

Revised Conceptual Compensatory Wetland Mitigation Plan for the Mill Creek Industrial Park (Salem Regional Employment Center)

Prepared for

Oregon Department of Administrative Services

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Compensatory Wetland Mitigation Summary Sheet

Explanatory Statement

The Mill Creek Industrial Park (hereinafter referred to as the Salem Regional Employment Center (SREC)) Master Plan may incur up to 20.71 acres of impacts to wetlands and other waters that are regulated by DSL and up to 15.05 acres of impacts to wetlands and other waters regulated by USACE. One integrated permitting package, containing the Joint Permit Application (JPA) and the Compensatory Wetland Mitigation (CWM) Plan, was prepared for ease of filing permit applications. The JPA and CWM Plan show mitigation that will satisfy the DSL requirements of 20.71 wetland mitigation credits. For the USACE permit, DAS is committed to providing the required 15.05 wetland mitigation credits.

Section 3.2 of this CWM Plan describes the phasing of the industrial/commercial development and of the mitigation plan. The USACE permitting requirements are expected to be satisfied within the implementation of Phase 2 of the wetland mitigation, as shown on Tables 5 and 5a.

In addition, mitigation for construction of Phases 1B and 1C includes 25 percent more credits than actually required, to offset a temporal loss of wetlands. The remaining mitigation includes 20 percent more credits than required, as a contingency against the possibility of some areas not meeting the performance standards. If all the mitigation is successful after the required monitoring period, the State of Oregon requests that the extra 20 percent, or portion thereof which is successful beyond the minimum requirement, be credited back to the State/City to meet future wetland mitigation needs.

Summary

Credits needed, DSL: 10.72 (wetlands impacts) + 9.99 (waters impacts) = 20.71

Credits to be provided, DSL: 28.69 (this includes 7.98 “extra” credits, above the required amount)

Credits needed, USACE: 4.04 (wetlands impacts) + 11.01 (waters impacts) = 15.05

Credits to be provided, USACE: 18.08 (this includes 3.03 acres of “extra” credit, above the required amount)

Table 5. Phasing and Amount of Wetland Mitigation Provided for DSL Permit

Central CWM Area (north) – Phase 1			
Future Condition	Acres	Ratio	Credits
Restored	4.46	1:1	4.46
Created	1.27	1:1.5	0.85
Enhanced	0.99	1:3	0.33
Enhanced, cropped	0	1:2	0
Mitigation for Impacts to Waters	3.68	1:1	3.68
Total	10.40		9.32

Southern CWM Area- Phase 2			
Future Condition	Acres	Ratio	Credits
Restored	0	1:1	0
Created	0	1:1.5	0
Enhanced	0	1:3	0
Enhanced, cropped	5.86	1:2	2.93
Mitigation for Impacts to Waters	8.99	1:1	8.99
Total	14.85		11.92

Central CWM Area (south) – Phase 3			
Future Condition	Acres	Ratio	Credits
Restored	0	1:1	0
Created	3.14	1:1.5	2.09
Enhanced	11.05	1:3	3.68
Enhanced, cropped	0	1:2	0
Mitigation for Impacts to Waters	1.68	1:1	1.68
Total	15.87		7.46

Total-All Mitigation Phases			
Future Condition	Acres	Ratio	Credits
Restored	4.46	1:1	4.46
Created	4.41	1:1.5	2.94
Enhanced	12.04	1:3	4.01
Enhanced, cropped	5.86	1:2	2.93
Mitigation for Impacts to Waters	14.35	1:1	14.35
Total	41.12		28.69

Table 5a. Phasing and Amount of Wetland Mitigation Provided for USACE Permit

Central CWM Area (north) – Phase 1			
Future Condition	Acres	Ratio	Credits
Restored	4.46	1:1	4.46
Created	1.27	1:1.5	0.85
Enhanced	0.99	1:3	0.33
Enhanced, cropped	0	1:2	0
Mitigation for Impacts to Waters	3.68	1:1	3.68
Total	10.40		9.32

Southern CWM Area- Phase 2			
Future Condition	Acres	Ratio	Credits
Restored	0	1:1	0
Created	0	1:1.5	0
Enhanced	0	1:3	0
Enhanced, cropped	0.90	1:2	0.45
Mitigation for Impacts to Waters	8.31	1:1	8.31
Total	9.21		8.76

Total-All Mitigation Phases			
Future Condition	Acres	Ratio	Credits
Restored	4.46	1:1	4.46
Created	1.27	1:1.5	0.85
Enhanced	0.99	1:3	0.33
Enhanced, cropped	0.90	1:2	0.45
Mitigation for Impacts to Waters	11.99	1:1	11.99
Total	19.61		18.08

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INTRODUCTION

The Compensatory Wetland Mitigation (CWM) for the Mill Creek Industrial Park (hereinafter referred to as Salem Regional Employment Center (SREC)) development is within the two areas shown on the master plan development site as: the central open space and the southern open space. The two on-site mitigation areas are located south of Aumsville Highway and north of Turner Road, in Salem, Marion County, Oregon, T8S, R2W, Section 8 (see Location Map, Figure 1). Activities proposed at the mitigation sites are designed to meet the requirements of Removal-Fill regulations, as required by the Oregon Department of State Lands (DSL) and Section 404 of the Clean Water Act for the U.S. Army Corps of Engineers (USACE).

The project site is located within two different watersheds separated by Aumsville Highway. Areas north of Aumsville Highway, including Parcel 1B and a small portion of Parcel 1C, drain to the Little Pudding River. Areas south of Aumsville Highway are in the Mill Creek Watershed. Onsite runoff flows overland to one of several ditches. The ditches drain to one of four site discharge locations.

This CWM Plan is organized to address each item required in OAR 141-085-0141. Each subsection contains one of those requirements. The italicized text is taken directly from OAR 141-085-0141.

The site area is mostly open fields that have been farmed for many years. Mill Creek lies southwest of the site. The site is primarily agricultural fields crossed by drainage ditches, and contains an animal waste pond. Recently, the fields have been farmed for a variety of crops.

1. COMPENSATORY WETLAND MITIGATION SITE INFORMATION

1.1 AREA

OAR Requirement: Area (size) of the CWM wetland proposed for impact relative to the total area of the wetland.

The total area of jurisdictional wetlands for the project site is approximately 35.16 acres (DSL) or 28.41 acres (USACE), with up to 10.72 acres of wetland impacted (DSL) or 4.04 acres impacted (USACE), as shown on Figure 2, Proposed Wetland Impacts. The following wetlands may potentially be filled: YY1, ZZT1, ZZT2A, ZZT2B, ZZT3, ZZT4A, ZZT4B, ZZT4C, ZZT6, a portion of A/D, BB, DD, F, J, KK, LL, UU, VV, WL1, WL2, WL3, WL4, and WL5. (A Removal/Fill permit has been filed for the impacts to all the ZZ wetlands, Wetland YY1, and Wetland J, DSL #33682FP; and a Nationwide 39 permit for Wetland J, USACE #200400803.) The site also contains 9.99 acres of other waters regulated by DSL and 11.01 acres regulated by USACE; these waters consist of ditches or tributary streams and an animal waste pond. Many of the ditches are proposed for filling or regrading as bioswales. For purposes of calculating mitigation credits, we have assumed that all the jurisdictional waters will be impacted. Appendix A contains a revised table from the Wetland Delineation report showing the areas of each wetland, and the report figures showing the locations of wetlands and waters.

Depending on the final layout of each parcel, it is possible that the actual impacts may be less than those estimated here.

