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To:	Amy Driessen	From:	Leslie Cho and Xiteng Liu
	Transportation and Economic Corridors		Stantec Consulting Ltd.
File:	123315222	Date:	June 18, 2024

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**Reference: North Central Region, Site NC010 - Highway 33:04 Willow Bend Slide, Spring 2024 Instrumentation Monitoring Report**

## **1.0 OBSERVATIONS**

### **1.1 FIELD PROGRAM AND INSTRUMENTATION STATUS**

The Spring 2024 reading cycle consisted of instrument readings on one slope inclinometer (SI97-3) and five standpipe piezometers (SP14-1, SP14-3, SP14-6, SP20-1, and SP20-2). Figure 1 attached provides a schematic of the site. The instruments were read by Andres Padros, Technician and Olawale Odusi, Geotechnical Technologist on May 15, 2024.

The slope inclinometer (SI) was measured using an RST MEMS digital inclinometer probe with 0.5 m increments and RST handheld PC. The standpipe piezometers (SP) were measured using a Heron Instruments water tape.

GPS coordinates of all instruments were obtained using a Garmin eTrex 22x handheld GPS unit.

## **2.0 INSTRUMENTATION READINGS**

### **2.1 GENERAL**

The SI plots are provided in the attachments and summarized in the following sections. Displacement-time plots along with movement rates, total cumulative movement, maximum movement rates, and incremental movements are provided in Table NC010-1 and the attachments.

The groundwater levels from SP readings are summarized in Table NC010-2 and in the following sections with resulting plots attached.

### **2.2 ZONES OF MOVEMENT**

No zones of movement were observed in the slope inclinometer SI97-3.

### **2.3 MONITORING RESULTS**

#### **2.3.1 Slope Inclinometers**

No zones of movement were observed in SI97-3. There was some deflection within the upper 2 m of the SI casing that is likely attributed to freeze-thaw cycles, poor grouting and deflections from the casing stick-up.

June 18, 2024

Amy Driessen

Page 2 of 4

**Reference:** North Central Region, Site NC010 - Highway 33:04 Willow Bend Slide, Spring 2024 Instrumentation Monitoring Report

### **2.3.2 Piezometers**

The groundwater level at the site was measured to range from 2.9 m to 6.6 m below ground surface. The water levels in each piezometer all rose slightly ranging from 0.2 m to 0.4 m increase.

## **3.0 RECOMMENDATIONS**

### **FUTURE WORK**

It is recommended that the next reading cycle take place in Spring 2025. Consideration for installing replacement SIs at SI97-1 and 97-2 should be given.

### **3.1 INSTRUMENTATION REPAIRS**

No instrument repairs are required at this time.

June 18, 2024

Amy Driessen

Page 3 of 4

Reference: North Central Region, Site NC010 - Highway 33:04 Willow Bend Slide, Spring 2024 Instrumentation Monitoring Report

**Table NC010-1: Spring 2024 Slope Inclinometer Reading Summary**

Instrument Name	Date Initialized	Coordinates <sup>(1)</sup> (UTM 11U, NAD1983) (m)		Total Cumulative Resultant Movement and Depth of Movement to Date (mm)	Maximum Rate of Movement (mm/yr)	Current Status	Date of Previous Reading	Incremental Movement Since Previous Reading (mm)	Current Rate of Movement (mm/yr)	Change in Rate of Movement Since Previous Reading (mm/yr)
		Northing	Easting							
SI97-3	May 18, 2000	5981186	672313	NA	NA	Operational	May 10, 2023	NA	NA	NA
(1) Updated May 15, 2024, with approximate accuracy of ± 3 m										

**Table NC010-2: Spring 2024 Piezometer Reading Summary**

Instrument Name	Date Initialized	Coordinates <sup>(1)</sup> (UTM 11U, NAD1983) (m)		Bottom Depth (mbgs), (Elevation)	Current Status	Maximum Water Level (m bgs)	Measured Water Level May 15, 2024 (m bgs), (Elevation)	Previous Water Level May 10, 2023 (m bgs), (Elevation),	Change in Water Level (m)	
		Northing	Easting							
SP14-1	Mar. 08, 2014	5981203	672283	15.4 (671.6 m)	Operational	4.7 (May 15, 2024)	4.7 (682.3 m)	5.1 (681.9 m)	0.4	
SP14-3	Mar. 08, 2014	5981186	672277	9.9 (676.6 m)	Operational	1.4 (Sep 16, 2022)	2.9 (683.7 m)	3.1 (683.4 m)	0.2	
SP14-6	Mar. 08, 2014	5981187	672312	10.1 (679.8 m)	Operational	4.7 (Sep 23, 2017)	5.4 (684.5 m)	-	-	
SP20-1	Apr 13, 2020	5981141	672291	19.5 (670.5m)	Operational	4.5 (Sep 16, 2022)	6.6 (683.3 m)	6.9 (683.1 m)	0.2	
SP20-2	Apr 13, 2020	5981221	672283	9.8 (676.5 m)	Operational	4.5 (May 15, 2024)	4.5 (681.8 m)	4.8 (681.5 m)	0.3	
(1) Updated May 15, 2024, with approximate accuracy of ± 3 m										

