APPENDIX F

Geo-Logic
ASSOCIATES
Geologists, Hydrogeologists and Engineers

MEMORANDUM

TO: E. William Hutton, P.C.

FROM: William Lopez, Geo-Logic Associates
Sarah J. Battelle, Geo-Logic Associates

DATE: June 15, 2009

SUBJECT: **DEFINITION OF ALLUVIAL LIMITS AND RIPARIAN PARCELS GREGORY CANYON LANDFILL PROJECT SAN DIEGO COUNTY, CALIFORNIA**

At your request, this memorandum provides a discussion of 1) the field methodology that was used to determine the alluvial limits that were mapped at the Gregory Canyon Landfill (GCL) site on January 8 and 9, 2009 and 2) follow-up mapping, analysis and delineation of the tracts within the landfill property where alluvial deposits comprising the Pala Basin alluvial aquifer are located.

1. Extent of Alluvium.

This work was performed by Mr. William Lopez, a state of California registered Professional Geologist and Certified Hydrogeologist with over 15 years of direct geologic experience including field mapping and hydrogeologic evaluation. The river channel within the San Luis Rey River Valley (SLRRV) consists of an active braided channel bounded on each side by fluvial terraces that represent a historic alluvial floodplain during a period of higher base level (sea level). These terraces are bounded on each side of the SLRRV by crystalline bedrock of the Southern California Batholith. Within the GCL property, the majority of the active alluvial channel is bounded by an unpaired cut terrace, while a secondary rock defended terrace was identified immediately west of the Verboom house (in the vicinity of stockpile A).

For the purposes of delineating the alluvial contact with the underlying bedrock, both the north and south sides of the SLRRV were walked as much as feasible, and points of contact were marked using a hand held Trimble GeoXH 2005 global positioning system (GPS) device. The GPS is a satellite-based positioning system operated by the U.S. Department of Defense. A constellation of operational NAVSTAR satellites orbit the earth every 12 hours, providing worldwide, all-weather, 24-hour time and position information. Equipped with a Zephyr antenna, the hand-held GPS device provides accuracy within 8 inches. Prior to conducting the field work, Mr. Lopez had access to a site aerial photograph and applicable portions of the "Geologic Map of the Pala 7.5 minute Quadrangle, San Diego County, California: A Digital Database, Version 1.0," by Michael P. Kennedy (2000).

Field geologic mapping techniques included evaluation of geologic materials and observation of the geomorphology of the SLRRV to identify the contact points between the alluvium and bedrock on the north and south sides of the San Luis Rey River. This information was recorded by the GPS device. Some safety limitations prevented accessing the exact contact when it occurred within or immediately adjacent to State Highway 76, and in a few locations next to the river where the contact between alluvium and bedrock was a steep cliff. Where possible, the distance to the point of contact was measured on a trend line that was recorded in the GPS database (e.g., contact 20 feet north of point). However, for some portions of Highway 76 that could not be safely walked or measured, the contact was located based on the road cut and drawn on the geologic map. Finally, in the portion of the site on the north side of State Highway 76, north of the Lucio dairy, that had been disturbed by grading and fill pads for several homes, the alluvial limit was drawn at the projected break in slope between the steeper bedrock and more flat-lying fill materials. However, none of the limits in this area were material, since they did not occur in areas proposed for landfill development or habitat restoration.

Figure 1 depicts the contact points recorded by the GPS device (the yellow "X"), and then connects these points to depict the northern and southern alluvial boundary. The alluvial boundary is depicted by the light blue line connecting yellow contact points. Figure 1 includes both the active channel and fluvial terraces since both of these units exhibit alluvial characteristics. (i.e. poorly consolidated, well rounded, gravelly sands associated with a hydraulic conductivity greater than 1E-03 cm/sec). The contact between the alluvium/terrace and bedrock units was conservatively estimated as the first noticeable change from the relatively flat alluvial floodplain to the elevated and more resistant crystalline bedrock.

