

CALIFORNIA COASTAL COMMISSION

45 FREMONT, SUITE 2000
SAN FRANCISCO, CA 94105-2219
VOICE AND TDD (415) 904-5200
FAX (415) 904-5400

**MEMORANDUM****Exhibit
MMM**

DATE: July 2, 2007

TO: John Dixon
Mark Johnsson

FROM: Jonathan Van Coops, Mapping/GIS Program Manager

SUBJECT: **Aerial Photo and Map Interpretation for Shea Property (Orange Co. APNs 110-016-19, 110-016-20, and 110-016-23)**

The results of my review of available aerial photography, topographic maps and other materials provided for the Shea property are included below. The primary purpose of my review was to attempt to identify changes due to landform alteration resulting from grading, filling, and other activities including farming, and to attempt to delineate various disturbed areas using a baseline of 1970's-era aerial photography and topographic maps. This information is intended to be of assistance in characterizing land cover changes over time and the determination of how much permitted and unpermitted filling of land has taken place on the property.

I. Methodology

The review consisted of analyzing a series of maps and vertical aerial photographs, and also reviewing materials included in the power point presentations submitted by J. Vandersloot and M. Stirdivant. The vertical aerial photos were viewed under magnification and, where possible, with standard magnifying stereoscopes in order to establish dates where various types of landform alterations were evident. Images taken before and after January 1, 1977 were examined to determine whether any evidence of development was visible prior to the effective date of the Coastal Act. Various images available at the Commission's offices were scanned and examined using computer software that allows enlargement of small areas of an image, and adjustment of the image contrast and color balance. Digital aerial images and maps obtained or already available in the Commission's offices were also examined using the software mentioned above.

II. Photo Interpretation Results

Some of the earliest commercial aerial photography missions were flown in Southern California, and, as a result, I was able to examine vertical aerial images of this area taken during 1934, 1952,

1970, 1977, 1981, 1983, 1986, 1995, 1999, 2001, and 2006, with stereopairs (overlapping images) available only for 1970, 1986, and 2001. Stereopairs are used to view the content of overlapping aerial photographs “three-dimensionally.”

The exhibit numbers given below for each image refer to the group of maps and photos that are attachments to this memorandum. This entire memorandum with attachments is labeled as Exhibit MMM to the staff recommendation for the July 2007 Commission meeting and can be viewed online on the Commission’s website as a link from the July agenda.

1934 image (see Exhibit 1)

This black and white image, taken February 12, 1934, covers the entire property and was part of an early series covering the coastal lowlands in this region of Orange County. Our copy is a paper xerographic enlargement. Unfortunately, the image quality is not very high, but it is clear that the area retains some of the typical characteristics of coastal wetlands, with numerous meandering channels and bare flats. The larger historical tidal channels and lower lying areas show clearly as darker tones. Riparian vegetation lines part of the channel towards the eastern margins of the property. The image pre-dates the current alignment of the East Garden Grove-Wintersburg flood control channel, however, a drainage channel appears at the southeast margin of the image with its western terminus at one of the historical tidal channels. The roughly 1000 foot long east-west oriented segment of this channel is identified and labeled Slater channel on later US Geological Survey (USGS) topographic maps. The property in the eastern half of the image has been cleared along narrow straight lines that demark several 5 to 6 acre areas. No structures appear on the property, and the primary access to these areas appears to be from the west through what is now the Orange Co. APN 110-016-18 (the Goodell property), with a light duty or unimproved road running in a south-southwest direction from the northern property boundary along the base of the slope. The east-west trending road identified as Slater Ave. on the 1965 Seal Beach quadrangle appears at the southwestern limits of the property.

1952 image (see Exhibit 2)

This black and white image, taken December 26, 1952, covers only the westernmost 500 feet or so of the property in question. Unfortunately, the image quality is also affected by “banding” visible throughout the image, although it is clear that the area is being used for agricultural activities. As with the 1934 image, this image pre-dates the current alignment of the East Garden Grove-Wintersburg flood control channel. Again, no structures appear on the property, and the access to the agricultural field appears to be from the west through the Goodell property. Slater Ave. appears similar to its depiction on the 1965 USGS Seal Beach quadrangle. There is clear evidence of fill and road construction activities at the western margin of the agricultural field near the base of the slope.

1970 images (see Exhibit 2)

These 1:12,000 scale black and white images were taken May 21, 1970, and present a good indication of pre-Prop 20 and Coastal Act conditions on the property. The extreme easternmost

portion (a triangular area approx. 2.5 acres in size) of the Shea property is just beyond the limits of the image. These photos were examined stereoscopically and show the area mostly in agricultural use. The cropland appears to be lying fallow although evidence of disking is apparent. The current alignment of the East Garden Grove-Wintersburg flood control channel bisects the image and the western extension of Slater Ave. is clearly visible just north of the channel embankment, along the southwestern margin of the property.

In their fallow state the slightly lower lying areas and historic tidal channels within the fields are quite easily distinguished from the rest of the cultivated area by their darker tones. The central portion of the area mapped and now identified as the EPA wetland appears to have been undergoing recent disking or plowing operations at the time the image was captured. The disturbance to the lower lying areas by disking enhances the soil contrast of wetter areas by darkening the “signature” of this feature in the image.

There do not appear to be any structures on the property in this image, and no improved roads other than the western extent of Slater Ave., which has been altered to allow for crossing the East Garden Grove – Wintersburg flood control channel. The main access to the agricultural fields appears to be from the Goodell property located immediately to the west, and via the light duty or unimproved road running in a southwest direction from the northern property boundary along the base of the slope. There is clear evidence of disturbance including clearing and road construction activities at the southeastern margin of the rectangular six-acre Goodell property. The 1970 images establish a pre-Prop 20, pre-Coastal Act baseline for gauging the extent of land alterations and other changes on the Shea property that came later.

1977 image (see Exhibit 3)

These 1:32,500 scale (1 inch equals approx. 2700 feet) color image was taken January 13, 1977, and present the closest indication of conditions on the site at the time the Coastal Act became effective, which was January 1, 1977. They are smaller scale (less detailed) than most of the other images, however they show the cropland appearing fallow and the historical channels and lower lying areas with characteristic darker tones. The filled area at the southeast corner of the Goodell property shows at least four structures and other vehicles or equipment in this part of the image. A single similar feature, probably a structure or vehicle, also appears to be situated on the adjacent property now owned by Shea (Orange Co. APN 110-016-20).

1981 black and white image (see Exhibit 4)

This image is from a vertical aerial photo taken January 31, 1981. The nominal scale of the original was probably 1:12,000 or 1 inch equals 1000 feet, although this has not been verified. The image covers only the westernmost 500 feet or so of the Shea property but clearly shows structures, vehicles, and an enclosed arena located on a disturbed area approximately six acres in size. All of this area is situated east of the Goodell property on what is now Orange Co. APN 110-016-20, and includes filled areas located both north and south of the segment of Slater Ave. that crosses the southwest portion of the property. This development also covers the majority of the property shown as lying below Mean Sea Level (MSL) on the 1965 USGS Seal Beach 7.5

minute quad for this area. Although truncated by the edge of the image, the darker grey tones of the lower lying area and former tidal channel are apparent in the cultivated area to the north of the disturbed area which was being developed as an equestrian facility.

1983 black and white image (see Exhibit 4)

This image is from a vertical aerial photo taken February 19, 1983. The nominal scale of the original was probably 1:12,000 or 1 inch equals 1000 feet, although this has not been verified. The image quality is low due to poor contrast and banding that is present in the digital file. The image covers only the westernmost portion of the property but, as with the 1981 image, shows the disturbed areas clearly, including additional fill north, south, and southwest of the riding arena. Well over 100 individual mounds of stockpiled fill material are evident in the area to the south and southwest of the arena. Similar to the 1981 image, the edge of this image truncates the cultivated part of the Shea property, but the darker grey tones of the former tidal channel are apparent in the area to the north of the arena and disturbed area being used as an equestrian facility.

1986 Department of Boating and Waterways (CCC) color image (see Exhibit 5)

These images are original prints of vertical aerial photos taken May 13, 1986. The nominal scale of the original images is 1:12,000 or 1 inch equals 1000 feet. Adjacent overlapping images were examined stereoscopically for the subject area and scanned versions of the same images were analyzed under magnification. Beyond the development present in the 1981 and 1983 images, additional filling is evident in the area to the south and west of the arena, as well as to its north, where over an acre of additional fill is visible with several enclosed corrals or riding areas constructed within the extended fill area.

The agricultural field occupying the balance of the property lies fallow in this image and, as in the earlier images, the darker signature of the former tidal channel and lower lying area shows clearly.

1995 black and white image (see Exhibit 6)

This image is a copy of a vertical aerial photo taken January 28, 1995. The nominal scale of the original is probably 1:12,000 or 1 inch equals 1000 feet, although this has not been verified. Adjacent overlapping images were not available which precluded stereoscopic analysis of the subject area for this year. A scanned version of the image was analyzed under magnification. The image shows the stable operations and further expansion in the stable area having ceased, and the area in the process of re-vegetating. Structure and vehicles in the stables area have been removed. Ponding in the lower lying parts of the agricultural fields is apparent in several areas, the largest being approximately 5 acres in size and located to the north of the former stables in the same general area as the EPA wetland mapped in the late 1980's.

1999 black and white image (see Exhibit 7)

This image is a digital version of a vertical aerial photo taken February 24, 1999. The nominal scale of the original is probably 1:24,000 or 1 inch equals 2000 feet, although this has not been verified. Adjacent overlapping images were not available which precluded stereoscopic analysis of the subject area for this year. A scanned version of the image was analyzed under magnification. The image covers only the westernmost portion of the property and is of relatively low contrast but, as with the 1981 and 1983 images, shows the filled, former stable area clearly, including additional fill extending to the north, and extensive disturbance throughout the entire filled area, and extending further to include the Shea property to southwest of the former riding arena. This image shows the dramatic, nearly complete alteration of the remnant coastal salt marsh area adjacent to Slater Ave. mapped as "pickleweed marsh" in the 1971 Dillingham report.

2001 color image (see Exhibit 8)

This image is a digital version of a vertical aerial photo taken June 29, 2001. The nominal scale of the original is 1:12,000 or 1 inch equals 1000 feet. Adjacent overlapping images were examined stereoscopically for the subject area and scanned versions of the same images were analyzed under magnification. The image covers the entire property and shows the agricultural fields under cultivation with the cropped portion divided into four quadrilateral shaped areas by three dirt roads and bounded by a perimeter road that follows the property lines. The southwest limit of the cultivated area is along the boundary between the City of Huntington Beach and unincorporated Orange County. The low lying non-agricultural Shea property to the southwest of the City/County boundary appears fragmented by trails but re-vegetating with both wetland and upland species. A channel has been constructed along the western margin of the cultivated area just east of the access road. This channel continues southwest through the County portion of the property. The dirt road following the western margin of the agricultural field northeast to the property boundary appears to have been undergoing some sort of construction activity at the time the image was taken. A vehicle is visible on the dirt road ahead of a line of specular reflection that usually indicates standing water. The pattern of vehicle tracks is consistent with a vehicle reversing direction at the end of the road and returning to the opposite end of the road via the same segment, as would occur if grading or watering were being done. This color image also shows the persistent tonal difference of the historical tidal channels and lower lying areas within the cultivated area.

