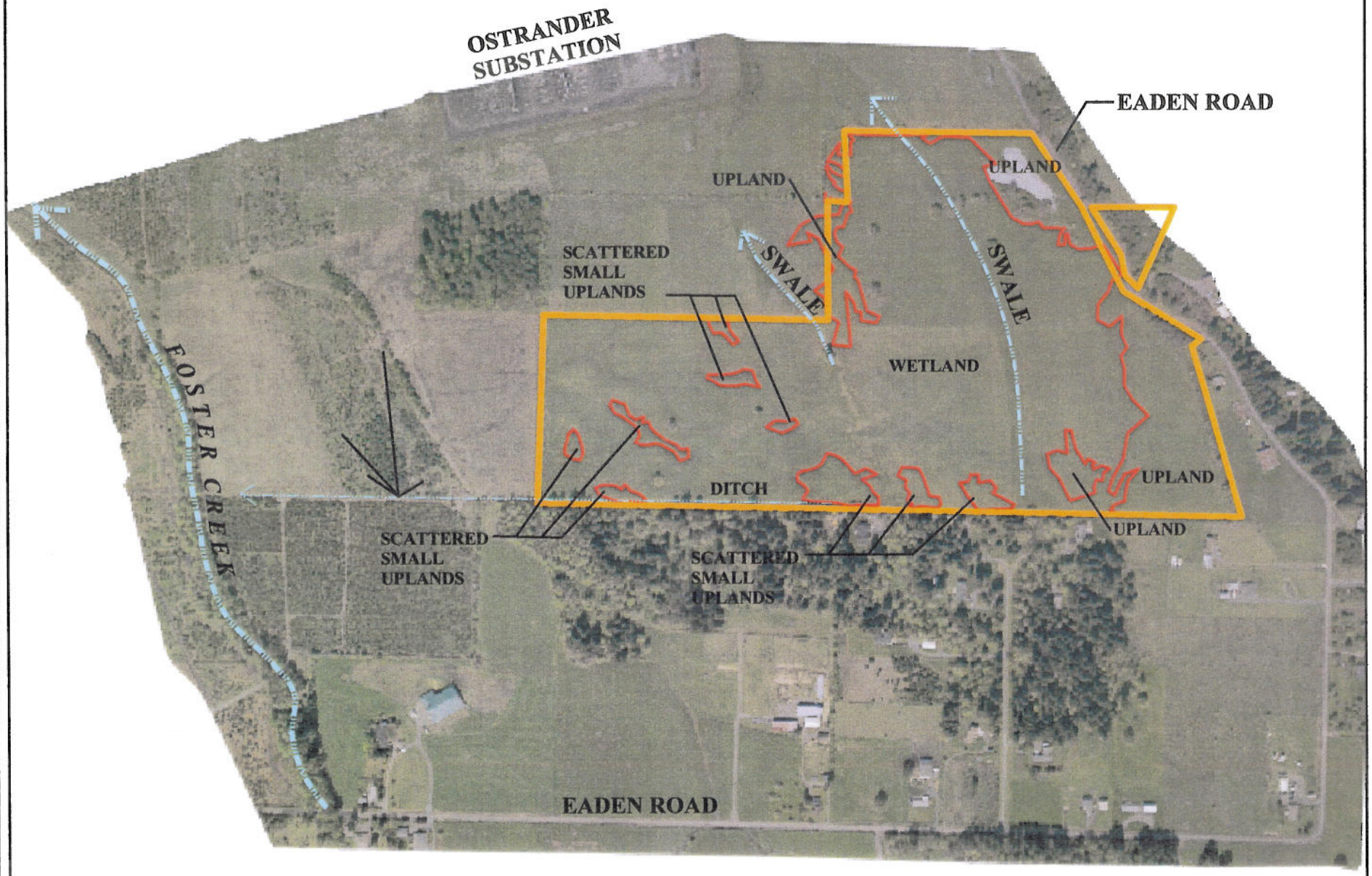


Figure 5.
Existing Conditions Map - Foster Creek Wetland