

**ALBERTA TRANSPORTATION
GEOHAZARD ASSESSMENT PROGRAM
PEACE REGION – PEACE RIVER/HIGH LEVEL
2018 INSPECTION**



THURBER ENGINEERING LTD.

Site Number	Location	Name	Hwy	km
PH 76	~5 km W. Cleardale	Culvert Slide	64:02	30.15
Legal Description		UTM Co-ordinates (NAD 83)		
SW6-85-10-W6		11V N 6246803	E 340894	

	Date	PF	CF	Total
Previous Inspection:	June 1, 2017	2	4	8
Current Inspection:	May 18, 2018	2	4	8
Road AADT:	420	Year:		2017
Inspected By:	Don Proudfoot, Barry Meays (Thurber); Ed Szmata, Ken Szmata, Roger Skirrow (AT)			
Report Attachments:	<input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Plans <input checked="" type="checkbox"/> Maintenance Items			

Primary Site Issue:	A slide took place in May 2015 on the south side of the highway shoulder, embankment, and ditch, adjacent to the east side of a 2.3 m high x 2.1 m span SPE bridge culvert.		
Dimensions:	Slide dimensions ~22 m long along the embankment x ~27 m wide along the highway (with an additional 14m long crack along the south shoulder extending overtop of and further west of the SPE).		
Date of any remediation:	South embankment slide and ditch were repaired in 2016/17, by excavating the slide, re-building the embankment with 6-80 gravel, and riprap re-placement around the culvert outlet and south ditch. The north highway embankment failed at this location about 20 years ago, and was repaired by excavating the failed material, placement of geotextile, and backfilling with pitrun gravel.		
Maintenance:	Asphalt overlay in 2008.		Worsened?
Observations:	Description	Yes	No
<input checked="" type="checkbox"/> Pavement Distress	Asphalt was placed over the slide repair since the 2017 inspection.	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Slope Movement	The south embankment slide was repaired in 2017.	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Erosion	The south ditch and culvert outlet riprap erosion was repaired in 2017.	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Seepage		<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Bridge/Culvert Distress	The SPE culvert (BF77806) was not damaged by the slide (in-service date 1974).	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Other		<input type="checkbox"/>	<input type="checkbox"/>
Instrumentation:	None		
Background/Assessment:	<p>The cause of the 2015 slide appeared to be due to an embankment slope that was too steep (22° or 2.5H:1V) for the highly plastic clay composition material, in conjunction with ditch erosion along the embankment toe. The slide may have been a progressive failure, due to gradual weakening of the clay fill by the weathering processes consisting of freeze thaw and wetting and drying cycles leading to a loss of cohesion.</p>		

In August 2016, a test hole was drilled on the highway, and a topographic survey was completed to provide data for the detailed design.

The south embankment slide was repaired in 2016/17 under Contract 14524, using the region's Highway Maintenance Contractor (LaPrairie). The repairs consisted of:

- 1 Subexcavating the failed slide mass down to intact clay, below ditch level
- 2 Rebuilding the slope with imported 6-80 gravel, placed and compacted in thin horizontal lifts, benched into the intact slope surface, utilizing a gravel shear key to stabilize the slide area
- 3 Some of the more suitable excavated clay was used to provide a covering layer ovetop the gravel as the finished slope surface to shed runoff, with the excess removed from site
- 4 A subdrain was installed along the base of the slide excavation surface, to drain any subsurface water that may enter the rehabilitated slide mass.
- 5 The existing Class 1 Riprap along the runoff ditch was salvaged and re-instated and replenished with new Riprap over non-woven geotextile along a new contoured ditch beyond the new slope.
- 6 The available topsoil was salvaged and replaced over the finished embankment surface and seeded. Erosion control soil covering was also placed over the east and west highway ditches leading into the riprap.

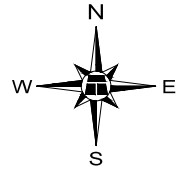
The existing SPE culvert was not damaged by the south slide, as the existing sandbag armour around the inlet was intact. The 2016/2017 slide repairs consisted of excavation and backfill extending around the edges of the outlet due to observed cracks extending west of the culvert location.

At the driveway approach east of this slide site, the maintenance contractor replaced the existing 600 mm CSP with a 900 mm CSP beneath the driveway approach sometime in 2015, with a slightly lower invert elevation, to avoid water backup at this resident's property.

