

**FINAL WETLAND MITIGATION AND MONITORING PLAN
FOR FOSTER AVENUE, LLC, CREEKSIDE HOMES
ASSESSOR PARCEL NUMBER
(APN) 505-161-11
ARCATA, CALIFORNIA**

August 2006

Prepared for:

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(California Engineering Company [CEC], July 28, 2006)

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SUMMARY

The property designated as Assessor's Parcel Number (APN) 505-161-11 is located northwest of the intersection of Alliance Road and 17th Street, in Arcata, California. Janes Creek borders the southeastern side of the proposed development parcel.

The project proposes to annex parcel APN 505-161-11 to the City of Arcata, modify the zoning, and subdivide the parcel for the development of residential lots, housing units, new residential streets, and a public roadway extension. To allow for the various aspects of the proposed development, wetland areas will be filled and impacted. A total of 33,412 square feet (0.77 acres) of two and three parameter seasonal wetlands will be filled in total, associated with the proposed site development. The mitigation plan proposes to create 0.85 acres (37,000 feet²) of wetlands in an on-site area on the property, adjacent to Janes Creek.

This conceptual mitigation plan is prepared for future use as part of the Section 404 Permit for the U.S. Army Corps of Engineers (COE). The mitigation project includes grading, planting, and five years of additional monitoring on the mitigation site.

PROJECT DESCRIPTION

Responsible Parties

Foster Avenue, LLC, is the owner of the project site and is the responsible party for development of the project site and implementation of mitigation plan. The proposed mitigation area is on-site of the subject parcel. The working contact for Foster Avenue, LLC, is Chris Dart, Danco Builders, 5251 Ericson Way, Arcata, California 95521, (707) 822-9000. Misha Schwarz and Lia Webb of Winzler & Kelly Consulting Engineers, 633 Third Street, Eureka, California 95501, (707) 443-8326, have prepared this Mitigation and Monitoring Plan.

Location

The project site is located in the Arcata North USGS 7.5 minute quadrangle, within the northwest ¼ of Section 29 and the southwest ¼ of Section 20 of Township 6 North and Range 1 East. The 16-acre property designated as Assessor's Parcel Number (APN) 505-161-11 is located adjacent to the east boundary of the City of Arcata and is proposed for annexation. Access to the site is provided by traversing west on 17th Street off of Alliance Road, which then leads to the project site on Foster Avenue. Janes Creek borders the southeastern side of the proposed development parcel. The parcel is within the Sphere of Influence and the Urban Services Boundary of the City of Arcata. The property is not in the Coastal Zone.

Proposed Project

The project proposes to annex the parcel APN 505-161-11 to the City of Arcata, modify the zoning, and subdivide the parcel for the development of residential lots, housing units, new residential streets, and a public roadway extension as detailed on the site plan (Appendix A, Sheet 1 of 5). A new subdivision access road will be provided off of Foster Avenue.

To allow for the various aspects of the proposed development, wetland areas will be filled and impacted. A total of 33,412 square feet (0.77 acres) of two and three parameter seasonal wetlands will be filled in total, associated with the proposed site development. Three grading scenarios

were analyzed during the mitigation site design that varied in side slope and resulting total mitigation acreage. The three grading options were presented to the City of Arcata Creeks and Wetlands Committee at an October 6, 2005 committee meeting. The Committee indicated that the preferred option is the 3:1 side slope scenario because although it would result in a comparatively less total mitigation acreage (with a 110% replacement value), the more gentle slope ensures slope stability and mitigation area success (Table 1).

Table 1: Impact Acreage of Wetlands to be Filled Versus Mitigation Acreage

Filled Wetland Type	Acres	Square Feet	Notes / Location
3-parameter	0.36	15,524	Wetland pockets scattered throughout development area
2-parameter	0.41	17,888	Ditch at southern edge of property and several others scattered throughout development area
Total Wetlands Filled	0.77	33,412	
Mitigation Wetland	0.85	37,000	3:1 side slopes, 110 % replacement