2006 color image (see Exhibit 9)

This image is a digital version of a vertical aerial photo taken in January 2006. The nominal scale of the original imagery is 1:12,000 or 1 inch equals 1000 feet. Adjacent overlapping images were not available which precluded stereoscopic analysis of the subject area for this year. The digital image was analyzed under magnification. The image covers the entire Shea property and shows the activity in the agricultural field, as well as in the County area southwest of the former stables operation, where changes include the placement of structures along the flood control channel, the expansion of an access road into this area, and additional fill extending to

the north of this expanded access road. Signs of relatively extensive grading and standing water in the area along the northwestern margin of the agricultural field and access road are clearly evident. As in most of the aerials, this color image also shows the persistent tonal difference of the historical tidal channels and lower lying areas within the cultivated area.

III. Analysis of maps and other materials

In addition to the aerial photographs described above, we reviewed maps and other materials that were either in our map archive or were provided for our review. The scale of the originals is variable and most were developed for a specific purpose (e.g., topographic mapping, vegetation overlay, wetland boundaries, etc.). Some have no scale or source information.

Vertical Datums

For topographic mapping efforts the survey elevation traditionally used for zero was Mean Sea Level (MSL). All other elevations were referenced to this elevation. In addition, because the MSL itself must be referenced to network of survey control, the idea of identifying a particular MSL became the basis for what is referred to as a “vertical datum.” Many topographic surveys performed in the mid-twentieth century used what is known as the National Geodetic Vertical Datum of 1929 (NGVD29), which was originally called the Sea Level Datum of 1929. It was created by the US Coast Survey after thousands of miles of transcontinental surveys had been completed using geodetic leveling to observe and establish a network of precise elevations from Chesapeake Bay to San Francisco. The Sea Level Datum of 1929 used the assumption that MSL at 26 control tide stations was equal, which we now know is not the case.

Due to advancements in the science of geodesy during the latter half of the twentieth century, our understanding of the shape of the earth and its implications for accurate surveying has changed dramatically. Consequently, periodic refinements to high-accuracy survey networks and datum changes must be made to reflect this new knowledge. As a result NGVD29 has been replaced by the North American Vertical Datum of 1988 (NAVD88) which references a single control elevation at a station in Canada as the zero elevation. The difference between the two vertical datums varies from location to location, but is approximately 2.3 feet in Orange County. Each of the digital topographic maps used in this review either used or was converted to NAVD88.

To further complicate the datum issue even reference datums are refined periodically. For example the 1980 map is NGVD29, 1976 OCS adjustment. Newer Orange County topographic maps are NAVD88, 1995 OCS adjustment. The result is that it can become quite complicated to compare topographic maps from different years, however, because all of these maps depict six inch to one foot contour intervals and spot elevations to the tenth, or at least half foot, it is possible to analyze the terrain and examine small relative differences that represent topographic depressions. The relative differences in elevation for these feature remains the same in different maps, but overlaying the information for visual presentation becomes difficult.

The primary maps reviewed are listed with comments below:

- 1) Large-scale topographic map prepared by the US Coast Survey in 1873 (T-1345). (see Exhibit 10)

This 1:10,000 scale (1 inch equals 833.33 feet) map shows tidal channels, ponds, salt marsh, flats and riparian woodland depicted on the property, which is situated entirely below the 5-foot contour. Nearby survey control point is named "Grass Edge" and is located at the mean high tide line (MHTL).

- 2) Regional-scale topographic map prepared by the US Geological Survey (USGS) in 1901 (So. California Sheet No. 1). (see Exhibit 11)

This 1:250,000 scale (1 inch equals 4 miles) map also shows tidal channels, salt marsh, and open water in the area. Vertical datum is mean sea level.

- 3) Large scale topographic map prepared by USGS in 1935 (Seal Beach 15 minute Quad). (see Exhibit 12)

This 1:31,680 scale (1 inch equals 0.5 mile) map also shows tidal channels, salt marsh, open water and manmade drainage channels in the area. This map was based on survey work done in 1932. Vertical datum is mean sea level.

- 4) Large scale topographic map prepared by the USGS in 1965 (Seal Beach 7.5 minute Quad). (see Exhibit 13)

This 1:24,000 scale (1 inch equals 2000 feet) map shows the current alignment of the East Garden Grove-Wintersburg channel, with the majority of the property lying below 5-foot elevation. The southwestern portion of the property is below Mean Sea Level (MSL), or zero elevation. This map was based on aerial photography taken in 1963, and the topography was done by planetable survey in 1965. The vertical datum for this map is NGVD29.

- 5) Large scale topographic map prepared by Orange County in 1978. (see Exhibit 14)

This 1:2,400 scale (1 inch equals 200 feet) map has a 5-foot contour interval and spot elevations to 0.5 foot. The topography is based on aerial photography taken in March 1978. The vertical datum is NGVD29, indicating elevations shown on this map will be approximately 2.3 feet higher than their respective NAVD88 elevations. This map

shows the current alignment of the East Garden Grove-Wintersburg channel, with the majority of the Shea property lying below the 5-foot elevation (2.7 ft. NAVD88). Spot elevations in the southwestern portion of the property range from .5 foot to 2.5 feet (-1.8 feet to 0.2 feet NAVD88), with the roadbed of the Slater Ave. connector at 5.0 feet (2.7 feet NAVD88). Spot elevations shown along the tops of the flood control channel levees range from 11.5 feet to 12.5 feet (9.2 feet to 10.2 feet NAVD88). This photogrammetric base map depicts the levees about 10 feet to 12 feet higher than the adjacent area to the north, and 6.5 feet to 7.5 feet higher than Slater Ave. In turn, the roadbed of Slater Ave. is 2.5 feet to 4.5 feet higher than the surrounding area.

Northeast of the City/County boundary the Shea property (APN 110-016-20) is again shown mostly below 5 feet elevation with spots ranging from 1.0 foot to 3.5 feet. The eastern part of the property is truncated by the map limits. As in the southwestern part of the Shea property, the adjacent levees in this area range from 9 feet to 11.5 feet higher than the agricultural lands to their north. A fence line map symbol is delineated between the northern approach to the Slater Ave. bridge crossing and approximately the southeast corner of the Goodell property.

6) Large scale topographic map prepared by Orange County in 1980. (see Exhibit 15)

This 1:3,600 scale (1 inch equals 300 feet) has a 2-foot contour interval below 10 feet elevation, and a 10-foot interval above 10 feet elevation, with spot elevations to 0.1 foot. The vertical datum for this map is Mean Sea Level (NGVD29, 1976 OCS adjustment). The effect of this datum is to lower elevations approximately 2.5 ft. The date of photogrammetry given for this map is September 17, 1980. The elevation information on the paper copy of the map in our archive covers only the southwestern part of the property (Orange Co. APN 110-016-19 and APN 110-016-23). None of the spot elevation information is shown for the larger portion of the Shea property (APN 110-016-20).

A version of this map that included topography for the larger Shea agricultural parcel was also produced by the County and was used as the base map for the 1987 Bilhorn delineation. This same 1980 map was provided to us in digital form and is discussed in Section 7 below.

The map depicts the current alignment of the East Garden Grove-Wintersburg channel, with the majority of the Shea property to its north lying below the 0.0-foot contour or zero elevation. Spot elevations in the southwestern portion of the property range from -1.9 feet to 1.6 feet, with only the roadbed of the approach to the Slater Ave. overpass at elevations ranging from 1.5 feet up to 2.8 feet. Spot elevations shown along the tops of the flood control channel levees range from 10.9 feet to 11.3 feet. This photogrammetric base map depicts the levees ranging from about 9 feet to 13 feet higher than the adjacent area to the north, and about 8 to 10 feet higher than

Slater Ave. In turn, Slater Ave. is about 1.5 feet to 3.9 feet higher than the surrounding area. As with the 1978 map, this map shows the area as very low-lying with topographic depressions, and the only appreciable rise in elevation being due to the slightly elevated Slater Ave. roadbed.

- 7) Digital topographic data and maps prepared for 1970, 1980, and 1986 received from Hunsaker

In map form the digital topographic data for 1970, 1980, and 1986 show large scale (contour interval - 1 foot) coverage of the entire property. The elevation data have been converted to NAVD88. The 1980 map is developed from the same topographic map published by the County.

June 28, 1970 (see Exhibit 16)

In the 1970 depiction the elevations above 10 feet are not shown. The lowest lying area is in the northwest quadrant of the property where elevations drop to minus 1.0 foot and below. The area lying below zero elevation is a single polygon just over 4 acres in size, situated in the same general area as the EPA wetland mapped in the late 1980's. Because of the 1 foot contour interval used the extent of the topographic depression in this area is somewhat obscured. Had this map included supplemental 0.5 foot contour lines, this area would have been enclosed by a 0.5 foot supplemental contour line symbolized so as to indicate a topographic depression closer in size to the EPA wetland. All of the spot elevations inside that contour line would be less than 0.5 feet. The area now occupied by the AP wetland is shown at elevation zero and above.

Most of the area in the southwest portion of the property later developed as a stables operation is less than 2 feet elevation. The site later occupied by the arena is less than 1 foot elevation.

The highest elevation contour indicated anywhere on the lower portion of the property shown is 3 feet, and occurs in just two areas: (1) the approach to the Slater Ave. overpass of the East Garden Grove – Wintersburg channel; and (2) the perimeter of the property adjacent to and southwest of Graham Street.

September 17, 1980 (see Exhibit 17)

This digital map is developed from the same topographic map published by the County, and converted to NAVD88. As with the 1970 view, the 1980 depiction also omits elevations above 10 feet. It shows the area lying below the zero elevation located in the same general vicinity as in the 1970 depiction and the EPA wetland

delineated in 1987, however, the area is fragmented and its eastern extent has decreased. In this view the area is diminished in size to about one quarter of the area shown on the 1970 map, and consists of three separate smaller areas, not one. The three irregular-shaped areas combined total approximately 1 acre in size. Because of the 1 foot contour interval used the extent of the topographic depression in this area is somewhat obscured. If this map included supplemental 0.5 foot contour lines, this area would have been enclosed by a 0.5 foot supplemental contour line symbolized so as to indicate a topographic depression closer in size to the EPA wetland. All of the spot elevations inside that contour line would be less than 0.5 feet. Similar to the 1970 view, the area now occupied by the AP wetland is shown in 1980 at elevation zero and above.

In the area in the southwest portion of the property developed as a stables operation the elevations are generally higher, especially along the levee, where elevations have increased 1 to 2 feet compared to the 1970 depiction. With the exception of the rise in topography associated with the approach to the Slater Ave. overpass of the East Garden Gove – Wintersburg channel, this area is shown as less than 2 feet elevation in the earlier 1970 view, whereas in this 1980 depiction there is an increase in the area shown between 2 and 3 feet elevation and above. The site occupied by the arena is shown at less than 1 foot elevation.

The highest elevation contour indicated anywhere on the lower portion of the property shown is 5 feet, and occurs in just one area, the approach to the Slater Ave, overpass of the East Garden Grove – Wintersburg channel. The area at the eastern perimeter of the property shown at or above 3 feet elevation has diminished in size relative to the 1970 map, and an oval shaped topographic depression at or below 1 foot elevation appears to the west of Graham Street.

Several irregular-shaped areas at or below 1 foot elevation are located to the north of the East Garden Grove – Wintersburg channel in the same general area as the WP wetland identified in 2006.