Recommendations:

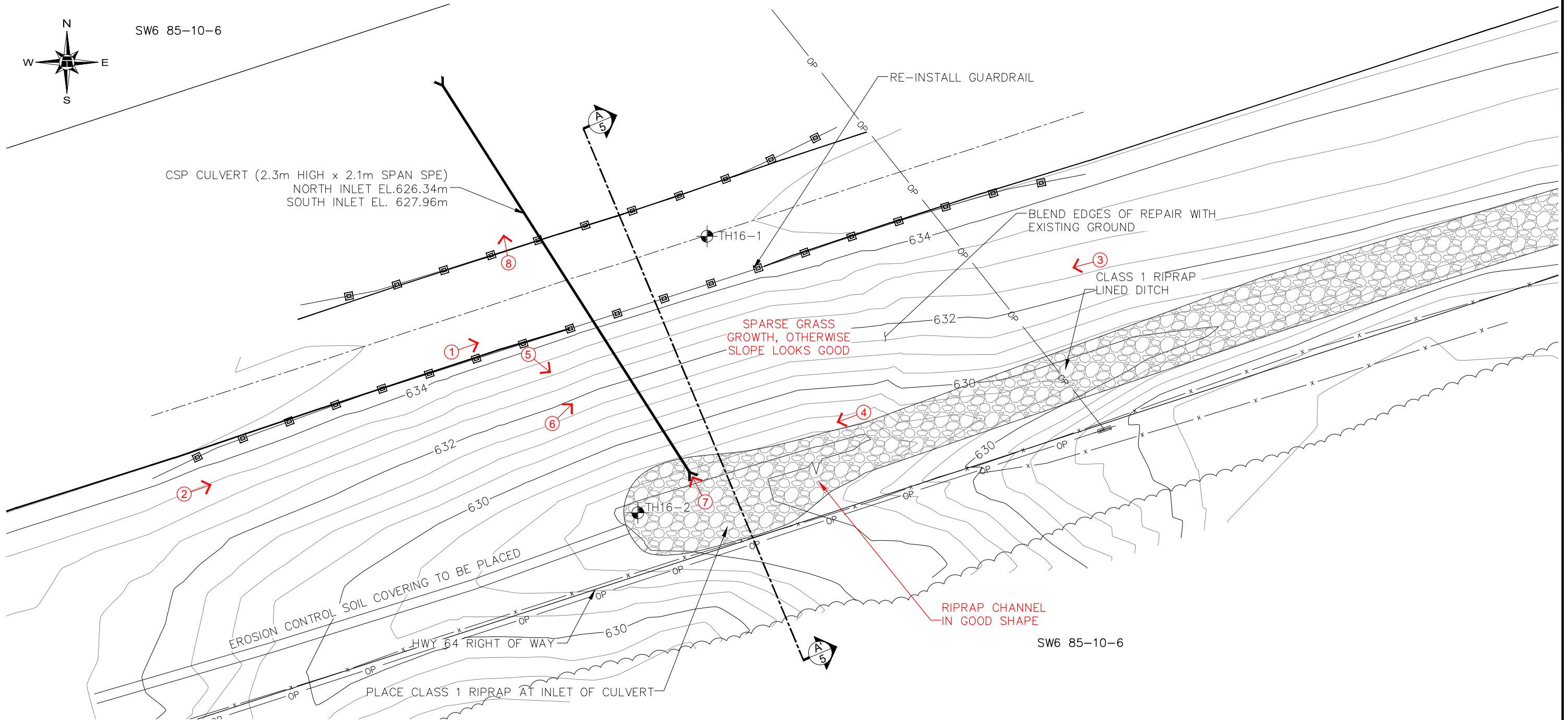
The repairs appear to be performing satisfactorily. However, in the short term, monitor the slide and ditch repaired area for any sign of movements, settlement or erosion.

H:\1300013351 Geohazard Assessment - Peace River/High Level (CON0017602)\Drafting\2018\BDM\13351 PH76- FIGURE 1-3.dwg - F1 - Dec. 06, 2018



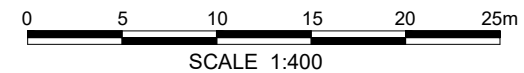
SW6 85-10-6

CSP CULVERT (2.3m HIGH x 2.1m SPAN SPE)
NORTH INLET EL. 626.34m
SOUTH INLET EL. 627.96m




LEGEND

- FENCE LINE
- APPROXIMATE TREE LINE
- APPROXIMATE GUARD RAIL LOCATIONS
- OVERHEAD POWER LINE
- STREAMBED CENTERLINE
- OVERHEAD POWER POLE
- APPROXIMATE TEST HOLE LOCATION
- HWY 64 SURFACE
- PHOTO & DIRECTION