The two CWM sites encompass approximately 41.12 acres within the open space areas. The existing wetlands within the CWM total approximately 24.55 acres (DSL) or 24.33 acres (USACE) (see Appendix A). The CWM sites receive direct precipitation and overland runoff, which currently sheet flows toward the west and north, where it enters the drainage/irrigation ditch system and is eventually directed off-site to Mill Creek. Overland runoff comes from within the site and from offsite properties to the east. Topography is very flat with a general slope to the west in a series of gradual sloping terraces. Wetland hydrology characteristics include ponding, saturation to the surface, oxidized rhizospheres, drainage patterns, sediment deposits and algal mats. Many of the fields have been drained by subsurface drain tiles. In addition, many of the fields and wetlands are irrigated in the growing season. Some of the existing wetland areas are up to 100 percent bare ground. Where vegetation is present, it consists primarily of a perennial ryegrass crop and English plantain. Recently, the fields have been farmed for a variety of crops. Both hydric and non-hydric soils are present. The soils have been manipulated for many decades for agricultural purposes, which have made them subject to erosion, tilling, and grazing over the years.

The CWM in the Central Open Space (Central CWM) contains wetlands that are characterized by ponded water. When vegetation is present it is dominated by *Juncus effusus*, *Alopecurus pratensis*, *Geranium molle*, *Cirsium vulgare*, *Poa annua* and *Avena sativa*. Approximately 16.08 (DSL) or 15.86 (USACE) acres of existing wetlands are present within the Central CWM. The CWM in the South Open Space (South CWM) contains wetlands that are characterized by ponded water; when vegetation is present it is dominated by *Poa annua* and *Avena sativa*. Approximately 8.47 acres of existing wetlands (both DSL and USACE) are present within the South CWM.

1.2 CWM SITE OWNERSHIP

OAR Requirement: *CWM site ownership information (name, address, phone). If this is different from the applicant, copies of legal agreements granting permission to conduct the CWM and willingness of the property owner to provide long-term protection are required.*

The owner of the CWM site is the State of Oregon, and the Oregon Department of Administrative Services – Facilities Division manages the site. The contact at the Oregon Department of Administrative Services is:

John H. Wales, RPS Manager
1225 Ferry St. SE U100
Salem, OR 97301-4281
Phone (503) 378-2865, X251
Fax (503) 373-7210

The Department of Administrative Services (DAS) will take responsibility for ensuring long-term commitment to this wetland mitigation plan. Once the CWM is constructed, the City of Salem will maintain the sites for DAS. Following the successful completion of the monitoring period, ownership of the open space areas will be transferred to the City and become a City of Salem public open space. The contact at the City of Salem is:

Patricia Farrell, Natural Resource Specialist
City of Salem, Public Works Department
555 Liberty Street SE
Salem, OR 97301-3503
pfarrell@cityofsalem.net
Phone (503) 588-6211

1.3 CWM SITE LOCATION

OAR Requirement: *Location (Township, Range, Quarter Section and tax lot(s)) and a USGS or similar map showing the CWM site location relative to the impact site.*

The CWM sites are located in T8S, R2W, Section 8. See Figure 1 for the location of the CWM sites, and Figure 4 in the Conceptual Master Plan (Otak et al. 2004) document for the CWM sites in relation to the location of the impact sites. The CWM sites are located on two parcels within the overall project site. The Central CWM is located south of Aumsville Highway, in the area currently surrounding Ditches 3 and 4, in the central portion of the SREC. The Southern CWM is located south of the Central CWM, in the area currently occupied by Ditch 7, between the current location of Ditch 6 and Turner Road.

2. EXISTING PHYSICAL AND BIOLOGICAL BASELINE INFORMATION OF CWM SITE

2.1 WETLAND DETERMINATION

OAR Requirement: *A wetland determination/delineation report (OAR 141-090).*

Two wetland delineation reports were prepared by Parametrix (September 2003 and July 2004) for several wetland areas at the Salem Regional Employment center. The delineation reports have been reviewed by both DSL and USACE (DSL Det #03-0262, #03-0675 and USACE #200400803). These reports included a wetland delineation completed for a portion of the property in 2000 by Entranco. The summary table and figures are included as Appendix A. The CWM sites are located within the areas described in those reports as the South Field. The Central CWM includes wetlands H, I, P, SS, TT, and part of A/D. The Southern CWM includes wetlands MM and GG.

2.2 FUNCTIONAL ASSESSMENT

OAR Requirement: *A functional assessment of any existing wetlands at the CWM site, proposed for enhancement or other alteration, including a description of the factors leading to the degraded condition of the site (OAR 141-085-0121).*

The Reference-based Method of the Hydrogeomorphic (HGM) Wetland Evaluation Method was used to assess the functions at both the impact sites and the mitigation sites (Table 1). The mitigation sites were assessed for current and future conditions. See the Parametrix Delineation Report and Section 3.6, Proposed HGM and Cowardin Classification in this report. The assessment shows an improvement in future conditions at the CWM for the following wetland functions:

- Water Storage & Delay
- Sediment Stabilization & Phosphorus Retention
- Nitrogen Removal
- Primary Production
- Invertebrate Habitat Support
- Wintering & Migrating Waterbird Support
- Songbird Habitat Support
- Support of Characteristic Vegetation

The site has been farmed for over 50 years. Degradation of the mitigation site and its surroundings occurred from normal farming practices (tilling, plowing, spraying) and alteration of hydrology (drain tiles, ditching).

Hydrogeomorphic Methodology. The existing habitat was assessed to evaluate the functional capacity of the current wetland system. Data were recorded for each parameter in the Reference-based Method, and the functional capacities calculated. There are 10 possible functions that may occur within the riparian/wetland area, as Thermoregulation, Anadromous Fish Habitat Support and Resident Fish Habitat Support are not described since they only apply to HGM Riverine wetlands.

Table 1 shows the functional capacity for wetlands compared to the least altered reference site (LAR) according to the HGM methodology developed by the DSL. LAR wetlands are reference wetlands that are chosen because they are among the least altered wetlands in the Willamette Valley ecoregion. LAR wetlands are used as baselines to which future wetlands can be compared, thus an assessment can be made of the wetlands functions and values.

The assessment shows that the existing wetlands on the CWM sites have the full range of functional capacities from low to high. The highest scoring functions are for Sediment Stabilization and Phosphorus Retention and Wintering and Migratory Waterbird Support. During the site visits, large flocks of geese were present in the project area. Breeding waterbird support received a score of zero, as permanent water greater than 10 feet wide does not persist through July 1. The use of the site for pasture and cultivated cropland, the surrounding land uses, and the lack of habitat complexity are the main factors that have reduced the functional capacity of the site.

Table 1. HGM Calculation For The South Field*

Calculated Function Capacity for SF sites	
Function:	Current CWM wetlands as compared to LAR:
Water Storage & Delay (ws)	0.06
Sediment Stabilization & Phosphorus Retention (sp)	0.67
Nitrogen Removal (n)	0.42
Primary Production (pp)	0.25
Invertebrate Habitat Support (i)	0.20
Amphibian & Turtle Habitat (at)	0.37
Breeding Waterbird Support (bw)	0.97
Wintering & Migrating Waterbird Support (ww)	0.72
Songbird Habitat Support (sb)	0.39
Support of Characteristic Vegetation (v)	0.16

*The South Field is the location of the CWM sites.

2.3 PLANT COMMUNITIES

OAD Requirement: *A description of the major plant communities and their relative distribution, including the abundance of exotic species.*

The majority of the wetlands within the mitigation areas are non-vegetated or vegetated with remnant row crops. Where vegetation is present, it consists primarily of a perennial ryegrass crop and English plantain. However, *Poa palustris*, *Poa annua*, and *Juncus effusus* are present within some of the wetlands. There are no forest or scrub-shrub species present. Dominant species in the Central CWM include *Alopecurus pratensis*, *Geranium molle*, *Cirsium vulgare*, *Poa annua* and *Avena sativa*. Dominant species in the Southern CWM include *Poa annua* and *Avena sativa*.