In delineating the alluvial contact, efforts were taken to prevent bias. In particular, the geologist did not have any maps with him as he undertook his field work. In the absence of maps, the geologist would not have any ability to identify the boundaries of the original land grants forming the GCL property. Since these boundary lines are not marked (e.g. with stakes or monuments) and do not follow topographic or geologic features, the geologist could not correlate the alluvial boundary with land grant boundary lines in the field.

To ensure the accuracy of the alluvial contact when overlaid on the aerial base map, several control points (points that are easily identifiable on the aerial map) were also recorded in the field using GPS (e.g. northern end of Verboom stone fence and southern K-rail point, and Lucio Dairy road intersection). Since these physical features are easily identified and located on the aerial map, these points were used to confirm the accuracy of all of the GPS readings by comparing the GPS reading for the control points with other source information.

The transfer of data points to prepare Figure 1 was accomplished by converting each of the points to survey coordinates before being integrated into compatible CAD files. This ethod provided a very high degree of accuracy when displaying the limits of alluvium onto the base aerial photo.

2. Original Grants Containing Alluvial Material.

After completing this initial mapping, Geo-Logic was requested by the Allen Matkins law firm to conduct an additional analysis of the data for the purpose of determining which of the original land grants from the United States that form the GCL property were located within the alluvium comprising the Pala Basin alluvial aquifer. Based on legal standards provided to Geo-Logic by Allen Matkins, any of the grants located within or touching the alluvium would be considered riparian, pending the outcome of chain of title research. Allen Matkins provided Geo-Logic with a map prepared by Masson & Associates depicting the nine original land grants included within the GCL property. This mapping is included as Figure 2, and was developed based on the current title and property records.

To compare the alluvial boundary with the boundaries of the original grants, the data points from the alluvial mapping were superimposed on Figure 2. This mapping is included as Figure 3. Data transfer was accomplished using the Masson & Associates map (Figure 2) in CAD format over existing alluvial limits and site topographic maps, all of which remained in CAD format to maintain the highest degree of accuracy. Figure 3 depicts the relationship of the alluvial limits with the boundaries of the original land grants to establish which of the original land grants would be considered riparian (i.e., land grants that contain mapped alluvial materials).

Analysis of Figure 3 shows that alluvium was clearly present in Grant Nos. 1, 2, 3, 4, 5 and 8. Therefore, all these original Grants are riparian. However, the contact between alluvium and bedrock and the boundary of the original Grant No. 6 was relatively close, and a more thorough analysis was required to determine its status as riparian.

In order to perform additional analysis of Grant No. 6, portions of Figure 3 were blown up to a much higher scale, from 1 inch = 1600 feet to 1 inch = 20 feet in the three areas where the alluvial contact appeared to touch the boundary of Grant No. 6. These three maps are included as Figure 4, Figure 5 and Figure 6. Since these figures were created from the CAD file constituting Figure 3, the data transfer was very precise and accurate.

The first alluvial contact point subjected to detailed review was located at the northwest corner of Grant No. 6, and is shown on Figure 4. Based on a review of the detailed 1 inch = 20 feet scale mapping, the alluvial contact is up to approximately 32 feet to the east of the boundary of Grant No. 6 at this location, and the alluvium lies within the boundary of Grant No. 6. After considering the GPS accuracy limit of 8 inches, it is concluded that the alluvial contact occurs within Grant No. 6 at this location, and therefore, Grant No. 6 is riparian.

The second alluvial contact point subjected to detailed review was located at the intersection of the northern boundary of Section 5, T10S, R2W, San Bernardino Meridian with the western boundary of the SE ¼ of the SE ¼ of Section 32, T9S, R2W, San Bernardino Meridian, and is shown on Figure 5. Based on a review of the detailed 1 inch = 20 feet scale mapping, there is alluvial material present in an area of approximately 20 x 90 feet within the boundaries of Grant No. 6. After considering the GPS accuracy limit

of 8 inches, it is concluded that the alluvial contact occurs within Grant No. 6 at this location, which also indicates that Grant No. 6 is riparian.