September 17, 1980 (see Exhibit 18)

The September 1980 map was used by T. Bilhorn as a base map for his June 1987 delineation. This is the same topographic map published by the County and described above. The portion of the map used for the 1987 delineation covers only Orange Co. APN 110-016-20. This 1:3,600 scale (1 inch equals 300 feet) has a 2-foot contour interval below 10 feet elevation, and a 10-foot interval above 10 feet elevation, with spot elevations to 0.1 foot. Supplemental six inch contour lines have been added. The vertical datum for this map is Mean Sea Level (NGVD29, 1976 OCS adjustment). The effect of this datum is to lower elevations approximately 2.5 ft. The map has not been converted to NAVD88. It shows the area lying below the -0.5 feet elevation in this part of the property, and incorporates part of the -0.5 foot

contour line as the wetland boundary. The delineated area consists of one polygon total approximately 8.1 acres in size. All of the spot elevations inside the wetland polygon are at or below -0.5 feet elevation.

In the area in the southwest portion of the property developed as a stables operation the elevations are generally higher, especially along the levee. The enclosed arena and other equestrian-related facilities are depicted, along with several elevated areas.

July 28, 1986 (see Exhibit 19)

As with the 1970 and 1980 topographic views, the 1986 depiction also omits elevations above 10 feet. This depiction also continues the trend with the lower lying area in the vicinity of the area mapped as the EPA wetland in the late 1980's, showing the eastern margin of the area below zero elevation further west, as two small adjoining irregular-shaped areas totaling about 0.1 acre, or about 2.5 % of the area shown for 1970. This map may be affected by the interpolation of the elevation data in the low-lying areas. Similar to the 1970 and 1980 views, the area now occupied by the AP wetland is shown at elevation zero and above.

In the area in the southwest portion of the property developed as a stables operation the elevations are generally higher, especially along the levee, where elevations have increased 2 to 3 feet compared to the 1970 depiction. With the exception of the rise in topography associated with the Slater Ave. overpass of the East Garden Grove – Wintersburg channel this area was shown as less than 2 feet elevation in the earlier view, whereas in the 1986 depiction there is an increase in the area shown as 2 to 4 feet elevation and above. Three distinct areas adjacent to the overpass approach and within the perimeter of the stables operation are depicted at elevations of 2 feet to 4 feet, whereas in the earlier 1970 view, the same areas ranged from 1 to 2 feet and below. The pattern of topography shown in this depiction in the area directly north of the overpass approach is consistent with the placement of fill on roughly 0.1 acre of land that was, in this case, 1 foot elevation and below, creating what appears as an “island” of higher lying ground rising to an elevation of 3 feet and above within it. The site occupied by the arena is shown at less than 2-foot elevation.

The highest elevation contour indicated anywhere on the lower portion of the property shown is 6 feet and occurs in just one area, the approach to the Slater Ave, overpass of the East Garden Grove – Wintersburg channel. The area at the eastern perimeter of the property shown at or above 3 feet elevation in the 1970 depiction has disappeared entirely in the 1986 view, and the oval shaped topographic depression at or below 1 foot elevation just to the west of Graham Street has widened along the northern property boundary.

Similar to the 1980 view, several irregular-shaped areas, at or below 1 foot elevation, and located in the same general area as the WP wetland identified in 2006, are apparent to the north of the flood control channel.

- 8) Photogrammetry-based topographic maps prepared for 1997 to 2007 received from Hunsaker

These large-scale topographic maps cover the years of 1997, 2000, 2002, 2005, 2006, and 2007, and show detailed coverage (contour intervals are 0.5 - 1 foot) of the entire property. The vertical datum for this information is NAVD88.

May 29, 1997 (see Exhibit 20)

The 1997 depiction includes topography for the entire property. This depiction also continues the trend of the earlier maps, showing the lower-lying area below zero elevation in the vicinity of the area mapped as the EPA wetland in the late 1980's smaller, further to the west, and as a single irregular-shaped area totaling about 0.1 acre, or about 2.5 % of the area shown for 1970. The 0.5 feet elevation contour encloses an irregular-shaped area in the vicinity of the EPA wetland, and is shown with a map symbol indicating that this contour line denotes a topographic depression. All of the spot elevations inside this contour line are less than 0.5 feet. Similar to the 1970, 1980 and 1986 views, the area now occupied by the AP wetland is shown at elevation zero and above. The 1997 map actually shows six inch contours, and indicates the AP location is at 0.5 foot and above.

In the southwest area of the property developed as a stables operation the elevations are generally higher, especially along the levee, where elevations have increased 3 to 4 feet compared to the 1970 depiction. With the exception of the rise in topography associated with the Slater Ave. overpass of the East Garden Grove – Wintersburg channel this area was shown as less than 2 feet elevation in the earlier view, whereas in the 1997 depiction there is an increase in the area shown as 2 to 5 feet elevation and above. Two distinct areas adjacent to the levee and Slater Ave. overpass approach and within the perimeter of the stables operation are depicted at elevations of 2 feet to 5 feet and above, whereas in the earlier 1970 view, the same areas ranged from 1 to 2 feet and below. The area directly north of the Slater Ave. overpass approach is depicted with elevations ranging from 8.3 feet to 9.8 feet, whereas this same area was shown at or below 1 foot elevation in 1970, and at or below 2 feet elevation in both the 1980 and 1986 depictions. A fourth area directly to the north of the arena is shown at 4 feet and above, whereas in the earlier 1970 view, the same area is shown at elevations of 1 foot and below, and at or below 2 feet elevation in the 1980 and 1986 depictions. The pattern of topography shown in this depiction in the areas directly north of the overpass approach and arena is consistent with the

placement of fill on land that is depicted in the earlier views at an elevation of 1 foot and below, creating what appears as “islands” of higher lying ground rising to elevations of 4 feet and above to the north of the arena, and over 9 feet in the area to the north of the Slater Ave. overpass approach. Spot elevations in the area occupied by the arena are approximately 1.5 feet.

The highest spot elevation indicated anywhere on the lower portion of the property shown is 9.8 feet and occurs in just one area, the approach to the Slater Ave, overpass of the East Garden Grove – Wintersburg channel. The area at the eastern perimeter of the property shown at or above 3 feet elevation in the 1970 depiction, which disappeared entirely in the 1986 view, is shown mostly at 2 feet elevation or below, and the oval shaped area at or below 1 foot elevation just to the west of Graham Street is shown with a map symbol indicating that inside this contour line is a topographic depression. All of the spot elevations inside this contour line are less than 1.0 feet.

In this 1997 view, the area occupied by separate irregular-shaped areas at or below 1 foot elevation in the 1980 and 1986 views located in the same general area as the WP wetland identified in 2006, is depicted as a single larger area at or below 1 foot elevation, just to the north of the flood control channel. Spot elevations within this area range from 0.7 foot to 1.0 foot.

September 25, 2000 (see Exhibit 21)

The 2000 depiction includes topography for the entire property, and also includes coverage of the subdivisions to the northeast of the Shea property. The elevation data has been converted from NGVD29 to NAVD88 resulting in elevations that are approximately 2.3 feet lower than the values for identical locations in the other years. The contour lines are shown at a 1 foot interval. As in the 1997 view, this depiction continues the trend of the lower lying area in the vicinity of the area mapped as the EPA wetland in the late 1980's, showing no contours lower than -1.0, but locating spot elevations down to -1.9 feet. Most of this area is shown below -1.5 feet elevation in a single irregular-shaped polygon. Had this map included supplemental 0.5 foot contour lines, this area would have been enclosed by a -1.5 foot supplemental contour line symbolized so as to indicate a topographic depression. All of the spot elevations inside that contour line are less than -1.5 feet. Similar to the 1970, 1980, 1986 and 1997 views, the area now occupied by the AP wetland is shown at higher elevations.

As in the other years subsequent to late 1970's, the elevations in the southwest portion of the property developed as a stables operation are generally higher, especially along the levee, where elevations in this 2000 view are relatively consistent with those shown in the 1997 depiction, where increases of 3 to 4 feet compared to 1970 were seen. With the exception of the rise in topography associated with the

Slater Ave. overpass of the East Garden Grove – Wintersburg channel this area was shown as less than 2 feet elevation in the earlier view, whereas in this 2000 depiction there is a general confirmation of the changes seen in the 1997 view, which showed increases in the area shown as 2 to 5 feet elevation and above. The pattern of topography shown in this depiction in the areas directly north of the overpass approach and arena is consistent of the placement of fill on land that is depicted in the earlier views at an elevation of 1 foot and below, creating what appears as areas of higher lying ground rising to elevations of 2 feet to 6 feet and above. Spot elevations in the area formerly occupied by the arena range from -0.5 feet to 0.3 feet.

Because of the datum conversion, the highest elevation contour indicated anywhere on the lower portion of the property shown is 6 feet and occurs in just one area, the approach to the Slater Ave, overpass of the East Garden Grove – Wintersburg channel. The area at the eastern perimeter of the property shown at or above 3 feet elevation in the 1970 depiction, which disappeared entirely in the 1986 view, is shown mostly at -0.4 feet to -1.9 feet. No contour line for -0.5 feet is indicated, making it uncertain whether the area remains a topographic depression.

Because of the 1 foot contour interval used in the 2000 view, the area occupied by separate irregular-shaped areas at or below 1 foot elevation in the 1980 and 1986 views located in the same general area as the WP wetland identified in 2006, is depicted entirely below the -1.0 foot contour line. The spot elevations in this area just to the north of the flood control channel range from -1.6 feet to -1.7 feet, roughly 6 inches lower than the spot elevations found further north and east. This area is bounded on the southwest by the filled area directly north of the Slater Ave. overpass approach.

January 6, 2002 (see Exhibit 22)

The image we received for 2002 is identical to the 2006 image, with the exception of the two intersecting straight lines visible in the 2006 image. It appears that the 2002 map has been mislabeled 2006, however, due to this discrepancy the description of the topography for this year was deferred.

October 21, 2005 (see Exhibit 23)

Like 1997 and 2000, the 2005 depiction includes topography for the entire property. This depiction also continues the trend of the earlier maps, showing the nearly complete disappearance of the lower lying area in the vicinity of the EPA wetland. Whereas the earlier years showed a distinct depression here, in 2005 it is essentially gone. The eastern extent of the area below zero elevation is depicted as two irregular-shaped areas along the western margin of the agricultural field to the west of the EPA wetland. The 0.5 foot elevation contour also encloses an irregular-shaped area in the same general area, and is shown with a map symbol indicating that inside this contour

line is a topographic depression. The area below the 0.5 foot contour line in this part of the property is adjacent to the farm road along the western margin of the agricultural field, and covers an area approximately 100 feet wide by 750 feet long. All of the spot elevations inside this contour line are less than 0.5 feet, with the lowest elevation being -0.8 foot. The area now occupied by the AP wetland is shown at elevation zero and below and represents the area graded or excavated to that depth.

In the area in the southwest portion of the property used formerly as a stables operation the elevations remain generally higher, especially along the levee, where elevations have increased dramatically compared to the 1970 depiction. In this view the rise in topography all around the approach to the former Slater Ave. overpass of the East Garden Grove – Wintersburg channel has been evened out by disking or plowing operations that have also created map artifacts that show up as parallel “spikes” in the contour lines extending in the direction of the plowing or disking. All of this area except the overpass approach itself was shown as less than 2 feet elevation in the 1970 view, whereas in the 2005 elevations range from 2 to 8 feet and above. The pattern of topography shown in this depiction in the areas occupied by the former stable operation reflects the disking and grading activities that would level the area and produce the changes in contour lines that are apparent in this image. Spot elevations in the area formerly occupied by the arena are 2 to 3 feet, about 1 to 2 feet higher than the elevation shown in 1997.