Site Characteristics

Jurisdictional Areas

See Site Plan (Appendix A) for project area and proposed wetland areas to be filled. Natural Resources Management Corporation (NRM) delineated the wetland areas on May 21-24 and July 8, 2004. As stated by NRM in the delineation report, the definition of a wetland on the project site may be subject to a number of different jurisdictional definitions, namely the 2-parameter City of Arcata definition and the 3-parameter Army Corp of Engineers definition (NRM, 2004). NRM additionally identified 1-parameter wetlands on site for informational and planning purposes. The 1-parameter wetland areas do not exhibit yearlong standing water, lack hydric soils, and were defined by dominant vegetation of poison hemlock and blackberry. These one-parameter wetlands were not included in total acreage of wetlands to be filled, as they do not meet the jurisdictional agencies (City of Arcata and COE) definitions of a wetland.

A total of 33,412 square feet (0.77 acres) of 2-parameter and 3-parameter wetlands will be filled as a result of the proposed project. All impacts to wetlands will be mitigated as outlined in this mitigation and monitoring plan.

Aquatic Functions

Janes Creek is a small third order stream that borders the southeastern side of the proposed project parcel. Lower Janes Creek has been greatly modified from pre-development conditions. A fish habitat study at the project site rated the Creek value in the vicinity of the project from fairly good habitat to poor habitat. The reaches of the creek immediately upstream and downstream of the project site have nearly complete shade canopy and are virtually devoid of reed canary grass. Shading has prevented canary grass encroachment and preserved low flow channel habitat. The existence of a floodplain, even a relatively small one, allows a portion of storm flow volume to spread over bank, a process that helps to reduce in-channel velocities and allows fish to temporarily use off-channel habitat to escape high storm flow velocities, an important benefit to over-wintering juvenile salmonids. The creation of floodplain benches to create additional flood storage can result

in fish entrapment as the creek level drops and is therefore not recommended as a mitigation alternative for this proposed project. Additionally, floodplain benches as a project alternative would effect mature riparian vegetation in most section of the creek (on site).

The scattered 3-parameter wetland areas that will be impacted as a result of the proposed project are the result of past heavy equipment use on the parcel and uneven compaction of fill material, and are considered atypical (NRM, 2004). Additionally, some of the impacted wetlands are 2-parameter ditches, and several 2-parameter wetlands are on compacted fill. The wetland areas formed on compacted gravel fill as well as the “ditch” wetlands have low aquatic function and are not connected hydrologically to Janes Creek or other wetland areas.

Hydrology and Topography

The project site is located on an uplifted alluvial plain. The majority of the project site is more or less flat, with elevations ranging from approximately 20 to 29 feet above sea level (asl). Elevations from the bed of Janes Creek to the top of the bank range from approximately 11 to 26 feet (asl) (Kelly-O’Hern Associates, 2001). On the project site the creek is well incised and the 100-year flood plain line is at the top of bank in most locations. Janes Creek is a small low gradient year round creek that also carries storm water from residential areas and runoff from adjacent agricultural fields during winter months.

Groundwater for the site typically remains lower than 3 feet below ground surface, yet fluctuating to within one foot in the upland areas and from 4 to 12 inches in the wetland areas for most of the year. Variations in depth to groundwater are due to the compacted fill that exists at the surface of the project site. The absence of distinct geologic variations or changes in topography at the project site indicates a low-lying groundwater gradient, with the slight grade sloped towards the creek (similar to topography). Groundwater monitoring well data collected by Pacific Watershed Associates is attached as Appendix B, but is inconclusive in predicting an accurate groundwater gradient slope and direction.

Soils

Fill material (compacted river-run gravel, gravelly silt, wood debris, etc.) caps the parcel to an approximate depth of 1 to 2.5 feet below ground surface (bgs). Below the fill, at approximately 1 to 2.5 foot depth, silt loam to silty clay loam were encountered to a depth of 3 to 4 feet bgs. Very fine loose sand underlies the silty loam in most locations, beginning at an approximate depth of 4 feet bgs.

Vegetation

Three habitat types exist at the project site, each with distinct plant species. The habitat types identified at the site are: disturbed upland, wetland areas (“pockets”), and riparian. The plant communities specific to the habitat types are presented below. Any potential special-status plant species are discussed in the following sub-section titled “Threatened / Endangered Species.”

