ALBERTA TRANSPORTATION AND ECONOMIC CORRIDORS
GEOHAZARD ASSESSMENT PROGRAM
PEACE REGION (PEACE RIVER DISTRICT)
2025 INSPECTION

THURBER

Site Number	Location	Name	Hwy	km
PH043	Daishowa East Hill	Daishowa Retaining Wall – Site A / Site B	986:01	33.45 – 33.74
Legal Description		**UTM Co-ordinates (NAD 83)**		
NE7/NW8-85-20 W5M		11V E 491380	N 6246075	

	Date	PF	CF	Total
Previous Inspection:	May 29, 2024	8 11	3 5	24 (Site A – slide risk rating) 55 (Site B – slide risk rating)
Current Inspection:	May 14, 2025	9 13	3 5	27 (Site A – slide risk rating) 65 (Site B – slide risk rating)
Road AADT:	1020		**Year:**	2024
Inspected By:	Rocky Wang, TEC Robert Senior, TEC		Tyler Clay, Thurber Don Proudfoot, Thurber	
Report Attachments:	☒ Photographs	☒ Plans	☒ Maintenance Items	

Primary Site Issue:	**Site A – Pile Wall (km 33.35 – 33.60)** Roadway constructed across major landslide. Embankment originally stabilized by diverting unnamed creek on north side of roadway through a culvert within toe berm constructed across valley bottom. Embankment failed up to roadway requiring installation of a cantilever pile wall in 2004. Shallow slumping has been ongoing below the wall subsequently. Culvert outlet also became unstable and was eroding/ 'head cutting' through toe berm. **Site B (km 33.60 – 34.00)** An unnamed creek was diverted through a culvert located under a toe berm downslope of the roadway embankment. The culvert was undersized to handle the spring runoff, which overflowed and eroded the west sideslope of the toe berm. Landslide movement in the natural creek valley severed the CPP downpipe near 33+850 which has since caused an erosion gully to form upslope of the culvert inlet area. A high flow event occurred in July 2024 that resulted in extensive erosion damage along the creek channel and to the hydraulic control measures within the valley bottom.
Dimensions:	Site A - Unstable roadway embankment was approximately 225 m in length. Distance from roadway to toe of slope approximately 110 m. Site B - Embankment is about 175 m long and extends 150 m below roadway to toe of slope.
Date of Remediation:	2017-2019 - Mitigation measures involved construction of gabion drop structures and overflow channels at both sites to reduce the rate of creek

	erosion. At Site A the work also included the installation of a driven steel pile retaining wall to allow the construction of the drop structure; further regrading work across the embankment slope that slid during construction; and the construction of an armored swale to repair an erosion gully down the east edge (crotch) of the embankment fill sideslope. At Site B the work also included construction of a swale to repair an erosion gully down the east edge (crotch) of the highway embankment sideslope and lining the highway ditch further east with gabion mattress and ECM.	
Maintenance:	None	
Observations:	**Description**	**Worsened?**
☐ Pavement Distress		☐
☒ Slope Movement	**Site A** During mitigation work in 2017/2018 a slide was initiated within the lower slope near the new drop structure that was mitigated via a driven steel pile wall. There is shallow slide activity with ongoing movement within the disturbed slide mass and minor retrogression and expansion downslope of the west end of the older buried tangent pile wall. (Photo 43-02) Previous cracking further east from this area have been graded during the mitigation work and appeared in good condition. No evidence of slope movement was observed upslope of the buried pile wall. (Photo 43-04) Bank slumping south of the culvert inlet was slightly worse with fresh soil exposures since the previous inspection. (Photo 43-05) Tension cracks from apparent shallow sliding towards the east crotch riprap swale (near damaged section) had expanded and the measured offset between the installed lath stakes from the 2024 condition was 1.265 m (+105 mm). (Photo 43-08) **Site B** Sliding is ongoing within the erosion gully at the broken CPP down pipe near 33+850. (Photo 43-16) Increased movement at the surficial slide that developed near the upper slope adjacent to the swale (33+825) first identified during the July 2024 callout. Slide had a 0.4 m scarp height, 0.9 m downdrop and a visible toe roll up to 0.7 m in height that extended to the edge of the swale. (Photo 43-17)	☒
☒ Erosion	**Site A** Rill erosion upslope from the steel pile wall was deeper (0.9 m) and wider (2 m) relative to the 2024 condition. At the culvert inlet (33+500) erosion along the south channel bank and within the lower part of the armoured swale was slightly worse. (Photo 43-05) The armoured swale at the east end of Site A with erosion damage from a 2019/2020 high flow event had increased damage, gullying was deeper and wider. (Photo 43-07)	☒

