COAL ASSESSMENT REPORT TITLE PAGE AND SUMMARY

TITLE OF REPORT:
Coal Assessment Report for Hermann Area 'A', Mt. Hermann area, British Columbia

TOTAL COST: $228,794.72 (for tenure 417327)

AUTHOR(S): **C.G. Cathyl-Huhn P.Geo**
SIGNATURE(S):
NOTICE OF WORK PERMIT NUMBER(S)/DATE(S): **CX-9-9 / February 11, 2019**

YEAR OF WORK: **2019-2020 licence term** REPORT DATE: **January 26, 2022**

PROPERTY NAME: **Hermann Project (164053)**

COAL LICENSE(S) AND/OR LEASES ON WHICH PHYSICAL WORK WAS DONE: **Coal Licences 417036 (Peace River Coal) and 417327 (Conuma Resources)**
[note: costs and statistics are given for tenure 417327 only]

MINERAL INVENTORY MINFILE NUMBER(S), IF KNOWN: **93P 031**
MINING DIVISION: **Liard (Peace region)**
NTS / BCGS: **NTS 93I/14 and 93P/3 BCGS 093P.004 and 093I.094**
LATITUDE: **55° 00' 04.5" N**
LONGITUDE: **121° 08' 50.5" W** (at centre of work)
UTM Zone: **10N** EASTING: **618500** NORTHING: **6096500**

OWNER(S): **Conuma Resources Limited**
MAILING ADDRESS: **200-235 Front Street, Tumbler Ridge, B.C. V0C 2W0 Canada**

OPERATOR(S): **Conuma Resources Limited**
MAILING ADDRESS: **200-235 Front Street, Tumbler Ridge, B.C. V0C 2W0 Canada**

REPORT KEYWORDS
geotechnical drilling, hydrogeological drilling, Cruiser Formation, Goodrich Formation, Hasler Formation, Boulder Creek Formation, Hulcross Formation

REFERENCES TO PREVIOUS ASSESSMENT WORK AND ASSESSMENT REPORT NUMBERS:
Coal Assessment Report 950, 999, and 1057 (principal references); also Reports 515, 609, 614, 616, 617, 618, 724, 739, 746, 753, 910, 942, 1057, and 1059.

SUMMARY OF TYPES OF WORK IN THIS REPORT		EXTENT OF WORK (in metric units)	ON WHICH TENURES
GEOLOGICAL (scale, area)			
	Ground, mapping	**none**	**not applicable**
	Photo interpretation	**none**	**not applicable**
GEOPHYSICAL (line-kilometres)			
	Ground (Specify types)	**none**	**not applicable**
		none	**not applicable**
	Airborne (Specify types)	**none**	**not applicable**
		none	**not applicable**
	Borehole	**none**	**not applicable**
	Gamma -- none	**none**	**not applicable**
	Resistivity -- none	**none**	**not applicable**
	Caliper -- none	**none**	**not applicable**
	Deviation -- none	**none**	**not applicable**
	Dipmeter -- none	**none**	**not applicable**
	Other -- none	**none**	**not applicable**
	Other -- none	**none**	**not applicable**
	Core **-- 13 sonic geotechnical boreholes**	**157.4 metres**	**417327**
	Non-core -- **6 rotary hydrological boreholes**	**333.78 metres**	**417327**
SAMPLING AND ANALYSES			
Total number of samples**: nil**			
	Proximate (including sulphur and s.g.)	**none**	**not applicable**
	Free swelling index (FSI)	**none**	**not applicable**
	Light transmittance (oxidation test)	**none**	**not applicable**
	Ultimate	**none**	**not applicable**
	Gieseler fluidity (ddpm)	**none**	**not applicable**
	Ash chemistry (mineral analysis of ash)	**none**	**not applicable**
	Petrographic (maceral determination)	**none**	**not applicable**
	Vitrinite reflectance	**none**	**not applicable**
	Coking	**none**	**not applicable**
	Wash tests (**float-sink tests**)	**none**	**not applicable**
PROSPECTING (scale/area)		**none**	**not applicable**
PREPARATORY/PHYSICAL		**none**	**not applicable**
Line/grid (km)		**none**	**not applicable**
Trench (number, metres)		**none**	**not applicable**
Bulk sample(s)		**none**	**not applicable**

1 Table of contents

1.1 List of tables

1.2 List of maps

2 Introduction and situation

This report, titled *Coal Assessment Report for Hermann Area 'A', Mt. Hermann area, British Columbia*, presents results of a multi-phase drilling programme conducted during the 2019-2020 work term by Conuma Coal Resources Limited (Conuma), now under the corporate name of Conuma Resources Limited (likewise referred to as Conuma). The report has been submitted by Conuma in keeping with obligations under the *Coal Act* and the *Coal Act Regulation*.

2.1 Terms of reference of this report

The subject of this report is geotechnical and hydrogeological drilling conducted during the 2019-2020 tenure term, within Conuma's coal licence 417327 ('on-tenure' work within Area 'A' of the Hermann property) and Peace River Coal's adjoining coal licence 417306 ('off-tenure' work), in support of a mine permit amendment for a planned open pit. The mine permit amendment application is, at time of writing this report, undergoing the provincial mine review process. Work within tenure 417036 was undertaken subject to an access agreement between Peace River Coal and Conuma Coal Resources Limited.

2.2 Property description

The Hermann coal property consists of provincially-granted Crown coal tenures comprising thirteen Coal Licences, numbered 383180-383183, 405136-405142, 417327, and 417485. All tenures are contiguous, with no freehold inholdings or adjacencies. Tenure 417327 is informally referred to as Area 'A' of the Hermann property. Tenure 417036, adjoining tenure 417327 (**Map 2-2**), is owned by Peace River Coal, and is not part of Conuma's holdings.

An application to convert coal licences 383180, 383181, 383182, 383183, 405139, 417327, and 417485 into a coal lease was submitted by Conuma in October of 2019. At the time of this report's writing, the application is still being considered by the Crown.

2.3 Property history

The Hermann coal licences were awarded by the Crown to Western Canadian Coal Corp. (WCCC) between the years 2000 and 2006, and subsequently acquired by Walter Energy Inc. and associated firms – including the Walter Canadian Coal Partnership (WCCP) – in the course of a corporate merger in 2011. In 2016, WCCP's ownership of the Hermann property was transferred to Conuma Coal Resources Limited, as part of a regional-scale purchase of WCCP's tenures.

2.4 Current physical work

Current physical work (during the 2019-2020 work term) within tenure 417327 (Area 'A' of the Hermann coal licences), and also within adjoining tenure 417036 (held by Peace River Coal, and accessed by agreement) comprises the drilling of 38 boreholes with total length of 700.82 metres. Of these boreholes:

- current 'on-tenure work within Conuma's tenure 417327 comprises the drilling of 19 boreholes, none of which approached known or potential coal-measures, with a total length of 491.18 metres; and
- off-tenure work within Peace River Coal's tenure 417036 comprises the drilling of 19 shallow boreholes during the 2019-2020 work term, with a total length of 209.74 metres. None of these boreholes approached known or potential coal-measures.

Positions, depths, and details of boreholes are reported within **Tables 2-3, A-1**, and **A-2**. **Appendix A** presents construction details of boreholes drilled during the 2019-2020 work term. This appendix lacks geophysical logs, as geophysics was not run within the study area during the 2019-2020 term.

Estimated on-property cost of exploratory work on tenure 417327 during the 2019-2020 work term is $228,794.72, for a unit cost of $465.81 per metre drilled. Estimated costs of off-property work on tenure 417036 (held by Peace River Coal) is $105,592.31, for a unit cost of $503.45 per metre drilled. Further discussion of costs is presented within **Chapter 7** of this report, and summarised in **Tables 7-1** through **7-3**.

Coal Assessment Reports 950, 999, and 1057 (CAR-950, -999, and -1057) are the primary background reference sources for the present report, and the interested reader is directed there to obtain a more detailed recounting of the broader geological setting of the Hermann coal property, including details of the Falher coal-measures which host the majority of the mineable coal.

2.5 Location and access

General location of the Hermann coal property is depicted within **Map 2-1** and **Map 2-2**, and coal tenure of the property's Area 'A' (**Table 2-1**) is depicted in relation to the local topographic setting of the Hermann coal property as **Map 2-3**.

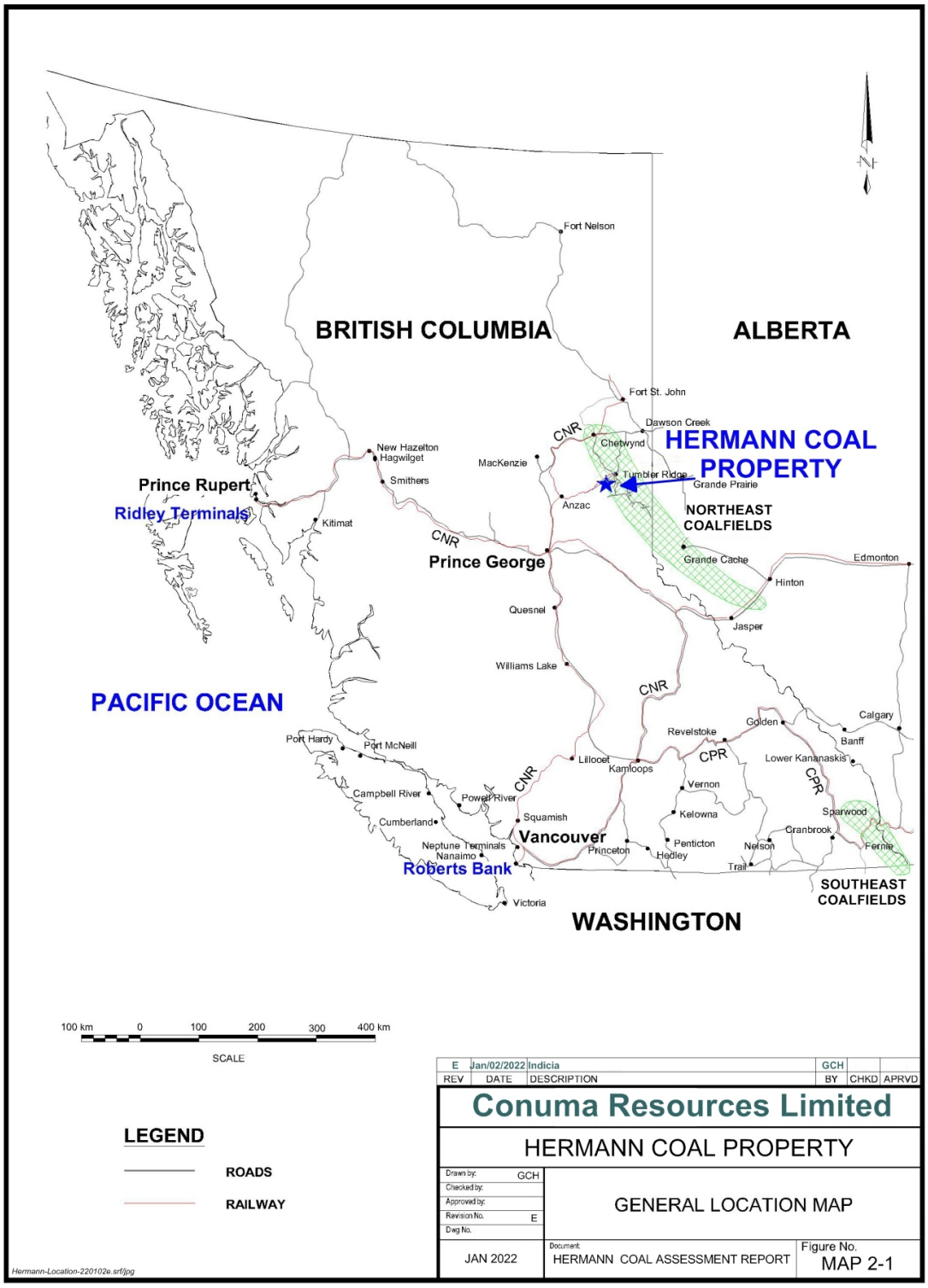
Area 'A' of the Hermann property is accessible via all-weather highways and roads, at a driving distance of 128 kilometres south from Chetwynd town, and 33 kilometres southwest from Tumbler Ridge town, within map-areas 93 P/03 and 93I/14 of Canada’s National Topographic System.