The third alluvial contact point subjected to detailed review was located along the western boundary of Grant No. 6 within the SE ¼ of the SE ¼ of Section 32, T9S, R2W, San Bernardino Meridian and is shown on Figure 6. Based on a review of the detailed 1 inch = 20 feet scale mapping, there does not appear to be alluvial contact with Grant No. 6 at this location, as the farthest extent of alluvium lies approximately four feet west of and outside the boundary of Grant No. 6. This portion of the alluvial boundary lies within Grant No. 5, but not Grant No. 6, at this location.

Based on this detailed review, the following original land grants of the United States comprising the GCL property contact alluvium, and therefore, are concluded to be riparian, pending chain of title research to be performed by Allen Matkins: Grant Nos. 1, 2, 3, 4, 5, 6 and 8.

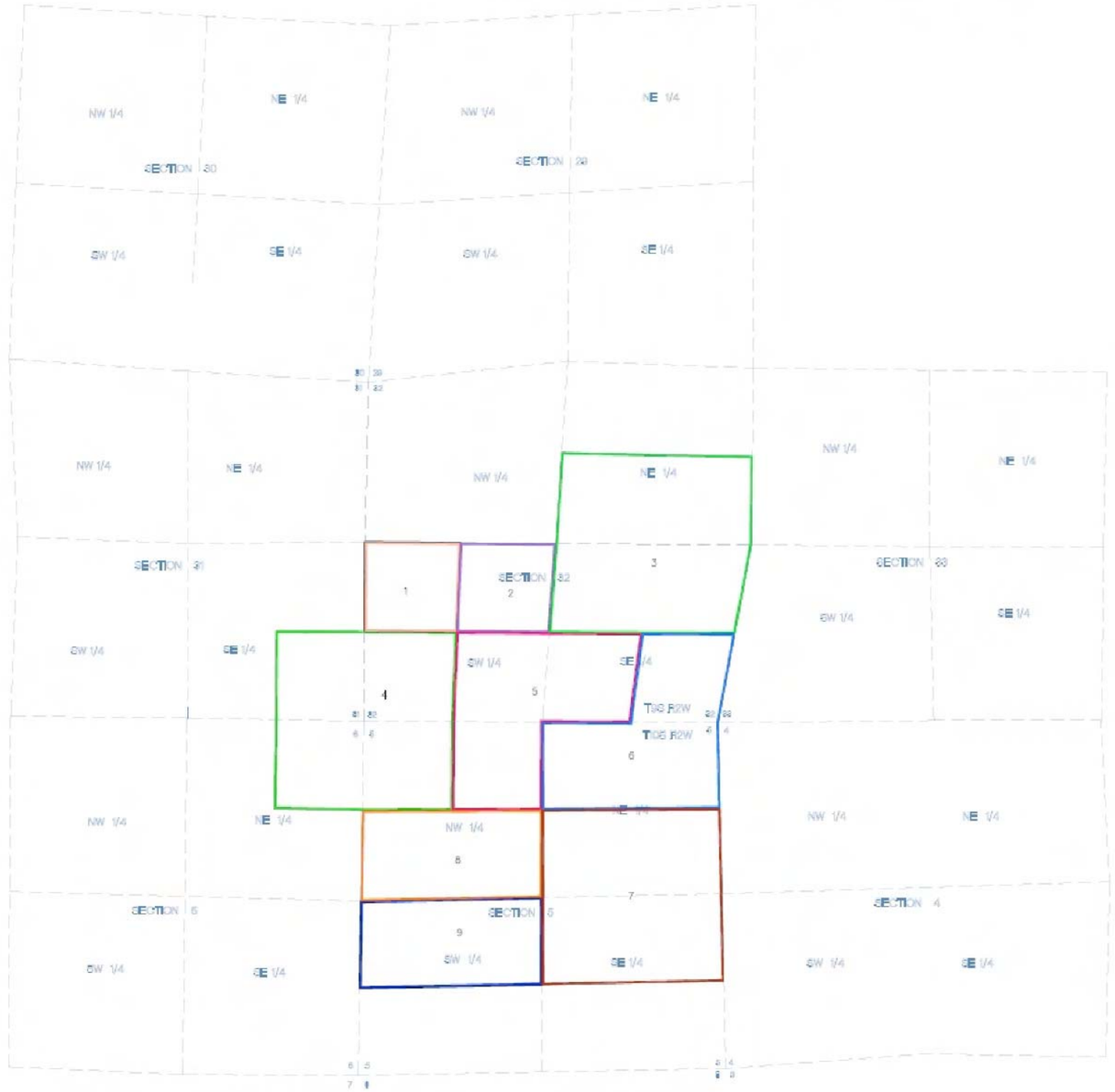
Based on a review of Figure 3, no portion of Grant Nos. 7 or 9 lie within the alluvial boundary, and it is concluded that these grants are not riparian.

