SUMMARY

In August and October 2007, and May 2008, USKH Inc. (USKH) conducted a wetland delineation at the Whitcomb Heights subdivision in Sitka, Alaska for the City and Borough of Sitka (CBS). This survey delineates and classifies wetland and upland areas within the CBS property boundary and additional CBS rights-of-ways that would be utilized for drainage easements and utilities (delineation boundary). Wetland determinations herein follow the U. S. Army Corps of Engineers Wetland Delineation Manual (1987) as well as the Alaska Regional Supplement (2007) three-tier approach. USKH investigated vegetation, soils, and hydrology at all test plot locations. USKH also documented relatively permanent waterbodies within the subdivision and followed them to their terminus wherever practicable.

The project site is located along a benched area above Sitka Sound approximately two miles north of downtown Sitka on Baranof Island. The subdivision is bound on the east by the Tongass National Forest and on the west by housing developments along Halibut Point Road. The subdivision can be accessed from Halibut Point Road via Kramer Avenue to the south or Harbor Mountain Road to the north. Numerous drainages flow through the subdivision, and forested wetland/upland mosaics exist along stream corridors and/or where the topography and soils allow hydric conditions to persist throughout the growing season. Of the approximately 200-acre delineation boundary, USKH has determined that 5.2 acres are wetlands or Waters of the U.S. All wetlands found during field investigations were determined to be hydrologically connected to the Sitka Sound, and therefore under the jurisdiction of the USACE per Section 404 of the Clean Water Act. Development of the subdivision will be coordinated with the USACE and follow the guidelines outlined in Special Public Notice SPN 2005-8: Evaluation and Review of New Subdivisions Developed Completely or Partially in Wetlands and Other Waters of the United States.
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1 INTRODUCTION

1.1 Site Location

The project area is located within the Whitcomb Heights subdivision, locally known as the Benchlands, named such because it sits on a bench that ranges in elevation from 100 to 300 feet above sea level, with steep grades both above and below. The bench runs parallel to the shoreline of Sitka Sound, on the west side of Baranof Island, approximately two miles north of downtown Sitka. The subdivision property is bound on the east by the Tongass National Forest and on the west by housing developments along Halibut Point Road. The subdivision can be accessed from Halibut Point Road via Kramer Avenue to the south or Harbor Mountain Road to the north. Sitka is within a maritime climatic zone, with cool summers, mild winters, and above average precipitation. The project area is located at 57°03’50” North latitude and 135°21’43” West longitude within Sections 22, 23, 26, and 27; Township 55 South; Range 63 East; Copper River Meridian. Figure 1 shows the location and vicinity of the project area (All figures are located in Appendix A).

1.2 Project Description

The Whitcomb Heights subdivision has been a concept in development off and on for 30 years. After subdividing the land into building lots, park preserves, and street rights-of-way (ROW), construction contractors built road bases for the subdivision in the early 1980’s. Work ceased shortly thereafter, and trees and brush now crowd the area. Figure 2 shows an aerial photograph of the project area as it exists today. The old roads can be distinguished by vegetation color changes where vegetation has overgrown the roadbed. The City and Borough of Sitka (CBS) recently received a State grant to start the design of the subdivision infrastructure, including access roads, and water and sewer utilities. The CBS expects to acquire additional funding in the coming years to construct the subdivision utilities and roads, and begin the sale of lots. Major components of the project include:

- Constructing paved road surfaces and widen existing road bases for sidewalks.
- Constructing water and sewer systems with extensions to individual subdivision lots.
- Constructing stormwater systems that maintain natural drainage patterns while not overwhelming existing downstream drainage systems.

The majority of this project will fall within the existing road base. Material for the project is expected to come from existing local material sites, and the existing road base will be used for haul routes and staging areas.