NOTES :
1. MAY 18, 2018 OBSERVATIONS SHOWN IN RED




**PEACE REGION (PEACE RIVER/HIGH LEVEL)
PH076-1 HWY 64:02 km 30.1 TO 30.2**

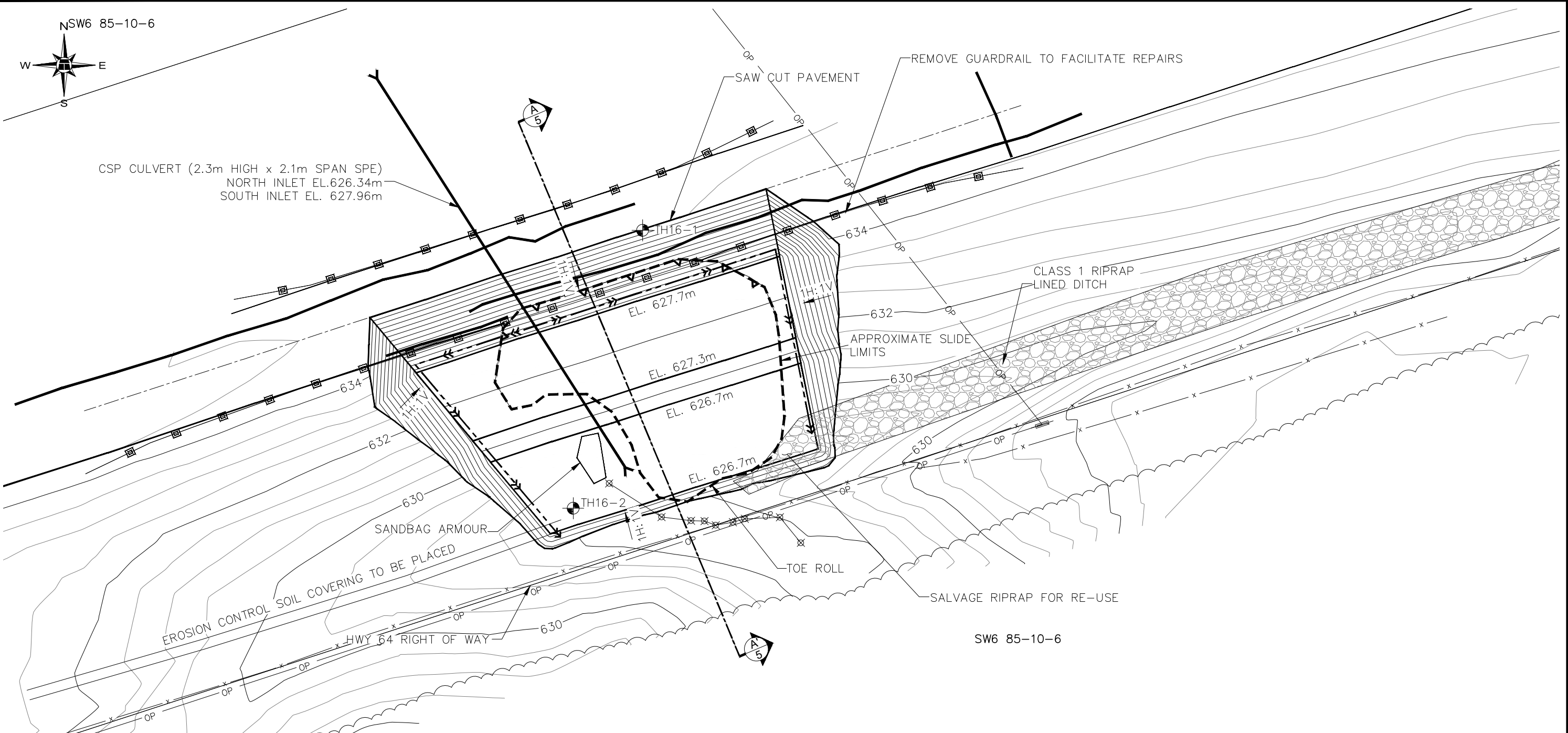
**2018 PH076-1 INSPECTION
DESIGN FINAL GRADE**

FIGURE PH076-1-1

DRAWN BY	ML
DESIGNED BY	BDM
APPROVED BY	DWP
SCALE	1:400
DATE	MAY 18, 2018
FILE No.	13351



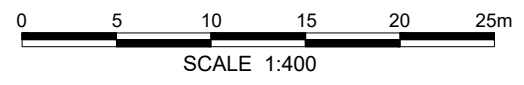
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LEGEND

- SURFACE CRACK
- SLIDE SCARP
- FENCE LINE
- APPROXIMATE TREE LINE
- APPROXIMATE GUARD RAIL LOCATIONS
- OVERHEAD POWER LINE
- STREAMBED CENTERLINE
- OVERHEAD POWER POLE
- APPROXIMATE TEST HOLE LOCATION
- HWY 64 SURFACE

