ASSESSMENT REPORT TITLE PAGE AND SUMMARY

BC Geological Survey
Assessment Report
40573

TITLE OF REPORT: GEOPHYSICAL REPORT on Sawflat Creek

TOTAL COST: $7,940.00

AUTHOR(S): Nicholas Gust
SIGNATURE(S):

NOTICE OF WORK PERMIT NUMBER(S)/DATE(S): STATEMENT OF WORK EVENT NUMBER(S)/DATE(S): 5948195

YEAR OF WORK: 2022

PROPERTY NAME: Sawflat Creek

NAME(S) (on which work was done):

1095732, 1093790, 1095149, 1095735

COMMODITIES SOUGHT: Gold

MINERAL INVENTORY MINFILE NUMBER(S),IF KNOWN:

MINING DIVISION: Cariboo
NTS / BCGS: 093A
LATITUDE: ____52____° ___57_____’ __2.146____"
LONGITUDE: __121_____° ___26_____’ 11.932_____" (at centre of work)

OWNER(S): Fred Lackie

MAILING ADDRESS:
531 Palmer Cres
Warman, SK
S0K 4S1

OPERATOR(S) [who paid for the work]:

Fred Lackie

MAILING ADDRESS:
531 Palmer Cres
Warman, SK
S0K 4S1

REPORT KEYWORDS (lithology, age, stratigraphy, structure, alteration, mineralization, size and attitude. **Do not use abbreviations or codes**)

Proterozoic-Paleozoic, Proterozoic-Paleozoic, Snowshoe Group, Snowshoe Group, Metamorphic rocks, Metamorphic rocks, Paleozoic, Paleozoic, Greenstones, Greenstones, Greenschists, Greenschists, Siltstones, Phyllites, Greywackes, Quartzites, Limestones, Gold, Pyrite

REFERENCES TO PREVIOUS ASSESSMENT WORK AND ASSESSMENT REPORT NUMBERS:

ARIS 15623

TYPE OF WORK IN THIS REPORT	EXTENT OF WORK (in metric units)	ON WHICH CLAIMS	PROJECT COSTS APPORTIONED (incl. support)
GEOLOGICAL (scale, area)			
Ground, mapping			
Photo interpretation			
GEOPHYSICAL (line-kilometres)			
Ground			
Magnetic			
Electromagnetic			
Induced Polarization			
Radiometric			
Seismic	1,800 meters	1095732, 1093790	$7,938.37
Other			
Airborne			
GEOCHEMICAL (number of samples analysed for …)			
Soil			
Silt			
Rock			
Other			
DRILLING (total metres, number of holes, size, storage location)			
Core			
Non-core			
RELATED TECHNICAL			
Sampling / Assaying			
Petrographic			
Mineralographic			
Metallurgic			
PROSPECTING (scale/area)			
PREPATORY / PHYSICAL			
Line/grid (km)			
Topo/Photogrammetric (scale, area)			
Legal Surveys (scale, area)			
Road, local access (km)/trail			
Trench (number/metres)			
Underground development (metres)			
Other			
		TOTAL COST	$7,938.37

GEOPHYSICAL REPORT

Tenure # 1095732, 1093790, 1095149, 1095735

Cariboo Mining Division

Map 093A

DATE OF REPORT
July 29, 2022

REPORT PREPARED BY
Nicholas Gust

CENTER OF WORK
Lat. 52°57'2.146"N , Long. 121°26'11.932"W

Table of Contents

Introduction

From July 18 to July 19, 2022, a geophysical survey was conducted on the Sawflat Creek Property.

The purpose of the survey was to map bedrock and subsurface layers to aid in placer exploration. The main goal was to provide evidence for a possible paleochannel running through the valley.

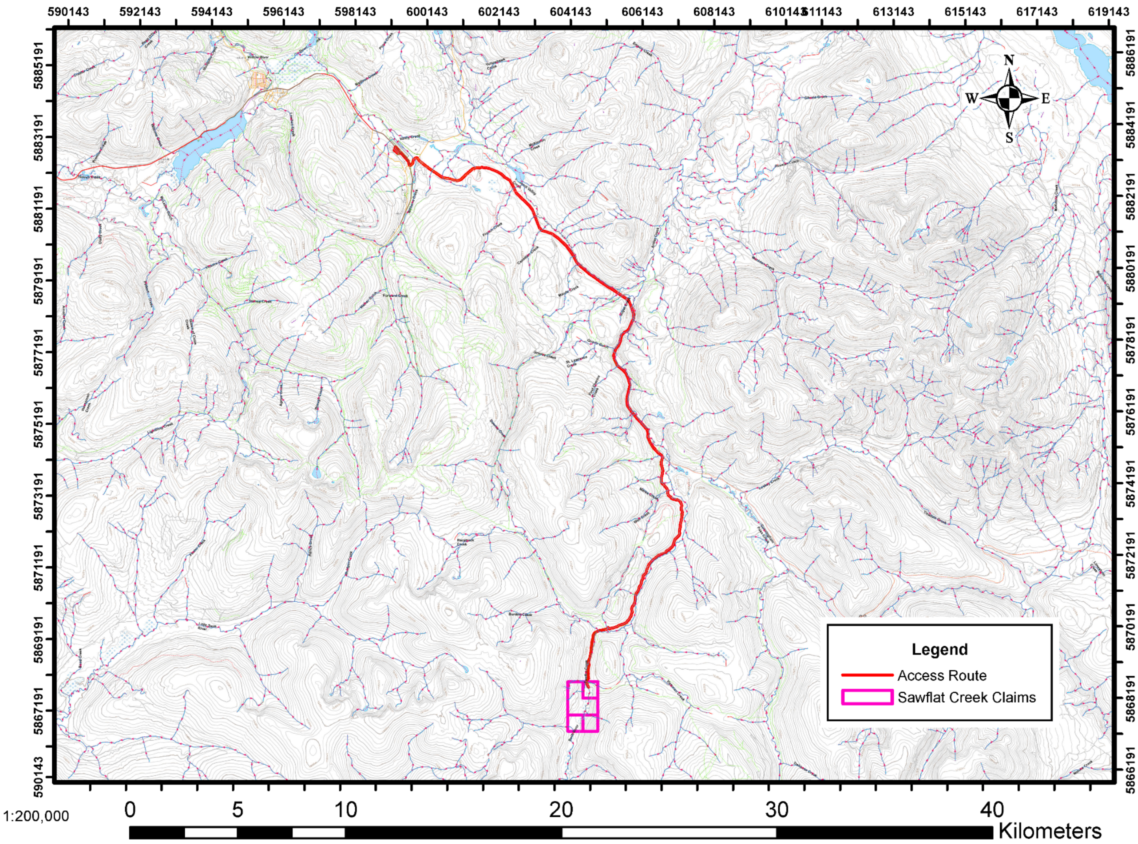
A passive seismic system was utilized in this survey. The instrument that we used records ambient seismic noise and does not require a source. In processing, we used the Horizontal-to-Vertical Spectral Ratio (HVSR) technique to identify bedrock depth over the survey area. The results of the survey provided clear evidence of the paleochannel and provided new targets for future exploration and mining.

The survey was conducted by West Coast Placer. The crew consisted of a three-person team led by Nicholas Gust, who is trained in the application and interpretation of this technique.

