

# **INFORMATION HANDOUT**

## **MATERIALS INFORMATION**

**FOUNDATION RECOMMENDATION – VEHICLE DETECTION SYSTEM (VDS)  
INSTALLATION**

**ROUTE: 99-SJ-Var**

# Memorandum

*Flex your power!  
Be energy efficient!*

**To: ABDUL BAKER**  
Senior Design Engineer, Branch A  
Project Development Division 1

**Date:** January 25, 2010

**File:** 10-SJ-99  
PM 0.0/38.0  
10-SJ-120  
PM 1.2/5.6  
10-0K320  
VDS Installation

**From: DEPARTMENT OF TRANSPORTATION**  
**DIVISION OF ENGINEERING SERVICES**  
**GEOTECHNICAL SERVICES – MS 5**

**Subject:** Foundation Recommendation – Vehicle Detection System (VDS) Installation

## Introduction

Per your request, dated December 3, 2009, recommendations are being provided for the VDS project on State Route (SR) 99. This project is located in San Joaquin County from PM 0.0 to 38.0. See Plate No. 1, Vicinity Map.

This project proposes to install 83 Traffic Monitoring Stations (TMS) on SR 99. Some TMS will be mounted on existing light poles while others will be mounted on new poles of type VDS 40 or Lighting Poles. Overall, 51 VDS (Type 40) and 14 Light Pole (Type 30) locations will require cast-in-drilled holes (CIDH) foundations.

This report includes a review of published data. No additional subsurface investigation was performed.

## Existing Facilities and Proposed Improvements

Route 99 provides primary access for movement of people, goods, and services and is considered the main transportation route for industrial, commercial and agricultural purposes. It is in the Freeway/Expressway System and the National Highway System (NHS) and is a Focus Route and High Emphasis Route in the Interregional Road System (IRRS). Also it is part of the Strategic Highway Network (STRAHNET) and it is a

Terminal Access Route for the National Truck Network. SR 99 currently has 6-lane and 8-lane sections throughout San Joaquin County.

Increased congestion has warranted a need to traffic count more often and in more difficult locations. Counts are currently collected manually, and expose workers to the freeway traffic. In order to meet census needs and facilitate the collection of traffic data, Caltrans proposes to install several TMS on the various State Routes in San Joaquin County. This project was initiated by the District Traffic Electrical Systems Branch to construct as one of the parts of an Intelligent Transportation System (ITS) in District 10. The ITS is needed to provide the traveling public with real time roadway and weather conditions.

**Geotechnical Conditions**

Based on the review of existing soil information, the subsurface materials range from fine sandy silt, silty coarse sand to clay.

Groundwater

As-built log-of-test borings (LOTBs) indicate ground water is present to a minimum depth of 1 ft to 4 ft below original ground (OG). However, the LOTBs date back to the 1950s and more recent ground water data collected from the Department of Water Resources (DWR) monitoring wells show deeper groundwater depths at 13.5 ft below OG (DWR groundwater values are not available for all proposed VDS locations).

Below are tables summarizing the geotechnical and groundwater conditions at each proposed VDS location.

**Table 1 – Conditions at proposed VDS locations – NB SR 99**

Location	PM	Type	Existing Slope	Groundwater (Ft below OG)
1	0.65	VDS 40	Flat	28’-29’ (LOTB, Main St OC 1964)
2	0.79	VDS 40	Flat	28’-29’ (LOTB, Main St OC 1964)
3	1.48	VDS 40	Flat	12’-17.5’ (LOTB, Acacia Ave POC 1963)

