STATE OF CALIFORNIA—THE RESOURCES AGENCY GRAY DAVIS, GOVERNOR

CALIFORNIA COASTAL COMMISSION

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August 8, 2003

Michael Josselyn
2169-G East Francisco Blvd.
San Rafael, CA 94901

SUBJECT: A-1-HMB-99-051 (Wavecrest Village)
Wetland Delineation

Dear Dr. Josselyn:

This letter is in response to the March 2003 Addendum to the "Ponding and Vegetation Study" that you prepared for the Wavecrest Village project site in Half Moon Bay and your April 2, 2003 letter to me transmitting that document. Per the enclosed memorandum, the Commission's Ecologist/Wetland Coordinator John Dixon reviewed your submittals along with the May 2002 wetland study and data. Based on his review of these documents, Dr. Dixon has determined that the wetland delineation for the Wavecrest Village project site is deficient. To complete the delineation, Dr. Dixon recommends reanalysis of the existing data collected and additional field work to document the presence or absence of hydric soils in the areas of the site that were not examined in 2002. Please refer to the enclosure for a more complete explanation of Dr. Dixon's determination.

In addition, we have not received a delineation of the wetlands south of Wavecrest Road and West of the nurseries (Central Area). Although development is no longer proposed in the Central Area, a minimum 100-foot buffer is required under the Half Moon Bay LCP for development adjacent to the wetlands in the Central Area, such as the parking lot for the ball fields and improvements to Wavecrest Road. To determine whether the proposed project is consistent with the LCP wetland buffer requirement, it is necessary to establish the boundaries of the wetlands located in the Central Area.

Please contact either John Dixon or me at (415) 904-5200 if you have any questions concerning the foregoing.

Sincerely,

Chris Kern
Coastal Program Manager
North Central Coast District

cc: Patrick Fitzgerald, Wavecrest Village, LLC
Jack Liebster, City of Half Moon Bay Planning Director

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MEMORANDUM

FROM: John Dixon, Ph.D.
Ecologist / Wetland Coordinator

TO: Chris Kern

SUBJECT: Hydric Soils and Wetland Delineation at the Wavecrest Site

DATE: August 4, 2003

Documents reviewed:

May 2002. Wetlands Research Associates (WRS). Ponding and vegetation study, Wavecrest Village, Polygons 18 and 19, Half Moon Bay.

June 11, 2002. P. Greer (WRA). Transmittal letter to P. Imhof (CCC) with attachments re: Field notes and rainfall data for Wavecrest Polygon 18/19 study.

March 2003. WRA. Addendum. Ponding and vegetation study, Wavecrest Village, Polygons 18 and 19, Half Moon Bay.

April 2, 2003. M. Josselyn (WRA). Letter to C. Kern re: A-1-HMB-99-051 Wavecrest Village Project.

Wetlands Research Associates conducted intensive field work within Polygons 18 and 19 at the Wavecrest site in early 2002. Based on their observations of vegetation with a preponderance of species categorized as "OBL" or "FACW," and areas of inundation or prolonged saturation, WRA delineated portions of those polygons as wetlands under the standards of the Half Moon Bay Local Coastal Program. On their last field survey (March 4), they also made notes concerning the presence or absence of redoximorphic features in the soil at their standard sample locations. Common, distinct mottles in association with soils of chroma of 2 or less[1] were present at most of the stations. At many of the stations, these features occurred within the upper 12 inches of the soil profile and appeared to meet the requirements of one of the indicators of hydric soils contained in the 1987 Army Corps of Engineers (Corps) Wetland Delineation Manual. Therefore, in an October 7, 2002 memorandum to CCC analyst Peter Imhof, I recommended that hydric soils within Polygons 18 and 19 be mapped on a uniform grid using as a field indicator mottles at 10 inches associated with soil chroma of 2 or less. In their March 2003 Addendum to their earlier study, WRA argues that this is not a valid indicator of hydric soils at Wavecrest.

[1] "Mottles" are blotches of color within the soil. "Chroma" is a measure of the strength or intensity of a color. Low chroma and mottles are usually the result of periodic reducing conditions caused by water-logged soils.