	Increased sliding within the north and south lower valley slopes due to bank erosion within the natural creek channel downstream of Site A (33+300). **Site B** There were no visible changes to shallow erosion rills between the road and north ditch gabion armour near km 34+000 since the previous inspection (Photo 43-20). South ditch erosion (east of 33+900) appeared active but did not significantly expand since the previous inspection. (Photo 43-19) Slightly worse gully erosion was noted near the outlet of the CPP down pipe (33+800) due to a leaking joint caused by a local landslide movement. Further upslope from the CPP down pipe outlet is an additional break in the pipe that has resulted in an active erosion gully offset approximately 200 m from the highway. (Photo 43-16) Slightly worse damage in the overland flow area within the multiple erosion channels and scour hole that developed during the 2024 high flow event approximately 100 m upstream of the drop structure. (Photo 43-14)	
☐ Seepage		☐
☒ Bridge/Culvert	**Site A** Gabion drop structure had minor increase in silt buildup at the base within the dissipation bowl and culvert outlet was underwater. No major changes from the previous inspection. (Photo 43-01) Culvert inlet is damaged and eroded causing water to partially flow under the base and come in at a joint connection. No major changes from the previous inspection. (Photo 43-16). **Site B** Culvert inlet at 33+800 was damaged from high flow event and has severely reduced flow capacity. Inlet was underwater due to ponding. No major changes from the previous inspection. (Photos 43-15). Increased erosion and damage along the north sidewall of the gabion drop structure due to the 2024 high flow event that flowed outside the structure. The entire north gabion sidewall has collapsed except at the dissipation bowl. The erosion gully had a near vertical 6 m high sidewall near the base of the drop structure. The culvert outlet was still flowing. (Photos 43-10 to 43-13).	☒
☒ Other	No significant beaver activity noted at the creek between Sites A and B. Sediment, log and wood debris buildup present throughout the overland flow areas and within the drop structures at Sites A and B from the 2024 high flow event. (Photos 43-03, 43-04, 43-05, 43-12, 43-15)	☐

Instrumentation (Spring 2025 Readings):	
Site A	North Embankment (km 33.450) ▪ Slope inclinometers SI-4, SI-5 and SI-6 are located east of the wall and outside the main slide block. All three SI's have typically shown a consistent long-term rate of movement between 1 to 3 mm/yr in the upper 6 m. SI-6 has shown a trend of increasing rate of movement (up to 9 mm/yr) over the past three years. Cumulative resultant movements range between approximately 30 mm and 185 mm. Buried Tangent Pile Wall ▪ SI04-1 – SI04-1 showed a rate of movement of 3.0 mm/yr over the length of the pile which is consistent with the long-term rate of 2.5 mm/yr since 2016. Above 14 m depth the pile is gradually tilting, and the pile head has deflected a total of 69 mm to date. ▪ SI04-3 – SI04-3 showed a rate of movement of 7.6 mm/yr over the length of the pile which is consistent with the long-term rate of 7.8 mm/yr since 2018. Above 12 m depth the pile is gradually tilting, and the pile head has deflected 118.4 mm to date. ▪ There has been an increased movement rate trend within the upper 2 m of the wall since a landslide occurred downslope of the wall during erosion mitigation construction in 2017/2018. Upslope of roadway ▪ SI03-6 – Creep (< 1.0 mm/yr) over 4.7 m to 6.0 m depth. Cumulative resultant movement of approximately 14 mm. Groundwater ▪ Groundwater elevation trend has been consistent since 2008 between 4 m and 7 m depth.
Site B	North Embankment (km 33.725) ▪ SI-7 – No discernible movement measured. ▪ SI-8 – fluctuating movements within the upper 1.5 m, with an overall rate of movement between 1 to 2 mm/yr since 2008. Above 4.0 m depth, movement was measured at 2.5 mm/yr since the spring of 2024 which represents a slowing rate of movement relative to an overall rate of movement less than 1.0 mm/yr since 2008. ▪ SI-9 – showed a rate of movement of 2.5 mm/yr within the upper 3 m since the spring of 2024 readings. This is consistent with the long-term rate of movement of approximately 3.0 mm/yr since 2008. ▪ An accelerating movement trend that was observed since 2021 for SI's 8 and 9 has appeared to level off towards the long-term movement rate trend.

Assessment (Refer to Drawings PH043-1 to PH043-3)**:**

Site A – Pile Wall:

Pile wall appears to be limiting sliding of area upslope of the wall and is protecting the west portion of the Site A embankment. The erosion repair work has reinforced the embankment toe and reduced the rate of soil loss from this area and the potential of destabilizing the upper embankment slope.

Slide activity in the lower part of the valley slope that was initiated during construction was mitigated via driven steel piles which appear effective in limiting new slide development. Instruments at the existing buried pile wall indicated a trend of increased movement rates since construction; however, current movement rates are consistent with long-term movement rates. There is ongoing slide activity directly below the west end of the old wall, but it appears relatively shallow and not currently a direct threat to the highway. The embankment above the old pile wall has not exhibited signs of slide movement and slide related pavement damage has not been observed. The apparent tension crack adjacent to the swale has increased in size and appears to be related to shallow movement likely as a result of reduce toe support due to the gully erosion.

Debris and sedimentation buildup has occurred around the erosion mitigation structures following the 2024 high flow event. Maintenance work is required around the culvert inlet and outlet (dissipation bowl cleanout) in the valley bottom. The east crotch swale riprap is no longer effective and should be rebuilt to prevent expansion of the erosion damage and minimize further upslope movement. Due to the gradient in this area, either angular riprap or anchored gabion mattress will be required.

