LEGEND

Area of cracking / settlement

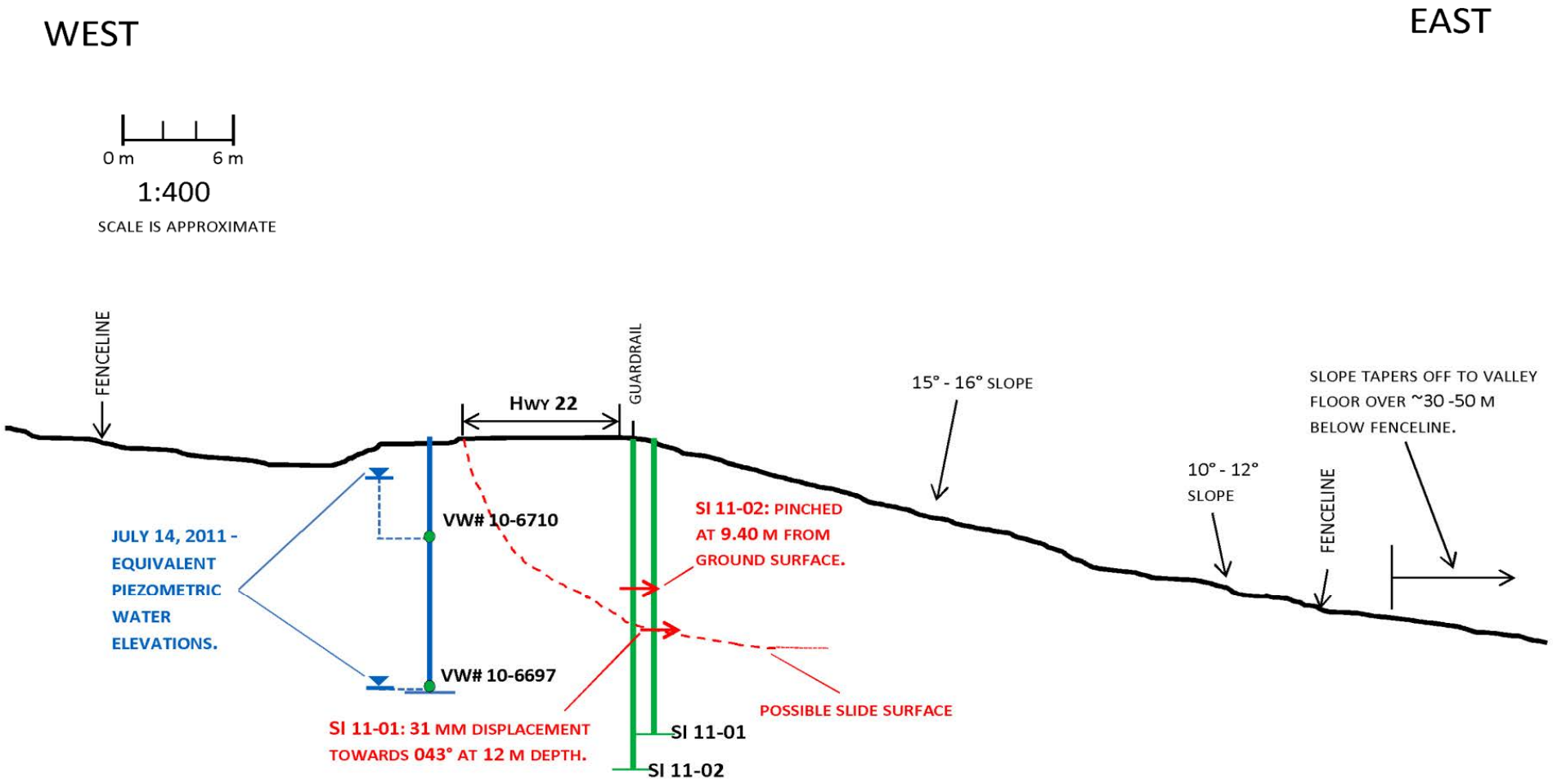
Slope Inclinometers

VW Piezometers

Note: Scale and Instrument locations are approximate.

Client: Alberta Transportation		Figure 1
Project: Southern Region Geohazard Assessment	Date: Sep-11	Revision:
S38 - Hwy 22:08 - Callum Creek - Site Plan and Instrumentation Detail	Job No. CG25352.200	
	Figure 1.xls	

amec



Note: Approximate cross-section, not surveyed.

Client: Alberta Transportation		Figure 2
Project: Southern Region Geohazard Assessment	Date: Sep-11	Revision:
S38 - Hwy 22:08 Callum Creek Cross-Section	Job No. CG25352.200	
	File No.: Figure 2.xls	

amec

LEGEND

Area of cracking / settlement

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Project: Southern Region Geohazard Assessment	Date: Sep-11	Revision:
S38 - Hwy 22:08 - Callum Creek - Site Plan and Instrumentation Detail	Job No. CG25352.200	
	Figure 1.xls	

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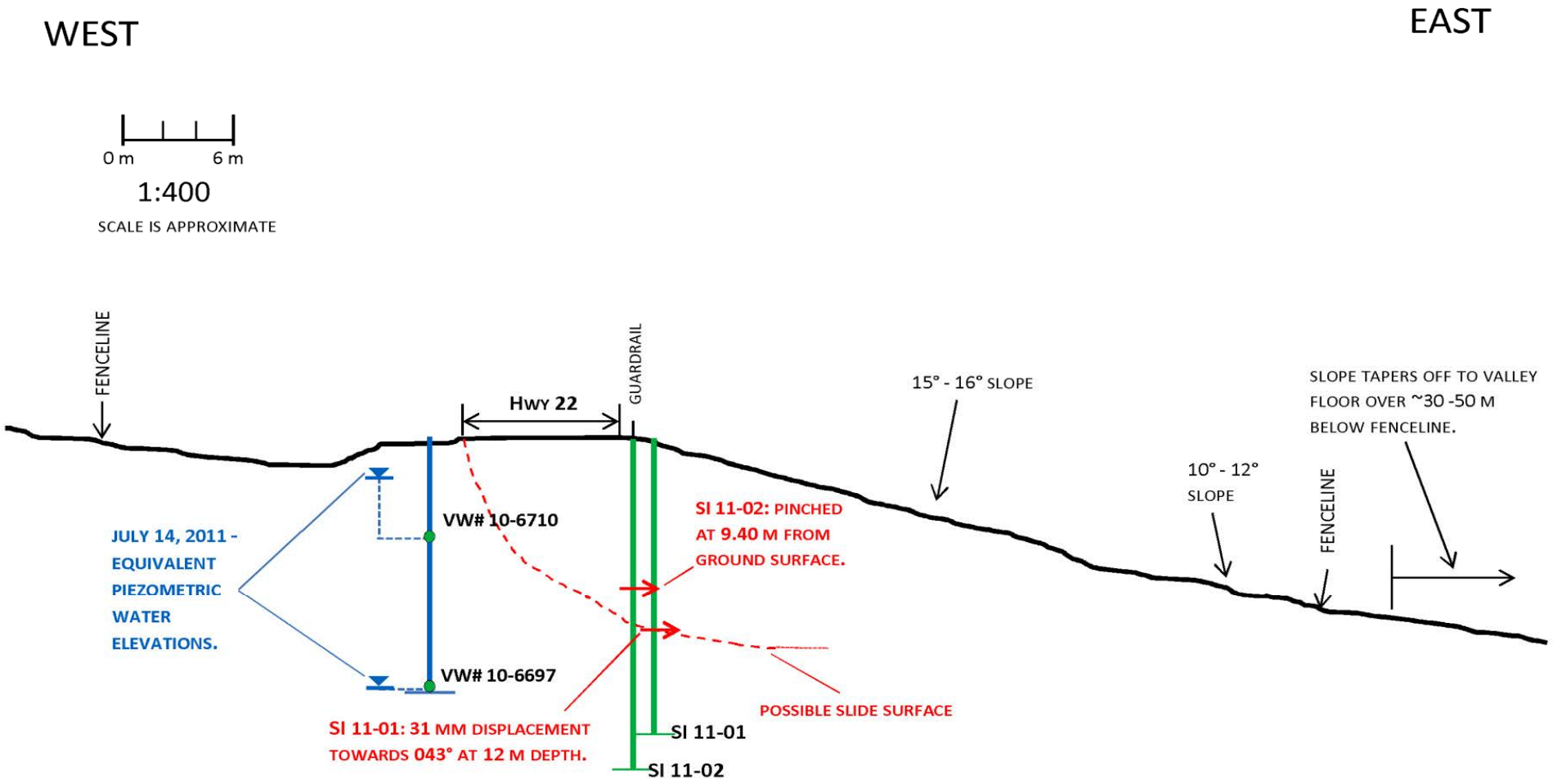