WRA asserts that the use of "dark color with mottling at 10 inches" as an indicator of hydric soils can lead to a false positive finding when applied to the conditions found at Wavecrest. Their argument is based on the following assertions:

- The local soil type is not listed as a hydric soil by the Soil Service.
- The soil is a mollisol and low chroma colors (dark soils) are naturally present regardless of wetland conditions.
- The Corps requires that mollisols contain gray mottles, not brownish mottles, as an indicator of hydric conditions.
- The brownish mottles that are present "were formed hundreds of years ago in naturally occurring clay layers at depths considerably deeper than 18 inches." This layer of mottles now appears closer to the surface because of erosion and compaction due to agricultural practices.

In order to evaluate these arguments, one needs first to consider the processes that affect wetland soil coloration. The inorganic particles that are constituents of soil are generally a light, neutral color. The dark color of soil is thought to be due to organic staining. The red and brown colors are provided by ferric iron. Under wetland conditions, insoluble ferric iron is reduced to soluble ferrous iron, which lacks its molecular relative's red color and which can be transported by water. Over time, soluble iron is leached out, leaving a soil with dark (low chroma) coloration. If repeatedly subjected to wetting and drying, remaining iron may form oxidized concentrations, essentially "rust" marks, known as "brown mottles." Very dark colors (chroma 1) or moderately dark colors (chroma 2) associated with mottles are accepted indicators of hydric soils when found within the "root zone"[2], which is standardized as the upper 12 inches of the soil. However, some soils have natural characteristics that complicate a hydric soils determination. The Corps refers to these as "problem soils."

The soil type at Wavecrest is a mollisol, which is considered a "problem soil". Mollisols develop under grassland vegetation and have organic-rich surface layers that are dark brown to black even in upland situations. Therefore, low chroma is not necessarily indicative of wetland conditions for these soils. However, mollisols can, and frequently do, have wetland inclusions. For this reason, the fact that the local mollisol (Watsonville Loam) is not listed as a hydric soil is not particularly germane. So, there are really two problems associated with these soils. First, coloration *per se* is not a good field indicator of hydric conditions in this circumstance. Second, the dark coloration of mollisols may mask the presence of brownish mottles when the soils are, in fact, hydric.

WRA addresses the issue of problem mollisols as follows:

> "The Corps Manual specifically states that mollisols are problem soils and that the standard field indicators cannot be used (Section 44 f (2)). Furthermore, the Corps issued additional guidance in 1992 that stated that for many problem soils,

[2] Corps guidance says to make an assessment just below the A-horizon of the soil or at 10 inches from the soil surface, which ever is shallower. The Natural Resources Conservation Service indicator F6 calls for a 4-inch layer of dark soil with mottles within the upper 12 inches.

the use of the low chroma color indicator at 10 inches is not appropriate. For mollisols, the Corps Manual recommends that the mottling be 'gray mottles at 10 inches or less'. Gray mottles were not observed at the Wavecrest Village property-only brownish to yellow mottles were observed."

Appendix D, Section 3 f (2) of the 1987 Manual indicates that nongleyed[3] soils "usually have one of the following color features immediately below the A-horizon or 10 inches (whichever is shallower)":

(a) Matrix chroma of 2 or less in mottled soils.
(b) Matrix chroma of 1 or less in unmottled soils.
(c) Gray mottles within 10 inches of the soil surface in dark (black) mineral soils (e.g., Mollisols) that do not have characteristics of (a) or (b) above.

The pertinent part of Section 44 f is contained in a note that reads, "The matrix chroma of some dark (black) mineral hydric soils will not conform to the criteria described in (a)[4] or (b)[3] above; in such soils, gray mottles occurring at 10 inches or less are indicative of hydric conditions." The pertinent part of the March 6, 1992 clarification referenced by WRA reads, "The statement (p.31 of the 1987 Manual) that gleyed and low-chroma colors must be observed 'immediately below the A-horizon or 10 inches (whichever is shallower)' is intended as general guidance. Certain problem soils may differ."

None of these guidance passages is a prohibition against using brownish mottles at around 10 inches as a hydric soil indicator. If such mottles are present in association with low chroma coloration, it is an indication of hydric conditions, even in mollisols. On the other hand, many mollisols have no apparent redoximorphic features, such as mottles, anywhere within the soil profile. The quoted passages are guidance for how to proceed in such cases where brownish mottles are masked by the dark coloration of the parent soil material, and provide a cautionary note against applying the recommended location for observations too rigidly.