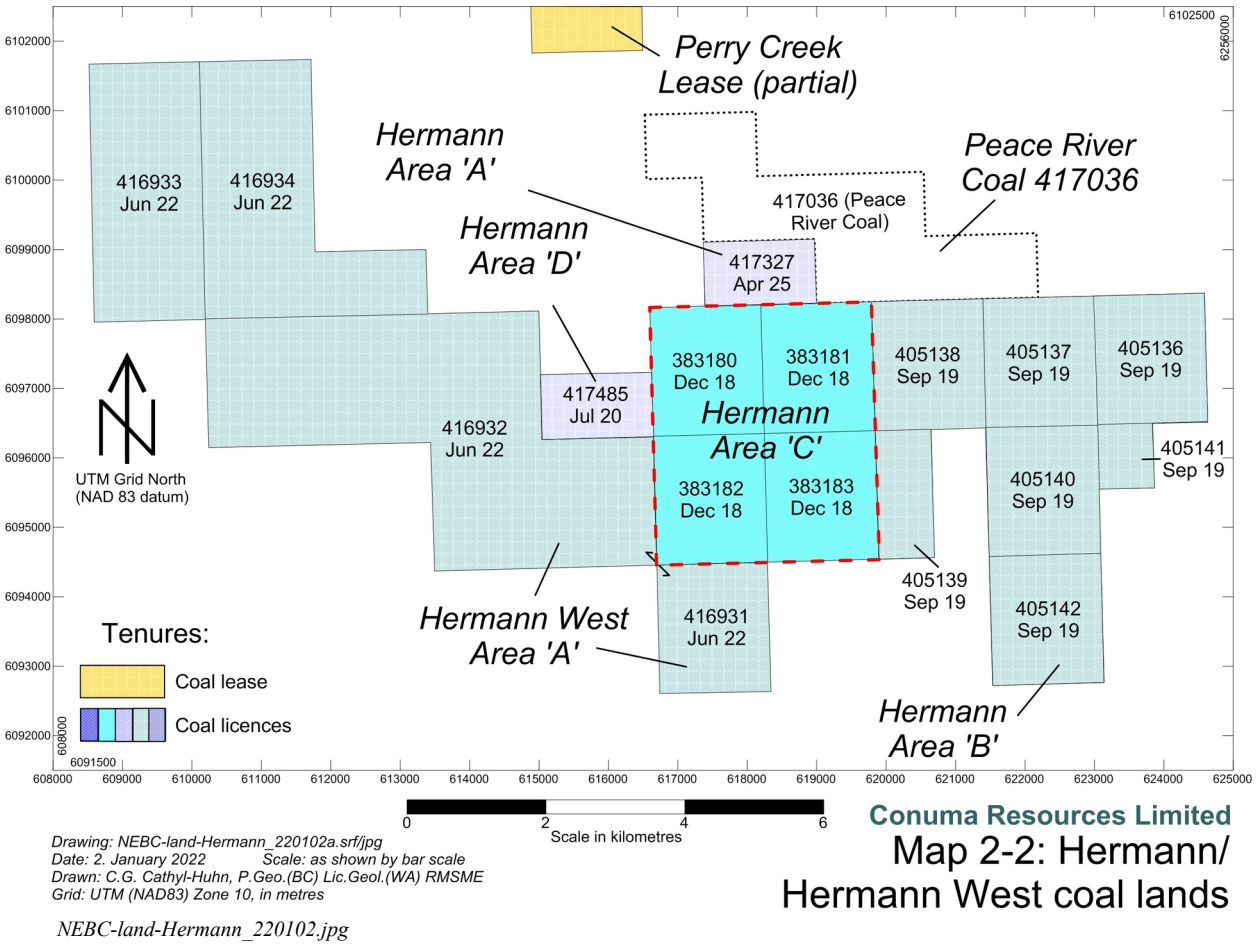
Highway access is via route BC-29, connecting Chetwynd to Tumbler Ridge, thence southward 15 kilometres on route BC-52E. From a well-marked junction at this point, access is via the first 9 kilometres of the Murray River Forest Service Road (FSR), which skirts the southern side of Teck Corporation’s mothballed Quintette coal-washery, thereafter passes through two culverted underpasses (signposted as 'tunnels') beneath Quintette’s former coal-haulage roads, and then crosses the Murray River.

Immediately past the river-crossing, Quintette’s Mesa coal-haulage road, now signposted as the Mast Creek Road (with radio call-name of 'Mast') extends a further 9 kilometres westward to its crossing with the non-status Nabors Road, which extends southward into Area 'A' of the Hermann coal property (as highlighted on **Map 2-3**).

From this junction, the Mesa coal-haulage road extends northwestward to the former Quintette Mine open-pits atop Mt. Sheriff and Mt. Frame. Also from this junction, the northward extension of the Nabors Road is also sign-posted as the Mast Creek Road; following this route an additional 13.9 kilometres northward eventually leads to a steel bridge across Wolverine River, and a junction at kilometre 8.3 of the Wolverine FSR.

Hermann-Location-220102e.jpg





2.5.1 Road and trail access details

The non-status Nabors Road runs generally southerly through Area 'A' and past its southern boundary, ultimately ending at a natural-gas well (d-64-J 93-I-14) situated south of the Hermann property's southern boundary (but within Conuma's adjoining Hermann West coal property).

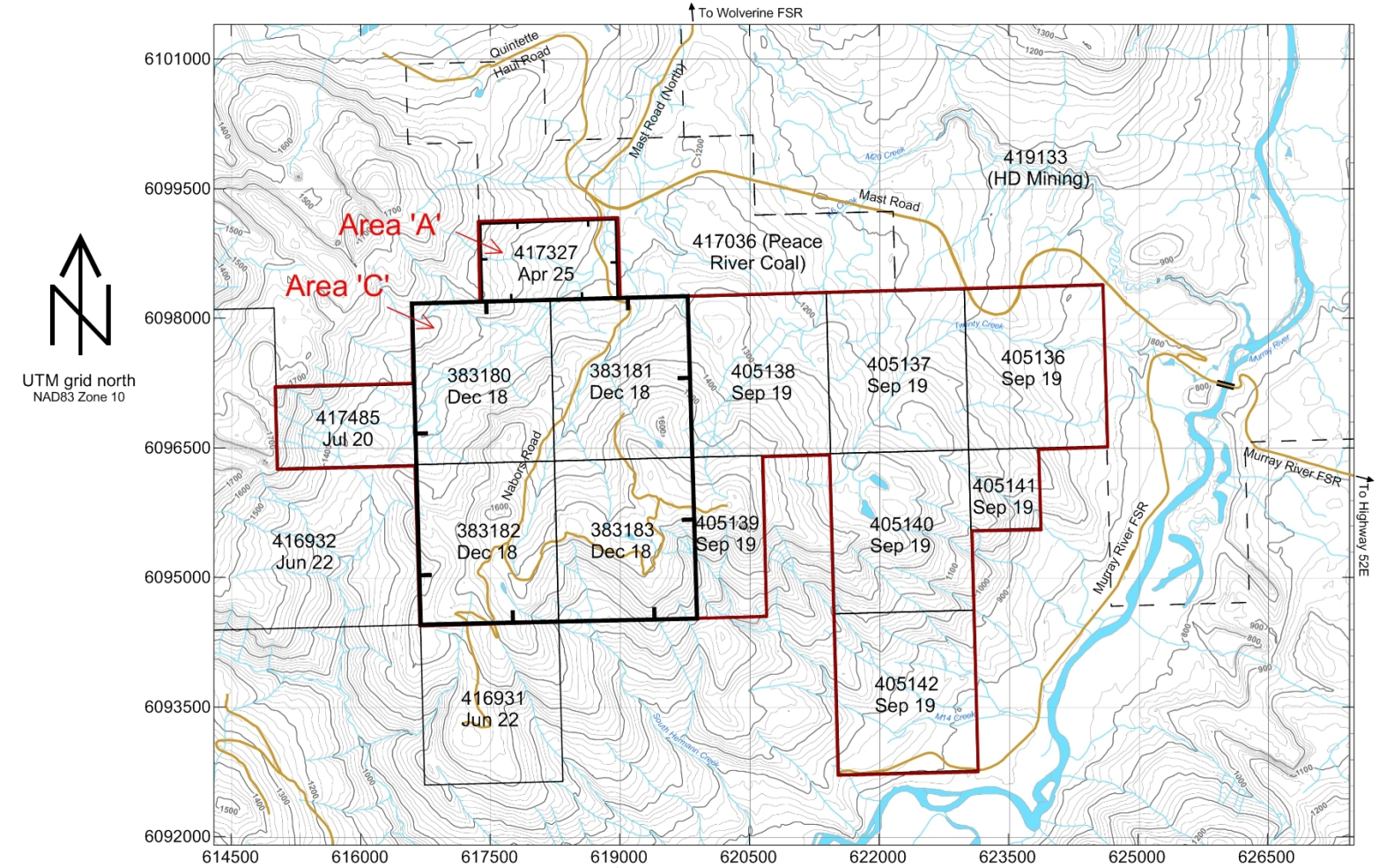
A network of forestry trails extends outward to the east and west of the Nabors Road. These trails are in various states of repair, but most are presently suitable as walking routes, or for usage by tracked vehicles. With modest effort at resurfacing them and restoring culverts, they can be made trafficable for trucks and drilling-rigs.

2.5.2 Airborne access

An unattended, paved airstrip is situated south of Tumbler Ridge; the airstrip is served by various chartered air-transportation firms, from airports at Prince George, Chetwynd and Dawson Creek. Numerous helicopter landing-points are available along logging-roads.

2.5.3 Regulatory setting of surface access

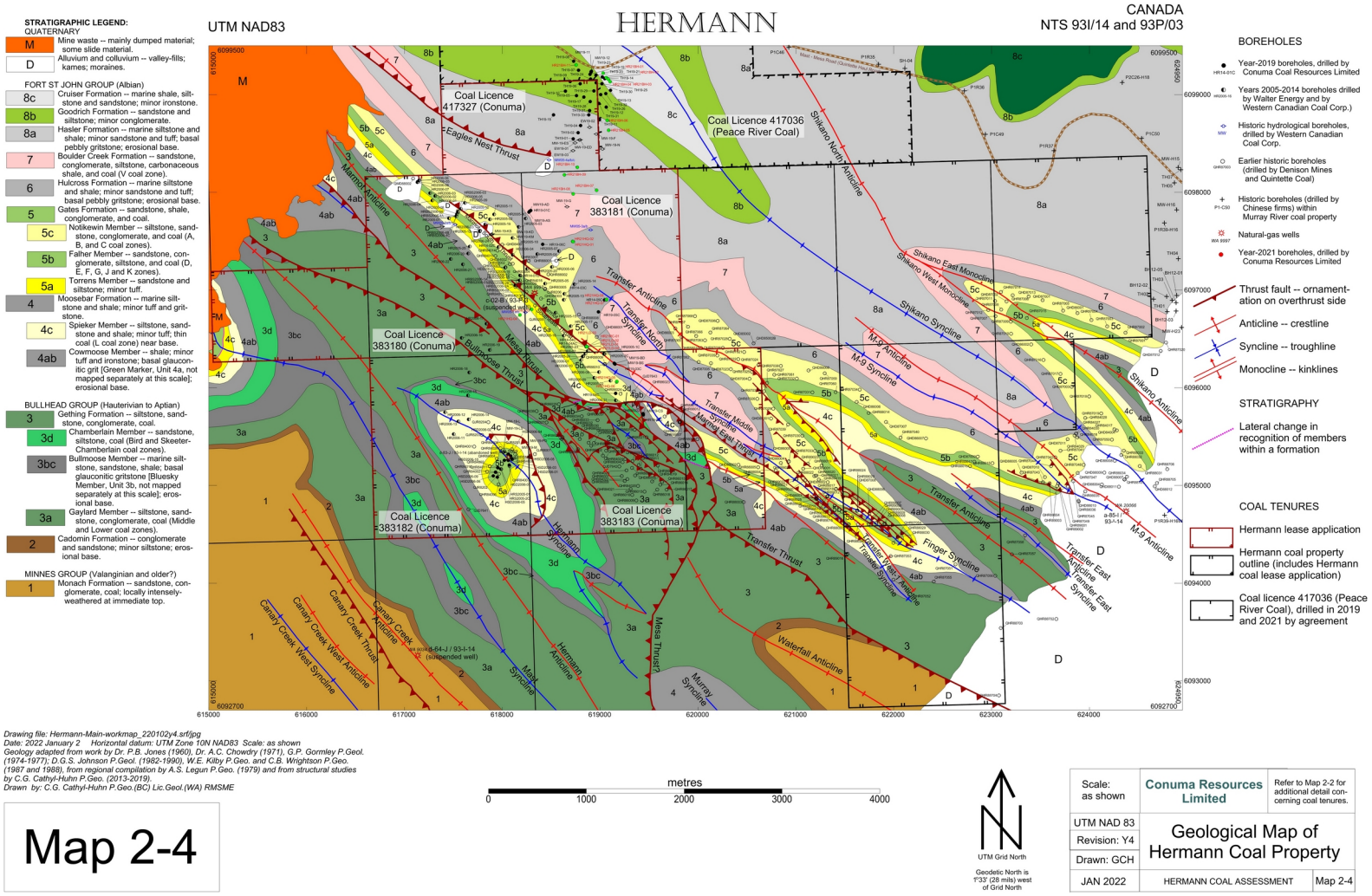
Surface access for drilling and other exploratory works is regulated by the provincial government, subject to the *Coal Act Regulations* and the *Mines Act*.