2.4 WATER SOURCE

OAD Requirement: *A general description of water source, duration, frequency of inundation or saturation, depth of surface or subsurface water and approximate location of all water features (wetlands, streams, lakes) within 500 feet of the CWM site.*

The water sources for the wetlands within the project area are overland flow and direct precipitation. The wetlands are seasonally inundated and saturated, with the water level generally rising in winter and spring and falling in summer, however irrigation artificially contributes hydrology to many of the wetlands in the growing season. Based on field work and the results of several groundwater monitoring wells, hydrology is often found in the upper 16 inches of the soil profile. The existing irrigation ditch system relies on a dam on Mill Creek that allows water to be backed-up into the ditches in the summer and pumped out for irrigation. At some points in the ditch system, surface water may overflow into adjacent wetlands (Wetland I).

In March and April 2004, the soil within the wetlands was saturated between 0 to 12 inches of the surface. The wetlands drain off-site through a series of ditches, gravel ponds, or an unnamed channel into Mill Creek. Figure 6 Revised in the Addendum to the Wetland Delineation shows all wetlands and ditches, including the proximity of all wetlands and other waters within 500 feet of the CWM sites (Appendix A).

2.5 HGM AND COWARDIN CLASSIFICATION

OAR Requirement: *HGM and Cowardin classification of any wetlands present within the CWM site.*

All wetlands within the CWM sites are in the HGM Flats class. They are fed by overland flow and direct precipitation. Water movement within the site is primarily vertical (i.e., seasonal fluctuations in depth). The Cowardin classification of all wetlands within the CWM sites is palustrine, emergent, seasonally flooded (PEMC).

2.6 OTHER WATERS

Ditches or tributary waters and an animal waste pond constitute the other waters present on the site. Approximately 9.99 acres of other waters are regulated by DSL, and 11.01 acres by USACE. These areas include a 5.86-acre animal waste pond.

The ditches vary in width from about 3 to 25 feet, and in length from about 980 to 4,020 feet. The ditches are currently used for irrigation. They are generally sparsely vegetated with a combination of upland and wetland non-native herbaceous species, such as *Poa annua*, *Trifolium repens*, *Geranium molle*, *Agrostis stolonifera*, *Echinochloa crus-galli*, *Holcus lanatus*, *Crepis setosa*, and *Festuca arundinacea*. Occasional native plants, including *Juncus effusus* and *Epilobium watsonii* are also present. Soil pits were dug at four sample points and varied between hydric and non-hydric conditions.

Only Ditch 6 could be considered a “natural” drainage, and it has been severely altered by past agricultural practices. It originates in the hills to the east of the project site and is piped for a long distance under the Baptist College athletic fields.

3. CWM PLAN DESCRIPTION

3.1 CWM PLAN GOALS, OBJECTIVES AND SUCCESS CRITERIA

The CWM plan goals are:

- To provide at least 20.71 wetland mitigation credits (DSL) and 15.05 credits (USACE).
- To provide detention, infiltration, and flood storage capacity for treated stormwater
- To enhance wetland plant communities for wildlife habitat
- To increase sediment stabilization and phosphorus retention functions
- To reduce waterfowl habitat in the vicinity of the airport
- To provide habitat for *Sidalcea nelsoniana* and *Sidalcea campestris* (Nelson's checker mallow and meadow checker mallow)
- To provide passive recreation surrounding the CWM area.

The objectives for meeting each goal are:

- **To provide at least 20.71 wetland mitigation credits (DSL) and 15.05 (USACE).**
Providing restored, created, and enhanced emergent, scrub-shrub, and forested wetlands will attract a variety of birds and other wildlife to use the area for nesting and feeding. The structural diversity of the vegetation will provide a greater variety of habitats to attract a wider variety of fauna. Stormwater runoff will provide wetland hydrology; many of the mitigation areas currently exhibit wetland hydrology.
- **To provide detention, infiltration, and flood storage capacity for treated stormwater**
Detention and infiltration of stormwater will occur in the existing and created wetland areas. Flood storage capacity will also be increased through grading to increase water flow-through periods and infiltration. Detention and infiltration will be achieved through a combination of grading and use of rock weirs (or other material that allows water to filter through). Outflows from the Central CWM will be controlled at its outlet under Kuebler Road.
- **To enhance wetland plant communities for wildlife habitat**
By providing emergent, scrub-shrub, and forested vegetation, a variety of birds and other wildlife are expected to use the area for nesting and feeding. The structural diversity of the vegetation will provide a greater variety of habitats to attract a wider variety of fauna. It is anticipated that wildlife usage of the site will increase after construction, and as the site vegetation matures. It is assumed that if the wetland plant communities are thriving and meeting their success criteria, wildlife habitat will be enhanced. During annual monitoring, anecdotal observations of wildlife species will be noted and included in the annual report.
- **To increase sediment stabilization and phosphorus retention**
Planting native vegetation, grading the site to have very gentle slopes, and designing the low flow channels of the wetland mitigation areas with very gentle gradients will increase sediment stabilization and phosphorus retention by slowing down water movement, and increasing water storage.

- **To reduce waterfowl habitat in the vicinity of the airport**

Due to the location of the mitigation areas within the 10,000 foot buffer area of the Salem Airport, the Federal Aviation Administration (FAA) requirements discourage the creation of environments (such as open water) that will attract waterfowl. Therefore, areas of open water will be designed to be shallow, seasonally inundated, and planted with native emergent vegetation to discourage use by waterfowl.

- **To provide habitat for *Sidalcea nelsoniana* and *Sidalcea campestris***

An area adjacent to the Central CWM site will be set aside for planting approximately 200-250 each *Sidalcea nelsoniana* and *S. campestris*. This area consists of shallow ponding transitioning into upland and is expected to provide suitable habitat for the *Sidalcea*. The Planting Plan, Figure 4 identifies the area proposed for the plants. Oregon Department of Agriculture (ODA) recommends establishing 200-250 plants each of *S. nelsoniana* and *S. campestris*. This would be accomplished by a combination of transplanting wild-collected individuals with greenhouse grown plants. In addition, the planting would be supplemented with seeding of each *Sidalcea* species.

- **To provide passive recreation surrounding the CWM area**

A trail will be constructed surrounding the CWM area, allowing views into the area. If the trail enters the CWM in any area, it shall be boardwalk so as not to impact the functioning of the wetland.

The success criteria for each objective, to be measured at the end of the five-year monitoring period, are:

- **To provide at least 20.71 wetland mitigation credits (DSL) and 15.05 credits (USACE).**

Project will provide up to 11.82 acres of emergent, 18.30 acres of scrub-shrub, and 11.00 acres of forested wetland habitat, which will be monitored to ensure success rates of planted vegetation and hydrology.

- **To provide detention, infiltration, and flood storage capacity for treated stormwater**

Success criteria for detention will be measured by observations and monitoring of inundation in the wetlands area during the winter and following storm events.

- **To enhance wetland plant communities for wildlife habitat**

Success criteria for wildlife habitat are dependent on the establishment of diverse wetland plant communities. The wetlands will be dominated by native hydrophytic vegetation, with a combination of native emergent (EM), shrub (SS), and tree species (FO). There will be a minimum of 70 percent cover of emergent/herbaceous species within the EM areas, 50 percent cover of shrubs in the SS areas, and 30 percent cover of trees (Cowardin 1979) after five years in the FO areas. Within each wetland zone, no single species will account for more than 50 percent of the total species count. There will be a maximum coverage of 20 percent of non-native invasive plants.