The purpose of this analysis is to determine wetland locations within the delineation boundary, in support of the design of the subdivision infrastructure. The City of Sitka received a permit (POA-2007-1291) for a separate project that included the construction of a water tank and access road located within the boundaries of the subdivision. The current delineation area is approximately 200 acres. This report includes descriptions of the delineated wetland and upland habitats throughout the site.
2 BACKGROUND INFORMATION

2.1 Existing Wetland Information

The U.S. Fish and Wildlife Service, National Wetland Inventory (NWI) has mapped the wetlands in the project area (http://wetlandsfws.er.usgs.gov/wti/launch.html). The NWI identifies large swaths of freshwater forested/shrub wetlands intersecting the subdivision. Subdivision construction downgradient (west) of the Benchlands area may have changed the size and extents of the wetlands shown on the NWI mapping. The NWI identifies these wetlands as *Palustrine Forested Needle Leaved Evergreen Saturated* (PFO4B). See Appendix C for NWI mapping of the project site. A feasibility study completed by Kean and Associates in 2004 for CBS states that no large wetland or open water areas were observed on the site. The study states that localized areas of skunk cabbage were observed during site investigations, indicating the presence of forested wetlands within the subdivision. No detailed wetland investigation or mapping effort was performed for these areas as part of the study (Kean and Associates, 2004).

2.2 Existing Vegetation Information

The *Alaska Vegetation Classification* handbook identifies the project area as Coastal Forest, characterized as being dominated by open evergreen needle leaf forests interspersed with mixed conifers (Viereck et al., 1997). The Kean feasibility study identifies the study area as being covered with old growth hemlock and spruce forest, intermixed with stands of Red alder (Kean and Associates, 2004). See Section 4 for detailed descriptions of the vegetation communities found in the project area during delineation fieldwork.

2.3 Existing Soils Information

The U.S. Department of Agriculture Natural Resource Conservation Service (NRCS) soil surveys do not provide detailed coverage of the project area. The Exploratory Soil Survey of Alaska gives general information about the soils in the project area (NRCS, 1979). According to the Exploratory Soil survey, the majority of the soils in southeast Alaska are loamy, gravelly Spodosols, typical to environments with heavy precipitation. In these places, iron and other minerals are leached through the organic soil horizon, becoming deposited in the lower soil layers. The survey also classifies the soils within the Benchlands subdivision as Typic Cryohumods and Humic Cryorthods. These soils are located in forested areas and are comprised mostly of volcanic ash in varying thicknesses and can be well or poorly drained (NRCS, 1979).

The Kean subdivision feasibility study is consistent with the soil survey, describing the soil layers as volcanic ash parent material overlain by organics of varying thicknesses. The feasibility study also states there may be historic (greater than 300-500 years old) slide debris soils in the subdivision based on records from the original 1985 construction of Kramer Avenue. These construction records indicate a large amount of overexcavation took place in order to build portions of Kramer Avenue due to what was called “slide debris” (Kean and Associates, 2004). Construction records do not identify the specific location where the overexcavation took place.
Golder Associates Inc. conducted a Geotechnical Investigation during the summer of 2007. The investigation found evidence of an ancient landslide in areas both east and west of the Emmons cul-de-sac that is causing a perched water table. According to the Golder report, areas with evidence of ancient landslides or disturbed volcanic ash tended to be poorly drained (Golder, 2008). See Appendix C for a copy of the Geotechnical Report. See Section 4 for detailed descriptions of soils found during fieldwork.

### 2.4 Existing Hydrology Information

The existing site work completed as part of the Kean feasibility study outlines several drainages flowing through the subdivision based on field observations of flow in neighborhoods down gradient of the area. Many of the drainage pathways within the subdivision are not well defined and stormwater run off is carried downstream by a small number of streams. During rain events, flows within these drainages can become high, and evidence of erosion is present at culvert inlets and across portions of Kramer Avenue (Kean and Associates, 2004). Aerial and satellite photography of the region show Cascade Creek to the south of the project area, an unnamed stream to the north, and Sitka Sound to the project’s west. USKH completed a Hydrology Study of the Whitcomb Heights Subdivision in March 2008. The study described drainage characteristics of the subdivision and makes recommendations for culvert design throughout the subdivision. Appendix C contains a copy of the Final Hydrology Study. Results of this study were used in combination with the results of the wetland delineation to determine the hydrologic connection (if any) between the wetlands found within the subdivision and Sitka sound to the project’s west.
3 METHODOLOGY