June 18, 2024

Amy Driessen

Page 4 of 4

## 4.0 CLOSING

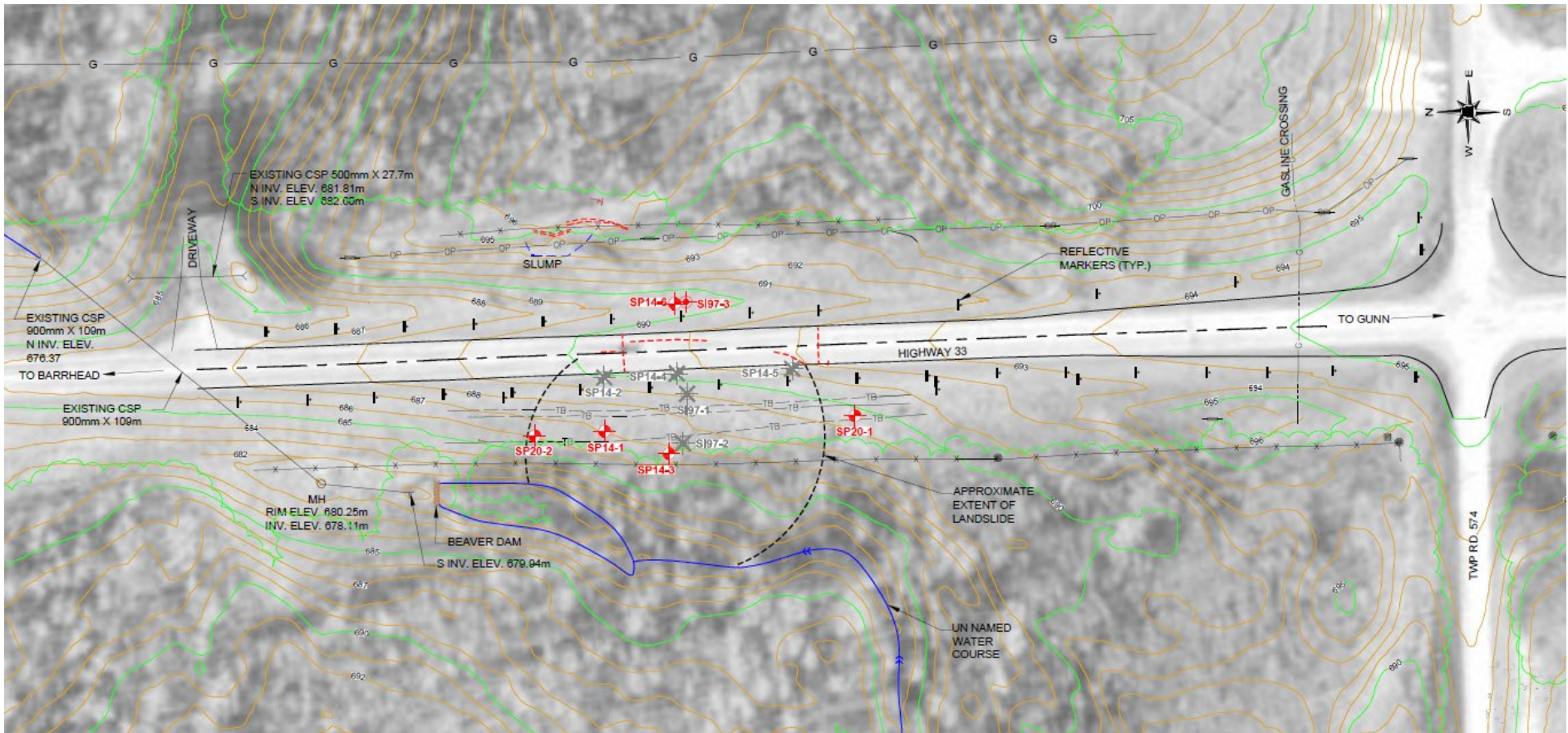
We trust this instrumentation report meets your requirements. If you have any questions, please do not hesitate to contact the undersigned.