File: Hermann-regional-topography_220102e.srf/jpg
Drawn: C.G. Cathyl-Huhn PGeo LicGeol RMSME
Projection: Universal Transverse Mercator Scale: as shown
Grid: UTM NAD83 Zone 10 (in metres) Date: 2 Jan 2022
Base map from Lorax Environmental
Tenure information from Mineral Titles Online
Hermann-regional-topography_220115f.srf/jpg

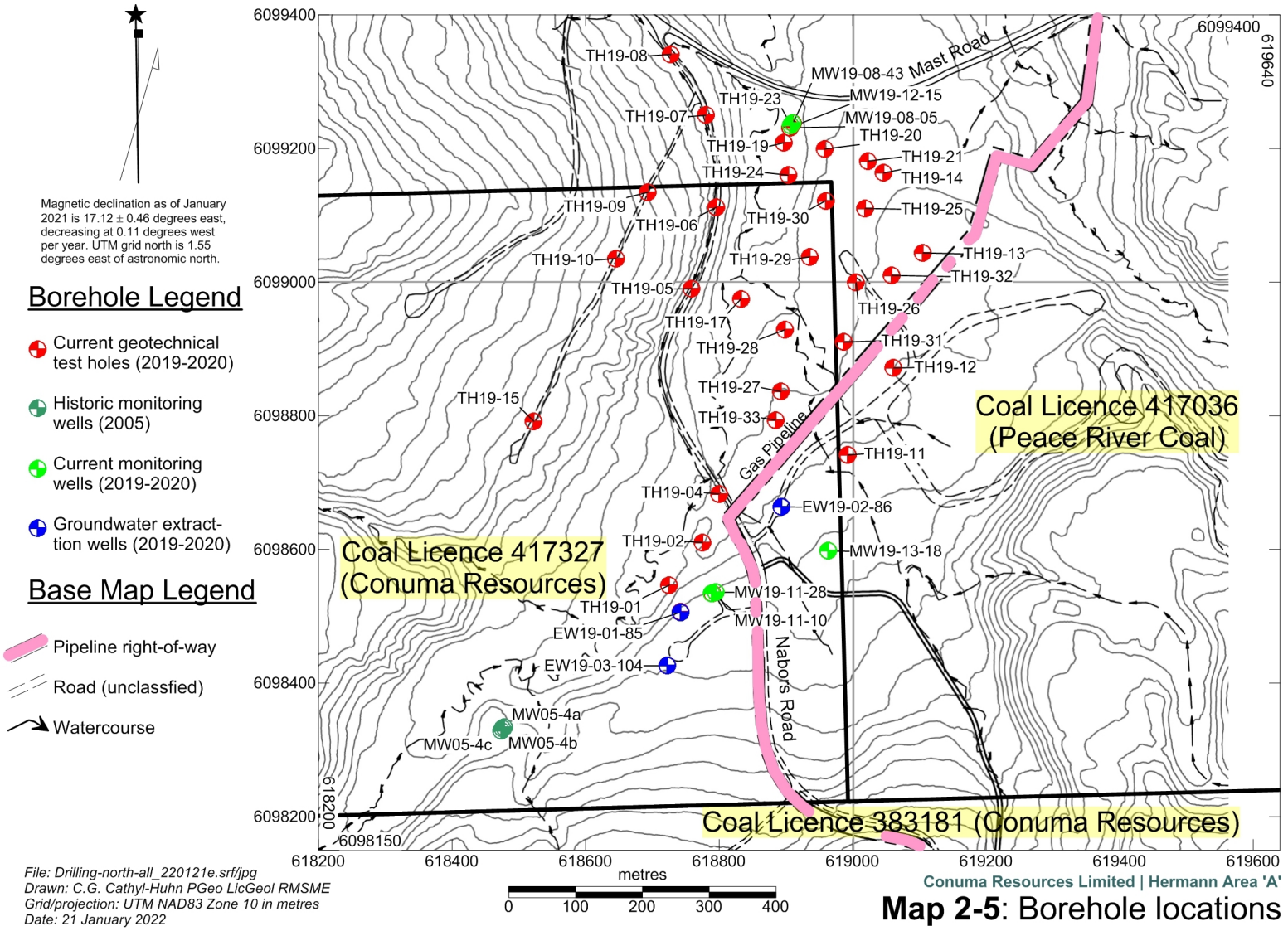
Conuma Resources Limited
Hermann coal property

Map 2-3: Coal tenure and topography



Map 2-4

Hermann-Main-workmap_220102y4.srf/jpg



File: Drilling-north-all_220121e.srf/jpg
Drawn: C.G. Cathyl-Huhn PGeo LicGeol RMSME
Grid/projection: UTM NAD83 Zone 10 in metres
Date: 21 January 2022

Conuma Resources Limited | Hermann Area 'A'

Map 2-5: Borehole locations

Drilling-north-all_220121e.srf/jpg

Non-coal tenures also exist:

- The Hermann coal property as a whole, including Area 'A', is situated within Block 4 of Canfor Inc.'s Tree Farm Licence No.48.
- The property is furthermore situated within the Dawson Creek Land and Resource Management Plan area, and the Foothills Resource Management Zone, allowing for multiple resource uses, including coal-mining.
- Oil and gas tenures exist throughout the Hermann coal property, including Area 'A'.
- Pipeline crossings have been made by Canfor, in the course of their forestry operations. A pipeline right-of-way through Area 'A' is shown on **Map 2-5.**
- No natural-gas wells lie within Area 'A'.

2.6 Coal tenure details

The Hermann property as a whole (including Area 'A') comprises 13 coal licences (**Maps 2-2** and **2-3)**, acquired from the Crown by Western Canadian Coal at various times between the years 2000 and 2006, transferred to Walter Energy after its acquisition of Western Coal., and now held by Conuma. **Table 2-1** presents details of the single coal licence (tenure 417327 with anniversary date of April 25th) which comprises Area 'A' of the Hermann property. The outline of Area 'A' is highlighted on **Map 2-2** and **Map 2-3**.

Coal licences grant to their holder the exclusive right to explore for coal, subject to consultation with local First Nations, coordination of access with other tenure-holders (such as oil and gas firms, other mineral-tenure holders, guide-outfitters, trappers, and timber companies), and the successful submission of an exploratory work plan.

Coal licences do not, in and of themselves, confer the ownership of coal upon their holder (as the coal remains the property of the Crown via the province of British Columbia), but they can under appropriate circumstances be converted into coal leases, upon which a scheme of mining may be established. A coal lease application has recently (October, 2019) been made, covering portions of the Hermann coal property.

The term of coal licences is one year, which may normally be extended upon the payment of an area-based annual rental fee as prescribed by the provincial *Coal Act Regulation*. Area 'A' is now within its fourth five-year span of increased rental fees, at $20/hectare.

Table 2-1: Coal tenure comprising Area 'A' of Hermann coal property

Land description			Area (ha)	Dates		Annual rental rate ($/ha)	Annual rental fee (rate x area)
Tenure	Blocks	Units		Issued on	Renew by		
417327	93P/3 Block B	22, 23	149.00	Apr.25, 2006	Apr.25, 2022	$20	$2980
1 coal licence / 2 units			149.00				$2980

2.7 Infrastructure and geomatics

Electrical power is potentially available from B.C. Hydro's Quintette substation, served by 230-KV transmission line 2L323, although no distribution lines are presently in place near the Hermann property. Sub-transmission and distribution lines, formerly serving the Quintette mines at Mt. Sheriff and Mt. Frame, were removed subsequent to those mines' closure.

Telecommunications are available via satellite and cellular telephone systems. Satellite access is excellent in upland areas, but unreliable in the heavily-wooded hillsides. Cellular coverage also likely to be inconsistent, owing to distance from transmitters, and issues of line-of-sight in mountainous country.

Base-mapping for Hermann is freely available from the provincial government's Base Map Online Store, which affords a facility for downloading shaded-relief topographic maps of the British Columbia Geographic System (BCGS) at 1:20,000 scale. BCGS map-sheets 093I.094, 093I.095, 093P.004, and 093P.005 cover the property and adjoining areas.

Georeferenced satellite photography is freely available via the *Google Earth* web-service. In general, this imagery is sufficiently detailed for studies of gross geological and geomorphological structure, and for the general tracing of roadways and vehicular access trails, but its level of detail is insufficient to allow for trafficability determinations.

2.8 Physiography, landscapes and climate of Hermann Area 'A'

Terrain (**Maps 2-3** and **2-5**) of Hermann Area 'A' is gentle to rolling, punctuated by ravines. Two creeks, M20 Creek and Nabors Creek, drain the property. Mixed coniferous and deciduous forest covers the property. Considerable areas have been deforested in the past five years, and the property is now a patchwork of forest (much of it immature or swampy) and forestry cutblocks.

Soil cover is pervasive, consisting mainly of silty, sandy, and gravely alluvium and peat at lower elevations, and till and glaciofluvial gravel at higher elevations.

Hermann has a continental montane to alpine climate, characterised by long, moderately cold, snowy winters and short, rainy, warm summers. Snow and frost may occur in any month of the year, and isolated snowfields persist on north-facing slopes into July. The coldest weather usually occurs from January through March, where temperatures of –40C occasionally occur. Winds are generally gusty and ongoing, with rare calm periods. Convective thunderstorms frequently occur during summer months, bringing intense rain-showers and occasional hail.

2.9 Synopsis of current (2019-2020 work term) drilling

'Current work', for the purposes of this report, comprises drilling (**Map 2-5**, **Tables 2-2 and 2-3**, and **Appendices A** and **B)**, and surveying of testholes and wells.

In all, 38 testholes and wells were drilled within or adjacent to Hermann Area 'A', during the 2019-2020 work term -- all of them for geotechnical or hydrological purposes. Amongst these 38 holes, 19 were drilled off-tenure (on coal licence 417036, held by Peace River Coal) as part of geotechnical and hydrological investigations in support of mine facility design. The off-tenure work was done by agreement with Peace River Coal.. As was the case with the 19 boreholes drilled within coal licence 417327, none of these 19 testholes and wells entered known or potentially coal-bearing rocks.

Table 2-2: Current drilling during 2019-2020 work term, on- and off-tenure

Testhole / well	UTM NAD83 Zone 10		Elevation	TD	Drilling method	Azimuth	Dip	Tenure
	Easting	Northing						
TH19-01	618725.32	6098546.63	1183.53	17	sonic	0	-90	417327
TH19-02	618775.03	6098610.46	1184.31	17	sonic	0	-90	417327
TH19-03	not drilled							
TH19-04	618800.14	6098683.01	1182.10	6.7	sonic	0	-90	417327
TH19-05	618758.89	6098990.18	1186.08	15.3	sonic	0	-90	417327
TH19-06	618795.54	6099112.10	1183.81	15.3	sonic	0	-90	417327
TH19-07	618779.97	6099249.77	1185.40	6.7	sonic	0	-90	417036
TH19-08	618727.80	6099340.82	1185.02	6.7	sonic	0	-90	417036
TH19-09	618693.38	6099134.55	1208.62	15.3	sonic	0	-90	417327
TH19-10	618645.49	6099035.15	1219.96	12.2	sonic	0	-90	417327
TH19-11	618992.54	6098741.35	1186.17	9.8	sonic	0	-90	417036
TH19-12	619061.09	6098871.48	1184.68	6.7	sonic	0	-90	417036
TH19-13	619105.24	6099043.81	1181.83	6.7	sonic	0	-90	417036
TH19-14	619046.16	6099163.49	1179.15	6.7	sonic	0	-90	417036
TH19-15	618522.40	6098791.87	1219.99	15.7	sonic	0	-90	417327
TH19-16	not drilled							
TH19-17	618832.63	6098974.88	1172.36	10.1	sonic	0	-90	417327
TH19-18	not drilled							
TH19-19	618897.18	6099208.60	1166.48	15.7	sonic	0	-90	417036
TH19-20	618957.99	6099199.27	1175.60	12.7	sonic	0	-90	417036
TH19-21	619022.92	6099181.26	1181.78	12.8	sonic	0	-90	417036
TH19-22	not drilled							
TH19-23	618907.57	6099234.82	1166.25	12.7	sonic	0	-90	417036
TH19-24	618903.34	6099160.09	1172.69	12.7	sonic	0	-90	417036
TH19-25	619018.47	6099110.32	1179.55	6.7	sonic	0	-90	417036
TH19-26	619005.06	6098999.35	1178.10	6.7	sonic	0	-90	417036
TH19-27	618892.45	6098836.37	1180.57	9.8	sonic	0	-90	417327
TH19-28	618898.27	6098928.64	1176.10	6.7	sonic	0	-90	417327
TH19-29	618935.69	6099037.78	1176.21	6.7	sonic	0	-90	417327
TH19-30	618959.40	6099121.71	1176.28	6.7	sonic	0	-90	417036
TH19-31	618986.80	6098910.45	1179.83	6.7	sonic	0	-90	417036
TH19-32	619058.21	6099010.16	1180.87	6.7	sonic	0	-90	417036
TH19-33	618884.43	6098793.59	1181.17	9.6	sonic	0	-90	417327
MW19-08-05	618906.20	6099231.00	1166.09	4.64	sonic	0	-90	417036
MW19-08-43	618910.91	6099238.38	1166.65	45.7	sonic	0	-90	417036
MW19-11-10	618789.41	6098534.09	1195.69	10.85	air rotary	0	-90	417327
MW19-11-28	618795.10	6098536.11	1195.76	30	air rotary	0	-90	417327
MW19-12-15	618906.20	6099231.49	1166.09	16	air rotary	0	-90	417036
MW19-13-18	618963.15	6098597.71	1190.58	18	air rotary	0	-90	417327
EW19-01-85	618742.4	6098506.2	1196	84.89	air rotary	0	-90	417327
EW19-02-86	618893	6098664	1186	86.41	air rotary	0	-90	417327
EW19-03-104	618722	6098426	1200	103.63	air rotary	0	-90	417327

Note: This table supersedes Table 2-2 of CAR-1057, insofar as complete borehole records were unavailable at the time of that report. Only GPS locations are available for EW19-01 through -03.

