

March 25, 2022

Alberta Transportation
2nd Floor, Willowglen Business Park
803 Manning Road NW
Calgary, Alberta
T2E 7MB

Alex Frotten, E.I.T.
Construction Engineer – Delivery Services Division (Southern Region)

Dear Mr. Frotten:

CON0022161 Southern Region GRMP
Call-Out Report – S053 Foremost Settlement

1 INTRODUCTION

As part of the Geohazard Risk Management Program (GRMP) contract for the southern region, Klohn Crippen Berger Ltd. (KCB) was requested by Alberta Transportation (AT) to conduct a call-out inspection for an existing GRMP site on Highway 879. This call-out report was prepared for AT under Contract No. CON0022161.

The contract reference for this site is H879:04 C1 km 1.125. The S053 Foremost Settlement site has been previously named as Rattlesnake Dip and Foremost Slide during previous contract periods. The site is located at 49°29.349' N, 111°26.550'W (WGS 84) in Contract Maintenance Area (CMA) 24.

Site S053 was brought to AT's attention by Mr. Warren Lagler, the Maintenance Contract Inspector (MCI) for CMA 24 (Taber). The site was inspected on March 10, 2022 by Mr. Chris Morgan, P.Eng. of KCB and Mr. Warren Lagler. The site walkover was also attended by Mr. Lorne Buis, Mayor of the Village of Foremost.

The 2021 annual average daily traffic (AADT) for this section of Highway 879 is 540 vehicles per day (northbound) and 410 vehicles per day (southbound). 2021 traffic data was downloaded from the AT Traffic Data Mapping website on March 15, 2022 for reference point 125060.

An overview of the site is shown on Figure 1. Photographs from the 2022 site inspection are included in Appendix I.

2 BACKGROUND

2.1 General

Site S053 is located on Highway 879, approximately 1.1 km north of the Village of Foremost, Alberta. At this location, Highway 879 is a paved single lane highway aligned roughly north to south. North of S053, the highway descends into Chin Coulee, a dried-out coulee channel aligned roughly east to west.

The area of interest is located on high ground, south of Chin Coulee. Prior to relocation of Highway 879 to the current alignment (estimated as 1992), the old highway was located to the east, following the curvilinear Becker Coulee on its descent into Chin Coulee. The old highway alignment is still present, however appears to be used for local agricultural access.

AT have been monitoring the site since approximately 2012. AT reported that pavement patching was carried out prior to 2016 due to settlement of the highway, but the number and frequency of patches is unknown. In 2016, KCB and AT walked the embankment slope east of the site; no visible sign of landslide movement was observed.

2.2 Geological Setting

Surficial geology at the site was estimated by KCB to consist of glaciolacustrine deposits, typically consisting of sediments deposited in or along the margins of glacial lakes; including

1. offshore sediment; rhythmically laminated to massive fine sand, silt, and clay, locally containing debris released by the melting of floating ice; and
2. littoral (nearshore) sediments; massive to stratified, well-sorted silty sand, pebbly sand, and minor gravel; occurs in beaches, bars, and deltas.

Bedrock at the site has been estimated using Canada Department of Mines and Resources Map 566A for Foremost, Alberta (Russell, L.S., 1940, GEOSCAN ID # 106792). The bedrock is reported as Upper Cretaceous Foremost Formation, typically consisting of shale and sandstone, and coal seams. The Foremost Formation is reported to represent several sequences marking the transition between marine mudstone (calcareous), foreshore sandstone and non-marine carbonaceous shale. Horizontally bedded sedimentary rock outcrops were noted in the valley slopes of a glacial outwash valley (Chin Coulee) north of the site.

2.3 Historic Air Photos

KCB purchased historic air photos from the Alberta Government air photo library for legal land description NE-20-06-11 W4M. A summary of air photo observations is included in Table 2.1. Air photos are included in Appendix II.

Review of the available air photos indicates that construction of Highway 879 included infilling a steeply sloped V-shaped ravine at the approximate location of the depression. No details are available of the construction; however, site observations suggest that the depression in the pavement is due to settlement of fill materials over the partially filled ravine.

Table 2.1 Summary of Historic Air Photos

| Date of Photo | Comment |
|---------------|--|
| October 2020 | Highway 879 is located on the present alignment. No visible evidence of slope instability. |
| August 2012 | Highway 879 is located on the present alignment. No visible evidence of slope instability. |
| July 2004 | Highway 879 is located on the present alignment. No visible evidence of slope instability. |
| July 1992 | Highway 879 is under construction on the present alignment, located at the crest of the slope and oriented approximately north to south. Construction of the new road alignment included infilling a ravine at the location of the observed dip. |
| August 1981 | No significant changes to the site since 1951. |
| July 1974 | No significant changes to the site since 1951. |
| June 1962 | No significant changes to the site since 1951. |
| July 1951 | Highway located on old alignment. Highway is situated east of the existing alignment, following the curvilinear Becker Coulee at is descends into Chin Coulee. |

2.4 Previous Site Inspections

KCB carried out an initial inspection in the form of a call-out in June 2016. Subsequent inspections were carried out during the annual Section B tour in May 2017 and July 2021, as summarized in Table 2.2.