Mitigation Bank Phase 1

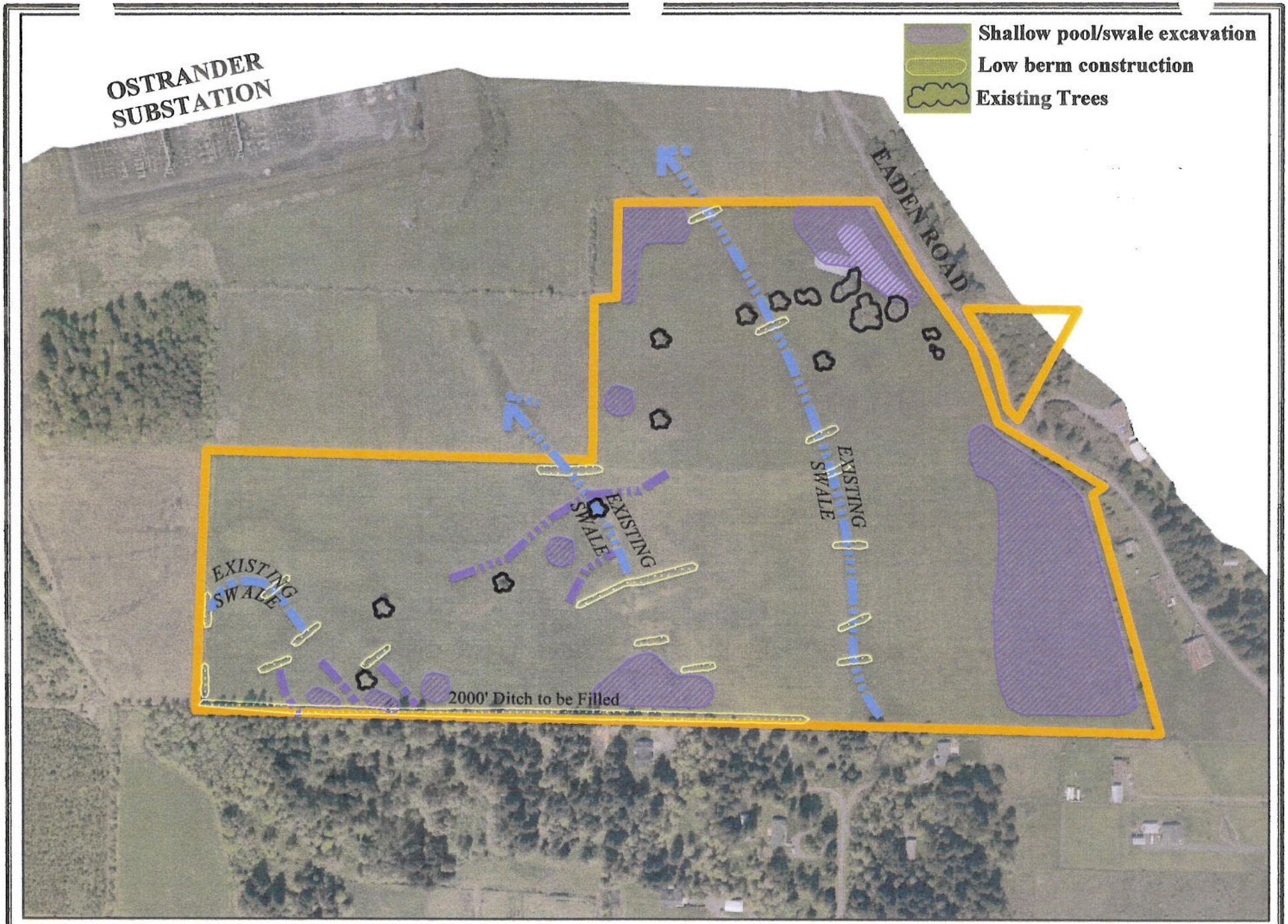
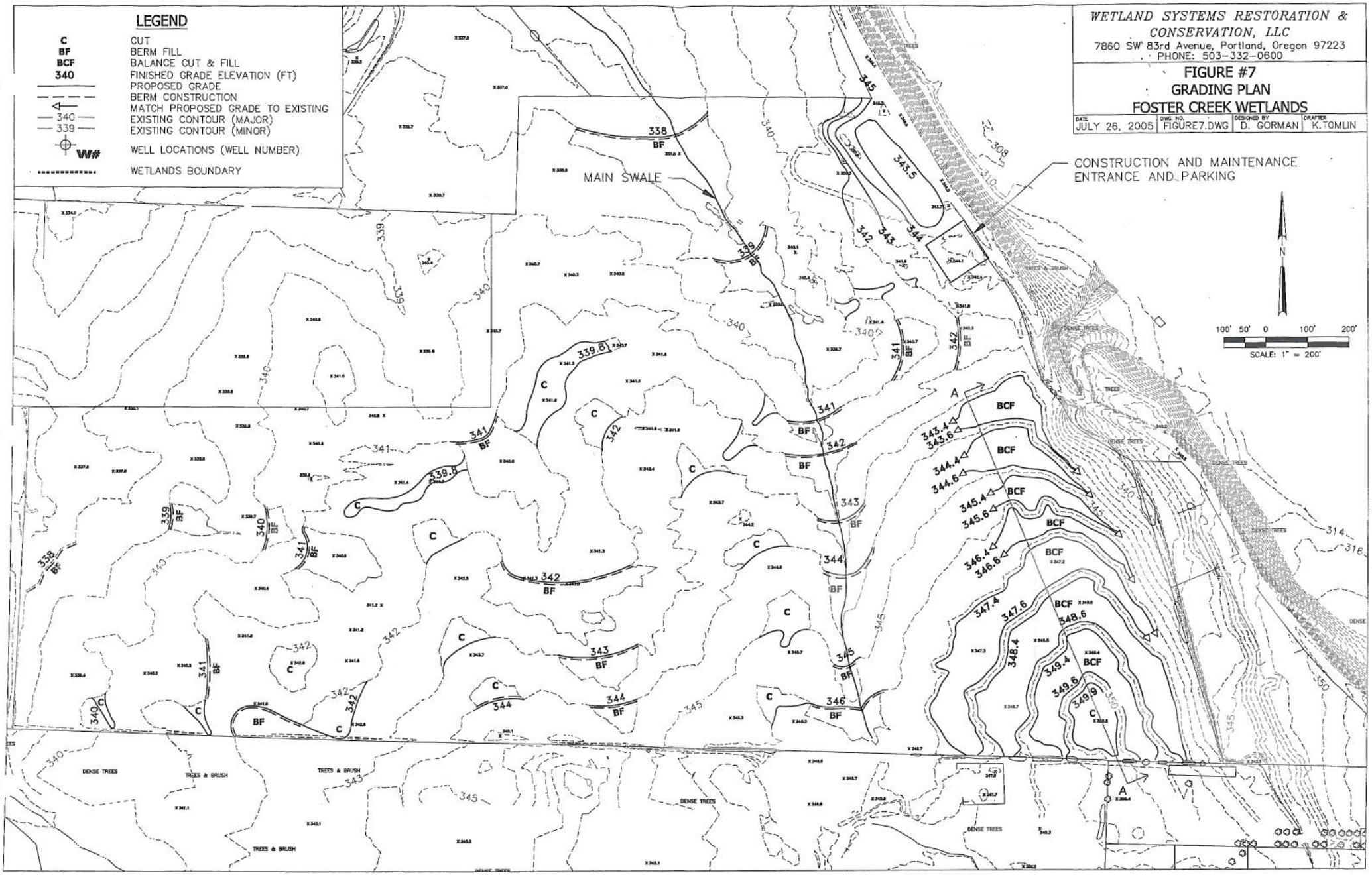