Table 2-3: Current drilling during 2019-2020 work term, on-tenure only

Testhole / well	UTM NAD83 Zone 10		Elevation	TD	Drilling method	Azimuth	Dip	Tenure
	Easting	Northing						
TH19-01	618725.32	6098546.63	1183.53	17	sonic	0	-90	417327
TH19-02	618775.03	6098610.46	1184.31	17	sonic	0	-90	417327
TH19-04	618800.14	6098683.01	1182.10	6.7	sonic	0	-90	417327
TH19-05	618758.89	6098990.18	1186.08	15.3	sonic	0	-90	417327
TH19-06	618795.54	6099112.10	1183.81	15.3	sonic	0	-90	417327
TH19-09	618693.38	6099134.55	1208.62	15.3	sonic	0	-90	417327
TH19-10	618645.49	6099035.15	1219.96	12.2	sonic	0	-90	417327
TH19-15	618522.40	6098791.87	1219.99	15.7	sonic	0	-90	417327
TH19-17	618832.63	6098974.88	1172.36	10.1	sonic	0	-90	417327
TH19-27	618892.45	6098836.37	1180.57	9.8	sonic	0	-90	417327
TH19-28	618898.27	6098928.64	1176.10	6.7	sonic	0	-90	417327
TH19-29	618935.69	6099037.78	1176.21	6.7	sonic	0	-90	417327
TH19-33	618884.43	6098793.59	1181.17	9.6	sonic	0	-90	417327
MW19-11-10	618789.41	6098534.09	1195.69	10.85	air rotary	0	-90	417327
MW19-11-28	618795.10	6098536.11	1195.76	30	air rotary	0	-90	417327
MW19-13-18	618963.15	6098597.71	1190.58	18	air rotary	0	-90	417327
EW19-01-85	618742.4	6098506.2	1196	84.89	air rotary	0	-90	417327
EW19-02-86	618893	6098664	1186	86.41	air rotary	0	-90	417327
EW19-03-104	618722	6098426	1200	103.63	air rotary	0	-90	417327

Note: all boreholes within this table were drilled on-tenure, within coal licence 417327. Boreholes drilled within other portions of the Hermann coal property have been previously-reported within CAR-1059 and earlier reports referenced therein.

Table 2-4: Historic hydrogeological drilling during 2005

Year-2005						
MW05-4a	618477.7	6098334.4	1201.44	81.7	Rotary	Groundwater-monitoring (hydrological) boreholes -- see CAR-950 for details.
MW05-4b	618475.4	6098331.8	1201.44	51.2	Rotary	
MW05-4c	618473.5	6098328.8	1201.44	13	Rotary	

Geotechnical and hydrological drilling concentrated on investigating the material characteristics and aquifer potential of unconsolidated and semi-consolidated Drift. Some of the hydrological boreholes did penetrate a few to several tens of metres into bedrock (Helsen *et al.*, 2019), as investigations turned to a search for bedrock aquifers.

2.10 Comments on historic (pre-2019) work

No pre-2019 drilling is known to have been done on Peace River Coal's tenure 417036, and none is expected to have been seriously-proposed, owing to the lack of outcropping coal-bearing strata within the tenure.

The only historic drilling within Conuma's tenure 417327 was a cluster of three groundwater-monitoring wells (MW05-4a, -4b, and -4c), drilled in 2005 as part of the mine-permitting process for the then-proposed North Pit of Hermann Mine. No coal was encountered by the three monitoring-wells (**Table 2-4**; **Appendix B**).

No outcropping coal was observed during regional exploration of what is now Area 'A'. Other than a small area of possibly coal-bearing Boulder Creek Formation (**Maps 2-4** and **3-1**), no coal-measures are known or reasonably expected to subcrop within Area 'A'.

2.11 Natural gas wells

Natural gas wells have not been drilled within Hermann Area 'A' (tenure 417327).

2.12 Acknowledgements and professional responsibility

Sam Payment GIT, Conuma's manager of permitting and regulatory affairs, gave yeoman service as the company's wrangler of drilling permits. David Donison PEng, formerly Conuma's capital projects manager, led the geotechnical and hydrological investigations.

Geological and project management support were provided by Apex Geoscience Ltd., led by their project geologists, Jerry Holmes PGeo., Rachelle Hough PGeo, and Philo Schoeman PGeo..

Lorax Environmental provided hydrogeological supervision during the drilling and testing of hydrogeological wells. Thanks are due to senior hydrological engineer Justin Bourne PEng., project hydrogeologist Steven Momeyer PGeo. and hydrogeologists Andrew Solod PGeo., Josh Young PGeo., Chris Bourque PGeo., and Jordi Helsen PGeo.

Wood Plc provided engineering support to the geotechnical drilling programme, led by geotechnical engineer Bruce Garlick PEng. DWB Consulting provided environmental monitoring, led by environmental specialist Ryan Bouchard.

The author of the present report, Gwyneth Cathyl-Huhn PGeo., accepts overall professional responsibility for the contents of this report, and has duly signed and sealed the original copy thereof.

3 Geology

Regional and local bedrock geology (**Maps 2-4** and **3-1**) of the Mt. Hermann area is known mainly from the extensive work of D.F. Stott (1960; 1963; 1968; 1982), and D.W. Gibson (1992) on behalf of the Geological Survey of Canada. Surficial geology (at regional scale) was mapped by T.H.F. Reimchen (1980), also for the Geological Survey of Canada.

Numerous coal-company technical reports (cited in **Section 8** of this report) are available as open-file documents from the British Columbia Geological Survey Branch. Copies of the reports are freely available for download via the provincial Survey's *Coalfile* website. Most of these reports have been censored to exclude clean-coal quality data, as such data are held confidential by the Crown in keeping with the provisions of the *Coal Act Regulation*.

3.1 Regional bedrock geology

The Hermann coal property lies within the Sukunka-Quintette coalfield of northeastern British Columbia, part of the Foothills structural province of the Canadian Cordillera. The majority of sedimentary rocks within the Sukunka-Quintette coalfield are clastic in nature, ranging in grain-size from claystones and mudstones through conglomerates. Lesser amounts of biologically- and chemically-derived sedimentary rocks are present, comprising coals, banded and nodular ironstones, glauconite-rich sandstones and gritstones, and impure dolomites.

Volcanic rocks constitute a very small but stratigraphically-significant component of the Early Cretaceous strata, comprising very fine- to fine-grained tuffs (locally altered to bentonites or tonsteins), interpreted to have originated as wind-borne distal ash-fall deposits from contemporaneous volcanoes situated upwind and far to the southwest of the property. The volcanic rocks characteristically occur as very thin (at most a few decimetres) yet regionally-extensive bands, thus useful as tephrachronological markers for structural and stratigraphic correlations (Duff and Gilchrist, 1981; Kilby, 1984a).

All rocks inferred to subcrop at rockhead within Area 'A' are of Early Cretaceous age, belonging to the Fort St. John (Albian stage) group.

3.1.1 Tectonostratigraphic context of Early Cretaceous rocks

During much of the Early Cretaceous, the Western Interior of North America was occupied by a shallow seaway, variably-designated by different authors as the Western Interior Sea, the Boreal Sea, or by analogues of formation names, such as the Clearwater Sea, Hulcross Sea or Moosebar Sea. Depths of the seaway, magnitude of accommodation space for sediments, and overall shoreline trends, were largely controlled by vertical movements within a complexly block-faulted crystalline basement terrane of Precambrian age, the Peace River Arch.

Sediments of the Fort St. John Group were derived from actively-rising thrust-faulted tectonic forelands situated to the west and southwest of the seaway, synchronous with the docking of allochthonous tectonic terranes against the western margin of the North American craton.

Coal deposits formed within the non-marine portions of the clastic sedimentary successions. Kalkreuth and Leckie (1989) recognised the close association between actively-subsiding shoreface sandstone deposits and the overlying presence of thick coal beds; this association is well-established within the upper part (Chamberlain Member) of the Gething Formation and the middle part (Falher Member) of the Gates Formation, within the Sukunka-Quintette coalfield, including the Hermann property.

3.1.2 Thin-skinned deformation and thrust-faulting

The Hermann coal property (including Area 'A') is characterised by a thin-skinned deformational style comprising folded, laterally-arcuate thrust faults and associated fault-bend folds (see regional work by Jones, 1979). Most thrusts are northeast-verging, except for the northern end of the Hermann property (including Area 'A': see **Map 2-4**), where the thrusts are typically southwest-verging (and, hence, termed as 'backthrusts', such as the Eagles Nest backthrust within tenure 417327). The culmination of a northwest-striking triangle zone may separate the zones of northeast-verging and southwest-verging thrust faults and backthrusts.

Within the more intensely-explored Area 'C' of the Hermann property, thrusts range in scale from mesoscopic features with stratigraphic displacements of a few decimetres to a few metres, to regionally-throughgoing faults and fault with stratigraphic displacements of several hundred metres. Similar conditions, with the possible exception of displacements greater than a hundred metres, are postulated to occur within the sparsely-explored bedrock at Area 'A'.

3.1.2.1 Decollement zones

Regionally, the Hasler Formation is often a zone of decollement (tectonic detachment), characterised by near-bedding-parallel thrust faults (Cooper and others, 2004). Other decollement zones, of at least local significance, may be hosted by soft, low-strength tuff bands within the Hulcross and underlying older formations. Such zones are of practical significance to mining, in the event that they are exposed at adverse orientations within mine walls (Rostad and Hogarth, 2019).

3.2 Local geology

A table of formations, including an enumeration of coal beds with coal zones, and estimates of formation thicknesses, is presented as **Table 3-1**. Stratigraphy is discussed in greater detail within **Section 3-3** of this report, which presents regionally-known characteristics of Drift units and of rock-units inferred to form bedrock beneath Area 'A'.

3.2.1 Local stratigraphy

Within the broader Hermann property, rocks belonging to the uppermost Minnes, Bullhead and all but the uppermost Fort St. John groups are exposed at the ground surface (see **Table 3-1**). Approximately 1130 metres of Bullhead and Fort St. John rocks remain in place, following Tertiary-Quaternary episodes of fluviatile erosion and glacial scouring. An additional 1350 metres of Minnes Group strata underlies the Bullhead Group; these deeper rocks are known mainly from the records of natural-gas wells.

Formations interpreted (see **Map 2-3** and **Table 3-1**) as being present at rockhead within Area 'A' and vicinity range downwards from the Cruiser Formation (map-unit 8c, the youngest mapped formation) to the Boulder Creek Formation (map-units 7a, 7b, and 7c). Approximate ages of these rocks range from 100.5 to 105 million years before present.

3.2.2 Local structure

The broader Hermann coal property consists of a moderately-deformed stack of marine and non-marine strata, generally present in normal (‘tops-up’) stratigraphic position, albeit with generally-steep bedding-surface dips. As a general consideration, thrust faults at Hermann are inferred to have developed in the typical downward-younging sequence of successive faulting, although out-of-sequence thrusting is locally possible.

Some of the historic and current hydrogeological wells within the Hermann property's Area 'A' encountered fracture zones within siltstone, suggesting that deformation extends into near-surface rocks within Area 'A'.

Bedding dips within Hermann Area 'A' are not yet known, owing to lack of bedrock outcrops, and lack of borehole cores or dipmeter logs within those few geotechnical test holes and hydrogeological wells which reached bedrock.