Table 2.2 Summary of Previous Site Inspections

| Date | Inspection Type | Notes |
|---------------|----------------------|---|
| June 16, 2016 | Call-out | Initial inspection. In 2016, AT reported that the pavement had settled over the previous four years, leading to a dip in the road surface over a length of approximately 20 m. No pavement cracking was reported. AT noted that pavement patching had been carried out, however settlement continued. |
| May 31, 2017 | Section B inspection | No significant changes to the site since previous inspection. AT installed “bump-in-road” signs in 2016-2017 and reduced the speed limit to 70 km/hr at the dip. The dip in the pavement was estimated to be up to 0.2 m in depth, likely caused by settlement of fill in the infilled erosion gully. No signs of embankment sliding, seepage, piping, void formation, or other settlements were noted on the back slope west of the highway, or the embankment fill slope to the east. A zone of denser and more lush vegetation was noted downslope of the highway (waypoint 326), but no other evidence of seepage or eroded materials was noted. |
| July 8, 2021 | Section B inspection | No significant changes to the site since previous inspection. The dimensions of the dip did not appear to have changed significantly when compared to previous observations (approximately 20 m of roadway affected and a drop in pavement of approximately 0.2 m visually estimated), however two new transverse pavement cracks up to 20 mm wide were noted. One transverse crack was present in the dip (waypoint 143); the other was located north of the dip (waypoint 142). A secondary pavement crack was starting to form 0.3 m south of waypoint 143. KCB noted that the east highway ditch appears to have settled downslope the dip, however the east fence line appeared to be vertical and straight. |

| Date | Inspection Type | Notes |
|----------------|-----------------|---|
| March 10, 2022 | Call-out | Call-out inspection requested by AT due to reports by the MCI that that depression was getting worse with time and due to proposed transportation of wind turbine components, including tower segments and turbine blades northbound on Highway 879. Wind turbine blades are reported by AT to be approximately 56 m in length. |

3 CONSTRUCTION RECORDS

AT supplied construction documentation for review. KCB have summarized the available information based on the assumption that the relevant pavement section is H879:04 km 0.391 to km 3.325 (Jct. Hwy 61 to Jct. Hwy 3):

- Report R-597, dated April 1, 1990, S.H.879 Hwy. 81 (Foremost) to N. of Chin Coulee: A collection of memos relating to the proposed construction of Highway 879 north of Foremost. Based on the available information:

 - ♦ A 250 mm (10 inch) diameter sanitary sewer owned by the Village of Foremost was noted, following the existing (old) highway alignment on its descent into Chin Coulee from the south.
 - ♦ A 760 mm diameter CSP culvert was reported approximately 1.5 km north of Foremost. On January 10, 1990, the pipe was reported to be in fair to poor structural condition, with no scour holes and a lot of vegetation growth at the ends of the pipe. The location and installation date of the pipe is unknown, however it was reported to be at least 35 years old (in 1990).
 - ♦ Backslope slumping was reported as a geotechnical issue along the old highway alignment in Becker Coulee.
- Plans and Profiles of Project S.H. 879:04 (Jct. of Hwy. 61 to N or Foremost) Sheet 1 of 2, Approved for Tendering in June 21, 1991: The drawing includes ground investigation results from a soil survey taken February/March 1991. The drawing includes an air photo with the new highway alignment, and a design profile for the highway alignment with borehole logs superimposed on the alignment. Soils data included results for plasticity index, soil classification (USCS), field moisture content, estimated optimum moisture content, and estimated maximum dry density. Based on the available information:

 - ♦ Between approximate stations 1+120 and 1+180, highway construction included infilling a ravine with up to approximately 12.9 metres of fill (to construct a pavement elevation of 879.71 m).
 - ♦ Ground investigation data (reportedly obtained from auger borings) between Station 0+800 and 1+200 recorded original ground conditions to consists of topsoil at ground surface (estimated to be approximately 0.2 m thick), underlain by inorganic clays of medium plasticity (either silty sandy clay or sandy clay), occasionally underlain by clayey sand. A boring at approximately Station 1+000 appeared to record 0.2 m of topsoil over 1.5 m of silty sandy clay, over 5.8 m of sandy clay, over 4.5 m of clayey sand.

- ◆ A utility line is illustrated heading northeast down the ravine, this may be a TransAlta transmission line. Additional details will be requested from AT.
- ◆ A 600 mm diameter and 21 m long CSP culvert is specified at Station 1+040. Additional details will be requested from AT.
- Project E32101116 Drawing (Figure 1 Widths and Thicknesses) for Highway 879:04 Contract 740610, dated July 2012: Between km 0.391 and km 3.325 the pavement width was reported as 9.3 m; the northbound and southbound lanes were each reported as 3.5 m wide plus paved shoulders 1.15 m wide. The pavement thickness was reported as 120 mm, consisting of two 60 mm lifts of ACP Type L1 (PG58-28A).
- Drawing PXS87904.DGN (updated 08/06/14): Pavement structure from km 0.391 to km 3.325 reported as 230 mm of Granular Base Course (GBC) (placed in 1991), 100 mm of Asphalt Concrete Pavement (ACP) (placed in 1991/1992), and 120 mm of ACP (L1) (placed in 2012). Width of pavement reported as 9.3 m.

4 UTILITIES

An Alberta OneCall ticket (No. 20220900430) was initiated by KCB in February 2022 to evaluate the presence of utilities in the project area. The OneCall ticket provides locations for utilities that have partnered with the OneCall service. Responses to the OneCall ticket are summarized in Table 4.1.

Table 4.1 Alberta OneCall ticket responses

| Provider | Type | Location | Potential for Conflict (Y/N) |
|--------------------------------|-------------------------|---|------------------------------|
| TELUS Communications Inc. (AB) | Buried fiber-optic line | Caution markers present for Alberta Supernet cable east of the highway within the AT ROW. | Yes |
| | Cable easement R/W | East side of highway. Running diagonally northeast down the infilled valley. | Yes |

Based on information supplied in historic construction records, KCB requests that AT confirm the location of 250 mm (10 inch) diameter sanitary sewer and a 760 mm diameter CSP culvert previously reported as present near to S053.