Methodology for this wetland delineation followed the process established in the U.S. Army Corps of Engineers (USACE) Wetland Delineation Manual (1987) and the Alaska Regional Supplement (2006). Methodology followed the three-tiered survey approach established in the USACE manual and included the examination of vegetation, soil, and hydrology at all wetland delineation test plot (TP) sites. Three separate site visits were completed from August 2007 to May 2008. An initial field visit took place on August 14 and 15, 2007, to establish a baseline of vegetation, soils, and hydrology within the subdivision. The initial site visit took place during the growing season for the Coastal Western Hemlock- Sitka Spruce Forest region. Weather at the project site during the initial investigation was sunny and warm. Temperatures averaged around 70 degrees Fahrenheit. August 2007 conditions in Sitka were relatively dry. Only 0.5 inches of precipitation was recorded at the Sitka airport between August 1 and August 14, 2007, with a total of 2.11 inches for the entire month of August. Average August precipitation for the area is 6.77 inches (http://www.wrcc.dri.edu/summary/climsmak.html). A second site visit took place on October 12 and 13, 2007. Weather during the October visit was rainy and cold with temperatures averaging around 40 degrees Fahrenheit. The third site visit took place May 12-16, 2008. Weather during the May site visit was rainy with temperatures in the upper 50s to low 60s (degrees Fahrenheit). Sara Lindberg and Jeff Raun, USKH environmental analysts, conducted the August field investigation; Sara Lindberg conducted the October investigation, and Sara Lindberg and Kacy McDonnell conducted the May trip.

3.1 Field Preparation

Prior to the initial field visit, Lindberg used existing background information and mapping to assess the project area and to identify areas that needed further study or field verification. Thick vegetation adjacent to the roadway visible on the aerial photography made it difficult to identify open areas or drainages that may contain wetlands (Figure 2). An initial site reconnaissance was conducted in the delineation area on August 13, 2007, to ascertain the diversity of the vegetation communities within the subdivision and identify areas where wetland verification and mapping were needed. Subsequent visits were prepared for by reviewing the previous visit’s data and planning delineation efforts around problem areas or areas where further study was needed to understand project impacts.

3.2 Wetland Delineation

The site presented difficult field conditions. Steep terrain, thick vegetation and numerous stream channels and drainages made navigation of the subdivision difficult, and in places, impossible. After the first initial site visit, wetland delineation efforts were prioritized into three categories.

1. High priority areas: High priority areas are identified as areas where previous delineation efforts identified wetlands, or where contours show the area may be flat and thus merit further investigation. High priority areas also included areas that would be directly impacted by construction of roadway improvements.
2. Relatively Permanent Waterbodies (RPW) (flowing for at least three months a year) and their drainage corridors: RPWs were walked to the extent practicable to identify the presence of wetland buffers adjacent to the drainage.

3. Isolated or “pocket wetlands”: Transects were walked where practicable to establish a pattern of vegetation along a particular elevation gradient. Efforts were focused on finding localized areas not covered in the high priority areas where benching and hydrology may create wetland pockets.

Each subsequent field visit built on the knowledge of the last, helping to predict where wetlands were likely to occur based on contours and streams. Global Positioning System (GPS) coordinates identified prior to field work were located for each priority area. Delineators began by navigating via GPS to each priority area. General notation and photographs of site characteristics, vegetation and hydrology were taken to assess the different vegetation communities present at each location. Test Plots (TP) were recorded for each community type within the priority area. When investigating drainage corridors and transects, test plots were taken at breaks in vegetation communities as the team moved along the corridor. Vegetation communities well represented in other TPs were documented with field notes and photographs referring to the representative TP. As transects were walked through the different vegetation communities, it became apparent which communities were likely to contain wetlands, and delineation effort was concentrated in these communities.

Methodology at each TP followed the three-tiered survey approach established in the USACE manual including the examination of vegetation, soil, and hydrology at each site. A survey protocol document was sent the USACE prior to the May 2008 field visit that outlined delineation methods and showed areas of high priority and areas where transects would be walked. After the May visit was complete, Figures 3-5 of the protocol document were revised to reflect actual transects and pathways the delineation team walked as they surveyed the area. See Appendix C for the survey protocol document and further detail of delineation methods. TP data forms and representative photographs of the wetland areas can be found in Appendix B.