Site B:

The culvert and erosion control mitigation work within the valley bottom requires repairs to restore full effectiveness and reduce rates of progressive damage. The culvert inlet is nearly pinched closed/partially blocked and requires repairs to restore full drain capacity. The end slope of the inlet should be cut steeper and shorter and lined with a stronger SWSP (with concrete collar) to resist hydraulic uplift forces. The riprap around the culvert needs to be reconfigured and should be "benched" into the slope as is practical to reduce displacement and sliding. The CPP downpipe requires replacement and realignment, which was caused by a local landslide in the lower valley slope. The gully erosion occurring downslope from the break will continue to retrogress upslope towards the highway and could initiate deeper instabilities.

During the spring of 2018 a sinkhole developed beside the lower portion of the drop structure, caused by water flowing under pressure from a separated joint in the underlying C.S.P. culvert creating a subsurface void. The void was grouted, and the sinkhole backfilled, however progressive distortions to the overlying gabion baskets/mattresses still occurred. It is believed the outlet of the C.S.P., which sits in the flow dissipation bowl, froze underwater and that the pressurized water eroded the sinkhole out the side of the pipe and drop structure. During the 2023 inspection further void expansion caused additional displacement of the gabion drop structure and ongoing erosion damage. Damage to the drop structure was significantly exacerbated during the July 2024 high flow event where overland flow went outside the armoured channel to the north side of the structure resulting in an erosion gully that undermined the north sidewall and has now caused it to collapse. The previous piping damage likely contributed to the outside flow path undermining the structure.

Extensive repairs of this area are required to limit further damage to the drop structure and allow proper culvert function. Work upstream of the drop structure within the overland flow area is required to direct future surface flows towards the south side of the drop structure inlet to minimize flow within the north erosion gully prior to full repairs of the drop structure can be completed. The erosion gully at the base of the drop structure has resulted in easier access to the compromised culvert joint for repair. The compromised joint section should be excavated and replaced with a bolted connection and concrete collar. Repairs at the drop structure will need to involve removal of the disturbed soils and damaged baskets, slope regrading, installation of a cut-off wall at the top and impermeable liner, and installation of new riprap armouring and salvaged gabion stone from damaged baskets that is blended into the intact structure.

The current instrumentation indicates shallow movement (less than 3 m depth) at slow and steady rates (<10 mm/yr). The SI closest to the highway (SI-7) has not measured movement. A shallow slide has developed upslope of the swale near km 33.825 that is currently offset approximately 18 m from the highway and does not represent an immediate threat. The instability can likely be attributed to a slightly oversteepened slope profile following construction of the armoured swale.

Recommendations:

Maintenance:

- Sediment buildup within the dissipation bowls of both drop structures should be cleaned out.
- Logs and woody debris within the drop structures should be cleaned out.
- Remove sand accumulation from side of roadway which is causing channelization of surface runoff on embankments and highway ditch.

Short-term Measures (repair work is prioritized in terms of urgency with "1" being lowest priority and "5" as the highest priority):

- (5) Site B - establish an armoured swale and diversion berm from the south side of the drop structure inlet to direct overland flow outside of the erosion gully and minimize surface flow to the north side of the structure into the erosion gully. ($50k)

- (4) Site B - drop structure erosion temporary gully armouring. The disturbed soils outside the drop structure wall should be excavated and backfilled with Class 1M riprap placed over non-woven geotextile. Class 1 rock should be placed as armour cover and to reinforce the toe of the backfilled zone. ($250k)
- (4) Site A - repair of the armored swale. Existing rock should be salvaged and used with additional imported material to line the armored swale with gabion mattress anchored at intervals to the slope. Swale alignment improvements should also be made (reduction of super elevation in the upper curve) and a cross berm should be added near the top to divert highway runoff into the swale. ($45k)
- (4) Site B - replace culvert inlet at km 33+800 within valley bottom. Replace with concrete faced headwall and rebuild embankment slope. The new inlet should comprise a liner with SWSP. Additional rip should be added and shaped around the reinforced headwall. ($85k)
- (4) Site A - replacement of the damaged culvert inlet with a stronger SWSP with steeper end bevel. The new culvert should be grouted into the existing CSP. Additional Class 2 riprap should be added and shaped to better funnel water into the inlet. ($30k)
- (3) Site B - replace CPP down pipe severed by landslide. Replace with welded HDPE pipe. ($175k)
- (3) Site A - repair south channel bank erosion near the culvert inlet and toe of the armored swale. The disturbed soils should be excavated and backfilled with gravel over non-woven geotextile. Additional Class 2 riprap should be added over the bank and blended into the toe of the armored drainage swale. ($25k)
- (2) Site B - repair erosion in south ditch and armor similar to north ditch with TRM and gabion mattress in section with gradient above 5%. Backslope could be used as borrow source to fill gullies. Estimate length of repair section is between 250 m to 300 m in order to extend the armoured section to the culvert inlet. ($85k)
- (1) Site B -repair erosion rills on north sideslopes above gabion mattress in ditch. Grade and line with TRM and composite rolls. ($15k)
- (1) Site A - fill erosion gully with rock above pile wall at outlet drop structure. ($5k)

