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M E M O R A N D U M

Date:	July 23, 2007
To:	Kate Bolton
Organization:	UC Berkeley Capital Projects
From:	Jorgen Blomberg
PWA Project #:	1799.01
PWA Project Name:	Winter Creek Temporary Stabilization Project
Subject:	Project Status: 2007 Monitoring
Copy(ies) To:	Mark Cederborg (Hanford ARC)

Philip Williams & Associates (PWA) is pleased to provide this memo summarizing the Winter Creek Temporary Stabilization Project 2006 – 2007 coordinated monitoring and maintenance activities performed by Hanford ARC and PWA. In coordination with PWA and Hanford ARC the University has monitored the stabilization project since the project was constructed in October 2005. As part of the monitoring program PWA and Hanford ARC have provided reports documenting conditions of the project site and specifically on the performance of the stabilization structures. Winter 2006 - 2007 was a relatively low precipitation year characterized by a series of brief low energy storm events; as a result the project only experienced 2 or 3 significant flow events.

Overall the project is performing well to protect the channel from erosion as intended. The structures appear to be very stable and should perform reliably into the future.

We have included photos of the site and stabilization structures to help illustrate conditions described in this memo.

Background

In 2005 the University of California, Berkeley (UC) implemented a temporary stabilization project in Winter Creek in Mather Memorial Redwood Grove at the University of California, Berkeley Botanical Gardens to address significant and active channel incision and associated bank instability. The intent of the project was to provide temporary stabilization and protection to the site and specifically to limit ongoing erosion until a comprehensive enhancement plan for long-term stabilization is developed and implemented. Hanford ARC and PWA collaborated to develop, implement and monitor the temporary stabilization project.

Please find the detailed summary of our coordinated 2006 - 2007 monitoring and recommended maintenance activities for the structures in Table 1 below.

Site Visit and Maintenance Summaries

PWA and Hanford ARC performed two monitoring site visits to the Winter Creek Temporary Stabilization Project site over winter 2006 - 2007. The purpose of the visits was to observe the general condition of the channel and stabilization structures as part of ongoing project monitoring and maintenance efforts. The first visit was performed in October 2006 in order to confirm that the stabilization structures were competent prior to the onset of seasonal rains. The team performed a more detailed site visit on Friday January 12, 2007 subsequent to several storms.

Notes from January 12, 2007 Site Visit: In general the channel and banks appear to be stable with limited evidence of new (or recent) erosion. Overall, the temporary stabilization structures - culvert extension, rock bag installations and geogrid baskets - continue to persist and function as intended. Several rock bags have been washed out and a couple small erosion features (scour holes and cavities) have either increased or developed since our last visit to the site. Recommendations were provided to help UC guide repair and maintenance activities to limit ongoing erosion within the project limits.

Table 1. Structure Monitoring and Maintenance

Location - Structure	**Observations/ Recommendations**
Culvert Extension/ Dissipation Basin	The culvert extension and associated dissipation basin and channel protection appear stable and functioning as intended. Action: No action recommended or required.
Geogrid Structure 1	Several rock bags appear to have been displaced. Action: No action recommended or required.
Geogrid Structure 2	Rock bag installations have nested effectively into the left bank (LB) and right bank (RB) upstream (US) of Structure 1. Action: No action recommended or required.
Geogrid Structure 3	A small cavity has formed in the channel along the LB downstream (DS) of Structure 3. It appears the scour feature is associated with a debris jam in the channel; the scour could initiate a knick-point/incision in the channel and exacerbate local bank instability. Action: Fill the cavity with rock bags displaced (if available) from other locations within the project limits.

Geogrid Structure 4	No degradation or change to the structure was noted. Action: No action recommended or required.
Geogrid Structure 5	A small bank failure has occurred on the LB DS of Structure 5. The creek bank at this location is over-steepened and likely to continue eroding. The scour cavity/ undercut bank below the footbridge has increased laterally under the LB. In addition several rock bags have been washed out and deposited around Structure 6. This erosion may continue to migrate and could undermine the bridge footing and should be arrested to the extent possible. Action: Relocate 4 to 6 rock bags that have been displaced within the project limits and place along bank scour feature DS of Structure 5. Retrieve and replace displaced rock bags in undercut bank under the footbridge.
Geogrid Structure 6	The slump on the LB is likely to be a source of sediment to Winter Creek and Strawberry Creek. The slump appears to be moving (albeit slowly) channel-ward. The slump is constricting the channel and may be forcing flows onto the RB. Although the erosion control measures (fabrics, brush layering and staking) remain in place on the surface of the slump the slump will continue to be a source of sediment to areas downstream until it is stabilized permanently. It is difficult to quantify sediment delivery from the slump. The geogrid structure remains intact and is functioning to stabilize the channel. Action: Continue to monitor condition of slump and channel.
Geogrid Structure 7	No degradation or change to the structure was noted. Action: No action recommended or required.

Hanford ARC performed the recommended repairs to the stabilization structures noted above on February 28, 2007. Finally PWA performed a reconnaissance level site visit to photograph and document the stabilization structures on July 19, 2007.

We hope this information is helpful to the University's ongoing activities to protect Winter Creek. Please feel free to contact us if you have any questions or need additional information.

Table 2. Site Photos - July 19, 2007

 Culvert Extension and Outfall Structure	 Structure 2 (Geogrid Basket)
 Outfall Structure (Rock Bags)	 Structure 5 (Geogrid Basket)

Table 2 (continued). Site Photos - July 19, 2007

	
Undercut Bank at Footbridge	Structure 7 (Geogrid Basket)

Table 3. Site Photos - July 19, 2007

Structure 6 – note slump on left bank