The highest elevation contour indicated anywhere on the lower portion of the property shown is 11 feet and occurs in just one area, the approach to the Slater Ave. overpass of the East Garden Grove – Wintersburg channel. The area at the eastern perimeter of the property shown at or above 3 feet elevation in the 1970 depiction, which disappeared entirely in the 1986 view, is shown mostly at 2 feet elevation or below, and an irregular-shaped area at or below 1.5 foot elevation is located to the west of Graham Street. This slight topographic depression is consistent with the location of the feature depicted and symbolized on earlier maps as a topographic depression. All of the spot elevations inside the 2005 depiction of the 1.5 foot contour line range from 1.2 feet to 1.4 feet.

In this 2005 view, the area occupied by separate irregular-shaped areas at or below 1 foot elevation in the 1980, 1986, and 1997 views located in the same general area as the WP wetland identified in 2006, is depicted as a single polygon at or below 1 foot elevation just to the north of the flood control channel. The areal extent has decreased on the western side compared to the 1997 depiction. Spot elevations within this enclosed polygon range from 0.7 foot to 0.9 foot.

January 1, 2006 (see Exhibit 24)

With the exception of the two intersecting straight lines visible in the image, this map is identical to the 2002 map. It appears that the 2002 map has been mislabeled 2006,

however, due to this discrepancy the description of the topography for this year was deferred.

January 16, 2007 (see Exhibit 25)

Like 1997 and 2000, and 2005, the 2007 depiction includes topography for the entire property. This depiction also continues the trend of the earlier maps, showing the nearly complete disappearance of the lower lying area in the vicinity of the EPA wetland. Whereas the earlier years showed a distinct depression here, in 2007, as in 2005, it is gone. The eastern extent of the area below zero elevation is depicted as an irregular-shaped polygon along the western margin of the agricultural field. The 0.5 foot elevation contour also encloses an irregular-shaped area in the same general area, and is shown with a map symbol indicating that inside this contour line is a topographic depression. As in the 2005 depiction, the area below the 0.5 foot contour line in this part of the property is adjacent to the farm road along the western margin of the agricultural field, and covers an area approximately the same as in 2005 (100 feet wide by 750 feet long). Its extent in the north is reduced compared to the 2005 view. All of the spot elevations inside this contour line are less than 0.5 foot, with the lowest elevation being -0.9 foot. A map symbol indicating a fence is depicted at the eastern side of this topographic depression, now identified as the AP wetland. The area now occupied by the AP wetland is shown at elevation zero and below and represents the area graded or excavated to that depth.

In the area in the southwest portion of the property used formerly as a stables operation the elevations remain generally higher, especially along the levee, where elevations have increased dramatically compared to the 1970 depiction. Similar to 2005, the 2007 view shows the rise in topography all around the approach to the former Slater Ave. overpass of the East Garden Grove – Wintersburg channel has continued to undergo disking or plowing operations that have created map artifacts that show up as parallel “spikes” in the contour lines extending in the direction of the plowing or disking. All of this area except the overpass approach itself was shown as less than 2 feet elevation in the 1970 view, whereas in the 2007 elevations range from 2 to 8 feet and above. The pattern of topography shown in this depiction in the areas occupied by the former stable operation reflects the disking and grading activities that would level the area and produce the changes in contour lines that are apparent in this image. Spot elevations in the area formerly occupied by the arena range from 2 to 3 feet, about 1 to 2 feet higher than the elevation shown in 1997.

The highest elevation contour indicated anywhere on the lower portion of the property shown is 11 feet and occurs in same area as in previous years, the former approach to the Slater Ave, overpass of the East Garden Grove – Wintersburg channel. The area at the eastern perimeter of the property shown at or above 3 feet elevation in the 1970 depiction, which disappeared entirely in the 1986 view, is shown mostly at 1.5 feet elevation or below, with an irregular-shaped area at or below

1.5 foot elevation located to the west of Graham Street. This slight topographic depression is consistent with the location of the feature depicted and symbolized on earlier maps as a topographic depression. All of the spot elevations inside the 2005 depiction of the 1.5 foot contour line range from 1.3 feet to 1.4 feet.

In this 2007 view, the area occupied by separate irregular-shaped areas at or below 1 foot elevation in the 1980, 1986, 1997, and 2005 views located in the same general area as the WP wetland identified in 2006, is depicted as a single polygon at or below 1 foot elevation to the north of the flood control channel. The areal extent of the polygon enclosed by the 1 foot contour line has decreased dramatically, covering less than 10% of the area shown in the 2005 depiction. The 2007 spot elevations within this area range from 1.1 feet to 1.4 feet.

IV. Conclusions

Based on the analysis of the available aerial photography, topographic maps and other materials, it is apparent that many landform changes have resulted due to development activities on the subject property over a long period of years, ranging from the leveling of the fields by agricultural activities during the 1900's and at present, to the fill of low-lying areas and construction of equestrian facilities in the 1980's and 1990's. The most dramatic changes involving fill appear to have taken place in the southwest part of the property (on both sides of the City /County boundary, however grading and farming activities in the agricultural field have also significantly altered the topography throughout that area, including the areas identified as the EPA wetland, the WP wetland, and the AP wetland. The CP wetland has been altered less in recent years.

EPA Wetland and AP Wetland

Historically, this area was part of the larger Bolsa Chica coastal wetland. Although agriculture has gone on in this area since the 1930's, the elevations have consistently indicated a topographic depression here. Aerial photography shows repeated instances of ponding in the area.

The base map used for the 1987 EPA wetland map was the 1980 topographic map produced by the County. The original map was drawn with 1 foot contours, and six inch supplemental contours were added to this map. The -0.5 contour line actually forms nearly half of the delineated wetland boundary. Because this map uses the NGVD29, 1976 OCS adjustment as the datum, elevations shown are below zero for most of the property. Interestingly this map shows spot elevations indicating a lower area in the vicinity of the WP wetland.

In this decade the topography of the EPA wetland area has changed dramatically, with the obliteration of the depression in its original location and the creation of a smaller, narrower depression now identified as the AP wetland at the western margin of the agricultural field. The areas covered by the AP wetland and the EPA wetland are not contiguous. Whereas the EPA wetland was a relatively broad and shallow (approx. six inches to 1 foot) depression, covering over 8 acres, the AP wetland shows as a narrower depression, over a foot deep at its maximum,

covering about an acre. The AP wetland boundary is essentially coincident with the zero contour line at the western margin of the agricultural field. The large-scale topographic maps produced in this decade show clear evidence of continued disturbance in this area.

Stables Area - Permitted Fill

Exhibit 26 shows the area where 1500 to 3000 cubic yards of fill for a parking area was authorized by CDP 5-82-278. This area is approximately 1 acre in size. Filling an area this size with enough material to raise the elevation 3 feet would take 2400 cubic yards. This entire area was mapped as below sea level in 1965, and at or below 1 foot elevation on the 1970 and 1980 maps. The elevation is at or below 2 feet on the 1986 map. The 1997 map shows elevations of 2.5 to 3.0 feet for this area. The map prepared for 2000 has elevations converted from NGVD29 to NAVD88 and depicts this entire area below 1 foot elevation. Other elevations on this map are about 2.5 feet below those shown on the other maps. The maps prepared for 2002, 2005, 2006, and 2007 all show this area ranging from 3.0 to 4.5 feet elevation (NAVD88). Exhibit 25 shows the area of permitted fill in the southwestern part of the property.

Stables Area – Unpermitted Fill and other Disturbance

Of course historically, this area was also part of the larger Bolsa Chica coastal wetland. Although agriculture has gone on here since the 1930's, the mapped elevations before 1980 have consistently indicated that the elevation in this location is at or below 2 feet. Nearly the entire area was mapped as below sea level in 1965 by the US Geological Survey. Aerial photography after 1977 shows repeated instances of filling and grading and construction in the area. In the 1980's the topography changed significantly, with the raising of elevations in the area north of the former Slater Ave. overpass to nearly 10 feet. The large-scale topographic maps produced in this decade show clear evidence of continued disturbance in this area, with the plowing and leveling of the area, and the construction of drainage ways. Exhibit 25 shows this approximately 10 acre disturbed area in the southwestern part of the property.

WP Wetland

As with the above areas, historically, this area was also part of the larger Bolsa Chica coastal wetland. Although agriculture has gone on in this area since the 1930's, the large-scale maps reviewed have consistently indicated the presence of small topographic depression in this general area. Recent aerial photography also shows instances of ponding in the area.

The topographic map used to delineate the area that has had standing water in recent years was the 2005 map described earlier. The boundary of the wetland roughly follows the 1.2 foot spot elevations and encompasses the 1.0 foot contour line. On the 2005 map spot elevations in the lowest part of the depression are 0.7 feet. The 2007 map shows a much-reduced depression varying from 0.8 feet to 1.0 foot elevation.

CP Wetland

Similar to the above areas, historically, this area was also part of the larger Bolsa Chica coastal wetland and maintained the characteristics of a coastal salt marsh longer than the other historical wetlands that were located on the property. Although agriculture has gone on in this area since the 1930's, it was north of Slater Ave. The large-scale maps have consistently indicated very low-lying elevations here. Aerial photography shows incursions of fill and evidence of clearing or grading in the 1980's and the more recent placements of structures along the levee. In this decade the topography has remained about the same as it was in 1986. The large-scale topographic maps produced in this decade may indicate some incursion of unpaved roads and trails in this area.