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Client: Alberta Transportation		Figure 2
Project: Southern Region Geohazard Assessment	Date: Sep-11	Revision:
S38 - Hwy 22:08 Callum Creek Cross-Section	Job No. CG25352.200	
	File No.: Figure 2.xls	

amec

Bale, Bryan

From: Clay, Tyler
Sent: Monday, July 18, 2011 5:31 PM
To: Ross Dickson
Cc: Bidwell, Andrew; Bale, Bryan
Subject: S38 - Callum Creek, Hwy 22 Site Conditions (July 2011)
Attachments: July2011_CallumCk_Figures.pdf

Hello Ross,

This email is intended to serve as a summary of the recent instrument data and observations from the July 14, 2011 visit to the S38 - Callum Creek site on Highway 22.

General Observations:

The highway appeared to have a recent overlay patch (within the last month or so) along the section where settlement and cracking had been previously observed (approximately 70 – 100 m length). There were some fresh cracks through the new overlay on the west side of the highway shoulder, approximately 20 m in length with aperture less than 50 mm (see attached photos). There was also roughly 10 mm or less of settlement of a portion of the road within the overlay area (see attached photos). The shape and position of the settled area was consistent with past observations of arc-shaped cracks and settlement. There was also some cracking visible on the east side of the road near SI 11-02 for approximately 10 -15 m and with an aperture less than 20 mm.

Instrument Data (see also attached data plots):

- **SI 11-01**: Since the April 12, 2011 initialization this SI has been read twice (May 2nd, July 14th). Prior to the July 14th readings there were no confirmed movement zones. The July 14th data shows a confirmed downslope movement zone at approximately 12 m depth with 31 mm displacement at 43° bearing.

- **SI 11-02**: Since the April 12, 2011 initialization this SI has been twice (May 2nd, July 14th). Prior to the July 14th readings there were no confirmed movement zones. On July 14th, this SI was found to be pinched off at approximately 9.40 m below ground surface.

- **VW 10-6697:** This piezometer tip is installed approximately 14 m BGS (below ground surface). This instrument has recorded small pressures since it was installed, i.e. the equivalent groundwater table would be only slightly above the piezometer tip.

- **VW 10-6710:** This piezometer tip is installed approximately 6 m BGS. This instrument has recorded a pressure approximately 37 kPa higher than the previous reading in May 2011. This current pressure corresponds to an equivalent piezometric elevation 4.55 m above the tip elevation, i.e. roughly 1.5 m BGS.

Comments and Recommendations

This site has active and significant landslide movement, based on the continued settlement and cracking visible in the road surface through recent overlay patches and the SI data. The depth of the movement zones in the SI's roughly corresponds to a layer of higher plastic clay with possible slickensides that was identified during the instrument installation drilling. The data from the vibrating wire piezometers indicates that there are potentially zones of higher water pressure within the slope. These water pressures could be a contributing factor that is driving the active movement at this site.

Recommended short-term actions:

- Continue placing overlays and/or milling down and resurfacing the asphalt to maintain a trafficable surface through the slide area but without accumulating an excessive load from repeated overlays (i.e. loading the upper portion of the landslide area).
- Maintain signage (e.g. "Bump Ahead") along with reduced speed limit as appropriate for the road surface conditions.
- There is a possibility that additional or accelerated landslide movement could lead to the loss of one of both lanes of the highway and the construction of a temporary detour lane in the upslope road ditch may be required.

Recommended medium to long-term actions:

- Select and design a repair measure for this site based on the information from the borehole drilling and instrument installations. The most practical and reliable repair measure for this site would likely be a pile wall similar to the one constructed at the other landslide area a short distance northbound from this site. Drainage measures (e.g. horizontal drains and/or impermeable lining of the upslope road ditch to reduce water infiltration into the slope) may also be beneficial. The pros/cons and cost/benefit of these and other repair options could be assessed with a slope stability analysis.

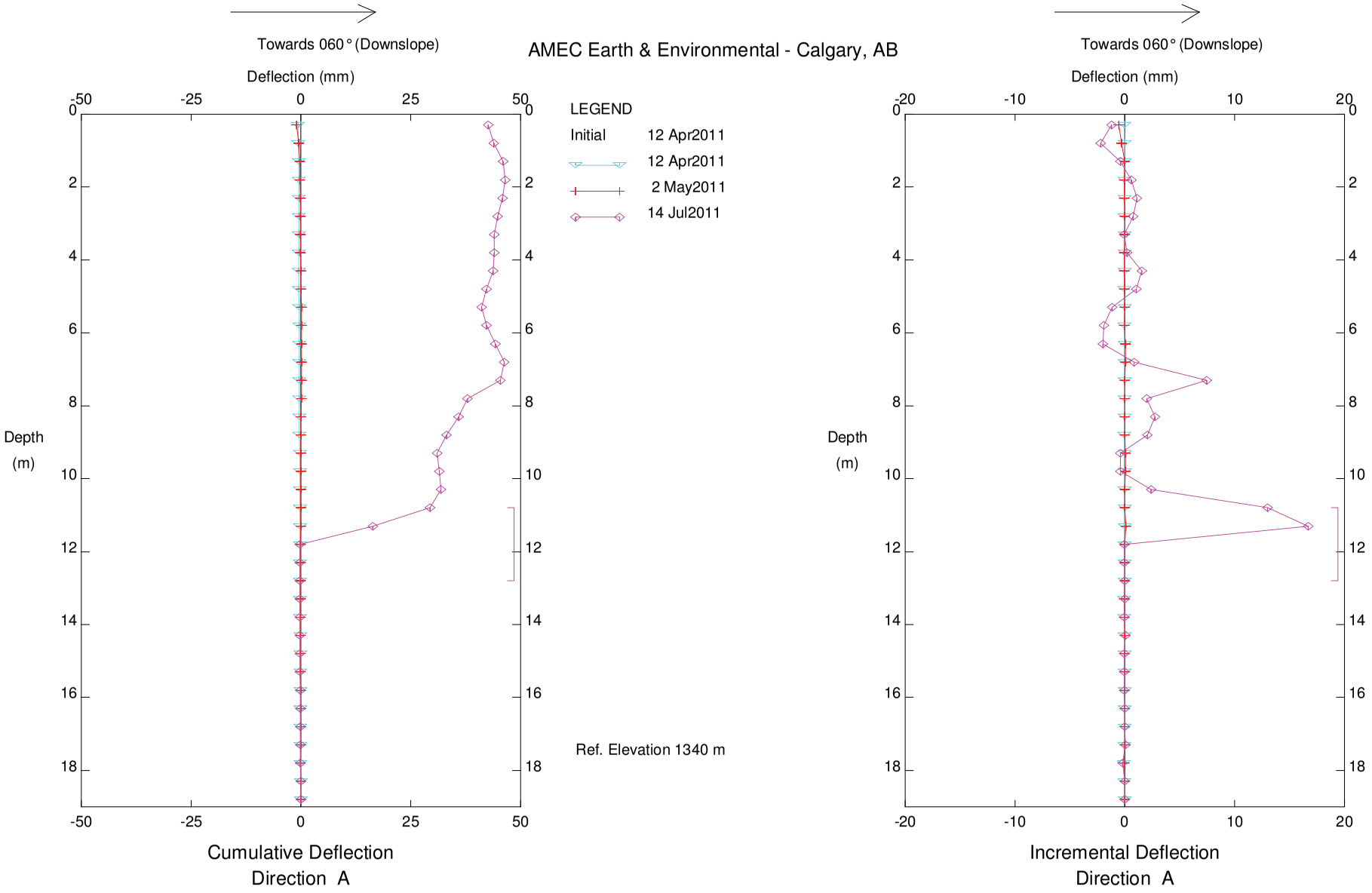
Please let us know if you require any further details re. the information above.