3.3 Stratigraphic details

The following discussion presents details of the lithology, inferred age and origin, typical thickness, and contact relationships of the various surficial and bedrock units interpreted to be present at Hermann (whether near-surface or at greater depth), keyed to the regional map-unit numbers used in **Map 2-4**, **Map 3-1**, and **Table 3-1**. Geological units are discussed in stratigraphic order from uppermost (youngest) to lowermost (oldest) within the exposed sequence of strata. Within Area 'A' of the Hermann property, only surficial deposits of map-unit D, and bedrock of map-units 6 through 8c have been encountered by boreholes.

3.3.1 Surficial deposits

3.3.1.1 Anthropogenic deposits (including map-unit M)

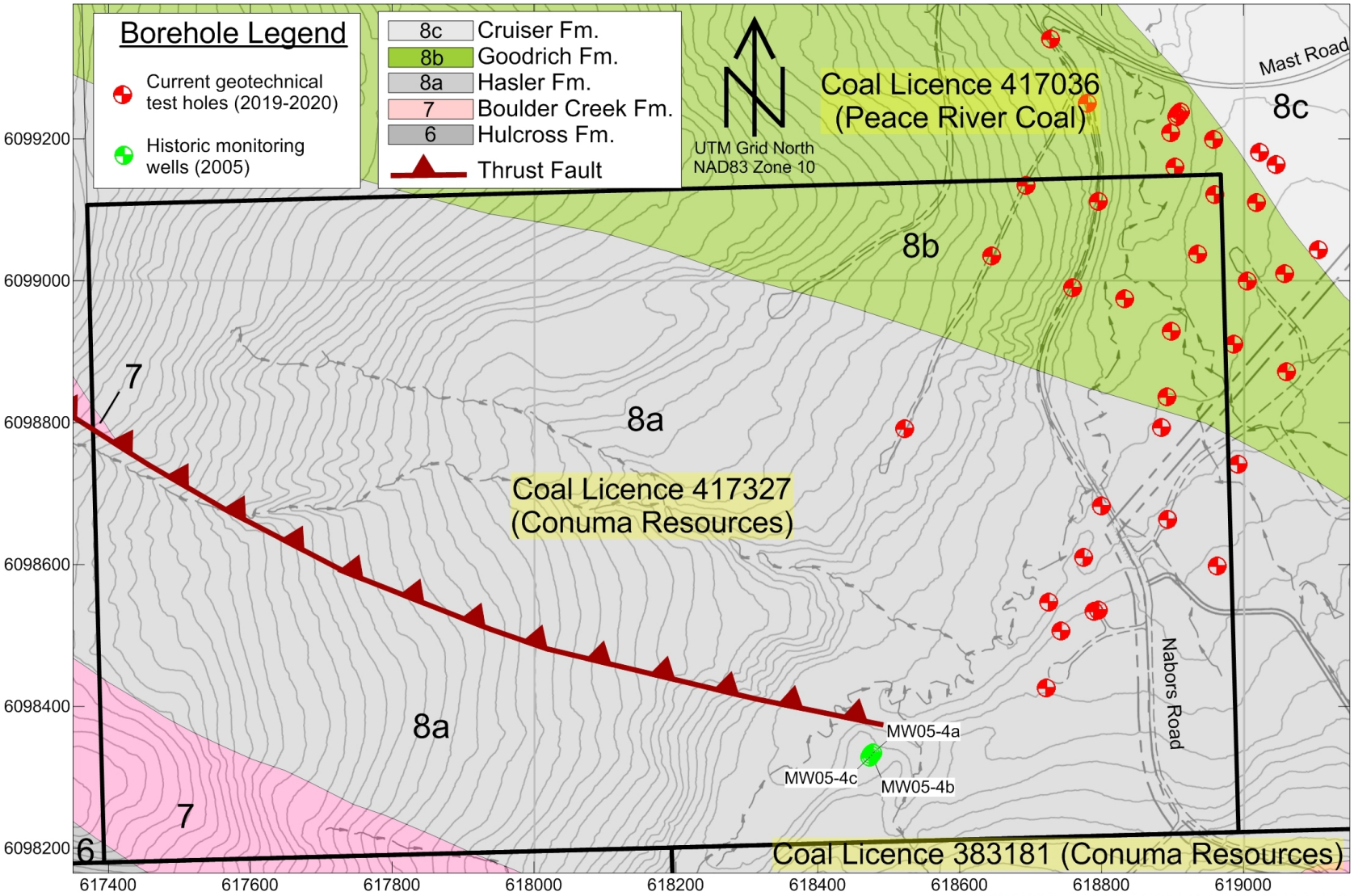
Within the broader Hermann study area (Cathyl-Huhn, 2019), mine waste (map-unit 'M') is associated with the abandoned open-pit workings of the Quintette mines. Mine waste does not extend to within Area 'A' of the Hermann property.

Within Area 'A' (coal licence 417327) and extending off-tenure into adjoining portions of coal licence 417306, silty gravels are present along some roads and forestry trails. These deposits are interpreted to be constructed fills, emplaced to raise the level of roads and trails. Fill deposits are not separately-mapped in **Map 2-4** and **Map 3-1**, as they are of limited and narrow extent.

3.3.1.2 Quaternary surficial deposits (map-unit D)

Unconsolidated surficial deposits of Quaternary age within Area 'A' of the Hermann property comprise valley-bottom and hillside Drift (map-unit D).

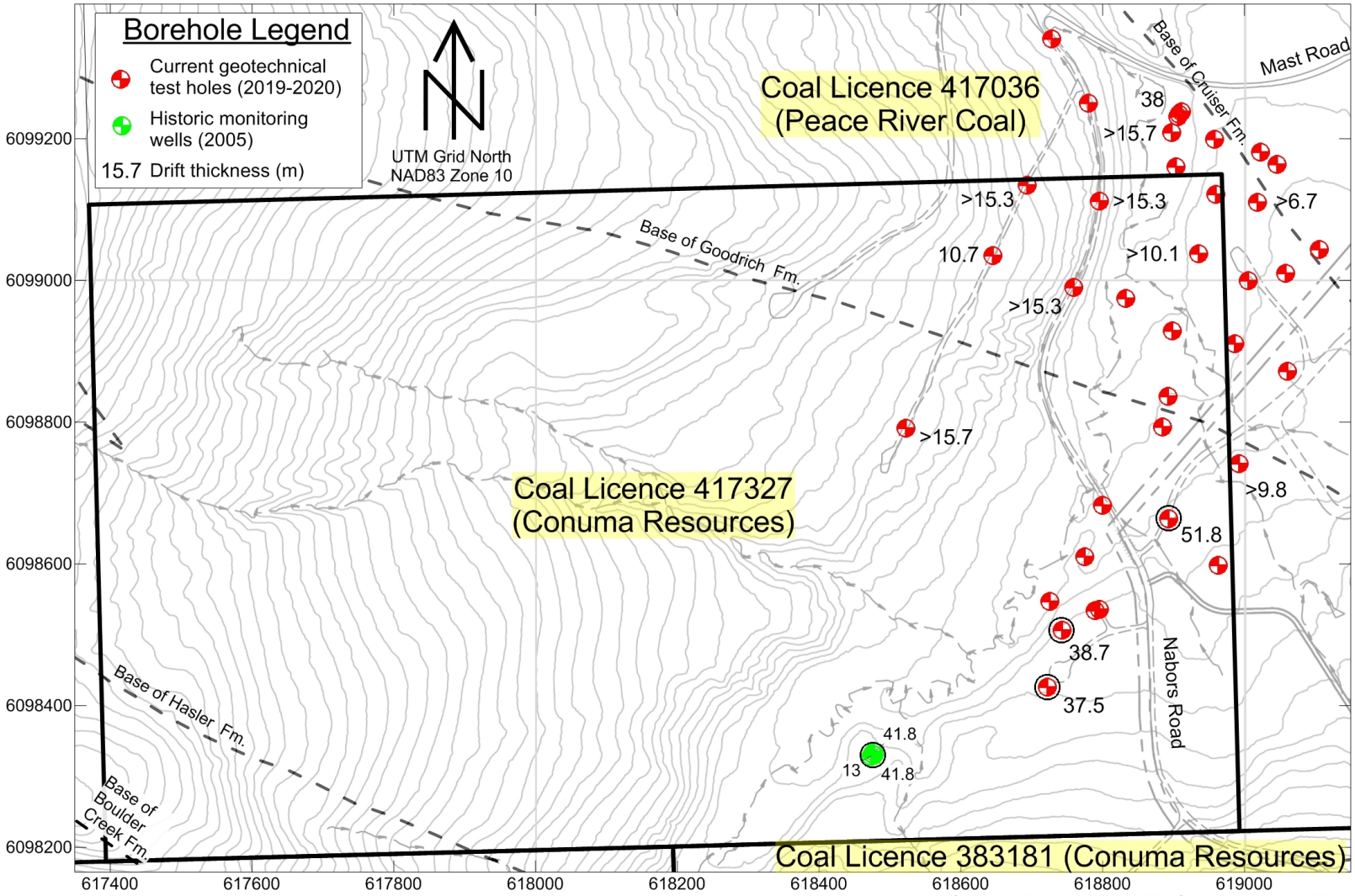
The flat-bottomed floor of M20 Creek's valley is occupied by the creek's braidplain, and by adjoining alluvial fans of tributary creeks which drain nearby upland areas. The banks of the creek, where exposed by channel-migration processes, show crudely-bedded silts, sands and gravels which are interpreted as fluvial deposits. Drilling within Area 'A' indicates that glacial and glaciolacustrine sediments, of broadly Pleistocene age, underlie the near-surface fluvial deposits.



File: Geology-Area-A_220121d.srf/jpg
Drawn: C.G.Cathyl-Huhn PGeo LicGeol RMSME
Date: 21 January 2022 Scale: as shown
Grid: UTM NAD83 Zone 10

Conuma Resources Limited | Hermann Area 'A'

Map 3-1: Bedrock geology of tenure 417327



File: Drift-Area-A_220121d.srf/jpg
Drawn: C.G.Cathyl-Huhn PGeo LicGeol RMSME
Date: 21 January 2022 Scale: as shown
Grid: UTM NAD83 Zone 10

Conuma Resources Limited | Hermann Area 'A'

Map 3-2: Drift thickness in tenure 417327

Table 3-1: Table of formations for Hermann property including Area 'A'

Geological Age		Lithostratigraphic Units				Thickness	Map-Units		Coal Beds/Coal Zones	
		Group	Formation	Member	Division				Bed	Zone
Quaternary			Mine waste			>50 m?	M			
			Drift			nil to 80 m	D			
Early Cretaceous	Late Albian	Fort St. John	Cruiser			>30 m?	8c			
			Goodrich			50 m?	8b			
			Hasler			150 m?	8a			
	Late Middle Albian to Late Albian		Boulder Creek	Paddy		130 m	7		V coal zone	
				Walton Creek						
				Cadotte						
	Middle Albian		Hulcross			105 m	6			
	Late Early Albian		Gates	Notikewin		90 to 115 m	5	5c	A coal bed	
									B coal bed	
									C coal bed	
				Falher		70 to 90 m		5b	D coal bed	
									E1-E3 coals	E
									E4 coal bed	
									F1 coal bed	F
									F2/G1 coal bed	
									G2 coal bed	G
									G3 coal bed	
									J1 coal bed	J
									J2 coal bed	
									J3 coal bed	
									K1-K3 coals	K
				Torrens	Upper Quintette sandstone	25 to 32 m		5a		
					medial siltstone	15 to 18 m			L coal bed near base	
					Lower Quintette sandstone	35 m				
			Moosebar	Spieker		49 to 55 m	4	4c		
				Cowmoose		60 to 70 m		4b		
				Green Marker		0.1 to 17 m		4a		
		Bull-head	Gething	Chamberlain		30 to 40 m	3	3d	Bird coal zone	
									Skeeter – Chamberlain coal zone	
				Bullmoose		25 to 35 m		3c		
				Bluesky		nil to 15 m		3b		
	Hauterivian to Late Early Albian			Gaylard		150 to 160 m		3a	Gething coal zone(s)	
	Barremian		Cadomin			30 to 85 m	2			
	Valanginian and older?	Minnes	Monach (and older formations below)			1300 to 1400 m	1		Coals present	

Thickness of the valley-filling Drift, where drilled within Area 'A', ranges from a few metres to at least 51.8 metres. The base of the valley-fill has often been unreachable by drilling, owing to refusal of penetration.

Outline of the mapped Drift (as depicted in **Map 2-4**) is set at inferred 20-metre depth to bedrock, consistent with Walter Energy's and Conuma's previous mapping.