**Stantec Consulting Ltd.**

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Attachment:      Figure 1 - Site Plan  
                         S197-3 Slope Inclinator Plots  
                         Standpipe Piezometer Level Depth vs Time Plot



\*Adapted from Thurber Engineering Drawing No. 13357-NC010-1

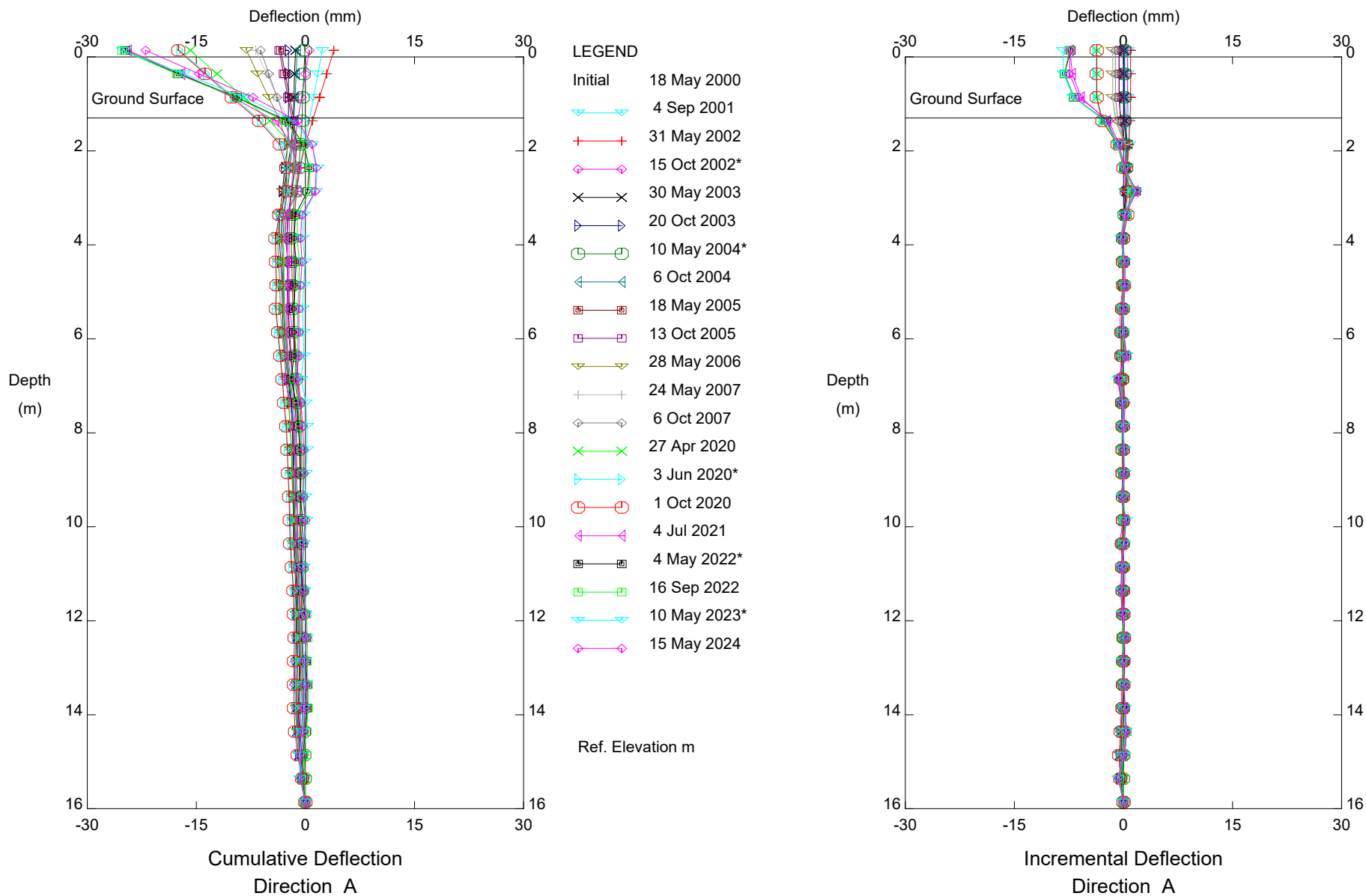


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 Date: 24AUG21  
 Prepared by: OZ  
 Checked by: LC