Regards,

Tyler

Tyler Clay, EIT
Geotechnical Engineer
AMEC Environment & Infrastructure,
a division of AMEC Americas Limited
140 Quarry Park Blvd. S.E.
Calgary, AB T2C 3G3
Phone: 403-248-4331 (reception)
Phone: 403-387-1855 (direct)
Cell: 403-804-5851
Fax: 403-387-1949


Visible edge of settlement
through overlay



S38 - Callum Creek, Inclinometer SI 11-01

Alberta Transportation

Figure S38-2

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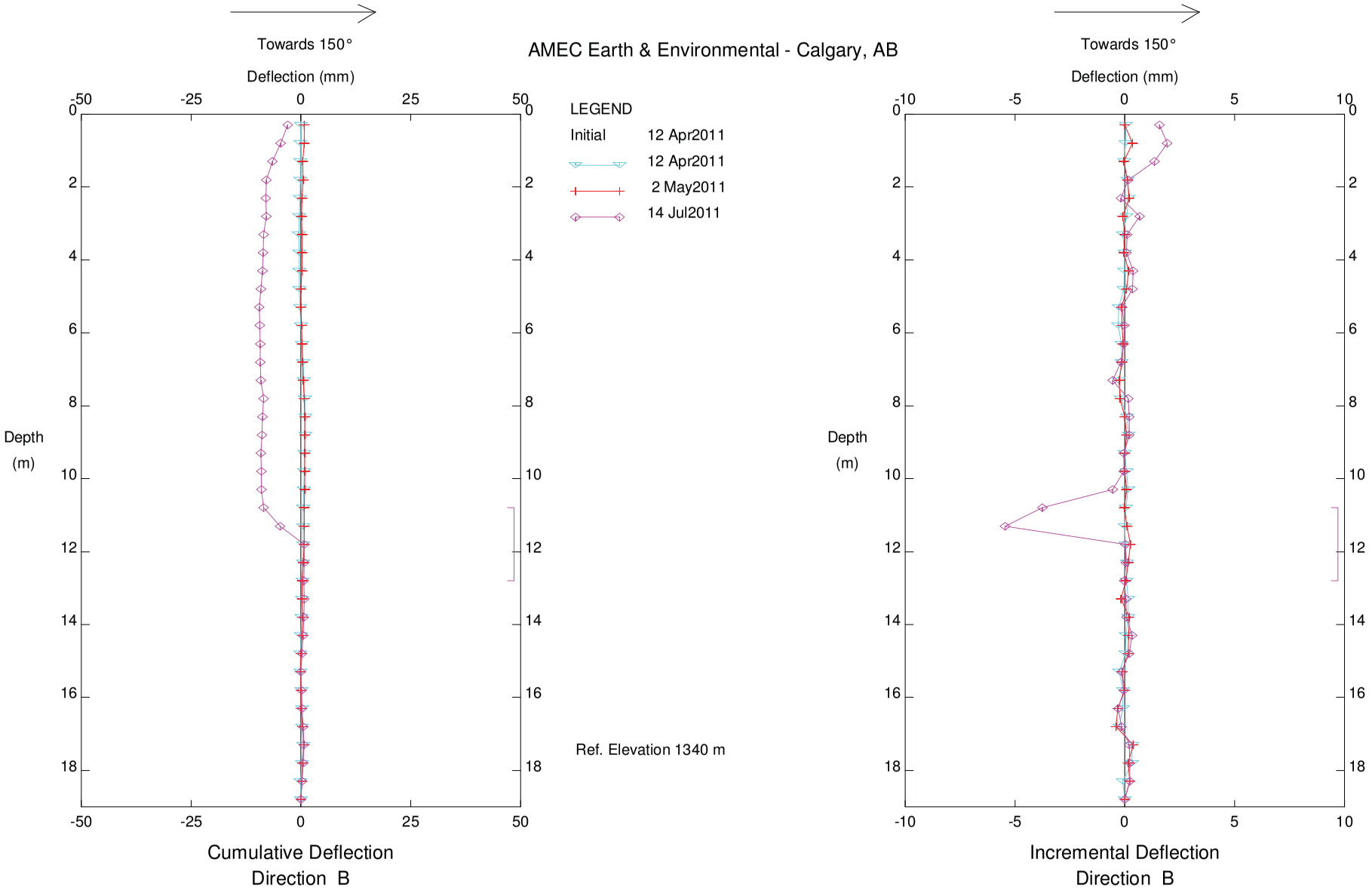