WRA further argues that, "...the brown mottles that were observed are not indicators of current conditions in which the soil has formed. The mottles which had formed at deeper layers of the soil have been brought closer to the surface because long-term agricultural practices have resulted in the loss of topsoil and alteration of the soil profile." Although presented as fact, the notion that the observed mottles were formed "considerably deeper than 18 inches," but now appear in the root zone due to soil loss and compaction is speculation. Although this *ad hoc* hypothesis is a possibility, I do not know what data could be used to test it.

WRA also points out that the soil disturbances due to plowing "...make the determination of soil properties extremely difficult especially when estimating depths to various soil layers." However, for this type of atypical situation, the 1987 Manual

[3] Gleyed soils are greatly reduced soils that have bluish, greenish, or grayish colors.
[4] Same as (a) and (b) in D3, above.

(Section F 74, step 3) provides the following guidance:

> "c. *Characterization of plowed soils*. Determine the depth to which the soil has been disturbed by plowing. Look for hydric soil characteristics (Part III, paragraphs 44 and/or 45) immediately below this depth."

In summary, delineations are commonly conducted in plowed fields and in areas with naturally dark soils. Although these situations present challenges to the delineator, there are standard procedures for dealing with such conditions. I discussed these issues with Mr. Dan Martel, an ecologist and experienced wetland delineator with the Army Corps of Engineers, San Francisco District. He pointed out that redoximorphic features[5] immediately below a plow line and redoximorphic features in mollisols usually indicate hydric soil conditions, and that such an interpretation is unlikely to be wrong if there is also evidence of hydrology and a preponderance of hydrophytic vegetation (personal communication, May 15, 2003).

The presence of hydric soils alone is sufficient evidence of a wetland under the definition of wetlands in the City of Half Moon Bay Local Coastal Program. However, WRA has made a reasonable case that because of the atypical situation and the problem soils that exist at the Wavecrest site, use of standard hydric soil indicators in isolation may result in the false identification of wetland conditions. In this special case, I think the solution to the problem is to accept the presence of mottles associated with a matrix chroma of 2 or less immediately below the A-horizon or at about 10 inches (whichever is shallower) or immediately below the plow line as an indicator of hydric soil conditions if there is also evidence of wetland hydrology and wetland vegetation, according to the definitions and field criteria for routine delineations contained in the 1987 Corps Wetland Delineation Manual. As a practical matter, this would entail conducting a routine Corps delineation at stations arrayed in a uniform grid throughout Polygon 18/19, and then defining wetland boundaries based on sampling appropriately placed additional points. This is consistent with the LCP standard, and simply requires additional evidence of hydrology and wetland plants in the special case of using soil color and redoximorphic features to identify hydric soils at this site. Areas that have a preponderance of hydrophytes or hydric soils identified through the use of other field indicators do not require additional evidence to be identified as wetlands.

In the March 2003 Addendum, WRA also discussed an issue that occasionally arises due to the definition of "wetlands" in Section 13577 of the California Code of Regulations. According to that definition, if an area is wet enough long enough either to have a preponderance of wetland vegetation or a preponderance of hydric soils, then the area is a "wetland." Since, by definition, plants contained in the U.S. Fish and Wildlife Service's regional lists of plant species that occur in wetlands also occur in uplands with some frequency, there is a danger of misclassifying uplands as "wetlands" when basing a delineation solely on the vegetation criterion. However, WRA misinterprets the Commission's approach to this potential problem, although that approach is discussed in my May 24, 2002 memo regarding the LA-90 project, which

[5] "Redoximorphic features" include mottles and low chroma colors.

WRA cites. The language WRA quoted from the report[6] on the Terrace Point wetlands also does not accurately characterize the Commission's standard. The Commission has taken the stance that plant species listed as OBL, FACW, or FAC (or as defined in an LCP) are presumptively "hydrophytes," and that a preponderance of hydrophytes or a preponderance of hydric soils is presumptive evidence of a "wetland." This presumption can be rebutted by strong, positive evidence of upland conditions. This is a high standard. In general, Terrace Point is not a good example, because it is an unusually complicated site where there is often ambiguous evidence of two of the wetland criteria when the third criterion is strongly present and where the boundaries between wetland vegetation or wetland soils and upland conditions are poorly defined. It is a very unusual delineation problem that has required an unusual approach and more field work than at any other site with which I have experience. Nevertheless, I will provide an example from that study. At Terrace Point, many areas support large clonal patches of *Baccharis douglasii* (OBL). Some of these areas have the following characteristics: (1) topographic high or slope, (2) very permeable soil, (3) no shallow confining layer, (4) *B. douglasii* patches amidst predominantly upland vegetation, and (5) merely moist soil after rainfall events, compared to nearby locations that are ponded or saturated within the upper 12 inches of the soil profile. This combination of facts is convincing evidence of upland conditions, and is qualitatively different than, for example, a lack of evidence of wetland hydrology.