Disturbed Areas

The vegetation across the majority of the parcel is characteristic of “degraded upland,” with a dominance of nonnative annual and perennial grasses, herbs, and shrubs. Himalayan blackberry (*Rubus discolor*), California blackberry (*R. ursinus*), sweet vernal grass (*Anthoxanthum odoratum*), soft chess (*Bromus hordeaceus*), annual fescue (*Vulpia* spp.), rose-flowered lotus (*Lotus micranthus*), bird’s-foot trefoil (*L. corniculatus*), hairy cat’s-ear (*Hypochaeris radicata*),

English plantain (*Plantago lanceolata*), poison hemlock (*Conium maculatum*), riverbank lupine (*Lupinus rivularis*), wild radish (*Raphanus* spp.), bluegrass (*Poa* spp.), wild rye (*Lolium* spp.), and wild teasel (*Dipsacus fullonum*) are the most commonly observed species on the parcel.

Riparian

A strip of riparian vegetation surrounds Janes Creek, and common plants in this area include red alder (*Alnus rubra*), willow (*Salix* spp.), Himalayan blackberry, reed canary grass (*Phalaris arundinacea*), goose grass (*Galium aparine*), creeping buttercup (*Ranunculus repens*), lady fern (*Athyrium filix-femina*), water parsley (*Oenanthe sarmentosa*), small-flowered bulrush (*Scirpus microcarpus*), and others. Many of the native trees and shrubs in the riparian area were planted by Redwood Community Action Agency (Eureka, CA) during restoration efforts in 1995 (Mad River Biologists, 2000).

Wetlands

The vegetation of the scattered wet areas on the parcel consists primarily of pennyroyal (*Mentha pulegium*) and water foxtail (*Alopecurus geniculatus*). Other topographic low areas on the parcel are dominated by blackberry (*Rubus* spp.) and other “wetland-oriented” species such as curly dock (*Rumex crispus*), creeping buttercup (*Ranunculus repens*), giant horsetail (*Equisetum telmateia*), and northern willow herb (*Epilobium ciliatum*). Most of the wetlands occur on compacted fill material.

Threatened / Endangered Species

Known wildlife use consists primarily of commonly occurring land birds found in coastal Humboldt County. No raptor nests or threatened or endangered bird or mammal species are known to exist at the site.

No rare, threatened or endangered plants occur at the project site. Sensitive plant species that could occur at the site (USGS 7.5 Minute Arcata-North Quad) include Point Reyes birds beak (*Cordylanthus maritimus* ssp. *palustris*), Humboldt Bay wallflower (*Erysimum menziesii* ssp. *eurekaense*), beach layia (*Layia carnosa*), and Humboldt Bay owl’s clover (*Castilleja ambigua* ssp. *humboldtiensis*) (USFWS, 2005). No habitat occurs in the project area to support any of these species (i.e., salt marsh or sand dunes).

Species-status fish species, including coast cutthroat (*Oncorhynchus clarki clarki*) and coho (*Oncorhynchus kisutch*) have historically occurred in Janes Creek. Present habitat use at the project site is likely limited to migration and occasional juvenile rearing. Coho adults returning to the hatchery on Jolly Giant Creek have been occasionally reported to stray to Janes Creek, which enters Arcata Bay only about one-half mile from Jolly Giant Creek. A single tagged coho carcass, originally released into Jolly Giant Creek as a smolt reared in the Arcata wastewater pond hatchery, was found in a spawned-out condition in Janes Creek in fall 1984. In June of 1985, coho juveniles were found in substantial numbers about one mile upstream of the project site, near the confluence of the north and south forks (Klein, 2004).

The riparian area around the creek provides for quality fish habitat, roughness elements (such as large woody debris or boulders which provide, among other things, over-wintering refuge from high stream flow velocities), shade canopy, and runoff filtration. The proposed project will not likely adversely affect coho and will not destroy or adversely modify critical habitat in the stream or the surrounding riparian vegetation. Janes Creek will be impacted in two locations from the

proposed project. An extension of Foster Avenue will mandate a crossover of Janes Creek with an arched culvert. As proposed, the mitigation area will connect to Janes Creek on the central eastern portion of the property. Limited bank protection (rip-rap) at this location will be necessary.