Medium and Long-Term:

- Site B – the following measures are recommended to reinstate the drop structure to the original design function:
    - Cut away and dismantle damaged baskets along north sidewall and salvage gabion stone. Care should be taken to keep step baskets intact.
    - Excavate disturbed gully soils.
    - Remove gabion baskets at bottom of structure to access culvert joint and replace with bolted connection and concrete collar.
    - Re-establish slope on north side of the drop structure with benched steps (matching drop structure geometry as close as possible) using compacted clay fill and install low permeability liner.
    - Install sheet pile cut-off wall at the top of the drop structure on the north side.
    - Place graded rock armouring over liner comprised of gravel bedding, salvaged gabion stone followed by Class 2 riprap blended into the intact drop structure steps.

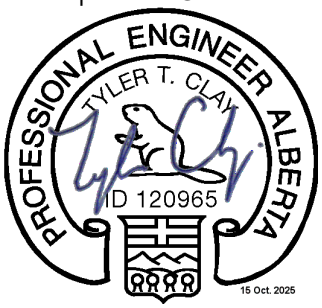
Ongoing Investigation/Monitoring:

- Annual inspections should continue with the next inspection occurring in the Spring of 2026.
- Biannual instrument readings should continue.
- Hydrotechnical assessment should be considered to better characterize the 2024 high flow event, consider implications of climatic changes for design performance and as input for future mitigation design.

Closure

It is a condition of this letter report that Thurber's performance of its professional services will be subject to the attached Statement for Use and Interpretation of Report.

Don Proudfoot, M.Eng., P.Eng.
Partner | Senior Geotechnical Engineer



PERMIT TO PRACTICE
THURBER ENGINEERING LTD.
RM SIGNATURE: Don Proudfoot
RM APEGA ID #: 51674
DATE: October 15, 2025
PERMIT NUMBER: P005186
The Association of Professional Engineers and Geoscientists of Alberta (APEGA)

Tyler Clay, P.Eng.
Geological Engineer

THURBER

STATEMENT FOR USE AND INTERPRETATION OF REPORT

1. STANDARD OF CARE

This Report has been prepared in a manner consistent with that degree of care and skill ordinarily exercised by members of the same profession currently practicing under similar circumstances at the same time and in the same or similar locality and in compliance with all applicable laws.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment, including this Statement For Use and Interpretation of Report, are a part of the Report, which is of a summary nature and is not intended to stand alone without reference to the instructions given to Thurber by the Client, communications between Thurber and the Client, and any other reports, proposals or documents prepared by Thurber for the Client relative to the specific site described herein, all of which together constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT, AS DESCRIBED ABOVE. THURBER IS NOT RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TOTHE WHOLE OF THE REPORT.

3. BASIS OF REPORT

The Report has been prepared for the specific site, development, design objectives, and purposes that were described to Thurber by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the Report, subject to the limitations provided herein, are only valid to the extent that the Report expressly addresses proposed development, design objectives and purposes, and then only to the extent that there has been no material alteration to or variation from any of the said descriptions provided to Thurber, unless Thurber is specifically requested by the Client to review and revise the Report in light of such alteration or variation.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client for the development, design objectives, and/or purposes described to Thurber by the Client. **NO OTHER PARTY MAY USE OR RELY ON THE REPORT OR ANY PORTION THEREOF FOR OTHER THAN THE CLIENT'S BENEFIT IN CONNECTION WITH THE PURPOSES DESCRIBED IN THE REPORT**. Any use which a third party makes of the Report is the sole responsibility of such third party and is always subject to this Statement for Use and Interpretation of Report. Thurber accepts no liability or responsibility for damages suffered by any third party resulting from use of the Report for purposes outside the reasonable contemplation of Thurber at the time it was prepared or in any manner unintended by Thurber.

5. INTERPRETATION OF THE REPORT

a) **Nature and Exactness of Soil and Contaminant Description:** Classification and identification of soils, rocks, geological units, contaminant materials and quantities have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors is inherently judgement-based. Comprehensive sampling and testing programs implemented with the appropriate equipment by experienced personnel may fail to locate some conditions. All investigations utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarizing such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and the Client and all other parties making use of such documents or records with or without our express written consent need to be aware of this risk and the Report is delivered subject to the express condition that such risk is accepted by the Client and such other parties. Some conditions are subject to change over time and those making use of the Report need to be aware of this possibility and understand that the Report only presents the interpreted conditions at the sampled points at the time of sampling. If special concerns exist, or the Client has special considerations or requirements, the Client must disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.

