Appendix 2.2A-8
Transmission Line Feasibility Study

NEW GOLD INC.
BLACKWATER GOLD PROJECT





TRANSMISSION LINE FEASIBILITY STUDY

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NEW GOLD INC.
BLACKWATER GOLD PROJECT

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VA101-457/6-3

Rev	Description	Date	Approved
0	Issued in Final	September 3, 2013	BB

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EXECUTIVE SUMMARY

Knight Piésold Ltd. (KP) has been retained by New Gold Inc. (NG) to complete a feasibility study for a new overhead transmission line that would run from the BC Hydro grid to their proposed Blackwater mine site. The results of this study are to be incorporated into the overall feasibility assessment for the Blackwater Gold Project and are to be compliant with NI43-101. In order to achieve this KP completed several tasks to help identify a preferred transmission alignment that meets a balance of social, environmental and economic considerations. Subsequently a feasibility level design was completed for the preferred alignment in order to undertake detailed costing, constructability reviews and creation of a detailed development schedule.

Project Description

The proposed Blackwater mine transmission line will be a 230 kV 3-phase single circuit transmission line that will carry up to 120 MW to service the mine sites energy needs over an expected 17 year mine life. The alignment will consist of wooden H-Frame structures, with some steel monopole structures with an overall length of 139.5 km. The line will draw energy from BC Hydro's transmission system at the Glennanon substation located near the existing Endako mine, 65 km west of Vanderhoof, B.C. The transmission line has been routed to make use of existing access and cross recently logged areas as much as practical along its alignment. A brief description of the various segments of the transmission line is to follow.

From the Glennanon substation the transmission line will head roughly southeast crossing the Stellako River at around km 6 and continuing north of Nithi Mountain to the Holy Cross Forest Service Road (FSR) at km 25. The alignment will continue south crossing just north of Tahultzu Lake at km 37 and the Nechako River at km 48. The crossing over the Nechako River will head due east across the Kenny Lake Dam road to km 52 where the line will continue south. From km 57 the alignment will run south making use of the East Swanson Road to km 79 from where it will follow the Kluskus FSR to about km 99. At km 98.5 the transmission line will diverge from the Kluskus and head to the southwest through the proposed Chu-Moly mine site (avoiding all currently proposed infrastructure) to rejoin the Kluskus FSR at km 114.5. Heading west along the Kluskus FSR the alignment will traverse between private parcels located to the north of Tatelkuz Lake. At km 127 the transmission line will head south following the proposed mine access road to the mine substation at km 139.5.

Scope of Work

The scope of work completed for this feasibility study includes:

- Desk top study to refine the alignment based on stakeholder comments and environmental considerations provided by AMEC and New Gold
- Terrain and hazards mapping along the transmission line corridor
- Site investigations to identify foundation requirements in areas of soft soils
- Civil design of the transmission line using PLS-CADD™ software
- Electrical design to optimize conductor size and minimize line losses
- Solicitation of contractor quotations for construction of the transmission line
- Generation of a detailed development schedule, and
- Cost estimate including construction and operations costs (CAPEX/OPEX).

This report presents the findings of the transmission line Feasibility Study. The report has been prepared exclusively for New Gold in relation to the Blackwater Gold Project. No third party should rely on the information, conclusions, opinions, or any other matter contained in this report.

Input from this Transmission line Feasibility Study and CAPEX/OPEX is intended to be fed into the overall Blackwater Mine Feasibility Report. The assumed accuracy of the feasibility costs presented are in the range of +15% -10% that is described as a Class 3 Feasibility Estimate in AMEC's Estimating Development Plan (Doc. No. 173304-0000-CB10-RPT-001 Rev F).

Study Components

In order to progress from the high level studies completed during the projects Preliminary Economic Assessment to a design alignment that could be assessed for the feasibility study the following tasks were completed:

1. Identification of alternative corridors (KP Report VA101-00457/2-1)
2. Site reconnaissance (KP Letter VA12-01459 – Appendix A)
3. Ranking assessment of alternative corridors (KP Letter VA12-00708 – Appendix C)
4. Interconnection study (BC Hydro Report – Appendix D)
5. Detailed assessment of preferred corridor (KP Letter VA13-01184 – Appendix E)
6. Design of approved alignment
7. Site investigation at select tower sites (KP Letter VA13-01607 – Appendix F), and
8. Cost estimate and schedule development (AllNorth and Valard Reports – Appendices G and I).

Study Findings

KP has worked closely with AMEC and New Gold throughout this feasibility study to derive the current proposed Blackwater transmission line. Following approval by New Gold to proceed with design of the proposed transmission line design criteria were developed for all aspects of the project. Transmission line design criteria are summarized in Appendix J. These criteria were referenced in all aspects of the feasibility design including electrical design completed using ETAP Software and alignment design completed using PLS Cadd Software. The resulting design alignment is illustrated in Figures 4.1 through 4.16.

Prior to finalising the feasibility design, the alignment was provided to AllNorth Consultants Ltd. (ACL) so they could assess access roads and clearing requirements along the transmission line. A summary of the work completed by ACL is provided in Appendix G. Several alignment modifications were made as a result of the work completed by ACL, which are reflected in the final feasibility alignment.

Valard Powerline Contractors was retained by New Gold to assist with detailed project costing and development schedule. A summary of their work is provided in Appendix I.

CAPEX and OPEX

Following completion of Feasibility Study tasks it was determined that there are no insurmountable issues with respect to technical, environmental and social aspects of this project. The final component of this study was to estimate the Capital Expenditures (CAPEX) and Operating Expenditures (OPEX) to design, build, and operate the proposed transmission line.

Project CAPEX includes all direct and indirect costs associated with road and transmission line clearing, access road construction, transmission line construction and interconnect with the BC Hydro grid. The CAPEX summary is as follows:

Item	Cost ($Million)
Clearing	4.31
Access Roads	9.90
Transmission Line Construction	69.46
Interconnection	8.6
Total CAPEX	**92.27**
Total CAPEX/km	**0.661**

The project OPEX includes regular Operations and Maintenance items such as:

- Access track maintenance
- Vegetation control (without herbicides)
- Annual on ground Inspections
- First and tenth year climbing inspections and hardware tightening
- Management of contracts and maintenance
- Wood pole ground line treating, and
- Pole replacement.

It is anticipated that at the end of the mines life the transmission line will need to be removed. Therefore an estimate of these costs has also been provided with the OPEX. The OPEX summary is as follows:

Item	Cost ($Million)
O & M	12.14
Closeout Costs	1.40
Total Undiscounted LoM OPEX	**13.54**
Total Average Annual OPEX	**0.796**

OPEX costs do not include energy purchases from BC Hydro or any costs associated with transmission line losses.

Development Schedule

A detailed development schedule was created in collaboration between ACL, Valard, New Gold and KP. The schedule includes all relevant tasks required to advance the proposed Blackwater transmission line from detailed design and permitting through line construction and commissioning.

The project development schedule was prepared by Valard and can be found in Appendix I. Notable milestones include the following:

- EA Certificate issued to New Gold in Q1 2015
- Detailed design complete in Q4 2014

- Material procurement will commence in Q4 2014
- Access road construction and clearing will commence in Q1 2015 and finish in Q3 2015
- BC Hydro substation upgrades complete in Q1 2016 (earliest date for line interconnection)
- Commissioning complete in Q1 2016

Conclusion

No fatal flaws have been identified in this study that would prevent the construction of a 139.5 km-long 230 kV overhead transmission line from the Blackwater Project site to the existing Glenannen Substation, near Fraser Lake, BC.

The majority of the proposed alignment can be feasibly constructed using standard construction methods. The recommended construction is with wooden H-frame pole structures. Some isolated areas may require steel towers due to the long spans, wind loading, potential ice loading, terrain hazards, and difficult terrain. The route crosses a number of known terrain hazards that can be avoided and/or mitigated by good structure placement.

Detailed design should be undertaken concurrently with permitting exercises to ensure a transmission line is designed that finds the optimal balance between technical, environmental and socio-economic criteria.

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ABBREVIATIONS

Blackwater Gold Project	the Project
API	air photo interpretation
BCH	British Columbia Hydro and Power Authority
CAPEX	capital expenditure
CSA	Canadian Standards Association
DFO	Fisheries and Oceans Canada
EIS	environmental impact statement
EPCM	engineering, procurement and construction management
OPEX	operating expenditure
POI	point of interconnection
ROW	right of way

1 – INTRODUCTION

1.1 PROJECT DESCRIPTION

New Gold Inc. is in the early stages of developing the Blackwater Gold Project, a gold-silver deposit located approximately 110 km southwest of Vanderhoof in central British Columbia (Figure 1.1). The proposed mine comprises an open pit operation, with approximately 356 Mt of ore being extracted over the 17 year mine life. The site is located on the Nechako Plateau. The Nechako Plateau is an area of gently undulating highlands dissected by valleys and other low-lying areas.

As part of the overall mine development New Gold will need to construct a 139.5 km-long 230 kV overhead transmission line to the mine site from the point of interconnection at the existing BC Hydro Glenannon Substation near Fraser Lake, BC. The transmission line will carry up to 120 MW for the power requirements of the Blackwater Project.

1.2 PREVIOUS STUDIES

New Gold conducted a Preliminary Economic Assessment (PEA) for the Blackwater Gold project that was completed in 2011 (ref. VA101-00457/2-1). The transmission line PEA study included the identification of several possible transmission line corridors. The following tasks were completed as part of the PEA:

- BC Hydro Interconnection Feasibility Study to assess potential points of interconnection with the transmission system
- Identification of various transmission line corridors
- High level costing for each corridor, and
- Recommendations for further studies on preferred corridors.

The transmission line PEA was updated (ref. VA101-457/4-2) at the request of New Gold in 2012 to include the following:

- Identification of private land along corridors
- Refinement of corridor options based on private parcels and BC Hydro interconnection recommendations
- Alternatives ranking assessment for the updated corridors, and
- Updated CAPEX and OPEX for the preferred corridor option.

1.3 SCOPE OF WORK

Knight Piésold Ltd. (KP) has been retained by New Gold Inc. to carry out the feasibility design of the overhead transmission line for the Blackwater Project.

The scope of work for the feasibility study includes the following:

- Desk top study to refine the alignment based on stakeholder comments and environmental considerations provided by AMEC and New Gold
- Terrain and hazards mapping along the transmission line corridor
- Site investigations to identify foundation requirements in areas of soft soils
- Civil design of the transmission line using PLS-CADD™ software
- Electrical design to optimize conductor size and minimize line losses

- Solicitation of contractor quotations for construction of the transmission line
- Generation of a detailed development schedule, and
- Cost estimate including construction and operations costs (CAPEX/OPEX).

This report presents the findings of the transmission line Feasibility Study. The report has been prepared exclusively for New Gold in relation to the Blackwater Gold Project. No third party should rely on the information, conclusions, opinions, or any other matter contained in this report.

Input from this Transmission line Feasibility Study and CAPEX/OPEX is intended to be fed into the overall Blackwater Mine Feasibility Report. The assumed accuracy of the feasibility costs presented are in the range of +15% -10% that is described as a Class 3 Feasibility Estimate in AMEC's Estimating Development Plan (Doc. No. 173304-0000-CB10-RPT-001 Rev F).

2 – PRELIMINARY TRANSMISSION LINE ROUTING

A preliminary transmission line alignment has been designed to an appropriate standard such that the overall feasibility of the alignment can be determined. The alignment presented in this report has been optimized for reliability and constructability such that the overall project costs are within the prescribed Class 3 Estimate accuracy.

This section describes the methodology followed in establishing a transmission line alignment for the feasibility design of the Blackwater project and provides a description of the resulting transmission line alignment.

2.1 METHODOLOGY

The following set of guiding principles is used to assist in the preparation of the feasibility transmission line routing:

- Minimize the number of watercourse crossings
- Minimize areas that may be impacted by terrain hazards
- Minimize clearing for transmission and access rights of way
- Minimize access requirements
- Maximize use of existing transmission corridors
- Maximize re-use of existing rights-of-way
- Optimize the quantity of structures while minimizing the number of angles structures
- Avoid designated Indian Reserves, Parks and environmentally sensitive areas, and
- Avoid private land parcels.

The methodology for developing a feasibility alignment and completing the subsequent design work included the following major tasks:

1. Identification of alternative corridors
2. Site reconnaissance
3. Ranking assessment of alternative corridors
4. Interconnection study by BC Hydro
5. Detailed assessment of preferred corridor
6. Design of approved alignment
7. Site investigation at select tower sites, and
8. Cost estimate and schedule development.

A brief summary of each of these tasks is provided below.

2.1.1 Identification of Alternative Corridors

Prior to mapping alternative corridors, the locations of potential points of interconnection (POI's) with the BC Hydro grid were identified. The POI's were identified using available data from BC Hydro including mapped locations of sub-stations and voltage of transmission lines servicing each. Upon selection of POI's within close proximity to the Blackwater mine site, corridors extending from each to the mine site were selected. In addition a high level assessment was completed by BC Hydro to determine whether each POI could support the Blackwater mine load.

Corridor selection was completed as a desk top exercise and included a GIS mapping exercise using readily available information from online sources.

These online sources include the BC Governments Land and Resource Data Warehouse (LRDW) and iMap BC. A summary of corridor identification and preliminary assessments is provided in KP report VA101-457/4-2 included in Appendix J Site Reconnaissance

Site reconnaissance was initially undertaken in July 2012 along the preferred transmission line corridor to identify potential geotechnical and constructability constraints along the alignment. Site reconnaissance was undertaken on July 12, 2012 by Keith Ainsley, James Haley and Lawrence Duong of KP, accompanied by Paul Hosford of New Gold. All work was conducted from a helicopter, without ground truthing. KP letter VA12-01459 provides a summary of site reconnaissance findings and is provided in Appendix A

Following this site reconnaissance recommendations were made to refine the alignment giving consideration to:

- The possible presence of any ground conditions or terrain hazards that could present a fatal flaw
- The foundation requirements for the structures based on the anticipated ground conditions along the proposed alignment, and
- Overall constructability.

2.1.2 Alternative Ranking Assessment

An assessment of the private land holdings along the preferred transmission line corridors was completed in order to identify the potential impacts to private land owners and establish preliminary alignments that would avoid as much private land as possible. The results of this task are summarized in KP letter VA12-00400 and provided in Appendix B. GIS mapping data obtained during corridor identification and interconnection data obtained during ongoing interconnection studies was used in conjunction with the private land data in order to define a set of alternative alignments to be further assessed.

The resulting alternatives were assessed based on specific criteria that fit into the following categories:

- Technical
- Environmental and Social
- Schedule, and
- Costs.

The results of this assessment are presented in KP letter VA12-00708 provided in Appendix C.

2.1.3 Interconnection Studies

Upon completion of BC Hydro's high level assessment of the various POI's, New Gold entered into a formal agreement with BC Hydro to complete interconnection studies to determine the feasibility of interconnecting the Blackwater mine load to the BC Hydro grid. These studies include:

- System Impact Study (SIS) that determines the viability of interconnecting the load to the BC Hydro grid and provides a high level estimate of capital costs (+100/-35% accuracy).
- Facilities Study that includes specific studies to determine the required interconnection equipment and the design of interconnection facilities. The Facilities Study capital cost estimate is based on the specific equipment and facilities design therefore has a higher accuracy (+/-20%).

During the SIS the preferred POI at Glenannon was determined through the alternatives ranking assessment. This POI will be used in all BC Hydro studies.

The System Impact Study is complete and the results of the study are provided in Appendix D. The Facilities Study is currently underway with an expected completion date of January 1, 2014. Some of the key findings from the SIS are provided below:

- Glennanon (GLN) Substation will provide the most reliable interconnection due to a direct 500kV feed from the GMS generating station
- A 230 kV line position is available at GLN and minimal upgrades will be required for interconnecting a new load to BC Hydro's system
- BC Hydro has planned capacity upgrades on their bulk transmission system that will need to be coordinated with the Blackwater load interconnection
- The SIS does not attribute any costs for the North Coast area Remedial Action Scheme that BC Hydro states will not be significant and anticipate they will fall within the stated accuracy range of their capital cost quote
- Interconnection is technically feasible at GLN, and
- BC Hydro confirms the system will be ready for the Blackwater Load in Q1 2016.

2.1.4 Detailed Assessment of Preferred Corridor

In late July 2012 a baseline alignment was mapped from the GLN substation to the Blackwater mine site. This was the alignment used by New Gold and their environmental consultant team lead by AMEC E&I to commence baseline studies to be included in the projects BC Environmental Assessment Application. Comments on the proposed transmission line alignment were received from several stakeholders during public consultation as well as from AMEC as part of an environmental review. In order to address these comments NG instructed KP to assess a total of 11 re-route options that deviate from the baseline alignment. The results of this assessment are presented in KP letter report VA13-01184 provided in Appendix E.

At the time this report was written a decision by New Gold on re-route options 2 and 9 had not been made due to ongoing negotiation with stakeholders. In order to not hold up the remaining feasibility design tasks the preferred alternative for these re-routes was followed. The alignment that resulted from this assessment was approved for use in all feasibility level designs.

A detailed terrain mapping exercise was also completed for the preferred corridor. The results of this study are provided in Section 3 of this report. The results were used in the design stage to determine optimal structure locations that avoid as much as possible areas of problematic soil conditions and known terrain hazards.

2.1.5 Design of Approved Alignment

Design tasks were completed for civil and electrical components of the transmission line. Feasibility design was completed using Powerline Systems Inc. software PLS-CADD™. PLS-CADD™ is a transmission line design program that incorporates the following information:

- Contour and high resolution imagery for the study area (provided by PhotoSat Information Ltd.)
- LiDAR data for the mine site and a portion of the alignment along the Kluskus FSR(provided by Eagle Mapping Ltd.)
- Terrain data

- Sag-tension criteria
- Electrical design criteria
- Climatic criteria
- External design loads
- Conductor clearances, and
- Etc.

2.1.6 Site Investigation

A site investigation was completed in July 2013 at 11 locations along the transmission line corridor. These locations were identified as potentially having soft soils based upon the findings of terrain mapping. The findings of the site investigation are reported in KP letter VA13-01607, a copy of which is presented in Appendix X. A summary of the key findings of the site investigation are detailed in Section 3.5 of this report.

2.1.7 Physiography

The site is located on the Nechako Plateau. The Nechako Plateau is an area of gently undulating highlands dissected by meltwater channels. The site area comprises hummocky and rounded topography with local hill-top plateaus. The site has been glaciated and the mountain tops are typically rounded. The transmission line corridor predominantly comprises gentle sloping terrain. There are some moderately steep to steep slopes, particularly adjacent to the main watercourses. There are some plains (areas with a natural slope angle of less than 5%) within the Study Area. The plains comprise poorly drained swamps, the top surfaces of fluvial and fluvioglacial terraces and glacial lake deposits as well as plateaus on hill tops. The elevation of the Study Site ranges from approximately 700 m asl at the northern end of the alignment to approximately 1000 m asl at the mine site.

2.1.8 Climate

The climate at the Blackwater property is sub-continental and characterized by warm summers and cold winters. The climate is influenced by cold arctic air and moisture-laden weather systems moving west along the Kitimat Ranges. Temperatures range from -40 C in winter to a maximum of 32 C in summer. The mean annual precipitation for the site is estimated to be 580 mm, with 50% falling as rain and 50% as snow.

2.1.9 Alternative Transmission Line Alignments

An alternatives assessment has been undertaken to determine a preferred routing of the transmission line. A total of five alignment options were identified in the alternatives assessment. A ranking exercise was completed as part of the alternatives assessment in order to provide a subjective account of each alignment option. The results of this assessment are described in KP report VA101-457/4-2 Transmission Line PEA Update. The western most alignment (Option 3 from the PEA Update report) was recommended for further assessment and to be used for the feasibility design.

Prior to commencing feasibility design tasks a routing assessment was completed on the preferred alignment. This assessment involved working with NG's environmental team to assess various

alignment options that would address concerns related to specific stakeholders as well as impacts to sensitive and/or rare habitats. Results of this assessment are described in KP letter VA13-01184, provided in Appendix E. Summary details that were used to assess each re-route option include technical, environmental and cost data.

2.1.10 Feasibility Design Alignment Description

The feasibility design transmission line alignment is approximately 139.5 km long and extends south from BC Hydro's Glenannon Substation located on Highway 16, near Fraser Lake, to the Blackwater mine site. The alignment is shown on Figures 2.1 to 2.18. A description of this alignment is provided below.

The Blackwater transmission line will commence on the northeast side of BC Hydro's Glenannon (GLN) substation located immediately south of Highway 16, to the east of Fraser Lake. The alignment will head southeast from GLN, parallel to BC Hydro's existing 230kV and 500kV transmission lines, and then head south to cross underneath these circuits around 1km.

The line will then head southeast through an area that is moderately forested with little existing access. The alignment crosses the Stellako River at Ch. 6 km and then continues south crossing the Francois Lake Road at Ch. 7 km.

From 7km to 21km the alignment will head west through an area to the north of Nithi Mountain to Foster Road with good access and several cleared areas. New access will be required from Ch. 7 km to Ch. 11 km and Ch. 17 km to Ch. 19 km with all other areas accessible from Nithi Mountain Road that will require upgrades to allow access to this area.

The alignment will head south from Ch. 21 km following Foster Road to Ch. 23 km where the alignment will head southeast crossing Foster Creek at Ch. 24.5 km and then join up with the Holy Cross FSR at 25km. New access will be required from the area between Ch. 23 km and Ch. 25 km.

The alignment will continue heading south generally following the Holy Cross FSR to Ch. 32 km, at which point the Holy Cross FSR diverges to the southwest and the alignment continues south along 1100 Road to the south of Tahultzu Lake up to Ch. 41 km. Several new access tracks will be required to gain access to the alignment from the existing access roads. The alignment crosses a few previously cleared areas and an area of old forest to the north of Tahultzu Lake.

At 41km the alignment diverges from 1100 Road and can be accessed from old roads that will need to be upgraded to approximately Ch. 47 km. The alignment will cross the Nechako River at 48 km, heading east across the Kenny Dam Road at Ch. 49.5 km and then heads south to intersect the East Swanson Road at Ch. 55 km. New access will be required from Ch. 47 km to Ch. 55 km. Construction on the east side of the Nechako River will be difficult due to steep terrain and wetland complexes around Greer Creek.

Following the East Swanson Road south from 55km will bring the alignment to intersect with the Kluskus FSR at Ch. 80 km. This area will require some new access from the East Swanson Road and will follow the road as close as possible to reduce clearing requirements. The alignment will continue south along the Kluskus FSR to about Ch. 97 km, again following the existing road so as to reduce clearing requirements. At Ch. 97 km the alignment will head southwest along Marten Road crossing just north of Brewster Lakes. From Ch. 105 km, the end of Marten Road, the alignment will cross through the proposed Chu-Moly mine site and rejoin the Kluskus FSR at Ch. 113 km.

The transmission line will follow the Kluskus FSR to the west from Ch. 113 km through the Mills Ranch area. The alignment will be constructed as close as possible to the Kluskus FSR through this area in order to avoid crossing private lands located to the north of Tatelkuz Lake. The transmission line will need to pass through a 30 m wide strip of crown land that lies between these private parcels. This piece of crown land is currently occupied by the Kluskus FSR right-of-way. Steel towers and short spans will be used to minimize any impacts to the private parcels.

The alignment will continue west along the Kluskus FSR to Ch. 125 km where it will diverge from the Kluskus FSR and head south to the Blackwater mine site. The segment from Ch. 125 km to the mine substation at Ch. 139.5 km will generally follow the newly proposed mine access road that is being designed by AllNorth Consultants Ltd.

A summary of transmission line details is provided below.

Table 2.1 Summary of Transmission Line Details

ITEM	UNIT	VALUE
TL Length	km	139.5
TL Structures	#	619
Foundations		
Rock	#	24
Soft Soil	#	15
Suitable Overburden	#	580
Road Crossings		
New Road	#	11
Existing Active Road	#	11
Upgrade Road	#	2
Road Parallel to TL		
New Road	km	63.5
Existing Active Road	km	54
Upgrade Road	km	8.7
Forested Land Base		
Cleared	km	22.2
New Forest	km	19.6
Moderate Age Forest	km	7
Older Forest	km	90.4
Stream Crossings		
Small (<20m)	#	52
Large (>20m)	#	4

NOTES:

1. Forested land base data obtained from PhotoSat imagery acquired in August 2012.
2. Road data obtained from AllNorth Consultants Ltd.

3 – GEOTECHNICAL CONSIDERATIONS

3.1 DESK TOP STUDY

3.1.1 Published Geological Mapping

3.1.1.1 Bedrock Geology

The published 1:250,000 scale geology maps for the Nechako River area (Williams, 1997) indicates the bedrock geology along the northern portion of the transmission line alignment (Ch. 0 km to Ch. 60 km) predominantly comprises Middle Jurassic to Early Cretaceous granodiorite. The bedrock geology south of Ch. 60 km is predominantly mapped as andesites, basalts, tuffs and breccias of the Lower to Middle Jurassic Hazelton Formation.

3.1.1.2 Surficial Geology

The regional surficial geology was researched from the 1:250,000 scale surficial geology map for the Nechako River Area, published by the Geological Survey of Canada (Plouffe et al, 2004). The mapping indicates there is an extensive cover of surficial deposits along the alignment, principally comprising glacial till deposited during the late Wisconsinan Glaciation (Drawings G0060 and G0061). The glacial till comprises boulder to pebble-sized clasts in a matrix of sand (46% on average), silt (51% on average) and clay (3% on average), according to the descriptive notes provided on the 1:250,000 scale map.

During the late Wisconsinan Glaciation, ice moved into the Study Area from the Coast Mountains. The ice sheet had a dominant flow direction towards the east-northeast before flowing further north, northeast and east onto the Interior Plateau. At the glacial maximum, the elevation of the ice surface was in excess of 1750 m, covering the highest peaks in the region. Massive, compact lodgement tills were deposited at the base of the advancing ice sheet. Ablation tills were also deposited, locally.

Deposits formed during de-glaciation of the area include ice-contact glaciofluvial and glaciolacustrine sediments. Glaciofluvial sands and gravels are common in valley bottoms and along the valley flanks, occurring as kames, eskers and terraces. The glaciolacustrine deposits include fine to coarse sand as well as silts and clays.

The Holocene deposits in the Study Area comprise organic deposits in flat-lying areas, colluvial veneers on steeper slopes and recent fluvial sediments in the valley bottoms.

3.2 AIR PHOTO INTERPRETATION

An Air Photo Interpretation (API) was undertaken using digital stereo pairs. The images were primarily taken in 2010 as part of the LIDAR survey. Additional satellite-acquired imagery was obtained in 2012. The stereo pairs were inspected using the *Datem* software package *Summit Lite* with the aid of a 3d screen and 3d glasses. A dual screen set-up was used for the API with the second screen displaying the 1 m LiDAR contours and the ortho-rectified imagery within the ArcGis software package *ArcEditor* and being used to create the line work.

Historic air photos of the Study Area were loaned from the University of British Columbia and inspected using a stereoscope. A summary of the historic air photos inspected is presented in Table 3.1, below:

Table 3.1 Summary of Historic Air Photos Inspected

Year	Flight Path	Scale	Photo Numbers
1953	BC 1815	1:30,000	25 to 29
1953	BC 1814	1:30,000	43 to 46, 75 to 76, 88 to 89, 93 to 96
1953	BC 1578	1:30,000	27 to 32
1953	BC 1577	1:30,000	58 to 64, 92 to 94, 69 to 74, 84 to 90
1953	BC 1813	1:30,000	8 to 9, 21 to 23
1966	BC 5217	1:30,000	217 to 219, 241 to 242
1973	BC 7560	1:20,000	70 to 72, 120 to 123, 262 to 263
1973	BC 7559	1:20,000	35 to 36, 153 to 154, 199 to 201
1978	BC 78079	1:60,000	98 to 100
1978	BC 78053	1:20,000	79 to 81, 87 to 88, 199 to 200
1979	BC 78076	1:60,000	278 to 279

The Study Area comprises the LiDAR Survey corridor, which is nominally approximately 2 km-wide, and includes the full extents of the upslope catchments. Terrain maps were prepared for the Study Area at a scale of 1:20,000 following the provincial guidelines (MoF, 1999). The terrain maps were prepared in accordance with the Terrain Classification System for British Columbia, as detailed by Howes and Kenk (1997). The mapping was undertaken to Terrain Survey Intensity Level 'E', which excludes ground-truthing (MoF, 1999). The maps were developed from the API and the slope angle maps, supplemented by the field observations. The terrain units were identified based upon the morphology, the presence and nature of soil or rock exposures, and vegetation associations.

Landslides mapped in the API are shown on Drawings G0070 to G0094 'Recent' landslides that may have occurred during or shortly before the period of the air photo record (i.e. within approximately the last 50 to 100 years) are distinguished from older 'relict' landslides.

3.3 FIELD RECONNAISSANCE

Helicopter site reconnaissance was undertaken on July 12, 2012 by James Haley P.Eng, Lawrence Duong, EIT and Keith Ainsley P.Eng. of KPL and Paul Hosford of New Gold. The weather was dry and mild during the fieldwork. A summary of the field reconnaissance is provided in Appendix A.

3.4 FINDINGS

3.4.1 Terrain Mapping

The terrain and terrain hazards maps are presented on Drawings G0070 to G0094. The legend for the terrain mapping is included on Drawing G0050. The findings of the mapping are presented in the following sections.

3.4.1.1 Surficial Geology

The surficial geology along the proposed transmission line alignment determined from the terrain mapping is broadly consistent with the geological model for the study site, developed as part of the desk top study.

The predominant terrain unit along the alignment comprises a blanket of glacial till (Mb). Streamlined landforms, comprising glacial till, were identified, locally in hill-top settings (Mbz1). These features were interpreted to comprise drumlins. The orientation of the drumlims indicates the predominant direction of ice movement was towards the northeast.

The mapping highlighted the presence of broad deposits of glaciofluvial soils adjacent to many of the active channels. These watercourses are interpreted to comprise glacial and post-glacial meltwater channels. The glaciofluvial soils mapped in the vicinity of these drainage lines are characterised by hummocky topography and were interpreted to predominantly comprise 'ice-contact' kame deposits (FGh). Glaciofluvial terraces (FGt) were mapped, locally. An area of north-trending sinuous ridges was identified in the vicinity of Ch. 124 km. These landforms were interpreted to be eskers, comprising ice-contact glaciofluvial deposits (FGr).

Glacial lake deposits (LG) were mapped at the toes of broad valley's along the alignment, in particular in the vicinity of Ch. 28 km, Ch. 83 km and Ch.111 km. The slope angles are generally gentle in these areas. The alignment traverses a broad terrace between Ch. 49.5 km and Ch. 50 km, which is interpreted to comprise glacial lake deposits (Photo 3.1):



Photo 3.1 The alignment traverses a broad terrace between Ch. 49.5 km and Ch. 50 km, interpreted to comprise glacial lake deposits

A surface veneer of colluvium (Cv) is interpreted to be present in the steeper areas of terrain. Steep gullied colluvial slopes (Cvg) were identified locally in the vicinity of the alignment, e.g. Ch. 5 km and Ch. 16 km. Talus slopes (C-Rb) have accumulated at the toes of steep rock slopes as a result of rock falls, particular in the vicinity of Ch. 5.8 km, Ch.36 km.