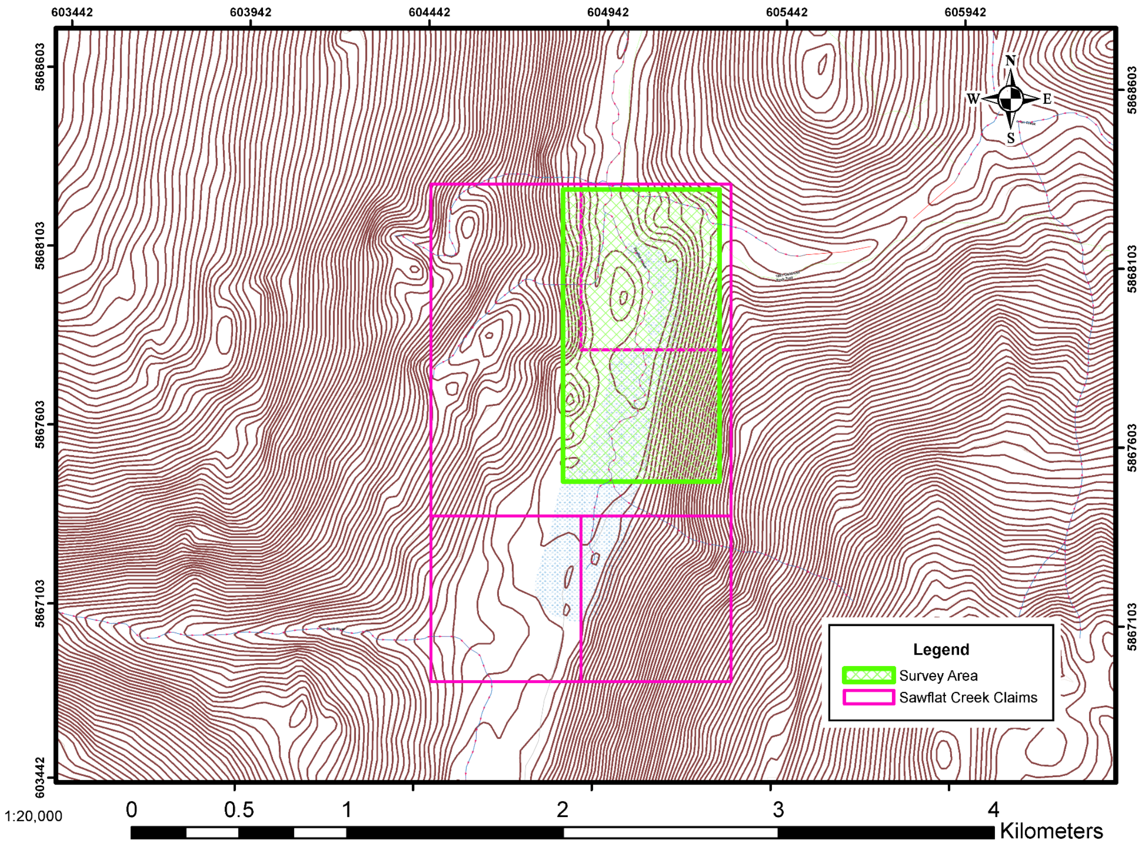
Location and Access

The Sawflat Creek placer claims are located in the province of British Columbia, Canada, in the Cariboo regional district. The Sawflat Creek claims are located approximately 35 kilometers south of the town of Wells, B.C. The 3100 FSR is taken for 12 kilometers then there are unnamed dirt roads that provide access to the claims. Part of the 1861 Gold Rush Pack Trail goes through the claim providing access.

Sawflat Creek 2022 - Access Route



Sawflat Creek 2022 - Claims Overview



Property Description

The property consists of four placer claims, tenure #'s 1095732, 1093790, 1095149, 1095735. The total workable area is 116.7 hectares.

Tenure #	Claim Name	Owner	Area (Ha)
1095732	SAW FLAT VALLEY	141802 (100%)	58.4469
1093790	P SAWMILL	141802 (100%)	19.481
1095149	SWIFT 1	141802 (100%)	19.485
1095735	SAWFLAT	141802 (100%)	19.4849

This area of the Cariboo is within the Quesnel Highland region in east central, British Columbia, which lies between the Cariboo Plateau and the Cariboo Mountains. The ground elevation measured during the seismic survey at the valley bottom was about 1,300 m with nearby ridges reaching elevations of 1,620 meters.

Local vegetation consists of pine, spruce, birch, and poplar forests with thick alder and willow swamps in areas of low relief. This area is underlain primarily by folded schistose rocks with infolds of volcanic and sedimentary rocks

Previous Work

Records of gold mining in the Antler Creek area date back to the earliest history of placer mining in British Columbia. Placer gold was discovered near the mouth of Keithley Creek in July 1860 by an American lawyer named Willaim Ross “Doc” Keithley and his partner Isaiah P. Diller. A year later the whole creek was staked and placer gold was discovered on Keithley, Snowshoe, Little Snowshoe, and French Snowshoe Creeks.

In early 1861 “Doc” Keithley and a small prospecting party including George Weaver, John Rose, and Benjamin MacDonald explored north of the creek over a high plateau (now known as the Snowshoe Plateau). As they made their way down they found gold lying exposed at the surface that had begun to oxidize on a small creek that they named Antler Creek. The party called the partially oxidized gold “sun-burned gold”. By the end of 1861 over 1,200 miners were at work on Antler Creek, the richest deposit discovered in British Columbia up to that point.

The discovery made by the Doc Keithley party in 1861 lies just a couple of kilometers downstream of the confluence of Sawflat Creek and Antler Creek (Bowman, 1888). Extensive work has been done in and around Antler Creek as well as many of its tributaries and the surrounding area, except for Sawflat Creek. The original pack trail between the town of Keithley Creek and Barkerville passes right through the Sawflat Creek claim.

There are very few records of placer exploration in the area surrounding the Sawflat Claim. There are no visual signs of past placer workings either.

Page 63A of the 1932 GSC Summary Report (Johnston, W. A, 1933) states:

> *A little gold is said to have been found in a shaft sunk by Jim Adams many years ago near the head of the flat, but no important deposits have been found. In 1902 Henry Boursin put down, by means of a horsepower drilling rig, a cross section of three bore-holes on Swift River about one-half mile from Littler's cabin. The depths of the holes to bedrock were 31 feet 4 inches, 52 feet 7 inches, and 72 feet. He reported that gold was found in all the holes, but not sufficient to pay for mining.*

Littler's Cabin was located a few kilometers south of the present claim on the old pack trail.

The 1948 Annual Report to the Minister of Mines describes additional drilling on Sawflat Creek:

> *Exploratory work was done during the summer of 1948 for the account Sawflat of A. F. Daily on three leases on Sawflat Creek. The three leases extend south from the junction of Sawflat Creek with Antler Creek. The valley of Sawflat Creek is 300 to 400 feet wide and slopes northward to Antler Creek with a gradient of about 0.75 percent. and was thought to be potential dredging- ground. Seven Keystone drill holes, totaling 303 feet, were put down by Herb Brown, driller, under the supervision of Martin W. Jasper. Three holes in a line about 3,600 feet south of the mouth of Sawflat Creek reached bedrock at depths of 13. 26. and 30 feet. Two holes, 1,000 feet farther south, reached bedrock at depths of 31 and.38 feet, and two holes about 1000 feet farther south at Two Mile Creek on the head of Swift River reached bedrock at 63 and 102 feet depth. All the material encountered was coarse slabby slide-rock and glacial drift. Only a trace of gold and very little black sand was recovered in any hole. The drill holes indicate that the bedrock beneath Sawflat Creek slopes southward on a gradient of about 1.6 per cent., even though.the surface slopes northward toward Antler Creek. This bedrock information provides conclusive proof that in pre-Glacial time. Antler Creek, upstream from Sawmill Flats, flowed down through the valley of Sawflat Creek into the Swift River.*

It has long been theorized that Sawflat creek drained south into the Swift River during pre-glacial times. The 1948 drilling results support this idea.

ARIS #15623 mentions a diamond drill hole that was drilled at the bottom of a placer pit near Sawflat Creek. The drill used was a Boyles BBS-1 diamond drill with AQ size core. The hole was drilled at the bottom of a placer test pit in 1986. The location given in the report is 52° 56’ 30”N, 121° 26’ 30” which is right on the southwest corner of the current claim block. No other information is given about this placer operation.

The area of the current claims was prospected between 2012 and 2015 by Ron Hegel. In his 2013 report (ARIS #34384) Mr. Hegel states that exploration was performed by “two prospectors armed with shovels, picks, gold pans, metal detectors, and Dithizone stock solution”. Hegel didn’t describe much about the results of the program but did state that samples were taken at 50-meter intervals and that gold particle counts increased as they progressed upstream towards the Swift River.

Hegel’s 2015 report was kind of ambiguous. It is assumed that he continued with the same methods but found no evidence of gold.

Regional Geology

Geology of the Cariboo gold district has been presented in reports and maps by Bowman (1889 & 1895), Johnston and Uglow (1926), Hanson (1935), Sutherland Brown (1957), Struik (1988), Levson & Giles (1993), and others.

Bedrock Geology

The Sawflat Creek project lies within the Barkerville Terrane, part of the Omineca Belt of the Canadian Cordillera (Struik, 1986 & 1988). The Barkerville Terrane consists of a late Proterozoic and/or Paleozoic sequence of the continental shelf and slope deposits developed adjacent to the craton of Ancestral North America, and includes clastic sedimentary rocks along with lesser amounts of volcanic rocks and carbonates. It is structurally the lowest exposed stratigraphic sequence in the area and is more deformed and metamorphosed than adjacent terranes.

Rocks of the Snowshoe Group in the Wells area have been metamorphosed to lower greenschist facies, generally of lower metamorphic grade than other sequences in the Barkerville Terrane. The Stevens Gulch area is primarily underlain by bedrock belonging to the Downey and Hardscrabble successions of the Barkerville Terrane.

The Downey consists of green to grey micaceous quartzite, grit, and phyllite, and minor mafic volcanic rocks and limestone. The Hardscrabble unit consists of black phyllite and siltite with volcanic and limestone intervals. These volcanic rocks are altered and schistose (Struik, 1988).