5 PAVEMENT MEASUREMENTS

5.1 Survey Pin Monitoring

In March 2017, AT started pavement surface survey measurements using a grid of survey points. The grid was laid out north to south, with station 1 south of the depression and station 25 north of the depression. The grid included eight lines of pavement elevation measurements across the highway,

from the shoulder of the southbound lane to the shoulder of the northbound lane. In addition to pavement surveys, ditch elevation measurements were taken at station 1, 5, 10, 15, 20, and 25.

Surveys were completed on March 28, 2017, July 6, 2017, December 8, 2017, October 5, 2018, October 10, 2019, and June 23, 2020. Data was supplied to KCB.

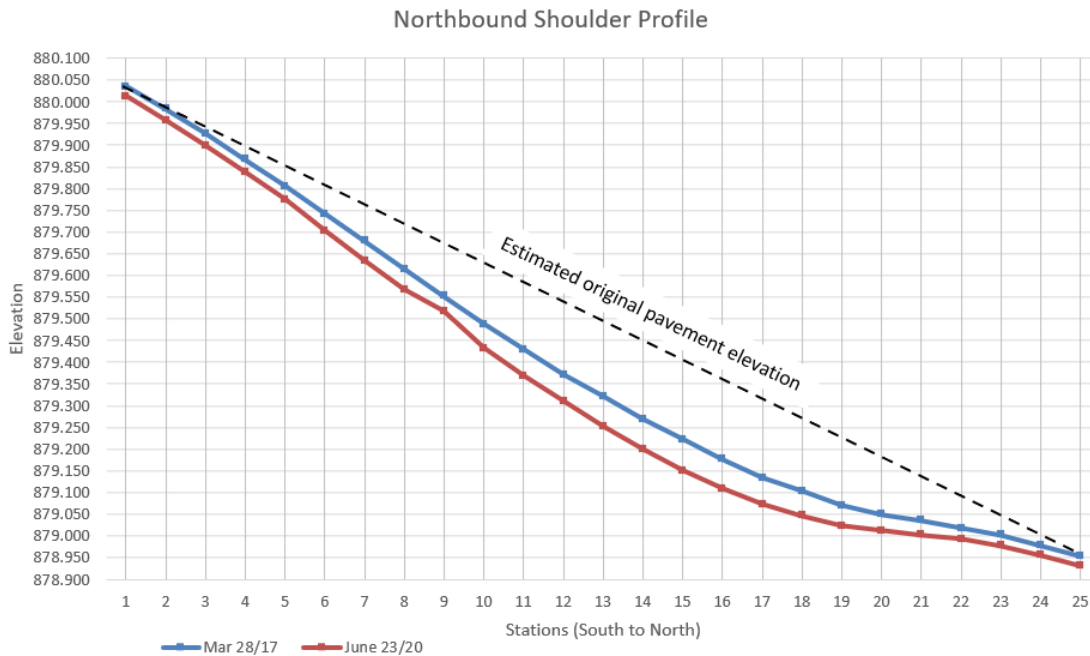
Based on the available data:

- Pavement settlement had taken place prior to the baseline survey from March 2017.
- Settlement of the pavement continued between March 2017 and June 2020, as illustrated in Table 5.1. Shading has been included for illustration purposes.
- For the survey pin data, KCB have estimated the original pavement elevation and compared it against topographic information. Based on the survey pin data, KCB have estimated that the road surface may have settled by up to 0.25 m (250 mm). An illustration is included in Figure 5.1.

Table 5.1 Elevation Change (mm) between March 28, 2017 (baseline survey) and June 23, 2020

| Station # | SB Shoulder | SB | SB | SB | NB | NB | NB | NB Shoulder |
|------------|-------------|-----|-----|-----|-----|-----|-----|-------------|
| 25 (North) | -20 | -15 | -17 | -16 | -13 | -16 | -23 | -21 |
| 24 | -15 | -18 | -19 | -19 | -20 | -18 | -21 | -22 |
| 23 | -18 | -17 | -17 | -20 | -19 | -17 | -23 | -25 |
| 22 | -16 | -18 | -17 | -20 | -21 | -23 | -23 | -25 |
| 21 | -18 | -19 | -20 | -25 | -23 | -30 | -31 | -33 |
| 20 | -23 | -25 | -24 | -30 | -33 | -33 | -32 | -38 |
| 19 | -28 | -29 | -35 | -37 | -38 | -36 | -45 | -47 |
| 18 | -34 | -44 | -41 | -46 | -44 | -47 | -49 | -56 |
| 17 | -41 | -42 | -45 | -48 | -52 | -54 | -57 | -62 |
| 16 | -41 | -48 | -51 | -58 | -56 | -59 | -60 | -68 |
| 15 | -47 | -54 | -53 | -55 | -59 | -62 | -64 | -71 |
| 14 | -53 | -57 | -57 | -59 | -61 | -63 | -66 | -69 |
| 13 | -56 | -57 | -57 | -62 | -59 | -66 | -64 | -69 |
| 12 | -56 | -58 | -59 | -62 | -56 | -61 | -61 | -62 |
| 11 | -55 | -55 | -56 | -60 | -56 | -59 | -59 | -63 |
| 10 | -50 | -51 | -51 | -54 | -51 | -51 | -55 | -57 |
| 9 | -43 | -45 | -43 | -47 | -45 | -49 | -48 | -35 |
| 8 | -39 | -40 | -39 | -36 | -39 | -40 | -42 | -47 |
| 7 | -33 | -33 | -31 | -34 | -30 | -32 | -40 | -45 |
| 6 | -26 | -31 | -26 | -29 | -29 | -32 | -34 | -38 |
| 5 | -27 | -21 | -23 | -23 | -24 | -30 | -31 | -30 |
| 4 | -20 | -21 | -20 | -24 | -19 | -21 | -24 | -29 |
| 3 | -22 | -18 | -19 | -41 | -18 | -17 | -21 | -27 |
| 2 | -19 | -17 | -17 | -17 | -15 | -19 | -42 | -26 |
| 1 (South) | -18 | -19 | -17 | -15 | -16 | -18 | -23 | -23 |