S38 - Callum Creek, Inclinometer SI 11-01

Alberta Transportation

Figure S38-3

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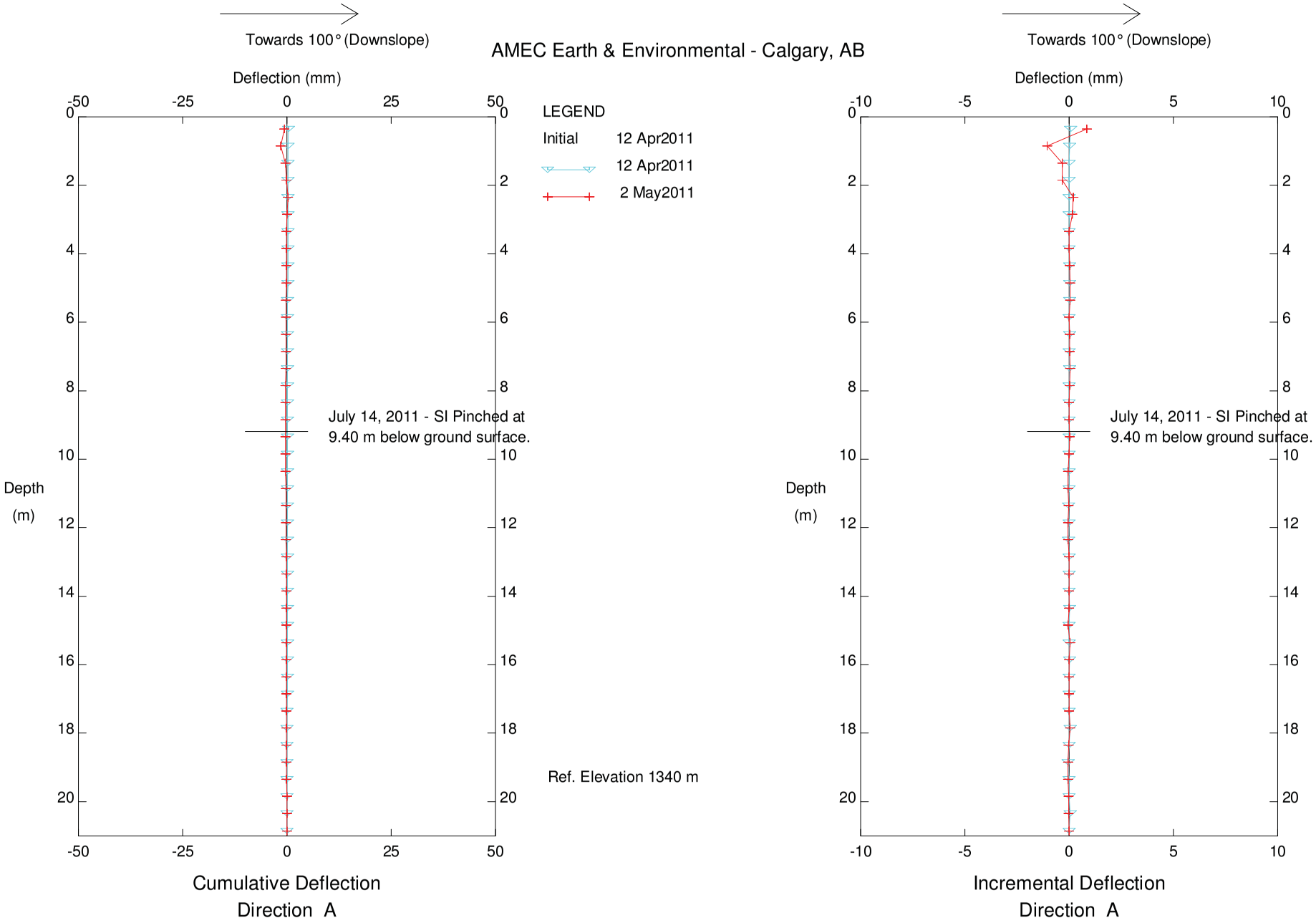

Callum Creek, Inclinometer 11-02

Alberta Transportation

Figure S38-4

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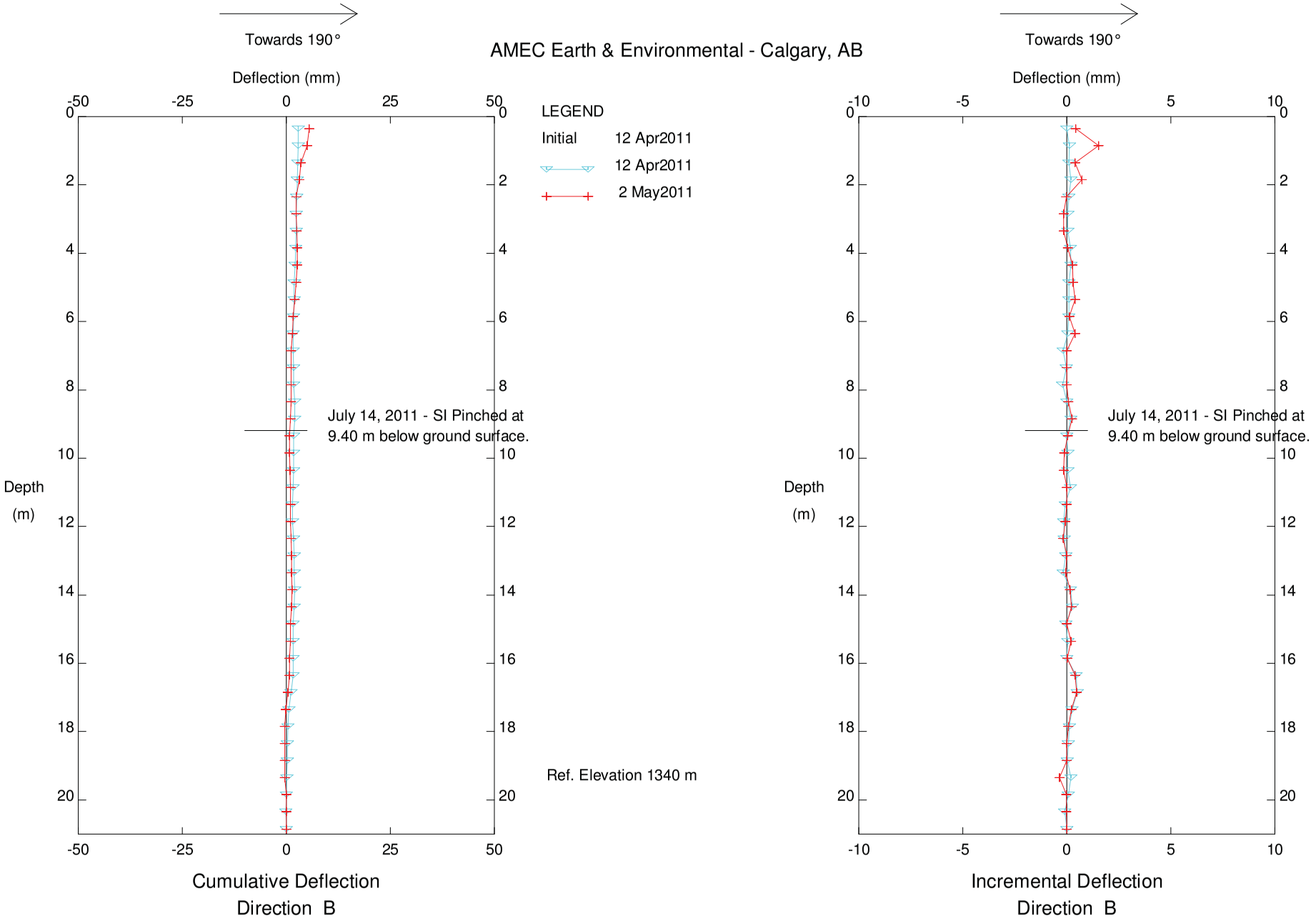