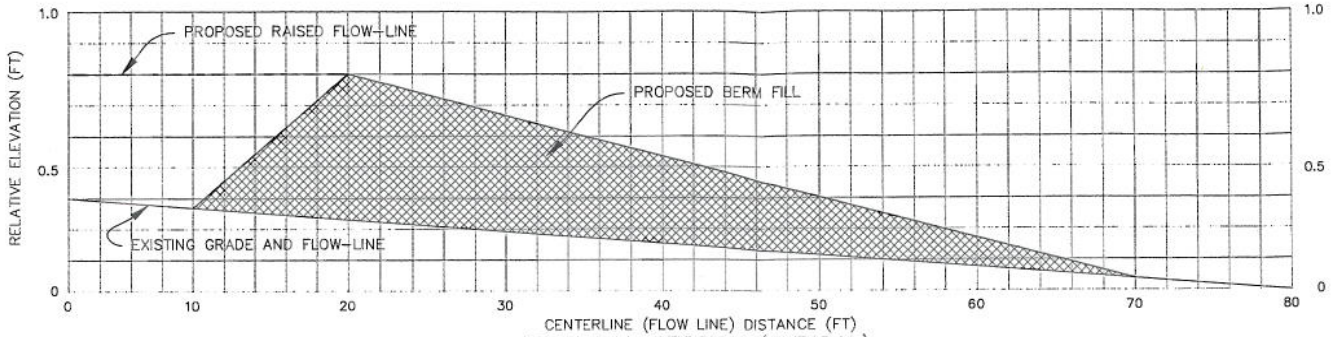
Figure 6.
Conceptual Site Plan - Foster Creek Wetland Mitigation Bank Phase 1