Client/Project  
 Alberta Transportation  
 AT GRMP

Title  
 Figure 1 - Site Plan

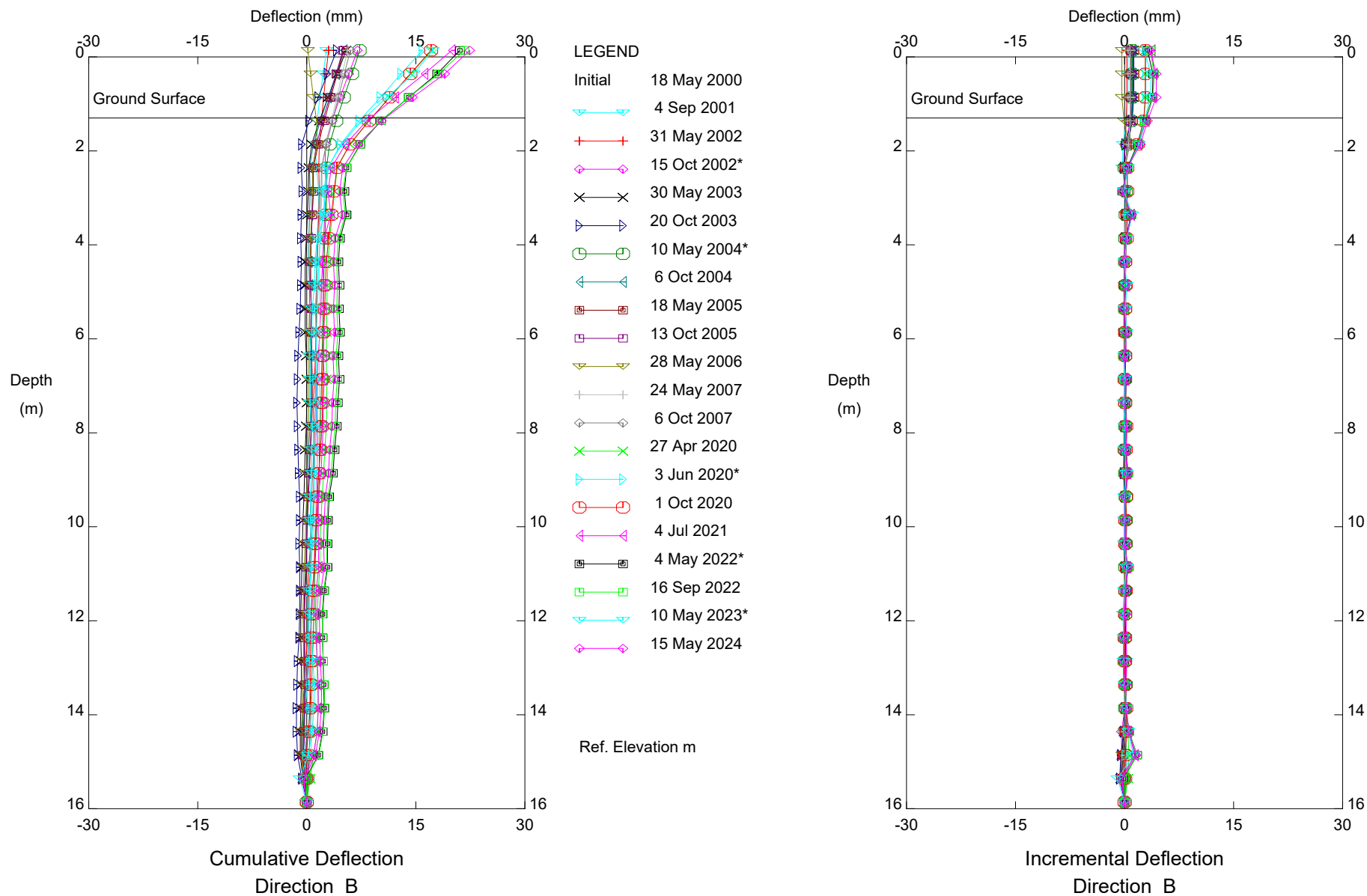
Figure No.  
 1



Hwy 33:04, 25 km North of Gunn, Inclinator SI#97-3

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Sets marked \* include zero shift and/or rotation corrections.



Hwy 33:04, 25 km North of Gunn, Inclinometer SI#97-3

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Sets marked \* include zero shift and/or rotation corrections.



### STANDPIPE PIEZOMETER DATA