WRA's discussion of "surface ponding and the occurrence of hydric soils" raises two additional issues that require comment. The first is the relationship between wetland definitional criteria and wetland field indicators of those criteria. The various definitions relating to wetlands contain criteria that cannot be demonstrated without extraordinary field effort. For example, the 1987 Manual states that an area has wetland hydrology if it is inundated or saturated to the surface for 5% of the growing season (18.5 days in California) in most years (50% probability of recurrence). However, acceptable evidence of wetland hydrology includes the one-time observation of inundation, soil saturation, watermarks, or sediment deposits. Acceptable evidence of soil saturation is an observation of standing water in a fresh soil pit, or water entering the pit from its sides, within the "major portion of the root zone,"[7] which is taken to be the upper 12 inches of the soil profile[8]. So, although the Manual says that an area has wetland hydrology if it has continuous saturation to the surface for 18.5 days during 50 years out of 100, it accepts a single observation of standing water in the upper 12 inches of the soil profile as sufficient evidence of hydrology. WRA attempts to make the definitional

[6] Huffman-Broadway Group, Inc. 2002. Investigation of the geographic extent of wetlands and other environmentally sensitive habitat areas on Terrace Point and Younger Lagoon Reserve, University of California, Santa Cruz. A report to the University of California at Santa Cruz dated July 2002.

[7] Section 49 b(2) of the 1987 Manual requires that saturation occur "within a major portion of the root zone (usually within 12 inches of the surface)." I believe WRA misinterprets the language of this section when they take it to mean that a majority of the upper 12 inches of the soil profile must be saturated. The intent of the section seems clear in the following passage: "If water is observed at the bottom of the hole but has not filled to the 12-inch depth, examine the sides of the hole and determine the shallowest depth at which water is entering the hole."

[8] "*Major portion of the root zone.* The portion of the soil profile in which more than 50 percent of plant roots occur. In wetlands, this usually constitutes the upper 12 in. of the profile." Appendix A, 1987 Corps of Engineers Wetland Delineation Manual.

criteria the primary evidentiary standard, rather than the wetland field indicators of those criteria. In contrast, the Coastal Commission has always accepted the presence of pertinent wetland field indicators of wetland criteria (or "parameters") as sufficient evidence of wetlands.

The second, and in some ways related, issue is the use of hydric soil criterion 3 as a hydric soil field indicator. Criterion 3 reads, "Soils that are frequently ponded for long duration or very long duration during the growing season[9]." The National Technical Committee on Hydric Soils (NTCHS) accepts hydric soil criterion 3 as a field indicator of hydric soils but also requires "proof" of anaerobic conditions, which may be professional judgment[10]. The Corps similarly accepts hydric soil criterion 3 as a field indicator of hydric soils, but does not require evidence of anaerobic conditions to use inundation as a hydric soil indicator (although evidence of anaerobic conditions in the upper 12 inches of the soil profile is considered sufficient evidence of a hydric soil). "[C]urrent practice in most Districts is to follow the guidance given by the NTCHS and accept as hydric any soil that is inundated for at least 7 consecutive days during the growing season in most years ... even if they lack hydric soil indicators[11]...." This difference reflects an intrinsic conflict between the Corps delineation requirements under the Clean Water Act and the approach of the Natural Resources Conservation Service and the NTCHS. The NTCHS defines hydric soils as soils that develop under anaerobic conditions. The Corps requires evidence of "hydric soils" but also regulates wetlands that are inundated or saturated for long periods but that never develop anaerobic conditions; yet, the 1987 Manual and supplemental guidance requires the use of the NTCHS definition of "hydric soils." The Corps is aware of this disconnect and Wakeley[12] has recommended changes to resolve it. The recommendations implicitly require a more expansive definition of "hydric soils" and explicitly include retaining ponding and flooding criteria as field indicators, apparently without a demonstration of anaerobiosis. The Commission has accepted evidence of ponding for 7 days as a hydric soil indicator.