Surficial Geology

A generalized Pleistocene stratigraphy in the Cariboo recognizes thick lowermost gravels deposited during the lengthy cool-temperate non-glacial interval overlain by subglacial deposits from the late Wisconsin glaciation when the area was covered by westward-moving ice flowing from the Cariboo Mountains. Late Wisconsin glaciation was responsible for depositing extensive plugs of lodgement till and related subglacial facies along most valleys. These in turn, have been reworked or buried by postglacial (Holocene) mass-wasting and fluvial activity which has left valley side fan deposits and terraced gravel sequences.

Placer deposits in the Cariboo occur in three distinct sedimentological settings: older gravels, subglacial complexes and postglacial placers

Survey Method and Theory

The passive seismic HVSR method consists of recording ambient or natural seismic energy vibrations using a seismometer. The seismometer must be able to record ground motion in three axes (XYZ), over a broad range of frequencies (0-128 Hz), and over a long time period (1 min to 60 min, usually 20 min).

Traditional seismic surveys use an energy source such as dynamite, or a dropped weight. The HVSR method is very different in that it utilizes ambient vibrations in the surface of the earth. These are considered noise in traditional surveys but in this case, provides the source vibrations.

The ambient signal consists primarily of surface Rayleigh and Love waves, which are generated from natural sources. Sources of ambient vibration are ongoing crustal microtremors, rain, and wind. In more populated areas sources can come from human activities such as traffic movement, construction and factories.

The ambient seismic energy creates seismic resonance within the near-surface strata and regolith. This resonance is a function of the thickness and the shear-wave velocity of the subsurface layers, and is particularly amplified when layers have a strong and sharp acoustic impedance contrast boundary. Acoustic impedance is a function of the density multiplied by the shear wave velocity of a layer. That impedance is how we can identify different layers and their depth.

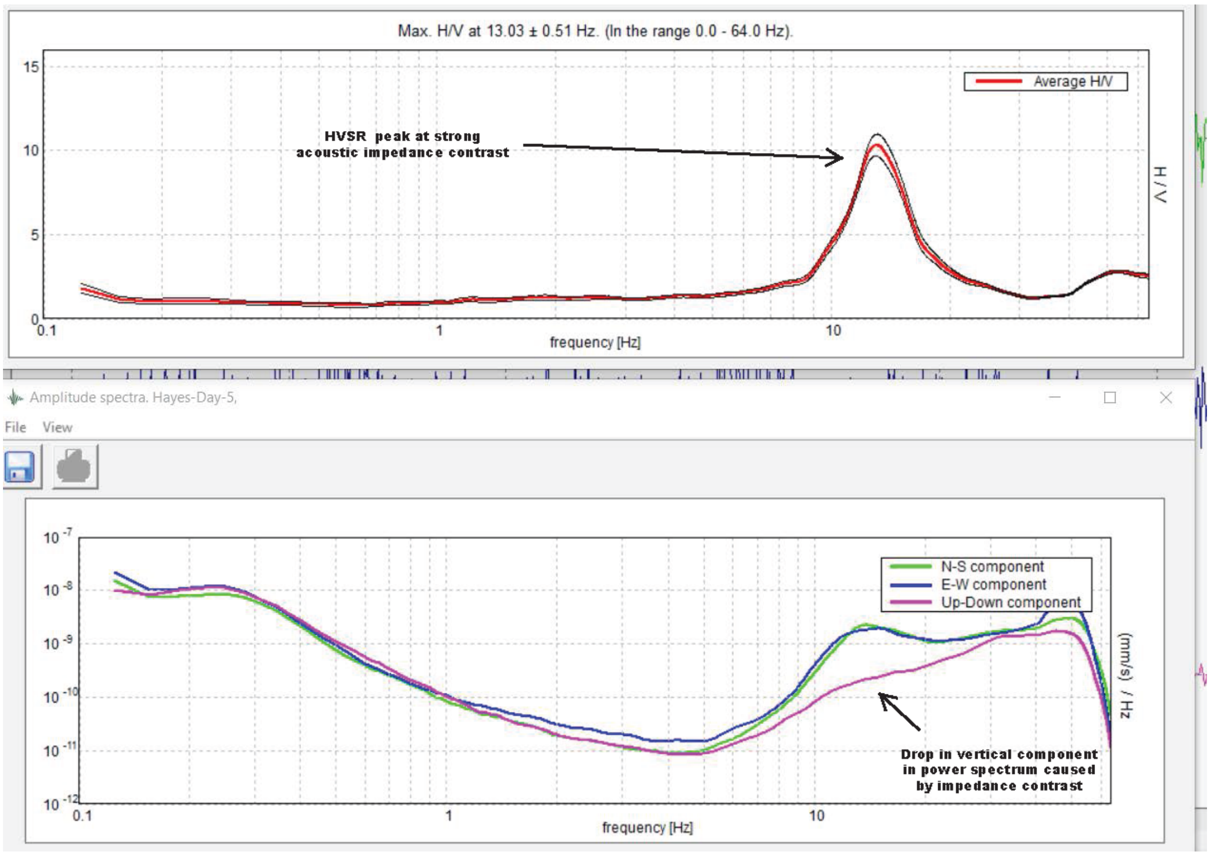
In processing with proprietary software the recorded time-series data (X, Y and Z) is converted to the frequency domain using a Fast Fourier Transform (FFT), and the two components are displayed as a power spectrum.

After the inversion, the horizontal components are usually very similar unless there is strong anisotropy in the near-surface. The Vertical component dips where resonance occurs from trapping by underlying layers. Where the vertical component deviates from the two horizontal components a H/V peak is interpreted. The frequency at which the peak occurs can be used to calculate the depth from surface.

This resonant frequency is related to the thickness and shear wave velocity of the resonant layer by the following equation from Nakamura (2000):

$f_0 = Vs/4h$

where f_0 = peak resonant frequency (Hz), Vs = shear wave velocity (m/s), and h = layer thickness (m). In a two-layered earth model, resonance frequency (f_0) can be used in estimating the overburden thickness (h) using the equation



From processing the data we know the peak resonant frequency but there are still two unknowns. Vs and the thickness (h). In order to accurately calculate the thickness for each location, we need to know the shear wave velocity of the overburden layers. That can be acquired by running a test station at an area of known depth such as a drill hole. Once the velocity is known it is simple to calculate the thickness.

Equipment

The Tromino 3G BLU Seismograph, manufactured by MoHo Science & Technology from Italy was used on this survey. The Tromino works on the HVSR principle, is a very light and portable instrument that records seismic noise in the frequency range of 0.1 to 1024 Hz.

The Tromino is a small (1 dm3, < 1 kg) all-in-one instrument, equipped with:

- 3 velocimetric channels (adjustable dynamic range)
- 3 accelerometric channels
- 1 analog channel
- GPS receiver

The Tromino does not require cables or a source and acts as a standalone geophysical instrument.

A Reach RS2 multi-band RTK GNSS receiver, manufactured by Emlid was used to record spatial information for computer mapping. Some of the specs are here below:

- Dimensions: 126x126x142 mm
- Weight: 950 gram
- Ingress protection: IP67
- Corrections: NTRIP, VRS, RTCM3
- Position output: NMEA, LLH/XYZ
- Positioning kinematic horizontal: 7 mm + 1 ppm
- Positioning kinematic vertical: 14 mm + 1 ppm
- GNSS signals tracked: GPS/QZSS L1C/A, L2C, GLONASS L1OF, L2OF, BeiDou B1I, B2I, Galileo E1-B/C, E5b

Number of channels: 184

Survey Procedure

Station spacing was set at 30m for the survey lines. A 30m rope was used to layout the survey lines using two people. Line locations were chosen in advance in GIS software and layed out in the field using a handheld GPS. Each station was marked with a pin flag and recorded on the GPS for processing.

Each reading takes 20 minutes, which allows for sufficient data collection to be modeled in the interpretation software. It is important for the seismometer to have good contact with the ground. At most stations, it was necessary to remove the vegetative mat and expose soil/subsoil that the instrument can be planted into.

The seismometer used in this survey is extremely sensitive since it’s designed for picking up faint, ambient energy in the earth. The trade-off is that it is also sensitive to sources of noise.

Station data is stored on the device and downloaded each day to check for data quality. Initial processing was completed in the evening each day. To estimate the shear wave velocities seismic data was recorded at several of the drill hole locations that were completed in previous years. Those velocities were used to satisfy the equation above and calculate the layer thicknesses.

Processing and Interpretation

Each station is processed independently using proprietary software that utilizes the HVSR method described above. Each trace is analyzed for quality and if necessary noisy sections can be removed using a windowing technique. There were two stations that had too much noise and had to be repeated but most were below the noise threshold or able to be cleaned up.

The coordinates and calculated bedrock depth are populated into a CSV file to be gridded. Surfer software was used for gridding the data and the resulting vector data can be used in GIS software such as ArcMap.

The final data is presented as a topographical map showing the difference between surface and bedrock elevations.