Figure 5.1 Topographic survey data for the northbound shoulder profile



5.2 Pavement LiDAR

AT supplied five sets of Light Detection and Ranging (LiDAR) survey monitoring data for Highway 879 between 2009 and 2019. Based on the available pavement LiDAR data, KCB have estimated that the cumulative settlement of the pavement is between 0.9 m and 1.0 m since 2009.

6 2022 SITE OBSERVATIONS

The weather during the site visit was clear, windy, sunny and 0°C. At the time of the inspection the shoulder of the highway and ditches were snow covered.

The following observations were made during the site visit:

- The inspection included driving the gravel road along Becker Coulee, to view the downslope section of the infilled ravine. The road was snow covered at the time and does not appear to be heavily trafficked. Surface water ditches are present on either side of the old road; erosion and oversteepening of the ditch sides was noted.
- The ravine fill slope was snow covered at the time of inspection but there was no evidence of slope instability or seepage visible downslope (east) of the highway.
- The MCI and Mr. Buis reported that there has been no visible seepage, erosion, or ice build-up in the ditch at the base of Becker Coulee.
- The MCI reported that the pavement depression appears more noticeable in the summer, and less so in the winter. The MCI also noted that the dip was continuing to settle year after year

and appeared to be more noticeable for southbound traffic. A bump in road sign is present to warn road users.

- The pavement survey pins are still in place. The last survey was completed in June 2020. The drop in pavement was visually estimated to be up to 0.2 m and approximately 20 m of roadway is affected.
- As noted in July 2021, a transverse pavement crack is present at the dip, up to 20 mm wide and for the full depth of the pavement. A second transverse crack is forming approximately 1.1 m south of the first crack.
- The fence line on the west side of the highway dips in the area of the pavement settlement and fence posts are leaning to the east. The MCI reported that the west ditch has positive drainage to the north. A surface runoff erosion feature is present on the back slope west of the ditch.
- At the time of the inspection, the east ditch was snow covered. The fence line on the east side of the highway is vertical and straight with no dip in the fence line noted.

7 RISK RANKING

Risk levels for AT GRMP sites are determined according to the following:

$$\text{Risk Level} = \text{Probability Factor} \times \text{Consequence Factor}$$

Where the AT risk level is defined as follows:

- Probability Factor varies from 1 (Inactive, very low probability of erosion) to 20 (Masswasting of great volumes of soil is occurring).
- Consequence Factor varies from 1 (Relatively small area of erosion involved confined to ditch or backslope) to 10 (Sites where the eroded material could directly flow into fish bearing rivers or affect water quality and aquatic resources).

The risk level for the site was determined by KCB in 2016 and re-evaluated in 2017 and 2021. The most recent risk ranking for the site was determined in July 2021 during the Section B tour using AT's risk level system for earth slides and debris flows. No significant changes have taken place at the site since July 2021 and therefore the risk ranking was unchanged.

The risk level for the site is presented as follows:

- Probability Factor – A rating of 10 was selected due to a steady or possibly increasing rate of settlement.
- Consequence Factor – A rating of 3 was selected for the site due to the speed restriction and the impact of settlement on the pavement.

A total Risk Level of 30 was assigned for the subject site.

8 SUMMARY AND RECOMMENDATIONS

The geohazard at this site consists of a depression in the pavement, considered to be caused by settlement of subgrade fill materials used to infill a V-shaped ravine during construction of Highway 879 in approximately 1992. Settlement has been ongoing for an unknown amount of time but the MCI became aware of the issue in approximately 2012. Settlement has continued and AT installed warning signs and a speed restriction in 2016-2017.

Construction records indicate that up to 12.9 m of fill was placed to infill the ravine. Survey pin measurements between 2017 and 2020 recorded up to 71 mm of pavement settlement, with the greatest settlement on the east shoulder of the highway (northbound shoulder). Review of pavement LiDAR records indicate that the pavement surface may have settled by up to 1.0 m at the S053 site since construction of the highway.

Settlement has led to transverse pavement cracking adjacent to the depression, which will contribute to surface water ingress, potentially saturating fill materials and increasing the rate of settlement.

Based on discussions with AT, KCB have prepared the following recommendations:

- **Deletable item** - Complete a borehole in the east ditch using a sonic drill rig to a depth of approximately 20 m below ground level to evaluate ground conditions and obtain in-situ strength data for geotechnical design using SPTs and Shelby tubes. Estimated cost for one borehole is \$13,000, plus approximately \$8,000 for site supervision, laboratory testing, and reporting.
- Carry out pre-construction environmental evaluation due to the presence of rattlesnakes in the area.
- Carry out highway repairs, including excavation of subgrade materials and placement of lightweight fill in accordance with a Request for Quotation memo to be prepared by KCB. As requested by AT, the repair solution will be suitable for execution by the maintenance contractor. KCB should be retained to provide full time construction supervision
- Potential lightweight fill materials for consideration are:
 - ◆ CEMATRIX Lightweight Cellular Concrete (as used at S022 S-Curve).
 - ◆ Expanded Polystyrene (EPS) Lightweight Fill (GEOFOAM or GeoSpec).
 - ◆ Tire Derived Aggregate (TDA).
 - ◆ Tephralite Volcanic Lightweight Aggregates.

