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GEOTECHNICAL ENGINEERING • ENVIRONMENTAL ENGINEERING
CONSTRUCTION TESTING & INSPECTION • WETLAND DELINEATIONS
MITIGATION & MONITORING • BIOLOGICAL ASSESSMENTS
HABITAT MANAGEMENT PLANS

Note: This report is subject to modification as a result of the completion of the SEPA analysis (Environmental Impact Statement) being undertaken as part of the governmental permitting process.

February 11, 2003 KA Project No. 104-01017

THORNDYKE RESOURCE OPERATIONS COMPLEX CENTRAL CONVEYOR AND PIER PRELIMINARY MITIGATION PLAN HOOD CANAL SAND AND GRAVEL CO. PROPERTY

FRED HILL MATERIALS
JEFFERSON COUNTY

1.0 INTRODUCTION

This report discusses the proposed mitigation plan for unavoidable wetland impacts presented from the construction of the Central Conveyor and Pier south of the Thorndyke "Block" in Jefferson County, Washington. Direct impacts to one Category II freshwater shoreline wetland (identified as Wetland B) and its associated buffer are necessary for erosion protection of the stormwater drainage tightline that outfalls to the shoreline. The wetland delineation report did not identify direct impacts to any other wetlands.

Impacts were minimized to an area of the wetland that has been naturally disturbed by an adjacent feeder bluff. The disturbed area is dominated by young alder. The area's soil character is primarily sand. The outer shoreline fringe is saltwater influenced during certain times of the year. The wetland continues along the shoreline, residing primarily along the toe of the slope both north and south of the project area. Adjacent shoreline wetland areas are forested or emergent in classification.

The tightline outfall will require a concrete gravity block thrust restraint at the bottom of the bluff, where the surface mount pipe tees into a sheet flow spreader. The sheet flow spreader will be approximately 40 feet long (size to be verified at final design) and located 35-50 feet from the base of the bluff, within the "Naturally Disturbed Area" (See Figure 1 for location) of Wetland B. The sheet flow spreader will be oriented perpendicular to the conveyor. Vegetation immediately adjacent to and under the sheet flow spreader will be trimmed to 6 inches high, with no disturbance of the root mat. An emergency overflow at the end of the sheet flow spreader will discharge onto a driftwood energy dissipator. Additional erosion protection may be required between stations 226+00 and 227+00. The area that may require additional erosion protection is

approximately 17 feet wide by 100 feet long, with a total impact area of 1,700 square feet. The impacted area will lie primarily within the wetland buffer yet direct impacts to the "Naturally Disturbed Area" of Wetland B will be incurred.

Temporary impacts to this wetland may also occur due to the construction of the conveyor truss system via beach access. A temporary construction access may be necessary for lifting prefabricated conveyor trusses into final position. Once the trusses are in place, the temporary construction access will be removed and the area restored to a quality equal to or better than existing.

Secondary impacts to Wetland B include the effect of the Single Conveyor's traverse along the wetland's entire width of 75 feet. The conveyor is completely suspended yet has the potential to impact the wetland and buffer through secondary measures identified as **shading**, **sediment escapement** to adjacent surface waters, and long term **vegetation** maintenance.

Shading effects are expected to be minimal since the alignment of the Single Conveyor is directed north to south, providing adequate sunlight to native vegetation adjacent to the project.

Sediment escapement is unlikely because the conveyor will be covered from the northern boundary of Wetland B to the loading point on the Pier. From the top of the marine bluff to the beginning of the Pier, the Single Conveyor will have a pan attached under the return belt. The proposed cover and enclosure minimizes the potential of sediment escapement by preventing exposure of sand and gravel to the strong winds and driving rains indicative of this environment.

Typical wetland vegetation within Wetland B consists of dense stands of young alder. Wetland **vegetation** located below the Single Conveyor will require regular trimming or removal to ensure long-term structural integrity of the conveyor. Percent cover and functional value of the existing vegetation will not be compromised, as described below, whereas the entire disturbed portion of the wetland will be enhanced with a planting scheme. As proposed, long-term solutions to vegetation maintenance include transitioning from a young forested system to a scrub-shrub dominated corridor that requires little to no maintenance.

2.0 WETLAND MITIGATION CONCEPT AND GOALS

The impacted wetland extends for an unquantified distance along the shore of Hood Canal. The majority of the wetland is forested with a dominant emergent classification. The impact area is not characteristic of the adjoining system. The impact area has been naturally disturbed by the natural sediment deposition from the bounding high bluff. The disturbed area is recovering from the sediment loading whereas young alder and willow are persistent throughout the disturbed boundaries.

Mitigation includes the enhancement of the surrounding wetland. The approach is to increase vegetation diversity, introducing increased function to habitat for multispecies utilization. High quality, diverse vegetation provides multiple habitat elements that will increase the potential habitat value for songbirds, small mammals and insects. The mitigation plan includes the removal and control of Himalayan blackberry (*Rubus discolor*), an invasive species dominating approximately 150 feet of the shoreline.