Exhibit 1

Early Aerial Photography

2/12/1934

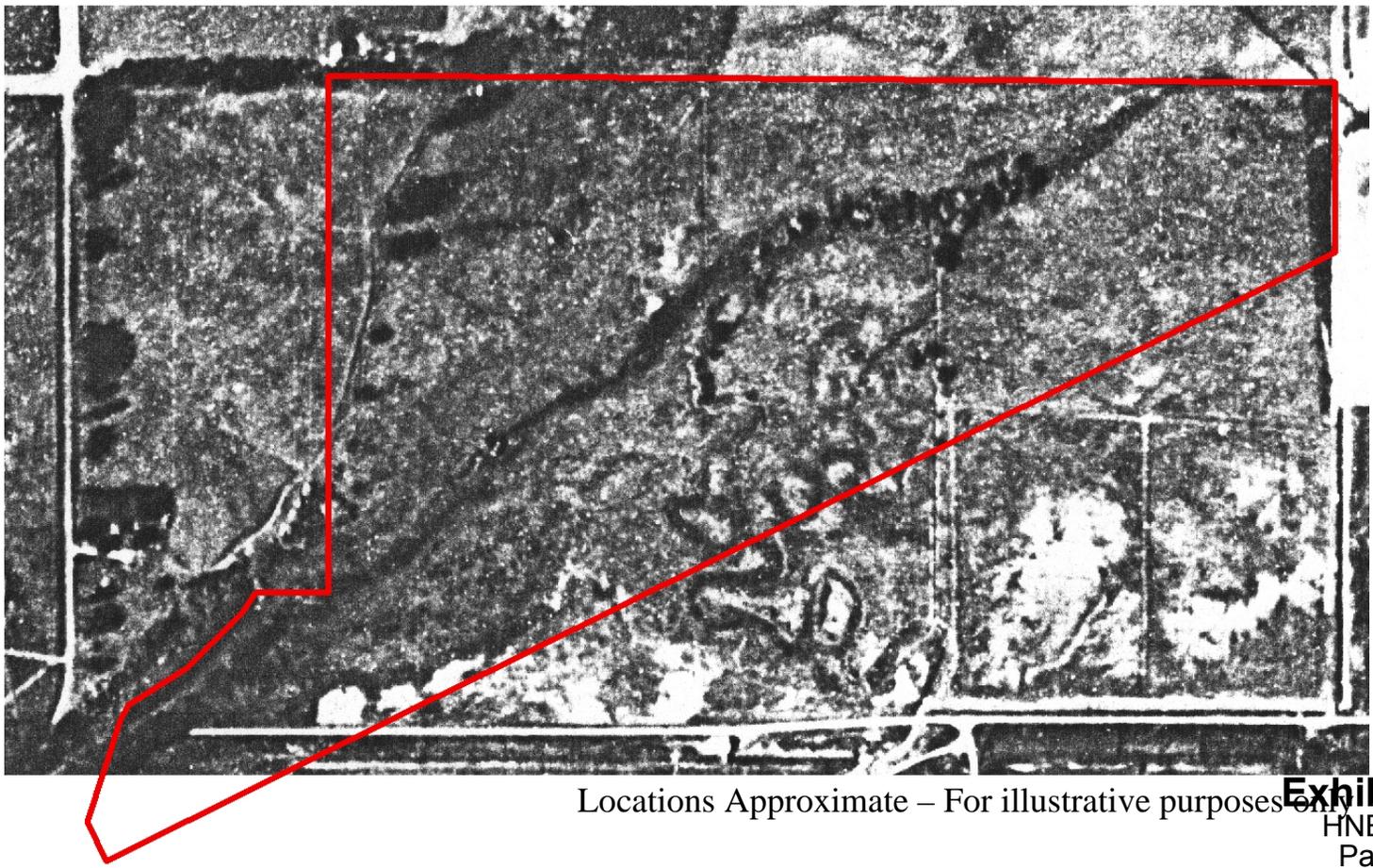




Exhibit 2

Pre-Prop 20 and Coastal Act

12/26/1952



5/21/1970



Exhibit 3 Pre-Coastal Act High-Altitude Coverage

1/13/1977



Locations Approximate – For illustrative purposes only



Exhibit 4 Stables Fill and Development

1/31/1981



2/19/1983

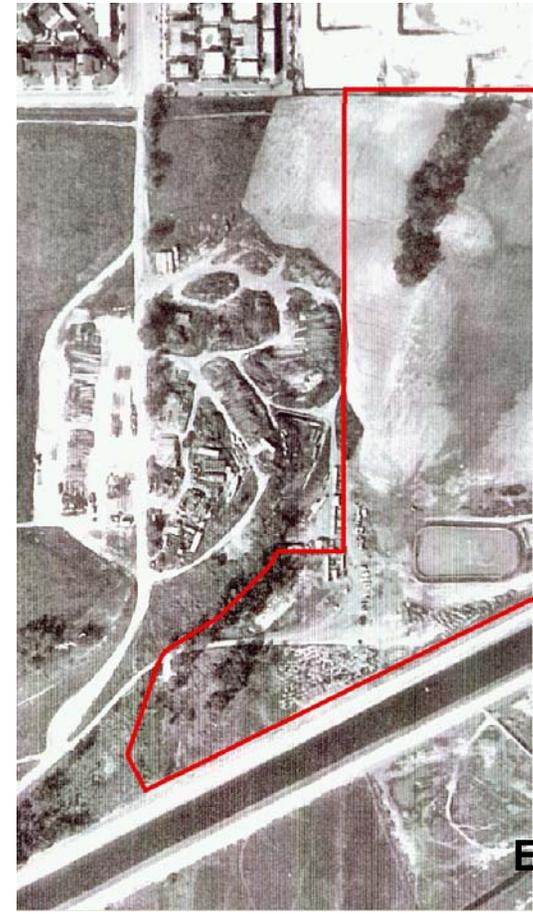


Exhibit MMM
HNB-MAJ-1-06
Page 23 of 45

Locations Approximate – For illustrative purposes only

Exhibit 5 Continued Fill and Stables Development

5/13/1986



Locations Approximate – For illustrative purposes only

Exhibit 6

Wetlands, Continued Fill and Decline of Stables Development

1/28/1995



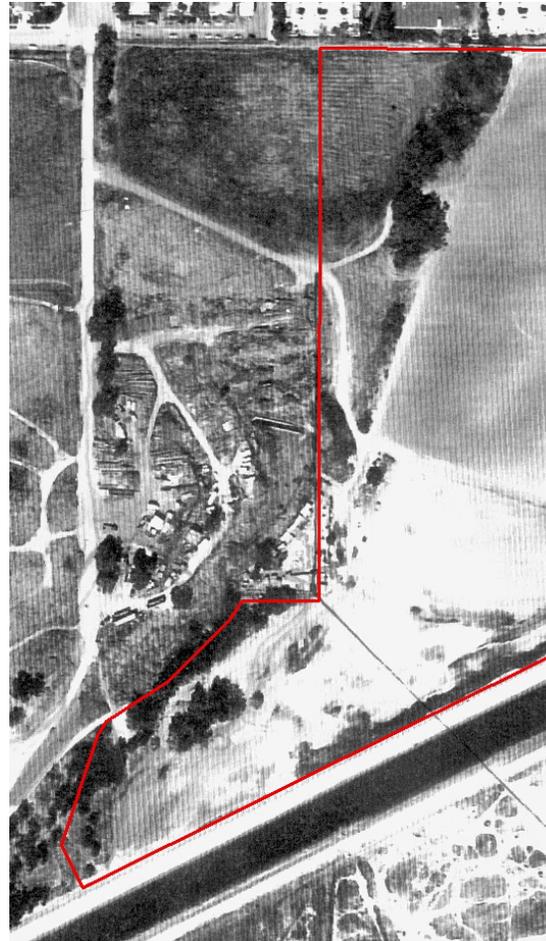
Locations Approximate – For illustrative purposes only

Exhibit 7

Continued Fill, Grading, and Stables Decline



2/24/1999



Locations Approximate – For illustrative purposes only

Exhibit 8

Continued Grading and Agricultural Development

6/29/2001



Locations Approximate – For illustrative purposes only



Exhibit 9 Continued Grading and Agricultural Development

January 2006



©1997-2006 AirPhotoUSA
Exhibit MMM
HNB-MAJ-1-06
Page 28 of 45

Locations Approximate – For illustrative purposes only



Exhibit 10

Vicinity of Shea Property

Source: T-1345, Surveyed in February to April 1873



Exhibit 11

Detail of Bolsa Chica: USGS Topographic Map

Source: So. California Sheet No. 1, edition of 1901





Exhibit 12

1935 USGS Topographic Map

Source: Seal Beach Quad, edition of 1935

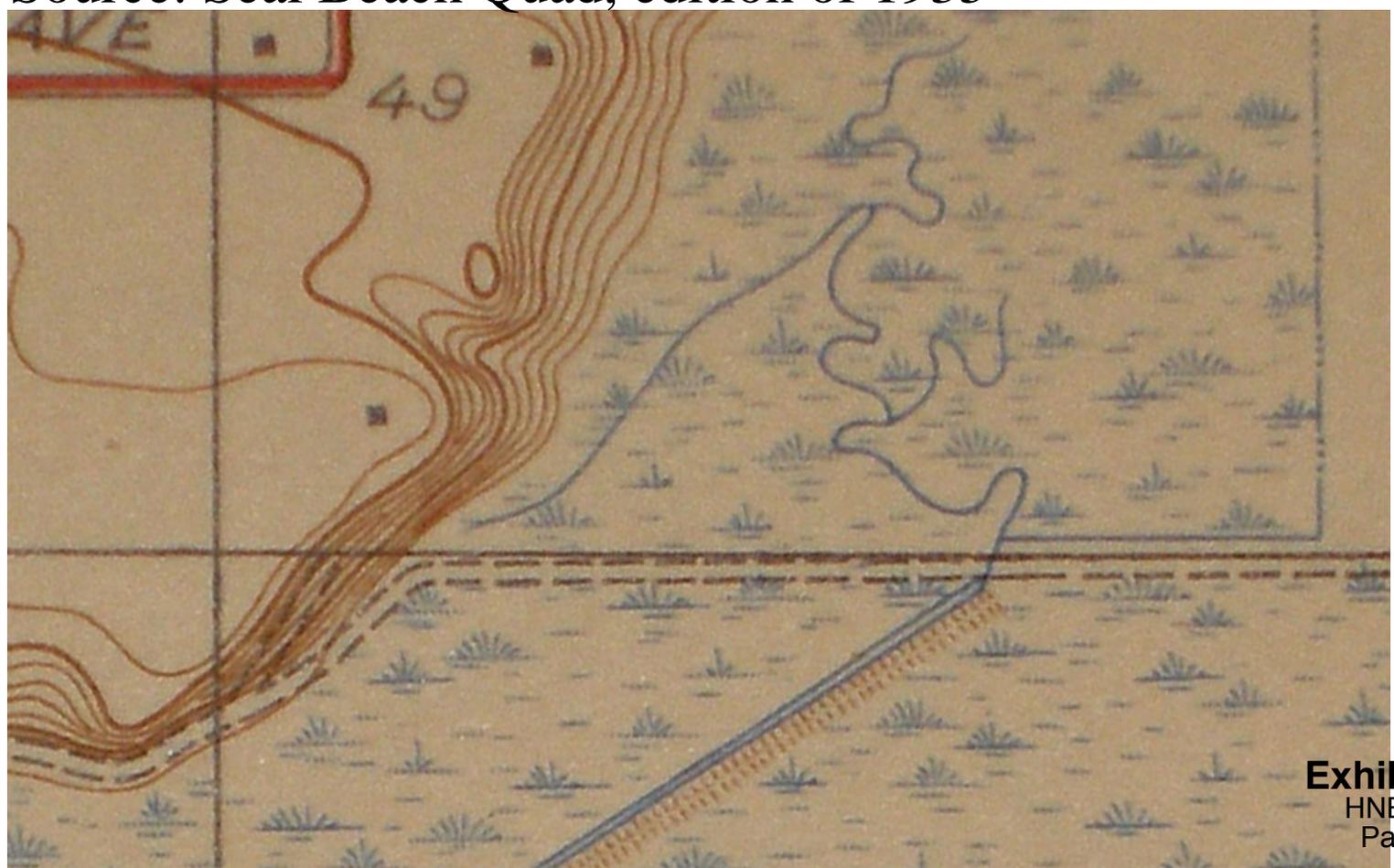
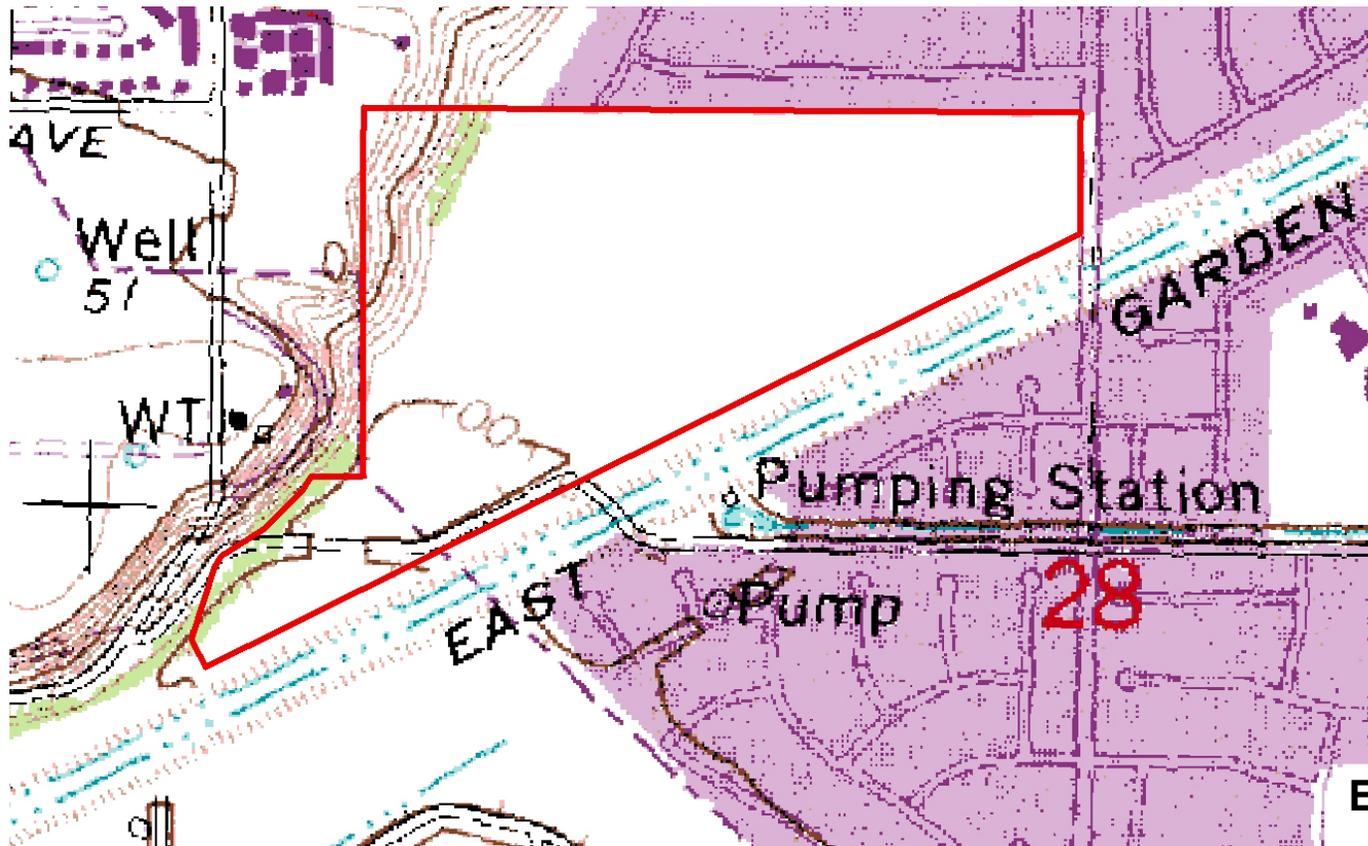