LEGEND
C CUT
BF BERM FILL
BCF BALANCE CUT & FILL
340 FINISHED GRADE ELEVATION (FT)
PROPOSED GRADE
BERM CONSTRUCTION
MATCH PROPOSED GRADE TO EXISTING
340 EXISTING CONTOUR (MAJOR)
339 EXISTING CONTOUR (MINOR)
W# WELL LOCATIONS (WELL NUMBER)
WETLANDS BOUNDARY
WETLAND SYSTEMS RESTORATION & CONSERVATION, LLC
7860 SW 83rd Avenue, Portland, Oregon 97223
PHONE: 503-332-0600
FIGURE #7
GRADING PLAN
FOSTER CREEK WETLANDS
DATE JULY 26, 2005
DWG. NO. FIGURE7.DWG
DESIGNED BY D. GORMAN
DRAFTER K.TOMLIN
MAIN SWALE
CONSTRUCTION AND MAINTENANCE ENTRANCE AND PARKING
N
100' 50' 0 100' 200'
SCALE: 1" = 200'
DENSE TREES
TREES & BRUSH

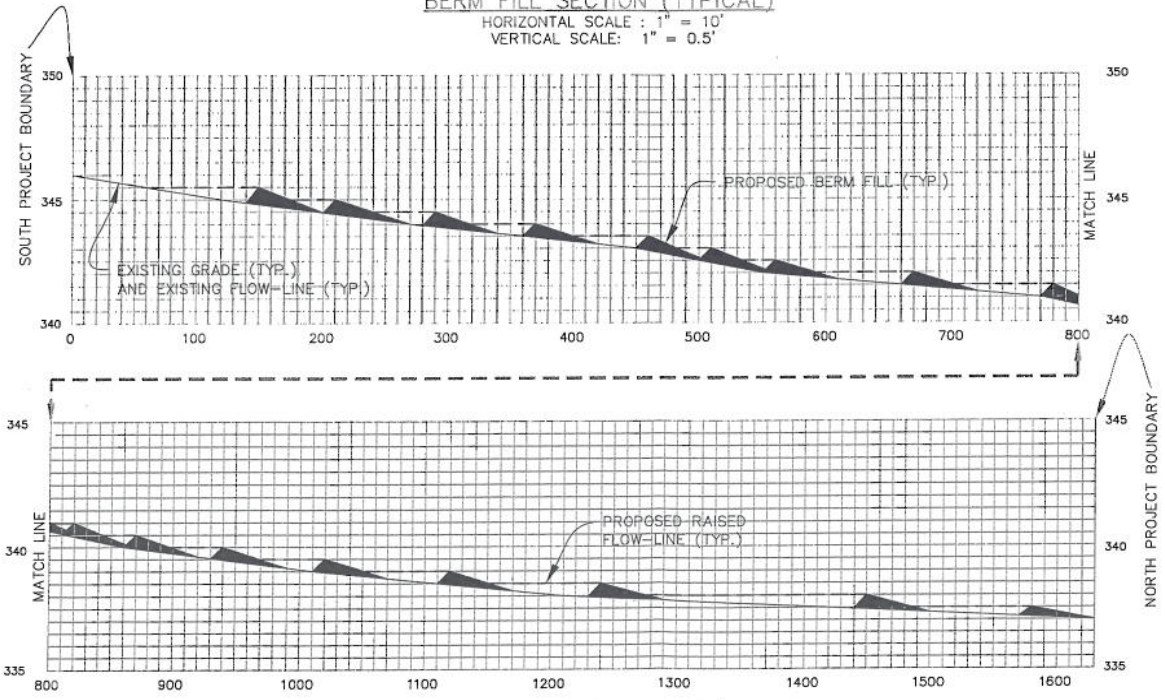
WETLAND SYSTEMS RESTORATION AND CONSERVATION, LLC
7860 SW 83rd Avenue, Portland, Oregon 97223
PHONE: 503-312-3167