Interpretation

Cross Sections

Line 1 is at the northern edge of the claim block. There was an anomalous deep spot at station L1S7 that appears to be part of a paleochannel. The bedrock slopes up hill on both sides of the valley. Station L1S1 showed thicker overburden and deeper bedrock.

Line 2 is about 200m south of Line 1. The western portion of the line showed shallow bedrock which got progressively deeper on the east side of the valley through stations L2S6 - L2S9. Stations L2S10 and L2S11 marked the edge of the paleochannel with thin bedrock sloping uphill.

Line 3 is 200m south of Line 2. The east part of the line showed shallow bedrock up the slope from the valley bottom. The flat section from L3S3 to L3S6 showed a clearly defined paleochannel in the valley bottom. Stations L3S7 - L3S9 exhibit a bedrock high point followee by a second deep channel at stations L3S10 and L3S11.

Line 4 showed a broader paleochannel from stations L4S4 to L4S8, with the deepest part at L4S8 (20 meters from surface). The east side of the line showed shallow bedrock sloping uphill out of the valley bottom.

Line 5 showed a similar profile to line 4. Deep bedrock was shown in the valley bottom from stations L5S3 to L5S6. The surface is completely flat in this section while the bedrock varies significantly. The deepest part of the channels is at station L5S5 at 36 meters deep.

Line 6 also showed a similar profile with shallow bedrock on the edges of the valley and deep bedrock in the middle. This line is a great example of a paleovalley with flat surface elevation and bedrock coming to a point in the middle of the valley. The gutter of the channel is at station L6S4 at 33 meters from surface.

Conclusion

The seismic survey was successful in highlighting deep areas in the bedrock that are consistent with the shape of a bedrock paleochannel. The surface of the valley bottom is perfectly flat in some areas while the bedrock forms a valley below. The results of this survey suggest that the Sawflat valley hosts a preglacial channel that was filled in with sediment duing the recent glacial periods.

The survey was successful in providing a better understanding of the buried paleochannels in this area. It is recommended to conduct further seismic exploration to map more of the channel and test the deep areas for gold values with a sonic or RC drill.

Costs

Personnel	Days/QTY	Rate	Subtotal
Geophysical Technician - Nicholas Gust	2	$900.00	$1,800.00
Equipment Costs	2	$600.00	$1,200.00
Field Assistant - Fred Lacie	2	$500.00	$1,000.00
Field Assistant - Mike Mann	2	$500.00	$1,000.00
Transportation (2 trucks) + quad	2	$270.00	$540.00
Food	2	$150.00	$300.00
Data Processing and Interpretation	1	$600.00	$600.00
Report Writing	1	$250.00	$250.00
Accommodation	2	$200	$400.00
Mob/Demob Costs	1307.69	$0.65	$850.00
Total			$7,940.00

References

Nakamura, Y., 2000, Clear identification of fundamental idea of Nakamura's technique and its applications, Proc. 12WCEE, No. 2656, 177–402.

Holland, S.S., 1950, Placer gold production of British Columbia: British Columbia Geological Survey, Bulletin 28, 89 p.

Bowman, A. Geological Survey of Canada, Annual Report vol. 3, (1887-1888), pt. C, 1888

Johnston, W. A, 1933, Placer and vein gold deposits of Barkerville, Cariboo District, British Columbia; Geological Survey of Canada Summary Report 1932, pt AI

British Columbia Ministry of Mines Annual Report for 1874.

Myers, W., 1986, GEOLOGICAL REPORT AND LOG OF DIAMOND DRILL HOLE #3 on the CHERYL MINERAL CLAIM, AR15623

Statement of Qualifications

I, Nicholas Gust, of the city of Mission, in the province of British Columbia do hereby certify that:

1. I am a graduate of the University of Calgary with a B.Sc.in Geophysics. I am also a graduate of the Southern Alberta Institute of Technology and hold a diploma in Exploration Technology.

2. I have received training from the manufacturer of the instrument used in this survey in the application of field techniques and interpretation.

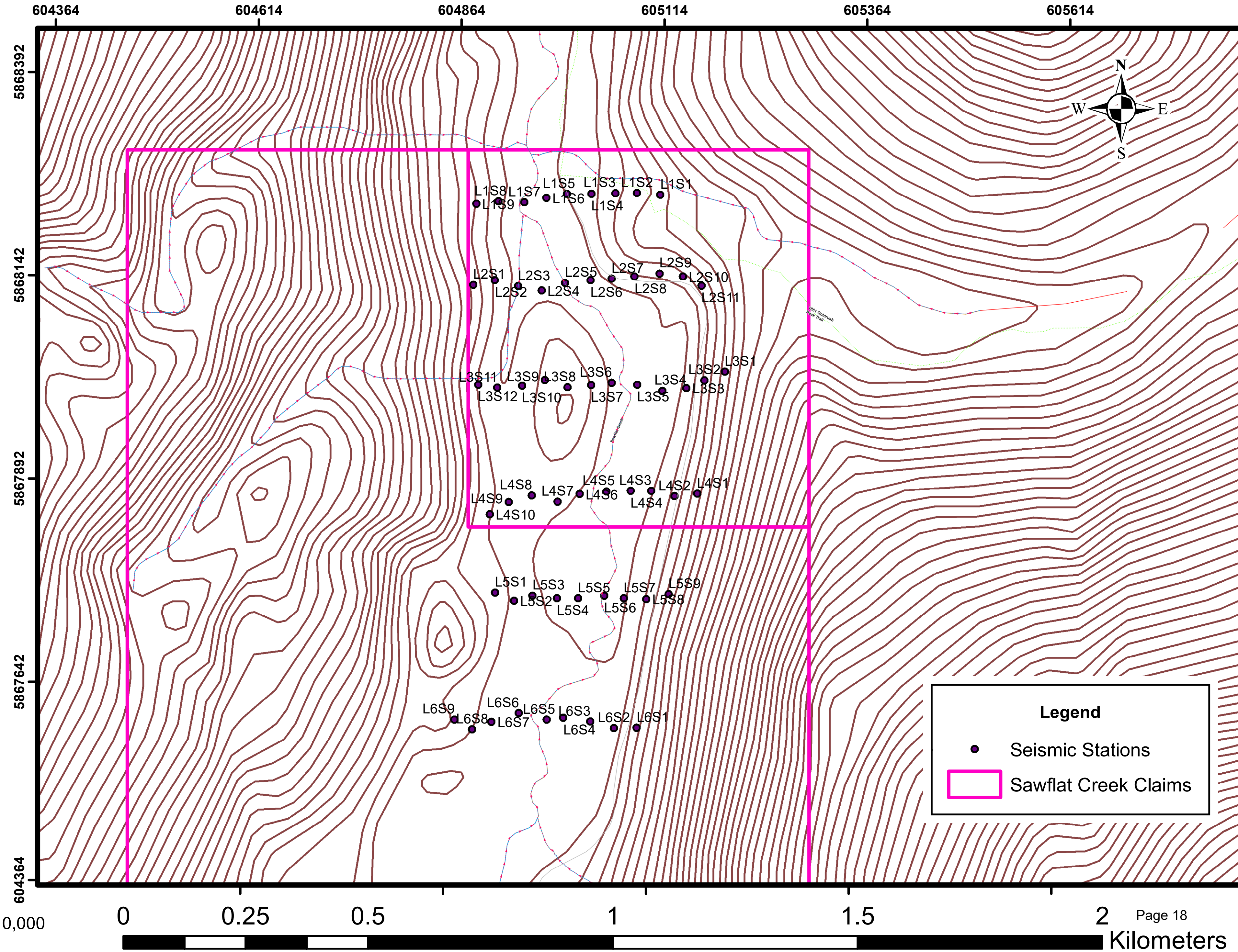
3. I have worked in the exploration industry and have been conducting geophysical surveys since 2008.

4. This report is compiled and interpreted from data obtained from a passive seismic survey carried out under my field supervision.