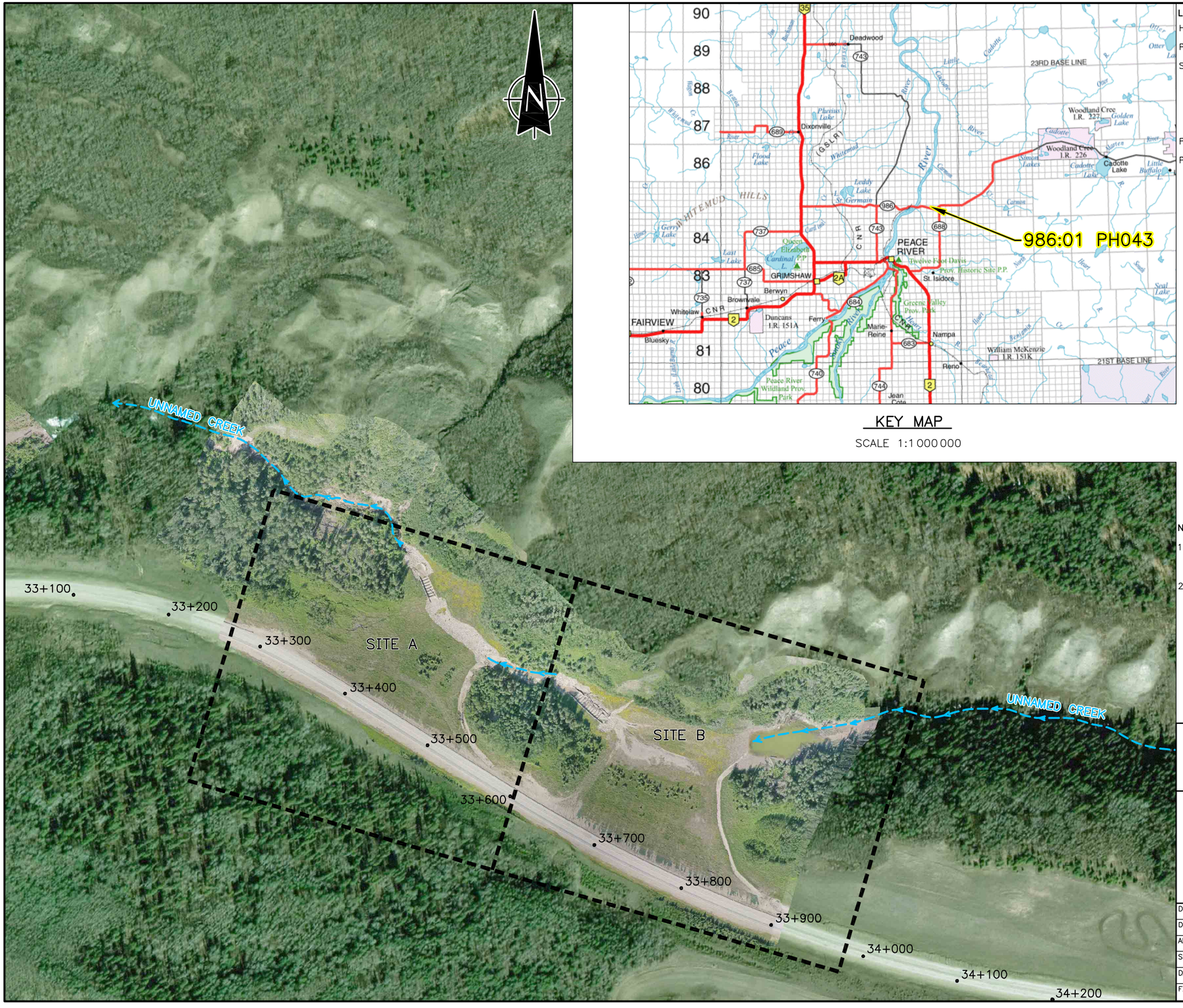
b) **Reliance on Provided Information:** The evaluation and conclusions contained in the Report have been prepared based on conditions in evidence at the time of site inspections and based on information provided to Thurber. Thurber has relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, Thurber does not accept responsibility for any deficiency, misstatement or inaccuracy contained in the Report resulting from misstatements, omissions, misrepresentations, or fraudulent acts of the Client or other parties providing information relied on by Thurber. Thurber is entitled to rely on such representations, information and instructions and is not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.

c) **Design Services:** The Report may form part of design and construction documents for information purposes even though it may have been issued prior to final design being completed. Thurber is recommended to be retained to review final design, project plans and related documents prior to construction to confirm that they are consistent with the intent of the Report. Any differences that may exist between the Report's recommendations and the final design need to be reported to Thurber immediately so that Thurber can address potential conflicts.

d) **Construction Services:** During construction Thurber should be retained to provide field reviews. Field reviews consist of performing sufficient and timely observations of encountered conditions to confirm and document that the site conditions do not materially differ from those conditions considered in the preparation of the report. Adequate field reviews are necessary for Thurber to provide letters of assurance, in accordance with the requirements of many regulatory authorities.

6. INDEPENDENT JUDGEMENTS OF CLIENT

The information, interpretations and conclusions in the Report are based on Thurber's interpretation of conditions revealed through limited investigation conducted within a defined scope of services. Thurber does not accept responsibility for independent conclusions, interpretations, interpolations and/or decisions of the Client, or other parties who may come into possession of the Report, or any part thereof, which may be based on information contained in the Report. This restriction of liability includes, but is not limited to, decisions made to develop, purchase, or sell land, unless such decisions expressly form part of the stated purpose of the Report as described in Paragraph 3.