MITIGATION DESIGN

Location of Mitigation Site

The mitigation area is located in an on-site upland area adjacent to Janes Creek.

Basis of Design

The project site has scattered wetland areas that are difficult to impossible to avoid by the proposed project and the required wetland setback of 50 to 100 feet would make the project infeasible.

An alternative to the proposed on-site mitigation area was evaluated in the planning process of the project. An off-site wetland mitigation area on the agricultural parcel adjacent to the west was considered, but would have resulted in permanently converting land used for agricultural purposes to wetlands and is outside the City limits. The alternative off-site mitigation area is potentially still available, but the on-site mitigation is favored. The on-site mitigation area matches the impact area in soils and elevation. The on-site mitigation area will convert a disturbed and compacted upland area adjacent to Janes Creek into a native wetland habitat and will have higher biological value than the impacted wetlands and the original disturbed upland habitat. The proposed mitigation area adjacent to Janes Creek is consistent with the Janes Creek Linear Park as mentioned in the City of Arcata Creeks Management Plan and Parks Master Plan.

Three grading design scenarios were analyzed for the wetland mitigation area that varied in side slope and resulting total mitigation acreage. The original plan for 1:1 side slopes from existing ground surface into the created wetlands were compared with variations in the side slope of 1:1, 2:1, 3:1, and a combination scenario. Lessening the slope of the side bank results in a reduction of the total created wetland area. A combination of 1:1 and 2:1 slopes would maintain a 1.5:1 mitigation ratio (150 percent replacement), as preferred as a minimum replacement ratio by the City of Arcata, while providing the benefits of less steep side slope. The 1:3 slope is the preferred and proposed option (as indicated by the City of Arcata Creeks and Wetlands Committee, October 6, 2005 meeting) as it satisfies concerns of the City of Arcata in regards to slope steepness while maintaining greater than 1:1 wetlands replacement ratio. Although the preferred scenario will result in a comparatively less total mitigation acreage, the more gentle slope ensures slope stability and mitigation area success.

Mitigation Site Characteristics

Ownership Status

Foster Avenue, LLC, is the owner and operator of the project and mitigation sites. After the grading and planting is completed, the wetland area will be part of the larger parcel, which is proposed for subdivision. After the mitigation and monitoring period of five years is over the COE and the City of Arcata must approve the success of the mitigation area.

Jurisdictional Delineation

The wetland areas at the project site were delineated on May 21-24 and July 8, 2004. The U.S. Army Corps of Engineers (COE) has not verified the delineation. The specific location of the mitigation area is confirmed to be upland based on the original delineation (NRM, 2004).

Aquatic Functions

The mitigation area is on the development parcel; therefore, the aquatic functions for mitigation area are similar as for the project site (presented above). The mitigation area is located at a minimum of 50 feet east of the development area. The area proposed for mitigation has been delineated as an upland area (NRM, 2004). The site is in close proximity to Janes Creek. Currently the area functions minimally for water filtration for runoff progressing towards the creek area.

Hydrology and Topography

The general hydrology and topography for the mitigation project area is presented above in existing conditions for the project site. The existing groundwater conditions within the proposed mitigation can be more specifically analyzed by assuming a flat surface and extrapolate based on Pacific Watershed Associates groundwater monitoring well data collected in the area adjacent to the proposed mitigation wetlands (Appendix B). Based on these data, it appears groundwater underlying the mitigation area currently fluctuates drastically depending on sustained rainfall, and can vary from as close as four inches and on average remaining from 4 to 8 feet below ground surface (bgs) in the winter yet can drop to as low as 10 feet bgs in the summer. These groundwater fluctuations are not presented on the site plan cross sections as the well locations were not surveyed and groundwater data was gathered only during a one year time period. Further details on existing groundwater conditions in the proposed mitigation area would require additional borings with in this area coupled with year long monitoring to evaluate seasonal fluctuations.

Soils

The soils in the mitigation area are the same as presented above for the project site.

Vegetation

The mitigation area is characterized by the upland disturbed habitat, as described above for the project site. The mitigation site is adjacent to the wetland riparian area, also previously described.