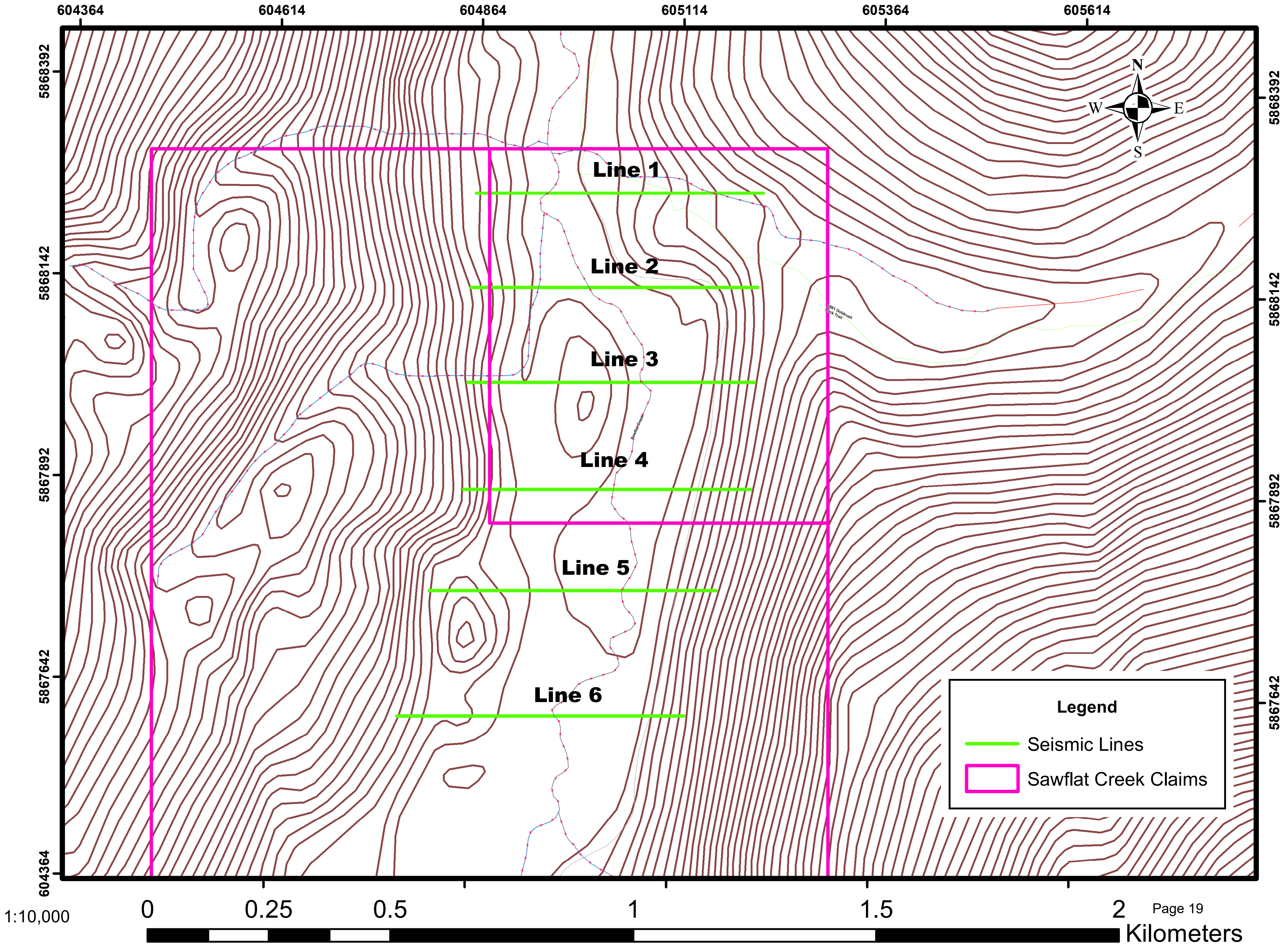
5. I have based the conclusions and recommendations contained in this report on my knowledge of geophysics, my previous experience, and the results of the field work conducted on the property.

