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Memorandum

DATE: January 18, 2011

TO: Phil Jones, Manager, Flood Control Design

FROM: Michael W. Costello, Manager, Materials Laboratory

SUBJECT: Soil Cement Mix Preparation and Testing for East Garden Grove – Wintersburg Channel

The Materials Laboratory was requested to obtain soil samples at the East Garden Grove-Wintersburg Channel at locations as shown in the attached Figure 1. We were requested to classify the soil, prepare cylindrical samples for compressive strength tests and to perform permeability tests from a OCFCD's prescribed mixture of cement, lime, soil and water; the binder was prepared with 25% lime and 75% cement and mixed with soils at 12 lb/ft^3 and water was added at the same rate even though moisture contents of the sample varied. Compressive strength tests were performed in our Materials Lab and the permeability tests were done by Hushmand Associates Incorporated. The results are tabulated below:

Lab Sample Number	Location	Station	Classification	Compressive Strength (psi)			Hydraulic Conductivity (cm/sec)
				7 day	28 day	56 day	
10-37	3' below the top of levee	54+00	Clayey Silt	130[a]	185	240	1.51×10^{-7}
10-38	3' below the top of levee	59+00	Silty Sand	110	200	250	6.75×10^{-7}
10-39	3' below the top of levee	62+00	Clayey Sand	90	55	85	4.34×10^{-7}
10-59	3' below the toe of levee	54+00	Silty Sand	190	185	275	1.34×10^{-5}
10-60	3' below the toe of levee	59+00	Clayey Sand	60	90	105	2.42×10^{-5}
10-61	3' below the toe of levee	62+00	Sandy Silt	140	170	205	3.39×10^{-7}

Note: a. Compressive strength tested at 10 days.

Except sample numbers 10-39 and 10-60 all the compressive strength test results are above the target value of 150 psi; except sample numbers 10-59 and 10-60 all the permeability test results are below the target value of 1×10^{-6} cm/sec. The variation is mainly due to the inconsistency of mixing at various moistures in preparing samples in the lab as shown in the Figure 2.

FIGURE 1

STA 62+00

10-61
10-39

STA 59+00

10-60
10-38

STA 54+00

10-59
10-37

FIGURE 2