Present and Historical Uses of Mitigation Area

The project site was historically used for the location of a lumber mill (North Coast Exports) and although the parcel has been vacant for over 30 years, past land use has influenced the site's present environmental setting. Fill material (compacted river-run gravel, gravelly silt, wood debris, etc.) caps the parcel to a depth of approximately 4 feet in some places (LACO, 2002). Building foundations are still visible.

Present and Proposed Uses of All Adjacent Areas

The agricultural parcel directly adjacent to the west of the project site (APN 505-151-01) has been used consistently for livestock grazing purposes. The site is proposed to remain as open space, with potential agricultural area and nature trails (still in planning phase). Further to the west are additional open agricultural fields. Residential housing is situated on the north and east side of

the parcel. To the south is Foster Avenue, with open fields and a few scattered houses bordering the road to the south. No changes to adjacent land uses are known at this time.

Created / Restored Habitats

Compensation Ratios

The compensation ratio for the wetlands fill is approximately 1.1 to 1 and the proposed mitigation is summarized in Table 1. Approximately 0.85 acres of wetlands will be created on-site.

Long-Term Goal(s)

Habitat enhancement / creation will include three main elements:

- 1) Create 0.85 acres of wetlands at the on-site mitigation area.
- 2) Connect the new wetland area to Janes Creek to allow for stormwater flow into the mitigation site while allowing escape routes for fish; therefore ensuring no fish entrapment occurs as a result of the proposed mitigation area.

Aquatic and Wildlife Functions

The wetland mitigation area will be of higher functional value than the compacted wetland areas being filled. The new wetland mitigation area will be hydrologically connected to Janes Creek and will retain flood waters during storm events, will function for groundwater recharge, serve as native wetland habitat, slow surface flow, and additionally filter surface runoff. The well established and deep rooted wetland and riparian vegetation in 2-parameter wetlands adjacent to mitigation site will not be significantly impacted by the mitigation site as a result of the steepening of adjacent slope. The low groundwater gradient (and corresponding flat topography), cool coastal climate with short summer season, available soil moisture, and low hydraulic conductivity soils will ensure that the mitigation area will not deplete groundwater conditions from the adjacent wetland areas.

Long-term mitigation wetland survival and stability will depend on vigorous vegetation establishment. Palustrine habitats created the first year will be available immediately for wildlife use. The maturity of the palustrine seasonal habitat will occur in approximately three to five years. The riparian trees will provide habitat for land birds and other wildlife in approximately three to ten years. The mitigation area will widen the wildlife corridor through the project area.

Hydrology / Topography

Based on the mitigation site groundwater monitoring data presented in Appendix B, the approximate grading depth of from 3 feet to as deep as 8 feet below existing ground surface will create seasonal wetland hydrology for a significant part of the growing season. Open water may exist at times, but a slope of approximately 0.4 percent towards the outlet to the creek will allow for flooding to dissipate into the creek and/or recharge groundwater. Groundwater data collected in the area adjacent to the proposed mitigation area indicates that the created wetland area at the deepest point will be saturated to the surface in the wetter months and will have from zero to four feet of standing water depending on sustained rainfall conditions. In the summer months, ground water will fluctuate from the soil surface to two feet below ground surface. Because of the low groundwater gradient, the sloped lands in the mitigation area will have gradually increasing depths

to groundwater based on vertical distance up from water table as established in the bottom of the mitigation area. The top of bank and upper portion of the slope in the created mitigation area is not included in the total wetland acreage and is not expected to support seasonal wetland hydrology or hydric soils. The grading of the specific mitigation area will significantly change the topography, which is generally flat except for undulations caused by past use and fill. The mitigation area will be graded down ranging from 3 to 8 feet below existing ground surface. Several design scenarios are being considered for the grading of the mitigation area (Table 1) with a 3:1 side slope being the preferred option, per the City of Arcata Creeks and Wetlands Committee, October 6, 2005 meeting.

Soils

Soils at the proposed mitigation site are described above under site characteristics of the project site. The mitigation area will be graded to an approximate depth of 3 to 8 feet below ground surface. It is expected that the soil in the new wetland mitigation area will be predominantly the underlying native Loleta silt loam subsoil in most locations, which will be uncovered during grading. Since the river-run fill cap is estimated to be on average 4 feet deep (bgs) for most of the project site, some areas of the mitigation site will be partially the same as the existing surface soil. The Soil treatment and disposal is discussed below under implementation plan.