Organic soils have accumulated from the decomposition of plant material in poorly-drained settings, including swales, depressions and upland areas with a shallow bedrock surface. The main areas of

organic soils identified in the vicinity of the alignment are at Ch. 27.5 km, Ch. 50.5 km, Ch. 92.5 km and Ch. 120 km to Ch. 121.5 km

It was determined that the transmission line alignment should follow the existing road alignment across the area of organic soils in the vicinity of Ch. 120 Km (Photo 3.2), as the alternate alignment in this area (located approximately 5 km to the northwest) crosses a more extensive area of organic soils with abundant standing water (Photo 3.3).



Photo 3.2 Organic Soils in the vicinity of Ch. 120 km



Photo 3.3 Extensive Area of Organic Soils in the vicinity of alternate alignment in the area of Ch. 120 km

Fluvial deposits were mapped in the vicinity of the main water courses. The deposits predominantly comprise active channel deposits (F-l) along the drainage lines and overbank deposits (Fp) in the adjacent floodplains. Fluvial fans (Ff) have developed, locally, at the confluence of higher and lower-order drainage lines. A very large (approximately 2.5 km-wide) fluvial fan was identified in the vicinity of Ch. 120.5 km of the alignment, as shown on Drawing G0091. There is interpreted to be a surface cover of organic soils on parts of the fan.

Hill top areas of weathered bedrock were identified in the vicinity of Ch. 2.5 km, Ch. 36 km, Ch. 43 km and Ch. 46 km. Bedrock cliffs with rockfall talus slopes at their toes were identified in the vicinity of Ch. 6 km and Ch. 36.5 km.

3.4.1.2 Geological and Geomorphological Model

Terrain mapping facilitated the development of a geological and geomorphological model for the Study Area. Identification of geological and geomorphological features aided the selection of tower sites.

The surficial geology and landforms in the Study Area are predominantly the product of the late Wisconsinan (Fraser) Glaciation. The Fraser Glaciation left an extensive cover of till and glaciofluvial sands and gravels within the Study Area. The rounded mountain tops provide evidence that the area was completely covered with ice at the maximum of the Fraser Glaciation. Bedrock outcrops are generally limited to the mountain tops and the steep slopes. The local presence of streamlined drumlins in the Study Area provides evidence that the direction of ice advance was generally towards the northeast. Till was deposited principally at the base of the ice sheet as a compact lodgement till. Terrain mapping highlighted the extensive presence of ice-contact glaciofluvial soils, deposited by glacial meltwater streams. These deposits occur mainly in the vicinity of the valleys and are interpreted to be mainly outwash kame deposits. Small lakes in the mapped areas of kame deposits result in classic ‘kame and kettle’ topography. The kame deposits were incised by meltwater channels as the ice sheet retreated, resulting in the formation of glaciofluvial terraces adjacent to the watercourses. An area of north-trending sinuous ridges was identified in the vicinity of Ch. 124 km. These landforms are interpreted to be eskers comprising ice-contact glaciofluvial deposits. Glacial lakes developed locally on the valley floors as the ice retreated. Fine sediments, comprising silts and fine sands, accumulated in the lakes. It is possible that coarser beach deposits, comprising sands and gravels, accumulated on the margins of the lakes.

Colluvium accumulated locally on the steeper slopes within the Study Area as a result of soil creep and landslides.

Organic developed from the decomposition of organic material in poorly-drained settings, including swales, depressions and upland settings with a shallow bedrock surface. They also accumulated on gentle slopes at the margins of the flood plains of the main watercourses. The creeks in the Study Area are actively depositing coarse alluvium within their channels and finer overbank deposits on their floodplains.

3.4.1.3 Soil Drainage

The areas of lodgement till are poorly to imperfectly drained. The glaciofluvial sands and gravels are well drained and the colluvium moderately well drained. The fluvial deposits are moderately well drained in the vicinity of the active channels and poorly drained on the floodplains. The organic soils

are poorly drained and the water table is at or very close to ground surface. Areas of bedrock exposure are expected to be generally poorly drained.

3.4.1.4 Reliability and Limitations of Study

Reconnaissance terrain mapping has been undertaken for the proposed transmission line corridor for the Blackwater Gold Project. The mapping was undertaken to 'Terrain Survey Intensity Level E' which comprises API but no field-truthing. The availability of 2 m contour base mapping for the Study Area facilitated the delineation of certain features of significance to the mapping, e.g. the lateral margins of kame deposits and glacial lake deposits in addition to areas of gullied terrain. Factors limiting the accuracy of the mapping are the forest cover, the lack of ground-truthing.

3.4.2 Terrain Hazards Assessment

3.4.2.1 Hazard Types

The terrain hazards identified in the Study Area comprise:

- Local debris and rock slides on steep slopes adjacent to the incised drainage lines
- Local rockfall hazards from steep rock slopes
- Possible local snow avalanche hazards, and
- Possible local flood hazards on fluvial plains.

The landslides identified in the vicinity of the alignment are shown on Drawings G0070 to G0094. In the mapping, 'recent' landslides are distinguished from 'relict' landslides. The former are interpreted to have occurred during the period of the air photo record, whereas the latter pre-date it.

3.4.2.2 Landslides and Erosion

Relatively few landslides were identified in the Study Area. The identified landslides all occurred in areas of natural terrain. No landslides were identified along the forestry roads in the vicinity of the proposed alignment.

'Recent' debris slides were identified in the incised slopes adjacent to watercourses at Ch. 5.8 km, Ch. 83.3 km, and Ch. 85.2 km. The landslide at Ch. 5.8 km (Photo 3.4 and Drawing G0070) occurred on the side slope of a gully. The debris slides at Ch. 83.3 km and Ch. 85.2 km both occurred within glacial sands and gravels based upon the findings of the terrain mapping. The latter of these two landslides occurred at a meander bend (Photo 3.5). A possible 'relict' debris slide was identified in the vicinity of Ch. 51 km (Drawing G0078). The geology at this landslide site is interpreted to predominantly comprise glacial lake deposits.

Previous rockfalls were identified from the presence of talus slopes at the toes of rock cliffs at Ch. 5.8 km (Photo 3.2) and Ch. 36.4 km of the alignment.

The terrain mapping highlighted a local area of sheet erosion in the vicinity of Ch. 123.5 km and Ch. 137 km of the alignment. The identified areas of sheet erosion occur in glaciofluvial sands and gravels, on moderately steep to steep slopes, adjacent to watercourses.



Photo 3.4 Rockfall Talus slope and recent debris slide on the Southwest side of the Creek Crossing at Ch. 5.8 km

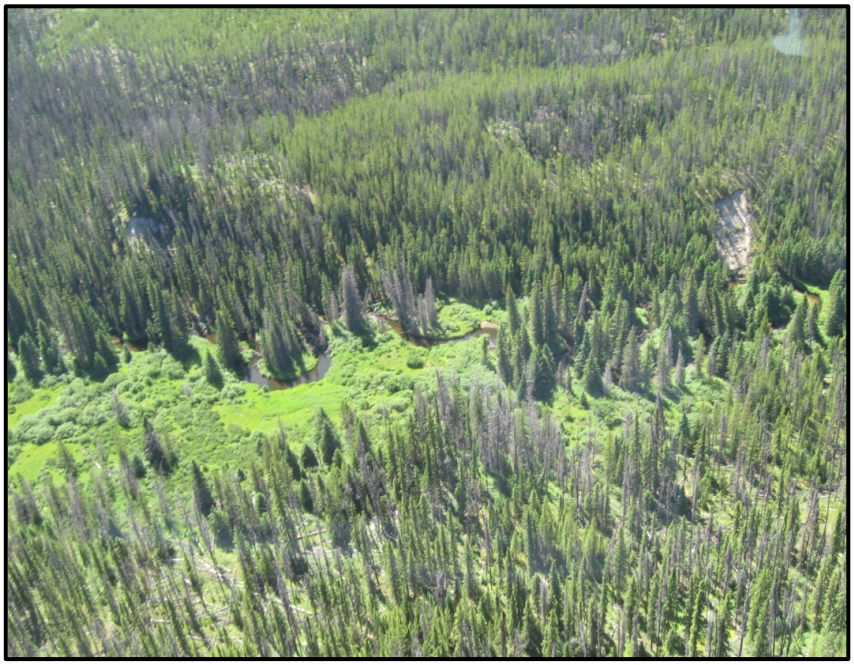


Photo 3.5 Debris slide in Hummocky Glacial Sand and Gravel deposit at meander bend near Ch. 85.2 km (WP 85)

3.4.2.3 Steep terrain

The terrain can generally be anticipated to be potentially unstable in relation to conventional side-cast road and access track construction practice in areas where the proposed transmission line corridor traverses steep ground (>60% slope). There are only local areas of steep terrain in the vicinity of the alignment. Areas of glacial lake deposits and areas of gullied terrain may be 'potentially unstable' at lower slope angles.

In areas where towers and construction access tracks are proposed to be constructed in 'potentially unstable' areas, the landslide risk should be managed by undertaking 'Terrain Stability Assessments' as part of the detailed design. Mitigation methods, such as full-bench construction practice with end-haul, may be required locally for access tracks in these areas.

3.4.2.4 Snow Avalanches

The location and altitude of the Study Area render it potentially susceptible to snow avalanche hazards during the winter. The mapping did not highlight the presence of any clearly discernible snow avalanche paths in treed areas. Snow avalanches generally occur on terrain with slope angles of approximately 27 to 40 degrees. There is a possibility of relatively small avalanches occurring in the local steeper areas of terrain after removal of mature vegetation. However, where development is proposed in such areas, the lengths of the moderately steep and steep slopes are relatively short. The risk of snow avalanches is therefore judged to be relatively low.

3.4.2.5 Flood Hazards

Possible flood hazards were identified in the vicinity of Ch. 48.2 km, Ch. 83.4 km, Ch. 92.6 km and Ch. 120 km to Ch. 121.5 km, where there are broad fluvial plains in the vicinity of the alignment.

3.4.2.6 Risk Management and Design Criteria

The process of managing the terrain hazards affecting a transmission line is typically initiated in the prefeasibility stage of the project and continues through the feasibility stage, the detailed design stage and into the construction and operational phases. The initial requirement is to identify the hazards; the risks can subsequently be analysed. Consideration needs to be given to the potential effects of the project on the environment as well as the potential effects of the environment on the project, i.e. the risk from landslides initiating on either road slopes or clear-cuts created by the project as well as the risk posed from natural terrain landslides. Initially, the emphasis is placed on avoiding identified hazards wherever possible. In areas where it is not possible to avoid identified hazards, the need for mitigation measures needs to be considered.

The following design criteria relating to terrain hazards are proposed for the transmission line:

- Landslides – 1 in 50-year event.
- Snow Avalanche Design – 1 in 50-year event for an avalanche that is greater in size than a Size 2 avalanche, according to the Canadian classification system for avalanche size (CAA, 2002).
- Snow Creep Design – 1 in 30-year event (provided there is a maintenance plan in place to dig out the poles, if necessary).

3.5 SITE INVESTIGATION

A site investigation was performed from July 4-15, 2013. A total of 11 sites were selected for shallow soil sampling using a Pionjar drill and Dynamic Cone Penetration Testing (DCPT). Sites where potentially soft soils had been identified by terrain mapping were chosen for soil sampling and DCPT. These sites primarily included mapped areas of organic soils. The glacial lake deposits were also investigated locally. The site investigation is reported in KP Letter VA13-01607, a copy of which is provided in Appendix F.

The organic soils were generally found to be less than 1m-thick at the investigated sites and the underlying soils were generally found to be compact or firm by approximately 1 m-depth. Soft soils were found to a depth of approximately 5 m in the vicinity of Ch. 37.4 km (Hole SH-03) and to a depth of approximately 1.5 m in the vicinity of Ch. 121.5 km (Hole SH-10) and it should be assumed that a deeper foundation solution will be required for any structures founded in the organic swamps in these areas.

3.6 FOUNDATION REQUIREMENTS

The foundation conditions for transmission line towers are expected to be generally favourable with extensive glacial deposits and only limited bedrock outcrops in the vicinity of the alignment. Talus slopes were identified, locally, in the vicinity of the alignment. It is anticipated that the tower locations can be refined, if necessary, during detailed design in order to avoid these areas. It is expected that many of the organic swamps along the alignment can be spanned. However it anticipated that a deeper foundation will be required, locally in the broader swamps.

3.7 CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER WORK

The feasibility study revealed generally favourable geotechnical conditions along the proposed transmission line alignment with no immediate and obvious fatal flaws, being identified. The foundation conditions for transmission line towers are expected to be generally favourable. It is expected that many of the organic swamps along the alignment can be spanned. However it anticipated that a deeper foundation will be required, locally in the broader swamps. Relatively few landslides were identified in the vicinity of the alignment and areas of steep terrain are relatively sparse. The terrain mapping did not highlight extensive existing widespread areas of sheet or gully erosion in the vicinity of the proposed alignment. Nonetheless, organic soils and silt-rich glacial lake deposits were identified, locally. These soils are expected to be particularly prone to erosion during the construction phase of the project when the surface vegetation is stripped. The local presence of such soils with a relatively high susceptibility to surface erosion should be accounted for in the project ‘Sediment and Erosion Control Plan’.

It is recommended that during the detailed design of the Blackwater Transmission line consideration be given to relocating the alignment:

- Towards the west between Ch. 91 km and Ch. 91.7 km so that the alignment avoids crossing steep slopes, and
- Towards the northwest between Ch. 123.5 km and Ch. 123.8 km so that the alignment avoids crossing steep slopes and follows the road alignment.

Consideration should be given to the possible flood hazard in areas, where the alignment crosses fluvial plains, in particular, in the vicinity of Ch. 48.2 km, Ch. 83.4 km, Ch. 92.6 km and Ch. 120 km to Ch. 121.5 km.

During detailed design, it is recommended that Terrain Stability Assessments be undertaken for proposed access tracks and field reviews for proposed structure sites in areas where the terrain is generally steeper than 50% and where past landslides have been identified. In addition the two alignment relocations noted above should be assessed in the field prior to alignment redesign to optimise tower placement.

4 – FEASIBILITY TRANSMISSION LINE DESIGN

4.1 TRANSMISSION LINE DESIGN BASIS

The proposed overhead power line for the interconnection of the Blackwater Gold Project will be designed and constructed in accordance with sound engineering practices to ensure satisfactory operation and to avoid adverse impacts on the safety and security of the transmission system. The line will be approximately 139.5 km in length with a rated phase-to-phase voltage of 230 kV. The transmission line design, including the parameters used for the conductors and pole structures, will generally be in compliance with the following:

- The latest version of Canadian Standards Association (CSA) standard for Overhead System CAN/CSA C22.3 No.1, which forms part of the Canadian Electrical Code, Part III.
- Sound engineering practices to ensure satisfactory operation and to avoid adverse impacts on the safety and security of the transmission system, and BC Hydro's interconnected system.
- Design studies to determine the actual climatic loading at high elevations (rime icing) and long water crossings (high wind exposure). As per CAN/CSA C22.3 No.1 Table 30, the minimum Weather Load to be used in the design will be "Heavy".
- All poles and structures will be located outside of navigable waters. Spans that cross known flight paths will need to be marked as per Transport Canada Aeronautical Assessment Division requirements.

Local weather information, soil conditions, operation of existing lines, local regulations, and environmental requirements are considered in the design.

Prior to commencing the feasibility design a comprehensive list of design criteria was developed in order to record the basis for the feasibility design. This record of the design basis is provided in Appendix J. As summary of these criteria are outlined in Table 4.1 below.

Table 4.1 Design Basis Criteria

ITEM		DESIGN CRITERIA	REFERENCE	COMMENTS
1.0	**General**			
1.1	Design Standards	Overhead Line Design	CSA C22.3	
		Electrical Design	CSA C22.1	Canadian Electrical Code
		Climatic and building code data	NBC 2005	National Building Code of Canada
		BC Hydro Transmission Technical Standard	BCH Manual 41	
		BC Hydro Load Interconnection	BCH Load IR	Guide and Requirements for Service at 69 to 287 kV
		WorkSafe BC Standards		
		Ministry of Energy and Mines Standards		
1.2	Survey	LiDAR Mapping - from km 89 to km 136		Completed by Eagle Mapping In 2011
		Satellite Mapping - from km 0 To km 89		Completed by PhotoSat in September 2012
1.3	Climatic Data	Temperature Criteria		
		Minimum = -30^{0}C	NBC 2005	Table C-2 - data for Burns Lake, B.C.
		Maximum = 25^{0}C	NBC 2005	Table C-2 - data for Burns Lake, B.C.
		Wind Pressure		50 year return period
		Reference Wind Pressure = 300Pa	CSA C22.3	Table 30 - Medium Loading B as per Figure C.2
		Ice Loading		
		Thickness = 12.5mm	CSA C22.3	Table 30 - Medium Loading B as per Figure C.2
		Snow		
		Max. Accumulated Depth = 0.6m	CSA C22.3	Table D.1 - Burns Lake
		Coordinate System	UTM	
2.0	**Route Description**			
2.1	Length	139.5 km		
		Start station: 0+000 Glenannan Substation		
		End Station: 139+210 Blackwater Substation		
2.2	Right of Way Width	40 m for standard spans		
		50 m for long spans		
		30 m between private parcels		Located north of Tatlekuz Lake at km 116
2.3	Elevation	Average = 1,000m		
		Maximum = 1,450m		
2.3	Terrain Hazards	See Drawings G0070 - G0095		KPL Terrain Hazards maps
2.4	Geotech Ground Conditions	Soft Soils (wetlands) - 15 structures		
		Rock - 24 structures		
		Suitable overburden - 580 structures		small layer of organics typically underlain by gravels and sands.
2.5	Water Course Crossings	minor - 195	Allnorth Mapping	no special requirements to cross
		major - 2	Allnorth Mapping	may require special structures to support crossing as well as accommodate air and boat navigation
2.6	Road Crossings	Primary - 20	Allnorth Mapping	FSR's and mainlines
		Secondary - 11	Allnorth Mapping	active roads off FSR's and Mainlines
3.0	**Conductor**			
3.1	Type	954 kcmil ACSR "Cardinal"		
3.2	Nominal Voltage	230 kV, phase-to-phase		
3.3	Peak Voltage	253 kV, phase-to-phase	BCH Load IR	
3.4	Phases	3 phase		
3.5	Basic Insulation Level (BIL)	950 kV	BCH Load IR	
3.6	Critical Impulse Flashover (CFO)	1265 kV	BCH Load IR	
3.7	Insulator Assemblies	Generally string I-type		
		# of insulator per string = 12	BCH Manual 41	
		Clearance = 1.372m (54 inches)	BCH Manual 41	
3.8	Plant Capacity	Peak Mine Load = 120 MW		
		Average Mine Load = 98 MW		
3.9	Electrical Thermal Capacity	Summer Line Rating (30ºC) = 975 A	ETAP software	
		Winter Line Rating (0ºC) = 1279 A	ETAP software	
3.10	Electrical Thermal Loading	Minimum = -20^{0}C (final conductor temp)	CSA C22.3	Table 30 - Medium Loading B as per Figure C.2
		Maximum = 90^{0}C (final conductor temp)	CSA C22.3	Clause 5.2.5 states 100 deg C, 90 deg C to preserve mechanical strength
3.11	Conductor Clearances	Ground = 6.1m	CSA C22.3	Table 2 Column VIII
		Navigable Waters = 13.3m	CSA C22.3	Table 3 Column V
		Forestry Roads = 11.1m	BCH Manual 41	Requires input from local logging firms to identify equipment standard
		Blackwater Mine Site Access Road = 11.1m	BCH Manual 41	Requires input from NG on mine vehicle heights
		Pipelines = 6.1m	CSA C22.3	Table 2 Column VIII
3.12	ROW and Circuit Separation	Horizontal Circuit to Circuit Separation (230kV to 500kV) = 4.5m	CSA C22.3	Clause 5.8.1 - Table 13
		Horizontal Circuit to Circuit Separation (230kV to 230kV) =2.4m	CSA C22.3	Clause 5.8.1 - Table 13
		To structures of another circuit = 2.5m	CSA C22.3	Table 16
		To bridges		
		Horizontal = 3.26m	CSA C22.3	Table 10
		Vertical = 4.46m	CSA C22.3	Table 10
3.13	Tension Limits	Max 7500 lbs		Typical BCH when using armour rods and no dampers.

ITEM		DESIGN CRITERIA	REFERENCE	COMMENTS
4.0	**Structures**			
4.1	Tangent	Wood H-Frame, Single circuit flat configuration Steel Monopole, Single circuit vertical configuration		Poles will be made from treated Douglas Fir
4.2	Angle	Wood H-Frame Wood 3-pole Structure Steel Monopole		Poles will be made from treated Douglas Fir
4.3	Deadend	Wood 3-pole Structure		Poles will be made from treated Douglas Fir
4.4	Guy Assembly	Wood "Deadman" anchors		
4.5	Crossarm	Wood and steel if necessary		
4.6	Cross Brace	Steel		
4.7	Foundation Options	Helical Piles - 15 structures Drill and Blast - 24 structures Direct Bury - 580 structures Guy Anchor - log deadman		Used in areas of soft soil. Friction piles may be used as an alternative. Required for all rock foundations. Excavate and backfill using native soil. Log anchor where available
4.8	Setback Requirements	Min distance from structure to road = tbd		Ensure conductor swing does not go over road otherwise vertical clearances may need to be increased.
		Min distance from structure to water = outside of designated riparian zone		Ministry of Environment standards
		Min distance from guy anchors to ROW edge = 5m		Ensure guy anchors are not compromised by traffic. Distance may be reduced if protective structures such as highway barriers are placed such that guy will be protected from traffic.
5.0	**Communication**	Fibre Optic Cable - 12 fibre single-mode ADSS		from mine site to Telus connection at GLN
6.0	**Protection**			
6.1	Shield Wire	~ 500m from substation	BCH Load IR	to be confirmed by BC Hydro
6.2	Grounding	All structures	BCH Load IR	to be determined based on conductivity testing along transmission line
6.3	Lightning Protection	N/A	BCH Load IR	to be confirmed by BC Hydro
6.4	Bonding	All structures		All metal components on structure to be bonded.
7.0	**Environmental and Permitting**	Riparian crossing		From DFO website: Operational Statement Overhead Line Construction
		Clearing and Grubbing		Breeding bird season will need to be considered
		Danger Tree Removal Naviagable waters / NWPA Utility crossings (pipelines, roads, highways) Aeronautical Assessments	BCH Manual 41	
		Access Road intersections with FSR's		FLNRO will require application to tie into FSR designated roads

NOTES

1. THIS DESIGN BASIS TABLE IS A LIVING DOCUMENT AND WILL BE UPDATED AS THE PROJECT PROGRESSES. ENSURE THAT THE LATEST VERSION IS BEING USED.

4.1.1 General

Design criteria classified as general will be referenced throughout various aspects of the project design. Items covered generally fall into the following three categories:

- Design Standards – CSA, National Building Code, WorkSafe BC, etc.
- Survey – products used for the design, and
- Climatic data – temperature, wind, snow and ice data.

4.1.2 Route Description

The route description includes key criteria that define the design of the transmission line alignment. These criteria include:

- Length
- Right-of-way width
- Elevations
- Terrain hazards
- Geotechnical ground conditions
- Water course crossings, and
- Road crossings.

4.1.3 Conductor

Information required for the electrical and mechanical design of the conductor is provided in this section. Specific criteria that are summarized include:

- Conductor type
- Nominal line voltage
- Peak line voltage
- Number of phases
- Basic insulation level
- Critical impulse flashover
- Insulator assembly data
- Mine plant capacity requirements
- Electrical thermal capacity
- Electrical thermal loading
- Conductor tolerances
- Right-of-way and circuit separation limits, and
- Conductor tension limits.

4.1.4 Structures

Material selection and structure configuration for the various structure types is provided in this section. Information is provided for the following components:

- Tangent structures
- Angle structures
- Deadend structures
- Guy anchor assemblies
- Structure cross arms
- Structure braces
- Foundation type and quantities, and
- Setback requirements.

4.1.5 Communication

The communication requirements between BC Hydro, the Blackwater mine site and New Gold headquarters are defined in this section.

4.1.6 Protection

Transmission line electrical protection requirements are provided in this section. This includes identifying the requirement for the following:

- Shield wire overtop of structures
- Grounding along the alignment
- Lightning protection, and
- Bonding of structure elements.

4.1.7 Environmental and Permitting

References are provided for environmental and permitting considerations that will need to be taken into account for the transmission line.

4.2 CIVIL AND CONSTRUCTION CONSIDERATIONS

The following sections describes the major civil works for transmission line construction, including clearing and right-of-way, temporary access and spur roads, pole structures, pole foundations, weather loading.

4.2.1 Clearing and Right-of-Way

The land base south of Vanderhoof has been extensively logged and the landscape is characterized by zones of clearcut having various ages of trees. Recent pine beetle infestation has decimated the mature pine tree volume in this area and subsequently an increase in harvesting pine beetle infested wood has followed.

Recent forest fires have also moved through this area having destroyed hundreds of thousands of hectares of harvestable and pine beetle infested timber. As a result large fire breaks have been cleared throughout this area to help prevent the propagation of forest fires. These large fire breaks predominantly follow existing logging roads in order to take advantage of already cleared road rights of way. The loss of harvestable timber in this area has put a strain on local logging companies therefore every effort to minimise loss of harvestable land base should be made.

Where the transmission line will be constructed adjacent to existing forest roads it may be advantageous to keep the transmission line within the cleared portion of the right of way where possible. Observations from site suggest a significant length of the Kluskus/Ootsa FSR has been cleared to a width of up to 50 metres to create a fire break. By placing the structures within this cleared area the additional volume of timber that will be required to be cut will be significantly reduced helping to minimise impacts to the local logging community.

Based on the observations mentioned above it is anticipated that the merchantable timber volume that will need to be cleared along any of the alternative transmission line alignments will be low. An estimate as to how much clearing will be required has been prepared by AllNorth Consultants Ltd. This estimate is provided in Appendix G.

The typical right-of-way (ROW) width for the 230 kV transmission line is 40 metres, with a management zone on either side of the ROW that will be screened for danger trees. Danger trees are trees that have a potential to fall on the transmission line; these will be topped or removed during construction and throughout the project life as needed. Danger tree removal is required to protect the power line and to minimize potential forest fire hazard.

4.2.2 Temporary Access and Spur Roads

Temporary access will be required to access all tower sites. In areas where the transmission line will follow existing forest roads, access tracks to tower sites will be constructed from these existing roads such that watercourse crossings and riparian vegetation clearing are minimised.

For areas where the transmission line will deviate from existing forest roads temporary access tracks will need to be constructed along the alignment. The access road along the transmission line route will be cleared to the distance recommended for the proposed type of equipment.

Access design for the construction and during operation and maintenance phases of the Blackwater mine transmission line has been completed Allnorth. Access includes temporary and permanent access infrastructure. A report summarizing the work that has been completed by AllNorth is provided in Appendix G.

4.2.3 Poles and Towers

As noted above, towers will be predominantly H-frame wood structures. The feasibility design uses single steel pole towers in areas where the line will run adjacent to private property to reduce right-of-way requirements. For example, when the transmission line traverses the Mill's Ranch, a low profile steel tower is used to reduce the right-of-way requirements and fit along the existing road. Steel towers are much more expensive but have the advantage of reducing right-of-way clearing and allowing for larger spans.

Tower construction can commence once clearing, temporary access and foundation construction has occurred. Towers are usually preassembled on site and erected into excavated foundations using a mobile crane. Poles are then backfilled and guy anchors will be installed.

Once all towers for a particular segment are erected the conductor will be strung. A pilot line will be flown by helicopter from one tower to the next through a segment. The pilot line will be used to pull the conductor from one end of a segment to the other where linemen will attach the conductor to the insulators on each tower and set each spans sag and tension.

H-frame structures will carry a flat configuration 3-phase circuit, and will be supported on two wood poles. The structures will generally be used as tangent and small to medium angle suspension structures. The conductor will be attached to the crossarms on suspension structures with I-type vertical suspension insulator strings approximately 2.4 m in length. The crossarms will be constructed of steel. The support structures will be constructed of either western red cedar or treated Douglas fir. The nominal spacing of structures will be approximately 250 metres along flat and low gradient sections. The exact location and spacing of these structures will be determined during detailed design; at this stage of feasibility design, Figures 4.1 to 4.16 show the structure locations and alignment. Typical H-frame structures and corresponding right-of-way are shown in Figure 4.17.

The steel pole structures place the conductors in a vertical configuration, which reduces the width between outer conductors by a factor of approximately two. These steel structures will be erected at least near Mill's Ranch. The exact location and spacing of these structures will be determined during detailed design. Typical steel pole structures and corresponding right-of-way are shown in Figure 4.18.

Guy wire anchors are often employed to counteract lateral forces induced by wind loads and lateral loads on the power line poles and towers. These anchors typically consist of a block of wood that is buried to a sufficient depth to resist the applied loads from the guy wire.

4.2.4 Foundations

For the most part wood H-frame structures will be founded in the natural ground. Poles are typically direct buried into the overburden to a suitable depth required to resist significant settlement and to resist over turning. In cases where bedrock is encountered blasting may be required in order to found the structures. Helical screw piles or friction piles may be required for founding poles within areas of soft soil. An initial assessment to determine the foundation type at each structure site has been completed based on the terrain mapping, as described in Section 3, and the site investigation work.

Poles set in soil will be buried to a standard design depth of 10% of the total pole length plus an additional 0.6 m. Embedment depths will vary for poles set in slash or solid rock. Typical foundation installation details are shown on Figure 4.19.

It is anticipated that steel poles will be utilized for rock foundations. A family of rock foundations, including light, medium, and heavy, will be needed to address variations in foundation loads. A typical rock foundation is shown on Figure 4.20.

The use of helical piles may be required for soft soil conditions, as shown on Figures 4.21 and 4.22.

4.2.5 Weather Loading

According to CSA C22.3 No. 1-06 Overhead Systems, the power line alignment is within a heavy loading area. The heavy loading area loading conditions are summarised below.

Table 4.2 Loading Condition for transmission line model

Loading Condition	Value
Radial thickness of ice, mm	12.5
Horizontal wind loading, N/m2	400
Temperature	-20°C

Design loading requirements outlined by CSA and BCH standards are within range of the loading conditions recorded for the project area. As such, the CSA and BCH standards represent the minimum loading requirements for the power line clearance, sag and mechanical strength.