FIGURE #8A
MAIN SWALE SECTION
FOSTER CREEK WETLANDS

DATE	DWG. NO.	DESIGNED BY	DRAFTER
JULY 26, 2005	FIGURE?.DWG	D. GORMAN	K.TOMLIN



BERM FILL SECTION (TYPICAL)
HORIZONTAL SCALE : 1" = 10'
VERTICAL SCALE: 1" = 0.5'



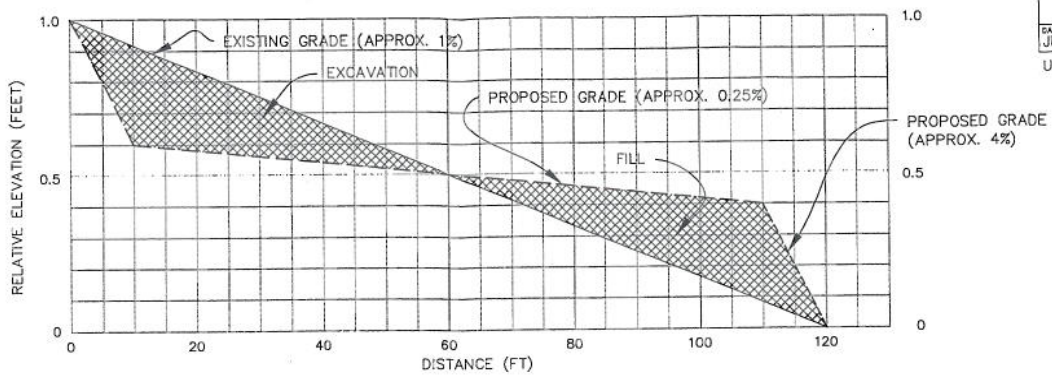
MAIN SWALE SECTION (TYPICAL)
HORIZONTAL SCALE : 1" = 100'
VERTICAL SCALE: 1" = 5'

WETLAND SYSTEMS RESTORATION AND CONSERVATION, LLC
7860 SW 83rd Avenue, Portland, Oregon 97223
PHONE: 503-312-3167