Vegetation

Vegetation at the new mitigation site will be managed to have a predominance of native wetland type species. The site will be planted according to the planting plan, presented in Table 3. The vegetation will have higher biological value than the wetland pockets that are proposed for filling.

MONITORING PLAN

Success Criteria

Table 2 provides the yearly criteria to be met, based on a reasonably paced progress towards final success criteria.

Table 2: Annual Performance Criteria

Year	Seasonal Wetland Vegetation Establishment
1	30% cover of native plant species over mitigation area and 30% of all species counted are FAC or wetter
2	35% cover of native plant species over mitigation area and 35% of all species counted are FAC or wetter
3	40% cover of native plant species over mitigation area and 40% of all species counted are FAC or wetter
4	45% cover of native plant species over mitigation area and 45% of all species counted are FAC or wetter
5	50% cover of native plant species over mitigation area and 50% of all species counted are FAC or wetter

Monitoring

Methods

Randomly placed, one-meter square sample plots shall be sampled at 15 locations within the mitigation area each season during June, July, or August. Five dominant plants in each sample plot shall be identified to species, and percent of hydrophytic vegetation and percent cover of native plant species shall be noted. The coverage of the 15 plots shall be averaged and compared to the Annual Performance Criteria.

Monitoring Schedule

The monitoring period will be for five years, beginning approximately 6 to 9 months after initial planting. Monitoring will occur once a year during June, July, or August.

Photo-Documentation

Photographs of the mitigation area during monitoring shall be taken from the same location in the same direction. Photos of each sampling location shall also be taken to document the percent vegetative cover and will be included with the annual report, as deemed necessary.

Maintenance Activities

Green machines and mowers will be used to weed around the riparian plantings and wetland mitigation site, as needed. The weed management will be done once a year in late summer until riparian plants are established. Stakes and mulch collars will help to keep the weeds and mowers away from the plants.

IMPLEMENTATION PLAN

Site Preparation

Avoidance Measures

Direct impacts to Janes Creek will be avoided by the proposed project. The only time that grading will occur in close proximity to the creek is at the juncture where the mitigation area joins in with Janes Creek. This phase of work will occur in summer months when the creek flows are low and no heavy equipment shall operate in the creek. The riparian vegetation that surrounds the creek will be left in place and will provide a buffer around the creek. Riparian vegetation will be removed only to allow for the arch culvert bridge of Janes Creek. The area will be revegetated immediately after construction completion. Little impact to the creek is expected and no long-term impacts will occur.

Soil Disposal

Any excess soil generated during wetland mitigation grading will be removed from the wetland mitigation area and stockpiled for future on site uses or removed completely from the project area.

Soil Treatment

All stockpiles will be covered if rain is pending to prevent sediment-laden runoff from impacting the wetlands and creek areas, in compliance with the SWPPP.

Noxious Plant Removal

There are many non-native plants in existence at the parcel due to adjacent agricultural parcels that are annually seeded and as well the disturbed existing conditions at the subject parcel. Most of the non-native plants within the proposed mitigation area are not identified as “pest plant” species. Patches of poison hemlock (*Conium maculatum*) and Himalayan blackberry (*Rubus discolor*) are present at the project site and are often identified as “pest plants” (NRM, 2004). The site will be completely graded during development and most to all vegetation will be removed, including the identified “pest plants.” The mitigation area will be replanted according to the planting plan presented in this report. The remainder of the parcel will be developed with the proposed housing project and re-vegetated according to the developer’s landscape plan.

Construction Monitor

Foster Avenue, LLC will oversee the implementation of the proposed project and mitigation based on this mitigation and monitoring plan. After construction, a qualified biologist shall complete wetlands monitoring for a total of five years.

Grading Plan

The mitigation site will be graded to a total depth varying from approximately 3 to 8 feet below ground surface, as shown on the Site Plan (Appendix A, Sheet 2 of 5) and cross sections (Sheets 3 of 5 and 5 of 5).