- **To increase sediment stabilization and phosphorus retention**

Success criteria will be stable slopes with no evidence of rilling, erosion, or deposition, and establishment of herbaceous groundcover throughout the mitigation areas.

- **To reduce waterfowl habitat in the vicinity of the airport**

Success criteria will be measured by observations of size and depth of inundated areas in the spring and summer, the establishment of shrub and tree species within the wetland mitigation areas, and observations of waterfowl use of the sites.

- **To provide habitat for *Sidalcea nelsoniana* and *Sidalcea campestris***

Success criteria will be the survival of 150 individual plants of *Sidalcea nelsoniana* and 150 individual plants of *Sidalcea campestris*. The population will be stable or increasing beyond at least a demographic population (50-100 plants) at the CWM site that has long-term protections. In addition, the surrounding plant community must have primarily native composition and the site must have appropriate long-term management for the species.

3.2 MITIGATION CONCEPT

OAR Requirement: *The CWM concept in general terms including a description of how the plan, when implemented, will restore, reverse, minimize or control the causes of wetland degradation and ensure that the wetland functions of the impacted wetland are replaced.*

This project will create, restore, and enhance currently degraded wetland areas by establishing emergent, scrub-shrub and forested components. Mitigation for both the Central CWM and South CWM are similar in concept and are therefore treated as a single mitigation area for the purpose of describing the mitigation concept. Section 3.8 of this document provides further details on the plans for construction methods, planting plans, and the anticipated development and phasing schedule.

Mitigation wetlands will be established by modifying existing grade to create the desired hydrology. Created wetlands will remove between 0 and 4 feet of existing surface soils. Excavated grades will complement adjacent existing wetlands in order to extend hydrology into the created wetland areas. Excavated slopes up to adjacent uplands will typically be constructed at 4:1 (horizontal to vertical). Existing wetlands will be selectively regraded in order to receive seasonal overflow and support desired native plant communities. Grade elevations will vary slightly depending on the resultant wetland habitat. Microtopographic variations between 4 and 6 inches will be incorporated throughout. Although existing wetland that are targeted for enhancement will be avoided, temporary impacts may occur in order to ensure a successful mitigation project through activities such as removal of invasive species, refining of topography, and other similar tasks. These temporary impacts are requested as part of the fill application.

Hydrology will be expanded to include surface water inputs through shallow swales that meander through the mitigation areas. Select existing ditches (Figure 2) that previously shunted surface runoff through the site will be strategically relocated and reconfigured to retard retention time. Swale channels will typically be constructed with a 4- to 6-foot wide bottom and 4:1 side slopes coming up to adjoin the adjacent wetlands. The channels will meander slightly to retard flows and provide complexity. Swale configurations and adjacent wetland area elevations are designed to readily provide bank overflow up to a maximum of 2 feet of standing water onto the adjacent wetlands during high water events.

Once final grade is achieved, the mitigation areas will be planted with native species appropriate for the proposed habitat. A variety of wetland habitats will be established throughout the Central and south CWM in order to maximize wetland functions. Emergent, forested, scrub-shrub and shallow open water habitat will be established with species adapted to those habitats.

Following construction, an as-built report will document site conditions and any deviations from the mitigation plan. Adaptive management will be utilized throughout maintenance and monitoring to effectively react to changes the habitat will go through during establishment.

Surface Water Management. Impacts from future impervious surfaces will be reduced by treating stormwater through bioswales and pretreatment devices, and discharge of treated water to approved locations. More than 7 miles of vegetated swales will be created in the surface water management design. The following set of published stormwater management standards and guidelines were considered in developing the Stormwater Management Memorandum for SREC (Appendix B).

- City of Salem Public Works Department, Design Standards for Stormwater Management, 2002.
- Stormwater Management Agreement between City of Salem, Oregon, City of Keizer, Oregon, and Marion County, Oregon, October 2000.
- NMFS HCD Stormwater Online Guidance Document, March 2003. (National Marine Fisheries Service – Habitat Conservation Division)
- City of Portland, Bureau of Environmental Services (BES), Stormwater Management Manual, September 2000.

Plantings. In addition, in many areas an open space buffer will be established between the edge of the mitigation areas and the development. Resource areas (buffer and wetlands) will be protected through the clear demarcation of boundaries (through berms, trails, grading, landscape treatment, etc.) and management of these areas will be by the City of Salem.

Wetland functions will be achieved by creating a wetland complex for a variety of wildlife, including birds, amphibians and small mammals. Excavation and grading of the wetlands will increase water flow-through times, allowing for sediment stabilization and phosphorus retention. Excavation and grading will also increase flood control for areas downstream. Areas likely to contain seasonal standing water will be shallow, planted with emergent vegetation, and surrounded by scrub shrub vegetation to discourage use by waterfowl such as geese.

The vegetation zones proposed for this project are:

- Emergent wetland (11.82 acres)
- Scrub-shrub wetland (18.30 acres)
- Forested wetland (11.00 acres)

In addition, there may be upland plants installed in the open space area surrounding the CWM sites as an upland buffer and passive recreational area. The following plant lists show the species selected for each wetland zone. Final plant lists and specifications will be developed in the construction documents for the CWM areas and may vary, depending on availability and cost.

Table 2. Emergent Wetland Plant List (to be a combination of seeds, bulbs, and plugs, depending on availability)

Common Name	Botanical Name
EMERGENTS	
nodding beggar's tick	<i>Bidens cernua</i>
camas	<i>Camassia quamash</i>
saw-beaked sedge	<i>Carex stipata</i>
tufted hairgrass	<i>Deschampsia caespitosa</i>
ovate spikerush	<i>Eleocharis obtusa</i> var. <i>ovata</i>
common spikerush	<i>Eleocharis palustris</i>
meadow barley	<i>Hordeum brachyantherum</i>
slender rush	<i>Juncus tenuis</i>
dagger-leaf rush	<i>Juncus ensifolius</i>
rice cutgrass	<i>Leersia oryzoides</i>
small-fruited bulrush	<i>Scirpus microcarpus</i>

Table 3. Scrub-Shrub Wetland Plant List

Common Name	Botanical Name
SHRUBS: Shrubs and stakes to be installed at a density of 3 feet on center	
red osier dogwood	<i>Cornus sericea</i>
nootka rose	<i>Rosa nutkana</i>
swamp rose	<i>Rosa pisocarpa</i>
Pacific, Scouler and Sitka willow – combination of containers and stakes	<i>Salix lucida</i> ssp. <i>lasiandra</i> , <i>scouleriana</i> , and <i>sitchensis</i>
black hawthorn	<i>Crataegus douglasii</i>
Pacific crabapple	<i>Malus fusca</i>
black twinberry	<i>Lonicera involucrata</i>
Pacific ninebark	<i>Physocarpus capitatus</i>
Douglas spiraea	<i>Spiraea douglasii</i>
SEEDS: to be applied at 30-35 lb/acre	
Alaska brome	<i>Bromus sitchensis</i>
tufted hairgrass	<i>Deschampsia cespitosa</i>
slender hairgrass	<i>Deschampsia elongata</i>
miniature lupine	<i>Lupinus bicolor</i>
blue-eyed grass	<i>Sisyrinchium idahoense</i>

Table 4. Forested Wetland Plant List

Common Name	Botanical Name
TREES: to be planted at a density of 10 feet on center (approx. 435 per acre)	
red alder	<i>Alnus rubra</i>
Oregon ash	<i>Fraxinus latifolia</i>
black cottonwood	<i>Populus balsamifera</i>
SHRUBS: to be planted at a density of 6-8 feet on center (approx. 945 per acre)	
black hawthorn	<i>Crataegus douglasii</i>
black twinberry	<i>Lonicera involucrata</i>
nootka rose	<i>Rosa nutkana</i>
SEEDS: to be applied at 30-35 lb/acre	
Alaska brome	<i>Bromus sitchensis</i>
tufted hairgrass	<i>Deschampsia cespitosa</i>
slender hairgrass	<i>Deschampsia elongata</i>
dagger-leaf rush	<i>Juncus ensifolius</i>

Construction Phasing. Construction of the mitigation project will be in three phases, based on development construction and funding availability. Phase 1 will be in the northern section of the Central CWM and will include the mitigation for Parcels 1A north, 1B, and 1C. Phase 1 will be constructed concurrently with the development of Parcel 1A north. Phase 2 will be the Southern CWM and will include the mitigation for wetlands impacted in Parcel 1A south. Phase 3 will be the southern portion of the Central CWM and will be for the wetland impacts in Parcel 2A development. The two phases of mitigation within the central CWM may be separated by a design feature. This will allow for greater ease of construction and monitoring. Figure 3 shows the conceptual layout of the phasing and different types of mitigation.