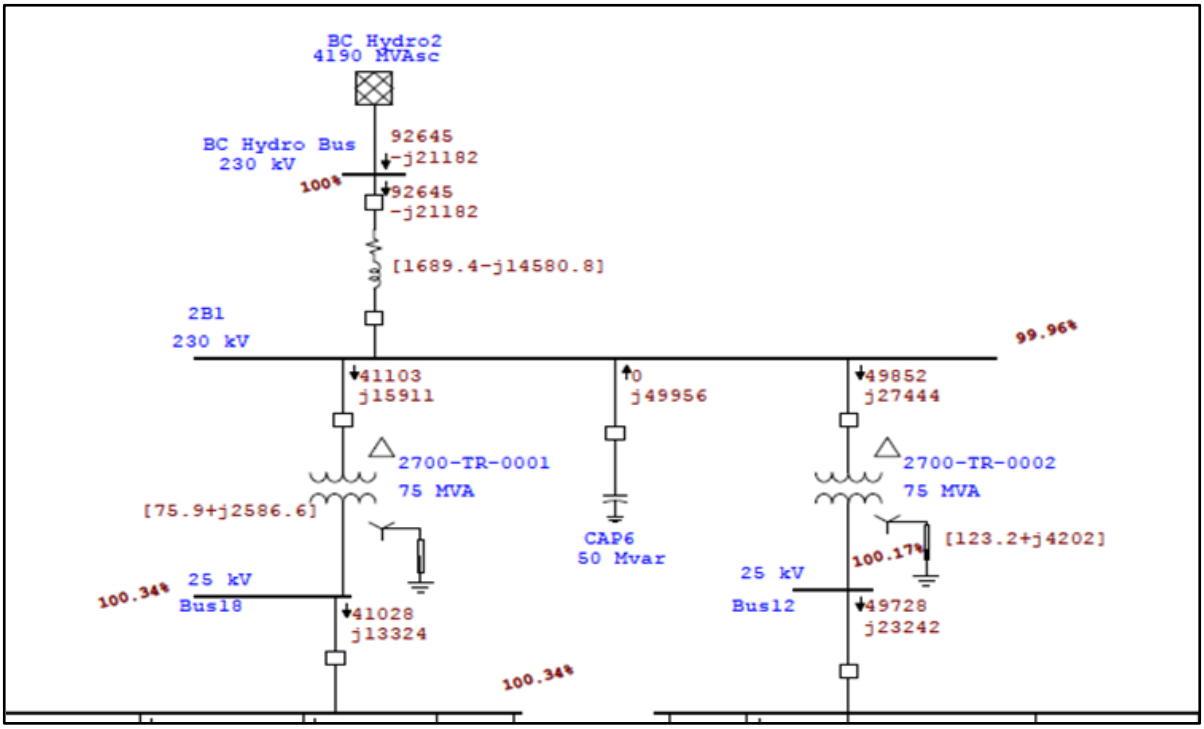
4.3 CONDUCTOR SELECTION

A voltage selection study was performed and the results are found in the Transmission Line and Access Road Preliminary Economic Assessment Report (VA101-457/2-1). The following criteria are taken into account in order to select the most viable line voltage for the Blackwater Gold Project:

- Quantity of transferred power
- Line length
- Corona
- Voltage regulation, thermal and system stability
- Transmission power loss
- Electrical equipment capital and operating costs, and
- BC Hydro interconnection capital and operating costs.
- Line rating

- Conductor sag and loading
- Conductor impedance, and
- Voltage drop.

The transmission line is presented with typical line parameters modelled with ETAP software; the schematic diagram of the ETAP model is shown below. Please note that the schematic does not show the entire mine facility, just up to the 25 kV bus located on the low side of each 230-25 kV transformer at the mine site substation.



4.3.1 Corona

The design practice for the high voltage transmission line is to keep the surface voltage gradient below the corona inception voltage in fair weather and ensure that the corona losses are acceptable in foul weather. Excessively high conductor surface gradient may cause radio noise, audible noise, electromagnetic interference, and corona.In order to mitigate the effects of corona, it is important to have a large, clean conductor surface without any voids or sharp imperfections. Large conductor surface is achieved by simply increasing the diameter of the conductor or utilizing a bundle of conductors. Another factor in the production of corona is weather. Rain and snow can distort the electric field thereby increasing the corona loss and electromagnetic interference.

Table 4.3 Conductor Surface Gradient or Corona Calculation

Conductor	Conductor Surface Gradient (kV/cm)
ACSR 795 kcmil "Drake"	16.2
ACSR 954 kcmil "Cardinal"	15.2
ACSR 1272 kcmil "Bittern"	13.8
2-bundle ACSR 397.5 kcmil "Ibis"	11.6
2-bundle ACSR 477 kcmil "Hawk"	10.7
2-bundle ACSR 556.5 kcmil "Dove"	10.0

NOTES:
1. Calculation based on “Overhead Power Lines” Kiessling et al., Printed 2003.
2. Recommended conductor surface gradient limited to 17 kV/cm.

4.3.2 Radio Interference Calculations

BC Hydro and federal Ministry of Transportation interconnection standards dictate that all transmission lines connecting to their system meet the requirements of a maximum radio interference level of 50 dB at 1 MHz in fair weather conditions (CAN/CSA, 2009).

A preliminary calculation, summarized in the below table, shows that the investigated conductors satisfy the relevant standards for maximum radio interference. A detailed radio interference study should be conducted to ensure that the preferred conductor meets all radio interference regulations.

Table 4.4 Radio Interference Calculations

Conductor	Radio Interference (dB)
ACSR 795 kcmil "Drake"	49.3
ACSR 954 kcmil "Cardinal"	47.1
ACSR 1272 kcmil "Bittern"	44.4
2-bundle ACSR 397.5 kcmil "Ibis"	28.1
2-bundle ACSR 477 kcmil "Hawk"	26.2
2-bundle ACSR 556.5 kcmil "Dove"	24.9

NOTES:
1. Calculation of radio interference according to RUS Bulletin 1724E-2000 Design Manual.
2. Radio interference assumed to be equal for all three phases.
3. Radio interference calculation based on a flat conductor configuration.

4.3.3 Power Flow Analysis

A power flow analysis was carried out by KP to estimate the voltage drop at the Project site. According to BC Hydro standards for load interconnections, the permissible voltage drop at the point-of-delivery, i.e. the Project site, must not exceed 3% of the nominal voltage once per hour, or 6% of normal voltage once per 8 hours.

The power flow analysis was performed using the ETAP software. The study model assumes that the Blackwater Gold Project substation is connected to the existing Glenannon substation. The power flow study was performed under steady-state conditions and a nominal running plant average load of 92.8 MW.and peak load of 105.5 MW

4.3.4 Conductor Selection

Selection of the optimum conductor takes into consideration the following parameters:

- Conductor cost
- Line losses
- Electrical stability, and
- Mechanical strength.

For the purposes of this feasibility study only conductors capable of handling 120 MW were considered. Bundled conductors were found to be acceptable electrically and mechanically; however, they are much heavier that single conductors and would require shorter spans or more robust support structures resulting in higher capital costs. Therefore they were not considered further.

Conductor selection was first based on electrical capacity and stability and then on capital and operating costs. The preferred conductor would have a low capital cost and low line losses. Conductor costs for the three, non-bundled conductors are provided below in Table 4.6.

Table 4.5 Conductor Costs

Conductor	Conductor Cost ($/km)
ACSR 795 kcmil "Drake"	$8,708
ACSR 954 kcmil "Cardinal"	$11,159
ACSR 1272 kcmil "Bittern"	$13,074

NOTES:

1. Per kilometer costs provided by Alcan General Cable website 18 July 2013. (http://www.cable.alcan.com/NR/rdonlyres/FDFC9360-D07F-4D32-9E21-D57BD0F1ACBC/0/Bare.pdf)

The preferred 230 kV overhead bare conductor based on the factors stated above is a single 954 kcmil ACSR “Cardinal” conductor per phase. The ACSR “Drake” and ACSR “Bittern” conductors meet all requirements but, ultimately, the larger “Cardinal” conductor is preferred over the “Drake” due to its higher mechanical strength enabling longer spans reducing the number of support structures and lower line losses.

It should be noted that the ACSR “Bittern” conductor was not chosen as the preferred conductor as part of the feasibility design due to higher capital costs; however, this conductor will have lower line losses than the ACSR “Cardinal. For the purposes of this feasibility study it is assumed that the trade-off between line losses (operating expense) and the conductor cost (capital expense) would not be significant once the net present value of future costs was calculated. It is recommended that a detailed trade-off study be completed for final conductor selection prior to detailed design, once the mine site equipment loads and assumed energy consumption is determined.

The mechanical properties of the “Cardinal” conductor to be used in the mechanical design of the Blackwater transmission line are summarized in the table below.

Table 4.6 Mechanical Properties of ACSR "Cardinal" Conductor

Property	Value
Codename	"Cardinal"
Description	54/7 ACSR (954 kcmil/483.4 mm^2)
Aluminum Diameter	3.376 mm (0.1329 inches)
Area Total	30.38 mm (1.196 sq. inches)
Stranding	54 Aluminum / 7 Steel
Rated Tensile Strength	15,331 kg (33,800 lbs)
Bare Mass	1,827 kg/km (1,228 lbs/1000ft)

4.4 ELECTRICAL DESIGN CONSIDERATIONS

4.4.1 Line Protection and Control

Entrance and line protection multifunction relays will be provided with adequate sensitivity for all electrical faults and preset to ultimate levels, which will coordinate with BC Hydro's protection systems. From the draft BC Hydro System Impact Study for the Blackwater Gold Project, a fiber optic line is required for communication between line protection multifunction relays.

The fiber optic line is to be strung as an under build and details will be confirmed during final design.

4.4.2 Grounding

Adequate grounding for the transmission line will be provided as per typical grounding details for wood and steel structures.

4.4.3 Earthwire

BC Hydro practice dictates the installation of an overhead ground wire on transmission structures extends 500 m or for a minimum of three structures out from the station terminals – whichever provides the greatest length – as per the Technical Interconnection requirement for Load Customers (BCH, 2008).

Ground resistivity field measurements is recommended at representative locations along the transmission line corridor to aid in determining whether it is practical and effective to install continuous overhead shield wire. However, during consultation with BC Hydro, an overhead shield wire past the required 500 metres from either terminal station is not necessary for the transmission line in the Project area due to low frequency of lightning activity.

5 – CAPEX AND OPEX COSTS

5.1 CAPEX

A detailed capital cost estimate has been completed for the Blackwater transmission line. The estimate includes all relevant cost items associated with the construction of the transmission line such as:

- Mobilisation and site establishment
- Tree removal and vegetation clearing of access roads and transmission line right-of-way
- Permanent and temporary access road construction (and decommissioning where appropriate)
- Construction camp and laydown preparation (and decommissioning where appropriate)
- Transmission line structure foundations
- Transmission line structure assembly and erection
- Transmission line conductor stringing
- Procurement of all materials required for construction, and
- Interconnection with the BC Hydro grid.

The CAPEX costs have been provided by the following parties:

- AllNorth Consultants Ltd. – tree removal and access roads including stream crossing structures
- Valard Powerline Contractor (Valard) – camp/laydown, procurement and line construction
- BC Hydro – Interconnection

In order to develop an accurate estimate of the Blackwater transmission line Capex, New Gold retained Valard to provide a detailed cost estimate within the prescribed accuracy of +15% / -10% which is described as a Class 3 Feasibility Estimate in AMEC's Estimating Development Plan (Doc. No. 173304-0000-CB10-RPT-001 Rev F).

A detailed assessment of constructability, schedule and costs has been completed by Valard. A summary of the work completed by Valard and an assessment of contractor pricing is provided in the text to follow.

5.1.1 Contractor Pricing

As mentioned above, Valard was retained to provide a construction cost estimate. Detailed information resulting from the feasibility study was provided to Valard to assist them with their pricing. This package of information included the following:

- A formal invitation to provide a quotation by e-mail
- Feasibility design Plan and Profile drawings of the transmission line (PLS Cadd output)
- An overview map of the transmission line alignment
- A table summarizing key information about the line including structure quantities, foundation conditions, etc., and
- A Google Earth file of the alignment for reference.

The information package is provided in Appendix H.

5.1.2 Transmission Line Capital Costs

At the request of New Gold, Valard has provided a capital cost estimate for the Blackwater transmission line. The cost estimate includes all direct and indirect costs associated with the construction of the transmission line, excluding the following:

- Clearing costs
- Access costs
- BC Hydro substation and interconnection costs
- Mine site substation costs, and
- Escalation costs.

The Valard cost estimate is provided in Appendix I and includes a summary table of all cost items included in their estimate accompanied by a memo that explains the limitations of their estimate. The total Capex for transmission line costs covered by Valard's estimate is **$69.46 Million** ($498,000/km). Note that this estimate includes a 15% contingency for the transmission portion of the Project.

Clearing costs have been estimated by AllNorth and include all associated direct and indirect costs. AllNorth has provided a detailed summary of their clearing cost estimate and is provided in Appendix G. The total Capex for transmission line and access road clearing costs covered by AllNorth's estimate is **$4.31 Million.**

Temporary and permanent access road costs have been estimated by AllNorth and include all associated direct and indirect costs. AllNorth has provided a detailed summary of their access road cost estimate and is provided in Appendix G. The total Capex for transmission line and access road construction costs covered by AllNorth's estimate is **$9.90 Million.**

Interconnection costs have been developed by BC Hydro during the System Impact Study (SIS) completed for the Blackwater project. The report prepared for this study is provided in Appendix D. The BC Hydro SIS provides a cost estimate having an accuracy of +100%/-35% which does not meet the Class C estimate standard set by AMEC. It is expected that this cost component will be sufficiently small compared to the other project costs, that it will have little bearing on overall project feasibility. The estimated interconnection costs for the Blackwater project are **$4.9 Million.**

5.1.3 Total Capex

Table 5.1 below provides a summary of the transmission line Capex as derived from the sources noted above.

Table 5.1 CAPEX Summary

Item	Cost ($Million)
Clearing	4.31
Access Roads	9.90
Transmission Line Construction	69.46
Interconnection	8.6
Total CAPEX	**92.27**
Total CAPEX/km	**0.661**

NOTES:
1. Clearing, Access Roads and TL Construction costs are within +15%/-10%
2. Interconnection costs are within +100%/-35%

5.2 OPEX

5.2.1 Transmission Line Operating and Maintenance Costs

Annual transmission line operations and maintenance costs have been calculated based on the following:

- Access track maintenance
- Vegetation control (without herbicides)
- Annual on ground Inspections
- First and tenth year climbing inspections and hardware tightening
- Management of contracts and maintenance
- Wood pole ground line treating, and
- Pole replacement.

A summary of the costs associated with each of these items is provided in Table 5.2 below. Based on this list of operations and maintenance items the average annual O & M cost for the Blackwater transmission line is approximately **$714,300** per year.

5.2.2 Close Out Costs

Once the Blackwater Project ceases operation it may be necessary to fully decommission the transmission line in order to limit New Gold's liability with this large linear infrastructure. Closeout costs associated with the Blackwater transmission line will be approximately $10,000 per kilometre. Therefore the total closeout cost for the Blackwater transmission line will be approximately **$1.4 Million.**

5.2.3 Total Opex

Table 5.2 provides a summary of the transmission line OPEX as derived from the sources noted above.

Table 5.2 OPEX Summary

Item	Cost ($Million)
O & M	12.14
Closeout Costs	1.40
Total Undiscounted LoM OPEX	**13.54**
Total Average Annual OPEX	**0.796**

OPEX costs do not include energy purchases from BC Hydro or any costs associated with transmission line losses.

6 – DEVELOPMENT SCHEDULE

A detailed development schedule was created in collaboration between ACL, Valard, New Gold and KP. The schedule includes all relevant tasks required to advance the proposed Blackwater transmission line from the current feasibility stage through to detailed design and permitting and subsequent construction and commissioning. The schedule includes the following major tasks:

- Permits and Approvals
- BC Hydro Interconnection
- Engineering
- Procurement
- Access Construction and Clearing
- Foundation and Anchor Construction
- Structure Assembly and Erection
- Conductor Stringing, and
- Commissioning.

The project development schedule was prepared by Valard and can be found in Appendix I. Notable milestones include the following:

- EA Certificate issued to New Gold in Q1 2015
- Detailed design complete in Q4 2014
- Material procurement will commence in Q4 2014
- Access road construction and clearing will commence in Q1 2015 and finish in Q3 2015
- BC Hydro substation upgrades complete in Q1 2016 (earliest date for line interconnection), and
- Commissioning complete in Q1 2016.

It is important to note that some aspects of this schedule may be accelerated. However, this may result in an increased cost estimate and thus it is important to review and potentially revise the transmission line cost estimate to accelerate the schedule, either due to delays in construction permit approvals or advancing the desired in-service date for the transmission line.

7 – CONCLUSIONS AND RECOMMENDATIONS

7.1 CONCLUSION

No fatal flaws have been identified in this study that would prevent the construction of a 139.5 km-long 230 kV overhead transmission line from the Blackwater Project site to the existing Glenannan Substation, near Fraser Lake, BC.

The majority of the proposed alignment can be feasibly constructed using standard construction methods. The recommended construction is with wooden H-frame pole structures. Some isolated areas will require steel towers due to the long spans, wind loading, ice loading, terrain hazards, and difficult terrain. The route crosses a number of known terrain hazards that can be avoided and/or mitigated by good structure placement.

Schedule inputs were solicited from Valard Powerline Contractor for the transmission line construction and AllNorth Consultants Ltd for right-of-way clearing and access road construction. Based on these inputs an in-service date for the transmission line in Q1 2016 is achievable.

Inputs for the project CAPEX were also provided by Valard and AllNorth. The overall CAPEX estimate for the design, procurement, construction and commissioning of the Blackwater Mine transmission line is **$92.27 Million**. The estimated annual average OPEX estimate for operating the Blackwater Mine transmission line for a period of 17 years is **$796,000**.

7.2 RECOMMENDATIONS

Should New Gold choose to move forward with the development of the Blackwater Mine, we recommend that the following tasks be completed during the next phase of project development:

- LiDAR should be acquired for the feasibility study alignment as soon as possible, prior to snow cover over the alignment
- Detailed field assessments should be completed for the two realignment segments identified in Section 3.7 above. This can be done as part of a comprehensive field review of all tower sites prior to detailed design.
- Decisions should be made by New Gold with respect to two proposed re-routes identified in Section 2.1.5.
- Geotechnical site investigations at tower locations that were identified during the field review as having problematic foundation conditions. The site investigation will help to determine the detailed design of each foundation ensuring the most cost effective options are developed.
- Conductor optimisation should be completed taking into account CAPEX and OPEX (cost of line losses) prior to detailed design.
- Detailed design should be undertaken concurrently with permitting exercises to ensure a transmission line is designed that finds the optimal balance between technical, environmental and socio-economic criteria

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9 – CERTIFICATION

This report was prepared, reviewed and approved by the undersigned.

Prepared:

James Haley, P.Eng.
Senior Geotechnical Engineer

Prepared:

FOR Lawrence Duong, E.I.T.
Staff Electrical Engineer

Reviewed:

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
K. L. AINSLEY
32421
SEPT 3/13

Keith Ainsley, P.Eng.
Senior Civil Engineer

Approved:

Ken Brouwer, P.Eng.
President

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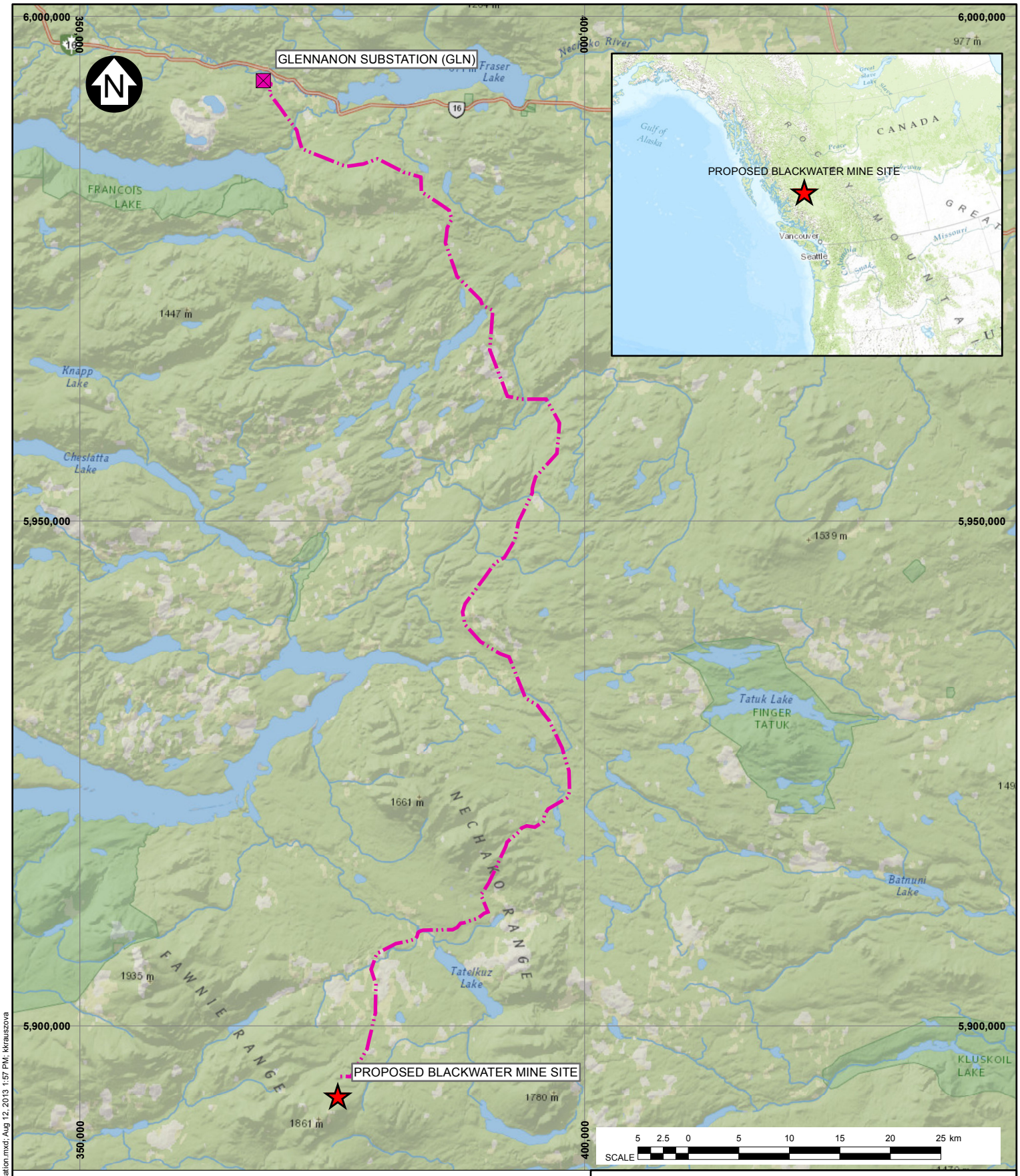

LEGEND:

- PROJECT LOCATION
- COMMUNITY
- PROPOSED TRANSMISSION LINE

NOTES:

1. BASE MAP: (C) MICROSOFT BING MAPS.
2. COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N.
3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:500,000 FOR 8.5x11 (LETTER) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

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0	08AUG'13	ISSUED WITH REPORT	KK	KK	KLA	KJB

NEW GOLD INC.

BLACKWATER GOLD PROJECT

PROJECT LOCATION MAP

Knight Piésold CONSULTING

P/A NO. VA101-457/6

REF NO. 3

FIGURE 1.1

REV 0

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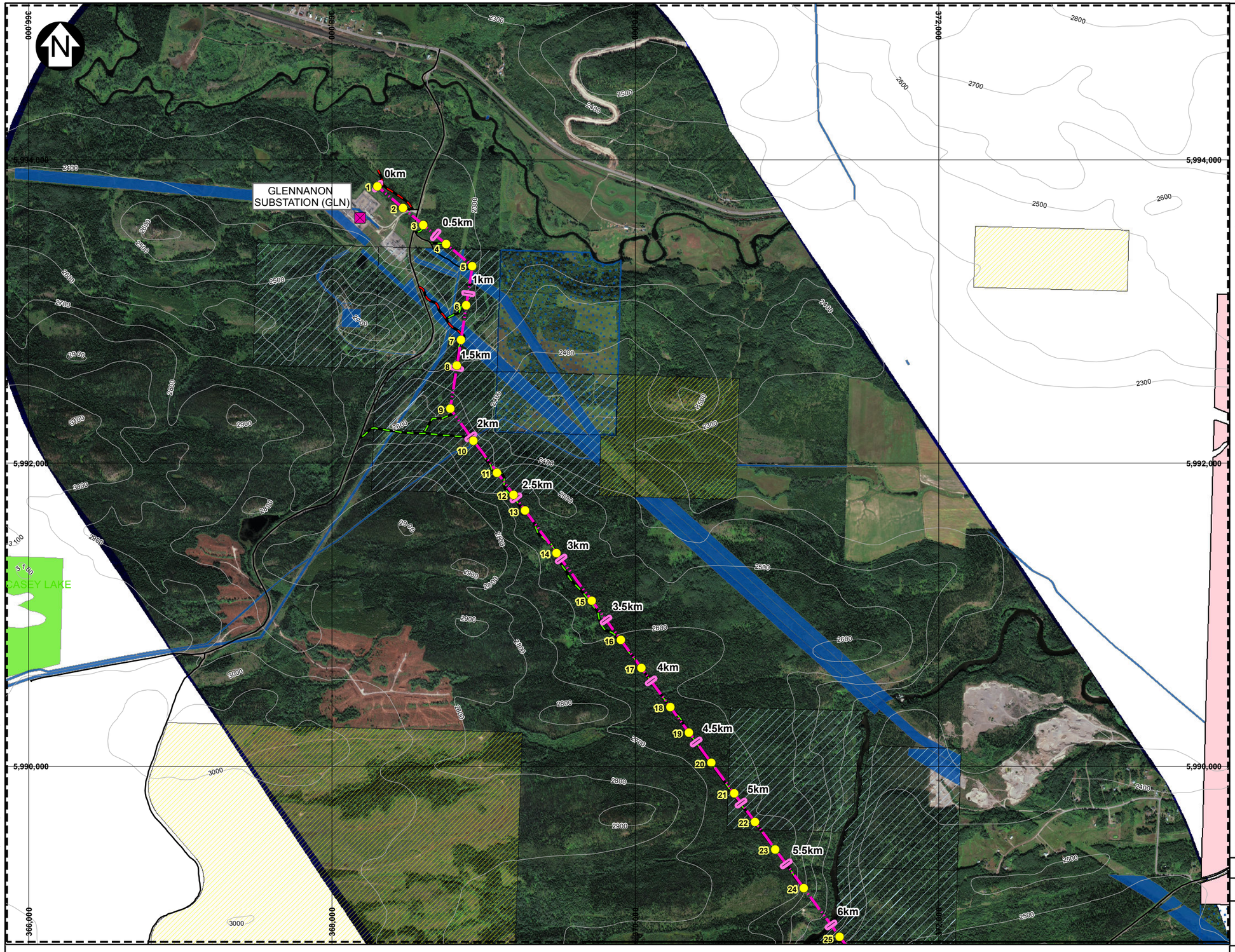

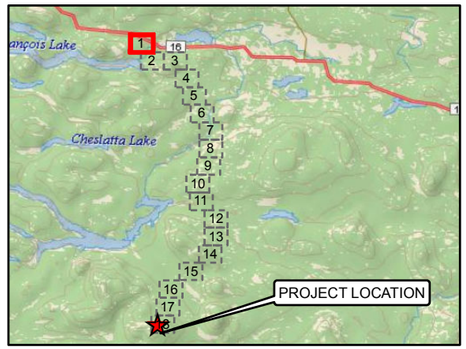

LEGEND:

GENERAL

- MINE SITE
- FORESTRY ROAD
- GRAVEL UNDIVIDED - 1 LANE
- GRAVEL UNDIVIDED - 2 LANES
- UNIMPROVED
- EXISTING ROAD
- CREEK/RIVER
- CONTOUR (100 M)
- MAPSHEET

TRANSMISSION LINE

- BC HYDRO SUBSTATION
- PROPOSED TRANSMISSION LINE STRUCTURE
- PROPOSED TL CENTERLINE

PROPOSED PERMANENT ACCESS ROAD OPTIONS

- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE

LAND AND RESOURCE DATA (LRDW)

- RECREATIONAL VISUAL QUALITY ZONE
- FOREST TENURE MANAGED LICENSES
- INDIAN RESERVATION
- UNGULATE WINTER RANGE
- SURVEYED PARCELS
- SURVEYED ROW'S
- PARKS, ECOLOGICAL RESOURCES AND PROTECTED AREAS
- RECREATIONAL AREAS
- AGRICULTURAL LAND RESERVE

NOTES:

1. BASE MAP: BC TRIM MAPPING.
2. COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N.
3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:25,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.
4. LRDW DATA OBTAINED FROM LRDW WEBSITE. CONTOURS OBTAINED FROM CANVEC.
5. PROPOSED ACCESS ROAD OPTIONS PROVIDED BY ALL NORTH CONSULTING LTD.