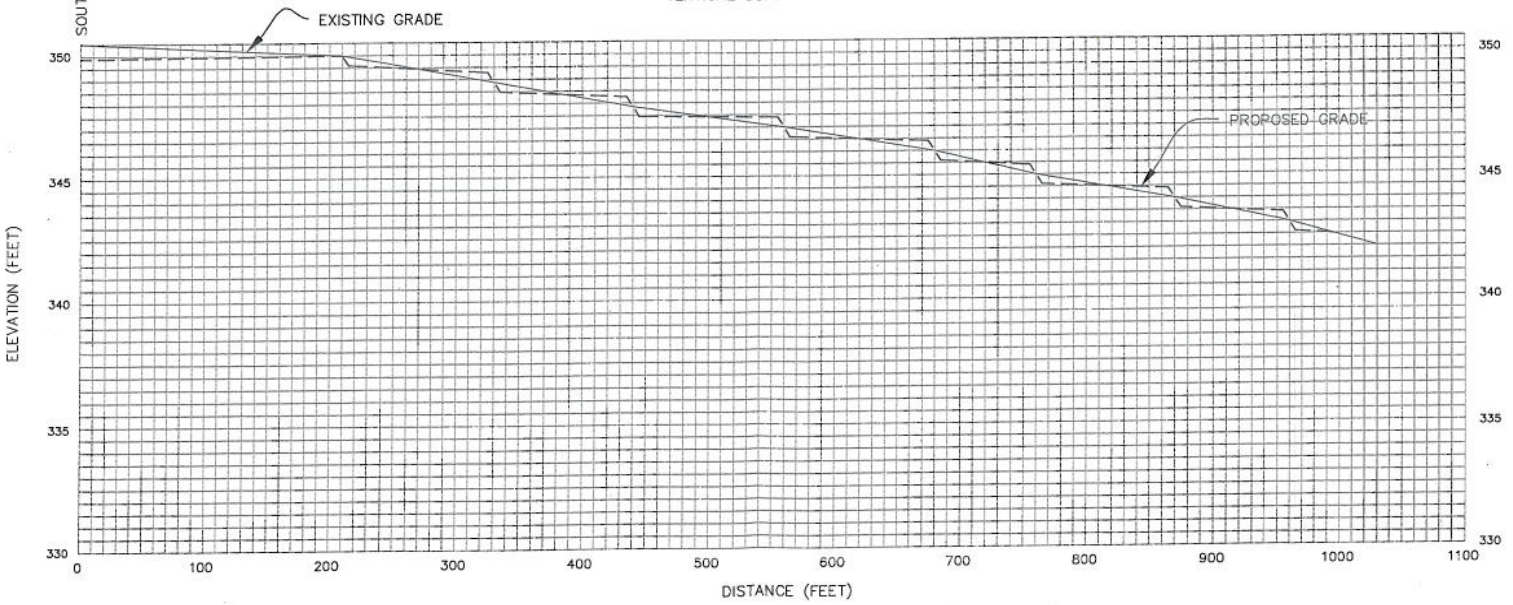
FIGURE #8B
SOUTHEAST TERRACE SECTION
FOSTER CREEK WETLANDS

DATE	DWG. NO.	DESIGNED BY	DRAFTER
JULY 26, 2005	FIGURE8B.DWG	D. GORMAN	K.TOMLIN

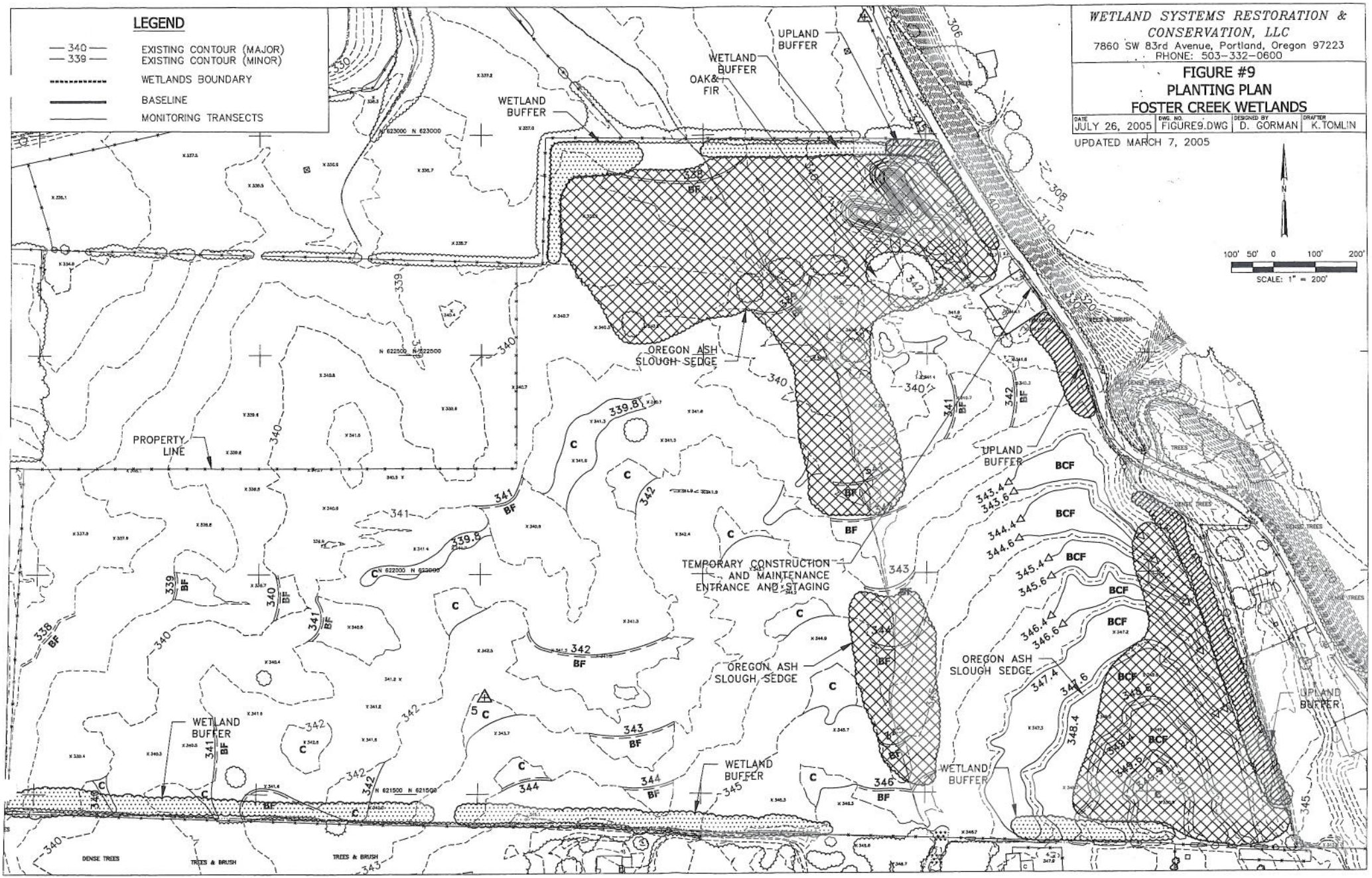
UPDATED DECEMBER 7, 2005

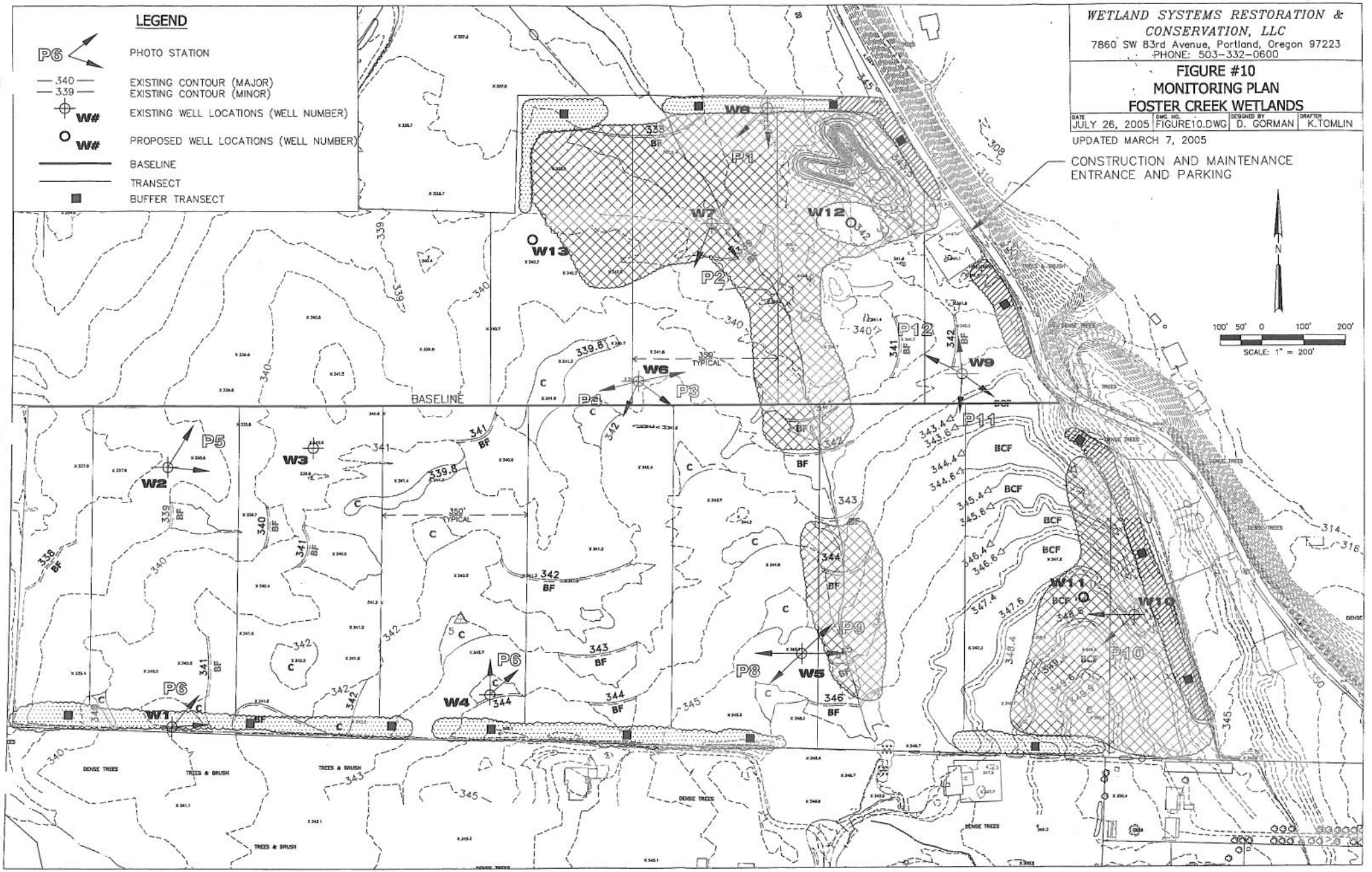


TERRACE SECTION (TYPICAL)
HORIZONTAL SCALE : 1" = 20'
VERTICAL SCALE: 1" = 0.5'



A-A SOUTHEAST TERRACE SECTION (TYPICAL)
HORIZONTAL SCALE : 1" = 100'
VERTICAL SCALE: 1" = 5'


LEGEND
340 EXISTING CONTOUR (MAJOR)
339 EXISTING CONTOUR (MINOR)
WETLANDS BOUNDARY
BASELINE
MONITORING TRANSECTS