Table 5 shows the amount of created, enhanced and restored wetlands the CWM sites will provide as mitigation for impacts to wetlands and waters.

Table 5. Phasing and Amount of Wetland Mitigation Provided

Central CWM Area (north) – Phase 1			
Future Condition	Acres	Ratio	Credits
Restored	4.46	1:1	4.46
Created	1.27	1:1.5	0.85
Enhanced	0.99	1:3	0.33
Enhanced, cropped	0	1:2	0
Mitigation for Impacts to Waters	3.68	1:1	3.68
Total	10.40		9.32
Southern CWM Area- Phase 2			
Future Condition	Acres	Ratio	Credits
Restored	0	1:1	0
Created	0	1:1.5	0
Enhanced	0	1:3	0
Enhanced, cropped	5.86	1:2	2.93
Mitigation for Impacts to Waters	8.99	1:1	8.99
Total	14.85		11.92
Central CWM Area (south) – Phase 3			
Future Condition	Acres	Ratio	Credits
Restored	0	1:1	0
Created	3.14	1:1.5	2.09
Enhanced	11.05	1:3	3.68
Enhanced, cropped	0	1:2	0
Mitigation for Impacts to Waters	1.68	1:1	1.68
Total	15.87		7.46
Total-All Mitigation Phases			
Future Condition	Acres	Ratio	Credits
Restored	4.46	1:1	4.46
Created	4.41	1:1.5	2.94
Enhanced	12.04	1:3	4.01
Enhanced, cropped	5.86	1:2	2.93
Mitigation for Impacts to Waters	14.35	1:1	14.35
Total	41.12		28.69¹

¹ Includes 25% more than required for Parcels IB/IC south to offset temporal loss and 20% more for contingency for other parcels. Up to 7.28 credits may be credited back to applicant if all mitigation is successful.

Mitigation Credits. The calculation of the restoration area is based on hydric soils mapped by the Marion County Soil Survey. The calculation of credits is based on the ratios as indicated in Table 5. The calculations include the impacts to other waters, ditches and tributary waters. The mitigation for impacts to these features is calculated at a 1:1 ratio. For wetland impacts in Parcels 1B and 1C south, the mitigation will be increased by 25 percent over that required to compensate for the temporal loss of wetlands. A separate wetland permit was submitted to the agencies for these parcels (DSL reference number 33682FP and COE project number 200400803) and it is anticipated that the development of parcels 1B and 1C west will take place before the first phase of mitigation is constructed. It is anticipated that Phase 1 mitigation in the Central CWM will be constructed when Parcel 1A north is developed.

Mitigation Extra Credits. For all other wetland impacts (besides parcels 1B and 1C), the mitigation is increased by 20 percent over that required as a contingency, in case a portion of the required mitigation is not successful. If all the mitigation is successful after the required monitoring period, the State of Oregon requests that the extra 20 percent, or portion thereof which is successful beyond the minimum requirement, be credited back to the State/City to meet future wetland mitigation needs.

Permit Period. Because the entire site will not be developed within five years from the time this permit has been obtained, the State requests that the permit period be extended to the maximum allowable by each agency to allow for the CWM sites to be concurrent with the development of each phase. Site plans are not available for the industrial development, and timing of impacts is currently unknown. Individual site plans will be designed by individual developers and approved by the City of Salem. Fill will not be placed until a specific development is proposed and approved for a parcel.

3.3 RATIONALE FOR SITE SELECTION

OAD Requirement: *A description of the rationale for the CWM site selection.*

The CWM sites were chosen because of their locations within the SREC site, allowing for on-site mitigation. The CWM sites contain existing wetlands, ditches and hydric soil allowing for wetland restoration, enhancement and creation. It is likely that historical wetlands existed in these areas based on topography and soil mapping. The location increases the probability of success. In addition, the wetlands will serve for detention and infiltration of treated stormwater from the development. The mitigation areas and their adjacent buffers will also provide an open space network through the site. Pedestrian and bicycle paths and educational signage may be placed in the buffer areas of the open space.

During project surveys and open houses it was recommended that the mitigation areas be kept on-site, rather than going to a wetland mitigation bank. The increased storage and detention capacity of the wetlands also addresses the flooding concerns of downstream residents. Thus, the selection of the CWM site serves many functions.

3.4 PROPOSED WATER SOURCE

OAD Requirement: *Proposed water source, duration, frequency of inundation or saturation of the CWM project.*

The proposed water sources will be direct precipitation and treated stormwater runoff. After pretreatment, the stormwater runoff from new development will be treated through a series of biofiltration swales adjacent to the new roadways. At various points along the bioswales, after required treatment, the stormwater will be discharged to the mitigation sites. The water will flow slowly through the sites with an average gradient of 0.5 percent. A low flow channel with rock weirs (or other material that allows water to filter through) will be constructed

directing the water to the outflow for each of the two CWM areas. A log weir or undersized culvert will be placed at the outlet of the Central CWM to further slow the water. It is anticipated that the sites will be shallowly inundated and/or saturated through the growing season, drying out in late summer. Grading of the sites will be “bumpy” to encourage small areas of shallow seasonal inundation. Flooding will be controlled by excavation within the CWM areas. Grading of the CWM areas is being coordinated with stormwater management design so that sufficient hydrology will be supplied, but these areas will not be inundated by deep water for extended periods. The maximum depth is estimated at 2 feet during lesser flood events, and up to 3 feet for the 100-year event. It is anticipated that treated stormwater will be discharged to the Southern CWM at two outfall locations, and to the Central CWM at four outfalls (See Surface Water Management Memorandum for more detail.).

It is assumed that all the ditches will be impacted during the development of the SREC. Table 6 describes the preliminary plans for each ditch on the site. Since construction plans are not complete, this information is subject to change. Note that Ditch 1 is in the ODOT right-of-way and not part of the project. Also note that although originally identified as a ditch, Ditch 2 did not exist.

Table 6. Preliminary Plans for Ditches and other Waters

Ditch	Likely Permanent Impacts?	Preliminary Plans
Ditch 3	Y	planned to be filled
Ditch 4	Y	likely to be filled
Ditch 5	N	likely to be regraded and designed to direct flood flows and possibly for continued use as an irrigation ditch
Ditch 6	N	downstream portion planned to be regraded and shaped in its current alignment to provide for shallower water depths and flatter side slopes; upstream portion, east of the South Open Space will be split between Central CWM and ditch along Deer Park Road.
Ditch 7	Y	planned to be filled
Ditch 8	Y	planned to be filled
Ditch 9	Y	planned to be filled
Ditch 10	Y	May be avoided, but possibly will be filled.
Agricultural Waste Pond	Y	planned to be filled

Stormwater quality treatment facilities will be designed to capture and treat approximately 90 percent of the annual runoff volume. Treatment facilities will also be designed to treat the peak flow from a 24-hour storm event, which constitutes 90 percent of precipitation in Salem. Stormwater quality pre-treatment facilities may include sedimentation manholes, hydrodynamic separators, and oil/water separators. Once runoff is routed through a pre-treatment facility, it will go to a basic treatment facility that may include vegetated swales, sand filters, and other media filtration devices. Stormwater will then be discharged to the CWM after receiving both pre-treatment and basic treatment.