Planting Plan

Recommended Plants

The wetland area will be planted according to the planting plan shown in Table 3. Red alder (*Alnus rubra*) and big leaf maple (*Acer macrophyllum*) will be planted on the top half of the slope and along the top of bank of the wetland boundary line and will provide a windbreak for the wetland mitigation area. Native willow(s) (*Salix* sp.) will be planted mid slope to the bottom of the slope of the mitigation area. Soft stem rush (*Juncus effuses*) and slough sedge (*Carex obnupta*) will be planted along the bottom of the sloped wetland area and within the flat bottom area.

All species will be planted in the late fall or early winter, when the plants are dormant, and after the rains have begun. Table 3 presents specific species to be planted in the wetland area. Also provided is planting location and recommended final spacing.

Source of Propagules

All plants should be obtained from a nursery in a minimum of ½ gallon pots to ensure healthy establishment, with the exception of the willows. Willow cuttings for the mitigation area can be gathered onsite or within 10 square miles and planted with adherence to the following directions.

Willow Planting Instructions

Willow (*Salix* sp.) cuttings can be taken from large vigorous-growing shrubs and trees from December 15 through February 1 (when plants are dormant) prior to bud swelling. The willow-cutting source shall be within a 15-mile radius of the project area. Length of cuttings shall be 3 feet with a minimum ¾ inch diameter at the base and maximum of 3 inches. It is recommended that the bottom of the willow cuttings be cut at a 45-degree angle in order to keep track of the correct orientation of the cutting and to facilitate planting. Cuttings shall be placed in a bucket filled with

water prior to planting to avoid desiccation. Willow cuttings shall be placed with the basal 2/3 of the slip in the ground, with approximately 10-12 inches above the soil surface. If holes are dug or augured for the willows the soil shall be tampered around each willow slip so no air void occurs.

Table 3: Species to Be Planted

Location	Common Name	Species	Spacing (feet) ^{1,2}
Bottom of Wetland	Soft stem rush	<i>Juncus effusus</i>	8-10
	Slough sedge	<i>Carex obnupta</i>	8-10
Bottom of Side Slopes (1/3 to 1/2 way up slope)	Willow species	<i>Salix</i> sp.	20
Top 1/2 of Side Slope and Top of Bank	Big leaf maple	<i>Acer macrophyllum</i>	100
	Red alder	<i>Alnus rubra</i>	35
<p>¹ The spacing between plants in the mitigation area is between individual plants. The plant species are to be mixed in some areas. For example, the spacing between the big leaf maple and red alder along the upper slope and top of bank should result in a big leaf maple every 200 feet, yet the red alder may be interspersed at a distance of 35 feet from any other plant.</p> <p>² To fit additional 50% increase in coverage to account for potential plant die off the recommended plant spacing may be decreased or plantings arranged in a zigzag across parcel.</p>			

Irrigation Plan

No irrigation is proposed. The planting will occur in the late fall or early winter once rains begin.

Fencing

Protective fencing will be placed at a minimum of three feet west of the wetland mitigation area. The fencing will be a minimum of 3 feet high and constructed of wood split rails.

Signage

Signs will be placed at the mitigation site identifying the area as a sensitive habitat and directing people to stay off the planted area. Signs shall be heavy, durable, vandal resistant, and weather resistant (such as baked enamel / embossed sign, porcelain enamel, metal, or equivalent). The sign border, legend, and symbol shall be white and the background shall be a contrasting dark color. Signs will be held by 4 inch by 4 inch or 6 inch by 6 inch wood rough cut Douglas fir posts (or equivalent or better). All posts shall be pressure treated according to AWPA Quality Standard C2 (min. retention of 0.25 lbs per cubic feet) for above ground use, and AWPA Quality Standard C2 (min. retention of 0.40 lbs per cubic feet) for ground contact with ACZA wood preservative. 2 inch diameter galvanized steel pipes or high tensile steel "U" - channel posts with pre-drilled 3/8 inch holes on 1 inch centers may be used in lieu of wood posts.

Implementation Schedule

The development of the mitigation area will be in accordance with the schedule presented in Table 4.