If you have any questions, please call me at (858) 451-1136.

FIGURE 1

ALLUVIUM LIMITS		
ALLUVIAL LIMITS EVALUATION GREGORY CANYON LANDFILL SAN DIEGO COUNTY, CA		
GeoLogic Associates Geologists, Hydrogeologists, and Engineers		
DRAWN BY: VL	DATE: OCTOBER 2009	JOB NO. 9539

Boundaries of Original Land Grants from U.S.



LEGEND:

——— OVERALL BOUNDARY

— — — SECTION LINES

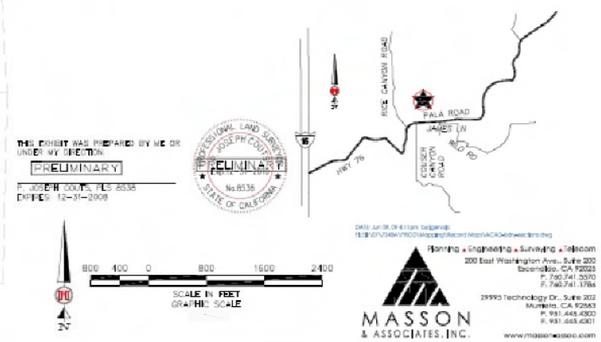
1. NW 1/4 of SW 1/4 of Section 32 (40 acres),
2. NE 1/4 of SW 1/4 of Section 32 (40 acres),
3. S 1/2 of NE 1/4 of Section 32 and the N 1/2 of SE 1/4 of Section 32 (160 acres),
4. SE 1/4 of SE 1/4 of Section 31; SW 1/4 of SW 1/4 of Section 32; Lot 1 of Section 6; Lot 1 of Section 6,
5. SE 1/4 of SW 1/4, Section 32; SW 1/4 of SE 1/4, Section 32 and NE 1/4 of NW 1/4, section 5 (120 acres),
6. NW 1/4 of SE 1/4, Section 32; Lots 3 and 4, Section 5 (same location as N 1/2 of NE 1/4, section 5 (about 120 acres) .
7. S 1/2 of NE 1/4 and N 1/2 of SE 1/4, Section 5 (160 acres)
8. S 1/2 of NW 1/4, Sec 5 (80 acres),
9. N 1/2 of SW 1/4, Section 5 (80 acres).

NOTES:

THE BOUNDARY AND SECTION INFORMATION SHOWN HEREON IS COMPILED FROM RECORD INFORMATION FROM A VARIETY OF SOURCES INCLUDING CHICAGO TITLE REPORT ORDER NUMBER 810022084-X02 DATED 10/20/2008, RECORDED PARCEL MAPS, RECORDS OF SURVEYS, RECORDED DEEDS AND ASSESSOR PARCEL MAPS.

THE LOCATIONS SHOWN HEREON ARE FOR ILLUSTRATIVE PURPOSES AND SHOULD NOT BE CONSTRUED AS THE ACTUAL ON THE GROUND BOUNDARY, NOR SHOULD THIS INFORMATION BE RELIED ON FOR FINAL ENGINEERING.