3.5 SITE CONSTRAINTS

OAD Requirement: *Any known CWM site constraints or limitations.*

Site constraints or limitations include the presence of cobbles in some areas, which may make it difficult to excavate the soils. In addition, although its existence has not been verified, it has been hypothesized that an aquitard exists on the site, and may create a perched water table. If an

aquitard is present, it will be important not to disturb this clay layer during excavation. This may need to be verified by additional geotechnical studies during the preparation of construction documents.

3.6 PROPOSED HGM AND COWARDIN CLASSIFICATION

OAR Requirement: *Proposed HGM and Cowardin classification.*

The proposed HGM classification will change, since the source of the hydrology and general flow pattern will be altered. The sites will be Depressional Outflow. The Cowardin classification within the CWM will become palustrine emergent, scrub-shrub, and forested seasonally flooded (PEM/SS/FOC).

OAR Requirement: *Proposed net losses and gains of wetland functions.*

Since the design of the two sites is very similar, it is anticipated that the functional capacity will be the same. The CWM sites are anticipated to increase the following functions, due primarily to the excavation and creation of a complex vegetative structure as shown on the HGM functional assessment (See Table 7):

- Water storage and delay – excavation will delay water discharge and increase flood storage in the future.
- Sediment stabilization and phosphorus retention – the detention of water will increase the ability for phosphorus to be retained on-site and for sediments in the water to settle out.
- Nitrogen removal – increased vegetation will contribute dead wood and leaves, increase soil organic layer, and increase soil microbial processes
- Primary production – the variety of plant forms will increase to include trees, shrubs, and herbs.
- Invertebrate habitat support – vegetative cover will increase, be abundant, and include emergents, shrubs, and trees.
- Songbird habitat support – there will be a greater variety in types of vegetation and under-canopy shrub cover, plants will cover a large portion of the site, and invasive species will be managed.
- Characteristic vegetation – there will be a greater variety of native species of trees, shrubs, and herbs, and invasive species will be controlled.
- Rare Plant Habitat – approximately 200 to 250 plants each of *Sidalcea nelsoniana* and *Sidalcea campestris* will be planted in an area of the central CWM. (See 3.1 for more information)

Two of the functions will decrease, due primarily to the decrease in permanent open water. Decreases in the following functions are anticipated at the CWM site, as shown in the HGM functional assessment:

- Amphibian and turtle habitat – there will be a decrease in open water on the site. (However, these wetlands could provide habitat for red-legged frog and other amphibians.)
- Breeding waterbird support – there will be a decrease in open grassland and ditches on the site and within the CWM areas. Due to the proximity of the Salem Airport, the FAA recommends that sites not be designed to attract waterfowl.

Table 7. Change in HGM Assessment for future CWM Sites

Function:	South Field Future Compared to LAR:	Change from existing Compared to LAR:
Water Storage & Delay (ws)	1.0	0.94
Sediment Stabilization & Phosphorus Retention (sp)	1.0	0.35
Nitrogen Removal (n)	0.43	0.01
Primary Production (pp)	0.67	0.42
Invertebrate Habitat Support (i)	0.51	0.31
Amphibian & Turtle Habitat (at)	0.30	-0.07
Breeding Waterbird Support (bw)	0.85	-0.12
Wintering & Migrating Waterbird Support (ww)	0.98	0.26
Songbird Habitat Support (sb)	0.44	0.05
Support of Characteristic Vegetation (v)	0.88	0.72

3.7 MAINTENANCE

OAR Requirement: *A description of how the applicant will maintain and protect the direct CWM site beyond the monitoring period.*

While it is planned that the CWM project will be self-sustaining after the monitoring period, the applicant realizes that some ongoing management will be necessary. Following planting and seeding, temporary irrigation will be set up for the first two years to increase survival. Following the completion and approval of the mitigation areas by the agencies, the City of Salem will assume responsibility for the management of the mitigation sites. The City will provide rough mowing, weed control activities, rodent protection and irrigation of buffer plantings when necessary. Weed control may consist of mechanical removal of invasive species, occasional chemical application of an herbicide approved for use near water, and planting of a suitable species in place of the invasives. After the monitoring period, weed control activities will occur as needed.

3.8 PLANS

The attached plans (Figures 3- 5) show the following information:

OAR Requirement: *Scaled site plan showing CWM project boundaries. (Figure 4)*

OAR Requirement: *Scaled grading plan with existing and proposed contours and cross section locations. (Figures 2, 2a, 5, and 6)*

OAR Requirement: *Description of construction methods (access, equipment).*

Access to the CWM sites for construction will be dependent on the phasing of the development and construction of new internal access roads. The site currently has several unimproved roads that may be used for construction access if the new roads are not in place at the time of mitigation construction. Three new roads are proposed: A new east/west road between Kuebler Boulevard and Deer Park Road; a north/south road connecting to Aumsville Highway; and a north/south road connecting to Turner Road. Building of the new roads will be the responsibility of the developers. Typical construction equipment will be used for clearing and grubbing, and for grading, including excavators, trackhoes, and backhoes. Excavation will generally proceed from the lowest elevations, moving back as work

proceeds. Dump trucks will be used to transport the excavated material, some of which will be used in construction on other parts of the site. Topsoil will be stockpiled and applied to the site after excavation.

Hand tools, such as shovels, will be used to install the plant materials. Rebar or mechanical augers will be used to make pilot holes where installing cuttings and dibbles may be used for installing plugs or bareroot plants. For areas likely to be underwater soon after construction, any seed to be planted will be applied using drill seeding. For areas likely to stay above water soon after construction, the soil will be scarified before seed is applied so that the surface is rough, and seed will most likely be hydro-seeded. For the low flow channels graded into the wetlands, coir fabric may be laid and attached with wooden stakes

For areas not being graded, the existing vegetation will be scalped from a two-foot square area at each planting location, and the shrubs and trees installed. A weed-blocking material (such as newspaper or a fabric) will be placed around new trees and shrubs and the area mulched. The stems of new trees and shrubs will also be wrapped with some type of browse protection (such as plastic tubing) or fenced.

OAR Requirement: *Schematic of any proposed hydrological structures.*

Figure 5 contains a schematic of a log weir that may be used at the outfall from the Central CWM and rock weirs may also be used throughout the drainage ways in the CWM sites to slow down water. The weirs within the drainage ways are to be constructed of rock or other material that allows water to filter through. In addition, there will be multiple stormwater outfalls into the open space areas. The outfalls will follow the City of Salem standards with a riprap pad at the pipe outfall. The outfalls and riprap pad will not be located within the wetland boundary. No pumping will be required to supply wetland hydrology on the mitigation site.

OAR Requirement: *Scaled cross sections showing elevations and distance.*

Figure 2a shows existing and proposed cross sections of the mitigation site. Figure 2 shows the locations of these cross-section. Figure 5 shows cross sections of each of the two portions of the proposed wetland mitigation site in greater detail with plantings. Figure 6 shows locations of these cross sections.