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NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION CORRIDOR - 25JUL'13
SHEET 1 OF 18

Knight Piésold CONSULTING

P/A NO.	REF NO.
VA101-457/6	3
FIGURE 2.1	REV 0

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	09AUG'13	ISSUED WITH REPORT	KLA	AMD	LD	KJB

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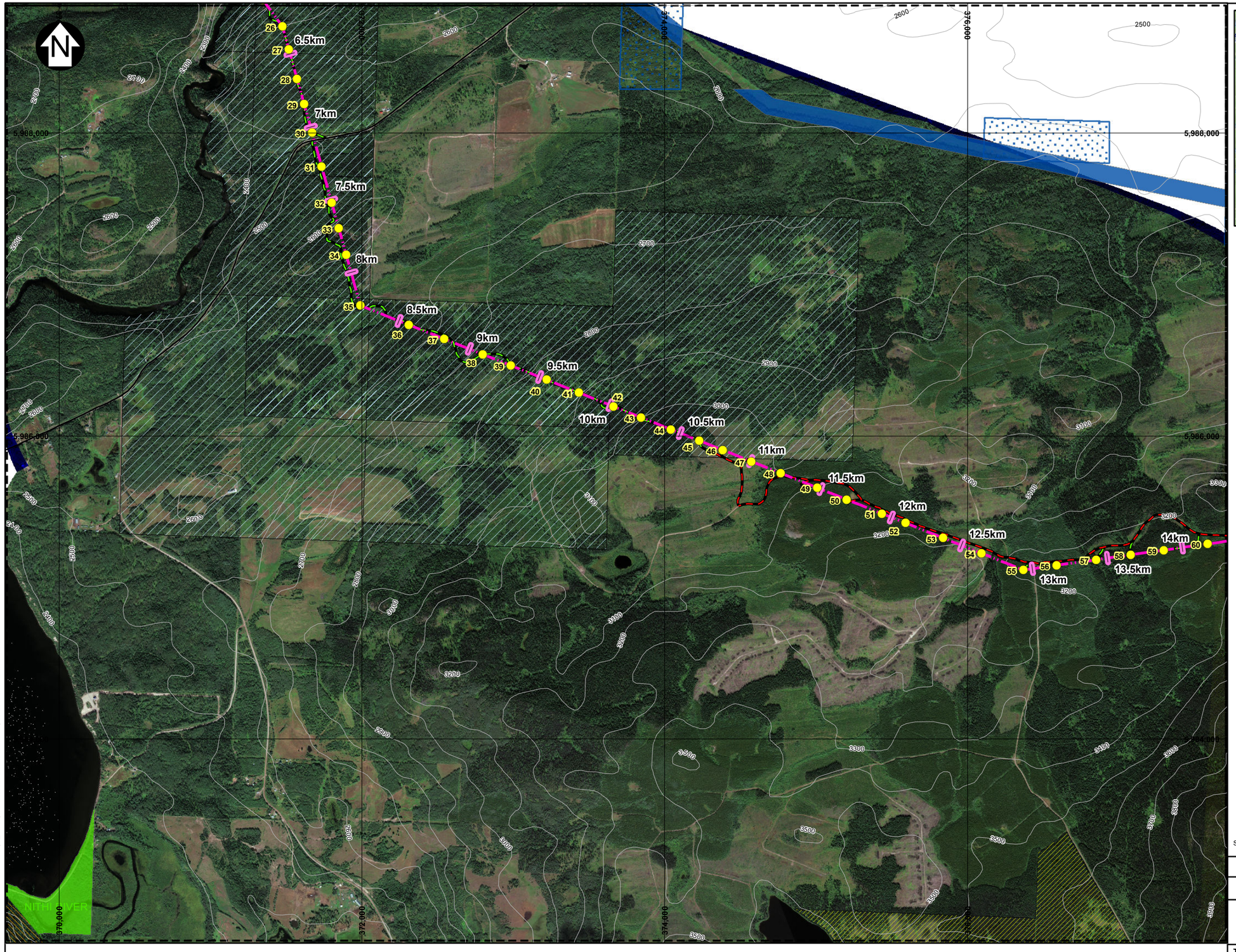

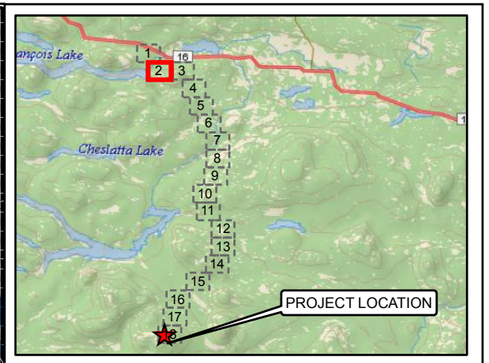

LEGEND:

GENERAL

- MINE SITE
- FORESTRY ROAD
- GRAVEL UNDIVIDED - 1 LANE
- GRAVEL UNDIVIDED - 2 LANES
- UNIMPROVED
- EXISTING ROAD
- CREEK/RIVER
- CONTOUR (100 M)
- MAPSHEET

TRANSMISSION LINE

- BC HYDRO SUBSTATION
- PROPOSED TRANSMISSION LINE STRUCTURE
- PROPOSED TL CENTERLINE

PROPOSED PERMANENT ACCESS ROAD OPTIONS

- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE

LAND AND RESOURCE DATA (LRDW)

- RECREATIONAL VISUAL QUALITY ZONE
- FOREST TENURE MANAGED LICENSES
- INDIAN RESERVATION
- UNGULATE WINTER RANGE
- SURVEYED PARCELS
- SURVEYED ROW'S
- PARKS, ECOLOGICAL RESOURCES AND PROTECTED AREAS
- RECREATIONAL AREAS
- AGRICULTURAL LAND RESERVE

NOTES:

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SCALE 250 125 0 250 500 750 1,000 Meters

NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION CORRIDOR - 25JUL'13
SHEET 2 OF 18

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	09AUG'13	ISSUED WITH REPORT	KLA	AMD	LD	KJB

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P/A NO. VA101-457/6 | REF NO. 3

FIGURE 2.2 | REV 0

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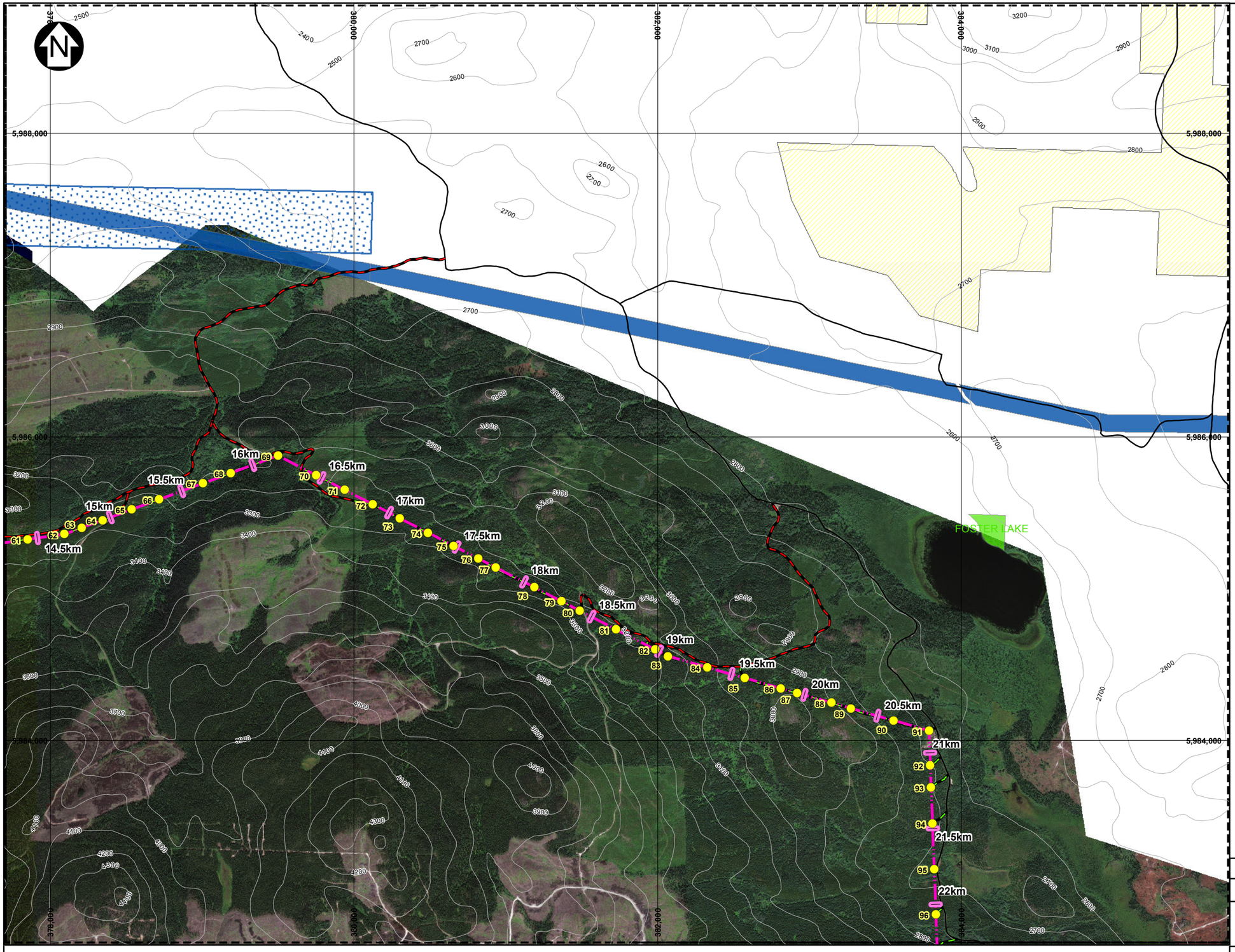

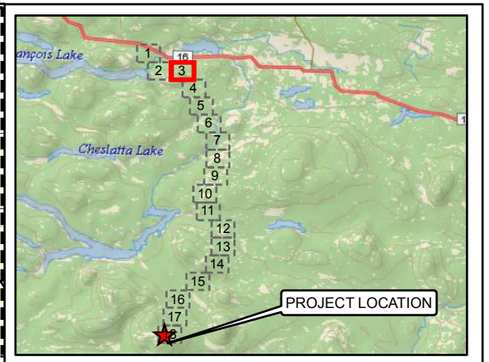

LEGEND:

GENERAL

- MINE SITE
- FORESTRY ROAD
- GRAVEL UNDIVIDED - 1 LANE
- GRAVEL UNDIVIDED - 2 LANES
- UNIMPROVED
- EXISTING ROAD
- CREEK/RIVER
- CONTOUR (100 M)
- MAPSHEET

TRANSMISSION LINE

- BC HYDRO SUBSTATION
- PROPOSED TRANSMISSION LINE STRUCTURE
- PROPOSED TL CENTERLINE

PROPOSED PERMANENT ACCESS ROAD OPTIONS

- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE

LAND AND RESOURCE DATA (LRDW)

- RECREATIONAL VISUAL QUALITY ZONE
- FOREST TENURE MANAGED LICENSES
- INDIAN RESERVATION
- UNGULATE WINTER RANGE
- SURVEYED PARCELS
- SURVEYED ROW'S
- PARKS, ECOLOGICAL RESOURCES AND PROTECTED AREAS
- RECREATIONAL AREAS
- AGRICULTURAL LAND RESERVE

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SCALE 250 125 0 250 500 750 1,000 Meters

NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION CORRIDOR - 25JUL'13
SHEET 3 OF 18

Knight Piésold CONSULTING

P/A NO. VA101-457/6 | REF NO. 3 | REV 0

FIGURE 2.3

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	09AUG'13	ISSUED WITH REPORT	KLA	AMD	LD	KJB

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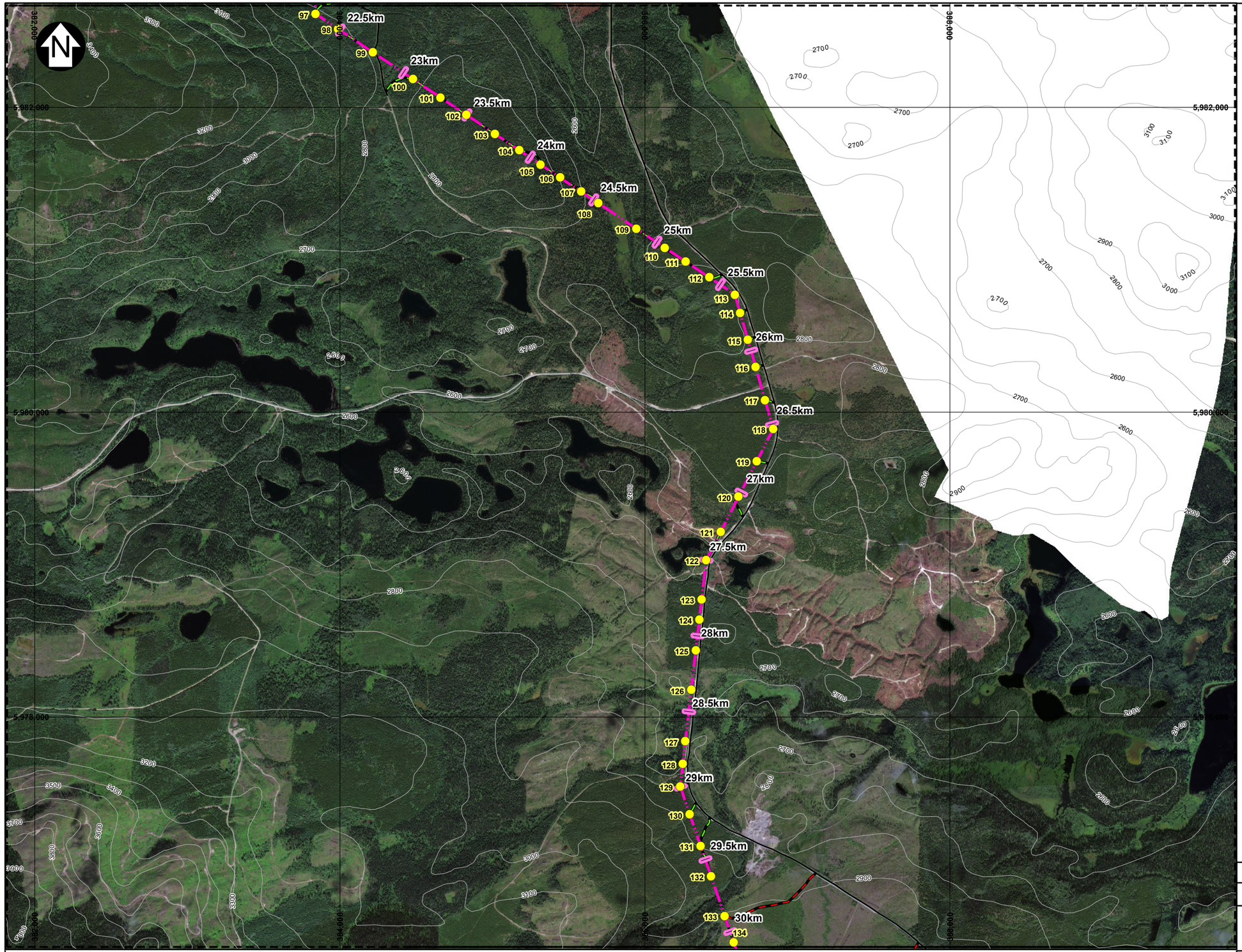

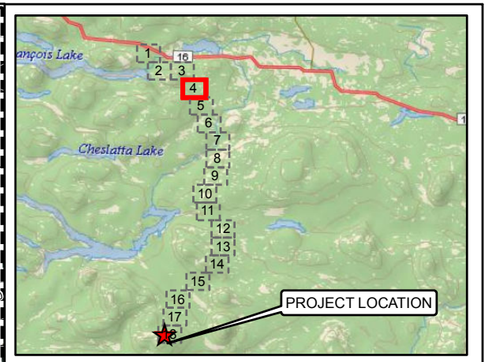

LEGEND:

GENERAL

- MINE SITE
- FORESTRY ROAD
- GRAVEL UNDIVIDED - 1 LANE
- GRAVEL UNDIVIDED - 2 LANES
- UNIMPROVED
- EXISTING ROAD
- CREEK/RIVER
- CONTOUR (100 M)
- MAPSHEET

TRANSMISSION LINE

- BC HYDRO SUBSTATION
- PROPOSED TRANSMISSION LINE STRUCTURE
- PROPOSED TL CENTERLINE

PROPOSED PERMANENT ACCESS ROAD OPTIONS

- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE

LAND AND RESOURCE DATA (LRDW)

- RECREATIONAL VISUAL QUALITY ZONE
- FOREST TENURE MANAGED LICENSES
- INDIAN RESERVATION
- UNGULATE WINTER RANGE
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- SURVEYED ROW'S
- PARKS, ECOLOGICAL RESOURCES AND PROTECTED AREAS
- RECREATIONAL AREAS
- AGRICULTURAL LAND RESERVE

NOTES:

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SCALE 250 125 0 250 500 750 1,000 Meters

NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION CORRIDOR - 25JUL'13
SHEET 4 OF 18

Knight Piésold CONSULTING

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VA101-457/6	3

FIGURE 2.4 REV 0

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	09AUG'13	ISSUED WITH REPORT	KLA	AMD	LD	KJB

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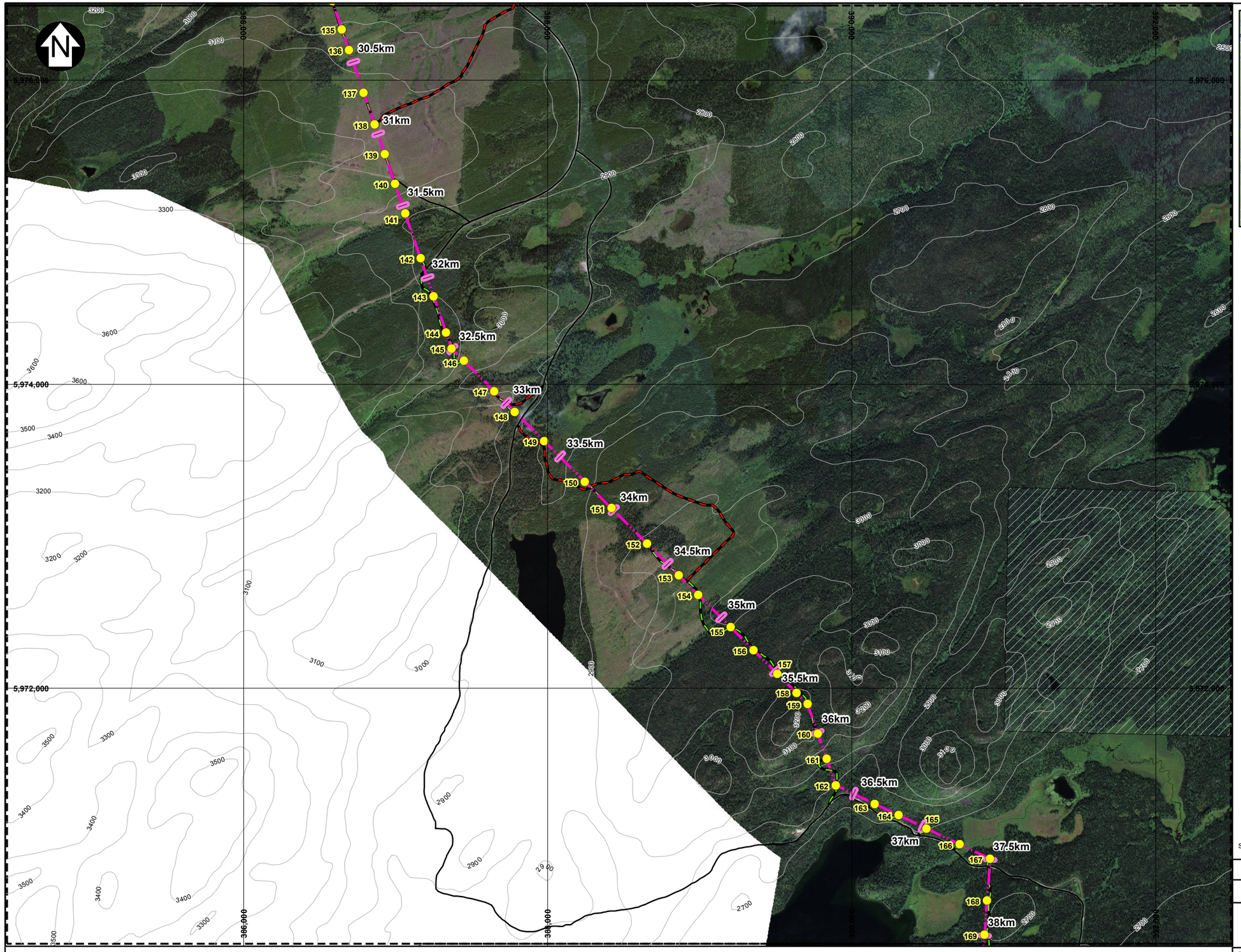

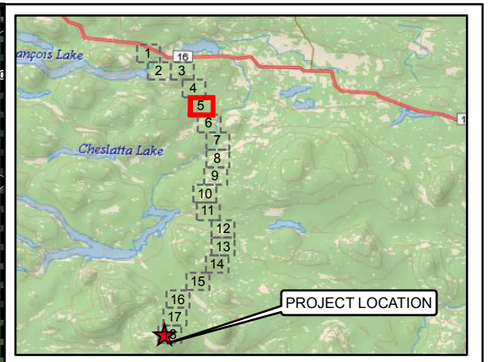

LEGEND:

GENERAL

- MINE SITE
- FORESTRY ROAD
- GRAVEL UNDIVIDED - 1 LANE
- GRAVEL UNDIVIDED - 2 LANES
- UNIMPROVED
- EXISTING ROAD
- CREEK/RIVER
- CONTOUR (100 M)
- MAPSHEET

TRANSMISSION LINE

- BC HYDRO SUBSTATION
- PROPOSED TRANSMISSION LINE STRUCTURE
- PROPOSED TL CENTERLINE

PROPOSED PERMANENT ACCESS ROAD OPTIONS

- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE

LAND AND RESOURCE DATA (LRDW)

- RECREATIONAL VISUAL QUALITY ZONE
- FOREST TENURE MANAGED LICENSES
- INDIAN RESERVATION
- UNGULATE WINTER RANGE
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- SURVEYED ROW'S
- PARKS, ECOLOGICAL RESOURCES AND PROTECTED AREAS
- RECREATIONAL AREAS
- AGRICULTURAL LAND RESERVE

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SCALE 250 125 0 250 500 750 1,000 Meters

NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION CORRIDOR - 25JUL'13
SHEET 5 OF 18

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	09AUG'13	ISSUED WITH REPORT	KLA	AMD	LD	KJB

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FIGURE 2.5 | REV 0

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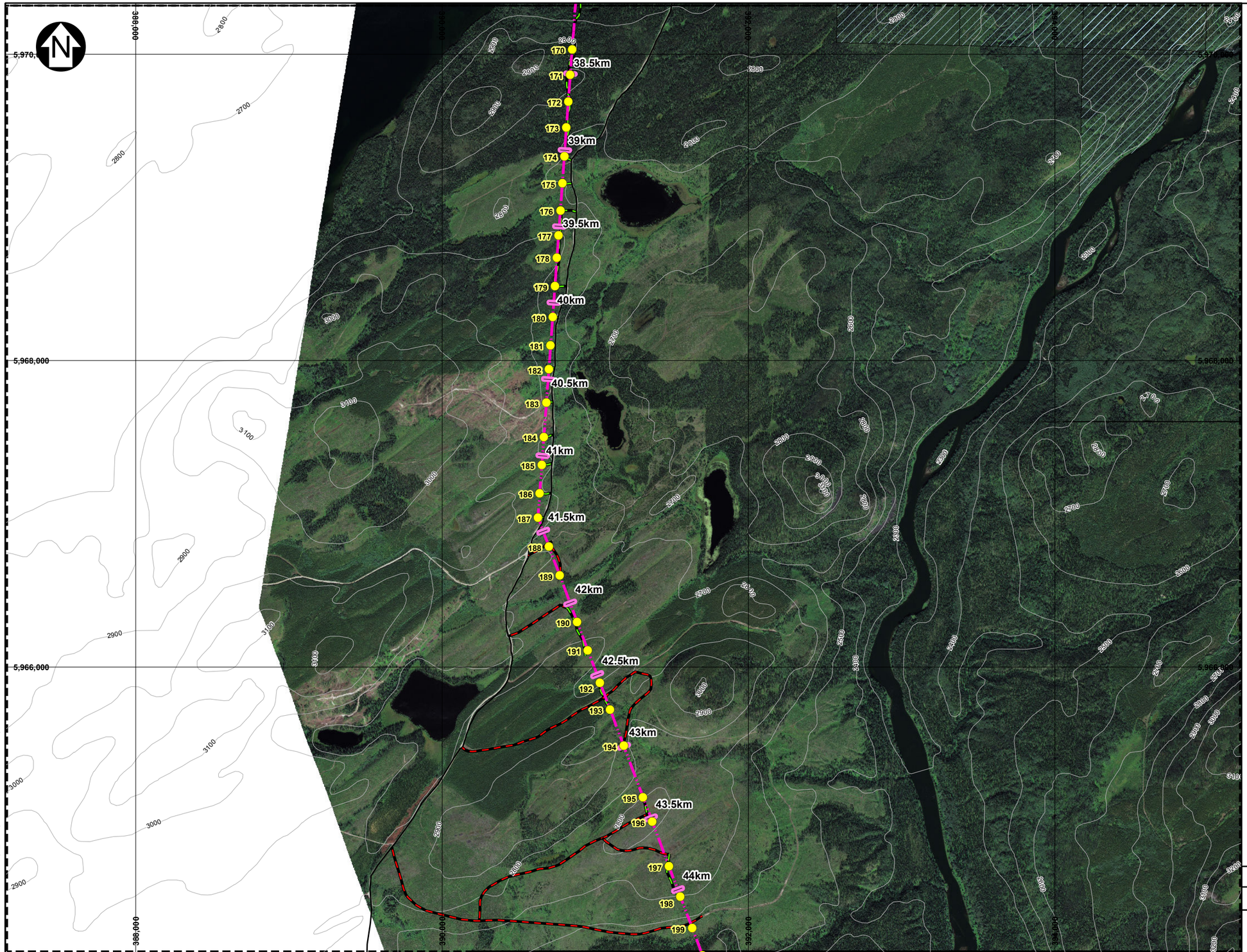

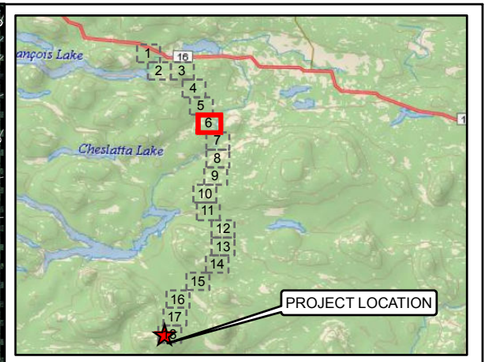

LEGEND:

GENERAL

- MINE SITE
- FORESTRY ROAD
- GRAVEL UNDIVIDED - 1 LANE
- GRAVEL UNDIVIDED - 2 LANES
- UNIMPROVED
- EXISTING ROAD
- CREEK/RIVER
- CONTOUR (100 M)
- MAPSHEET

TRANSMISSION LINE

- BC HYDRO SUBSTATION
- PROPOSED TRANSMISSION LINE STRUCTURE
- PROPOSED TL CENTERLINE

PROPOSED PERMANENT ACCESS ROAD OPTIONS

- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE

LAND AND RESOURCE DATA (LRDW)

- RECREATIONAL VISUAL QUALITY ZONE
- FOREST TENURE MANAGED LICENSES
- INDIAN RESERVATION
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- SURVEYED ROW'S
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NOTES:

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SCALE 250 125 0 250 500 750 1,000 Meters

NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION CORRIDOR - 25JUL'13
SHEET 6 OF 18

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	09AUG'13	ISSUED WITH REPORT	KLA	AMD	LD	KJB

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P/A NO. VA101-457/6 | REF NO. 3

FIGURE 2.6 | REV 0

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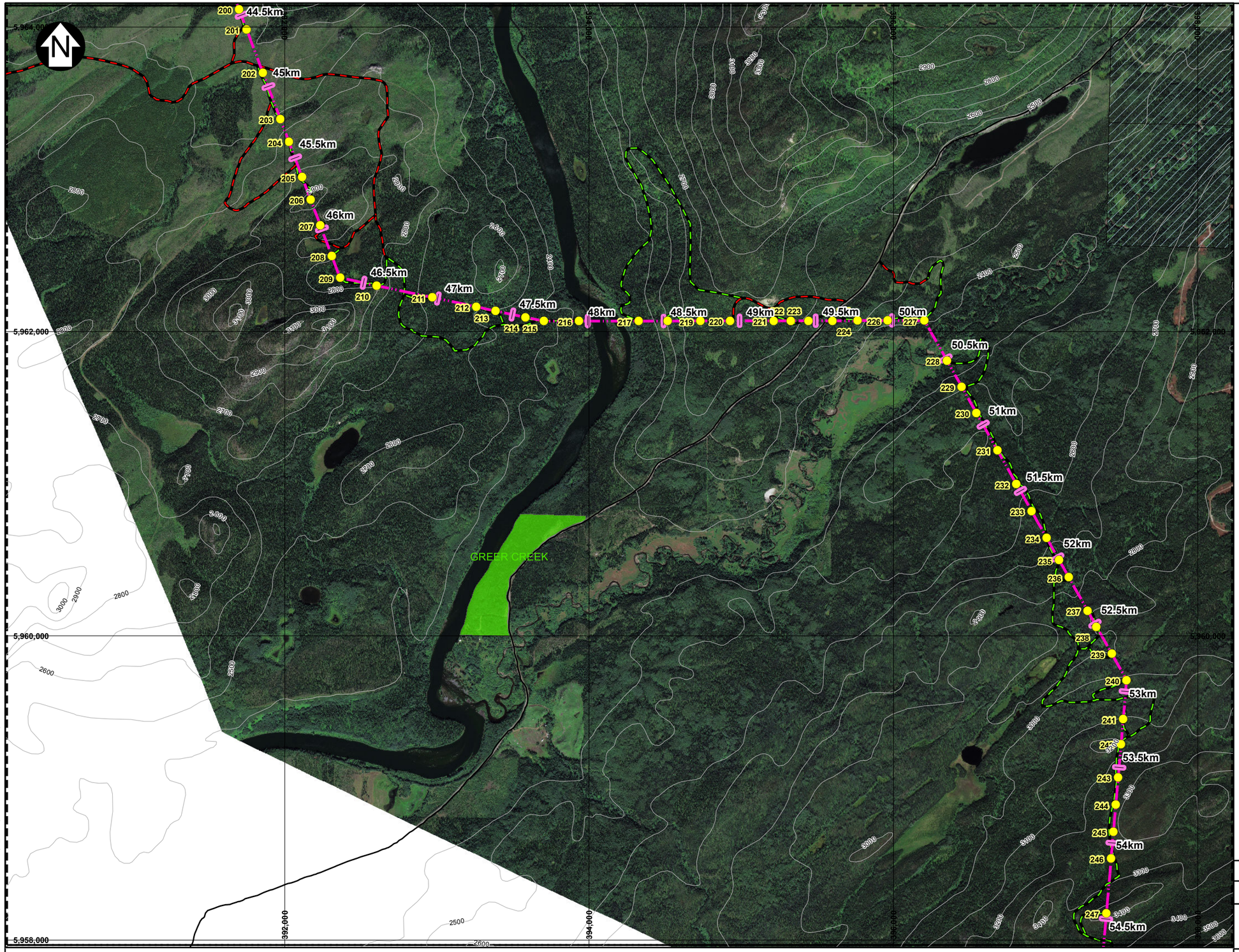

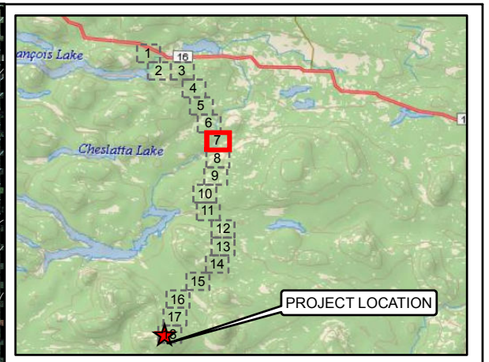

LEGEND:

GENERAL

- MINE SITE
- FORESTRY ROAD
- GRAVEL UNDIVIDED - 1 LANE
- GRAVEL UNDIVIDED - 2 LANES
- UNIMPROVED
- EXISTING ROAD
- CREEK/RIVER
- CONTOUR (100 M)
- MAPSHEET

TRANSMISSION LINE

- BC HYDRO SUBSTATION
- PROPOSED TRANSMISSION LINE STRUCTURE
- PROPOSED TL CENTERLINE

PROPOSED PERMANENT ACCESS ROAD OPTIONS

- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE

LAND AND RESOURCE DATA (LRDW)

- RECREATIONAL VISUAL QUALITY ZONE
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NOTES:

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SCALE 250 125 0 250 500 750 1,000 Meters

NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION CORRIDOR - 25JUL'13
SHEET 7 OF 18