DUE TO THE VARIOUS POINTS OF BEGINNING FOR EACH PARCEL AND THE DIFFERENT BASIS OF BEARINGS FOR EACH RECORDED DOCUMENT, SOME OF THE PARCELS HAVE BEEN TRANSLATED AND ROTATED TO ACHIEVE A "BEST FIT". AS SUCH, ANY DIMENSIONS SHOW HEREON ARE TO THE NEAREST FOOT AND MAY OR MAY NOT REFLECT THE ACTUAL RECORD DISTANCES.



THIS EXHIBIT WAS PREPARED BY ME OR UNDER MY DIRECTION.

PRELIMINARY

P. JOSEPH COATS, PLS 8536

DATED: 12-31-2008

PRELIMINARY

JOSEPH COATS

No. 8536

REGISTERED PROFESSIONAL LAND SURVEYOR

STATE OF CALIFORNIA

800 400 0 800 1600 2400

SCALE IN FEET

GRAPHIC SCALE

MASSON & ASSOCIATES, INC.

Planning ▲ Engineering ▲ Surveying ▲ Telecom

200 East Washington Ave., Suite 200
Escondido, CA 92025
P. 760.741.3570
F. 760.741.1786

29995 Technology Dr., Suite 202
Murrieta, CA 92563
P. 951.445.4300
F. 951.445.4301

www.massonassoc.com

FIGURE 2

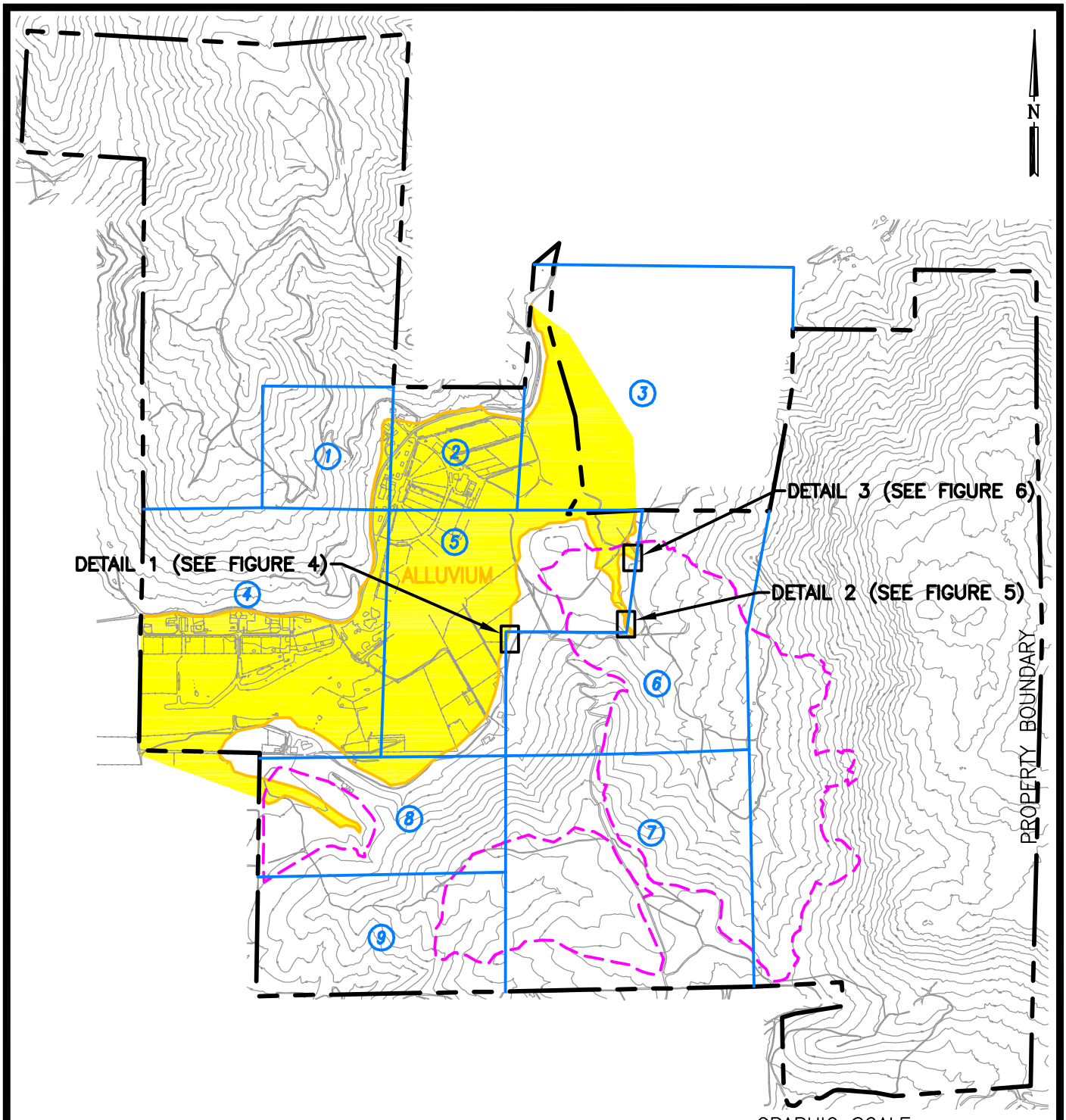
BOUNDARIES OF ORIGINAL LAND GRANTS FROM U.S.