OAR Requirement: *Planting plan (with species, size, number, spacing and installation methods).*

Figure 4 shows the conceptual planting plan, and tables 2 through 4 show the proposed plant lists and spacing. Detailed planting plans will be developed as construction documents prior to construction. The plans will show areas of seeding, seeding rates, typical planting densities and compositions, irrigation and details, as well as specifications for materials and construction. Preparation of the construction documents will be the responsibility of the City.

OAR Requirement: *Monitoring plan (schedule, timetable, methods).*

See Section 4.0 of this CWM Plan.

OAR Requirement: *Contingency plan for CWM failures.*

See Section 5.0 of this CWM Plan.

OAR Requirement: *Implementation schedule and construction sequence.*

Construction and sequencing of the mitigation project will be phased, and is dependent on the development construction to a large degree. Due to financial constraints, it is anticipated that there will be a lag time of at least two years between the first phases of development and the beginning of wetland construction. The site will be developed as an Urban Renewal Area and

tax increment financing from the development is necessary to help finance the mitigation construction. Table 8 shows the anticipated development schedule.

Table 8. Anticipated Development Schedule

Construction Activity	Anticipated Schedule	Associated Actions
Parcel 1B or 1C development	Fall 2006 - 2008	Dependent on City zoning and Comprehensive Plan changes; suitable developer
Sewer and water line extension	2007	
Preparation of wetland mitigation construction documents	2006	Possible RFQ
Aumsville Highway widening	2007-2008	
Parcel 1A North development	To be determined	
Phase 1 Central CWM construction (north)	Concurrent with Parcel 1A north development	Requires flow control at culvert under Kuebler Blvd.
Parcel 1A South development	To be determined	
Phase 2 South CWM construction	Concurrent or prior to Parcel 1A South development	Detention within wetland needed for development
Parcel 2A/2B development	To be determined	Off-site reservoir needed for Phase 2
Phase 3 Central CWM construction (south)	Concurrent or prior to Parcels II A or B	

Table 9 shows the anticipated time for each activity and sequence of events:

Table 9. Implementation Schedule and Construction Activity

Sequence	Construction Activity	Anticipated Schedule
1	Grading/Erosion Control	Days 1-60
2	Seeding	March 1-May 15 or October 1-31
3	Planting, including installing weed barriers	February/March or October/November Days 14-90
4	Install Cuttings	February-March
5	Install plant protection	Days 14-100

OAR Requirement: *A reference site, combination of reference sites, or reference data of the same HGM class or subclass (e.g. from the Willamette Valley HGM Guidebook) and representing a less functionally-altered condition than the CWM site. Compare and relate the sites and/or data to the CWM goal.*

Two reference sites have been selected to compare to this CWM project (Figure 1). Reference site 1 is a wetland mitigation site for a quarry, located on Turner Road. It is a palustrine scrub shrub/emergent (PSS/EM) wetland of the HGM class Slopes. The site contains areas of seasonally ponded water in shallow depressions.

Vegetation on reference site 1 includes:

Common Name	Botanical Name
TREES	
Oregon ash	<i>Fraxinus latifolia</i>
black cottonwood	<i>Populus trichocarpa</i>
SHRUBS	
native willows	<i>Salix</i> spp.
native rose	<i>Rosa</i> sp.
HERBACEOUS SPECIES	
aster	<i>Aster</i> sp.
sedge	<i>Carex</i> sp.
tufted hairgrass	<i>Deschampsia caespitosa</i>
spikerush	<i>Eleocharis</i> sp.
common rush	<i>Juncus effusus</i>
curly dock	<i>Rumex crispus</i>
cattail	<i>Typha latifolia</i>

Reference site 2 is a wetland located on Cordon Road at Macleay Road (Figure 1). It is a palustrine forested/ scrub shrub (PFO/SS) wetland of the HGM class Flats. The site contains a swale with intermittent flow. Vegetation on reference site 2 includes:

Common Name	Botanical Name
TREES	
Oregon ash	<i>Fraxinus latifolia</i>
SHRUBS	
black hawthorn	<i>Crataegus douglasii</i>
native rose	<i>Rosa</i> sp.
HERBACEOUS SPECIES	
camas	<i>Camassia</i> sp.
spreading rush	<i>Juncus patens</i>
buttercup	<i>Ranunculus</i> sp.

In addition, these sites provide many of the same functions that this mitigation plan aims to create, including:

- Water storage and delay
- Sediment stabilization and phosphorus retention
- Nitrogen removal
- Primary production
- Invertebrate habitat support
- Amphibian and turtle habitat
- Breeding waterbirds
- Songbirds
- Characteristic vegetation

OAR Requirement: *Provisions for a financial security instrument (OAR-141-085-0176), if the impact is greater than two-tenths of an acre. The financial security instrument is not required for the application but will be required prior to permit issuance.*

The State of Oregon will provide the required security instrument prior to permit issuance.

OAR Requirement: *Plans for restoration projects shall include data substantiating that the site was formerly, but is not currently, a wetland (e.g. a wetland delineation report).*

The previously submitted Wetland Determination Report (Parametrix, 2004) shows that this area was formerly part of a mosaic of wetlands. The soils map (Figure 4 in the report and in Appendix A) shows the locations of hydric soils in portions of the site that was formerly, but not currently, wetland.

4. MONITORING PLAN

OAR Requirement: *The purpose of the direct CWM monitoring requirement is to provide information to: (a) Determine if the direct CWM project complies with the conditions of the authorization; (b) Evaluate whether the CWM project meets the goals, objectives and success criteria of the CWM plan; and (c) Provide information for removal/fill program monitoring.*

The permit holder shall monitor the direct CWM site and provide to the Agency: (a) A post construction report demonstrating "as-built" conditions including grading and discussing any variation from the approved plan. Unless waived by the Agency, the post construction report shall be submitted within ninety (90) calendar days of completing grading; (b) An annual written monitoring report that includes all data necessary to document compliance with CWM conditions and success in meeting the CWM goals. These data may include photographs, topographic surveys, plant survival data, hydrologic data and other information as required to demonstrate compliance. Monitoring shall be conducted for 5 years unless otherwise specified by the Agency.

The report shall include the following sections:

- (A) Introduction*
- (B) Goals, objectives and success criteria*
- (C) Methods*
- (D) Results,*
- (E) Summary and recommendations*
- (F) Figures*
- (G) Appendices with data and photographs*

An "as-built" report will be conducted after construction if significant design changes occurred during construction. The as-built report will be included with the first year monitoring report. Photographs will be taken before, during and after grading from permanent photographic monitoring points for construction documentation.

Compliance with CWM conditions and success in meeting CWM goals:

- Permanent photographic monitoring points will be established at each entrance and exit of drainages within the CWM area; at both ends of each fixed transect (transects are located within each wetland type); at the southernmost corner/point of each quadrat/sampling area; at the southernmost point of the *Sidalcea nelsoniana* planted area; and from several fixed points to be established at appropriate locations. Ordinal direction of all photographs taken from each photo point will be established to ensure consistency in project view. Where applicable, multiple photographs may be taken from the same photo point to give a landscape perspective. Photographs will be taken after planting and during the first winter/early spring for a visual assessment of water detention and flood storage functions. In addition, photographs will be taken during the annual site monitoring to provide a visual record of percent cover of emergent, shrub, tree, and invasive species. Photographic documentation during the first winter/early spring and annual monitoring will also show evidence of rilling, erosion, deposition, or large unvegetated areas. Permanent photographic point locations will be recorded using a GPS unit.
- Vegetation will be monitored by establishing transects across emergent, scrub-shrub, and forested zones. Transects will range from 150 to 1000 feet in length, depending on site conditions and boundary limitations. Transects will be no closer than 150 feet from another transect. Quadrants will be spaced at 100 foot intervals along each

transect or as needed to reflect plant communities, with randomly selected starting points.

