

September 25, 2013
Project No. 207885003

Mr. Krishnamenon Nadaraja
Materials Lab/OC Inspection Division
Orange County Public Works
1152 East Fruit Street
Santa Ana, California 92701

Subject: Remedial Grading Below Channel Bottom
Rossmoor Storm Channel (C01S02) Improvement Project
From Upstream of Los Alamitos Boulevard to Downstream of Rochelle Street
City of Los Alamitos, Orange County, California

References: County of Orange Public Works, 2013, Plans for Improvement of Rossmoor Channel (Facility No. C01S02) (Los Alamitos Boulevard to Rochelle Street), Sta. 54+30.00 to Sta. 79+77.44 +/-, dated November.

Ninyo & Moore, 2011, Geotechnical Data Report for Rossmoor Storm Channel (C01S02) Improvement Project, From Upstream of Los Alamitos Boulevard to Downstream of Rochelle Street, City of Los Alamitos, Orange County, California, dated July 21.

Dear Mr. Nadaraja:

In accordance with the request of Vinny Hoang with Orange County Public Works Flood Control Design (OCFCD), we have reviewed the referenced improvements plans for the Rossmoor Channel Improvement Project (County of Orange Public Works, 2013) in order to evaluate cost-saving remedial grading alternatives.

At the time of the preparation of our report, three alternatives were considered for improvement of the channel. Alternative No. 2 was selected which generally includes lining the existing 1.5:1 (horizontal to vertical) sloped channel and channel bottom with reinforced concrete. The concrete on the channel bottom will be underlain by a 12-inch-thick gravel base that will extend beyond the channel bottom 1 foot horizontally. The gravel base will extend approximately 1 foot above the toe of the channel slope and include 3-inch-diameter perforated pipe weep holes that will outlet through the concrete lining on the slope.

Based on communication with representatives of OCFCD, it is our understanding that similar improvements were made to Rossmoor Channel immediately upstream of the subject project in 1996. During construction of these improvements, the bottom of the channel was cut to the gravel sub-

base subgrade without additional remedial grading, and it is our understanding that the improvements have performed well since construction without significant distress to the concrete.

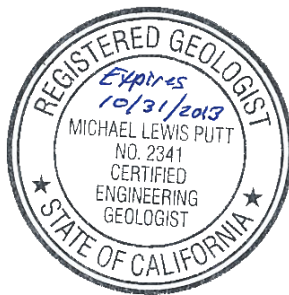
Our referenced report (Ninyo & Moore, 2011) included recommendations for remedial grading to a depth of 2 feet below the bottom of the channel gravel subbase. Based on our review of the referenced improvement plans, which include a 12-inch-thick gravel subbase, and in consideration of the relatively good performance of the upstream improvements, it is our opinion that the remedial grading depths below the bottom of the channel may be reduced. We recommend that the channel bottom is excavated to the elevation of the gravel subbase bottom and the bottom is moisture conditioned and recompacted in-place to 90 percent relative compaction as evaluated by ASTM International D 1557. However, if the bottom is unstable due to soft/loose or wet ground conditions, recompaction work may involve scarification and aeration to allow the subgrade soils to dry to near-optimum moisture conditions. If drying-back the subgrade soils is not preferred, the wet and/or soft/loose subgrade soils may be overexcavated and replaced with additional gravel. The thickness of the additional overexcavation should be evaluated at the time of construction by the geotechnical consultant, but should generally extend to a depth such that a firm and unyielding base is provided to support the design 12 inches of gravel base. Where additional gravel base is utilized, the filter fabric should be placed on the bottom of the gravel base.

We appreciate the opportunity to provide geotechnical services for this project.

Sincerely,
NINYO & MOORE



Michael Putt, CEG
Senior Geologist



Daniel Chu, PhD, GE
Chief Geotechnical Engineer



Carol A. Price, CEG
Principal Geologist

MLP/DBC/CAP/lr



Distribution: (1) Addressee (via e-mail)
(1) Vinny Hoang (via e-mail)
(1) Charles Busslinger (via e-mail)