3.3 Data Analysis and Mapping

Mapping of wetland delineation boundaries while in the field was completed by walking the boundary with a GPS unit where vegetation and terrain permitted. In areas where vegetation was too thick or terrain too steep to make mapping practicable, the wetland boundary was drawn on the map in the field using contour and other landmark data. Drainages were walked where practicable, and flow paths were marked with a GPS unit.

After returning to the office, field investigators reviewed data sheets and correlated field data with site photographs and GPS locations. Wetland areas were then assigned a classification using data collected from the field visit as well as existing NWI mapping and Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al., 1979). GPS points used to identify TP locations were correlated with known points on the ground from earlier survey efforts to verify their locations. Wetland boundaries were mapped using GPS information and
other notes taken in the field. Wetland boundaries and locations of wetland delineation TP are shown on Figures 3, 4 and 5.
4 RESULTS AND DISCUSSION

4.1 Wetland Habitat Types

The Benchlands subdivision consists of old growth Western hemlock forests, with numerous streams and drainages flowing throughout the benched area. One wetland habitat type exists within the delineation area. Forested wetland/upland mosaics (PFO4/Upland) exist along drainage pathways and in locally benched areas. The ratio of wetland to upland within a particular mosaic area is primarily driven by the local microtopography of the specific location. Some mosaics have a larger percentage of wetlands than others, depending on how much of the area is made up of microtopographic “lows”. PFO4/Upland mosaics make up approximately 5.2 acres of the area within the subdivision boundary. See Appendix B for TP data sheets and representative photos of this wetland type. Figures 3, 4 and 5 show the locations and extents of wetlands relative to the proposed project components.

4.1.1 Palustrine Forested Needle-Leaved Evergreen Wetland/Upland Mosaics (PFO4/Upland)

PFO4/Upland mosaics are located along stream channels and low areas throughout the project. Western hemlock (*Tsuga heterophylla*), Western Redcedar (*Thuja plicata*) and Sitka spruce (*Picea sitchensis*) as well as the shrub species Red huckleberry (*Vaccinium parvifolium*) and False azalea (*Menziesia ferruginea*) dominate the overstory and exist on the microtopographic “highs”. Wetland lows are sparsely vegetated with Skunk cabbage (*Lysichiton americanum*) and mosses amid standing or flowing water. Forested wetland/upland mosaics within areas where ancient land slide debris were found have a slightly different vegetation community than the typical mosaics throughout the rest of the subdivision. These areas are located west of the Emmons cul-de-sac above and below a natural hill formation in the vicinity of TP 2, TP 66 and TP 67. This area is typically more flat and contains an open forest canopy with numerous large, standing dead trees. While the shrub and herb layers remain largely the same, tree and sapling species within the slide debris areas appear to be stressed and/or dying.

Soils in wet portions of the PFO4/Upland mosaics consist of organic layers of varying thickness underlain with layers of volcanic ash and cobbles. Organic layers measure eight inches in areas where water flows frequently and greater than 22 inches in areas where ancient slide debris were found. Saturation and presence of the water table within the soil pit occurs within all wetland/upland mosaics, but varies greatly depending on the location of the soil pit within the mosaic topography. Soils within low areas of the mosaic tend to have thicker organic layers and are saturated to the surface, whereas soils a few feet away in a slightly higher location are not saturated. In addition, soils in the microtopographic highs have numerous large roots within the organic soil horizon belonging to the tree and shrub layer. In many places, the microtopographic highs are made up entirely of roots, the trees growing on top of their own buttressed root system to escape inundation. Soils in these areas consist entirely of decomposing wood.

Hydric soil indicators were difficult to identify depending on the weather conditions and time of year the data was taken. Three separate site visits over the months of May to October provided an overall survey of the soil conditions within the subdivision. During the August site visit, saturation was sporadic partially due to local microtopography and partially due to the unusually
dry weather. During the October site visit, soils in all wetland mosaic “lows” were saturated. Some soils were oversaturated due to the lack of plant growth during the fall season to assist in the uptake of the water. The May site visit provided a balanced overview of the soils within the subdivision.