9 CLOSING

This report is an instrument of service of Klohn Crippen Berger Ltd. (KCB). The report has been prepared for the exclusive use of Alberta Transportation (Client) for the specific application to the Southern Region GRMP, and it may not be relied upon by any other party without KCB's written consent.

KCB has prepared this report in a manner consistent with the level of care, skill, and diligence ordinarily provided by members of the same profession for projects of a similar nature at the time and place the services were rendered. KCB makes no warranty, express or implied.

Use of or reliance upon this instrument of service by the Client is subject to the following conditions:

1. The report is to be read in full, with sections or parts of the report relied upon in the context of the whole report. The observations, findings and conclusions in this report are based on observed factual data and conditions that existed at the time of the work and should not be relied upon to precisely represent conditions at any other time.
2. The report is based on information provided to KCB by the Client or by other parties on behalf of the client (Client-supplied information). KCB has not verified the correctness or accuracy of such information and makes no representations regarding its correctness or accuracy. KCB shall not be responsible to the Client for the consequences of any error or omission contained in Client-supplied information.
3. KCB should be consulted regarding the interpretation or application of the findings and recommendations in the report.
4. This report is electronically signed and sealed and its electronic form is considered the original. A printed version of the original can be relied upon as a true copy when supplied by the author or when printed from its original electronic file.

Please contact the undersigned if you have questions or comments about this report.

Yours truly,

KLOHN CRIPPEN BERGER LTD.



2022-03-25

Chris Morgan, P.Eng.
Senior Geotechnical Engineer

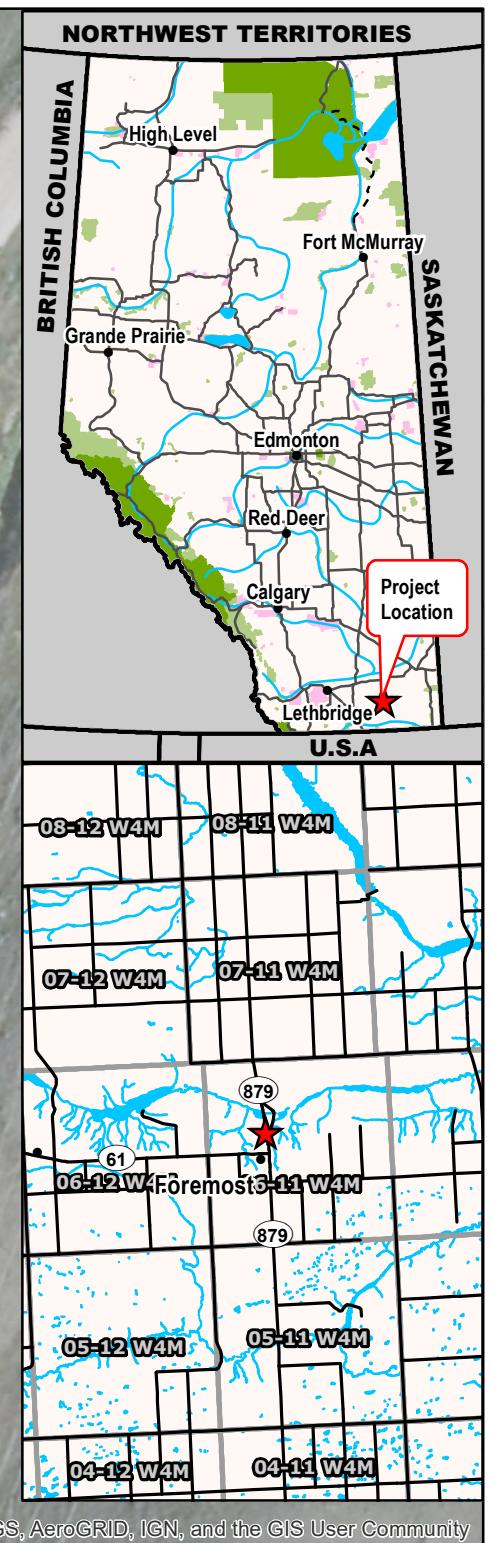
cc: Chris Gräpel, P.Eng. – Senior Civil/Geotechnical Engineer, Associate

Attachments

FIGURES

| | |
|----------|--------------------------------------|
| Figure 1 | Site Plan |
| Sheet 1 | S.H.879:04 Issued for Tender Drawing |

Time: 11:31:45 AM
 Date: October 12, 2021
 File: Z:\AUCSY\Alberta\A05116A03\ABT_Southern Region GRMP\400 Drawings\2021\Section B figures\MXD\IS053_211012.mxd



- Legend**
- ▲ GPS Waypoint (2021)
 - ▲ GPS Waypoints (May 31, 2017)
 - GPS Track (2021)

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

| | | |
|---|--------------------------|--|
| NOTES: 1. HORIZONTAL DATUM: NAD83 2. GRID ZONE: UTM Zone 12N 3. IMAGE SOURCE: World Imagery from ESRI ArcGIS Online. Source date January 2015 | CLIENT | PROJECT SOUTHERN REGION GEOHAZARD RISK MANAGEMENT PROGRAM |
| | | TITLE Site Plan S053 - Foremost Slide Hwy 879:04 |
| SCALE 1:1,000 | PROJECT No. A05116A03 | FIG No. 1 |