NOTES:
 1. MAY 18, 2018 OBSERVATIONS SHOWN IN RED






**PEACE REGION (PEACE RIVER/HIGH LEVEL)
 PH076-1 HWY 64:02 km 30.1 TO 30.2**

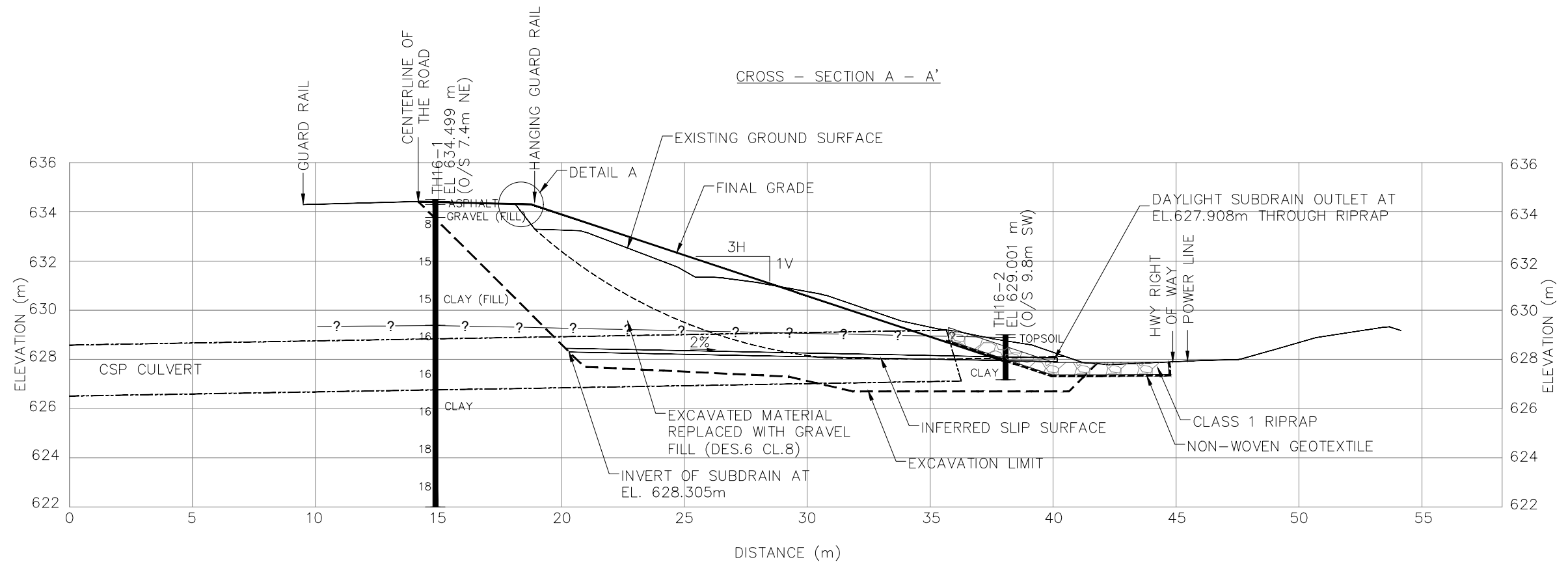
**2018 PH076-1 INSPECTION
 DESIGN EXCAVATION PLAN**

FIGURE PH076-1-2

DRAWN BY	ML
DESIGNED BY	BDM
APPROVED BY	DWP
SCALE	1:400
DATE	MAY 18, 2018
FILE No.	13351



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PEACE REGION (PEACE RIVER/HIGH LEVEL)
PH076-1 HWY 64:02 km 30.1 TO 30.2

2018 PH076-1 INSPECTION
CROSS - SECTION A - A'

FIGURE PH076-1-3

DRAWN BY	ML
DESIGNED BY	BDM
APPROVED BY	DWP
SCALE	1:200
DATE	MAY 18, 2018
FILE No.	13351





Photo 1 – Looking east along the highway over the repaired slide area.



Photo 2 – Looking east along the repaired highway embankment.



Photo 3 – Looking west along the south highway embankment from the east end.



Photo 4 – Looking west along the toe of the repaired south highway embankment, and re-constructed riprap channel leading to the culvert inlet.



Photo 5 – Looking south over the new embankment and culvert inlet area.



Photo 6 – Close-up view of the grass beginning to grow in the bottom of the furrows.



Photo 7 – Looking north through the culvert from the inlet area.



Photo 8 – Looking north across the downstream highway embankment and culvert outlet area.