ALLUVIAL LIMITS EVALUATION
GREGORY CANYON LANDFILL
SAN DIEGO COUNTY, CA

GeoLogic Associates

Geologists, Hydrogeologists, and Engineers

DRAWN BY:	DATE:	JOB NO.
VL	OCTOBER 2009	9539



PROPERTY BOUNDARY

GRANT BOUNDARY AND NUMBER

ALLUVIUM

LANDFILL COMPONENTS

GRAPHIC SCALE

800 0 400 800 1600

(in feet)

1 inch = 1600 ft.

FIGURE 3

NOTE: THE LIMITS OF THE ALLUVIUM EXTEND BEYOND THE PROPERTY BOUNDARY. HOWEVER, ITS EXTENT OUTSIDE THE PROPERTY HAS NOT BEEN DEFINED.

ALLUVIAL LIMITS OVERLAIN ON GRANT BOUNDARIES

ALLUVIAL LIMITS EVALUATION
GREGORY CANYON LANDFILL
SAN DIEGO COUNTY, CA

GeoLogic Associates

Geologists, Hydrogeologists, and Engineers

DRAWN BY:	DATE:	JOB NO.
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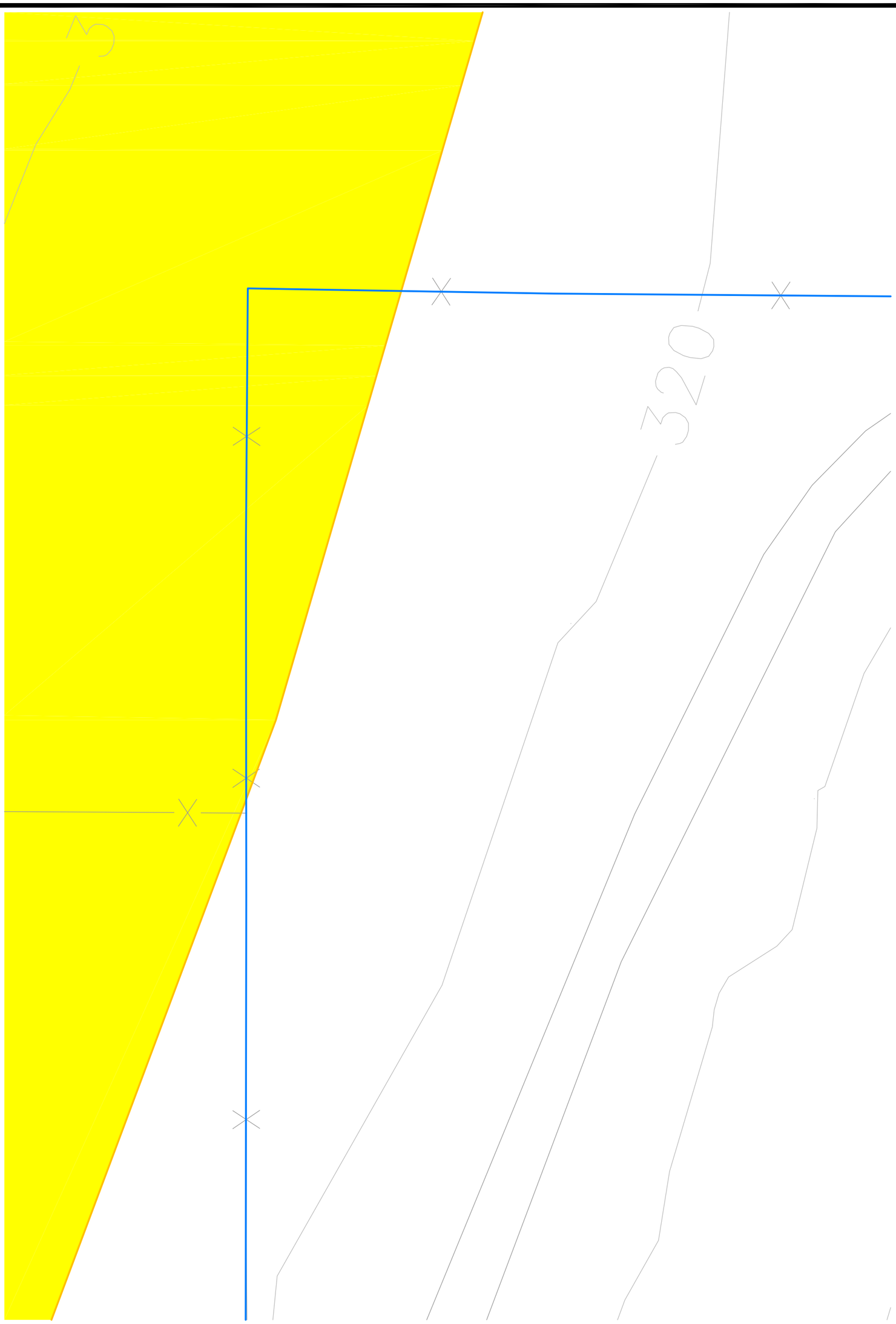

FIGURE 4

GRANT BOUNDARY

ALLUVIUM

GRAPHIC SCALE
10 0 5 10 20
(in feet)
1 inch = 20 ft.

N

ALLUVIAL LIMITS OVERLAIN ON GRANT NO. 6 – DETAIL 1

ALLUVIAL LIMITS EVALUATION
GREGORY CANYON LANDFILL
SAN DIEGO COUNTY, CA

GeoLogic Associates
Geologists, Hydrogeologists, and Engineers

DRAWN BY:	DATE:	JOB NO.
VL	OCTOBER 2009	9539

GRANT BOUNDARY

ALLUVIUM

GRAPHIC SCALE

10 0 5 10 20

(in feet)

1 inch = 20 ft.