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	09AUG'13	ISSUED WITH REPORT	KLA	AMD	LD	KJB

Knight Piésold CONSULTING

P/A NO.	REF NO.
VA101-457/6	3

FIGURE 2.7 REV 0

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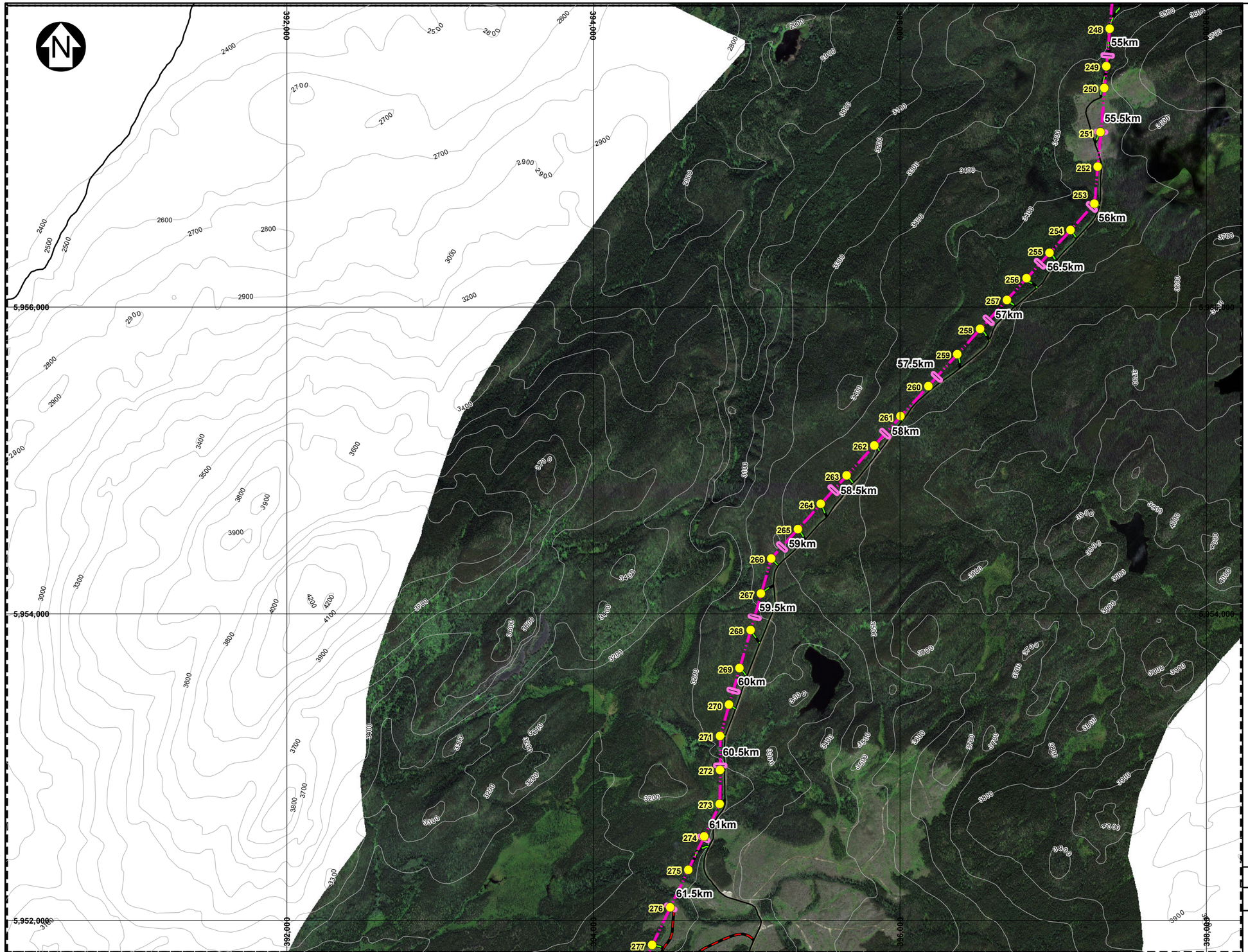

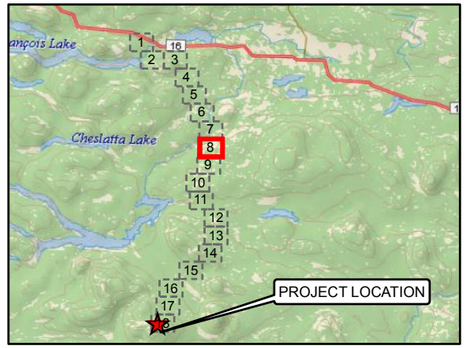

LEGEND:

GENERAL

- MINE SITE
- FORESTRY ROAD
- GRAVEL UNDIVIDED - 1 LANE
- GRAVEL UNDIVIDED - 2 LANES
- UNIMPROVED
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- CREEK/RIVER
- CONTOUR (100 M)
- MAPSHEET

TRANSMISSION LINE

- BC HYDRO SUBSTATION
- PROPOSED TRANSMISSION LINE STRUCTURE
- PROPOSED TL CENTERLINE

PROPOSED PERMANENT ACCESS ROAD OPTIONS

- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE

LAND AND RESOURCE DATA (LRDW)

- RECREATIONAL VISUAL QUALITY ZONE
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NOTES:

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4. LRDW DATA OBTAINED FROM LRDW WEBSITE. CONTOURS OBTAINED FROM CANVEC.
5. PROPOSED ACCESS ROAD OPTIONS PROVIDED BY ALL NORTH CONSULTING LTD.

SCALE 250 125 0 250 500 750 1,000 Meters

NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION CORRIDOR - 25JUL'13
SHEET 8 OF 18

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	09AUG'13	ISSUED WITH REPORT	KLA	AMD	LD	KJB

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VA101-457/6	3
FIGURE 2.8	REV 0

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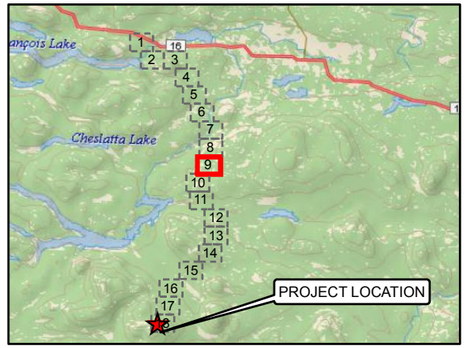

LEGEND:

GENERAL

- MINE SITE
- FORESTRY ROAD
- GRAVEL UNDIVIDED - 1 LANE
- GRAVEL UNDIVIDED - 2 LANES
- UNIMPROVED
- EXISTING ROAD
- CREEK/RIVER
- CONTOUR (100 M)
- MAPSHEET

TRANSMISSION LINE

- BC HYDRO SUBSTATION
- PROPOSED TRANSMISSION LINE STRUCTURE
- PROPOSED TL CENTERLINE

PROPOSED PERMANENT ACCESS ROAD OPTIONS

- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE

LAND AND RESOURCE DATA (LRDW)

- RECREATIONAL VISUAL QUALITY ZONE
- FOREST TENURE MANAGED LICENSES
- INDIAN RESERVATION
- UNGULATE WINTER RANGE
- SURVEYED PARCELS
- SURVEYED ROW'S
- PARKS, ECOLOGICAL RESOURCES AND PROTECTED AREAS
- RECREATIONAL AREAS
- AGRICULTURAL LAND RESERVE

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SCALE 250 125 0 250 500 750 1,000 Meters

NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION CORRIDOR - 25JUL'13
SHEET 9 OF 18

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
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FIGURE 2.9 | REV 0

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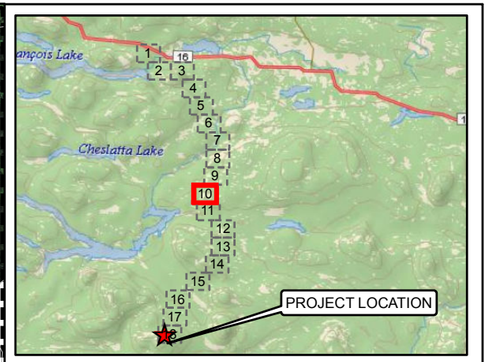

LEGEND:

GENERAL

- MINE SITE
- FORESTRY ROAD
- GRAVEL UNDIVIDED - 1 LANE
- GRAVEL UNDIVIDED - 2 LANES
- UNIMPROVED
- EXISTING ROAD
- CREEK/RIVER
- CONTOUR (100 M)
- MAPSHEET

TRANSMISSION LINE

- BC HYDRO SUBSTATION
- PROPOSED TRANSMISSION LINE STRUCTURE
- PROPOSED TL CENTERLINE

PROPOSED PERMANENT ACCESS ROAD OPTIONS

- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE

LAND AND RESOURCE DATA (LRDW)

- RECREATIONAL VISUAL QUALITY ZONE
- FOREST TENURE MANAGED LICENSES
- INDIAN RESERVATION
- UNGULATE WINTER RANGE
- SURVEYED PARCELS
- SURVEYED ROW'S
- PARKS, ECOLOGICAL RESOURCES AND PROTECTED AREAS
- RECREATIONAL AREAS
- AGRICULTURAL LAND RESERVE

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NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION CORRIDOR - 25JUL'13
SHEET 10 OF 18

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FIGURE 2.10	REV 0

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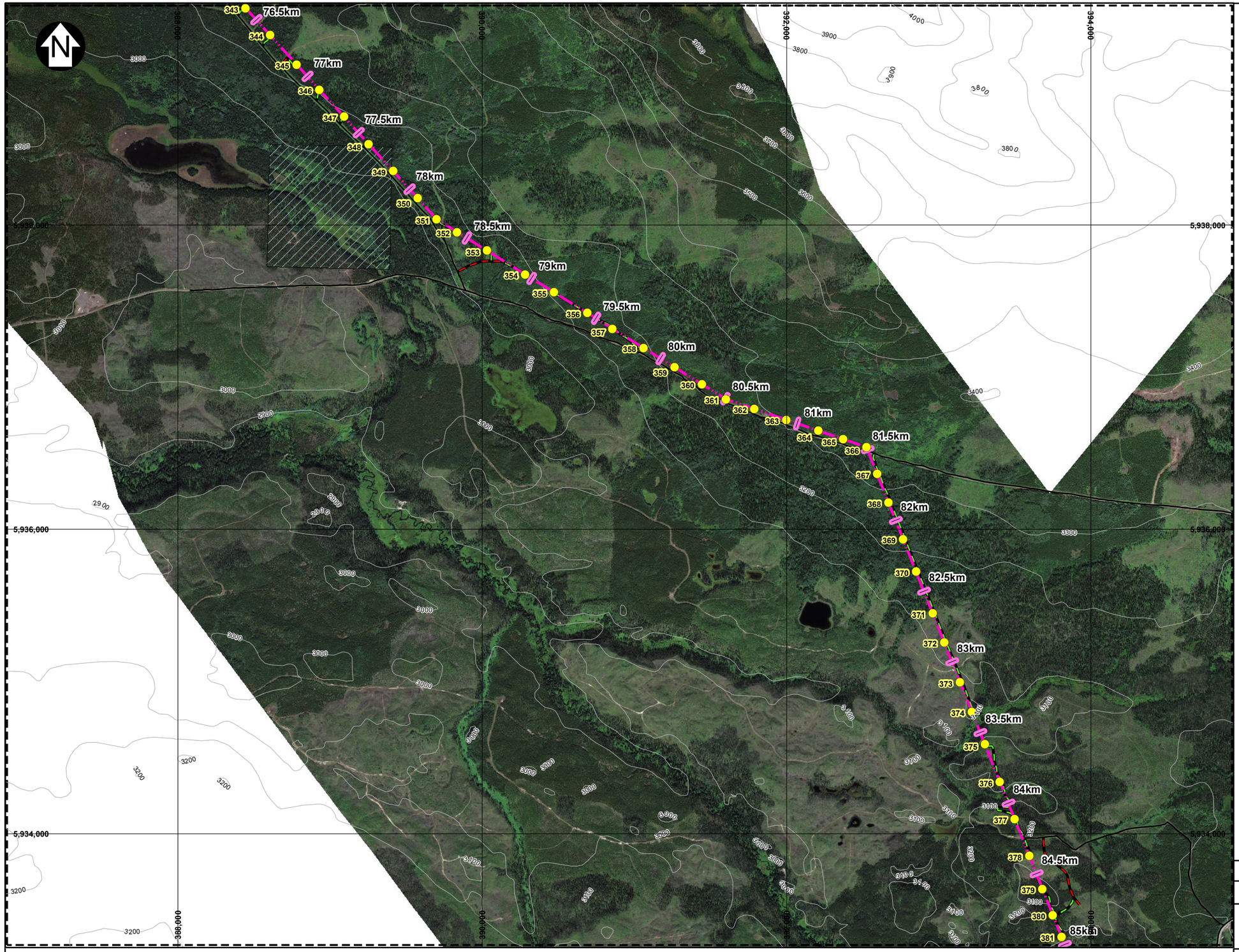

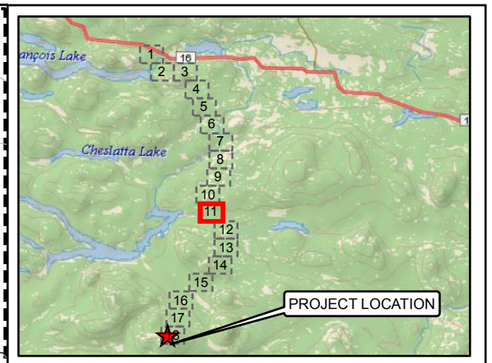

LEGEND:

GENERAL

- MINE SITE
- FORESTRY ROAD
- GRAVEL UNDIVIDED - 1 LANE
- GRAVEL UNDIVIDED - 2 LANES
- UNIMPROVED
- EXISTING ROAD
- CREEK/RIVER
- CONTOUR (100 M)
- MAPSHEET

TRANSMISSION LINE

- BC HYDRO SUBSTATION
- PROPOSED TRANSMISSION LINE STRUCTURE
- PROPOSED TL CENTERLINE

PROPOSED PERMANENT ACCESS ROAD OPTIONS

- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE

LAND AND RESOURCE DATA (LRDW)

- RECREATIONAL VISUAL QUALITY ZONE
- FOREST TENURE MANAGED LICENSES
- INDIAN RESERVATION
- UNGULATE WINTER RANGE
- SURVEYED PARCELS
- SURVEYED ROW'S
- PARKS, ECOLOGICAL RESOURCES AND PROTECTED AREAS
- RECREATIONAL AREAS
- AGRICULTURAL LAND RESERVE

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SCALE 250 125 0 250 500 750 1,000 Meters

NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION CORRIDOR - 25JUL'13
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FIGURE 2.11	REV 0

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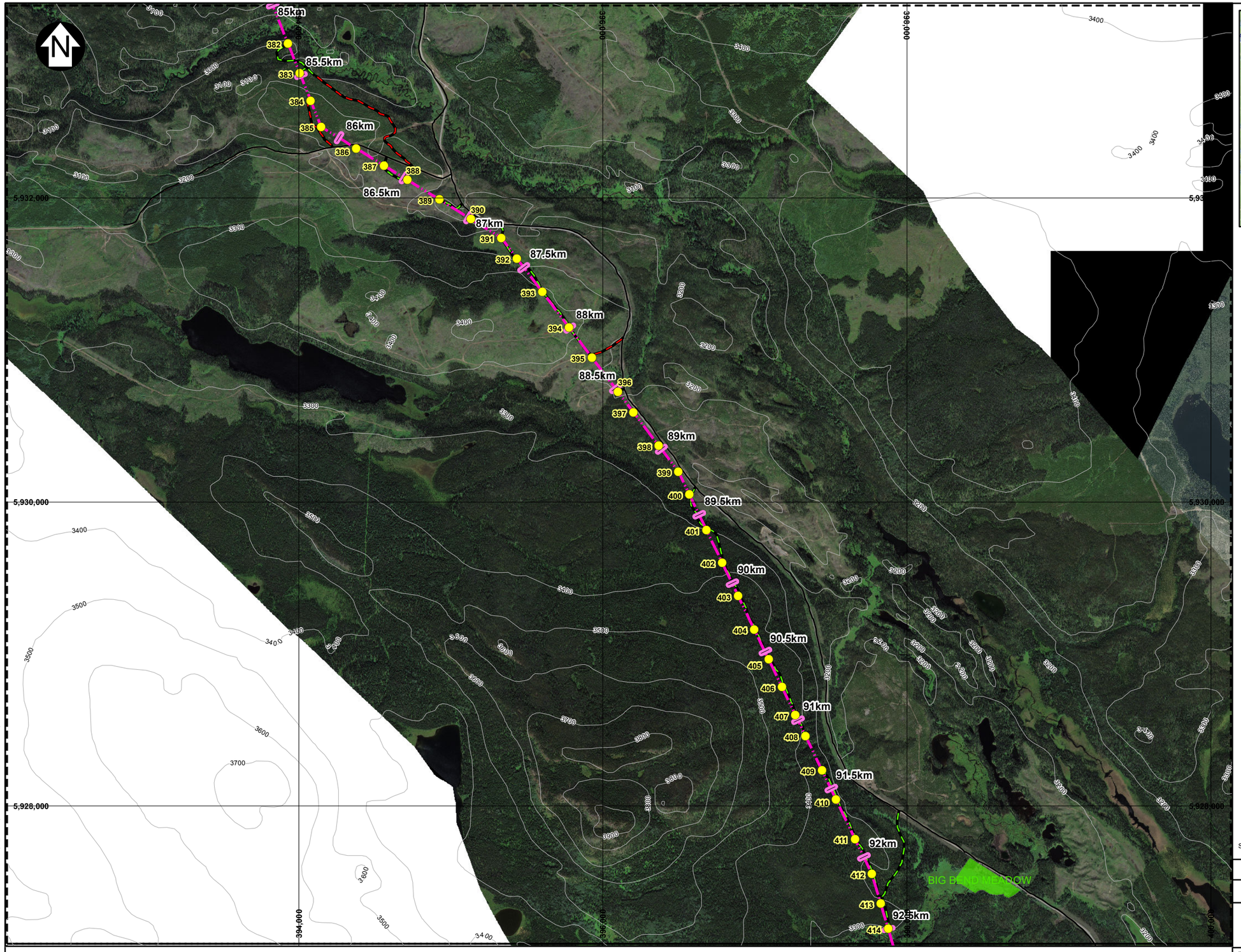

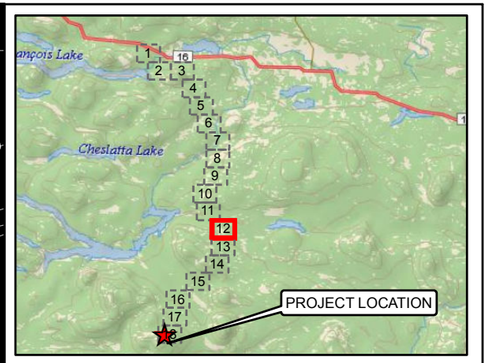

LEGEND:

GENERAL
- MINE SITE
- FORESTRY ROAD
- GRAVEL UNDIVIDED - 1 LANE
- GRAVEL UNDIVIDED - 2 LANES
- UNIMPROVED
- EXISTING ROAD
- CREEK/RIVER
- CONTOUR (100 M)
- MAPSHEET

TRANSMISSION LINE
- BC HYDRO SUBSTATION
- PROPOSED TRANSMISSION LINE STRUCTURE
- PROPOSED TL CENTERLINE

PROPOSED PERMANENT ACCESS ROAD OPTIONS
- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE

LAND AND RESOURCE DATA (LRDW)
- RECREATIONAL VISUAL QUALITY ZONE
- FOREST TENURE MANAGED LICENSES
- INDIAN RESERVATION
- UNGULATE WINTER RANGE
- SURVEYED PARCELS
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NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION CORRIDOR - 25JUL'13
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FIGURE 2.12 | REV 0

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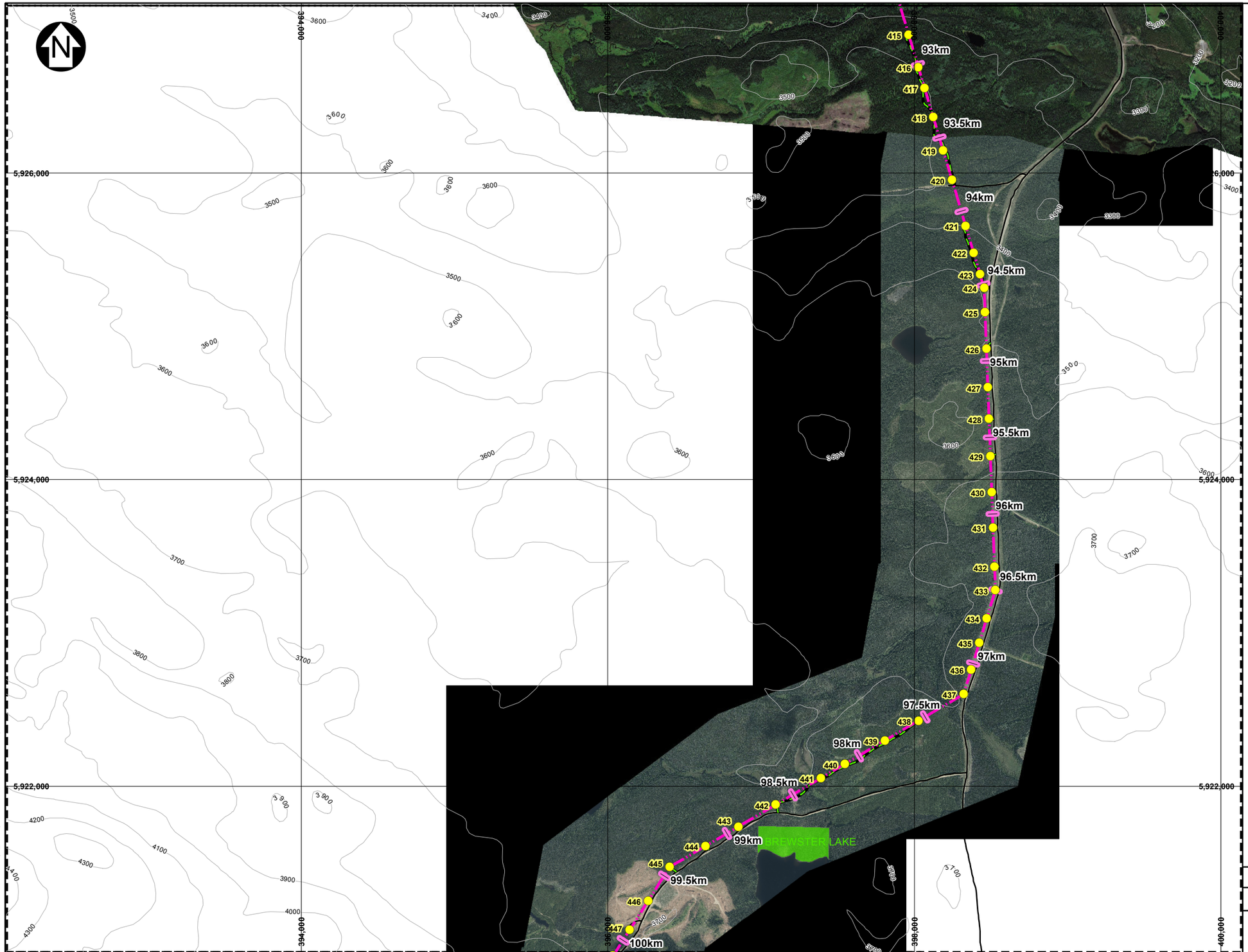

LEGEND:

GENERAL

- MINE SITE
- FORESTRY ROAD
- GRAVEL UNDIVIDED - 1 LANE
- GRAVEL UNDIVIDED - 2 LANES
- UNIMPROVED
- EXISTING ROAD
- CREEK/RIVER
- CONTOUR (100 M)
- MAPSHEET

TRANSMISSION LINE

- BC HYDRO SUBSTATION
- PROPOSED TRANSMISSION LINE STRUCTURE
- PROPOSED TL CENTERLINE

PROPOSED PERMANENT ACCESS ROAD OPTIONS

- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE

LAND AND RESOURCE DATA (LRDW)

- RECREATIONAL VISUAL QUALITY ZONE
- FOREST TENURE MANAGED LICENSES
- INDIAN RESERVATION
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NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION CORRIDOR - 25JUL'13
SHEET 13 OF 18

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P/A NO. VA101-457/6 | REF NO. 3

FIGURE 2.13 | REV 0

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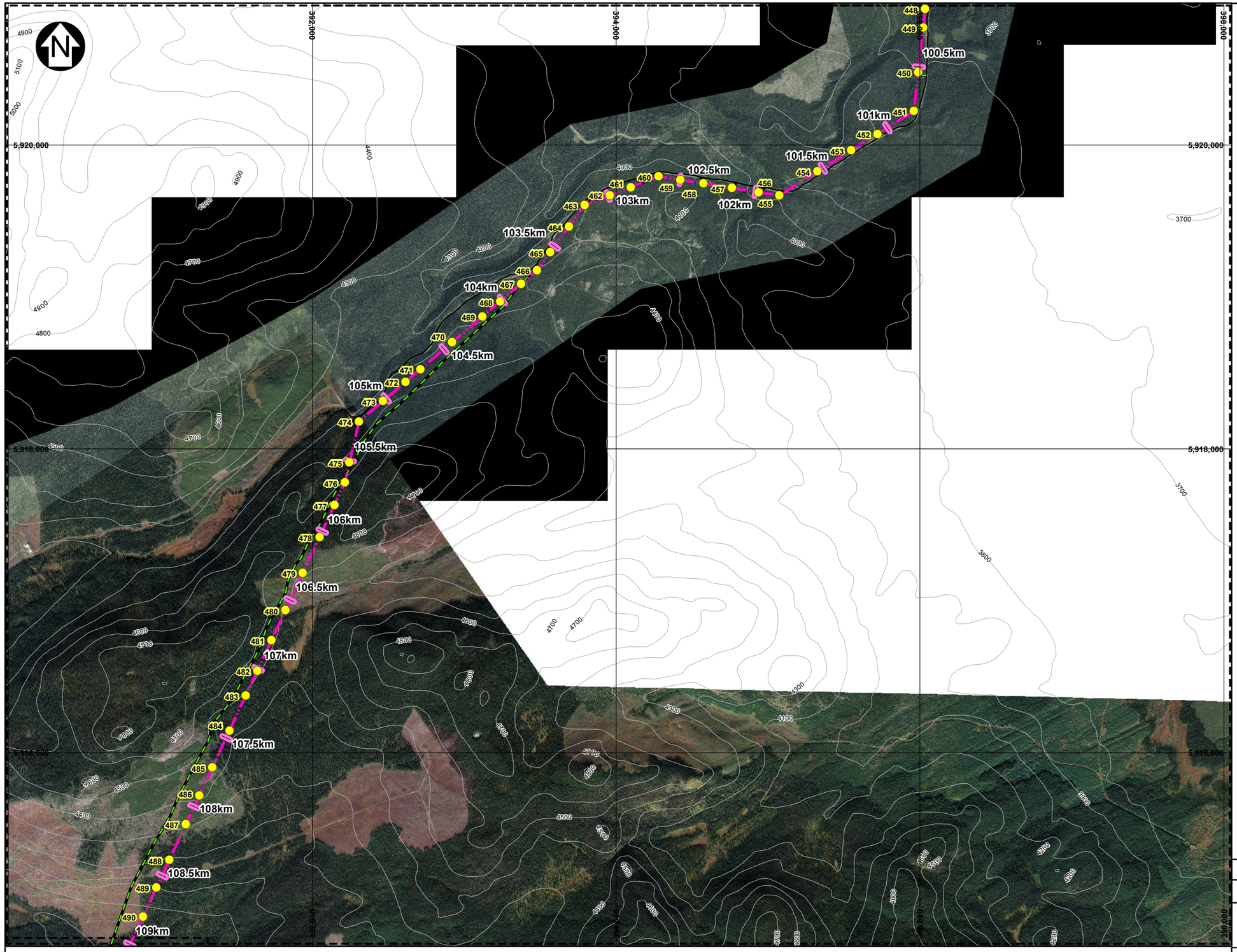

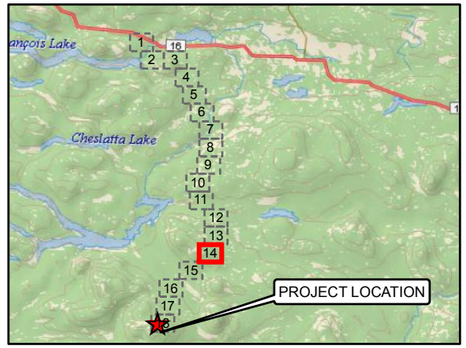

LEGEND:

GENERAL

- MINE SITE
- FORESTRY ROAD
- GRAVEL UNDIVIDED - 1 LANE
- GRAVEL UNDIVIDED - 2 LANES
- UNIMPROVED
- EXISTING ROAD
- CREEK/RIVER
- CONTOUR (100 M)
- MAPSHEET

TRANSMISSION LINE

- BC HYDRO SUBSTATION
- PROPOSED TRANSMISSION LINE STRUCTURE
- PROPOSED TL CENTERLINE

PROPOSED PERMANENT ACCESS ROAD OPTIONS

- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE

LAND AND RESOURCE DATA (LRDW)

- RECREATIONAL VISUAL QUALITY ZONE
- FOREST TENURE MANAGED LICENSES
- INDIAN RESERVATION
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SCALE 250 125 0 250 500 750 1,000 Meters

NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION CORRIDOR - 25JUL'13
SHEET 14 OF 18