WETLAND SYSTEMS RESTORATION & CONSERVATION, LLC
7860 SW 83rd Avenue, Portland, Oregon 97223
PHONE: 503-332-0600
FIGURE #9
PLANTING PLAN
FOSTER CREEK WETLANDS
DATE JULY 26, 2005
DWG NO. FIGURE9.DWG
DESIGNED BY D. GORMAN
DRAFTER K.TOMLIN
UPDATED MARCH 7, 2005
N
100' 50' 0 100' 200'
SCALE: 1" = 200'
UPLAND BUFFER
WETLAND BUFFER
OAK& FIR
OREGON ASH SLOUGH SEDGE
PROPERTY LINE
TEMPORARY CONSTRUCTION AND MAINTENANCE ENTRANCE AND STAGING
BCF
BF
C
DENSE TREES
TREES & BRUSH


LEGEND
P6 PHOTO STATION
340 EXISTING CONTOUR (MAJOR)
339 EXISTING CONTOUR (MINOR)
W# EXISTING WELL LOCATIONS (WELL NUMBER)
W# PROPOSED WELL LOCATIONS (WELL NUMBER)
BASELINE
TRANSECT
BUFFER TRANSECT
WETLAND SYSTEMS RESTORATION & CONSERVATION, LLC
7860 SW 83rd Avenue, Portland, Oregon 97223
PHONE: 503-332-0600
FIGURE #10
MONITORING PLAN
FOSTER CREEK WETLANDS
DATE JULY 26, 2005
DWG. NO. FIGURE10.DWG
DESIGNED BY D. GORMAN
DRAFTER K.TOMLIN
UPDATED MARCH 7, 2005
CONSTRUCTION AND MAINTENANCE ENTRANCE AND PARKING
N
100' 50' 0 100' 200'
SCALE: 1" = 200'
BASELINE
350' TYPICAL
W1
W2
W3
W4
W5
W6
W7
W8
W9
W10
W11
W12
W13
P1
P2
P3
P4
P5
P6
P8
P9
P10
P11
P12
BF
BCF
C
DENSE TREES
TREES & BRUSH