Callum Creek, Inclinometer 11-02

Alberta Transportation

Figure S38-5

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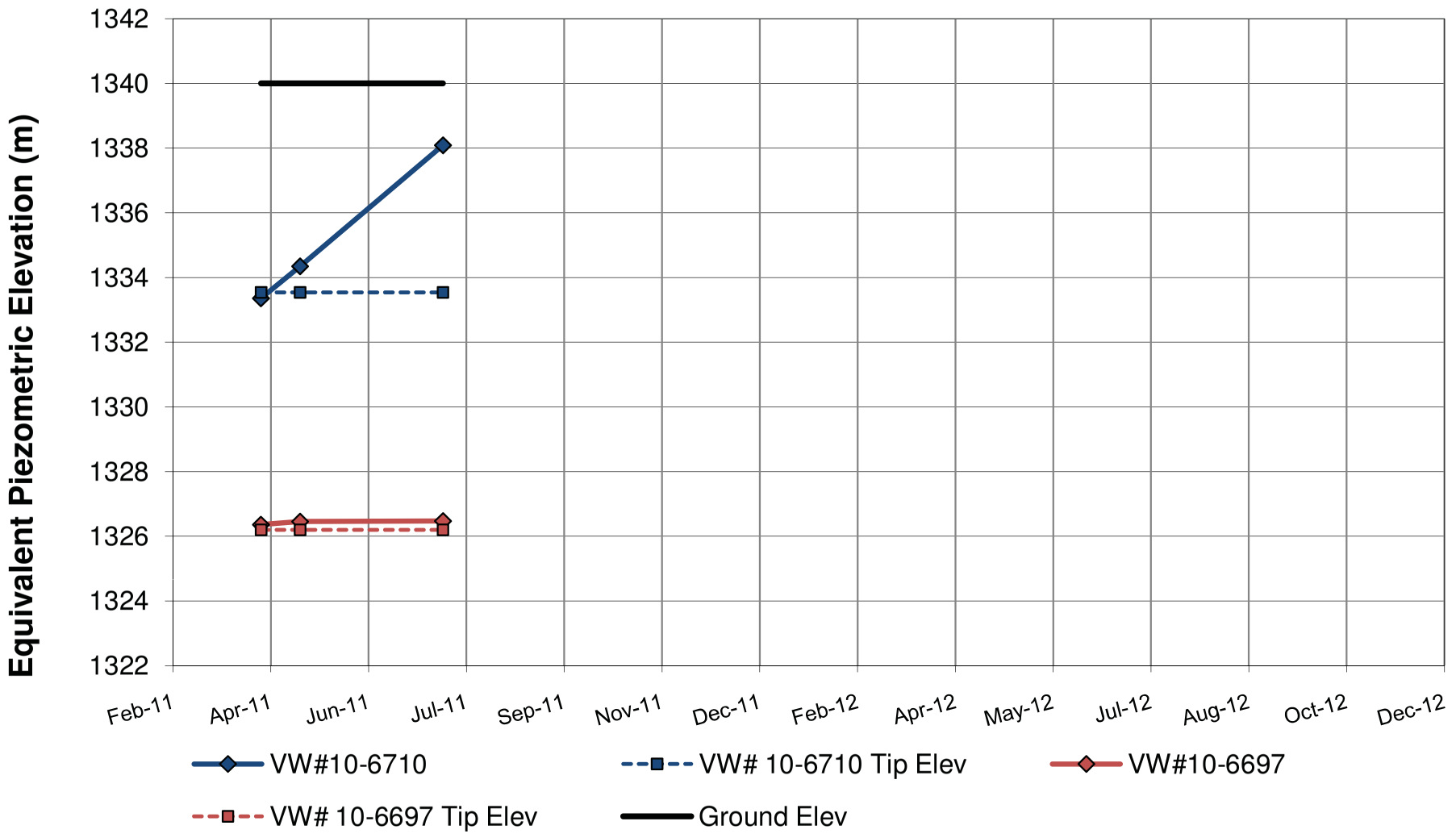


Note:
Elevations relative to assumed ground level of 1340 m.

Client: Alberta Transportation		Figure 6
Project: Hwy 22:08 - Callum Creek Site	Date: Jul-11	Revision:
BH# 11-03 - Equivalent Piezometric Elevations	Job No. CG25352.300	
	File No.: Figure 1.xls	

amec

WSW

ENE

X-Section along 066., i.e. facing 336

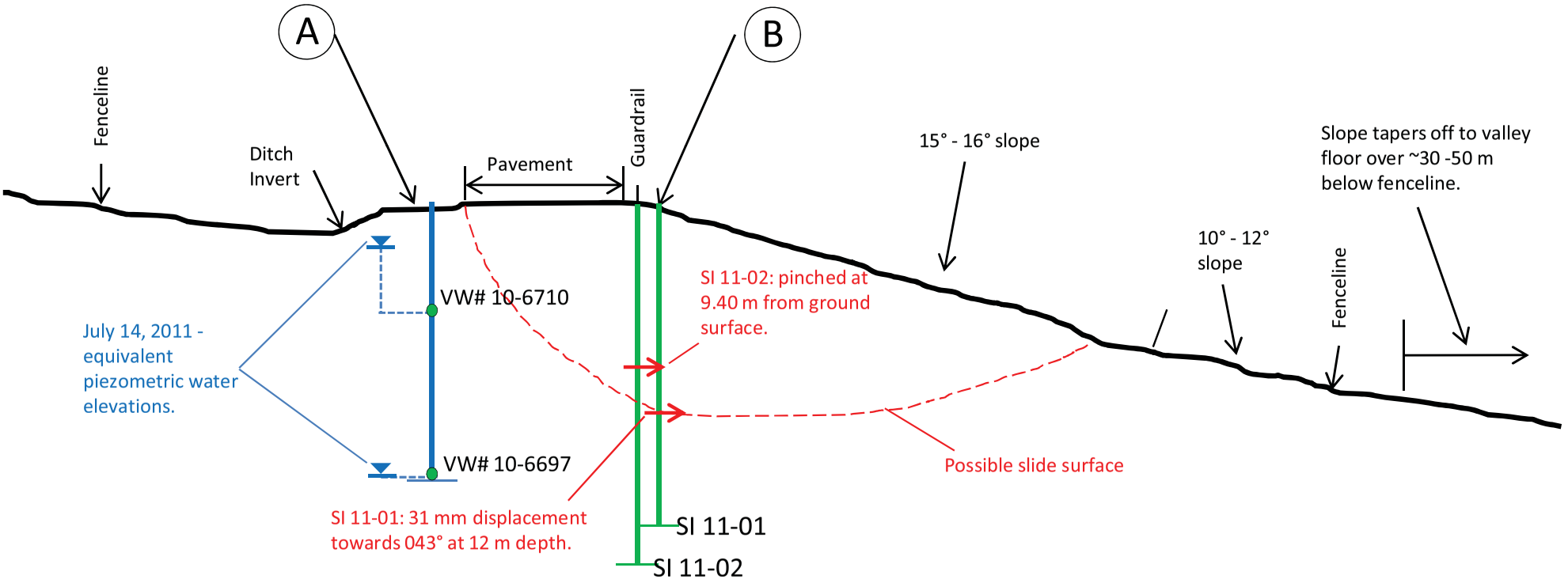
A ~4 m wide flat strip immediately upslope of edge of pavement