3.3.2 Fort St. John Group (Early Cretaceous)

An incomplete section of the Fort St. John Group is present within and adjoining Area 'A', owing to the group's top contact having been stripped off by erosion during Tertiary uplift of the rocks, and further scouring by glaciers during the Quaternary era. From top down, the Group's following formations are inferred to form bedrock within and adjacent to Area 'A':

- Cruiser Formation -- shale and siltstone (ca. 30 m; incomplete);
- Goodrich Formation -- sandstone and siltstone (50 m);
- Hasler Formation -- shale and siltstone (150 m);
- Boulder Creek Formation -- sandstone, conglomerate, shale, and minor coal (130 m); and
- Hulcross Formation -- shale, siltstone, sandstone, and minor tuff (105 m); overlies coal-measures of Gates Formation.

Thicknesses and lithologies of the Cruiser, Goodrich, and Hasler formations are known mainly from examination of outcrop sections situated beyond the boundaries of the broader Hermann property, augmented by partial information concerning their drilled thicknesses in nearby properties.

The Cruiser, Goodrich and Hasler formations are considered by Stott (1968) to be lateral equivalents of the Shaftesbury Formation of the Alberta Syncline, where the Goodrich sandstone is not recognisable within a thick sequence of fine-grained rocks. During the Denison-Quintette era of exploration at Hermann, coal-company geologists did not recognise the tripartite division of the strata overlying the Boulder Creek Formation, and thus they mapped these rocks as Shaftesbury.

3.3.2.1 Cruiser Formation (map-unit 8c)

The Cruiser Formation is the uppermost formation within the Fort St. John Group. The Cruiser is reported by Stott (1968) to comprise 105 metres of dark grey mudstone with frequent interbeds of siltstone and occasional interbeds of fine-grained, silty sandstone. Bands of discoidal to spheroidal sideritic concretions occasionally occur. The formation's age, on the basis of marine fossils, ranges from Late Albian to Cenomanian.

Within and adjoining Area 'A' of the Hermann coal property, only the basal 30 metres or so of the Cruiser Formation is inferred to have been preserved from erosion; this part of the formation is therefore noted to be of Late Albian age in **Table 3-1**. The basal contact of the Cruiser Formation with the underlying Goodrich Formation is abrupt (Stott, 1968), and possibly disconformable.

3.3.2.2 Goodrich Formation (map-unit 8b)

The Goodrich Formation is reported (Stott, 1968) to comprise approximately 50 metres of medium- to thick-bedded, locally cliff-forming sandstone, with frequent interbeds of siltstone and mudstone. In the general vicinity of Hermann Area 'A', the Goodrich Formation contains a southeastward-increasing proportion of siltstone and mudstone bands, such that the

formation becomes unmappable on the eastern side of Murray River.

No coal is known from the Goodrich Formation at Area 'A', nor within the surrounding area, and none is expected to be subsequently discovered by deeper drilling, on account of the marine origin of the formation's rocks.

The Goodrich is of Late Albian age, as established by its molluscan fauna (Stott, 1968). The basal contact of the Goodrich Formation with the underlying Hasler Formation is gradational.

3.3.2.3 Hasler Formation (map-unit 8a)

The Hasler Formation (Stott, 1968) comprises approximately 150 metres of dark grey, locally rusty-weathering mudstone with frequent interbeds of siltstone and occasional interbeds of fine-grained, silty sandstone. The Hasler is probably of Late Albian age, on the basis of the probable Late Albian age assigned to the underlying Boulder Creek Formation (Gibson, 1992). The abrupt base of the Hasler Formation is locally marked by a thin (a few centimetres to decimetres) layer of pebbly mud-matrix conglomerate.

3.3.2.4 Boulder Creek Formation (map-unit 7)

The Boulder Creek Formation comprises 130 metres of ridge-forming, competent, thick-bedded to massive, coarse-grained sandstone and conglomerate, with thin interbeds of siltstone, variably-carbonaceous mudstone and occasional thin (a few decimetres to a metre) coal beds, locally recognised as the V coal zone.

Gibson (*op. cit.*) recognised three members within the Boulder Creek Formation, on the basis of lithostratigraphy. From top down these are the Paddy, Walton Creek, and Cadotte members. Although this subdivision can be readily mapped on the basis of the Paddy and Cadotte being ridge-formers in higher-elevation portions of the Hermann coal property, such a distinction is not practicable within the more-subdued lower-elevation topography of Area 'A'. **Maps 2-4** and **3-1** therefore depict the Boulder Creek Formation as undivided.

3.3.2.5 Hulcross Formation (map-unit 6)

The Hulcross Formation, of Middle Albian age within the Early Cretaceous (Stelck and Leckie, 1988; Gibson, 1992b) comprises 105 metres of thinly-interbedded, locally-concretionary medium grey siltstone, fine-grained sandstone and dark grey mudstone with occasional very thin but extremely-persistent interbeds of soft, light grey to white, tuffaceous volcanic ash. Some of the ash bands locally manifest as harder, medium grey claystones, which are more difficult to recognise in the absence of gamma-ray observations.

The Hulcross ash bands are potentially planes of weakness within the strata, and therefore of interest in rock-mechanics studies. The ash bands, as well, provide a means of discerning fault offsets within the formation.

Mesoscale (a few decimetres to a few metres thick) fining-upward sequences reminiscent of proximate turbidites or tempestites are common within the Hulcross, as are trace-fossils and poorly-preserved shell fossils. Fine-grained pyrite is locally-abundant within the Hulcross rocks. The disconformable base of the Hulcross Formation is characteristically marked by a thin (generally a few decimetres, and rarely up to a metre or so thick) erosive-based bed of cherty pebbly sandstone or gritstone.

3.3.3 Older rocks

Note: rock-units older than the Hulcross Formation are not interpreted to subcrop at rockhead within Area 'A', being inferred to be present only at depth. Refer to **Table 3-1** and **Map 2-4** for details of these units' thickness and distribution.

4 Coal resources and coal reserves

4.1 Historic estimates

No historic resource or reserve estimates have been done within Area 'A'.

4.2 Current estimates

No current resource or reserve estimates have been done for Area 'A'.

5 Coal quality

No coal quality data are available for Area 'A', owing to lack of deep drilling to reach the coal-measures of the Gates Formation.

6 Reclamation

Within the Hermann 'A' area (coal licence 417327, including the area of off-tenure work within coal licence 417036), geotechnical and hydrogeological drilling was mostly conducted in late winter, such that the major site concern was thawing of the ground and collapse of roadways. Extensive use was made of wood mulching, and of portable rig mats, as a means to minimise disturbance and maintain safe access. At the closure of work in each area, rig mats were removed and either transferred for use elsewhere, or sent back to the rental agency.

Although the original plan for exploratory drilling did include the construction of many new trails, most drillsite access was by means of existing roads, or via forestry skidder trails.

With the exception of those drill trails and pads required for ongoing access to hydrological wells, drill trails and pads have been reclaimed by pulling down cutbanks, and by scattering of appropriately-bucked woody debris and/or wood mulch. Seeding with appropriate native species was done on drill pads and trails.

7 Statement of estimated costs

The exploration costs shown below in **Tables 7-1** through **7-3** are a minimum estimate. For purposes of comparison, British Columbia average unit costs are presented at the bottom line of the table.

The following major contractors serviced the work programme:

- Blue Max Drilling -- sonic drilling of geotechnical and hydrogeological boreholes;
- Anderson Water Services -- air-rotary drilling of hydrogeological boreholes;
- Lorax Environmental Services Ltd. -- technical supervision of hydrogeological boreholes and groundwater extraction wells;
- Wood Environment & Infrastructure Solutions -- technical supervision of geotechnical boreholes;
- DWB Consulting -- environmental monitoring;
- APEX Geoscience -- project management; and
- Hi-Sky Enterprises -- road and trail construction and maintenance

Purchase order accruals for drilling and support services were checked up to a cutoff date of November 30, 2019. Costs presented in the following tables are estimated, and likely to be incomplete owing to lack of tenure-based cost details.

Table 7-1: Estimated cost breakdown by activity, for geotechnical and hydrogeological drilling, on tenures 417036 and 417327

Year	Boreholes in TH19-, MW19-, and EW19-series	Number of holes	Meterages		Estimated drilling costs		Estimated non-drilling costs					Totals
			Air-rotary drilling [Anderson]	Sonic drilling [Blue Max]	Air-rotary drilling	Sonic drilling	Geophysical logging	Coal analyses	Catwork (incl. snow clearing, layout, and rig mats)	Personnel (geological super- vision by contractors	Well components / instruments	
2019-2020		38 holes	349.78 m	351.14 m	$128,601.79	$151,071.34	$nil	$nil	$27,911.00	$14,361.85 (from BC unit costs)	$12,443.55	$334,389.53
			combined 700.92 m									
2019-2020	as above	38 holes	Meterages		*unit costs per metre of drilling*							
			349.78 m	351.14 m	$367.66/m	$430.23/m	$nil	$nil	$39.82/m	$20.49/m (from BC unit costs)	$17.75/m	$477.07/m
			combined 700.92 m									
British Columbia average unit costs per metre, for comparison			n/a	n/a	$201.53/m	n/a	$17.56/m	n/a	$23.30/m	$20.49/m	n/a	n/a

Table 7-2: Estimated cost breakdown by activity, for geotechnical and hydrogeological drilling, on tenure 417036 (PRC land)

Year	Boreholes in TH19- and MW19-series	Number of holes	Meterages		Estimated drilling costs (proportioned as shown)		Estimated non-drilling costs (proportioned on metreage basis at 29.92%)					Totals
			Air-rotary drilling [Anderson]	Sonic drilling [Blue Max]	Air-rotary drilling (proportioned at 4.57%)	Sonic drilling (proportioned at 55.17%)	Geophysical logging	Coal analyses	Catwork (incl. snow clearing, layout, and rig mats)	Personnel (geological super- vision by contractors	Well components / instruments	
2019-2020		19 holes	16 m	193.74 m	$5,877.10	$83,346.06	$nil	$nil	$8,350.97	$4,297.07 (from BC unit costs)	$3,723.11	$105,594.31
			combined 209.74 m									
2019-2020	as above	19 holes	Meterages		*unit costs per metre of drilling*							
			16 m	193.74 m	$367.32/m	$430.20/m	$nil	$nil	$39.82/m	$20.49/m (from BC unit costs)	$17.75/m	$503.45/m
			combined 209.74 m									
British Columbia average unit costs per metre, for comparison			n/a	n/a	$201.53/m	$210.34/m	$17.56/m	n/a	$23.30/m	$20.49/m	n/a	n/a

Table 7-3: Estimated cost breakdown by activity, for geotechnical and hydrogeological drilling, on tenure 417327 (Hermann 'A')

Year	Boreholes in TH19- and MW19-series	Number of holes	Meterages		Estimated drilling costs (proportioned as shown)		Estimated non-drilling costs (proportioned on metreage basis at 70.08%)					Totals
			Air-rotary drilling [Anderson]	Sonic drilling [Blue Max]	Air-rotary drilling (proportioned at 95.43%)	Sonic drilling (proportioned at 44.83%)	Geophysical logging	Coal analyses	Catwork (incl. snow clearing, layout, and rig mats)	Personnel (geological super- vision by contractors	Well components / instruments	
2019-2020		19 holes	333.78 m	157.40 m	$122,724.69	$67,725.28	$nil	$nil	$19,560.03	$10,064.28 (from BC unit costs)	$8720.44	$228,794.72
			combined 491.18 m									
2019-2020	as above	19 holes	Meterages		*unit costs per metre of drilling*							
			333.78 m	157.40 m	$367.68/m	$430.27/m	$nil	$nil	$39.82/m	$20.49/m (from BC unit costs)	$17.75/m	$465.81/m
			combined 491.18 m									
British Columbia average unit costs per metre, for comparison			n/a	n/a	$201.53/m	$210.34/m	$17.56/m	n/a	$23.30/m	$20.49/m	n/a	n/a

Note: *costs given in these tables are estimated on the basis of incomplete invoicing, and should be regarded as minimum values.*

8 References

The following references were consulted during the preparation of this report.

Baxter, K. and Bourne, J.
2020: Wolverine-Hermann Amendment Project: Hermann Disturbance Area hydrogeologic baseline update; *Lorax Environmental Services Ltd*., unpublished report dated March 2020, for Conuma Coal Resources Limited.

Cathyl-Huhn, C.G.
2015: Coal Assessment Report for the Hermann coal licences; *Wolverine Coal Partnership*, unpublished report dated September 16, 2015, on behalf of Walter Canadian Coal Partnership; *British Columbia Geological Survey Branch*, Coal Assessment Report No. 999.

Cathyl-Huhn, C.G. and Singh, P.
2014: Coal Assessment Report for Hermann coal licences, Mt. Hermann area, British Columbia; unpublished report dated November 19, 2014, on behalf of Walter Canadian Coal Partnership; *British Columbia Geological Survey Branch*, Coal Assessment Report No. 950.