4	1.59	VDS 40	Flat	12'-17.5' (LOTB, Acacia Ave POC 1963)
6	2.49	VDS 40	2:1 or flatter	13' (LOTB, Jacktone Rd OC 1997)
8	5.03	VDS 40	2:1 or flatter	1'-4' (LOTB, Austin Rd OC 1952) 13.5' (DWR, 2009)
11	9.31	VDS 40	Flat	4'-5' (LOTB, Lathrop Rd OC 1953) 25.6' (DWR, 2008)
12	11.66	VDS 40	Flat	9'-10' (LOTB, Turner St OH 1954) 37.5' (DWR, 2009)
14	13.02	VDS 40	Flat	50' (DWR, 1997)
16	14.76	VDS 40	Flat	Not Available
18	21.03	VDS 40	Flat	20'-25' (LOTB, Cherokee Rd OC 1956)
21	24.10	VDS 40	Flat	34'-37' (LOTB, Morada Ln OC 1959) 76' (DWR, 2009)
22	25.28	Light Pole (Type 30)	2:1 or flatter	No GW (LOTB, Eight Mile Rd OC 1962) 80' (DWR, 2009)
23	25.39	VDS 40	Flat	No GW (LOTB, Eight Mile Rd OC 1962) 80' (DWR, 2009)
24	27.49	Light Pole (Type 30)	Flat	41' (LOTB, Armstrong Rd OC 1959) 82' (DWR, 2009)
25	27.57	VDS 40	2:1 or flatter	41' (LOTB, Armstrong Rd OC 1959) 82' (DWR, 2009)
26	28.47	VDS 40	Flat	29'-34' (LOTB, Harvey Ln OC 1959) 80' (DWR, 2003)
28	28.81	Light Pole (Type 30)	2:1 or flatter	30'-36' (LOTB, South Lodi OC 1957)
30	29.68	VDS 40	2:1 or flatter	30'-36' (LOTB, Route 99/12 Sep 1957)
31	30.92	VDS 40	1:1	25'-30' (LOTB, Route 12/99 Sep 1957)
33	31.29	Light Pole (Type 30)	2:1 or flatter	27.5'-28' (LOTB, North Lodi OC 1960)
34	31.43	VDS 40	Flat	30' (LOTB, Turner Rd OC 1960)
35	31.57	VDS 40	2:1 or flatter	30' (LOTB, Turner Rd OC 1960)
36	31.98	VDS 40	Flat	5'-7' (LOTB, Mokelumne River UC 1989)
38	32.66	Light Pole (Type 30)	2:1 or flatter	No GW (LOTB, Woodbridge Rd OC 1954) 57' (DWR, 2009)
39	32.74	VDS 40	Flat	No GW (LOTB, Woodbridge Rd OC 1954) 57' (DWR, 2009)
40	33.72	VDS 40	Flat	Not Available
42	34.73	VDS 40	Flat	No GW (LOTB, Peltier Rd OC 1954)
44	35.67	Light Pole (Type 30)	2:1 or flatter	No GW (LOTB, Jahant Rd OC 1954)

45	35.76	VDS 40	Flat	No GW (LOTB, Jahant Rd OC 1954)
46	36.42	VDS 40	Flat	47' (LOTB, Collier Rd OC 1954)
47	36.52	VDS 40	Flat	47' (LOTB, Collier Rd OC 1954)
48	37.66	VDS 40	Flat	36.5' (LOTB, Liberty Rd OC 1954)
49	37.75	VDS 40	Flat	36.5' (LOTB, Liberty Rd OC 1954)

**Table 2 – Conditions at proposed VDS locations – SB SR 99**

Location	PM	Type	Existing Slope	Groundwater (GW) (Ft below OG)
50	0.74	VDS 40	Flat	Approx 28'-29' (LOTB, Main St OC 1964)
51	1.09	Light Pole (Type 30)	Flat	Not Available
52	2.00	Light Pole (Type 30)	Flat	13' (LOTB, Jacktone Rd OC 1997)
53	2.66	Light Pole (Type 30)	2:1 or flatter	13' (LOTB, Jacktone Rd OC 1997)
54	4.50	VDS 40	2:1 or flatter	1'-4' (LOTB, Austin Rd OC 1952) 13.5' (DWR, 2009)
55	4.94	VDS 40	2:1 or flatter	1'-4' (LOTB, Austin Rd OC 1952) 13.5' (DWR, 2009)
56	8.98		2:1 or flatter	4'-5' (LOTB, Lathrop Rd OC 1953) 25.6' (DWR, 2008)
57	9.34	VDS 40	Flat	4'-5' (LOTB, Lathrop Rd OC 1953) 25.6' (DWR, 2008)
58	9.39	VDS 40	Flat	4'-5' (LOTB, Lathrop Rd OC 1953) 25.6' (DWR, 2008)
59	11.62	VDS 40	2:1 or flatter	9'-10' (LOTB, Turner St OH 1954) 37.5' (DWR, 2009)
60	11.70	Light Pole (Type 30)	Flat	9'-10' (LOTB, Turner St OH 1954) 37.5' (DWR, 2009)
61	12.73	VDS 40	2:1 or flatter	50' (DWR, 1997)
62	14.47	VDS 40	2:1	Not Available
70	25.30	VDS 40	2:1 or flatter	No GW (LOTB, Eight Mile Rd OC 1962) 80' (DWR, 2009)
72	27.51	VDS 40	Flat	41' (LOTB, Armstrong Rd OC 1959) 82' (DWR, 2009)
74	28.50	Light Pole (Type 30)	Flat	29'-34' (LOTB, Harvey Ln OC 1959) 80' (DWR, 2003)
76	28.87	VDS 40	Flat	30'-36' (LOTB, South Lodi OC 1957)