KEY MAP

SCALE 1:1 000 000

LEGEND:

- HORIZONTAL CHAINAGE — 32+100
- PHOTOGRAPH LOCATION — 43–01
- SLOPE INCLINOMETER
  - NO MOVEMENT — SI 64
  - CREEP — SI 82
  - MEASURABLE MOVEMENT (OR RECENTLY SHEARED) — SI 82
- PIEZOMETER — PN 004
- PH43 BOUNDARY

NOTES:

1 FIGURE MUST BE USED IN CONJUNCTION WITH THE ATTACHED REPORT REFERENCE 32121 DATED OCTOBER 2025 AND IS SUBJECT TO ANY LIMITATIONS DESCRIBED THEREIN.

2 AIR PHOTO BASE FROM DRONE IMAGERY DATED JULY 18, 2024 AND ESRI (DIGITAL GLOBE, 2016).

0 50 100 200 300 m

UTM 11N NAD83

Alberta Transportation

PEACE REGION (PEACE RIVER DISTRICT)

DAISHOWA EAST HILL
HWY 986:01 (PH043)
LOCATION PLAN

FIGURE PH043-1

DRAWN BY	ICB
DESIGNED BY	TTC
APPROVED BY	DWP
SCALE	1:4 000
DATE	OCTOBER 14, 2025
FILE No.	32121–A3G

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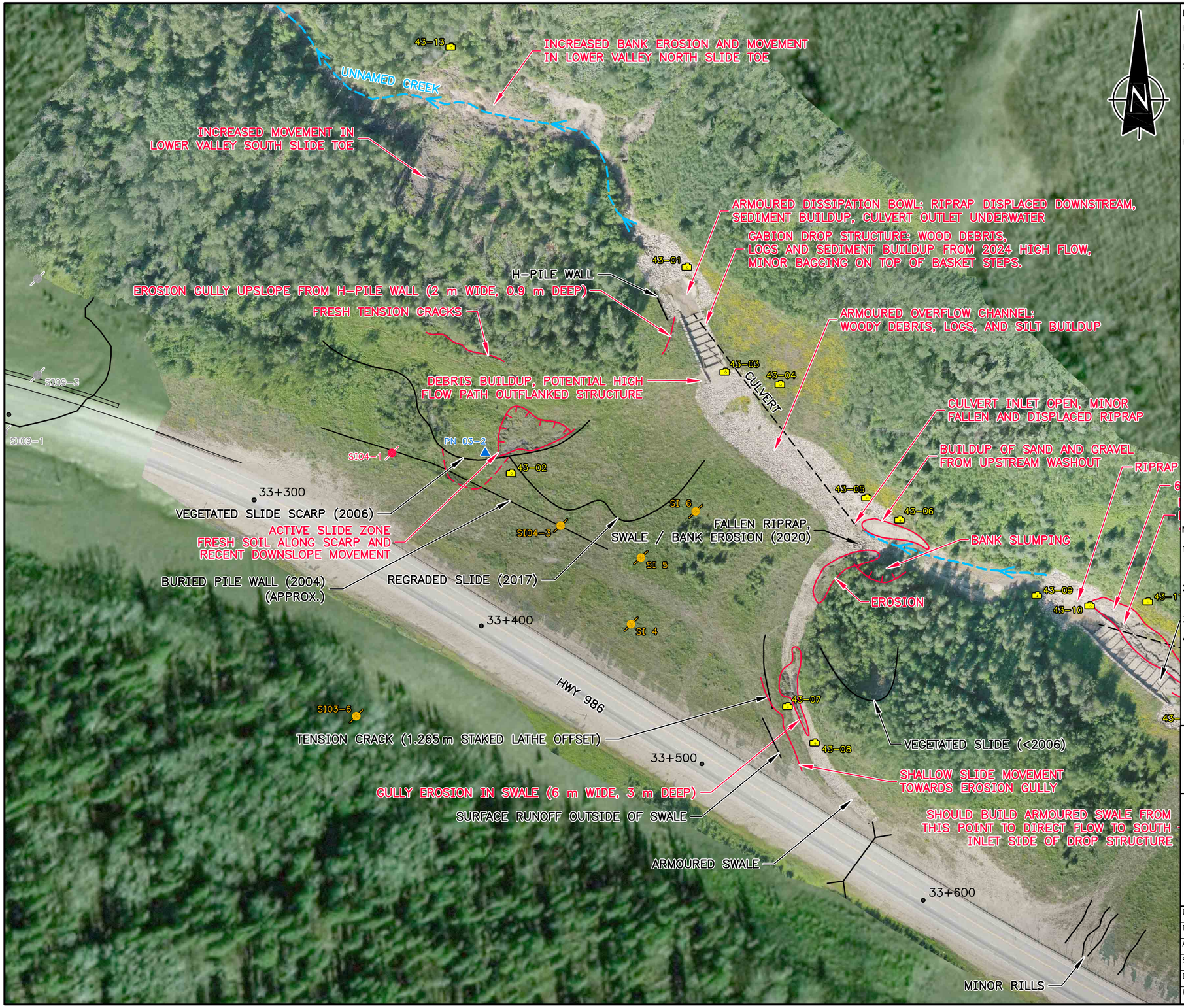

LEGEND:

- HORIZONTAL CHAINAGE — 32+100
- PHOTOGRAPH LOCATION — 43-01
- SLOPE INCLINOMETER
  - NO MOVEMENT — SI 64
  - CREEP — SI 62
  - MEASURABLE MOVEMENT (OR RECENTLY SHEARED) — SI 82
- PIEZOMETER — PN 004

NOTES:

1 FIGURE MUST BE USED IN CONJUNCTION WITH THE ATTACHED REPORT REFERENCE 32121 DATED OCTOBER 2025 AND IS SUBJECT TO ANY LIMITATIONS DESCRIBED THEREIN.