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FIGURE 2.14 | REV 0

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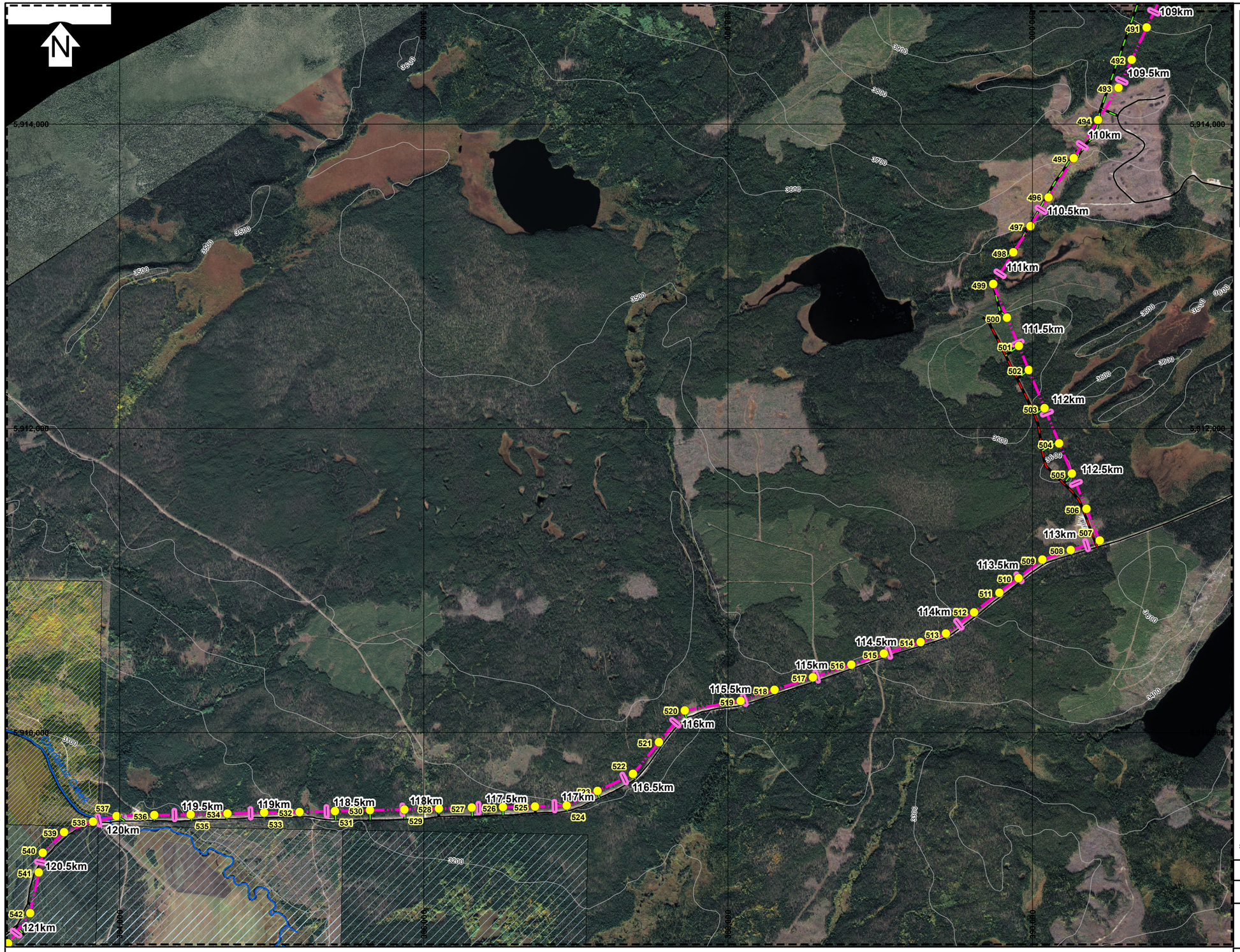

LEGEND:

GENERAL

- MINE SITE
- FORESTRY ROAD
- GRAVEL UNDIVIDED - 1 LANE
- GRAVEL UNDIVIDED - 2 LANES
- UNIMPROVED
- EXISTING ROAD
- CREEK/RIVER
- CONTOUR (100 M)
- MAPSHEET

TRANSMISSION LINE

- BC HYDRO SUBSTATION
- PROPOSED TRANSMISSION LINE STRUCTURE
- PROPOSED TL CENTERLINE

PROPOSED PERMANENT ACCESS ROAD OPTIONS

- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE

LAND AND RESOURCE DATA (LRDW)

- RECREATIONAL VISUAL QUALITY ZONE
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NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION CORRIDOR - 25JUL'13
SHEET 15 OF 18

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FIGURE 2.15	REV 0

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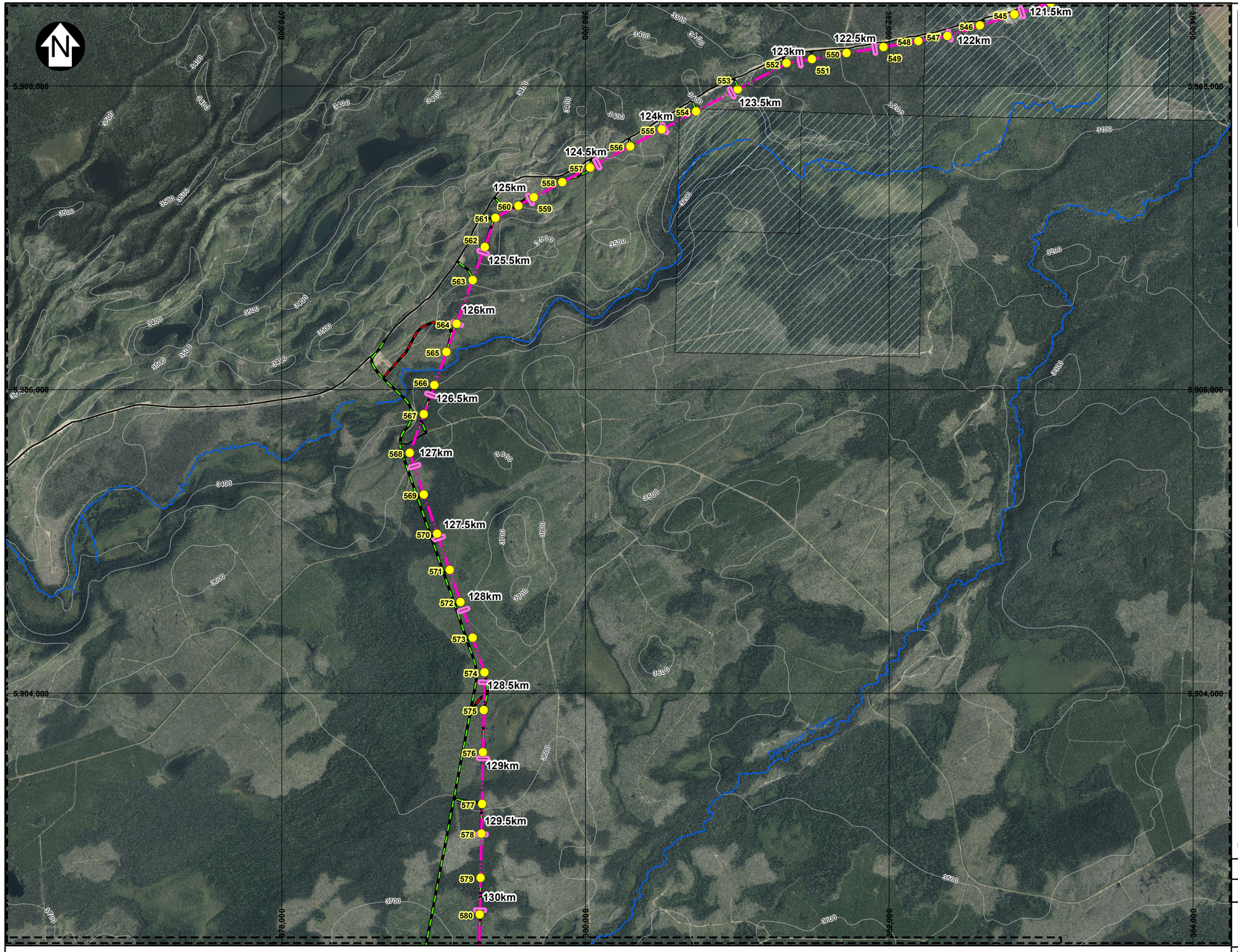

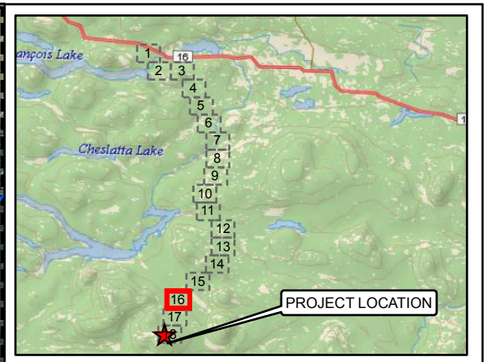

LEGEND:

GENERAL

- MINE SITE
- FORESTRY ROAD
- GRAVEL UNDIVIDED - 1 LANE
- GRAVEL UNDIVIDED - 2 LANES
- UNIMPROVED
- EXISTING ROAD
- CREEK/RIVER
- CONTOUR (100 M)
- MAPSHEET

TRANSMISSION LINE

- BC HYDRO SUBSTATION
- PROPOSED TRANSMISSION LINE STRUCTURE
- PROPOSED TL CENTERLINE

PROPOSED PERMANENT ACCESS ROAD OPTIONS

- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE

LAND AND RESOURCE DATA (LRDW)

- RECREATIONAL VISUAL QUALITY ZONE
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NEW GOLD INC.

BLACKWATER GOLD PROJECT

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SHEET 16 OF 18

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FIGURE 2.16	REV 0

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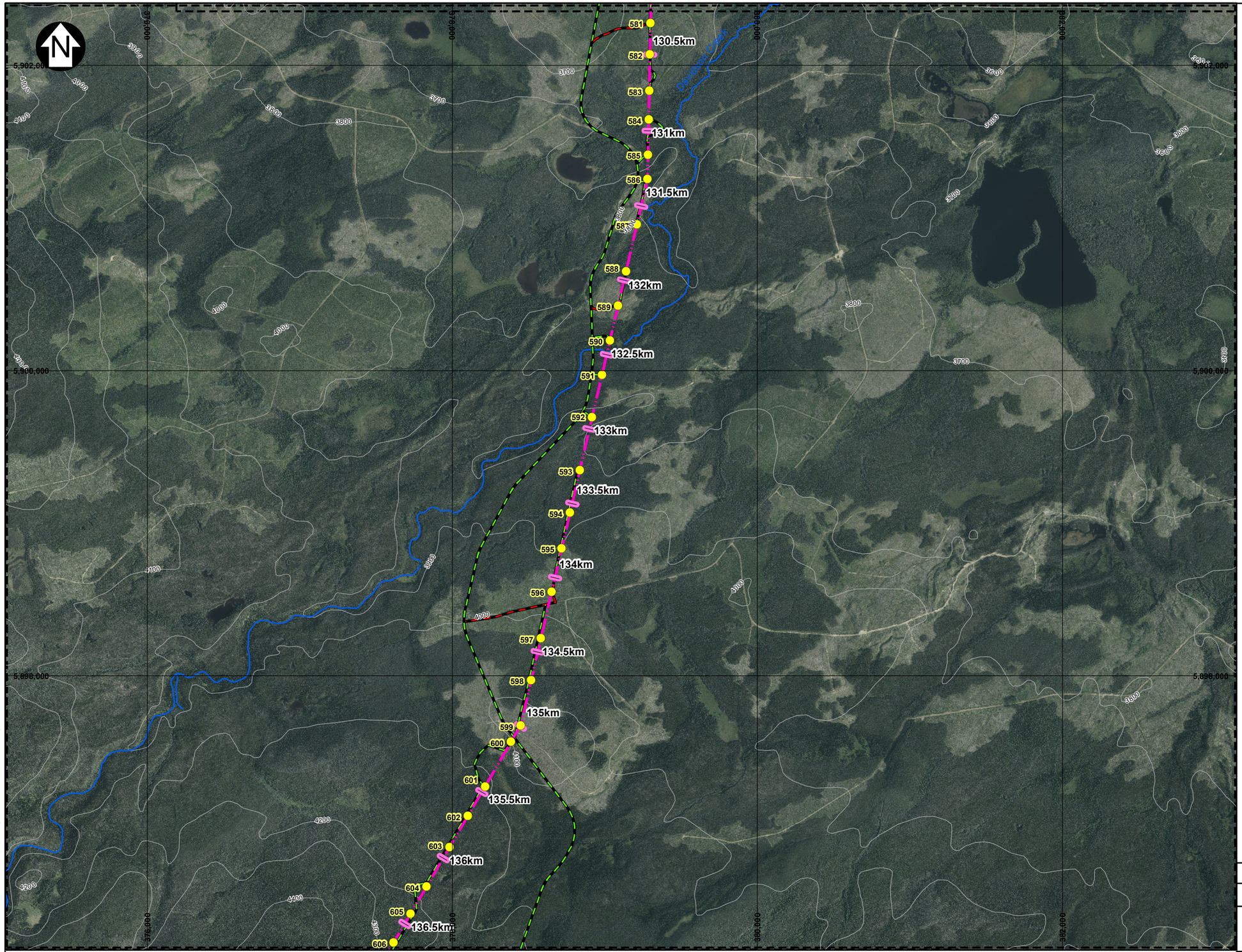

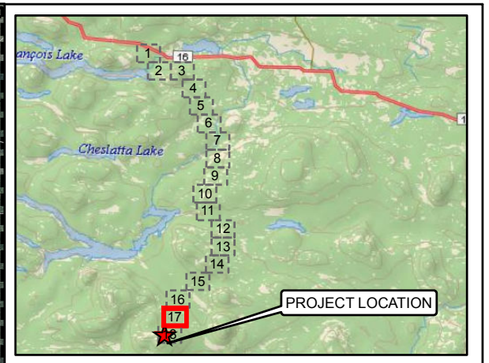

LEGEND:

GENERAL

- MINE SITE
- FORESTRY ROAD
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- GRAVEL UNDIVIDED - 2 LANES
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- CONTOUR (100 M)
- MAPSHEET

TRANSMISSION LINE

- BC HYDRO SUBSTATION
- PROPOSED TRANSMISSION LINE STRUCTURE
- PROPOSED TL CENTERLINE

PROPOSED PERMANENT ACCESS ROAD OPTIONS

- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE

LAND AND RESOURCE DATA (LRDW)

- RECREATIONAL VISUAL QUALITY ZONE
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NEW GOLD INC.

BLACKWATER GOLD PROJECT

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SHEET 17 OF 18

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0	09AUG'13	ISSUED WITH REPORT	KLA	AMD	LD	KJB

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P/A NO.	REF NO.
VA101-457/6	3
FIGURE 2.17	REV 0

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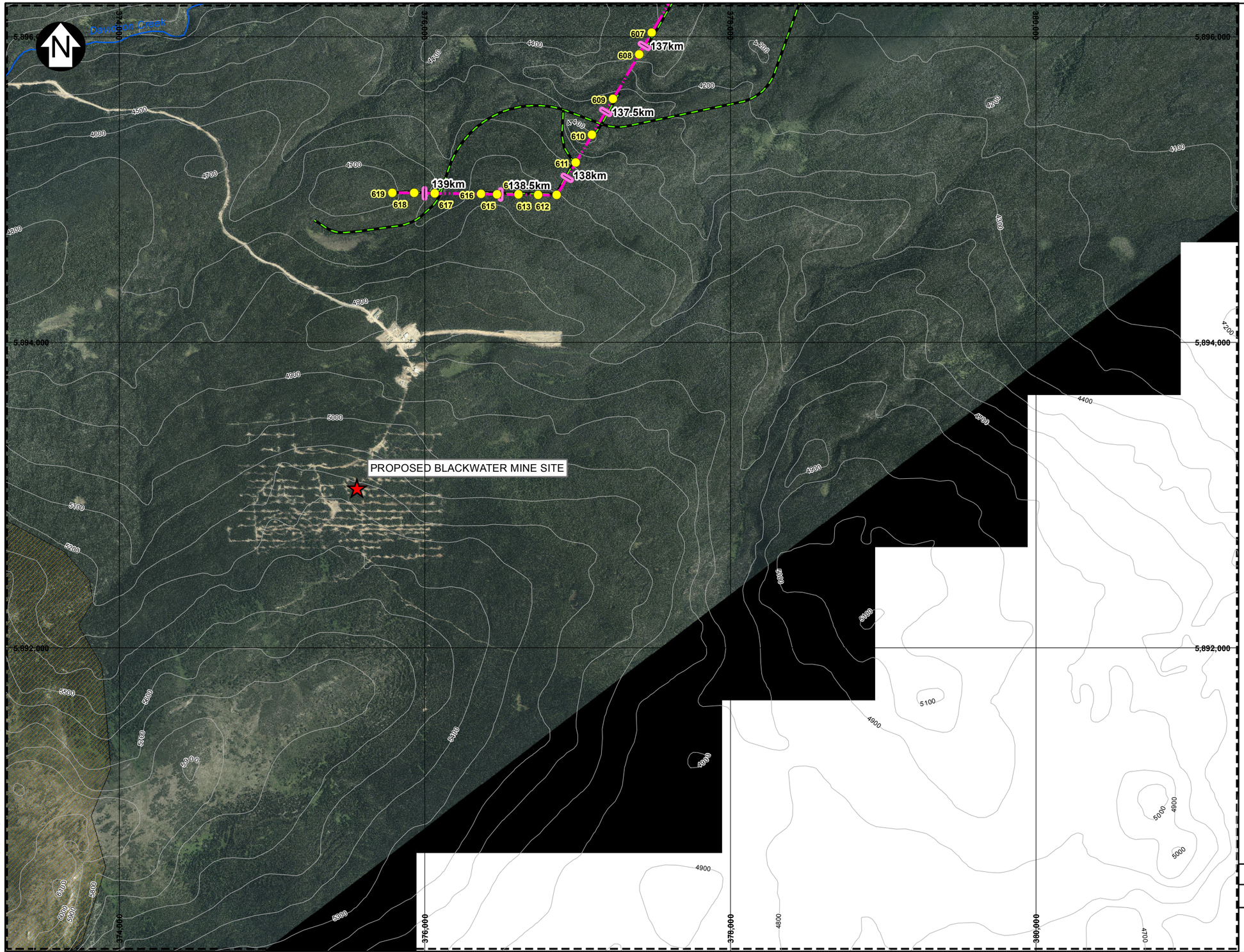

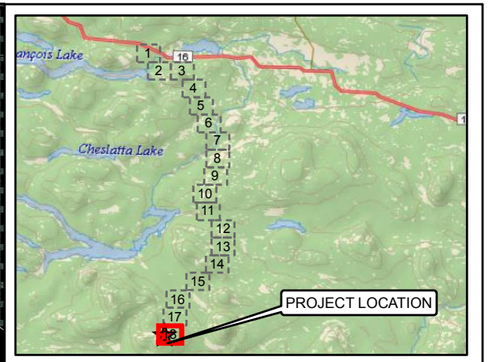

LEGEND:

GENERAL

- MINE SITE
- FORESTRY ROAD
- GRAVEL UNDIVIDED - 1 LANE
- GRAVEL UNDIVIDED - 2 LANES
- UNIMPROVED
- EXISTING ROAD
- CREEK/RIVER
- CONTOUR (100 M)
- MAPSHEET

TRANSMISSION LINE

- BC HYDRO SUBSTATION
- PROPOSED TRANSMISSION LINE STRUCTURE
- PROPOSED TL CENTERLINE

PROPOSED PERMANENT ACCESS ROAD OPTIONS

- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE

LAND AND RESOURCE DATA (LRDW)

- RECREATIONAL VISUAL QUALITY ZONE
- FOREST TENURE MANAGED LICENSES
- INDIAN RESERVATION
- UNGULATE WINTER RANGE
- SURVEYED PARCELS
- SURVEYED ROW'S
- PARKS, ECOLOGICAL RESOURCES AND PROTECTED AREAS
- RECREATIONAL AREAS
- AGRICULTURAL LAND RESERVE

NOTES:

1. BASE MAP: BC TRIM MAPPING.
2. COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N.
3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:25,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.
4. LRDW DATA OBTAINED FROM LRDW WEBSITE. CONTOURS OBTAINED FROM CANVEC.
5. PROPOSED ACCESS ROAD OPTIONS PROVIDED BY ALL NORTH CONSULTING LTD.

SCALE 250 125 0 250 500 750 1,000 Meters

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TRANSMISSION CORRIDOR - 25JUL'13
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FIGURE 2.18 REV 0

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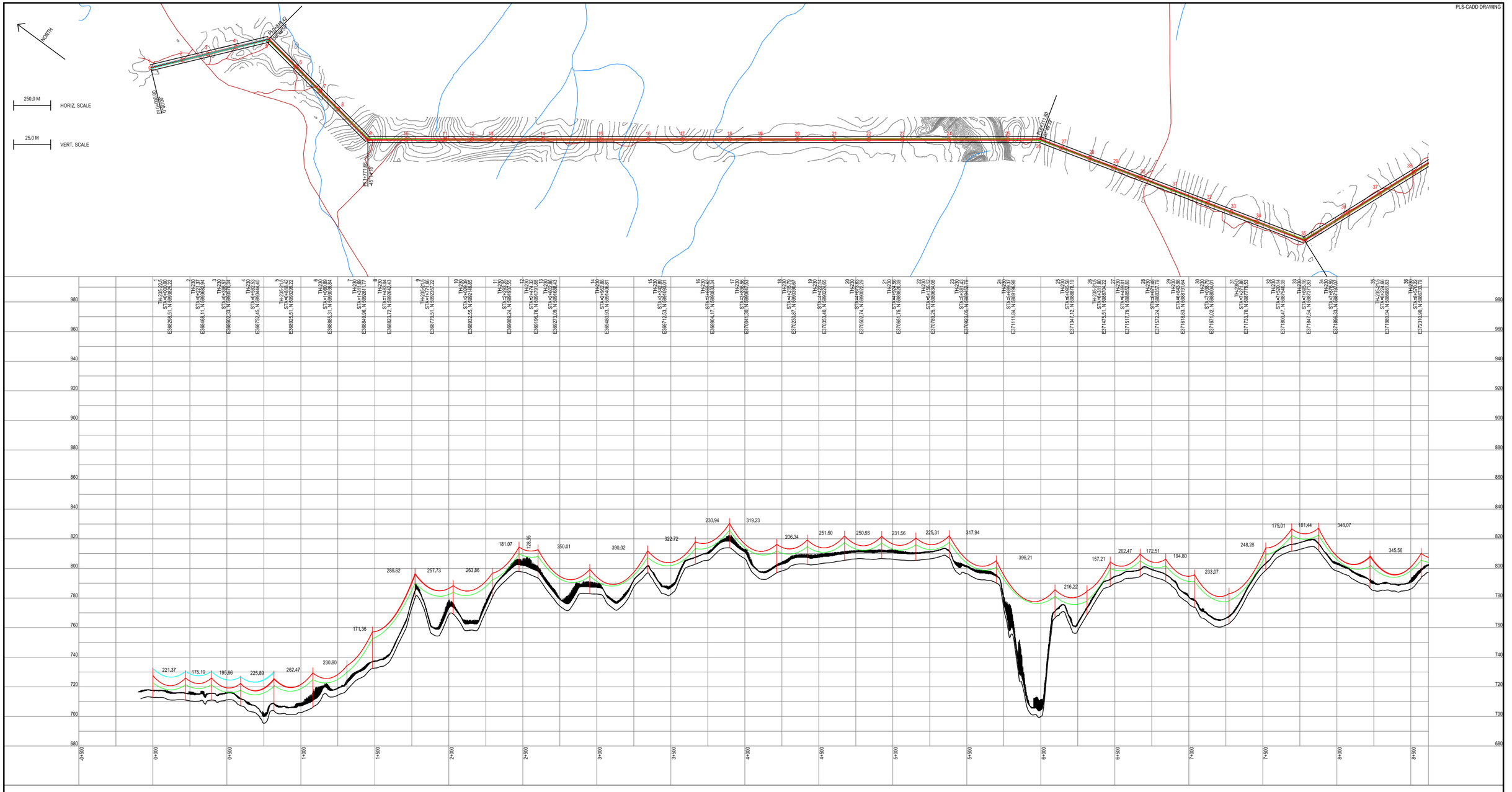
PLS-CADD DRAWING

NORTH

250,0 M HORIZ. SCALE

25,0 M VERT. SCALE



NOTES:

1. COORDINATE GRID IS UTM NAD83 ZONE 10 N.
2. CONTOUR INTERVAL IS 5 METRES.
3. DIMENSIONS AND ELEVATIONS ARE IN METERS, UNLESS NOTED OTHERWISE.
4. PLAN AND PROFILE DATA GENERATED USING PLS CADD.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	06AUG'13	ISSUED WITH REPORT	LD	LD	KLA	SRM

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TRANSMISSION LINE FEASIBILITY DESIGN
PLAN AND PROFILE
SHEET 1 OF 16

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REF NO. 3

FIGURE 4.1

REV 0

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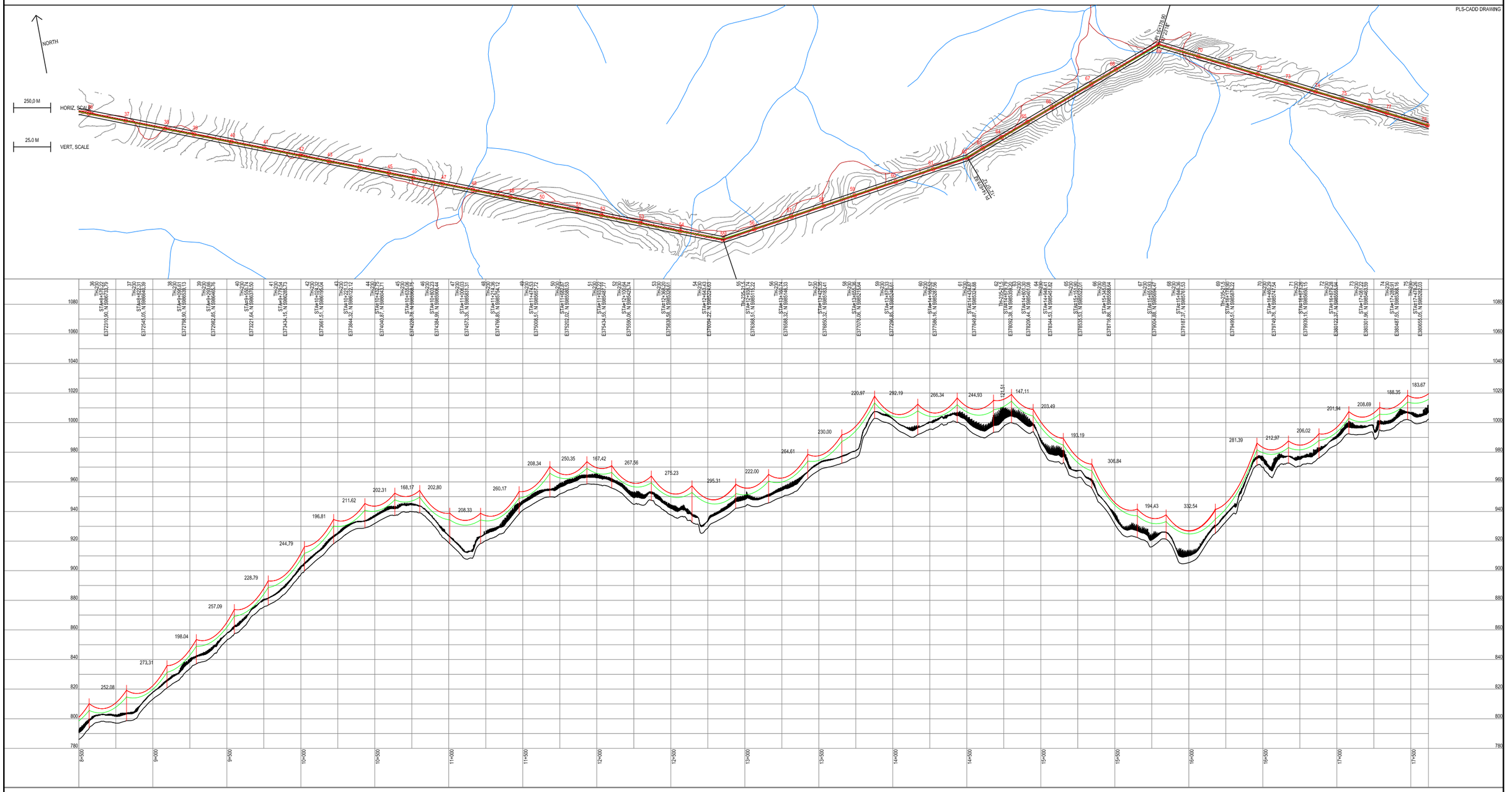

NOTES:

1. COORDINATE GRID IS UTM NAD83 ZONE 10 N.
2. CONTOUR INTERVAL IS 5 METRES.
3. DIMENSIONS AND ELEVATIONS ARE IN METERS, UNLESS NOTED OTHERWISE.
4. PLAN AND PROFILE DATA GENERATED USING PLS CADD.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	06AUG'13	ISSUED WITH REPORT	LD	LD	KLA	SRM

NEW GOLD INC.