Exhibit 13

1965 USGS 7.5 Minute Quad

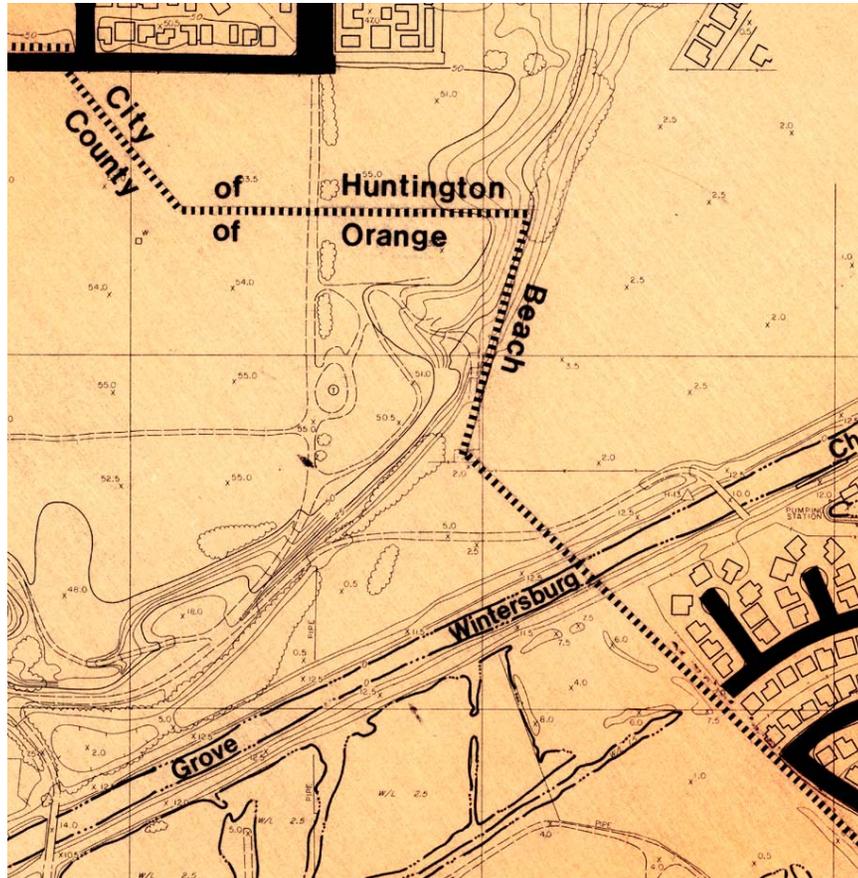
Source Dates: Aerials 1963, Topo by Planetable 1965, photorevisions (purple) from 1978 aerials