N

FIGURE 5

ALLUVIAL LIMITS OVERLAIN ON GRANT NO. 6 – DETAIL 2

ALLUVIAL LIMITS EVALUATION
GREGORY CANYON LANDFILL
SAN DIEGO COUNTY, CA

GeoLogic Associates
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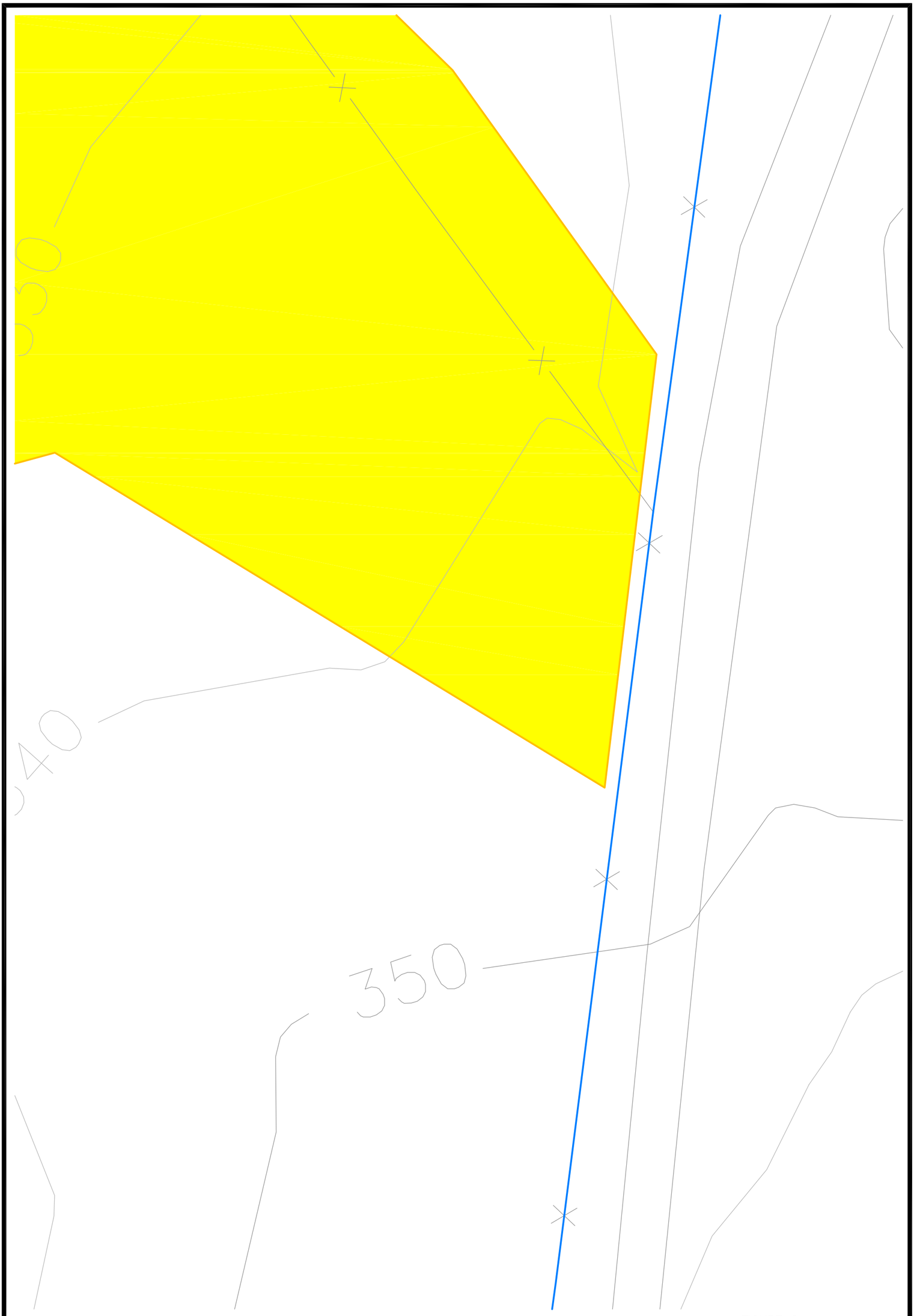

GRANT BOUNDARY

ALLUVIUM

LANDFILL COMPONENTS

GRAPHIC SCALE

10 0 5 10 20

(in feet)

1 inch = 20 ft.

N

FIGURE 6

ALLUVIAL LIMITS OVERLAIN ON GRANT NO. 6 – DETAIL 3

ALLUVIAL LIMITS EVALUATION
GREGORY CANYON LANDFILL
SAN DIEGO COUNTY, CA

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