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TRANSMISSION LINE FEASIBILITY DESIGN
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SHEET 2 OF 16

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REF NO. 3

FIGURE 4.2

REV 0

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PLS-CADD DRAWING

NORTH

250.0 M HORIZ. SCALE

25.0 M VERT. SCALE

PI 1+000.00
-77°00'00.0"

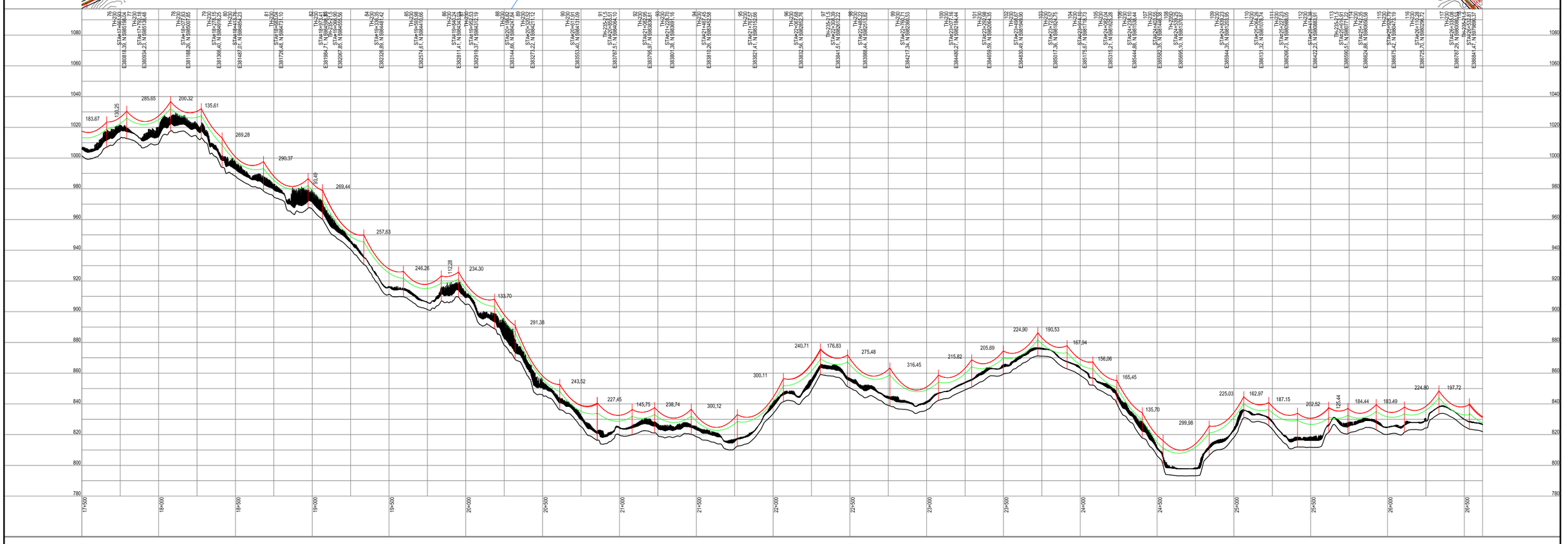
PI 1+538.95
-58°59'59.9"

PI 2+252.95
-58°59'59.9"

PI 2+729.95
-90°00'00.0"

PI 3+177.48
-58°59'59.98"

PI 3+452.95
-58°59'59.98"



NOTES:

1. COORDINATE GRID IS UTM NAD83 ZONE 10 N.
2. CONTOUR INTERVAL IS 5 METRES.
3. DIMENSIONS AND ELEVATIONS ARE IN METERS, UNLESS NOTED OTHERWISE.
4. PLAN AND PROFILE DATA GENERATED USING PLS CADD.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	06AUG'13	ISSUED WITH REPORT	LD	LD	KLA	SRM

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FIGURE 4.3

REV 0

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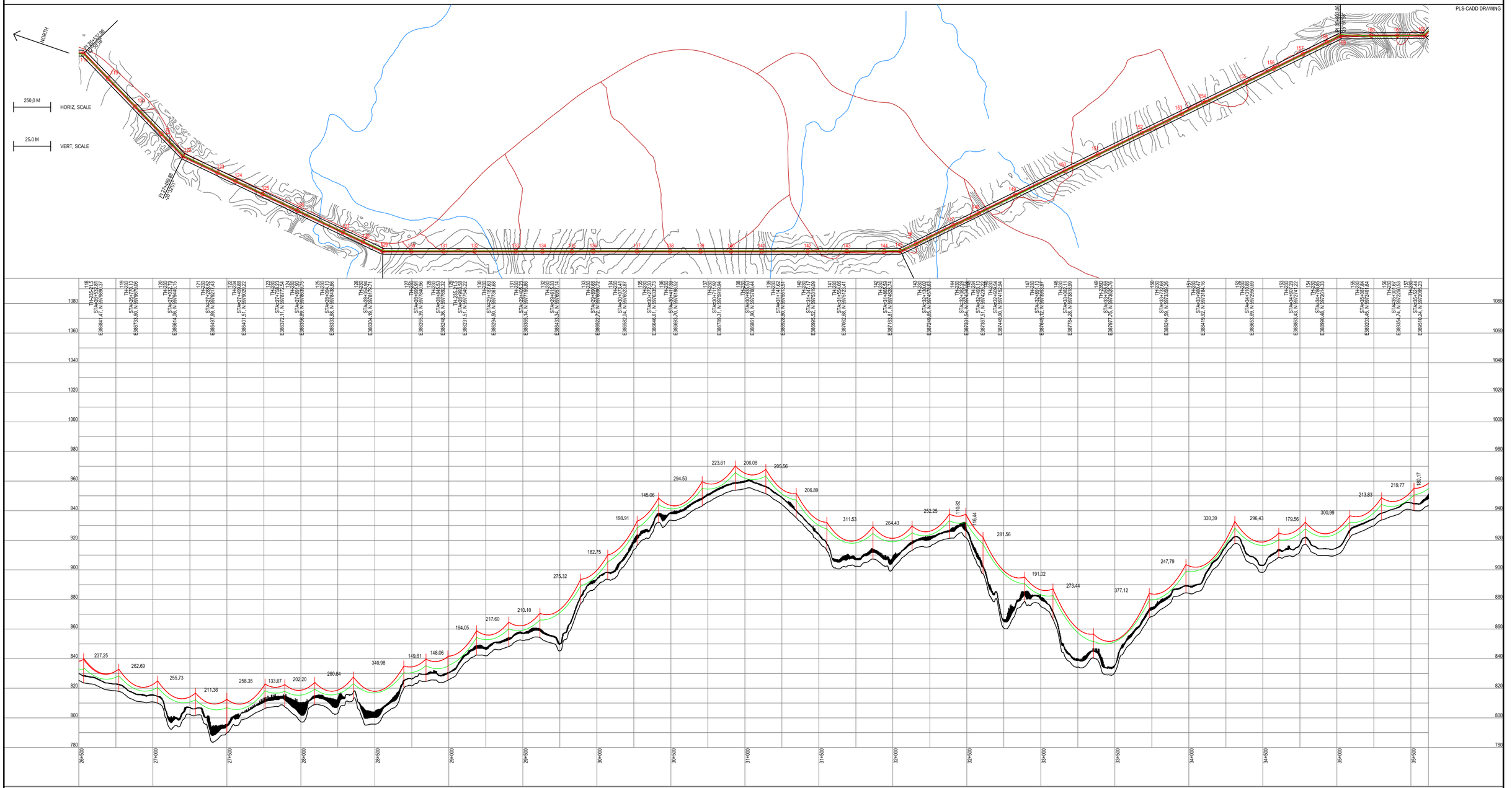

NOTES:

1. COORDINATE GRID IS UTM NAD83 ZONE 10 N.
2. CONTOUR INTERVAL IS 5 METRES.
3. DIMENSIONS AND ELEVATIONS ARE IN METERS, UNLESS NOTED OTHERWISE.
4. PLAN AND PROFILE DATA GENERATED USING PLS CADD.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	06AUG'13	ISSUED WITH REPORT	LD	LD	KLA	SRM

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TRANSMISSION LINE FEASIBILITY DESIGN
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FIGURE 4.4

REV 0

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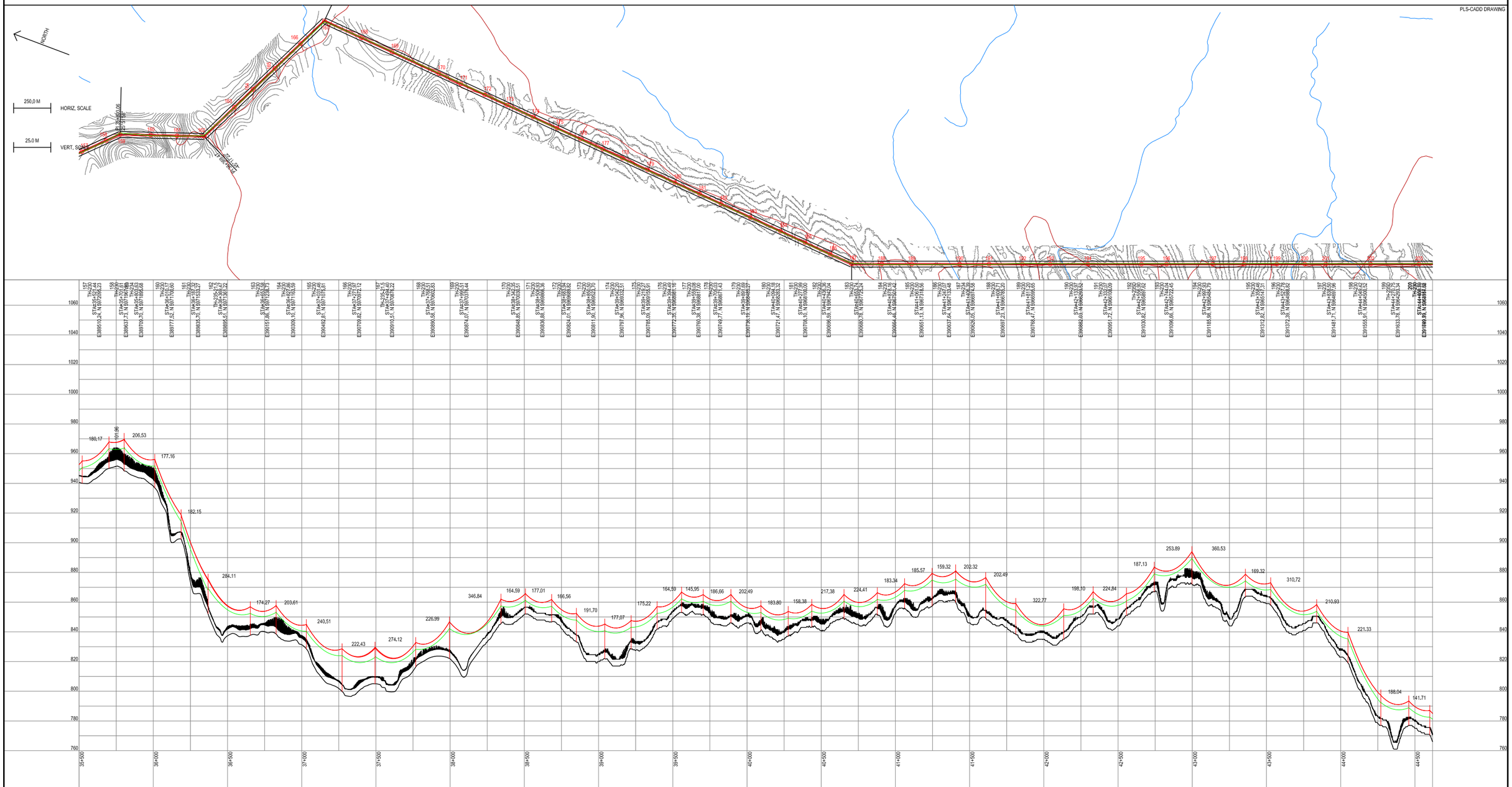

NOTES:

1. COORDINATE GRID IS UTM NAD83 ZONE 10 N.
2. CONTOUR INTERVAL IS 5 METRES.
3. DIMENSIONS AND ELEVATIONS ARE IN METERS, UNLESS NOTED OTHERWISE.
4. PLAN AND PROFILE DATA GENERATED USING PLS CADD.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	06AUG'13	ISSUED WITH REPORT	LD	LD	KLA	SRM

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FIGURE 4.5 REV 0

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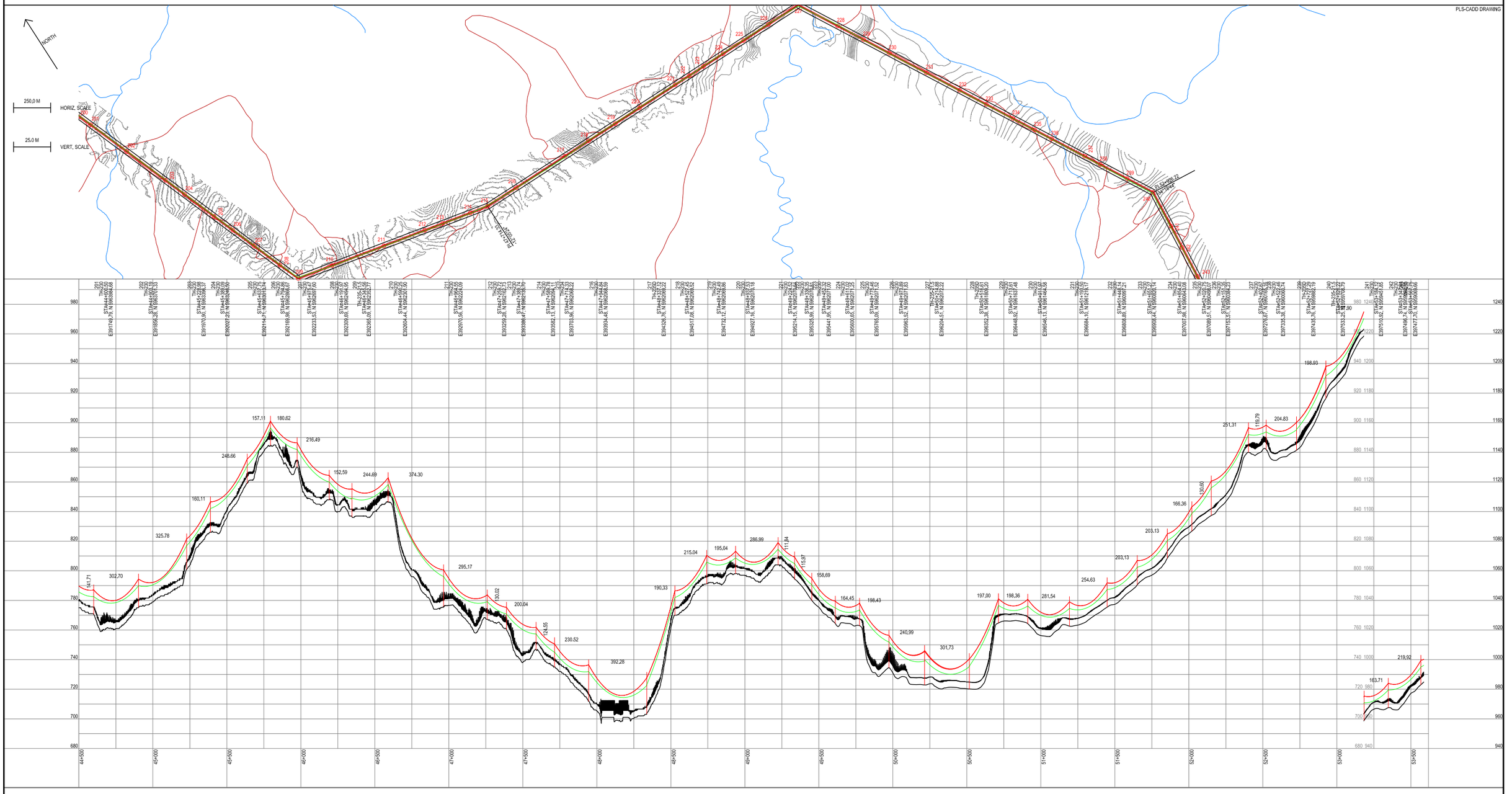

NOTES:

1. COORDINATE GRID IS UTM NAD83 ZONE 10 N.
2. CONTOUR INTERVAL IS 5 METRES.
3. DIMENSIONS AND ELEVATIONS ARE IN METERS, UNLESS NOTED OTHERWISE.
4. PLAN AND PROFILE DATA GENERATED USING PLS CADD.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	06AUG'13	ISSUED WITH REPORT	LD	LD	KLA	SRM

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FIGURE 4.6 REV 0

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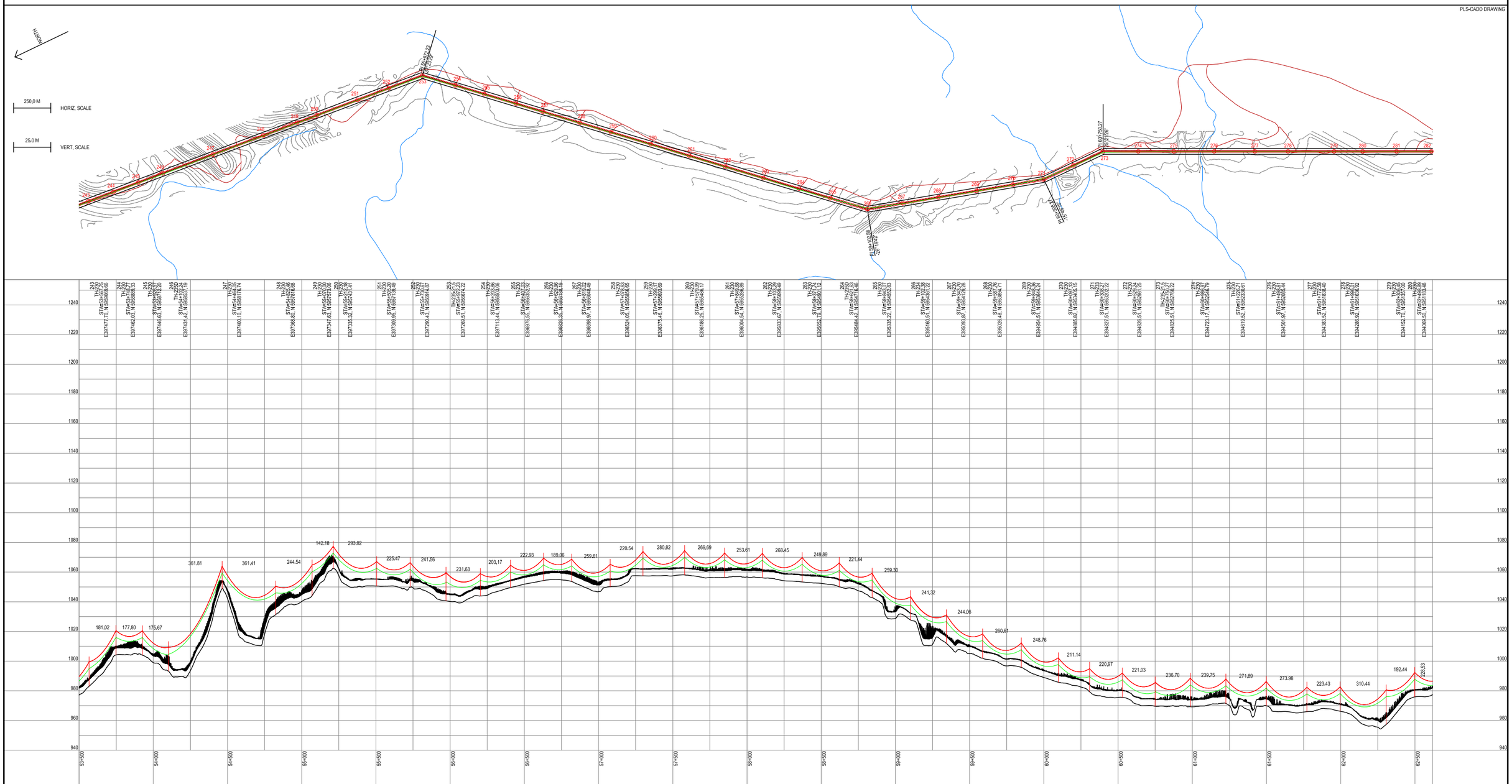

NOTES:

1. COORDINATE GRID IS UTM NAD83 ZONE 10 N.
2. CONTOUR INTERVAL IS 5 METRES.
3. DIMENSIONS AND ELEVATIONS ARE IN METERS, UNLESS NOTED OTHERWISE.
4. PLAN AND PROFILE DATA GENERATED USING PLS CADD.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	06AUG'13	ISSUED WITH REPORT	LD	LD	KLA	SRM

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FIGURE 4.7 REV 0

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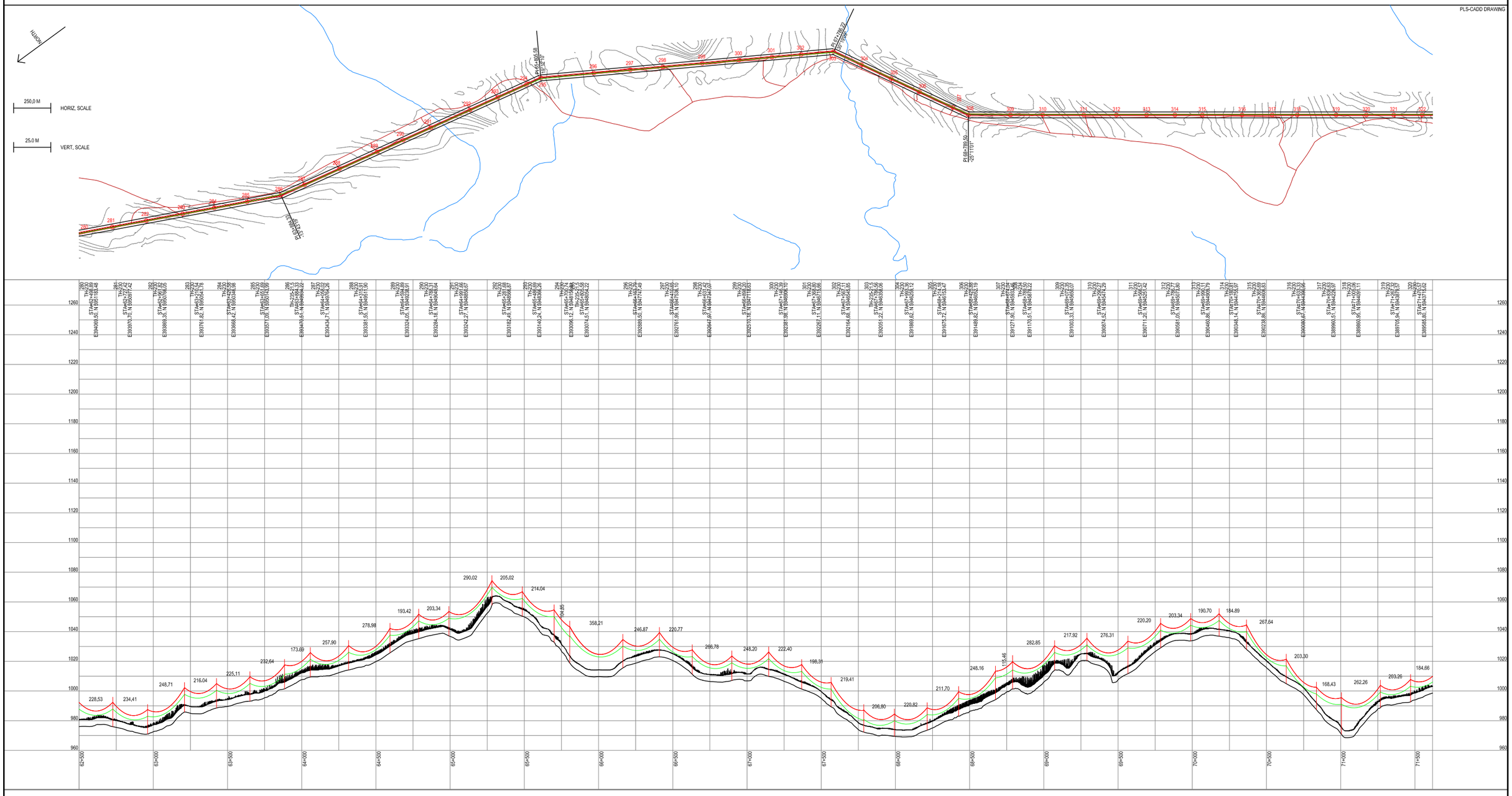

NOTES:

1. COORDINATE GRID IS UTM NAD83 ZONE 10 N.
2. CONTOUR INTERVAL IS 5 METRES.
3. DIMENSIONS AND ELEVATIONS ARE IN METERS, UNLESS NOTED OTHERWISE.
4. PLAN AND PROFILE DATA GENERATED USING PLS CADD.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	06AUG'13	ISSUED WITH REPORT	LD	LD	KLA	SRM

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REF NO. 3

REV 0

FIGURE 4.8

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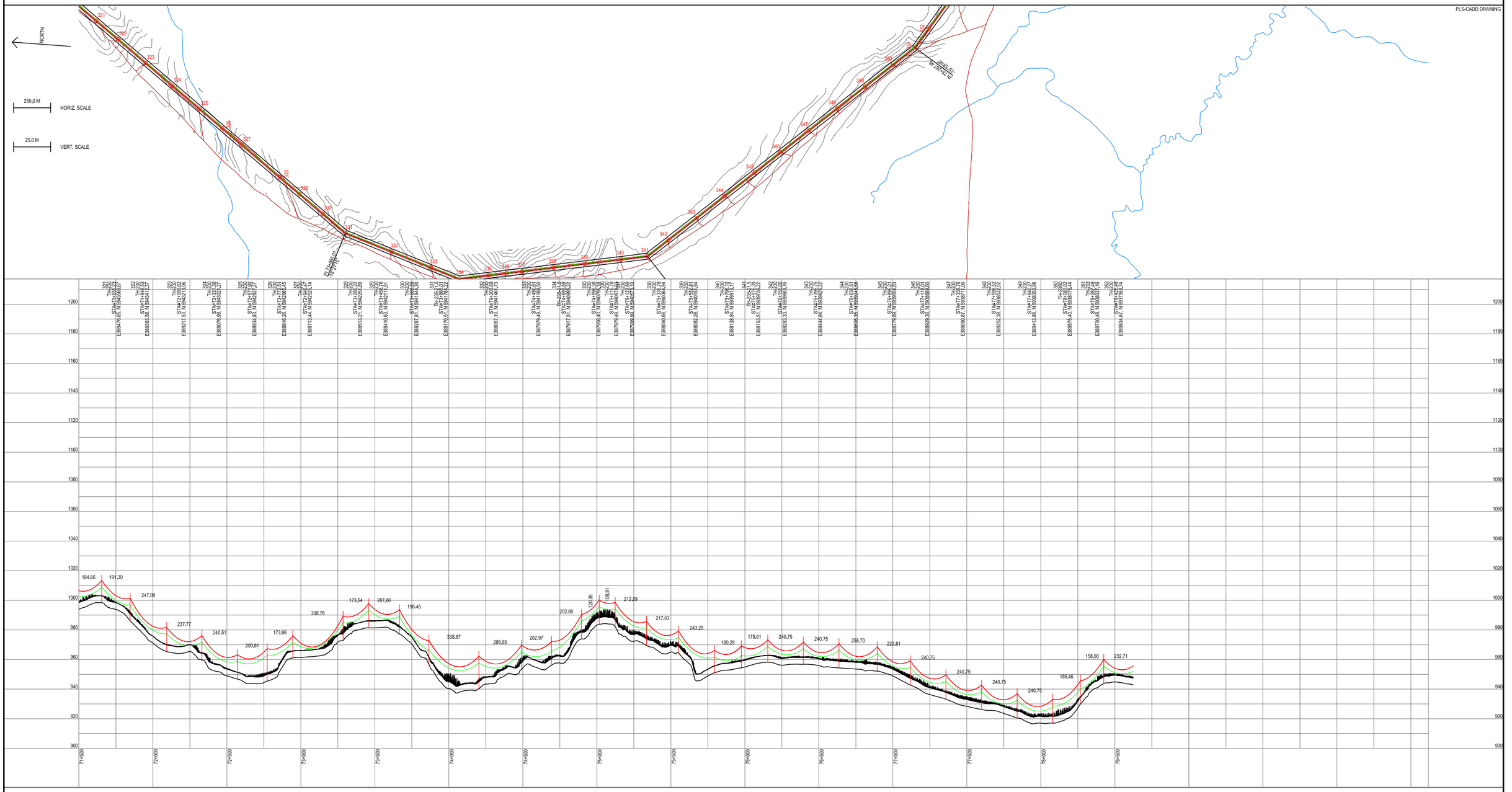

NOTES:

1. COORDINATE GRID IS UTM NAD83 ZONE 10 N.
2. CONTOUR INTERVAL IS 5 METRES.
3. DIMENSIONS AND ELEVATIONS ARE IN METERS, UNLESS NOTED OTHERWISE.
4. PLAN AND PROFILE DATA GENERATED USING PLS CADD.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	06AUG'13	ISSUED WITH REPORT	LD	LD	KLA	SRM

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FIGURE 4.9 REV 0

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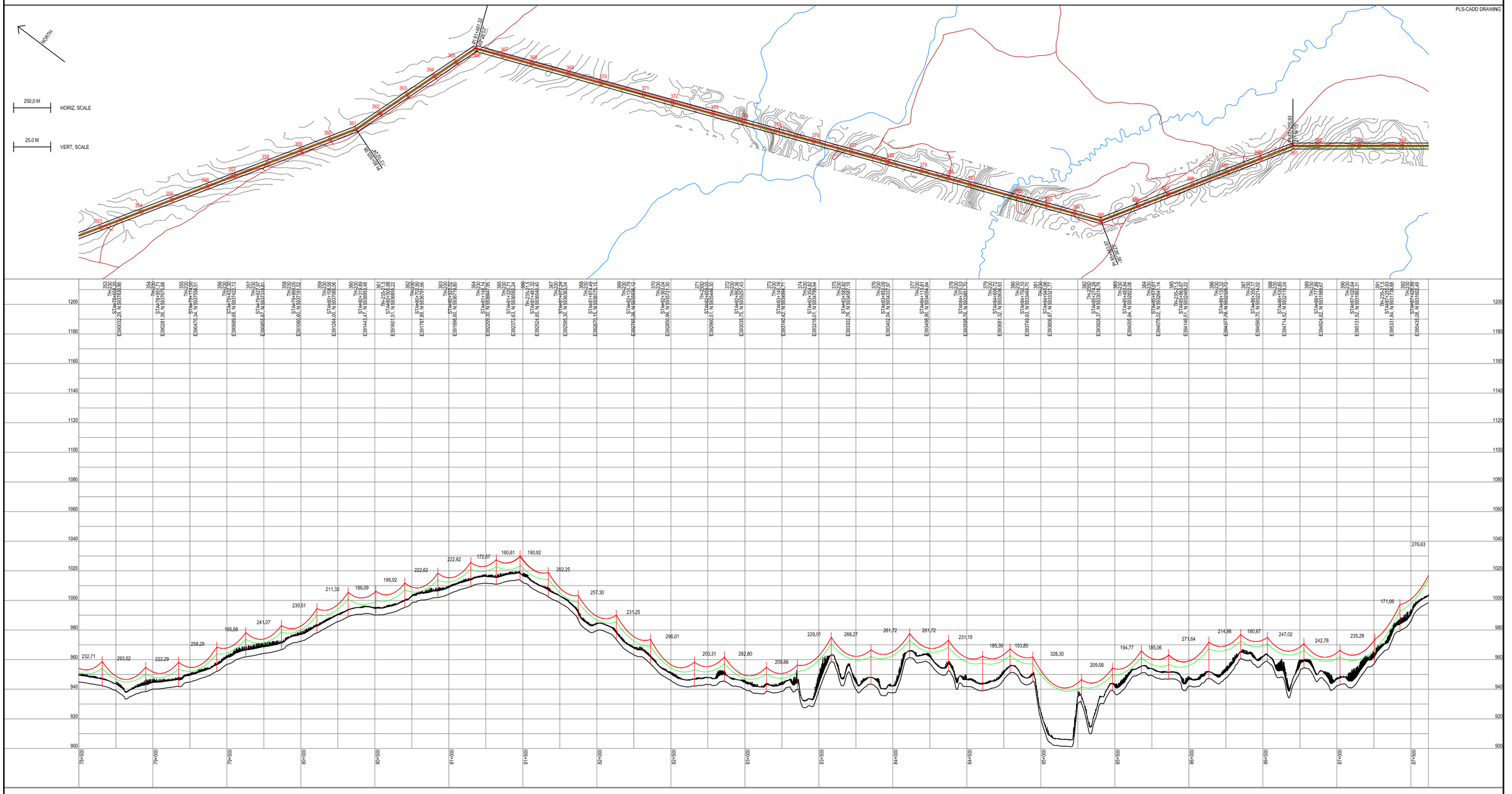

NOTES:

1. COORDINATE GRID IS UTM NAD83 ZONE 10 N.
2. CONTOUR INTERVAL IS 5 METRES.
3. DIMENSIONS AND ELEVATIONS ARE IN METERS, UNLESS NOTED OTHERWISE.
4. PLAN AND PROFILE DATA GENERATED USING PLS CADD.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	06AUG'13	ISSUED WITH REPORT	LD	LD	KLA	SRM