B Relatively flat strip ~1.8 m wide immediately downslope of guardrail

0 m 6 m

1:400

SCALE IS APPROXIMATE




Visible edge of settlement
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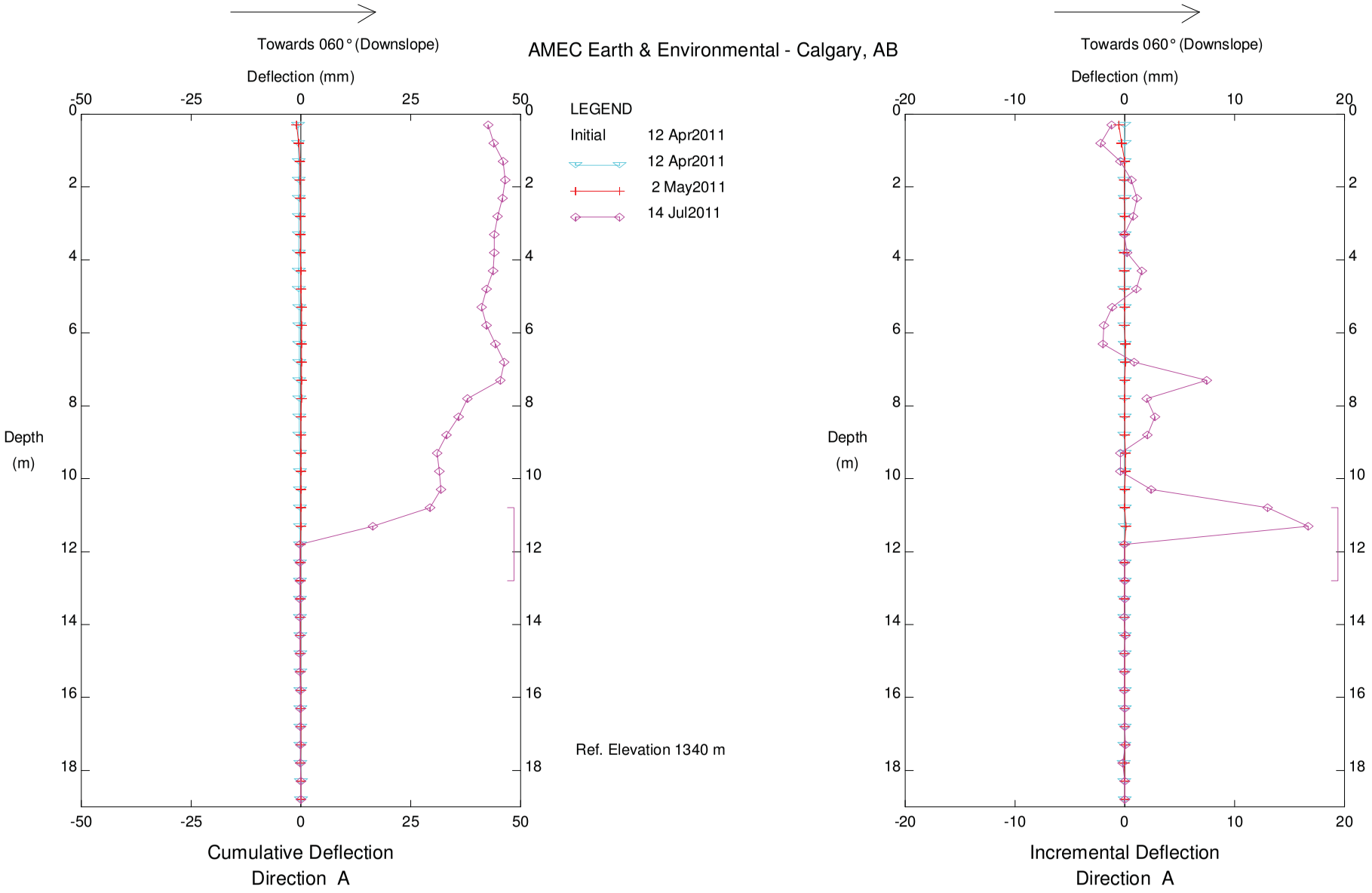

S38 - Callum Creek, Inclinometer SI 11-01

Alberta Transportation

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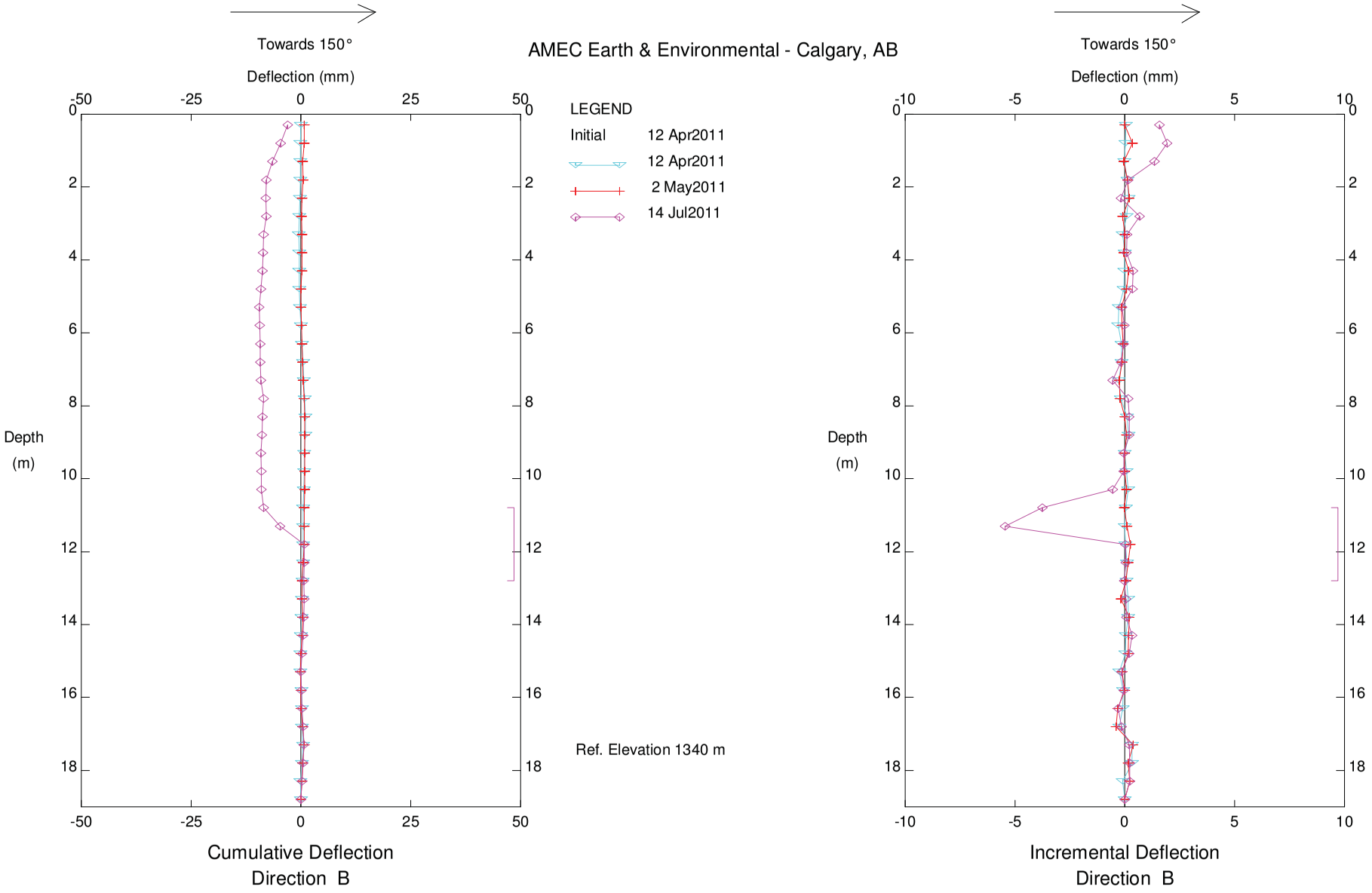

