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| SITE NUMBER AND NAME:<br><b>S048 Castle Back Slopes</b>                              |  | HIGHWAY & KM:<br>3:04, 23.567 | PREVIOUS INSPECTION DATE:<br>May 2, 2018 | INSPECTION DATE:<br><b>June 9, 2020</b> |
| LEGAL DESCRIPTION:<br>15/06-12-007-01 W5M  | NAD 83 COORDINATES:<br>UTM Northing Easting<br>11 5492157 715695 |                               | RISK ASSESMENT:<br>PF: 9 CF: 3 TOTAL: 27 |   |
| AVERAGE ANNUAL DAILY TRAFFIC (AADT):<br>3,860 (west), 4,140 (east), (Ref. No. 78050) |  |                               | CONTRACTOR MAINTENANCE AREA (CMA):<br>26 |   |

|   |   |
|---|---|
| SUMMARY OF SITE INSTRUMENTATION:<br><br>None<br><br>LAST READING DATE: N/A  | INSPECTED BY:<br>Chris Morgan (KCB)<br>Margot Lederman (KCB)<br>Alex Frotten (AT)<br>Roger Skirrow (AT) |
| PRIMARY SITE ISSUE: Multiple slope failures on the south bank of the highway into the ditch extending up to 4 m onto private land. The slope failures are coalescing to form larger backslope failure areas and toe rolls are blocking the ditch. |   |
| APPROXIMATE DIMENSIONS: Approximately 200 m length of 6 m to 10 m high back slope. The slope is approximately 3H:1V.  |   |
| DATE OF ANY REMEDIAL ACTION: No recent remedial measures have been undertaken.  |   |

| ITEM              | CONDITION EXISTS |    | DESCRIPTION AND LOCATION                                  | NOTICABLE CHANGE FROM LAST INSPECTION |    |
|-------------------|------------------|----|---|---------------------------------------|----|
|                   | YES              | NO |   | YES                                   | NO |
| Pavement Distress |                  | x  | Failures are not affecting the highway.                   |                                       | x  |
| Slope Movement    | x                |    | Slope above the highway has failed in multiple locations. | x                                     |    |
| Erosion           | x                |    | Some erosion of the failed material in the ditch          | x                                     |    |
| Seepage           | x                |    | Some moist soil in the slide areas                        |                                       | x  |
| Culvert Distress  |                  | x  | None observed   |                                       |    |