Appendix I:
Maps and Data

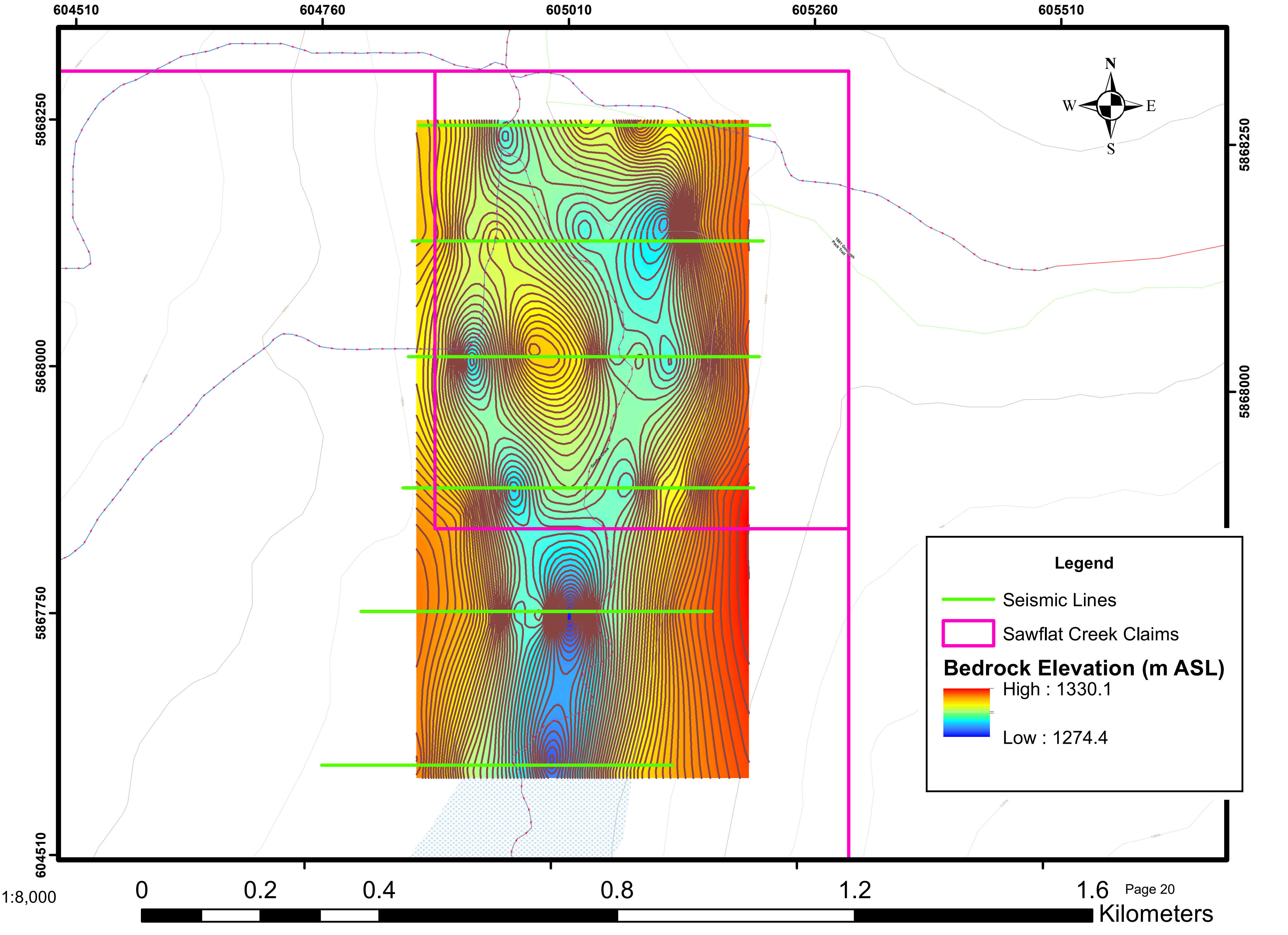
Sawflat Creek 2022 - Seismic Stations



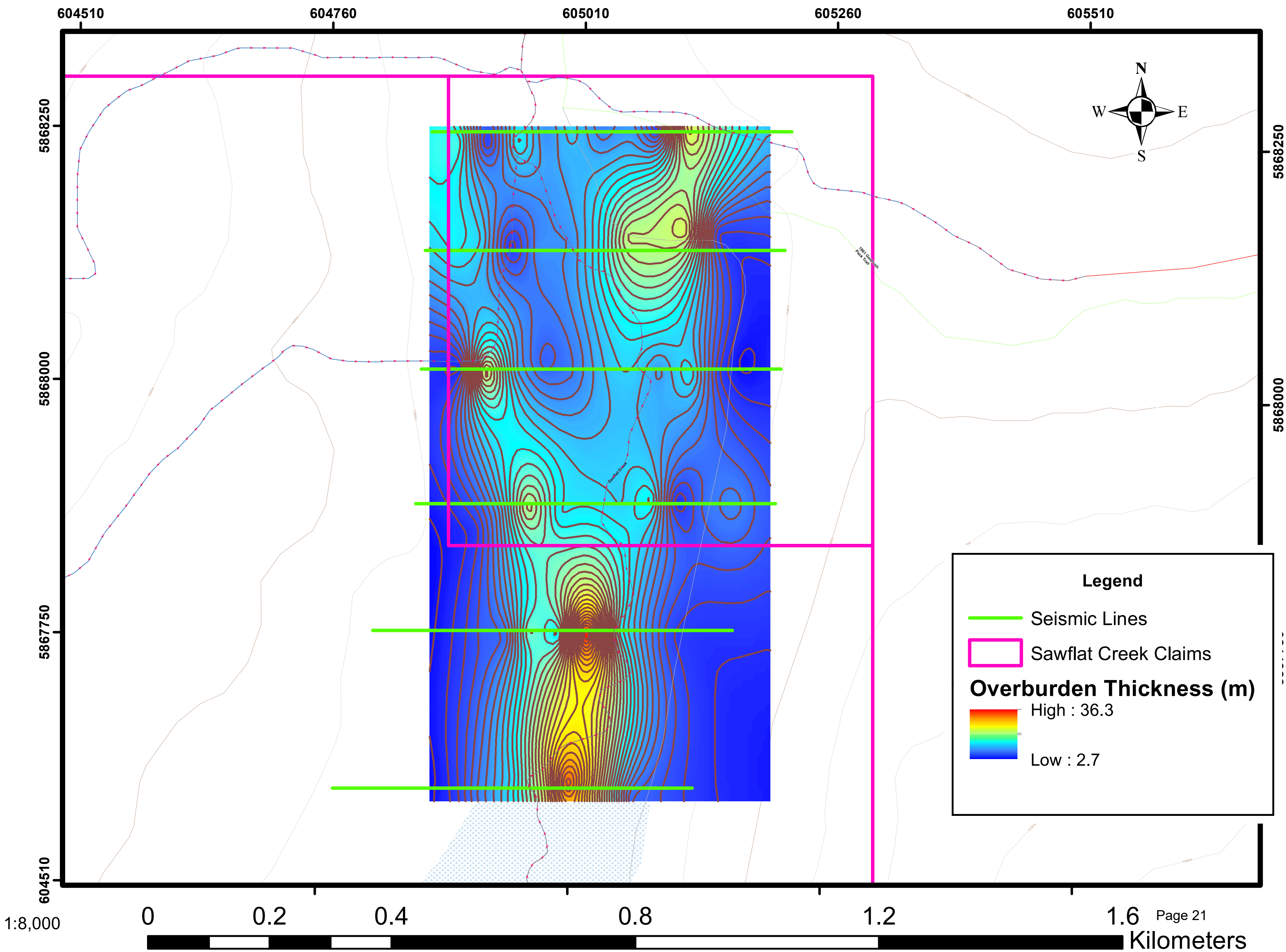
Sawflat Creek 2022 - Seismic Lines



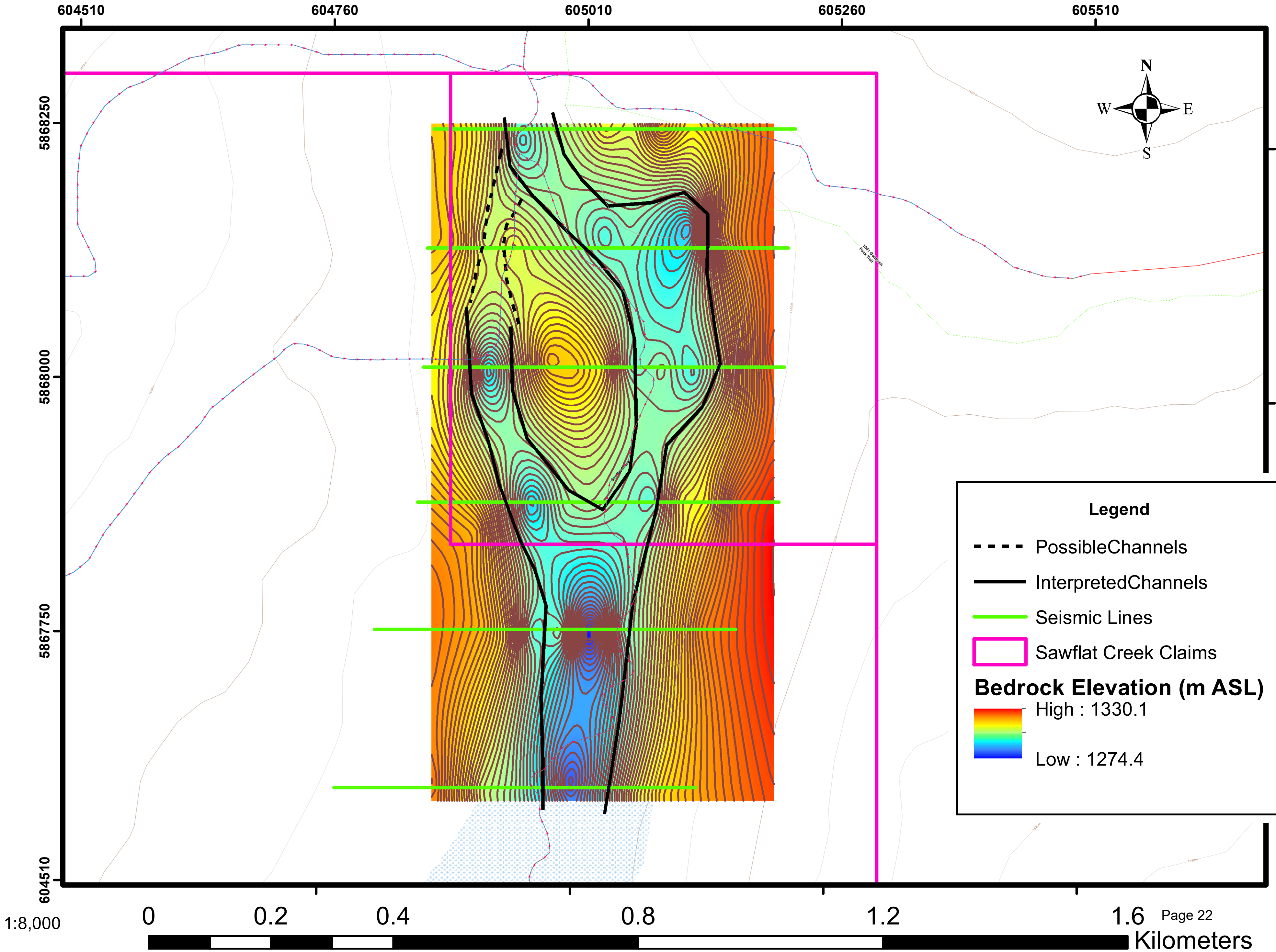
Sawflat Creek 2022 - Bedrock Elevation



Sawflat Creek 2022 - Overburden Thickness



Sawflat Creek 2022 - Interpreted Channels

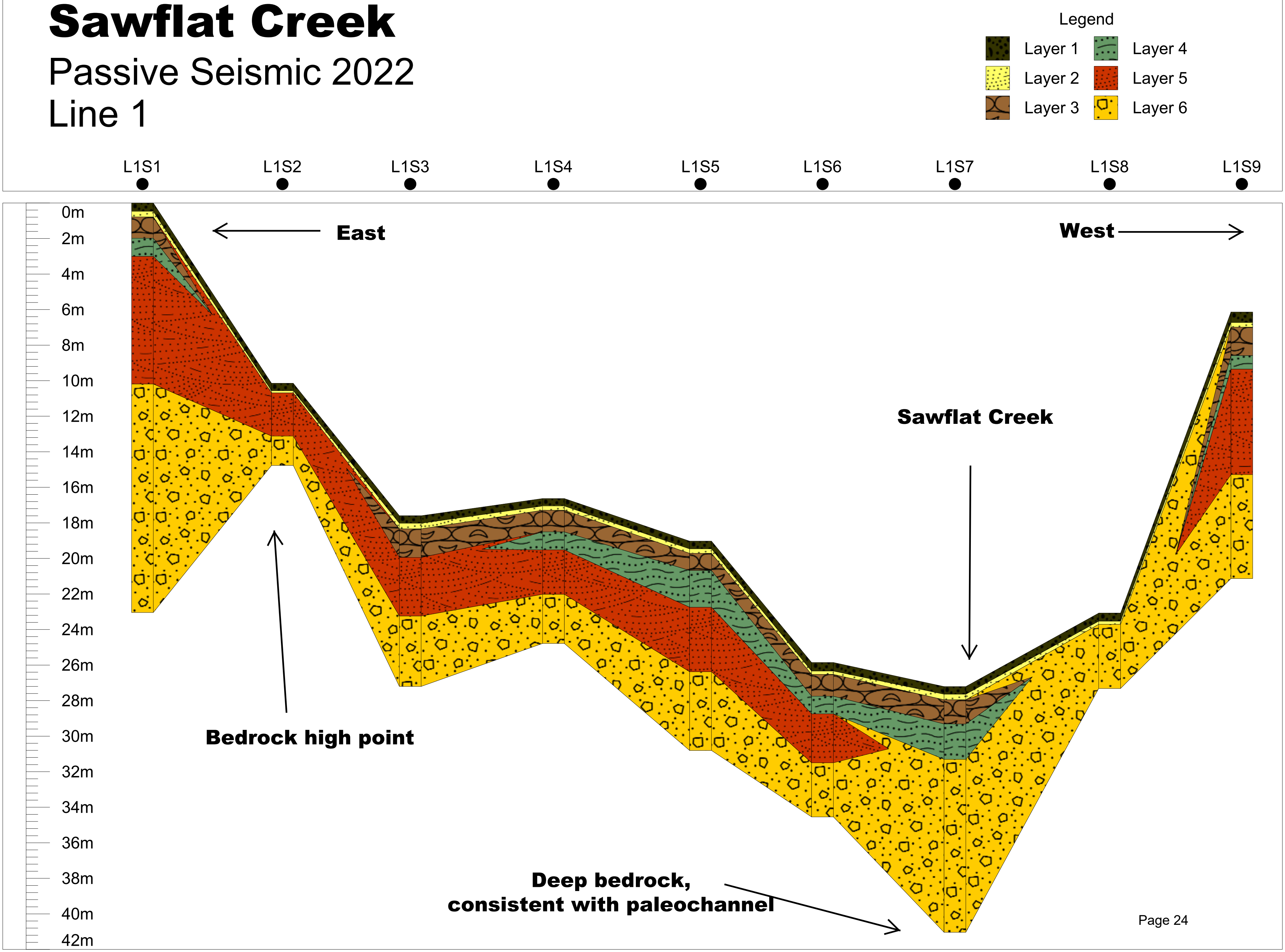