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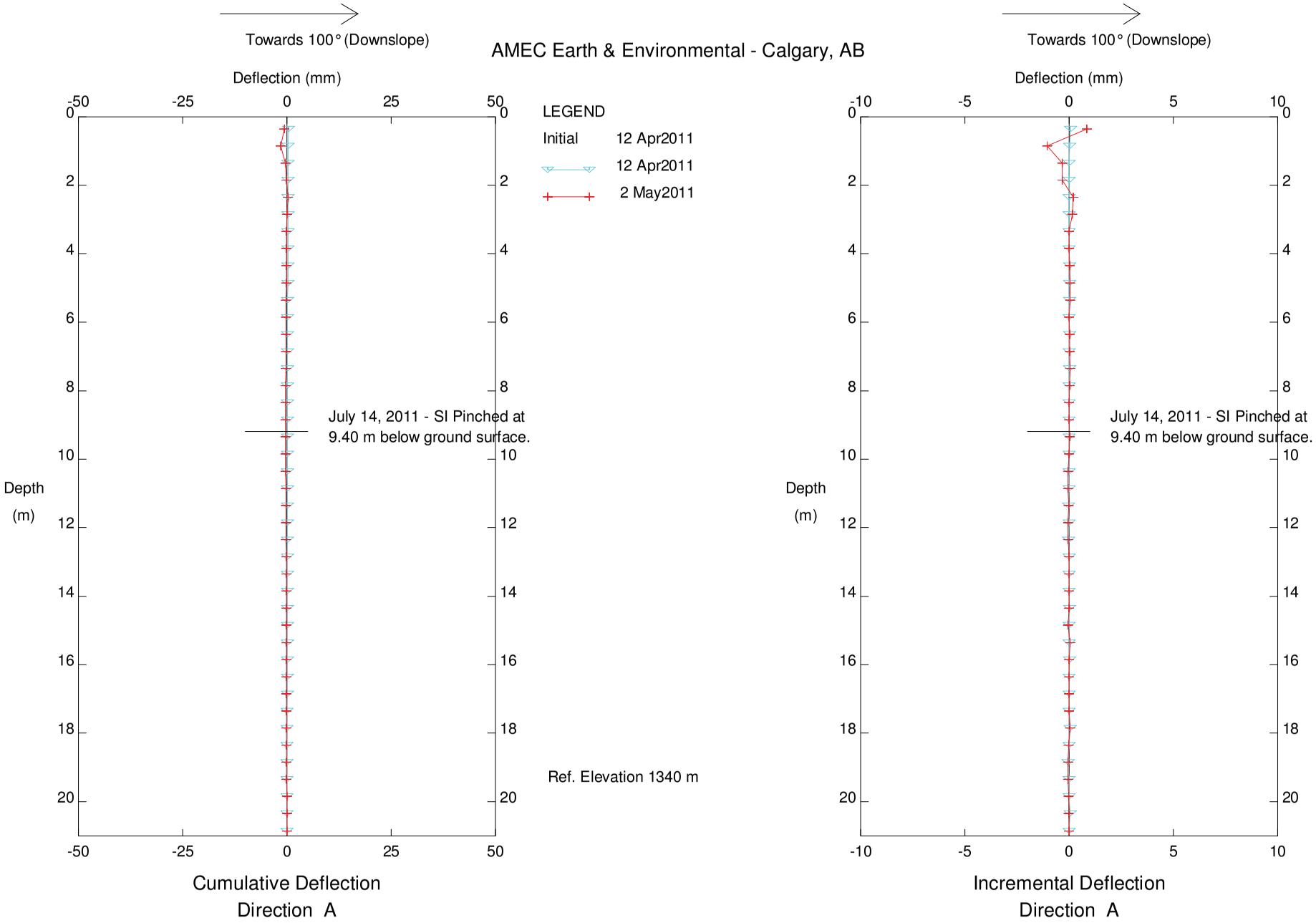

Callum Creek, Inclinometer 11-02

Alberta Transportation

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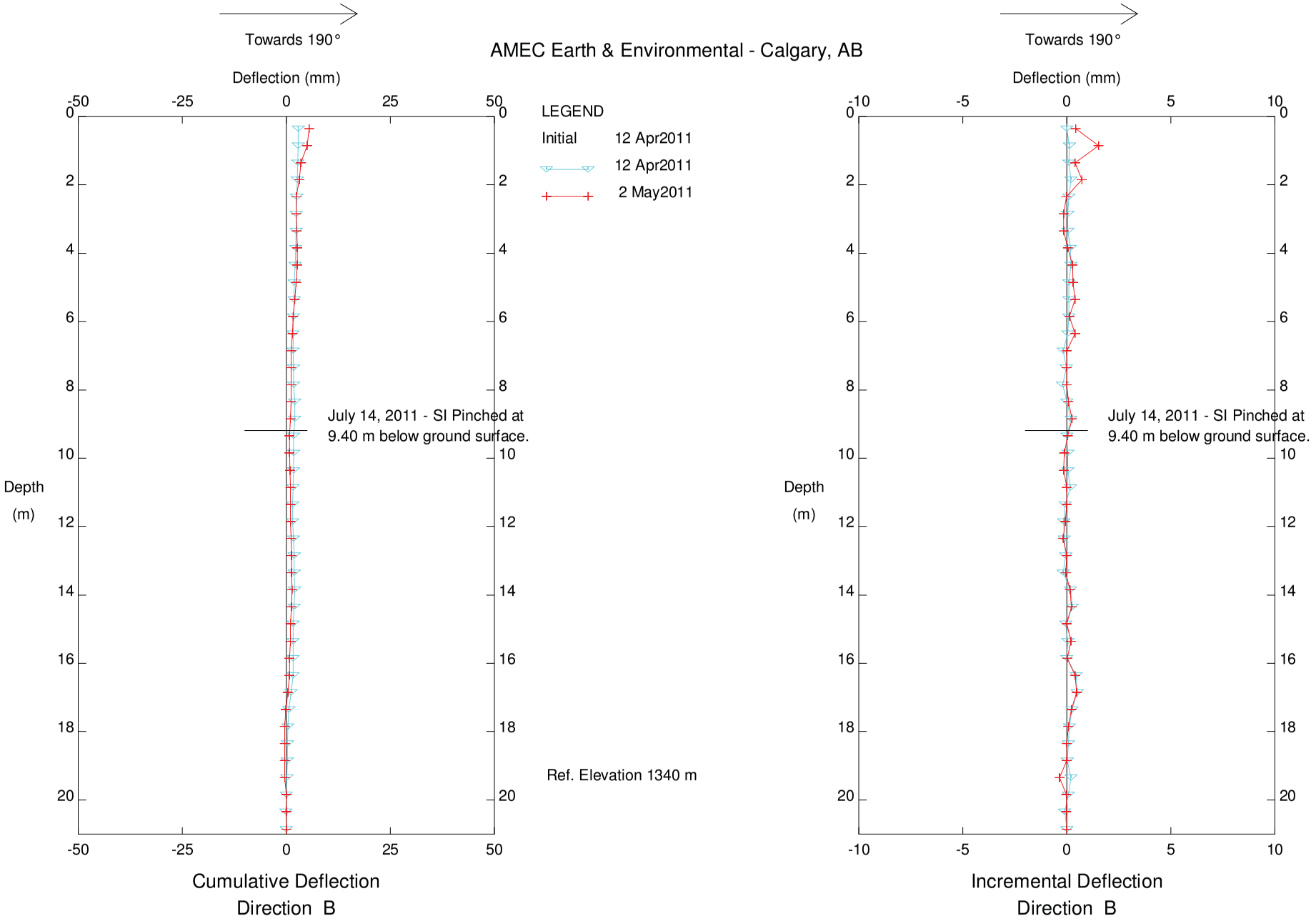