Locations Approximate – For illustrative purposes only



Exhibit 14 Large Scale Topographic Map

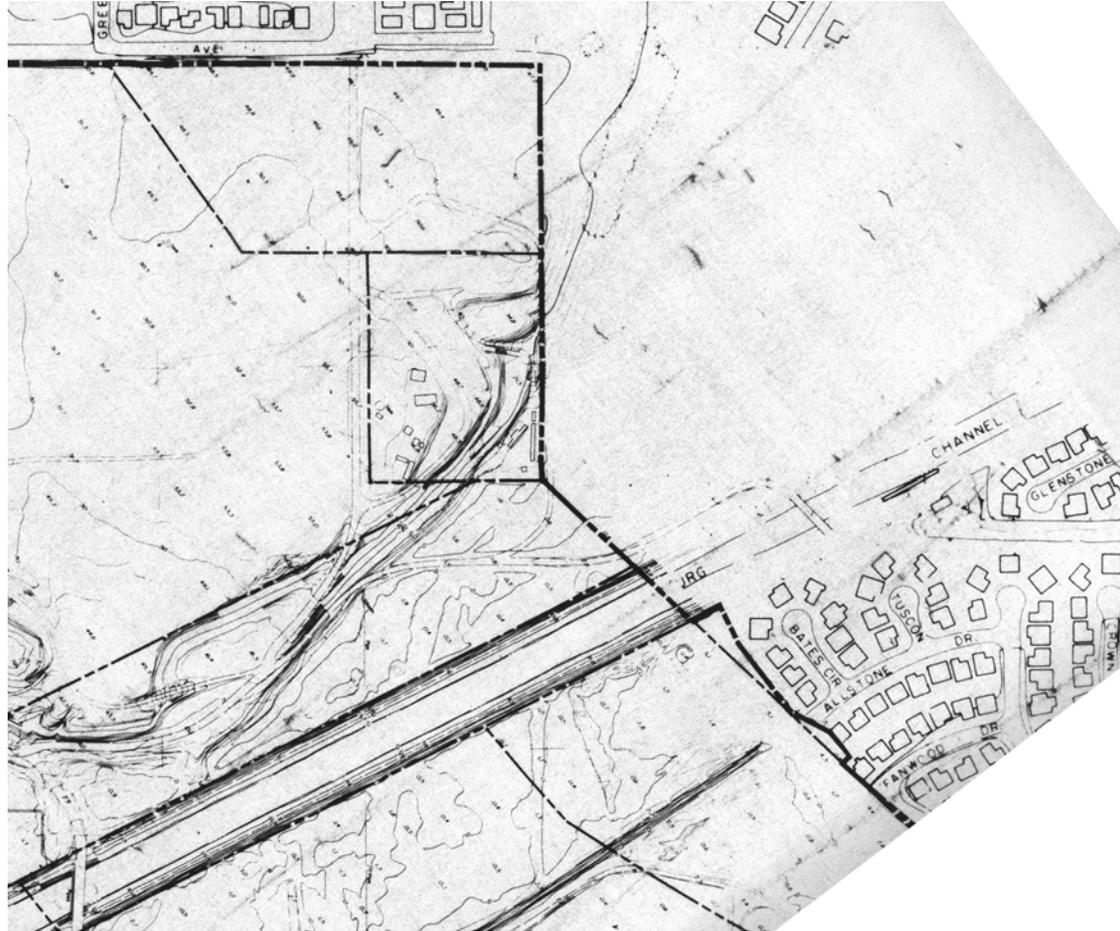


Source: Orange Co. EMA, based on photography taken in 1978



Exhibit 15

Large Scale Topographic Map



Source: Orange Co. EMA, based on photography taken September 17, 1980



Exhibit 16

Large Scale Topographic Map

June 28, 1970 Source: Hunsaker, 2007

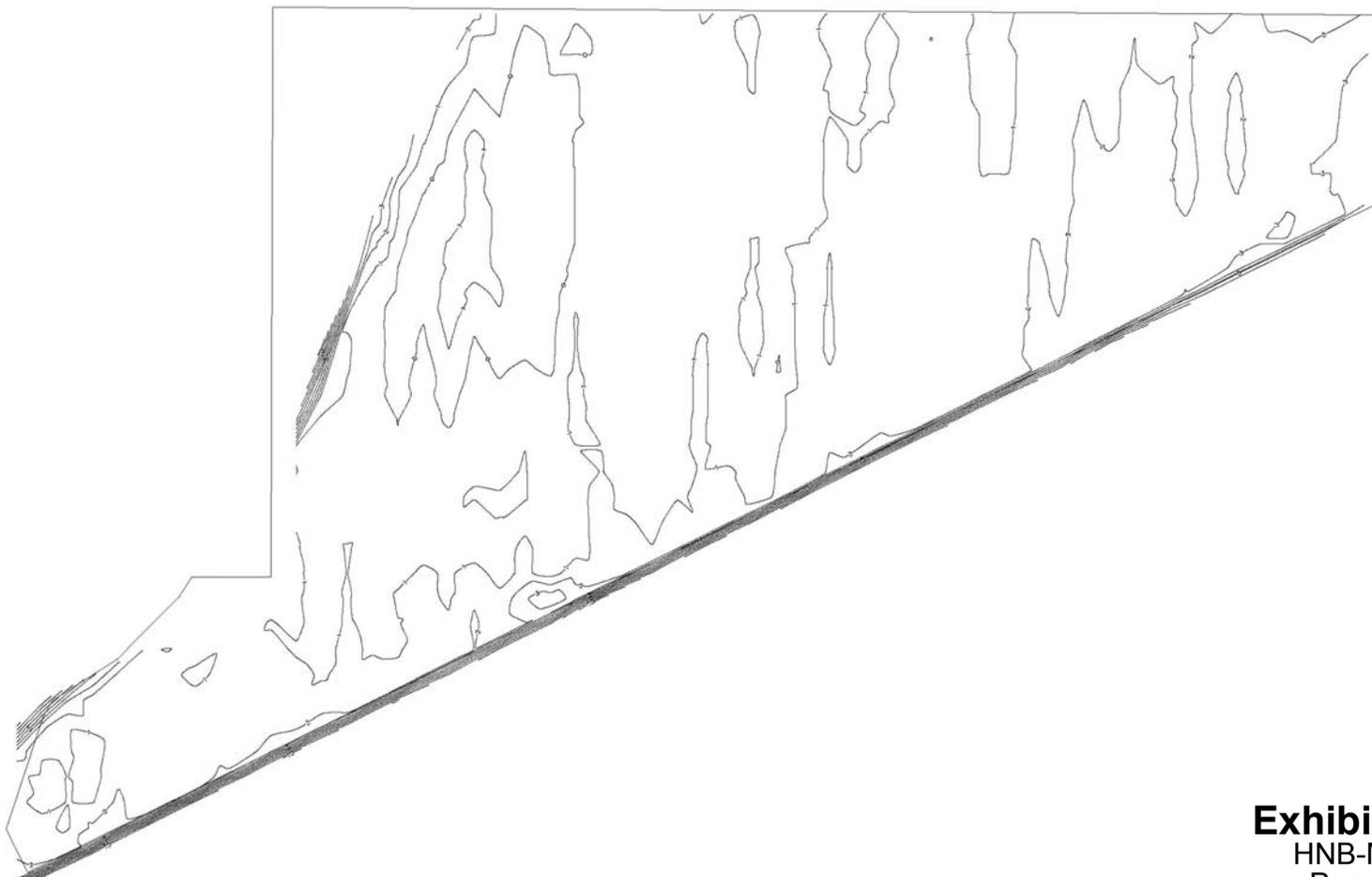




Exhibit 17

Large Scale Topographic Map

September 17, 1980 Source: Hunsaker, 2007

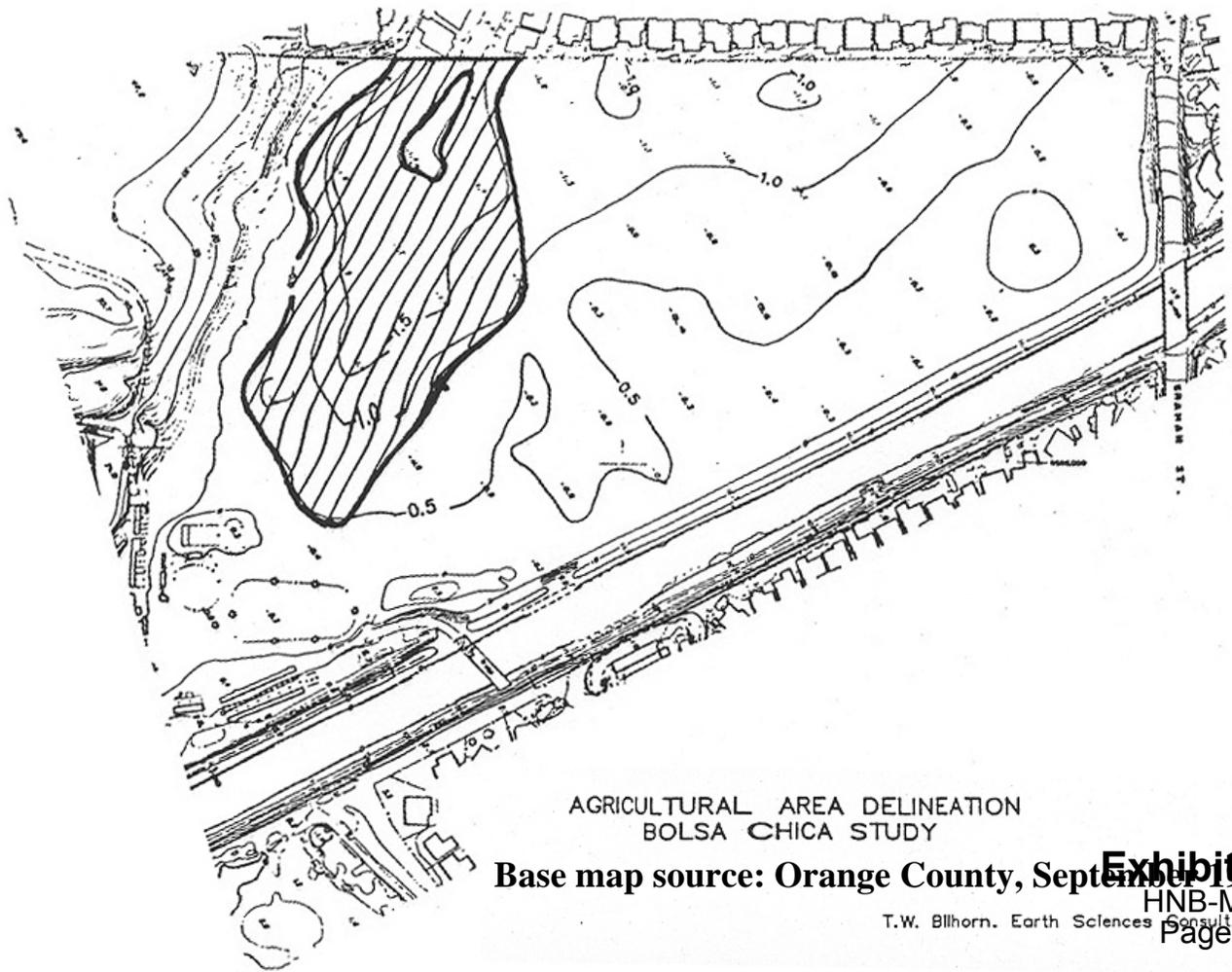




Exhibit 18

Agricultural Area Delineation

Source: Thomas W. Bilhorn, June 1987



AGRICULTURAL AREA DELINEATION
BOLSA CHICA STUDY

Base map source: Orange County, September 1980

Exhibit MMM
HNB-MAJ-1-06
T.W. Bilhorn, Earth Sciences Consultants
Page 37 of 45



Exhibit 19