Appendix II:
Cross Sections

Sawflat Creek

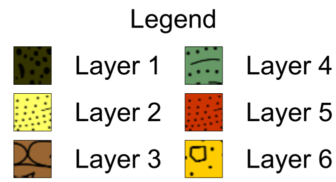
Passive Seismic 2022

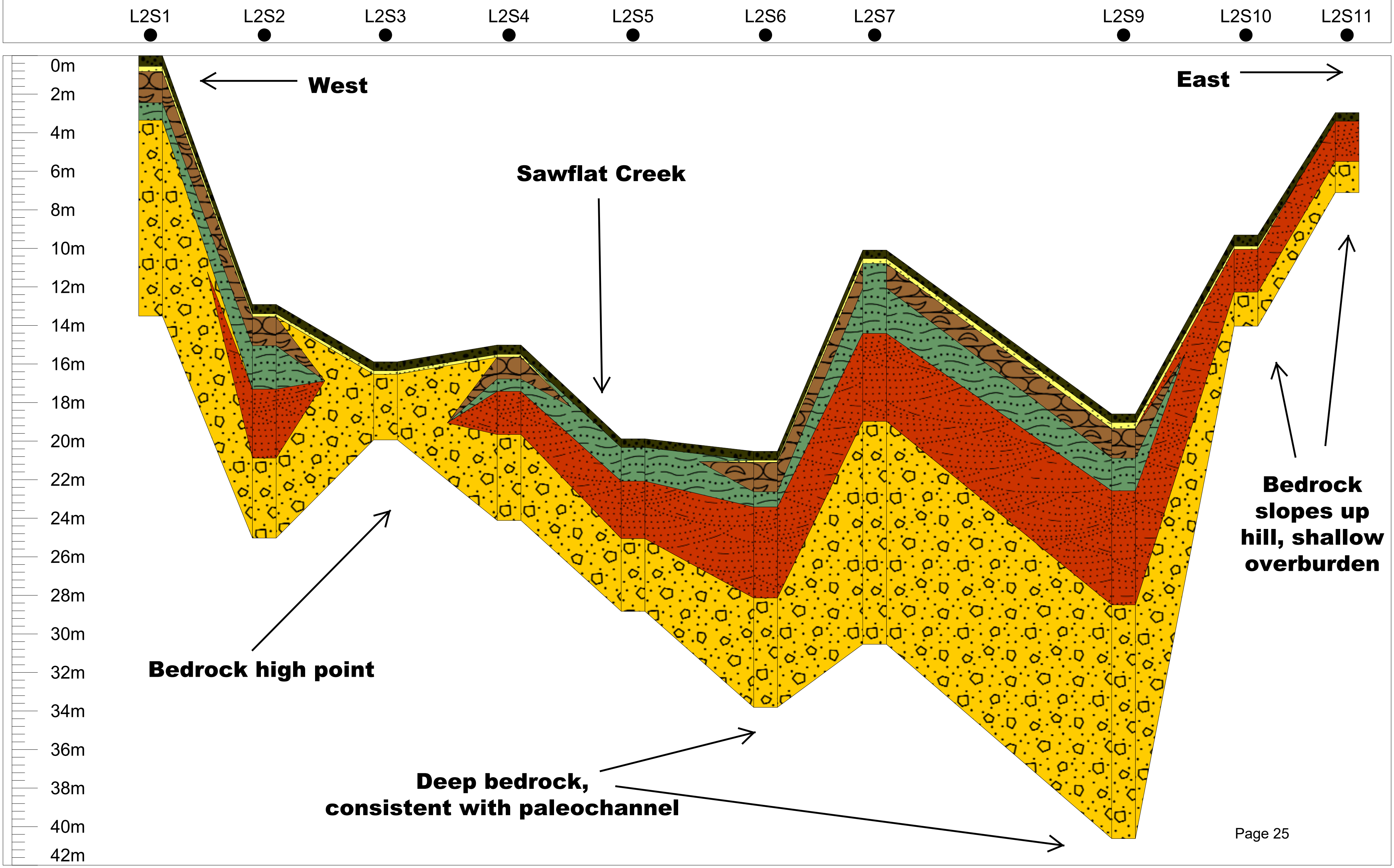
Line 1

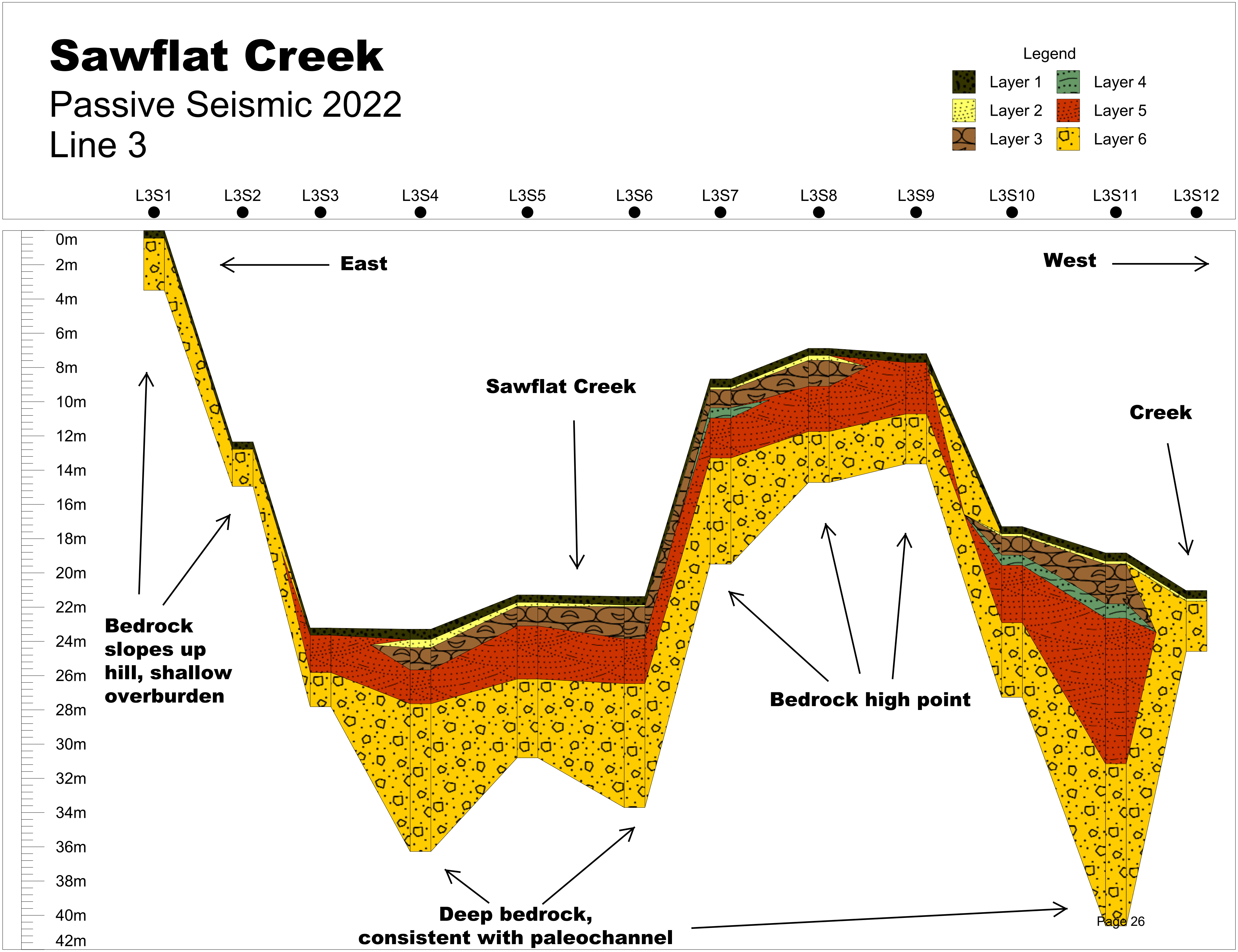


Sawflat Creek

Passive Seismic 2022
Line 2



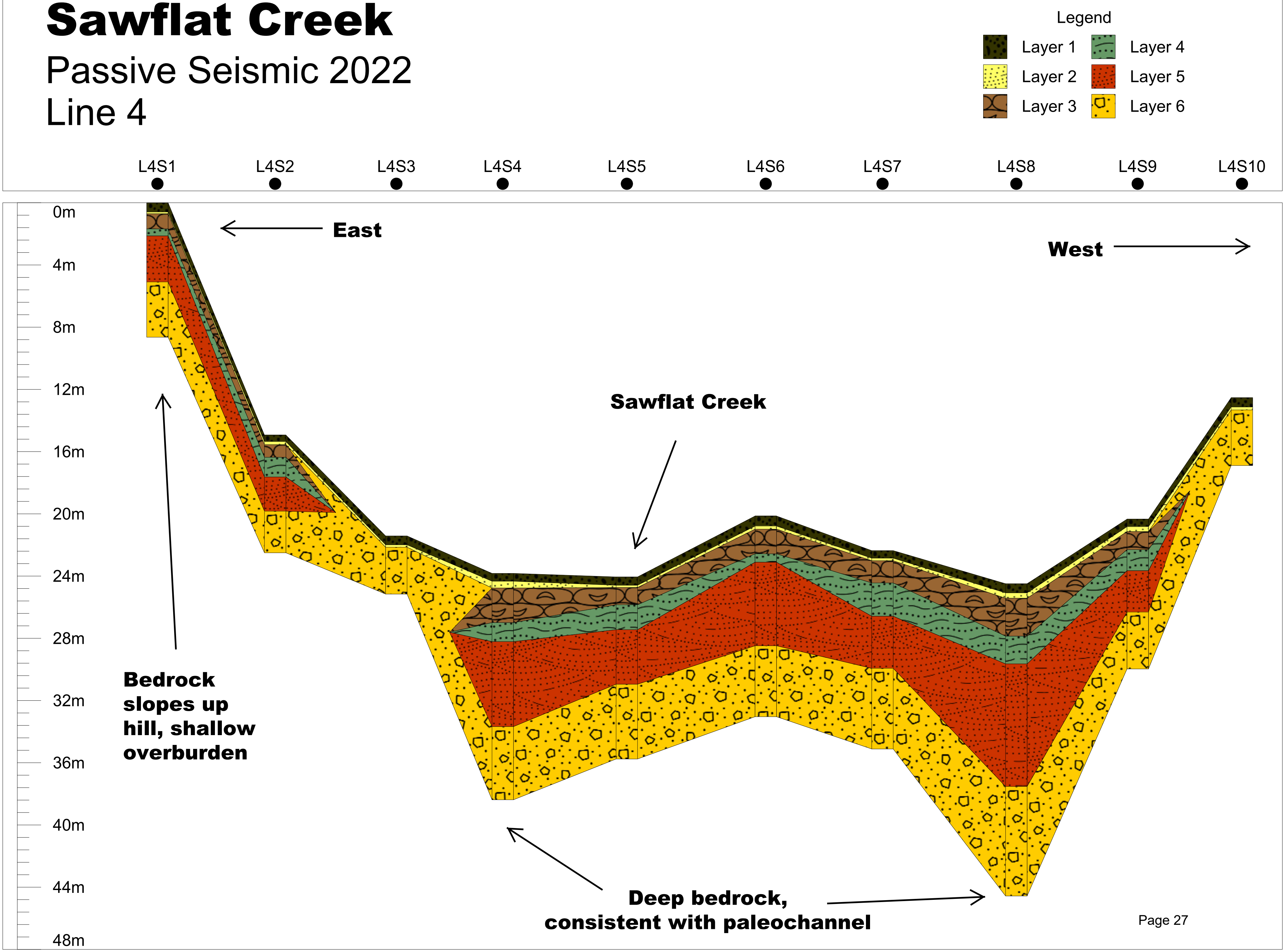




Sawflat Creek
Passive Seismic 2022
Line 3
Legend
Layer 1
Layer 2
Layer 3
Layer 4