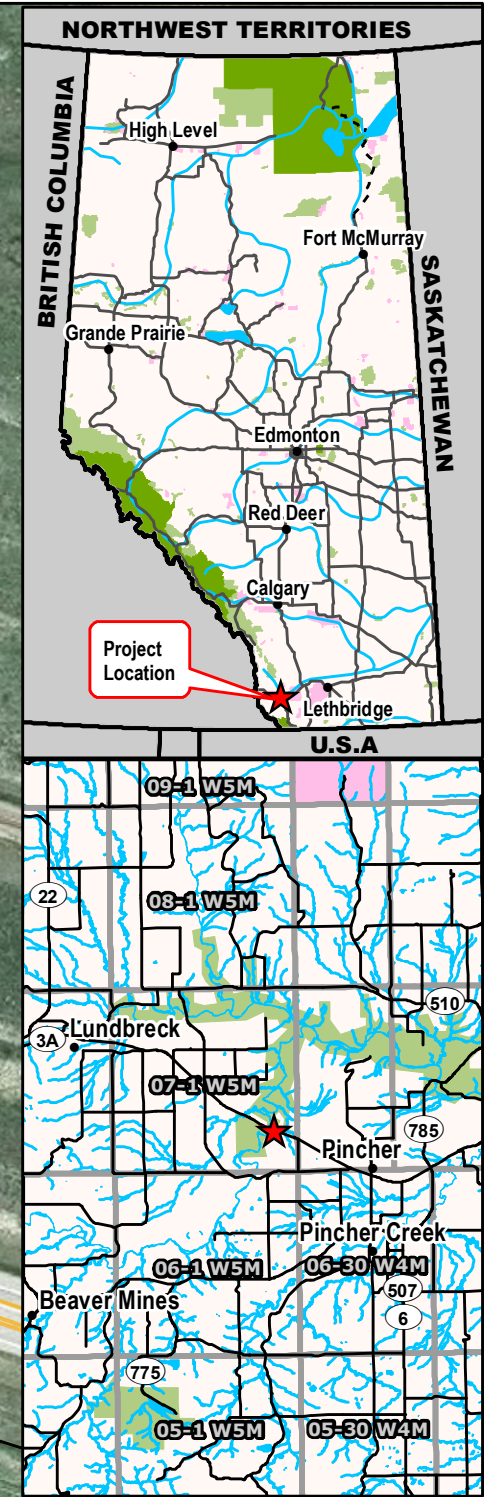
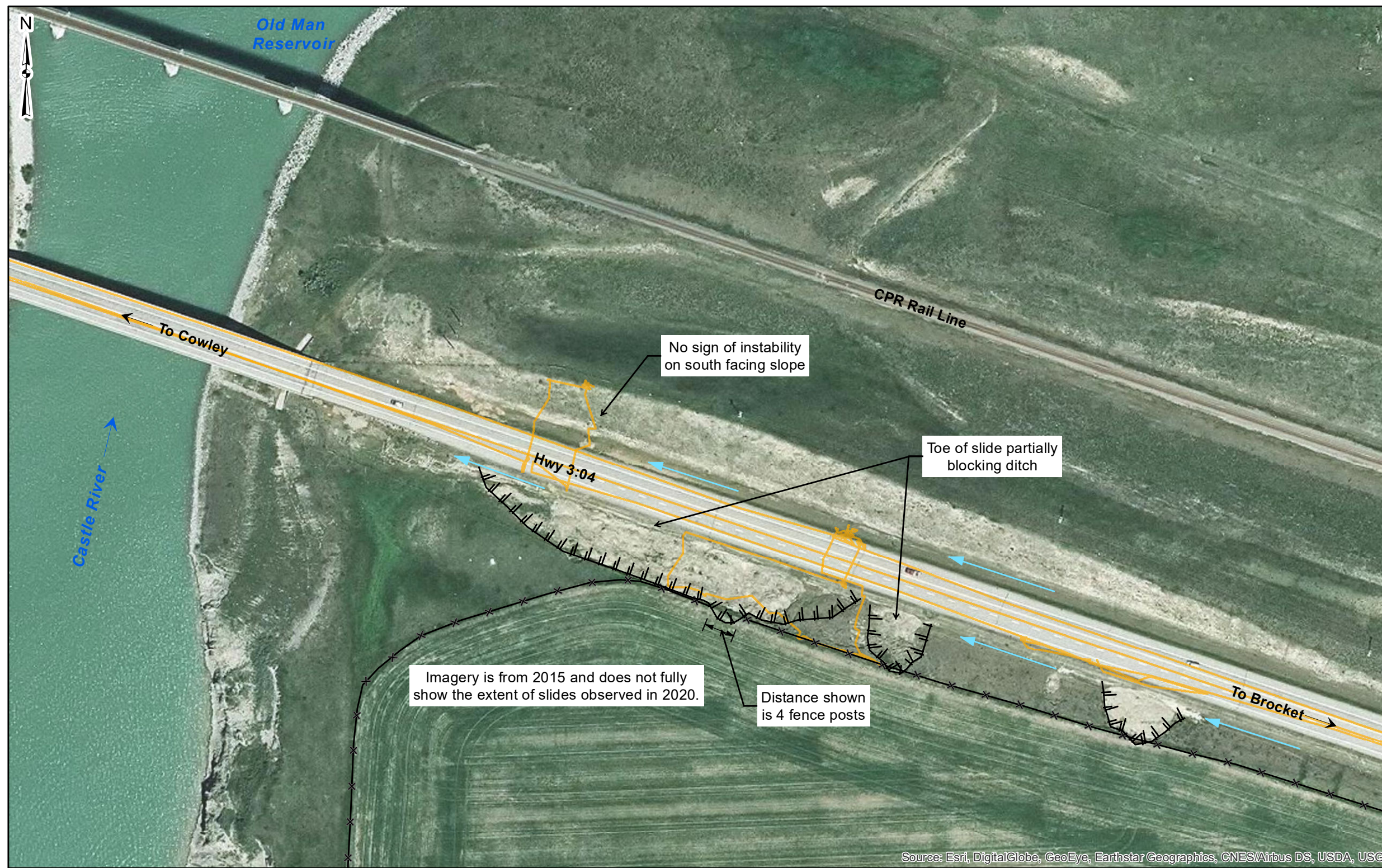
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| <b>COMMENTS</b>   |
| The slide appears to be a result of groundwater and precipitation leading to saturation of the slope south of the highway. The field located at the top of the slope failure is mostly graded towards the river and crop furrows are parallel to the fence line meaning that surface runoff is likely to drain away from the highway. The north-facing aspect of the slide will decrease evapo-transpiration from the slope surface and promotes a longer duration of snow cover in the spring. |
| Barbed wire fence at the crest of the slope to private farmland is being undermined by the slope failures at 4 separate locations. Other sections of fence appear relatively straight along the crest of the slope.   |
| The highest stable slope is 5.5 m, located at the east end of the north facing backslope. The south-facing backslope is stable.   |
| Failure zones are coalescing and the zone of accumulation at the toe of the slide is blocking the ditch over the length of the failure. Areas of ponded water were noted along the length of the ditch.   |
| The exposed back scarp was up to 1.8 m high. Tension cracking near the crest indicates ongoing slope movement and slide retrogression.  |
| A Shaw utility line is located approximately a quarter of the way up the slope. The utility cable is marked with a sign.  |