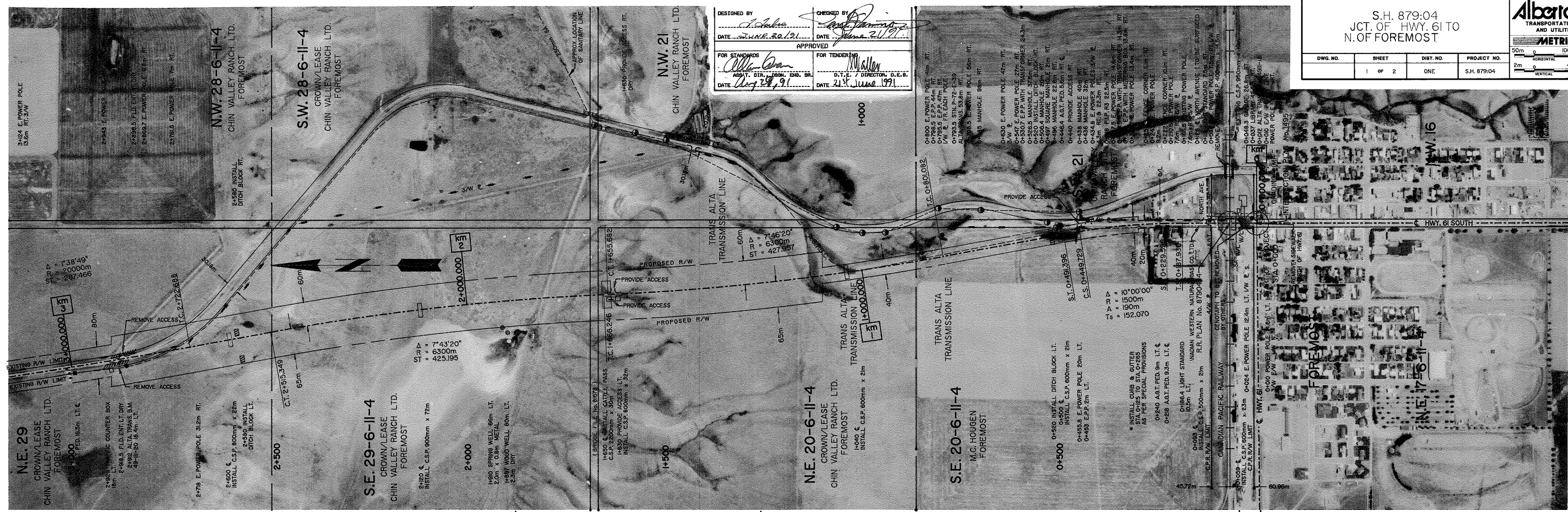
| DATE | BY | REVISIONS | DETAIL | NO. | DATE | BY | MOSAIC | DATE OF PHOTOGRAPHY |
|-------|----------------|-----------|--------|-----|------|----|--------|---------------------|
| 05/91 | T. SCORY | | | | | | | |
| 06/91 | D. SCHEBELBEIN | | | | | | | |
| 06/91 | F.F. | | | | | | | |

| DATE | BY | REVISIONS | DETAIL | NO. | DATE | BY | MOSAIC | DATE OF PHOTOGRAPHY |
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| 05/91 | T. SCORY | | | | | | | |
| 06/91 | D. SCHEBELBEIN | | | | | | | |
| 02/91 | FLOYD FORBES | | | | | | | |
| 06/91 | D. SCHEBELBEIN | | | | | | | |