2 AIR PHOTO BASE FROM DRONE IMAGERY DATED JULY 18, 2024 AND ESRI (DIGITAL GLOBE, 2016).

3 FEATURES/PHOTOGRAPH LOCATIONS SHOWN APPROXIMATE ONLY.

4 FIELD OBSERVATIONS FROM MAY 14, 2025 SHOWN IN RED.

0 10 20 30 40 50 100 m

UTM 11N NAD83

Alberta Transportation

PEACE REGION (PEACE RIVER DISTRICT)

DAISHOWA EAST HILL
HWY 986:01 (PH043)
SITE A PILE WALL - 2025 SITE INSPECTION PLAN

FIGURE PH043-2

DRAWN BY	ICB
DESIGNED BY	TTC
APPROVED BY	DWP
SCALE	1:1 500
DATE	OCTOBER 14, 2025
FILE No.	32121-A3G

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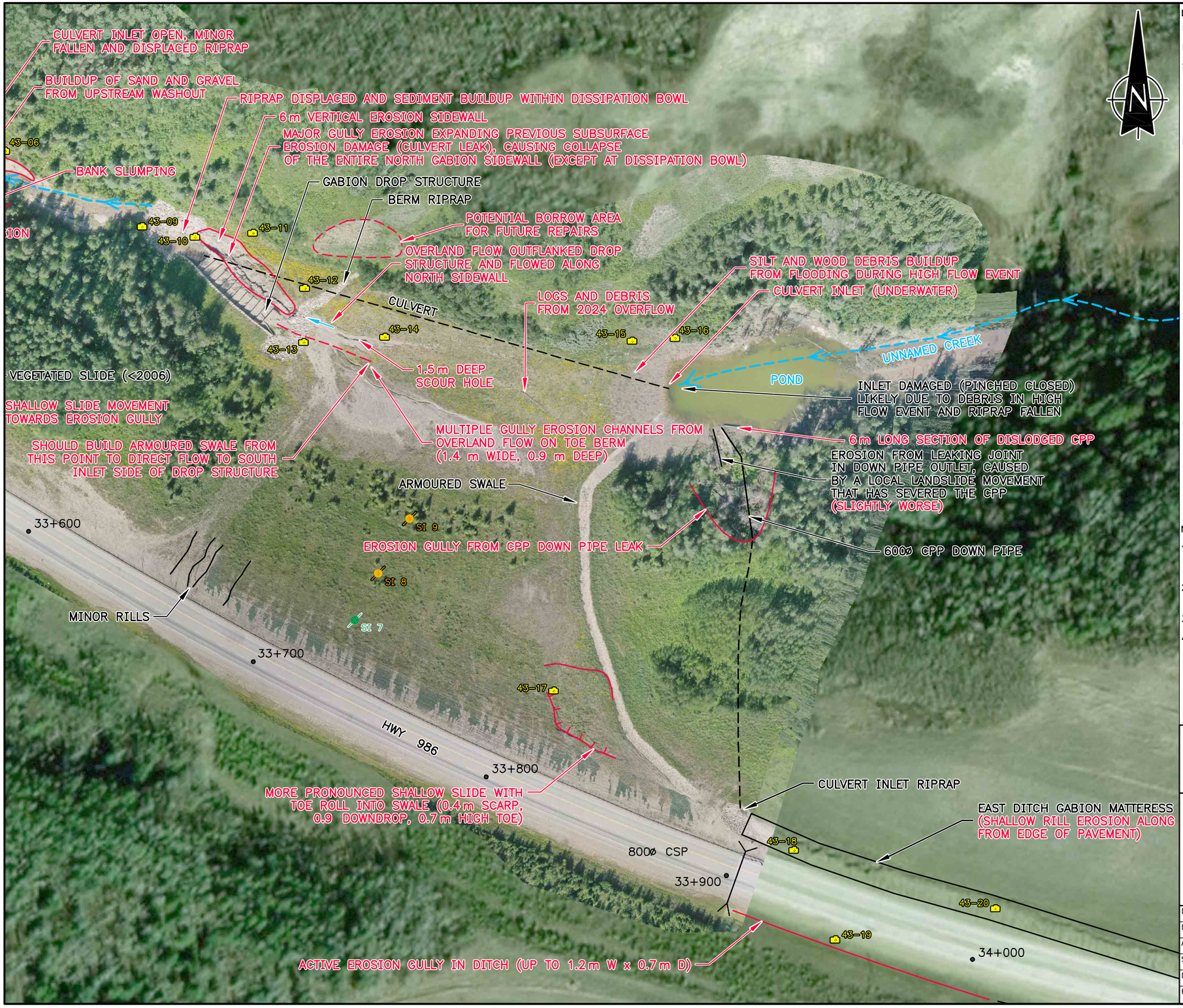

LEGEND:

- HORIZONTAL CHAINAGE — 32+100
- PHOTOGRAPH LOCATION — 43-01
- SLOPE INCLINOMETER
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4 FIELD OBSERVATIONS FROM MAY 14, 2025 SHOWN IN RED.