Table 4: Development Time Schedule (Preliminary)

Task	Description	Date¹
1	Grade mitigation site	June
2	Begin bridge construction	June
3	Place material in fill area	June
4	Complete in-stream work	October
5	Place wetland plants in mitigation area	November
6	Place wetland trees in mitigation area	December / January
7	Complete as-built drawings	February
8	Monitor wetland success	For five years from implementation
¹ Actual dates/years are not yet determined for the proposed project. Months provided are estimates of when the work would be expected to occur.		

MONITORING REPORTS

Due Dates

Annual reports of monitoring results shall be submitted yearly. The first annual report shall be delivered by November 1 of the year following the first growing season after planting, and for every year through the five-year monitoring period.

As-built Conditions

A report will be submitted to the City of Arcata and the COE within six weeks of completion of the mitigation site planting describing as-built conditions. A topography map of as-built contours of the mitigation area and planting areas will be provided.

Annual Reports

The report will assess both attainment of yearly target criteria and progress toward final success criteria. If final success criteria are met early, then a request for early completion of mitigation will be made. Photographs of mitigation area taken during monitoring, as described by the monitoring methods, shall be included with the annual report, as necessary to document site conditions.

CONTINGENCY MEASURES

Initiating Procedures

The mitigation area will be evaluated annually against the success criteria proposed herein. If an annual performance criterion (averaged over 15 sample plots) is not met for any year, or if final criteria are not met, a report shall be prepared analyzing the cause of failure and, if necessary, will propose remedial action. Specifically, if success criteria are not met consecutively for three years, remedial actions will be mandated to be implementation of replacement plantings and/or regrading of the site to improve hydrologic conditions. If after the fifth year of monitoring the success criteria are not met, and all feasible onsite remedial measures have been attempted, then additional off-site mitigation (within the same major watershed system) will be sought, at a replacement ratio of 2:1, based on the original impact area (may take into consideration areas of mitigation area that have been successful).

Funding Mechanisms

The property owner, Foster Avenue LLC, will provide funding for installation of the wetland mitigation area and subsequent maintenance and monitoring. Mr. Chris Dart of Danco Builders will be the responsible party.

COMPLETION OF MITIGATION

Notification of Completion

The COE shall be notified when performance criteria have been met at the time the annual report is submitted.

Confirmation

It is the responsibility of the COE to verify or confirm that the wetland mitigation area has been successfully established. A jurisdictional delineation may be required at the completion of the monitoring period

LONG-TERM MANAGEMENT

Property Ownership

The Foster Avenue, LLC parcel will be subdivided and sold as individual lots. The private property owners will then be responsible for maintenance of each individual parcel. No specific long-term maintenance of the wetland areas and enhancement areas is required.

Management Plan

The long-term management plans for the wetland mitigation area is unknown at this point. Foster Avenue LLC will develop long-term plans for the wetland mitigation area in coordination with the City of Arcata, Creeks and Wetland Committee, the Planning Commission, and the City Council.

Site Protection

The wetland mitigation area will be protected from the development by a minimum 50-foot buffer. No buildings or site development features will encroach on this setback (except for the stormwater detention basin and access routes for bikes, walking, nature trails, or emergency access). The wetland mitigation area will be protected from future development and impacts as a result of this buffer zone.

REFERENCES

- Kelly O'Hern Associates, 2001. *Topographic Survey for Foster Avenue LLC*. Unpublished survey map, Eureka, CA.
- LACO, 2002. *Soils Report for Proposed Foster Avenue Development*.
- Mad River Biologists, 2000. *Biological Assessment--North Coast Export Foster Avenue LLC* Unpublished technical report, Project No. 5196.00. Eureka, CA.
- NRM, 2004. "*Wetland Delineation Report for Foster Avenue*". Natural Resources Management Corporation (NRM).
- USFWS, 2005. *Listed/Proposed Threatened and Endangered Species for the Arcata North Quadrangle (Candidates Included)*. United States Fish and Wildlife Service (USFWS).
- University of California, 1965. *Soils of Western Humboldt County California*. Department of Soils and Plant Nutrition, University of California, Davis, in cooperation with County of Humboldt.

Appendix B
Groundwater Monitoring Data