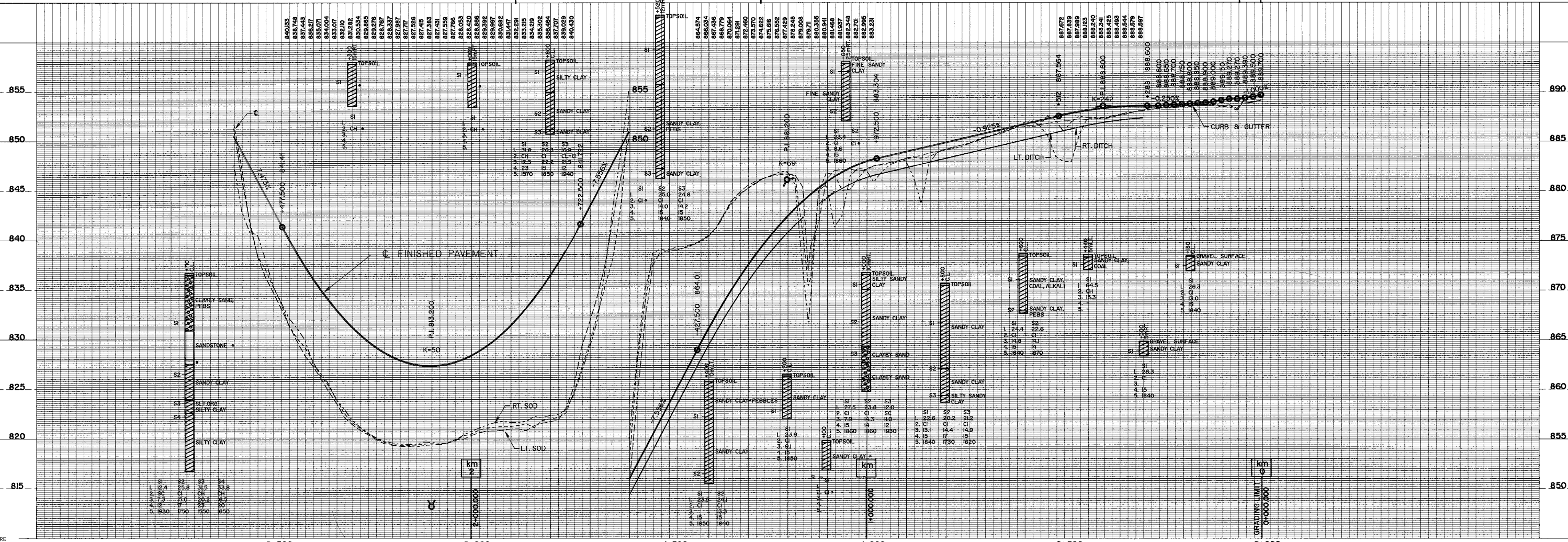
AT & U RECORDS CENTRE



S.H. 879:04
JCT. OF HWY. 61 TO
N. OF FOREMOST

| DWG. NO. | SHEET | DIST. NO. | PROJECT NO. |
|----------|--------|-----------|-------------|
| | 1 of 2 | ONE | S.H. 879:04 |

50m 100m
2m 4m
HORIZONTAL
VERTICAL



SHEET 1 OF 2

JCT. OF HWY. 61 - N OF FOREMOST

2-H. 819:04

APPENDIX I

S053 Site Walkover Photos

Photo 1 View west from Becker Coulee (old highway alignment) towards the ravine that was infilled during construction of Highway 879 (red circle). Photo taken facing west on March 10, 2022.



Photo 2 View west towards ravine infilled during construction of Highway 879. Photo taken on March 10, 2022.



Photo 3 Drainage ditch (red circle) west of old highway at the base of Becker Coulee. Photo taken facing southwest on March 10, 2022.



Photo 4 View north along ditch on west side of the highway (red circle shows the dip location). Photo taken facing north on March 10, 2022.



Photo 5 View north from south of the dip (red circle shows the dip location). Photo taken facing north on March 10, 2022.



Photo 6 View north along east ditch from south of the dip (red circle shows the dip location). Photo taken facing north on March 10, 2022.



Photo 7 East ditch and infilled ravine viewed from south of the dip (bump in road sign is located near the dip). Photo taken facing north on March 10, 2022.



Photo 8 View from Highway 879 northeast down the infilled ravine towards the old highway in Becker Coulee. Photo taken facing northeast on March 10, 2022.



APPENDIX II

Historic Air Photos

MEMORANDUM

TO: Project Team

DATE: March 25, 2022

FROM: Chris Morgan, P.Eng.

FILE NO: A05116A03

SUBJECT: Air Photo Review

1 INTRODUCTION

Site S053 was previously referred to as Rattlesnake Dip and Foremost Slide. At the time of writing, the preferred name is S053 Foremost Settlement (H879:04 C1 km 1.125). The site is located on Highway 879 north of Foremost, Alberta.

2 AIR PHOTOS

Google Earth (October 2020)



Air Photo (August 2012)



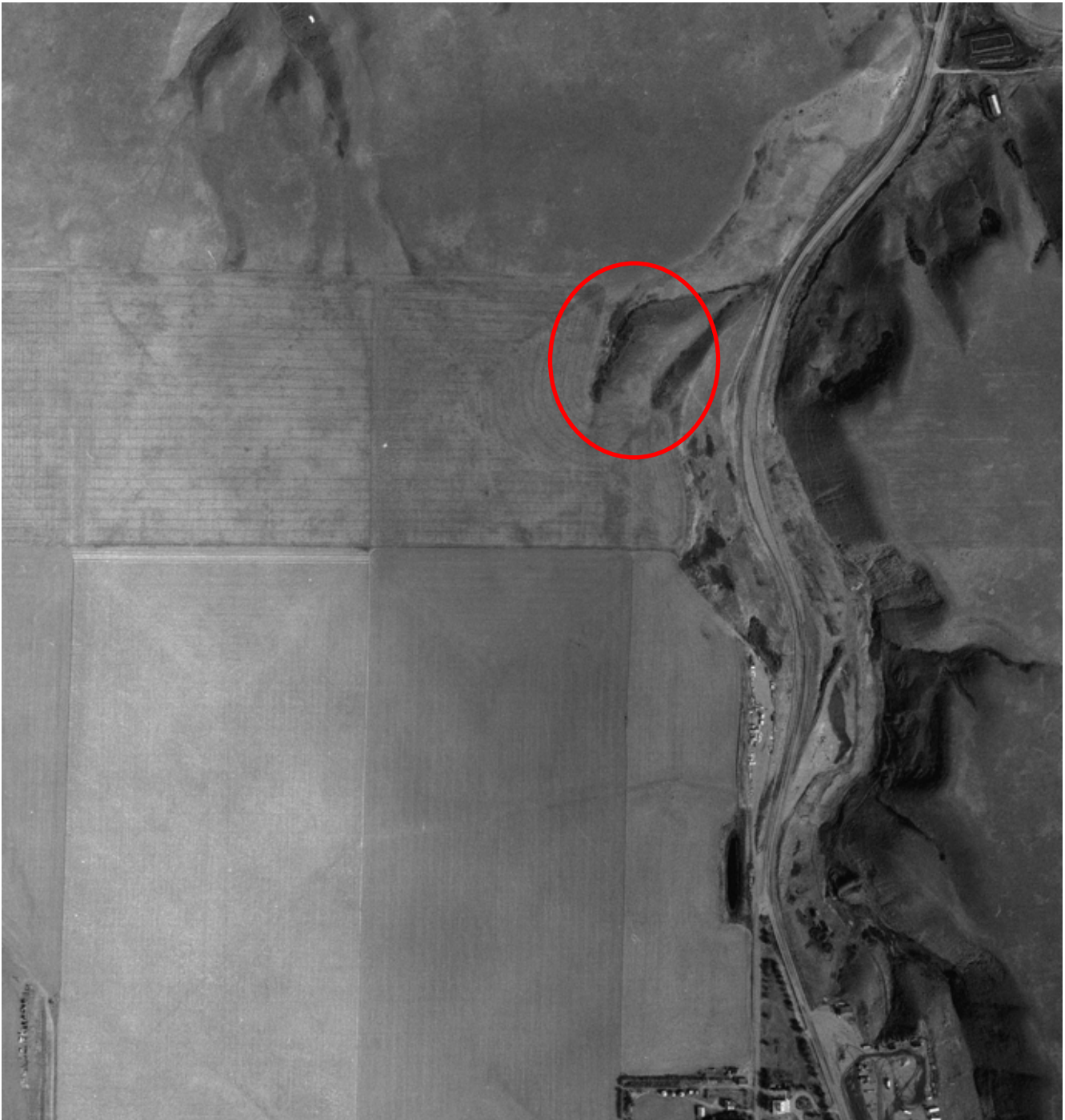
Air Photo (July 2004)