Cooper, M., Brealey, C., Fermor, P. and Morrison, M.
2004: Structural models of subsurface thrust-related folds in the Foothills of British Columbia – case studies of sidetracked gas wells; in K.R. McClay (editor), Thrust tectonics and hydrocarbon systems; *American Association of Petroleum Geologists*, Memoir 82, pages 579 to 597.

Duff, P.McL.D. and Gilchrist, R.D.
1981: Correlation of Lower Cretaceous coal measures, Peace River Coalfield, British Columbia; *British Columbia Ministry of Energy, Mines and Petroleum Resources*, Paper 1981-3, 31 pages.

Gibson, D.W.
1992: Stratigraphy and sedimentology of the Lower Cretaceous Hulcross and Boulder Creek formations, northeastern British Columbia; *Geological Survey of Canada*, Bulletin 440, 111 pages.

Gormley, G.P.
1987: Quintette Coal Limited Transfer area geological report; unpublished report dated March 1987; *British Columbia Geological Survey Branch*, Coal Assessment Report No. 724.

Helsen, J., Baxter, K., and Stastny, V.
2019: Wolverine-Hermann Amendment Project: Hermann Disturbance Area groundwater supply assessment; *Lorax Environmental Services Ltd*., project A512-6; unpublished report dated 29 November 2019, for Conuma Coal Resources Limited.

Holmes, A. and Burgert, A.
2006: Monitoring well logs, in Appendix 8: Groundwater; *Piteau and Associates Engineering Ltd*.; unpublished report dated November 2006, for Western Canadian Coal Corp.

Johnson, D.G.S.
1985: 1984 Quintette geological report; unpublished report PR – Quintette 84(1)A, dated April 15, 1985, on behalf of Quintette Coal Ltd.; *British Columbia Geological Survey Branch*, Coal Assessment Report No. 618.

1989: Quintette Coal Limited 1988 geological report, Transfer, Grizzly, Perry Creek, Marmot and Wolverine Valley South areas, unpublished report dated April, 1989 on behalf of Technical Services Department, Quintette Coal Limited; *British Columbia Geological Survey Branch*, Coal Assessment Report No. 746.

1990: Quintette Coal Limited 1988 geological report, Transfer, Grizzly and Mesa North Extension; *British Columbia Geological Survey Branch*, Coal Assessment Report No. 753.

Jones, P.B.
1979: Report on geological fieldwork in the North Monkman area, British Columbia; Triad Oil Co. Ltd., unpublished report; *British Columbia Ministry of Energy, Mines and Petroleum Resources*, Petroleum Resources Branch Geological Report No. 863.

Kilby, W.E.
1984a: Tonsteins and bentonites in northeast British Columbia (93O, P, I); in Geological Fieldwork 1983, *British Columbia Ministry of Energy, Mines and Petroleum Resources*, Geological Survey Branch Paper 1984-1, pages 95 to 107.

Kilby, W.E. and Wrightson, C.B.
1987: Bedrock geology of the Bullmoose Creek area (NTS 93P/3); *British Columbia Ministry of Energy, Mines and Petroleum Resources*, Open File 1987-06.

Pernito, M.A., Simon, D.A., and Bianchin, M.
2019: Wolverine-Hermann Amendment Project: Hermann Disturbance Area water management system geotechnical site assessment and design report*; Wood Environmental & Infrastructure Solutions*, project VE52738; unpublished report dated November 27, 2019, for Conuma Coal Resources Limited.

Reimchen, T.H.F.
1980: Surficial geology, Dawson Creek, West of Sixth Meridian; *Geological Survey of Canada*, "A' series map 1467a, 1 sheet; accessed via *https://doi.org/10.4095/120060*

Rostad, M. and Hogarth, J.D.
2019: Pit slope design review -- Hermann Pit; *Piteau Associates Engineering Ltd*., report 3194-19-LR001 dated October 8, 2019, for Conuma Coal Resources Limited.

Solod, A. and Momeyer, S.
2020: Wolverine-Hermann Amendment Project: Hermann Disturbance Area 2019 hydrogeology field investigation program update; *Lorax Environmental Services Ltd*., project A512-8; unpublished report dated 31 January 2020, for Conuma Coal Resources Limited

Solod, A., Momeyer, S., and Baxter, K.
2019: Hermann Mine 2019 hydrogeological field investigation program Notice of Work #1; *Lorax Environmental Services Ltd.*, draft report A512 Rev0, dated August 1, 2019, for Conuma Coal Resources Limited.

Stelck, C.R. and Leckie, D.A.
1988: Foraminiferal inventory and lithologic description of the Lower Cretaceous (Albian) Hulcross Shale, Monkman area, northeastern British Columbia; *Canadian Journal of Earth Sciences*, volume 25, pages 793 to 798.

Stott, D.F.
1960: Cretaceous rocks between Smoky and Pine rivers, Rocky Mountain Foothills, Alberta and British Columbia; *Geological Survey of Canada*, Paper 60-16, 52 pages.

1963: Stratigraphy of the Lower Cretaceous Fort St. John Group, Gething and Cadomin formations, Foothills of northern Alberta and British Columbia; *Geological Survey of Canada*, Paper 62-39, 48 pages.

1968: Lower Cretaceous Bullhead and Fort St. John groups, between Smoky and Peace rivers, Rocky Mountain Foothills, Alberta and British Columbia; *Geological Survey of Canada*, Bulletin 152, 279 pages.

1982: Lower Cretaceous Fort St. John Group and Upper Cretaceous Dunvegan Formation of the Foothills and Plains of Alberta, British Columbia, District of Mackenzie and Yukon Territory; *Geological Survey of Canada*, Bulletin 328, 124 pages.

9 Conclusions and recommendations

9.1 Conclusions

Geotechnical and hydrogeological boreholes drilled during the 2019-2020 work term, at and adjacent to Hermann Area 'A', did not encounter workable coal, on account of the boreholes being too short to reach the deeply-buried coal-measures.

Area 'A' (tenure 417327) and its immediate vicinity are pervasively covered by thick deposits of unconsolidated and semi-consolidated Drift, locally more than 50 metres thick. Although 38 boreholes were drilled during the 2019-2020 work term, only five boreholes reached rockhead, at depths ranging from 10.7 to 51.8 metres. Three earlier monitoring wells, drilled in 2005, all reached bedrock.

Physical work on tenure 417327 (Area 'A'), comprised 19 boreholes with an overall depth of 491.18 metres, at an estimated cost of $228,794.72 (Canadian). Physical work on adjoining tenure 417036 (held by Peace River coal, and so not included in this report's statistical cover-sheets) comprised an additional 19 boreholes with an overall depth of 209.74 metres, at an estimated additional cost of $105,594.31(Canadian).

9.2 Recommendation

Continued maintenance of tenure 417327 in 'good standing' under the *Coal Act* (through payment of rentals and submission of work reports) is essential to ongoing operations, including the construction of the Hermann open-pit's ancillary facilities. The next upcoming coal assessment reporting date is April 25th (for Tenure 417327).

Structural step-out drilling is recommended for tenure 417327, as part of a regional-scale exploration programme. These drill sites have already been permitted, although the work permits may have timed-out. These boreholes would allow better definition of geological structure and coal-zone geometry within the northwestern portion of the Hermann property.

10 Statement of qualifications

I, C.G. Cathyl-Huhn P.Geo.(BC) Lic.Geol.(WA) RMSME, do hereby certify that:

a) I am currently employed on a full-time basis as Chief Geologist, by Conuma Resources Limited, in their Canadian head office in Tumbler Ridge, British Columbia.

b) This certificate applies to the current report, titled *Coal Assessment Report for Hermann Area 'A',, Mt. Hermann area, British Columbia*, dated January 26, 2022..

c) I am a member (Professional Geoscientist, Licence No.20550) of the Association of Professional Engineers and Geoscientists of British Columbia, licensed as a geologist (Licence No.2089) in Washington State, a Life Member of the Canadian Institute of Mining and Metallurgy, and a founding Registered Member of the Society for Mining, Metallurgy and Exploration (SME, Registered Member No.518350). I have worked as a colliery geologist in several countries for over 43 years since my graduation from university with a Bachelors' in Geological Sciences.

d) I certify that by reason of my education, affiliation with professional associations, and past relevant work experience, having written numerous published and private geological reports and technical papers concerning coalfield geology, coal-mining geology and coal-resource estimation, that I am qualified as a Qualified Person as defined by Canadian *National Instrument 43-101* and a Competent Person as defined by the Australian *JORC Code*.

e) I have worked as Chief Geologist for Conuma Coal Resources Limited and Conuma Resources Limited since September of 2016.

f) My most recent visit to Area 'A' of the Hermann coal property was in July of 2021.

g) I am the sole author of this report, titled *Coal Assessment Report for Hermann Area 'A', Mt. Hermann area, British Columbia*, dated January 26, 2022, concerning tenure 417327 within Area 'A' of the Hermann coal property.

h) I accept professional responsibility for this report.

i) As of the date of this report, I am not independent of Conuma Resources Limited, pursuant to the tests in Section 1.4 of *National Instrument 43-101*, for the reason that I am a full-time employee of Conuma Resources Limited.

j) The effective date of this report is April 25, 2020.

“original signed and sealed by”

Dated this 26th day of January, 2022. C.G. Cathyl-Huhn P.Geo. Lic.Geol. RMSME

Appendix A: Details of testholes and wells

Following are positional and construction details (**Table A-1**), and geological details **(Table A-2)** of Drift thickness, rockhead elevation (where reached) and reported bedrock geology, of geotechnical testholes (TH-series), hydrogeological monitoring wells (MW-series) and groundwater extraction wells (EW-series).

Depths, thicknesses, and elevations are given in metres. **Table A-1** further presents the names of drilling contractors for each testhole or well.

All testholes and wells were set-up to be vertical; azimuth is thus reported as 0 degrees and dip as -90 degrees. Downhole surveys of deviation and verticality were not run.

All surface positions of testholes and wells were surveyed, with coordinates reported in terms of Zone 10 (northern hemisphere) of the Universal Transverse Mercator system, relative to the North American Datum of 1983. Elevations reported are for the ground surface, in metres above geodetic datum. Some locations are only given to the nearest metre.

In the tables, 'Drift' refers to unconsolidated and semi-consolidated sedimentary deposits, such as sand, gravel, silt, peat, or (in some cases along roads and trails) artificial fill. 'Rockhead elevation' refers to the interpreted elevation of rock beneath Drift. Lithology of rock is as reported on graphic logs of testholes and wells. In some cases, only unspecified 'bedrock' is mentioned. No coal was reported from any of the testholes or wells here-discussed.

A.1: Summary of drilling programmes

During the 2019-2020 drilling programmes within and adjoining Area 'A' of the Hermann coal property, 38 boreholes were drilled for geotechnical studies and groundwater investigations. Of these boreholes, 19 were drilled within Conuma's coal licence 417327, and 19 were drilled within Peace River Coal's coal licence 417036. Work was divided into three phases, denoted as NOW-2, NOW-3, and NOW-4 respectively:

- NOW-2: 29 geotechnical boreholes (TH-19 series)and 1 hydrogeological monitoring well (MW19-series);
- NOW-3: 5 hydrogeological monitoring wells (MW19-series); and
- NOW-4: 3 water-supply wells (EW19-series).

Locations (including tenures upon which the holes were drilled) and construction details of these boreholes are presented in **Table A-1**.

A.2 Geophysical logging

Geophysical logging was not done during the 2019-2020 drilling within and adjacent to Area 'A' of the Hermann coal property.

A.3 Compilation and presentation of drill logs

Drill logs were compiled by engineers and geoscientists working for contracted consulting firms. Logs have been compiled as single- and multi-page strip logs, included in consulting reports, and copied from the reports for presentation within **Appendix B** of the present report.