0 10 20 30 40 50 100 m

UTM 11N NAD83

Alberta Transportation

PEACE REGION (PEACE RIVER DISTRICT)

DAISHOWA (EAST HILL)
HWY 986:01 (PH043)
SITE B - 2025 SITE INSPECTION PLAN

FIGURE PH043-3

DRAWN BY	ICB
DESIGNED BY	TTC
APPROVED BY	DWP
SCALE	1:1 500
DATE	OCTOBER 14, 2025
FILE No.	32121-A3G

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Photo 43-01.: View towards the southeast (upstream) from the base of the Site A gabion drop structure. No major change from 2024 condition. Debris visible from high flow event and there was sediment buildup within the dissipation bowl at the base of the drop structure.

Photo 43-02.: Main slide scarp of active shallow failure downslope of the buried pile wall (33+325) first observed in 2017. Fresh scarps were observed in 2024 and had additional movement and minor retorgression.

Photo 43-03.: View towards the northwest (downstream) at from the top of the Site A gabion drop structure (33+400). Debris and sediment buildup visible at the top of the structure from the 2024 high flow event. No major changes.

Photo 43-04.: Looking south at the area of previous slumping associated with culvert erosion below pile wall and regraded slide during construction in 2017 (33+430). No visible changes from 2024 condition.

Photo 43-05.: Site A - Standing atop the armoured overflow channel looking towards the southeast (upstream) near 33+525. Buildup of woody debris and sediment visible from the 2024 high flow event. Increased gully erosion along the armoured swale and slumping of the south channel banks.

Photo 43-06.: Site A - View southwest towards the culvert inlet and debris deflector (33+500). Large buildup of sand and gravel from upstream washout during 2024 high flow event. Inlet was open and flowing. No significant change from 2024 condition.

Photo 43-07.: Downslope view towards the north at the washed out riprap and extensive erosion gully damage within the armoured swale at the east side of Site A (33+500) first observed in 2020. Deeper and expanded erosion damage since 2024.

Photo 43-08.: View west along the sideslope above the armoured swale at the east side of Site A (33+530). Tension cracks have formed from shallow slide movement towards the erosion gully.

Photo 43-09.: Site B - View west (downstream) along the channel downstream of the gabion drop structure with displaced riprap and sediment buildup (33+600).

Photo 43-10.: Site B- view east (upstream) from the base of the gabion drop structure and riprap dissipation bowl at the culvert outlet (33+600). Additional erosion expansion and complete gabion collapse along the north sidewall of the drop structure from the erosion gully that formed when high flow outflanked the structure in 2024. Lower area previously compromised from culvert joint leak and piping.

Photo 43-11.: Site B- view south towards the expanded damage and erosion gully along the north side of the gabion drop structure (33+610). Increased sediment buildup in dissipation bowl. Culvert outlet was open and flowing.

Photo 43-12.: Site B- view south towards the top of the gabion drop structure where high flow outflanked the structure along the outside of the north sidewall during the 2024 high flow event causing subsequent collapse from undermining. Logs and wood debris buildup visible.

Photo 43-13.: Site B- view east at upstream end/inlet of the gabion drop structure with riprap berm near west end of the overland flow toe berm (33+625). Increased erosion and riprap displacement near the head of the erosion gully at the north side of the drop structure.

Photo 43-14.: Site B- view east towards a 1.5 m deep scour hole the formed during the 2024 high flow event within the overland flow area upstream from the drop structure near 33+675.

Photo 43-15.: Site B- view south of overland flow area above the culvert inlet near 33+800. Log and sediment debris buildup were visible from the 2024 high flow event.

Photo 43-16.: Site B - Looking south towards the outlet of the CPP down pipe near the culvert inlet (33+850). Increased gully erosion and sliding since 2024 due to a leaking joint that requires repair. Water is ponded above the damaged culvert inlet (pinched) that has significantly restricted flow capacity.

Photo 43-17.: Site B - Looking east towards the scarp of a shallow slide developing above the armoured swale that was identified in 2024 (33+850). Slide was more pronounced with a 0.4 m high main scarp and visible toe roll that extended to the edge of the swale.

Photo 43-18.: Site B - View west towards centreline culvert outlet, CPP downpipe inlet and riprap protection near 33+900 on north side of road. No visible changes from the 2024 condition.

Photo 43-19.: Site B – Increased erosion within gully that has formed upstream of the culvert inlet within the south ditch between approximately 33+900 to 34+010.

Photo 43-20.: Site B – Shallow rill erosion between the road sideslope and north ditch gabion armour had no major change compared to the 2024 condition (34+000).