79	30.85	VDS 40	Flat	30'-36' (LOTB, Route 99/12 Sep 1957)
81	31.35	VDS 40	Flat	27.5'-28' (LOTB, North Lodi OC 1960)
82	31.63	VDS 40	Flat	30' (LOTB, Turner Rd OC 1960)
83	32.04	VDS 40	Flat	5'-7' (LOTB, Mokelumne River UC 1989)
86	32.50	Light Pole (Type 30)	2:1 or flatter	No GW (LOTB, Woodbridge Rd OC 1954) 57' (DWR, 2009)
87	33.50	VDS 40	2:1 or flatter	Not Available
88	33.70	Light Pole (Type 30)	2:1 or flatter	Not Available
89	34.42	VDS 40	Flat	No GW (LOTB, Peltier Rd OC 1954)
90	34.51	VDS 40	Flat	No GW (LOTB, Peltier Rd OC 1954)
91	35.71	VDS 40	Flat	No GW (LOTB, Jahant Rd OC 1954)
92	35.80	VDS 40	Flat	No GW (LOTB, Jahant Rd OC 1954)
93	36.82	VDS 40	Flat	47' (LOTB, Collier Rd OC 1954)
95	37.77	VDS 40	2:1 or flatter	36.5' (LOTB, Liberty Rd OC 1954)
96	37.96	VDS 40	Flat	36.5' (LOTB, Liberty Rd OC 1954)

## Foundation Recommendations

### VDS (Type 40)

Based on the site investigation and analysis, the Office of Geotechnical Design North (OGDN) recommends 2 ft cast-in-drilled holes (CIDH) with embedment depths of 10 ft when OG is flat, and 12 ft when topography consists of sloping ground (refer to above tables for topography details). The foundation shall be treated as a sloping ground condition if the VDS is on a slope or within 10 ft from the edge at the top of the slope (hinge point). The foundation should also be at minimum 20 ft away from any existing bridge, changeable message sign, and overhead sign foundation, and 8 ft away from existing sound walls.

### Light Pole (Type 30) w/ VDS

The OGDN also recommends 2.5 ft cast-in-drilled holes (CIDH) with embedment depths of 7 ft when OG is flat, and 8 ft when topography consists of sloping ground (refer to above tables for topography details). This is based on a 3/4 inch maximum horizontal ground surface displacement requirement provided by Headquarters (HQ) Office of Design and Technical Services. The foundation shall be treated as a sloping ground condition if the VDS is on a slope or within 10 ft from the edge at the top of the slope (hinge point). The foundation should also be at minimum 20 ft away from any existing bridge, changeable message sign, and overhead sign foundation, and 8 ft away from existing sound walls.

### **Construction Considerations**

All earthworks shall follow Section 19 of Caltrans Standard Specifications. Temporary casing may be used for CIDH construction if caving occurs. In the event of localized groundwater and surface water during construction, especially during the rainy season; the contractor shall be prepared to construct the CIDH piles under these conditions according to the Caltrans wet specs.

### **Project Information**

Standard Special Provision S5-280, "Project Information", discloses to bidders and contractors a list of pertinent information available for their inspection prior to bid opening. The following is an excerpt from SSP S5-280 disclosing information originating from Geotechnical Services. Items listed to be included in the Information Handout will be provided in Acrobat (.pdf) format to the addressee(s) of this report via electronic mail.

*Data and information attached with the project plans are:*  
None

*Data and information included in the Information Handout provided to the bidders and contractors are:*

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*Data and information available for inspection at the District Office:*

None.

*Data and information available for inspection at the Transportation Laboratory are:*

None.

If any changes are proposed during the final project design, the Office of Geotechnical Design – North should review those changes to determine if the foundation recommendations herein still apply.

If you have any questions or comments, please call Gina Lopez at (916) 227-1055 or John Huang at (916) 227-1037.

Report by:  
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c: JHuang  
DME (E-copy)  
GDN File  
GS File

LIST OF ATTACHMENTS

Plate 1 Vicinity Map





EA: 0K320

Date: January 2010

### Vicinity Map

Figure 1

CALTRANS

Division of Engineering Services  
 Geotechnical Services  
 Office of Geotechnical Design - North



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