Layer 5
Layer 6
L3S1
L3S2
L3S3
L3S4
L3S5
L3S6
L3S7
L3S8
L3S9
L3S10
L3S11
L3S12
East
West
Sawflat Creek
Creek
Bedrock slopes up hill, shallow overburden
Bedrock high point
Deep bedrock, consistent with paleochannel

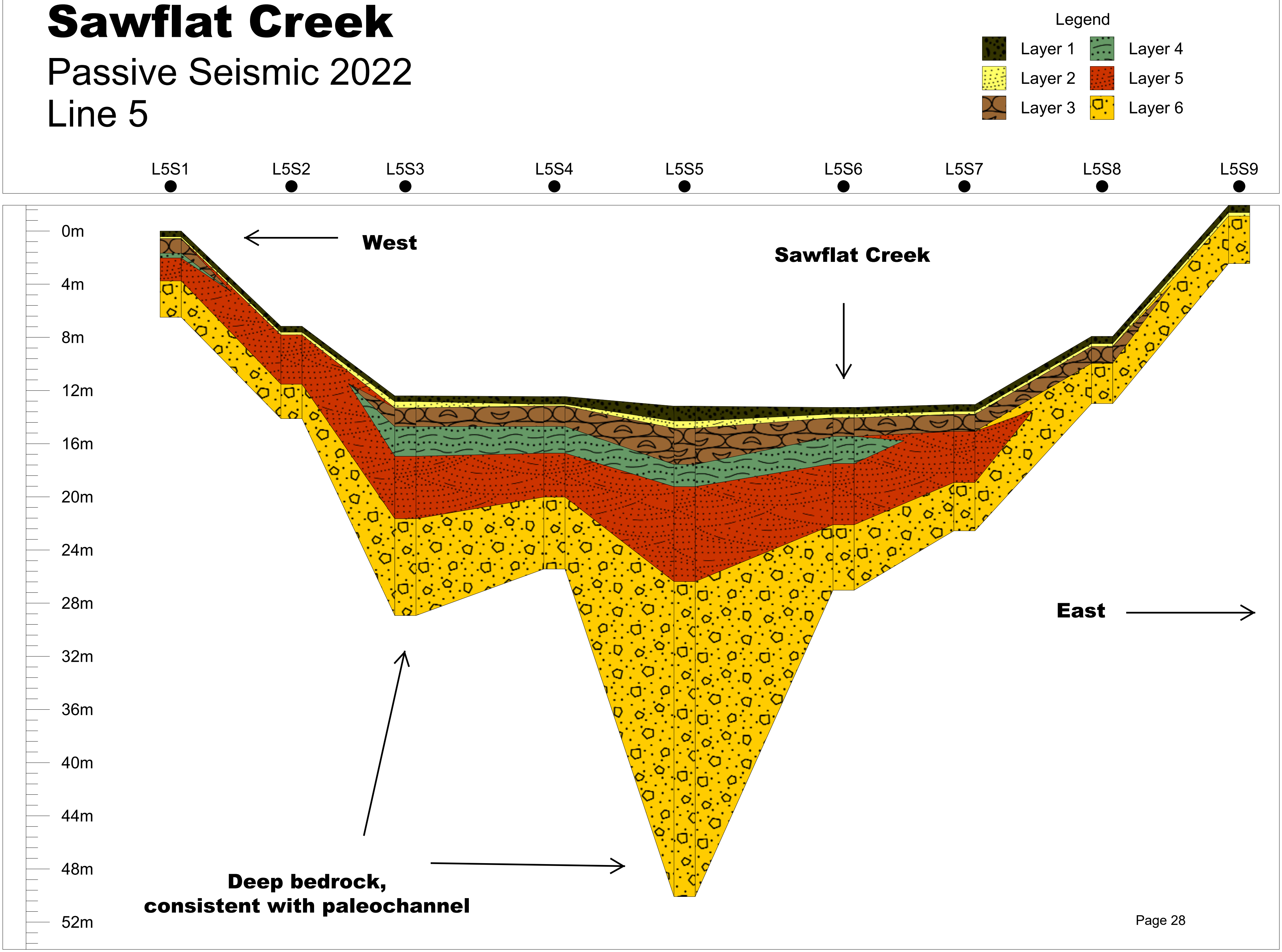
Sawflat Creek

Passive Seismic 2022
Line 4



Sawflat Creek

Passive Seismic 2022
Line 5



Sawflat Creek

Passive Seismic 2022

Line 6