Specifically, the plan will provide mitigation as follows for the wetland impacts (See Figure 1):

- Approximately 24,573 square feet of the on-site wetland will be enhanced by densely planting with native species (Enhancement Area 1)

- Approximately 7,588 square feet of forested wetland will be enhanced through the removal of Himalayan blackberry (Enhancement Area 2)

- Pruning and cutting of approximately [2,800] square feet of vegetation adjacent to and under the proposed conveyor and sheet flow spreader. This area will undergo some light plantings to introduce low maintenance shrub species.

The mitigation proposed is more than adequate for the small area of direct impacts to the wetland. The total area to be enhanced equals 32,161 square feet (Enhancement Areas 1 and 2 combined), providing an enhancement ratio of 19:1. The quantity of plantings and mitigation area proposed is greater than necessary given the proposed impacts.

2.1 Performance Standards

The primary goals of the mitigation plan are to enhance the existing wetland, preserve the hydrology and water quality of the wetland, and enhance the native plant community with increased diversity. By the tenth year following implementation, the enhanced wetland shall meet the following performance standards:

1. Minimum of 80 percent average native vegetative cover of trees and shrubs throughout the mitigation areas by the end of the five-year monitoring period.
2. Ninety percent survival of planted shrubs at the end of the first year.
3. Eighty percent survival of planted trees and shrubs at the end of the fifth year of the monitoring period. Survival rate is established as a goal and may be adjusted where natural regeneration, growth and colonization has resulted in minimum plant cover, as defined above (1).
4. Less than ten percent cover within the designated mitigation area by invasive weedy species at the end of each growing season during the five year monitoring period.

3.0 MONITORING PLAN

The enhanced wetland will be monitored three times over a five-year period. Monitoring will be conducted in Years 1, 3 and 5 of the monitoring period. Monitoring will be conducted using the techniques and procedures described below to quantify the

survival, relative health and growth of plant material. A monitoring report submitted at the end of the year of each monitoring year will describe and quantify the status of the mitigation at that time.

Vegetation monitoring consists of two (2) tasks. The first is an inspection of planted material to determine overall health and vigor. Survival of all planted material will be quantified during each monitoring event.

The second task will be the sampling of the plant community to determine that adequate vegetative coverage is developing. Since the mitigation site will be in the early stages of succession, the shrub and tree species will be monitored using the Line Intercept method as described by Canfield (1941). Two randomly located transects will be located in the scrub-shrub wetland plant community and will be sampled using the Line Intercept technique. A table documenting linear density index, relative density, frequency, relative frequency, linear coverage, relative coverage and importance value for each species in the shrub/tree strata will be produced.

The herb strata will be sampled using a 0.25 m^2 rectangular quadrant randomly located at permanently established points (to be set during the first monitoring) within each plant community. Ten (10) sample points will be sampled and coverage classes based upon Daubenmire (1959) will be recorded. A table documenting frequency, relative frequency, coverage and relative coverage for each species in the herb strata will be produced. Vegetation monitoring will be completed during September of each monitoring year in order to capture the full canopy coverage available.

Separate photo stations will be set up along different portions of the buffer to visually document the overall appearance of the mitigated area.

Visual observation of all wildlife species observed during the monitoring will be recorded.

3.1 Maintenance Plan

The primary goals of the mitigation plan are to enhance Wetland B by increasing plant community diversity and habitat complexity while preserving water quality. Vegetation pruning and trimming near the conveyor belt is required on an annual basis to maintain the integrity of the structure. Trimming and pruning along the conveyor belt alignment will be a long-term maintenance requirement and will be conducted during periodic maintenance routines.

The maintenance plan will ensure that the installed plants survive and meet the performance standards within the five-year monitoring period. Maintenance includes watering as needed during the dry season. If the plants are installed between March 15 and October 15 of the installation year a temporary irrigation system may be necessary.

Removal of all non-native, invasive and noxious vegetation will be conducted yearly. All removal of vegetation is to be conducted by hand without the use of pesticides or

chemicals. All debris will be removed from the site and disposed of in an approved landfill. Volunteer native shrub and tree species will not be removed and will be included as part of the enhancement plan.

3.2 Contingency Plan

If the monitoring results indicate that any of the performance standards are not being met, it may be necessary to implement a contingency plan. Careful attention to maintenance is essential to ensure that problems do not arise. Should any part of the site fail to meet the success criteria, a contingency plan will be developed and implemented with the lead regulatory agency. Such plans are prepared on a case-by-case basis to reflect the failed mitigation characteristics.

REFERENCES

Canfield, R.H., 1941. *Application of the line interception method in sampling range vegetation.* Journal of Forestry, vol. 39, p. 388-394.

Daubenmire, R.F., 1959. *A canopy-coverage method.* Northwest Science, vol. 33, p. 43-64.