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Alberta Transportation

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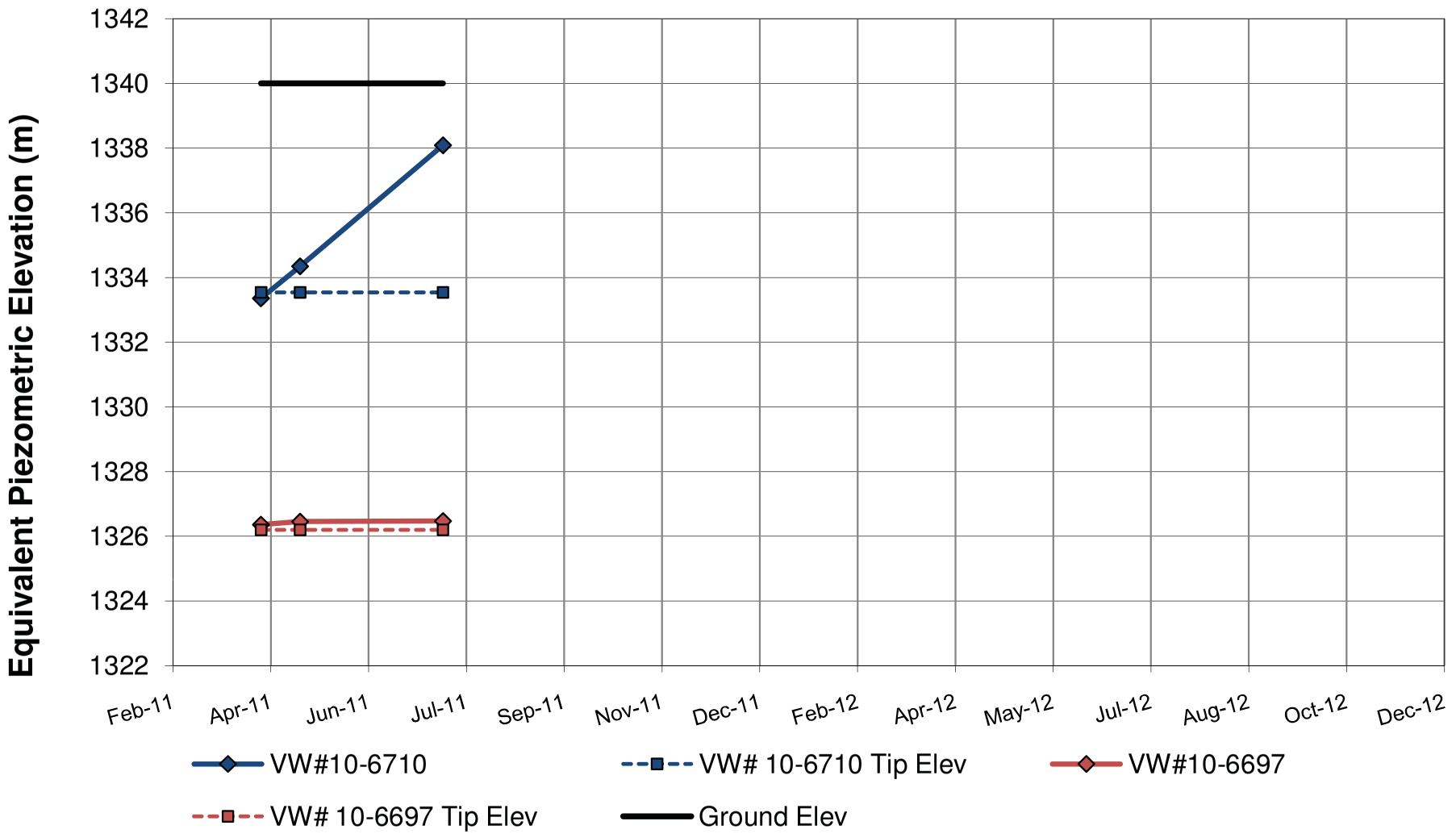

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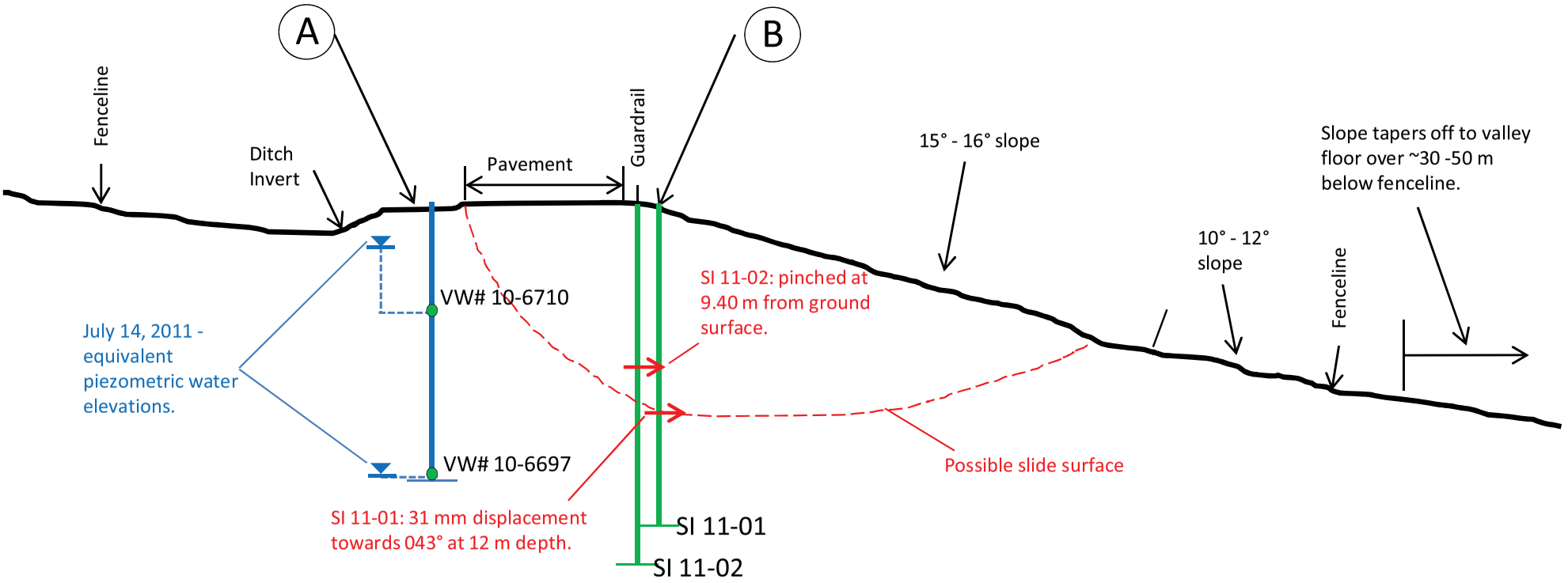

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