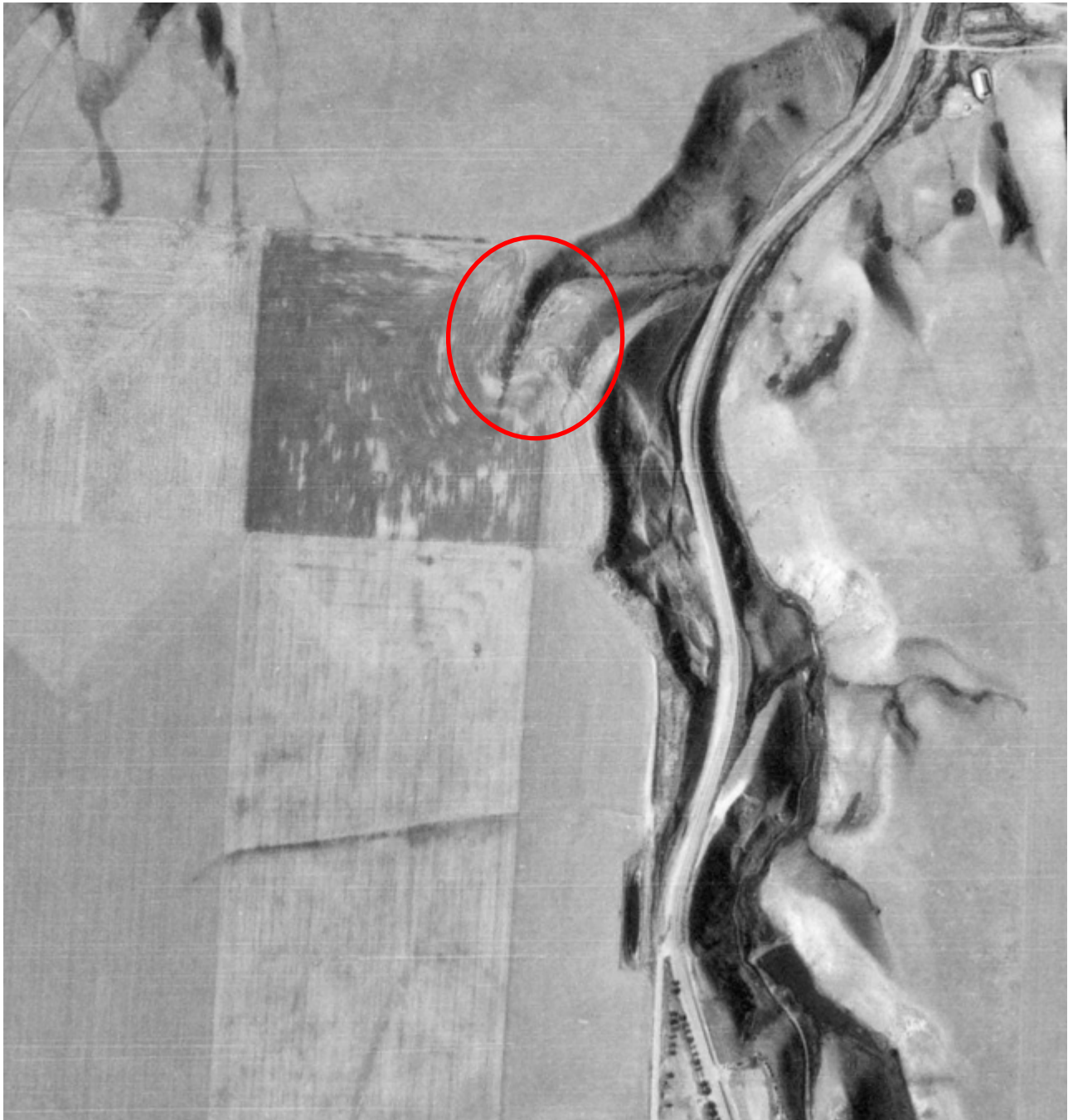
Air Photo (July 1992)



Air Photo (August 1981)



Air Photo (July 1974)



Air Photo (June 1962)



Air Photo (July 1951)