Hydrology indicators were the main driver in determining wetland boundaries for the project area. Obvious drainage patterns and changes in microtopography were visible throughout the subdivision. During the August site visit, soil saturation was not present for all wetland areas identified due to the unusually dry conditions. Wetland hydrology indicators in these cases were identified using obvious drainage patterns, microtoporaphic relief, and sparsely vegetated concave surface indicators. Oversaturation of the soil during the October site visit made hydrology indicators unreliable for some of the TPs. In these cases, data sheets from similar areas found during the August delineation were used to verify the hydrology of the wetlands visited in October. Hydrology indicators during the May trip were typical for conditions in southeast Alaska. One area considered wet during the August 2007 site visit was later determined to be upland during the May 2008 site visit based on the lack of hydric soil and hydrology indicators.

4.2 Upland Habitat Types

The Benchlands subdivision supports great expanses of Western hemlock forests. Delineators used the Alaska Vegetation Classification System (Viereck et al., 1997) to classify upland habitats. Uplands make up approximately 195 acres within the 200-acre delineation boundary. Three different vegetation communities exist within the delineation boundary. Open Western Hemlock-Sitka Spruce Forests occur throughout the majority of the area, generally occurring on slopes less than 30 percent, and are comprised of an open forest canopy of Western hemlock and Sitka spruce with a dense shrub layer of False azalea and Red huckleberry. It is within this forest type that all the wetlands within the subdivision were found. Forests occurring on the steeper slopes (greater than 30 percent) within the subdivision are classified as Closed Western Hemlock-Sitka Spruce-Western Redcedar Forest and contain a closed forest canopy, with almost no shrub layer, and very little ground cover except for a thick layer of forest floor mosses. These closed forest areas contain large expanses of downed woody debris that are covered with moss. The closed canopy areas have shallower soils, and USKH delineators determined after the August and October site visits that wetlands were not likely to occur in this habitat type. The third upland vegetation type within the subdivision is Closed Red Alder Forest. These areas exist along and include the disturbed ground of the existing subdivision roads, and in most cases, are growing out from the road bed itself. The understory in these areas consists of almost exclusively Sitka spruce saplings, which also grow out of the rocky material of the road bed. Soils in all the upland forested communities except for the rocky soils of the disturbed road bed consist of an organic/loam forest duff layer of varying thickness, underlain by layers of volcanic ash and gravel or cobbles. Soils in the upland areas are not saturated. General topography of the upland areas is sloped and encourages surface water drainage towards adjacent streams and/or drainage ways.
4.3 Streams/Drainages

Streams and drainages occur throughout the subdivision, crossing the subdivision roads through culverts. Figures 3, 4 and 5 identify RPWs found during the site visits. Due to the unusually dry conditions during the August field visit, many of the drainage routes within the forested areas were dry. During the subsequent visit in October, almost all drainages contained flowing water. Determining whether a stream or drainage could be considered an RPW after one site visit was difficult. As a result the drainage pathways were revised after each site visit and finalized subsequent to the May site visit.

Drainages within the closed forested areas that had little shrub undergrowth were easily followed and mapped with a GPS unit or by using contours where steep topography made walking the corridor impractical. Drainages were followed to their western most termini where practicable as well as upgradient to the east where the RPW began to flow within a defined channel. Drainages within the open forested areas where shrub under growth was very thick were more difficult to follow. Drainages in these areas flow underground or under thick masses of downed logs covered in moss and following them was not always practicable. In the ancient slide area, and in some of the wetland/upland mosaics, drainages would often split and meander and then become indeterminate altogether, before coming out again at the ditch line of a road. Figures 3, 4 and 5 show all the RPWs within the subdivision boundary.

4.4 Conclusion

Development activities from road construction and lot development within the boundaries of the subdivision would likely impact wetlands and/or Waters of the U.S. under the jurisdiction of the USACE. 5.2 acres of PFO4/upland mosaic wetlands were identified within the approximately 200-acre delineation boundary. Development of the subdivision roads and utilities will include consideration of all subdivision impacts including those from individual lot development. According to SPN 2005-08, Evaluation and Review of New Subdivisions Developed Completely or Partially in Wetlands and other Waters of the U.S., the subdivision will be developed and permitted in consideration of effects from lot development. It is anticipated that the permit application for the subdivision will follow “Alternative No. 2” for development of subdivisions, where the permittee will apply for a permit to construct the road improvements only, and require individual lot owners to obtain their own permits. Subdivision development will include coordination with the USACE and compliance with Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act.
REFERENCES


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