Large Scale Topographic Map July 28, 1986 Source: Hunsaker, 2007





Exhibit 20

Large Scale Topographic Map

May 29, 1997 Source: Hunsaker, 2007





Exhibit 21

Large Scale Topographic Map

September 25, 2000 Source: Hunsaker, 2007

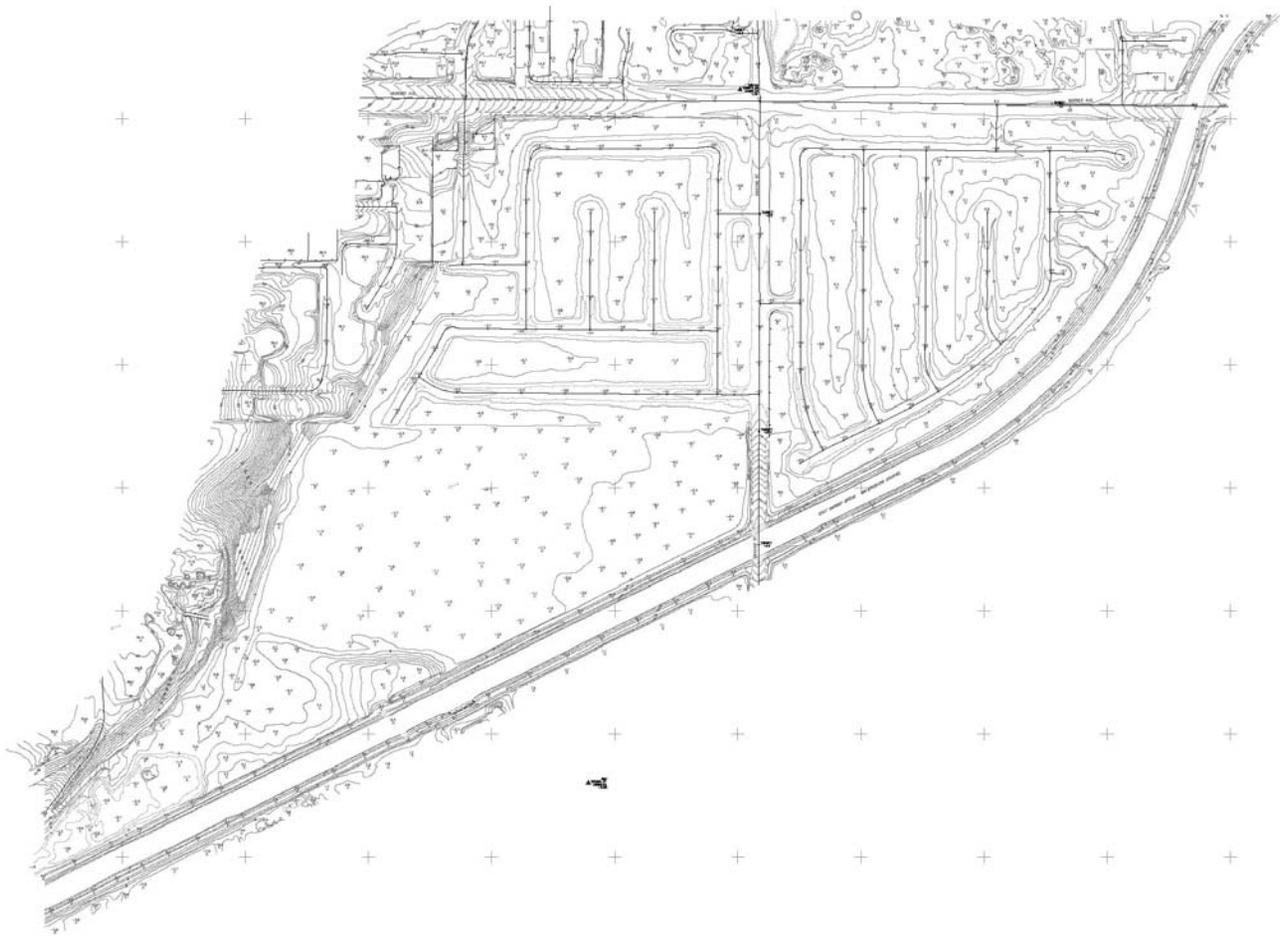




Exhibit 22

Large Scale Topographic Map

January 6, 2002 Source: Hunsaker, 2007

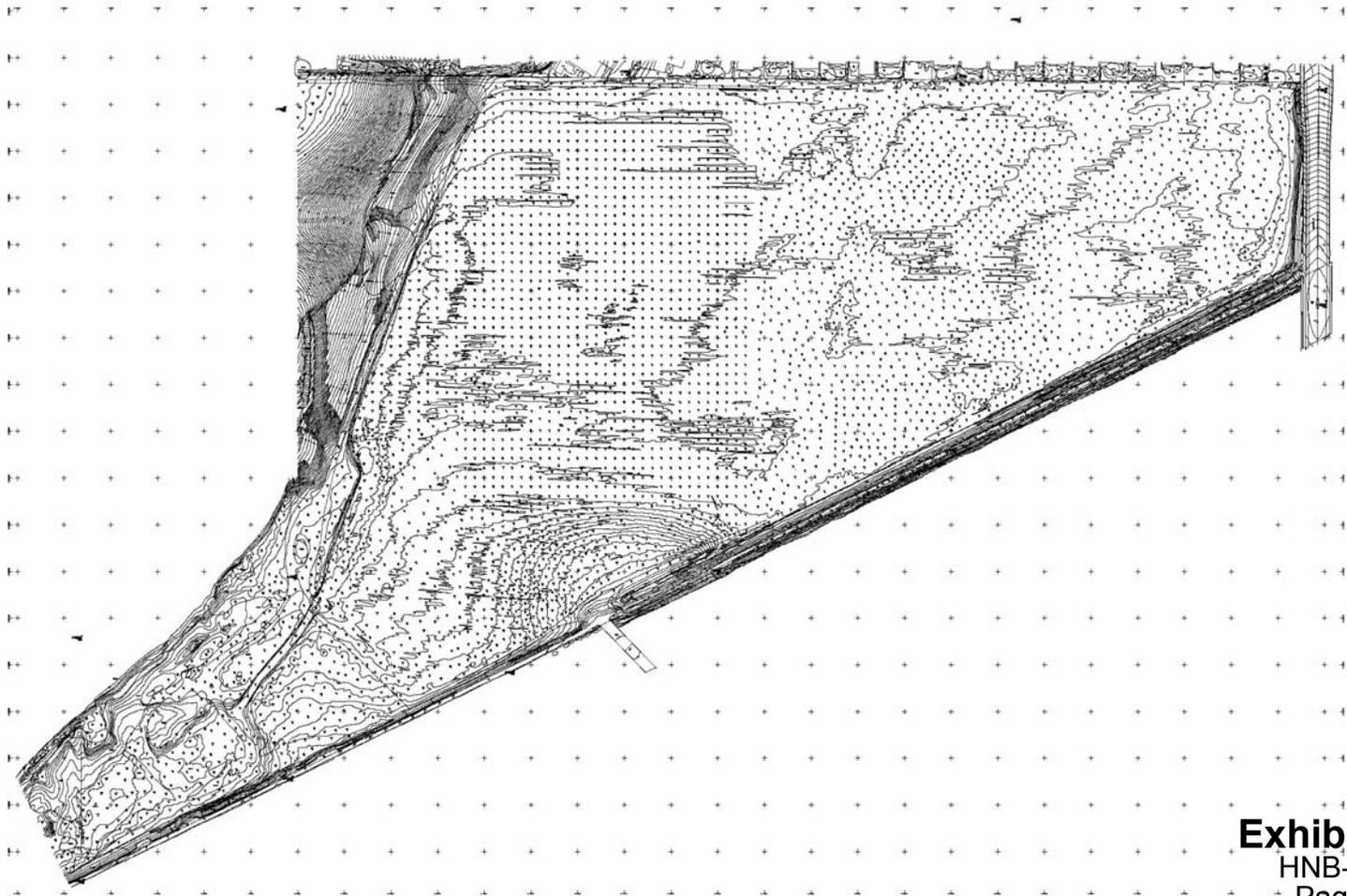
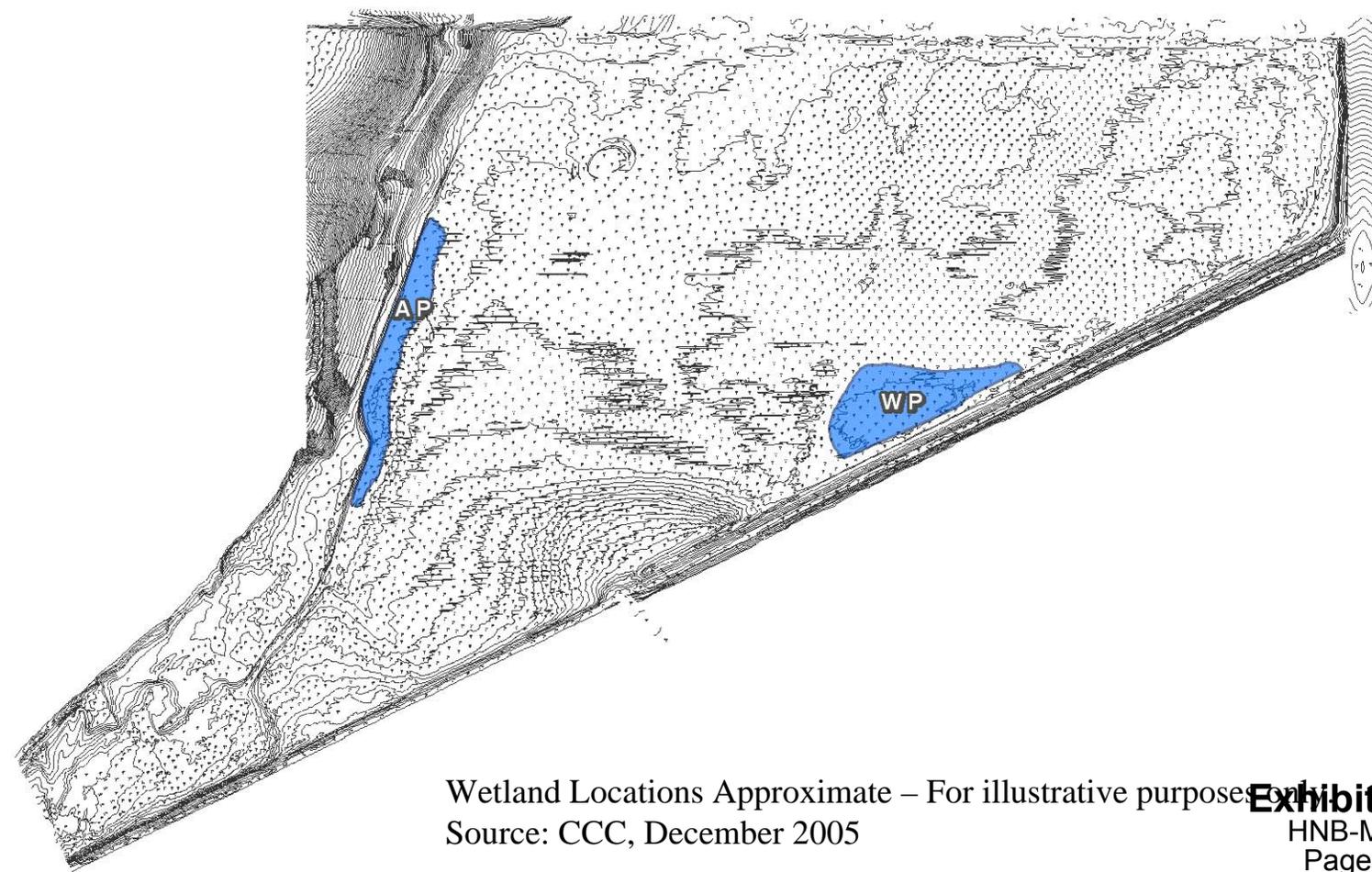




Exhibit 23

Large Scale Topographic Map

October 21, 2005 Source: Hunsaker, 2007



Wetland Locations Approximate – For illustrative purposes only
Source: CCC, December 2005

Exhibit MMM
HNB-MAJ-1-06
Page 42 of 45



Exhibit 24

Large Scale Topographic Map

January 1, 2006 Source: Hunsaker, 2007

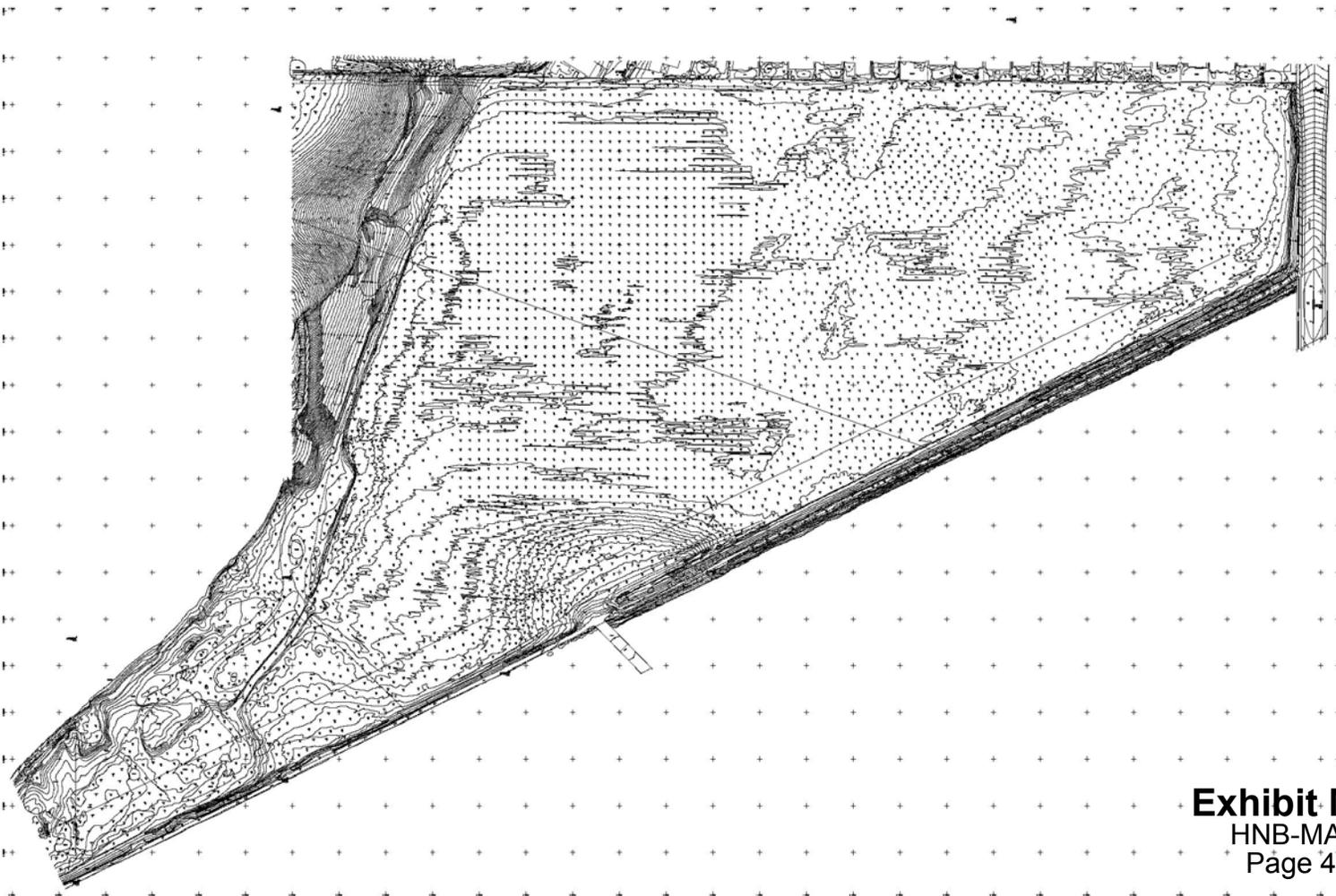




Exhibit 25

Large Scale Topographic Map

January 16, 2007 Source: Hunsaker, 2007