- Vegetation monitoring along transects will assess the number of stems of trees and coverage of native and invasive shrub and herbaceous species using the method described below. Transects/quadrants are intended to provide a representative sampling within each wetland zone. Monitoring data will be compared to the success criteria and mitigation objectives. Recommendations for remedial actions, such as replanting or weed control, will be made in the annual report.
 - Emergent and shrub-scrub zones – Square-meter quadrants will be placed along the established transects at 100 foot intervals with randomly assigned starting points (can be determined and fixed before monitoring or can be randomly assigned each year – transects are fixed in either case). The center point of the quadrat will correspond to the determined point on the transect. The monitoring ecologist will record each species present and absolute percent aerial coverage of native and invasive species within the quadrat. The percent of bare ground within the quadrat will also be noted. The percent coverage of native and invasive species as well as bare ground within all quadrants from a given zone will be averaged and compared to the success criteria and mitigation objectives for each zone.
 - Forested zones – Points at 100-foot intervals along transects within forested zones will be used as center points for 30-foot circumference, circular sample areas. All tree species present within 30-feet of the established point will be recorded with an indication of condition (0 = dead, 1 = poor health, 2 = moderate health, 3 = vigorous). In addition, herbaceous and shrub species will be recorded along with the absolute percent aerial coverage of native and invasive species. The tree species stem counts per unit area (900π) will be averaged to give the average survival rate. The percent coverage of native and invasive species and bare ground within all sample areas will be averaged. These results will be compared to the success criteria and mitigation objectives for the forested zone.
- In addition to the wetland zones, a small area (450 to 500 square feet) planted with *Sidalcea nelsoniana* and *Sidalcea campestris* will be monitored to assure the survival of these species. Monitoring will be conducted each summer for at least five years by an ecologist familiar with the species of plants installed. Protocol for establishment and monitoring will be determined in consultation with Oregon Department of Agriculture (ODA) and U.S. Fish and Wildlife Service (USFWS) and as discussed in the Biological Assessment for the project.
 - *Sidalcea nelsoniana* and *Sidalcea campestris* planted area – All species present within this area will be recorded, along with the absolute percent coverage of both species, other native species, invasive species, and bare ground.
- Visual observations will be made to ensure that there is shallow standing water present during the early growing season, that there are no large permanent areas of standing water attracting waterfowl, and that the hydrologic structures (weirs, overflow devices, outfalls etc.) appear to be functioning, allowing for water to be detained and dispersed in the mitigation areas. Hydrology will also be monitored by digging soil pits to document conditions during the growing season. Soil pits will be dug along the boundary of the CWM area, or as far in from the boundary as necessary to document wetland hydrology. At least 5 soil pits will be dug and

observed in the central CWM area and 3 in the southern CWM area. Visual observations will be made in March through June, or as long as surface water is visible. Photographic documentation (described previously) will accompany visual observations. In addition, monitoring wells installed prior to construction can be used to assess hydrology as necessary. The locations of monitoring wells, if used, will be recorded using a GPS unit.

- Provided the monitoring shows required coverage and survival rates for planted vegetation and water detention, an increase in songbird habitat, sediment stabilization and phosphorus retention, flood control, and reduction of waterfowl habitat will be expected to occur. Songbird species and other wildlife identified during annual monitoring and other site visits will be recorded and included in the annual monitoring report.
- An annual report for each mitigation phase will be submitted by certified mail to the agencies for the required period, after completion of the individual phase. The report will include mitigation goals, objectives and success criteria, monitoring methods, monitoring results, summary and recommendations, figures, data and photographs. Each annual monitoring report will contain an assessment of whether the CWM areas are meeting the success criteria. If any of the success criteria is not being met, actions will be taken as outlined in the Contingency Plan. Changes will be made as necessary on an ongoing basis to help ensure that permit conditions are met by the end of the five-year monitoring period.

The success criteria will be assessed annually, with the following targets to be achieved each year:

Parameter	Target Year 1	Target Year 2	Target Year 3	Target Year 4	Requirement Year 5
EM % cover	10%	20%	35%	55%	70%
SS % cover	10%	20%	30%	40%	50%
FO % cover	5%	10%	17%	25%	30%
Wetland Hydrology	Wetland hydrology present throughout				
Inundation	No large areas of standing water in spring and summer				
Diversity	No one species more than 50% total species count				
Non-native invasives	Less than 20% cover				
Erosion/ Sedimentation	No evidence of erosion				
<i>Sidalcea</i>	Survival of at least 150 plants of each species				

A new wetland delineation will be performed following the 5 year monitoring period to verify that the required area of wetlands exists. When the site is functioning as planned, DAS requests that the DSL and USACE certify the end of the monitoring period and acceptance of the mitigation areas through an official letter.

5. CONTINGENCY PLAN

The purpose of the direct CWM contingency plan is to specify activities that would be performed should any of the success criteria not be met. If monitoring activities show that the success criteria are not being met, appropriate contingency measures will be taken. The measure to be taken will depend on the specific conditions found and the severity of the problem. A qualified wetland specialist and landscape architect will be consulted to design the details as appropriate.

5.1 WILDLIFE HABITAT

During monitoring activities, if it appears that the required coverage and survival of woody plants may not be achieved (see Section 3.1), the area will be replanted. Consideration will be given to whether to replant the same species, different species, or a different form of plants. If the seeds do not germinate, consideration will be given to planting plugs. If bareroot plants or cuttings do not survive, container plants may be installed.

During monitoring activities, if it appears that there is more than 20 percent coverage of non-native invasive plants then weed eradication steps will be taken. Steps to consider will depend on the severity of the problem and may include application of herbicide, implementing a hand-removal program, temporary manipulation of hydrology, and additional dense plantings of native species. In addition, a program of mechanical removal and re-planting will be employed, and the area replanted at a high density.

In addition, in the emergent zone, if more than 10 percent of the area remains bare, such areas will be reseeded and/or planted with plugs.

5.2 DETENTION AND FLOOD CONTROL

During monitoring activities, if it appears that there is not standing water present during the winter or early growing season, or that the hydrologic structures are not properly functioning, the hydrologic structures will be redesigned and installed so that the areas hold adequate water. Conversely, if an excess of open water (standing water that is bare of vegetation) is present, an evaluation will be made of whether to increase plantings or to amend the hydrologic structures. If hydrology is inadequate, water levels in the existing monitoring wells may be studied to help determine the underlying causes. The appropriate action will be taken to rectify the conditions.

5.3 SEDIMENT STABILIZATION AND PHOSPHORUS RETENTION

If monitoring activities reveal evidence of unstable slopes or erosion, those areas will be replanted with appropriate seeding, planting, or stabilization techniques.

5.4 WATERFOWL HABITAT

If an abundance of open water is attracting waterfowl, appropriate steps will be taken to reduce water levels, as described in the Detention and Flood Control section above.

5.5 *SIDALCEA NELSONIANA* AND *SIDALCEA CAMPESTRIS*

If monitoring activities reveal an insufficient survival rate of *Sidalcea* plants, ODA and USFWS will be contacted to assist in determining the cause. Remedial actions for *Sidalcea* will be implemented in coordination with ODA and USFWS, as described in the Biological Assessment.

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Figures

Figure 1. Location Map

Figure 2. Proposed Wetland Impacts

Figure 2a. Cross-Section of Existing and Proposed Topography

Figure 3. Phasing and Types of Wetland Mitigation

Figure 4. Conceptual Planting Plan

Figure 5. Cross Section and Hydrologic Structures

Figure 6. Conceptual Grading Plan

APPENDIX A

Wetland Delineation Summary Table and Figures

APPENDIX B

Surface Water Management Memorandum