


**PRELIMINARY TECHNICAL
MEMORANDUM NO. 2**
County of Marin, Department of Public Works
Flood Control Zone No. 3
Crest Marin Creek Pump Station
66-inch Diameter CMP Inlet Culvert Review



Reviewed by: _____
Date: _____


3-23-07

PREPARED FOR: Tim Hampton, P.E., Marin County Flood Control

PREPARED BY: Craig Lewis, S.E., Winzler & Kelly

REVIEWED BY: Rick Jorgensen, P.E., Winzler & Kelly

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INTRODUCTION

The purpose of this memorandum is to provide comments regarding the visual survey of the 66-inch diameter corrugated metal pipe (CMP) lined culvert at the inlet to the Crest Marin Pump Station. The culvert appears to have suffered some settlement at the transition to the pump station inlet.

At the request of the District, Winzler & Kelly provides the following comments based on the site visit and visual inspection of the culvert by our Structural Engineer.

SUMMARY

The CMP was measured to be out-of-round by approximately four to six inches with the deformation creating an elliptical shape (see Photo 1 below). The culvert appears to have settled four to five inches at the invert (see Photo 2 below). This may be the result of loss of bearing material due to soil washout at the invert and the haunches of the CMP. Soil applies pressure to the culvert, but also supports the CMP and much of the load. We note that the asphalt or mortar lining does not appear to be visually distressed or disbonded and contributes to the stiffness of the ring. The CMP is separated at the joint splice near the transition section. Reviewing the record drawings provided, there appears to be 3'-6" to 4'-0" of soil cover for the culvert.

DISCUSSION

Winzler & Kelly recommends the following course of action:

- The District should continue to monitor the culvert on a regular basis to note any additional settlement at the invert. Additional deformation in the ring could result in a localized crushing of the culvert wall. This would not necessarily result in a collapse of the culvert, but may represent a performance limit of the CMP with regard to a reduction in the safety factor of the steel. A flexible circular ring such as the CMP is in equilibrium when it is subjected to uniform external pressure of the soil. If the settlement of the culvert continues

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and the ring deformation increases, remedial measures may be required to maintain the operable function of the culvert.



Photo 1 – Deflection at Top of Culvert



Photo 2 – Settlement at Culvert Invert