Short Term:

- The drainage ditch should be regraded to allow for positive surface water drainage, this will require the removal of the slide toe materials from the ditch. Materials removed should be kept to the minimum required to re-establish drainage without initiating additional slope movements.

Long Term options:

- Flatten the slope to 4H:1V or 5H:1V, which would require moving the fence line back on the slope crest. A preliminary design should be prepared to assess slope flattening and the area of land required should be assessed. KCB could prepare the preliminary design without investigation, with AT putting the investigation costs into land purchase. AT land agents should contact owner of the land at the crest of the backslope and start discussions on land procurement.
- Material excavated during slope flattening could be stockpiled in low area to the southwest of the site, levelling the area for possible future use by the farmer. The stockpile/fill placement should consider the potential for destabilizing the Oldman River slope near the Hwy 3 bridge.



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

**Legend**

- GPS Track (June 9, 2020)
- Main Scarp
- Fence
- Flow Direction



NOTES:  
 1. HORIZONTAL DATUM: NAD83  
 2. GRID ZONE: UTM Zone 11N  
 3. IMAGE SOURCE: World Imagery from ESRI  
 ArcGIS Online. Source date January 15, 2015

CLIENT

*Alberta*

Klohn Crippen Berger

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|--|--------------------------|--------------|
| PROJECT<br>SOUTHERN REGION GEOHAZARD RISK MANAGEMENT PROGRAM           |                          |              |
| TITLE<br>Site Plan<br>S048 - Castle Back Slopes<br>Hwy 3:04, km 23.567 |                          |              |
| SCALE<br>1:1,700   | PROJECT No.<br>A05115A03 | FIG No.<br>1 |

Time: 14:28:08 PM  
 Date: June 26, 2020  
 File: Z:\AEDM\A05115A03\ABT Southern Region GRMP\A00 Drawings\2020\2 Section BIM\XDS\048\_200624.mxd

**Photo 1** Looking south at the north-facing failing back slope. The photo was taken on June 9, 2020.



**Photo 2** Looking south at the north-facing failing back slope. The photo was taken on June 9, 2020.



**Photo 3** Toe rolls coalescing and blocking the ditch. The photo was taken facing west on June 9, 2020.



**Photo 4** Fence being undermined in several locations by slope failure. Photo taken facing east on June 9, 2020.



**Photo 5** Toe rolls blocking ditch at several locations. Photo taken facing east on June 9, 2020.