Most Corps Districts also accept evidence of long period (7-day) saturation as evidence of hydric soils, but in this case, only if "there is additional evidence of anaerobic conditions in the form of chemical tests or hydric soil morphology[13]."[14] I recommend that the Commission also accept this Corps standard for saturation as a hydric soil indicator. Unfortunately, WRA's chemical sampling program was not sufficiently intensive to avoid the risk of false negative determinations because there were instances of saturation for 7 days or longer that were not accompanied by a chemical

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[9] "Frequently" means a 50% chance of occurrence. "Long duration" is 7 to 30 days; "very long duration" is greater than 30 days.

[10] "According to the NTCHS, Criteria 1, 3, and 4 can be used to document the presence of a hydric soil; however, proof that anaeroblosis exists must also be obtained. Either data or best professional judgement may be used to prove anaerobiosis." NTCHS Technical Note 1: Proper use of Hydric Soil Terminology.

[11] Wakeley,J.S. 2002. Developing a "Regionalized" Version of the Corps of Engineers Wetlands Delineation Manual: Issues and Recommendations. ERDC/EL TR-02-20, U.S. Army Engineer Research and Development Center, Vicksburg, MS, page 14.

[12] ibid.

[13] For example, brownish mottles.

[14] Wakeley, 2002, op cit.

test. Where soil saturation is the hydric soil indicator, I recommend that the presence of redoximorphic features be accepted as sufficient evidence of anaerobic conditions.

In summary, WRA has identified some potential problems in the interpretation of wetland field indicators at the Wavecrest site. However, WRA's solution is to require the field demonstration of wetland definitional criteria, which is a much higher standard than required by the Corps or the Commission. I recommend that all areas with a predominance of OBL and FACW indicator species be mapped as wetlands, as has been done by WRA. In addition, I recommend that all areas with predominantly wetland soils be so mapped. I further recommend that, in this site-specific situation, the following field indicators be considered sufficient evidence of hydric soil conditions: (1) brownish mottles in association with matrix chroma of 2 or less immediately below the A-horizon or at about 10 inches (whichever is shallower) or immediately below the plow line, when accompanied by a predominance of OBL, FACW, and FAC indicator species and standard Corps field indicators of wetland hydrology, (2) saturation of 50% or more of the upper 12 inches of the soil profile for 7 consecutive days or more, if there is also the presence of either redoximorphic features or a positive ferrous iron test, or (3) ponding for 7 consecutive days or more. This will require a reanalysis of the existing data collected by WRA and additional field work to document the presence or absence of hydric soils in areas that were not examined in 2002.

Wetlands Research Associates, Inc.

April 2, 2003

Chris Kern
California Coastal Commission
45 Fremont, Suite 2000
San Francisco, CA 94105-2219

RE: A-1-HMB-99-051 Wavecrest Village Project

Dear Chris:

I have enclosed an Addendum (3 copies) to our May 2002 study of ponding and vegetation within Polygons 18/19 of the Wavecrest Village project site. The 2002 study was requested by the Commission in order to evaluate public comments received on the application. Following the submittal of this study to the Commission, the applicant received letters from the Commission dated July 26, 2002 and October 16, 2002 commenting on the results and data interpretation contained in that study. In addition, the applicant received comments from the City's biological consultant, Dr. Terry Huffman in a letter prepared on July 30, 2002. Finally, the Commission staff, Dr. Huffman, the applicant, and myself met on September 6, 2002 to discuss the report and the analyses conducted.

The attached addendum addresses comments and questions that were raised in the various correspondence and meetings. I have tried to cast the data in the same format that was used by the Commission staff in their review so as to be consistent in format and comparable with Dr. Dixon's tables. In addition, I have also responded to Dr. Dixon's specific suggestions on possible ways to analyze the observations. Where there are differences in opinion, I have relied on the protocols and descriptions in the Corps manual, documents prepared by the National Technical Committee on Hydric Soils, and other scientific literature to support the conclusions reached.

I look forward to your review of this report and would welcome the opportunity to discuss our findings further.

Sincerely yours,

Michael Josselyn, PhD
Certified Professional Wetland Scientist

Encl.

cc Patrick Fitzgerald, Wavecrest Village

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