Philip Williams and Associates, Ltd., "Memorandum Regarding Channel Geomorphic Assessment of Chiquito Canyon" (June 12, 2007; 2007a)



MEMORANDUM

Date:	June 12, 2007
То:	Matt Carpenter and Corey Harpole
Organization:	Newhall Land and Farming Company
From:	Andrew Collison
PWA Project #:	1820.02
PWA Project Name: Subject:	Newhall Ranch
U	Channel geomorphic assessment of Chiquito Canyon
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Purpose of Investigation

PWA conducted reconnaissance-level geomorphic assessments and collected sediment samples from the beds and banks of Chiquito Canyon near Valencia, CA, to support sediment transport modeling, geomorphic and channel design activities.

Data Collection

Fieldwork was carried out between February 7th and 9th 2006 with repeat visits to selected sites in summer of 2006. The channel was walked for its entire length within the Newhall Ranch project area. A total of 7 sediment samples were taken from the channel bed. Sediment samples were collected approximately every 1000 feet along the channels. Sites were selected by pre-programming GPS coordinates along the streambed at fixed intervals and then identifying geomorphically-typical reaches close to the site. At each sampling point the nearest mid-channel or point bar was selected and a sample taken from a position one third from the upstream edge of the bar, in accordance with sediment sampling protocols outlined by Reid and Dunne (1996) and Thomas and Gee (2005). Sediment taken from this location is believed to be representative of average-sized sediment that is in transport through the system. Samples were collected by digging a 6 inch pit in the bed and transferring the entire sample to a polythene bag. Bank samples were taken from actively eroding banks where they appeared to be the main source of sediment in the channel. Typically in all creeks studied the bed samples had a thin veneer of gravel but were dominated by sand beneath that. Samples were transferred to Cooper Testing Laboratory for particle size distribution. Most samples were clearly non-cohesive and were analyzed by wet sieving. A few appeared to be cohesive and were sampled using the hydrometer method to differentiate silt and clay from coarser sediment.

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The sample locations and particle size distribution curves are shown in the attached figure, with typical sediment sizes and channel geomorphic assessment for context. A reconnaissance-level geomorphic assessment was conducted, primarily focused on the degree of channel incision (disconnection between the bankfull channel and floodplain). This was assessed by running a HEC-RAS model with the 5-year flow (model and data supplied by PACE) to determine the extent to which the 5-year flow was confined in a well defined bankfull channel or not. This was based on the observation of SCCWRP (Coleman et. al. 2005) that stable channels in this area contain the 5-year flow. Where the 5-year flow did not fill what appeared to be the bankfull channel and qualitative geomorphic evidence supported the assessment the channel was classified as incised or widening. Figures from the reconnaissance are attached to this memo.

Summary of Sediment Characteristics

All 7 samples were classified as 'sand'. Chiquito Canyon is a mixture of well and poorly graded sand and gravel.

Summary of Geomorphic Assessment

Chiquito Canyon enters the project area in a confined reach with very high, unstable banks (Images 449, 449b). Further downstream it exits its confined canyon and enters a long reach that is dominated by a series of large alluvial fans on the east bank (Images 450a through 452c). These fans are supplying abundant sand to the creek and the channel has formed low banks in the toe of the fan that have little erosion resistance, in part due to the arable landuse and lack of woody vegetation. As a result this reach is aggrading and widening (map classification of this reach as "stable" reflects an initial objective of classifying the channel for potential vertical channel incision). Further downstream (Images 453 through 453b) the channel becomes slightly incised as it cuts through the alluvial fans, leaving abandoned terraces on the banks that are actively eroded on outside bends. Towards the downstream end of the tributary (Images 454 and beyond) the channel remains slightly confined and has been modified by a series of bridges, culverts and artificial channel sections. In places these appear to cause local backwaters and sediment deposition (e.g. Image 453-4b).

References

Coleman, D., MacRae, C. and Stein, E.D., 2005, Effect of Increases in Peak Flows and Imperviousness on the Morphology of Southern California Streams.

Reid, L. M. and T. Dunne, 1996. Rapid Evaluation of Sediment Budgets. GeoEcology Paperback. Catena Verlag Gmbh. 164 p.

Thomas, William, and Gee, D. M. 2005. Sedimentation in Stream Networks (HEC-6T) – Supplement to the User Manual. 36 p.





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Chiquito Canyon

Geomorphic Reconnaissance





d50 = 1.5 n

d50 = 0.35 mn

d50 = 0.75 mm













Middle, slightly aggradational alluvial fan dominated reach









Middle, slightly aggradational alluvial fan dominated reach





































