



**GEOHAZARD RISK MANAGEMENT PROGRAM**  
**North Central Region – Edson Area**  
**2013 Annual Inspection Report**



<b>Site Number</b>	<b>Site Name</b>	<b>Hwy</b>	<b>km</b>
NC1	Whitecourt East Hill	43:16	1.9
<b>Legal Land Description</b>		<b>UTM Coordinates (NAD83)</b>	
NW26-59-12-W5M		Zone 11U	N5999334 E586330
<b>Operational Site Instrumentation</b>		<b>Slope Inclinometers</b>	8
		<b>Pneumatic Piezometers</b>	1
		<b>Vibrating Wire Piezometers</b>	0
		<b>Standpipe Piezometers</b>	8
<b>Date of Last Instrumentation Readings</b>		May 22, 2013	

	<b>Date</b>	<b>PF</b>	<b>CF</b>	<b>Rating</b>
<b>Current Inspection</b>	June 27, 2013	10	3	30
<b>Previous Inspection</b>	July 31, 2012	6	3	18
<b>Report Attachments</b>	<input checked="" type="checkbox"/> Photographs (7 pages)		<input checked="" type="checkbox"/> Site Plans (2 pages)	

	<b>Golder</b>	<b>Alberta Transportation</b>
<b>Inspected By</b>	Ian Darrach; Eric Leishman	Roger Skirrow; Jon Lee; Kathleen Davis
<b>Date of Remediation</b>	Toe berm North of Hwy 43 constructed in 1980's	
<b>Recent Maintenance</b>	-Asphalt patch in 2010 at West, East and Catch Basin Cracks, some cracks resealed in 2012 -Paved walking trail overlaid in 2012	
<b>Primary Site Issue</b>	Potentially deep seated slide beyond berm area	
<b>Observations</b>	<b>Description and Location</b>	<b>Change From Previous Inspection</b>
<input checked="" type="checkbox"/> Pavement Distress	-Dip in pavement at Catch Basin Cracks (Photo 1) -No significant changes to crack widths/differentials (Photos 2 to 4)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<input type="checkbox"/> Culvert Distress		<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Bridge Distress		<input type="checkbox"/> Yes <input type="checkbox"/> No
<input checked="" type="checkbox"/> Slope Movement	Continued movement in berm area	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<input checked="" type="checkbox"/> Erosion	-Erosion gully along EBL of highway	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<input checked="" type="checkbox"/> Seepage	-Springs in slope near SI06-4 -Seepage in north embankment slope between East Cracks and Catch Basin Cracks	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Other		<input type="checkbox"/> Yes <input type="checkbox"/> No





<b>Discussion</b>	<p>During the site visit, the highway surface, back and side slopes, and culvert inlets and outlets were inspected. The slope and paved walking trail near the bin wall at the west end of the site were also inspected.</p> <p>Pavement patching was conducted in 2010, with crack patterns reflecting through as observed in the 2011 inspection. Crack patterns remain relatively unchanged, and are documented on Figure 1. One noticeable change observed was a slight dip surrounding the catch basin at the Catch Basin Cracks, as seen in Photo 1.</p> <p>The surficial backslope movement first observed in 2012 was found to be more pronounced during the 2013 inspection (see Photos 5 and 6). The toe bulge was observed to be approximately 200 to 300 mm in height, and 30 m in length. No new adverse effects were noted in the walking trail at the crest of the slope in this area.</p> <p>The sinkhole within the Town of Whitecourt ROW was measured as 340 mm in depth and did not appear to have changed since the previous inspection.</p> <p>A spring was observed approximately 10 m upslope of SI06-4. A depression approximately 100 mm wide by 150 mm long by 200 mm deep was found at the base of a leaning tree above the SI. Water was observed within the depression, flowing downstream towards the SI. At the SI, the water flow was observed to return below surface, with seepage noted again approximately 1.5 m downslope of the instrument. See Photo 7.</p> <p>Seepage was observed in the north embankment slope, at approximately Station 1+950 between the East Cracks and the Catch Basin Cracks, as seen in Photo 8.</p> <p>Instrumentation showed trends of continued slope movement within the toe berm. SI06-3, SI06-4 and SI12 have shown increased movement rates over the past few readings, likely due to wetter periods. SI01-2A was confirmed to be sheared at approximately 1.2 m below ground surface.</p> <p>No changes were observed within the culverts at the site. The half round culverts located on the north side of Highway 43 contained minor amounts of debris; however, water flow was not restricted. See Photos 9 to 11.</p> <p>The condition of the Bin Wall, including the paved walking trail above it, remains unchanged since the 2012 inspection. SI31 at this location continued to show movement in the upper 3.5 m.</p>
<b>Assessment</b>	<p>Site observations and instrumentation readings indicate that the slide to the east of the berm is still active. Instability at this location may be due to the toe berm not extending into this area, combined with seasonal changes in groundwater levels and higher than average amounts of precipitation over the last few years.</p> <p>Asphalt patching has been effective at improving trafficability in the crack locations; however, the cracks have reflected through the patch and some are increasing in width and/or depth. Widening of these cracks increases the probability of surface water infiltrating into the slope, potentially leading to increased instability.</p> <p>Based on a comparison of observations from the 2012 and 2013 inspections, the backscarp and toe bulge on the backslope on the south side of Highway 43 appears to be active on a shallow shear surface, and isn't presumed to be affecting the overall stability of the slope.</p>



<b>Recommendations</b>	<p>Short term remediation should include:</p> <ul style="list-style-type: none"><li>▪ Sealing pavement cracks to reduce surface water infiltration into the slope;</li><li>▪ Repairing the erosion along the shoulder of the eastbound lanes to limit further undermining of the asphalt and to enhance surface water drainage; and,</li><li>▪ Checking culverts and subdrains on a regular basis and cleaning when necessary to promote drainage and reduce the possibility of pore pressures building up in the slope.</li></ul> <p>Long term recommendations include the installation of additional instrumentation at the toe berm site to adequately define the failure mechanism. Once this is complete, a concept design should be conducted to determine the amount of land required at the toe of the slope should an extension to the existing berm be warranted. AT may need to purchase some of this land before it is developed. Alberta Transportation has requested a proposal for this work, as Part F of the Geohazard Risk Monitoring Program, which will be provided under separate cover. Instrumentation to be installed would include additional slope inclinometers and piezometers.p</p> <p>The surficial movement on the backslope of Highway 43 should continue to be monitored by the MCI. Movement of the toe bulge downslope could impact surface water flow in the ditch and may require additional engineering analysis to remediate this area.</p> <p>All instrumentation at the site should continue to be read semi-annually, with site inspections continuing annually.</p>
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