Borehole / well inventory -- **Table A-1**

Program	Testhole / well	UTM NAD83 Zone 10		Elevation	TD	Diameter	Contractor	Drilling method	Azimuth	Dip	Commenced	Completed	Tenure
		Easting	Northing										
NOW-2	MW19-12-15	618906.20	6099231.49	1166.09	16	158.8 mm	Anderson	air rotary	0	-90	2019 Jun 09	2019 Jun 09	417036
NOW-2	TH19-01	618725.32	6098546.63	1183.53	17	152.4 mm	Blue Max	sonic	0	-90	2019 May 31	2019 May 31	417327
NOW-2	TH19-02	618775.03	6098610.46	1184.31	17	152.4 mm	Blue Max	sonic	0	-90	2019 May 30	2019 May 30	417327
NOW-2	TH19-03	not drilled											
NOW-2	TH19-04	618800.14	6098683.01	1182.10	6.7	152.4 mm	Blue Max	sonic	0	-90	2019 May 25	2019 May 25	417327
NOW-2	TH19-05	618758.89	6098990.18	1186.08	15.3	152.4 mm	Blue Max	sonic	0	-90	2019 May 25	2019 May 25	417327
NOW-2	TH19-06	618795.54	6099112.10	1183.81	15.3	152.4 mm	Blue Max	sonic	0	-90	2019 May 26	2019 May 26	417327
NOW-2	TH19-07	618779.97	6099249.77	1185.40	6.7	152.4 mm	Blue Max	sonic	0	-90	2019 May 25	2019 May 25	417036
NOW-2	TH19-08	618727.80	6099340.82	1185.02	6.7	152.4 mm	Blue Max	sonic	0	-90	2019 May 25	2019 May 25	417036
NOW-2	TH19-09	618693.38	6099134.55	1208.62	15.3	152.4 mm	Blue Max	sonic	0	-90	2019 May 27	2019 May 28	417327
NOW-2	TH19-10	618645.49	6099035.15	1219.96	12.2	152.4 mm	Blue Max	sonic	0	-90	2019 May 27	2019 May 27	417327
NOW-2	TH19-11	618992.54	6098741.35	1186.17	9.8	152.4 mm	Blue Max	sonic	0	-90	2019 May 23	2019 May 23	417036
NOW-2	TH19-12	619061.09	6098871.48	1184.68	6.7	152.4 mm	Blue Max	sonic	0	-90	2019 May 23	2019 May 23	417036
NOW-2	TH19-13	619105.24	6099043.81	1181.83	6.7	152.4 mm	Blue Max	sonic	0	-90	2019 May 23	2019 May 23	417036
NOW-2	TH19-14	619046.16	6099163.49	1179.15	6.7	152.4 mm	Blue Max	sonic	0	-90	2019 Jun 01	2019 Jun 01	417036
NOW-2	TH19-15	618522.40	6098791.87	1219.99	15.7	152.4 mm	Blue Max	sonic	0	-90	2019 May 26	2019 May 26	417327
NOW-2	TH19-16	not drilled											
NOW-2	TH19-17	618832.63	6098974.88	1172.36	10.1	152.4 mm	Blue Max	sonic	0	-90	2019 May 29	2019 May 29	417327
NOW-2	TH19-18	not drilled											
NOW-2	TH19-19	618897.18	6099208.60	1166.48	15.7	152.4 mm	Blue Max	sonic	0	-90	2019 Jun 04	2019 Jun 04	417036
NOW-2	TH19-20	618957.99	6099199.27	1175.60	12.7	152.4 mm	Blue Max	sonic	0	-90	2019 Jun 02	2019 Jun 03	417036
NOW-2	TH19-21	619022.92	6099181.26	1181.78	12.8	152.4 mm	Blue Max	sonic	0	-90	2019 Jun 02	2019 Jun 02	417036
NOW-2	TH19-22	not drilled											
NOW-2	TH19-23	618907.57	6099234.82	1166.25	12.7	152.4 mm	Blue Max	sonic	0	-90	2019 Jun 04	2019 Jun 04	417036
NOW-2	TH19-24	618903.34	6099160.09	1172.69	12.7	152.4 mm	Blue Max	sonic	0	-90	2019 Jun 03	2019 Jun 03	417036
NOW-2	TH19-25	619018.47	6099110.32	1179.55	6.7	152.4 mm	Blue Max	sonic	0	-90	2019 May 24	2019 May 24	417036
NOW-2	TH19-26	619005.06	6098999.35	1178.10	6.7	152.4 mm	Blue Max	sonic	0	-90	2019 May 24	2019 May 24	417036
NOW-2	TH19-27	618892.45	6098836.37	1180.57	9.8	152.4 mm	Blue Max	sonic	0	-90	2019 May 29	2019 May 29	417327
NOW-2	TH19-28	618898.27	6098928.64	1176.10	6.7	152.4 mm	Blue Max	sonic	0	-90	2019 May 29	2019 May 29	417327
NOW-2	TH19-29	618935.69	6099037.78	1176.21	6.7	152.4 mm	Blue Max	sonic	0	-90	2019 May 24	2019 May 24	417327
NOW-2	TH19-30	618959.40	6099121.71	1176.28	6.7	152.4 mm	Blue Max	sonic	0	-90	2019 Jun 02	2019 Jun 02	417036
NOW-2	TH19-31	618986.80	6098910.45	1179.83	6.7	152.4 mm	Blue Max	sonic	0	-90	2019 May 24	2019 May 24	417036
NOW-2	TH19-32	619058.21	6099010.16	1180.87	6.7	152.4 mm	Blue Max	sonic	0	-90	2019 May 24	2019 May 24	417036
NOW-2	TH19-33	618884.43	6098793.59	1181.17	9.6	152.4 mm	Blue Max	sonic	0	-90	2019 May 29	2019 May 29	417327
NOW-3	MW19-08-05	618906.20	6099231.00	1166.09	4.64	152.4 mm	Blue Max	sonic	0	-90		2019 Jun 10	417036
NOW-3	MW19-08-43	618910.91	6099238.38	1166.65	45.7	152.4 mm	Blue Max	sonic	0	-90		2019 Jun 09	417036
NOW-3	MW19-11-10	618789.41	6098534.09	1195.69	10.85	158.8 mm	Anderson	air rotary	0	-90	2019 Oct 29	2019 Oct 30	417327
NOW-3	MW19-11-28	618795.10	6098536.11	1195.76	30	158.8 mm	Anderson	air rotary	0	-90	2019 Oct 28	2019 Oct 29	417327
NOW-3	MW19-13-18	618963.15	6098597.71	1190.58	18	158.8 mm	Anderson	air rotary	0	-90	2019 Nov 01	2019 Nov 02	417327
NOW-4	EW19-01-85	618742.4	6098506.2	1196	84.89	200 mm	Anderson	air rotary	0	-90	2019 Sep 16	2019 Sep 21	417327
NOW-4	EW19-02-86	618893	6098664	1186	86.41	200 mm	Anderson	air rotary	0	-90	2019 Sep 18	2019 Sep 27	417327
NOW-4	EW19-03-104	618722	6098426	1200	103.63	200 mm	Anderson	air rotary	0	-90	2019 Sep 23	2019 Sep 25	417327

Borehole / well geological results -- **Table A-2**

Borehole	UTM NAD83 Zone 10		Ground elevation	Drift thickness	Rockhead elevation	Lithology of bedrock	Total depth	Commenced	Completed	Geophysics?	Tenure
	Easting	Northing									
MW19-12-15	618906.20	6099231.49	1166.09	>16	not reached	not reached	16	2019 Jun 09	2019 Jun 09	no	417036
TH19-01	618725.32	6098546.63	1183.53	>17	not reached	not reached	17	2019 May 31	2019 May 31	no	417327
TH19-02	618775.03	6098610.46	1184.31	>17	not reached	not reached	17	2019 May 30	2019 May 30	no	417327
TH19-03	not drilled										
TH19-04	618800.14	6098683.01	1182.10	>6.7	not reached	not reached	6.7	2019 May 25	2019 May 25	no	417327
TH19-05	618758.89	6098990.18	1186.08	>15.3	not reached	not reached	15.3	2019 May 25	2019 May 25	no	417327
TH19-06	618795.54	6099112.10	1183.81	>15.3	not reached	not reached	15.3	2019 May 26	2019 May 26	no	417327
TH19-07	618779.97	6099249.77	1185.40	>6.7	not reached	not reached	6.7	2019 May 25	2019 May 25	no	417036
TH19-08	618727.80	6099340.82	1185.02	>6.7	not reached	not reached	6.7	2019 May 25	2019 May 25	no	417036
TH19-09	618693.38	6099134.55	1208.62	>15.3	not reached	not reached	15.3	2019 May 27	2019 May 28	no	417327
TH19-10	618645.49	6099035.15	1219.96	10.7	1209.26	bedrock	12.2	2019 May 27	2019 May 27	no	417327
TH19-11	618992.54	6098741.35	1186.17	>9.8	not reached	not reached	9.8	2019 May 23	2019 May 23	no	417036
TH19-12	619061.09	6098871.48	1184.68	>6.7	not reached	not reached	6.7	2019 May 23	2019 May 23	no	417036
TH19-13	619105.24	6099043.81	1181.83	>6.7	not reached	not reached	6.7	2019 May 23	2019 May 23	no	417036
TH19-14	619046.16	6099163.49	1179.15	>6.7	not reached	not reached	6.7	2019 Jun 01	2019 Jun 01	no	417036
TH19-15	618522.40	6098791.87	1219.99	>15.7	not reached	not reached	15.7	2019 May 26	2019 May 26	no	417327
TH19-16	not drilled										
TH19-17	618832.63	6098974.88	1172.36	>10.1	not reached	not reached	10.1	2019 May 29	2019 May 29	no	417327
TH19-18	not drilled										
TH19-19	618897.18	6099208.60	1166.48	>15.7	not reached	not reached	15.7	2019 Jun 04	2019 Jun 04	no	417036
TH19-20	618957.99	6099199.27	1175.60	>12.7	not reached	not reached	12.7	2019 Jun 02	2019 Jun 03	no	417036
TH19-21	619022.92	6099181.26	1181.78	>12.8	not reached	not reached	12.8	2019 Jun 02	2019 Jun 02	no	417036
TH19-22	not drilled										
TH19-23	618907.57	6099234.82	1166.25	>12.7	not reached	not reached	12.7	2019 Jun 04	2019 Jun 04	no	417036
TH19-24	618903.34	6099160.09	1172.69	>12.7	not reached	not reached	12.7	2019 Jun 03	2019 Jun 03	no	417036
TH19-25	619018.47	6099110.32	1179.55	>6.7	not reached	not reached	6.7	2019 May 24	2019 May 24	no	417036
TH19-26	619005.06	6098999.35	1178.10	>6.7	not reached	not reached	6.7	2019 May 24	2019 May 24	no	417036
TH19-27	618892.45	6098836.37	1180.57	>9.8	not reached	not reached	9.8	2019 May 29	2019 May 29	no	417327
TH19-28	618898.27	6098928.64	1176.10	>6.7	not reached	not reached	6.7	2019 May 29	2019 May 29	no	417327
TH19-29	618935.69	6099037.78	1176.21	>6.7	not reached	not reached	6.7	2019 May 24	2019 May 24	no	417327
TH19-30	618959.40	6099121.71	1176.28	>6.7	not reached	not reached	6.7	2019 Jun 02	2019 Jun 02	no	417036
TH19-31	618986.80	6098910.45	1179.83	>6.7	not reached	not reached	6.7	2019 May 24	2019 May 24	no	417036
TH19-32	619058.21	6099010.16	1180.87	>6.7	not reached	not reached	6.7	2019 May 24	2019 May 24	no	417036
TH19-33	618884.43	6098793.59	1181.17	>9.6	not reached	not reached	9.6	2019 May 29	2019 May 29	no	417327
MW19-08-05	618906.20	6099231.00	1166.09	>4.64	not reached	not reached	4.64		2019 Jun 10	no	417036
MW19-08-43	618910.91	6099238.38	1166.65	38	1128.65	mudstone	45.7		2019 Jun 09	no	417036
MW19-11-10	618789.41	6098534.09	1195.69	>10.85	not reached	not reached	10.85	2019 Oct 29	2019 Oct 30	no	417327
MW19-11-28	618795.10	6098536.11	1195.76	>30	not reached	not reached	30	2019 Oct 28	2019 Oct 29	no	417327
MW19-13-18	618963.15	6098597.71	1190.58	>18	not reached	not reached	18	2019 Nov 01	2019 Nov 02	no	417327
EW19-01-85	618742.4	6098506.2	1196	38.7	1157.3	siltstone	84.89	2019 Sep 16	2019 Sep 21	no	417327
EW19-02-86	618893.0	6098664.0	1186	51.8	1134.2	siltstone	86.41	2019 Sep 18	2019 Sep 27	no	417327
EW19-03-104	618722.0	6098426.0	1200	37.5	1162.5	siltstone	103.63	2019 Sep 23	2019 Sep 25	no	417327

Appendix B: Graphic drill logs

Following in the printed version of this report are copies of the graphic logs of the three year-2005 monitoring wells drilled within tenure 417327, plus the graphic logs of 2019-2020 geotechnical testholes, monitoring wells, and groundwater-extraction wells drilled within tenures 417036 and 417327. Vertical scales of these logs vary, and are as shown on each log column and in notes.

In the digital copy of this report, PDF-formatted scans of the graphic logs are presented in the following files:

- MW05- monitoring wells: filename *Scan-Area-A-logs-MW05s-1.pdf*
- EW19- groundwater-extraction wells: filename *Scan-Area-A-logs-EW19s-1.pdf*
- MW19- monitoring wells: filename *Scan-Area-A-logs-MW19s-1.pdf*
- TH19- geotechnical testholes: filenames *Scan-Area-A-logs-TH19s-1.pdf*, and *Scan-Area-A-logs-TH19s-2.pdf*