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FIGURE 4.10 REV 0

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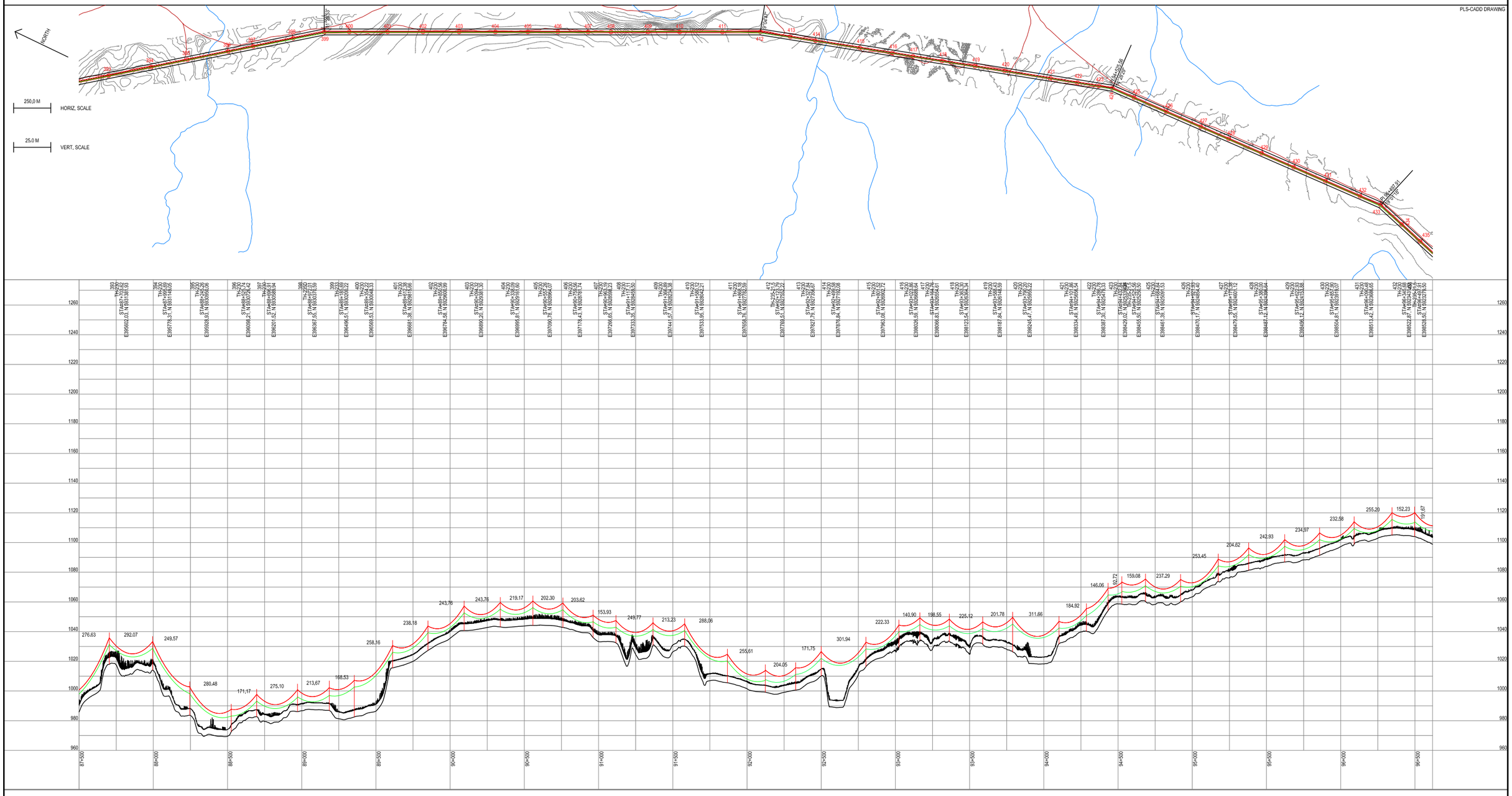

NOTES:

1. COORDINATE GRID IS UTM NAD83 ZONE 10 N.
2. CONTOUR INTERVAL IS 5 METRES.
3. DIMENSIONS AND ELEVATIONS ARE IN METERS, UNLESS NOTED OTHERWISE.
4. PLAN AND PROFILE DATA GENERATED USING PLS CADD.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	06AUG'13	ISSUED WITH REPORT	LD	LD	KLA	SRM

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FIGURE 4.11 REV 0

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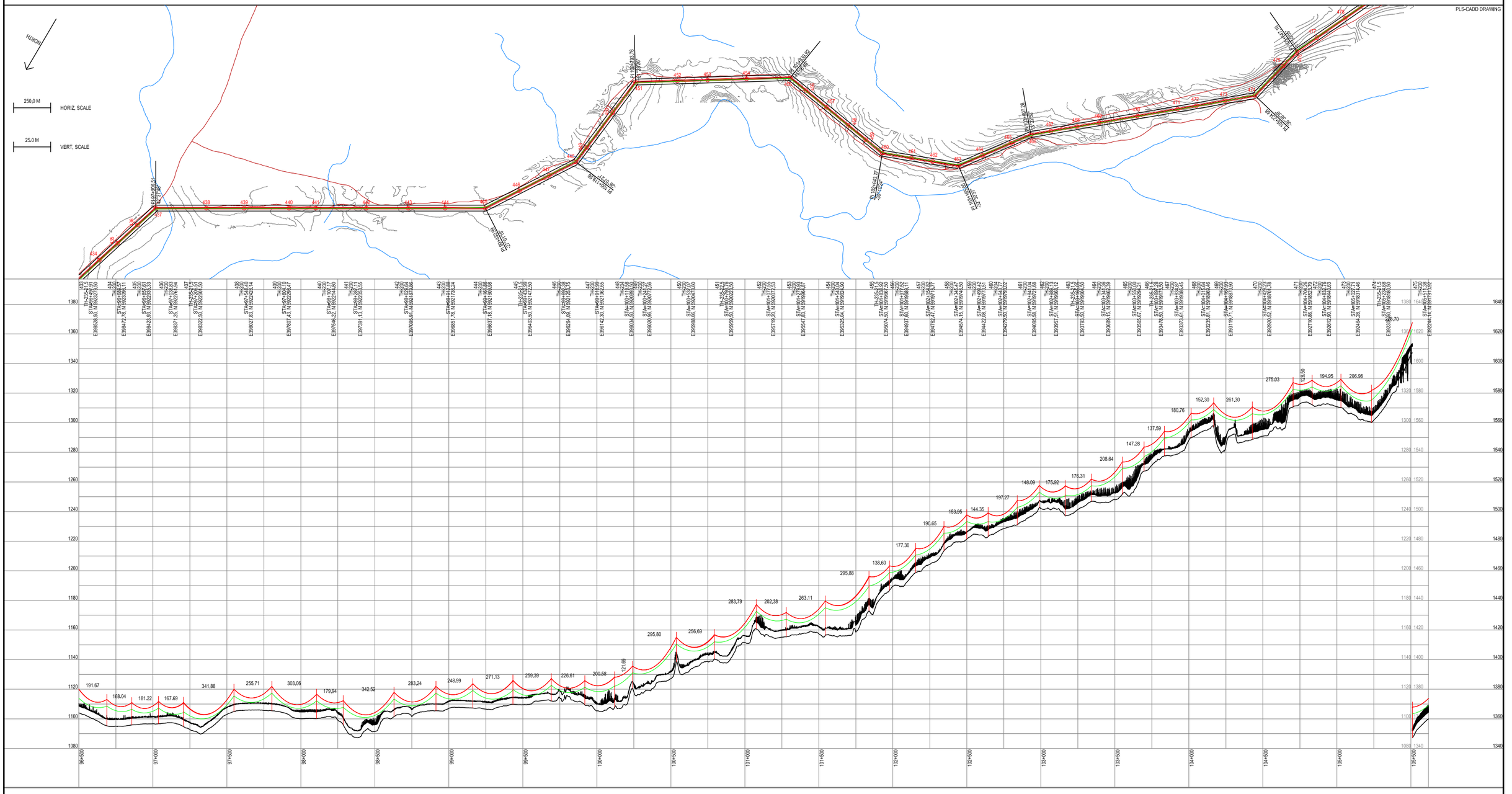

NOTES:

1. COORDINATE GRID IS UTM NAD83 ZONE 10 N.
2. CONTOUR INTERVAL IS 5 METRES.
3. DIMENSIONS AND ELEVATIONS ARE IN METERS, UNLESS NOTED OTHERWISE.
4. PLAN AND PROFILE DATA GENERATED USING PLS CADD.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	06AUG'13	ISSUED WITH REPORT	LD	LD	KLA	SRM

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REF NO. 3

FIGURE 4.12

REV 0

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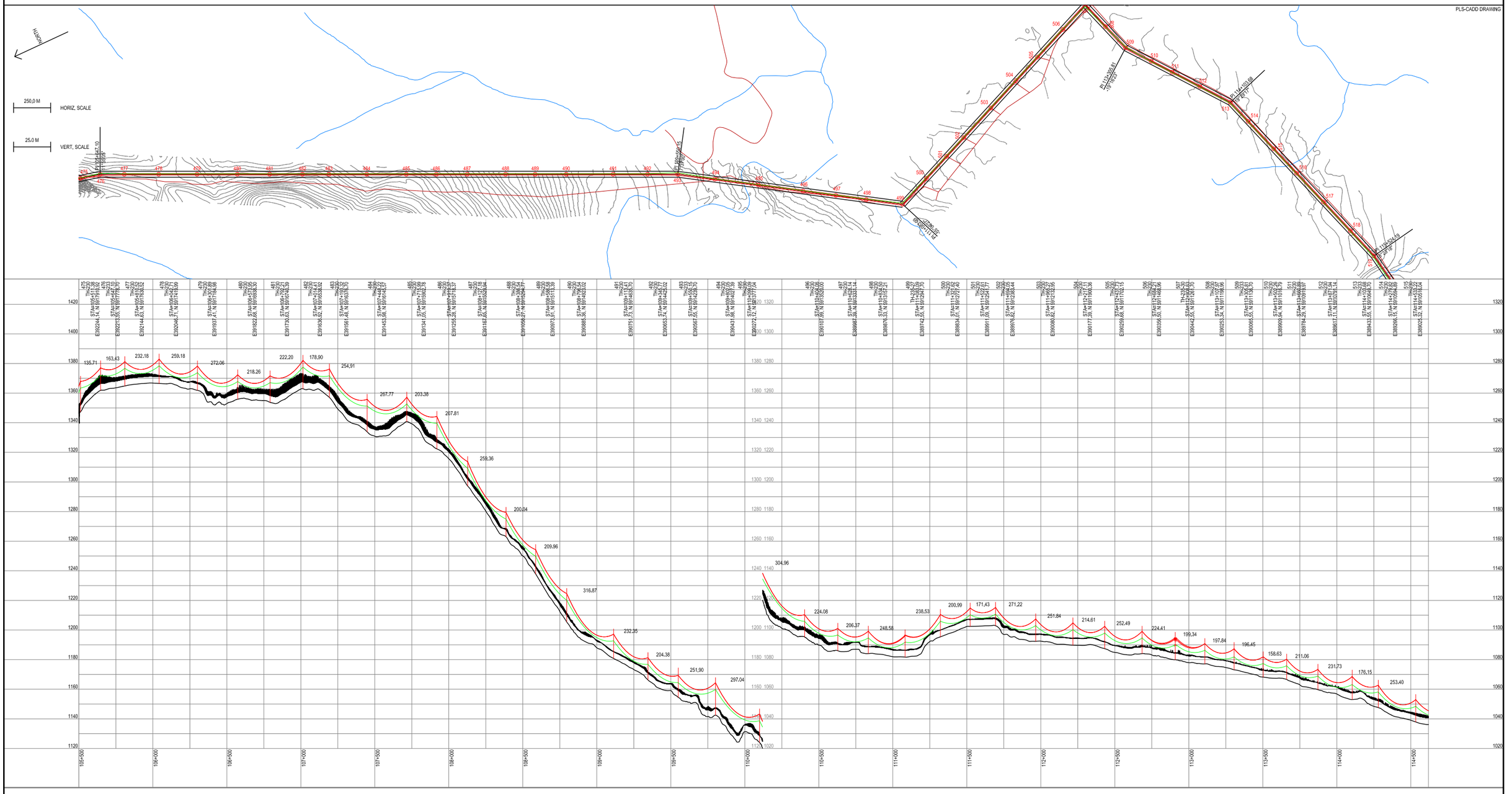

NOTES:

1. COORDINATE GRID IS UTM NAD83 ZONE 10 N.
2. CONTOUR INTERVAL IS 5 METRES.
3. DIMENSIONS AND ELEVATIONS ARE IN METERS, UNLESS NOTED OTHERWISE.
4. PLAN AND PROFILE DATA GENERATED USING PLS CADD.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	06AUG'13	ISSUED WITH REPORT	LD	LD	KLA	SRM

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BLACKWATER GOLD PROJECT

TRANSMISSION LINE FEASIBILITY DESIGN
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REF NO. 3

FIGURE 4.13

REV 0

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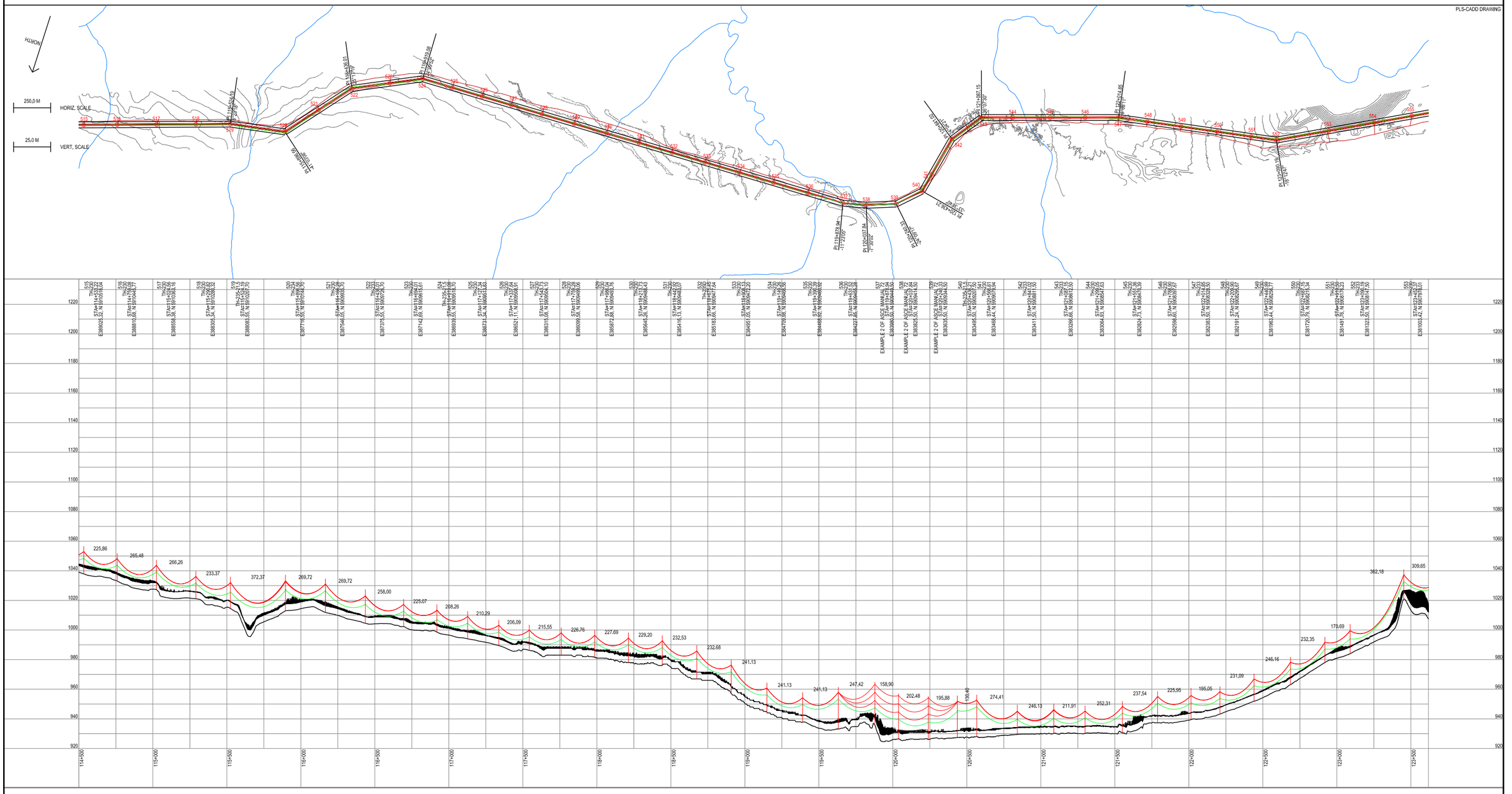

NOTES:

1. COORDINATE GRID IS UTM NAD83 ZONE 10 N.
2. CONTOUR INTERVAL IS 5 METRES.
3. DIMENSIONS AND ELEVATIONS ARE IN METERS, UNLESS NOTED OTHERWISE.
4. PLAN AND PROFILE DATA GENERATED USING PLS CADD.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	06AUG'13	ISSUED WITH REPORT	LD	LD	KLA	SRM

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FIGURE 4.14 REV 0

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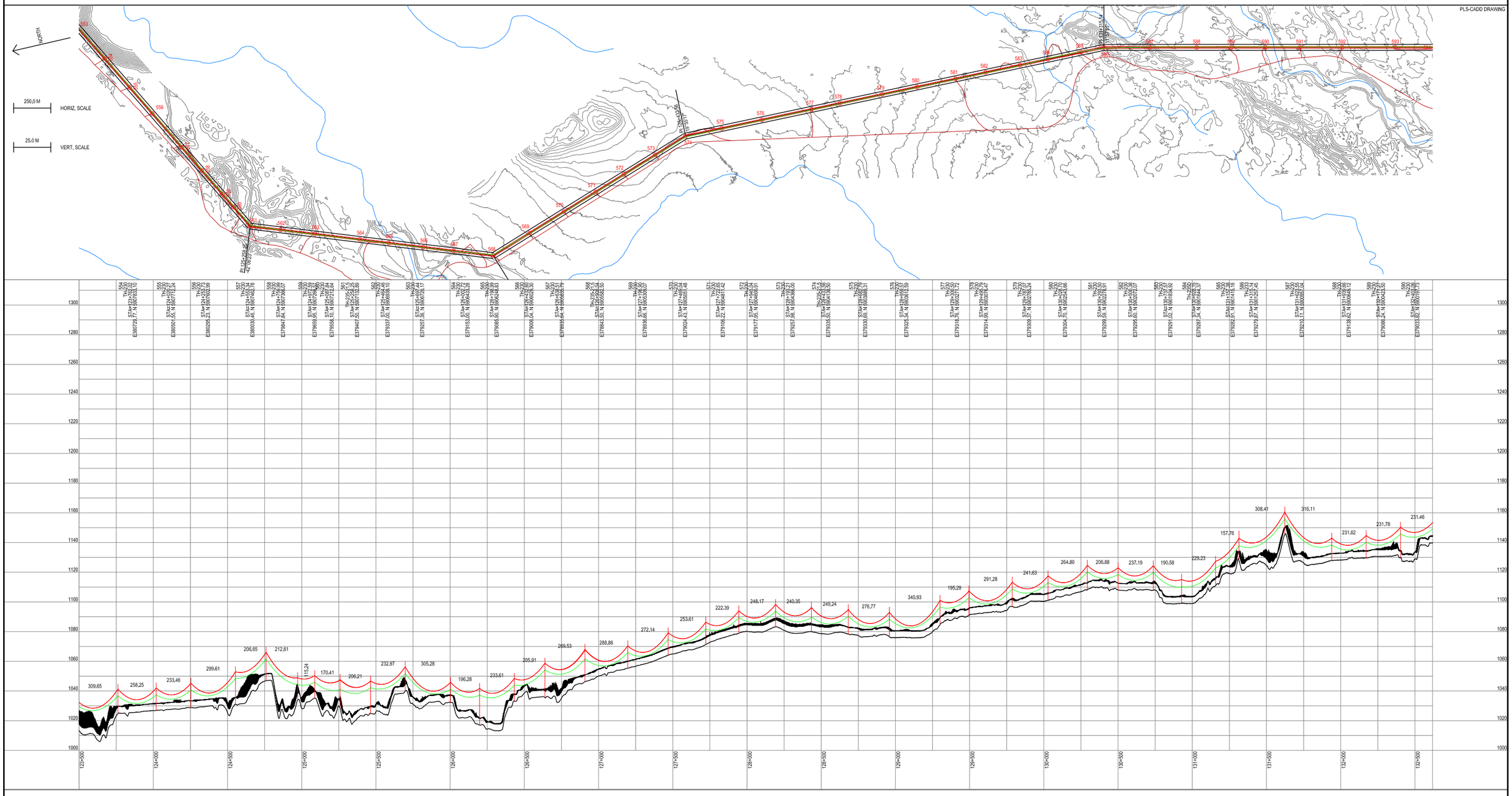

NOTES:

1. COORDINATE GRID IS UTM NAD83 ZONE 10 N.
2. CONTOUR INTERVAL IS 5 METRES.
3. DIMENSIONS AND ELEVATIONS ARE IN METERS, UNLESS NOTED OTHERWISE.
4. PLAN AND PROFILE DATA GENERATED USING PLS CADD.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	06AUG'13	ISSUED WITH REPORT	LD	LD	KLA	SRM

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FIGURE 4.15 REV 0

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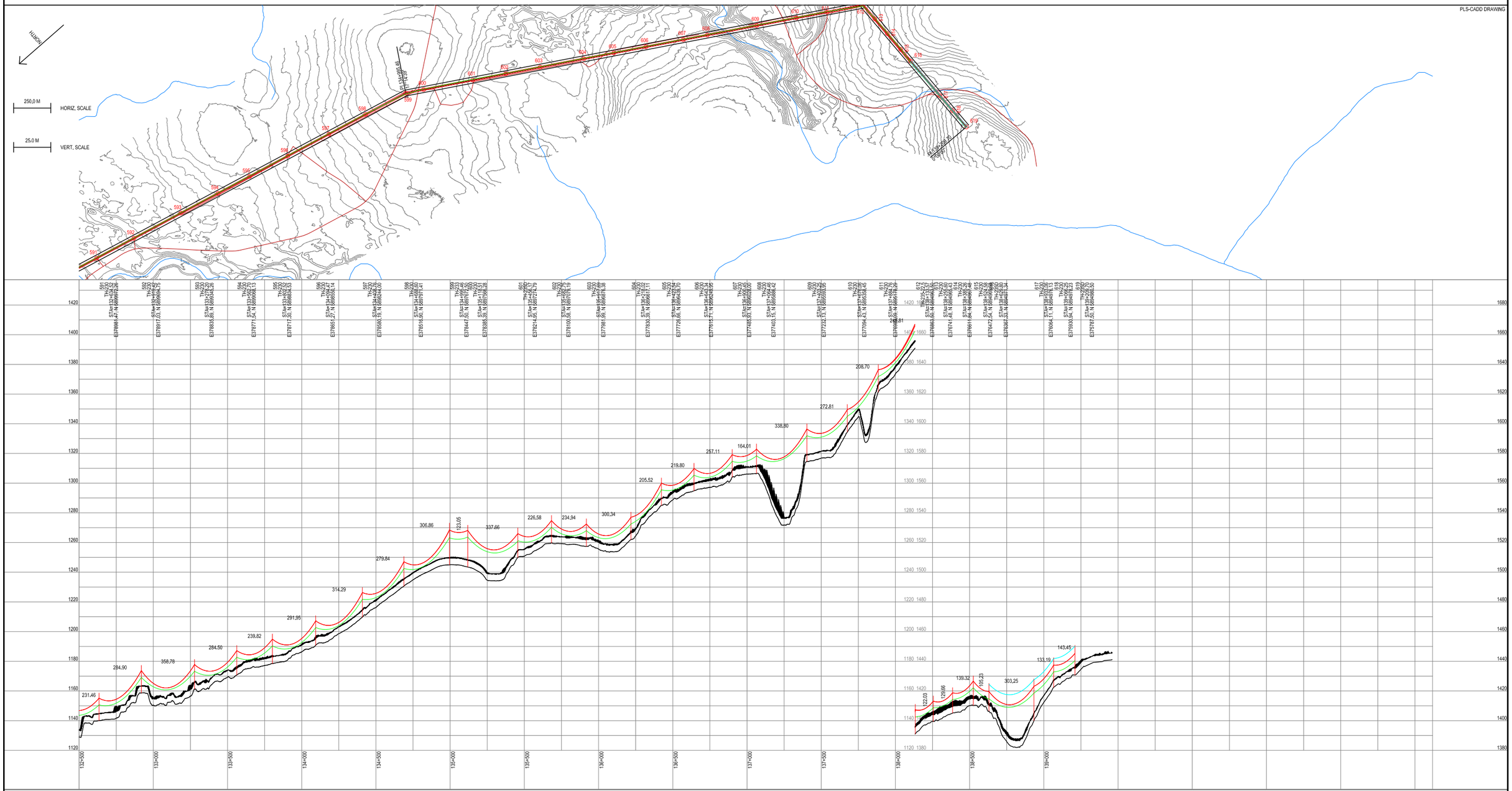

NOTES:

1. COORDINATE GRID IS UTM NAD83 ZONE 10 N.
2. CONTOUR INTERVAL IS 5 METRES.
3. DIMENSIONS AND ELEVATIONS ARE IN METERS, UNLESS NOTED OTHERWISE.
4. PLAN AND PROFILE DATA GENERATED USING PLS CADD.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	06AUG'13	ISSUED WIH REPORT	LD	LD	KLA	SRM

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TRANSMISSION LINE FEASIBILITY DESIGN
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VA101-457/6	3

FIGURE 4.16 REV 0

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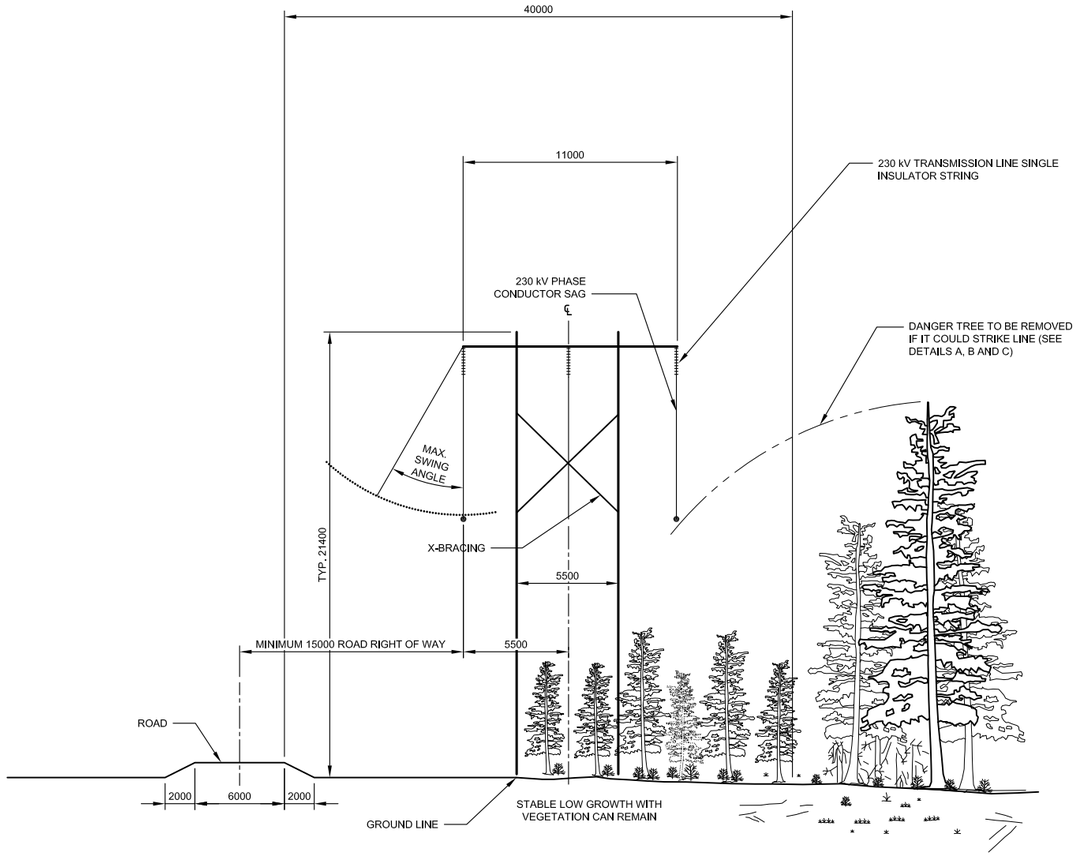
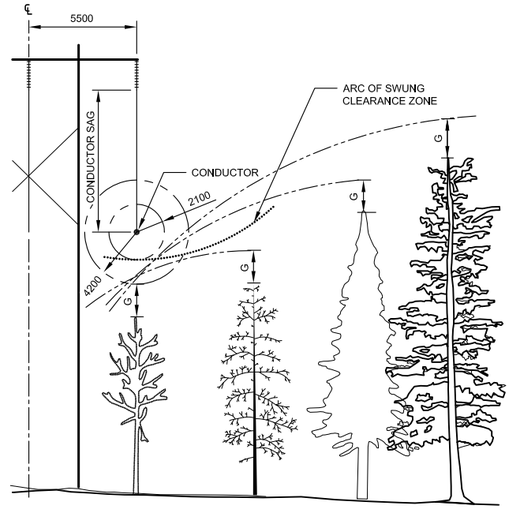
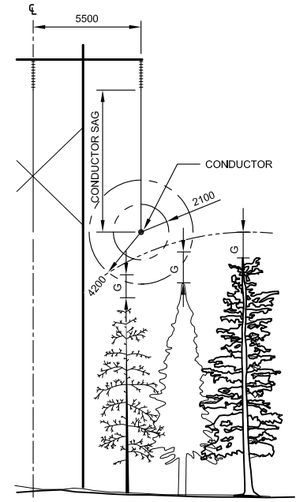
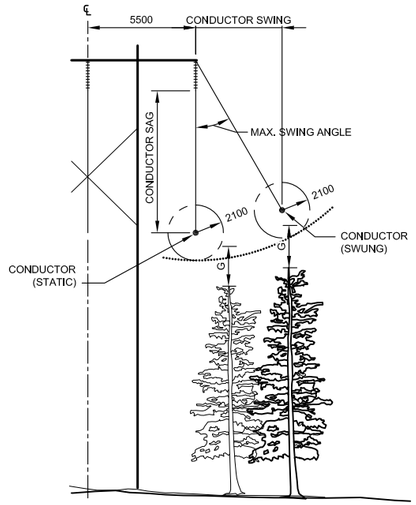




A **DETAIL**
THESE TREES ARE SAFE FOR TEN YEARS
NTS



B **DETAIL**
THESE TREES SHOULD BE CONSIDERED FOR REMOVAL
NTS



C **DETAIL**
TREES DANGEROUS BECAUSE OF CONDUCTOR SWING
NTS

NOTE:

1. G = GROWTH FACTOR (10 YEAR TREE GROWTH).
2. PROPOSED CONDUCTOR IS 954 Kcmil ACSR "CARDINAL".
3. ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS OTHERWISE NOTED.

NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	06AUG'13	ISSUED WITH REPORT	LD	LD	KLA	SRM

NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION LINE
RIGHT-OF-WAY ALONG ROAD
TYPICAL H-FRAME WOOD POLE

Knight Piésold CONSULTING

P/A NO. VA101-457/6 | REF NO. 3

FIGURE 4.17 | REV 0

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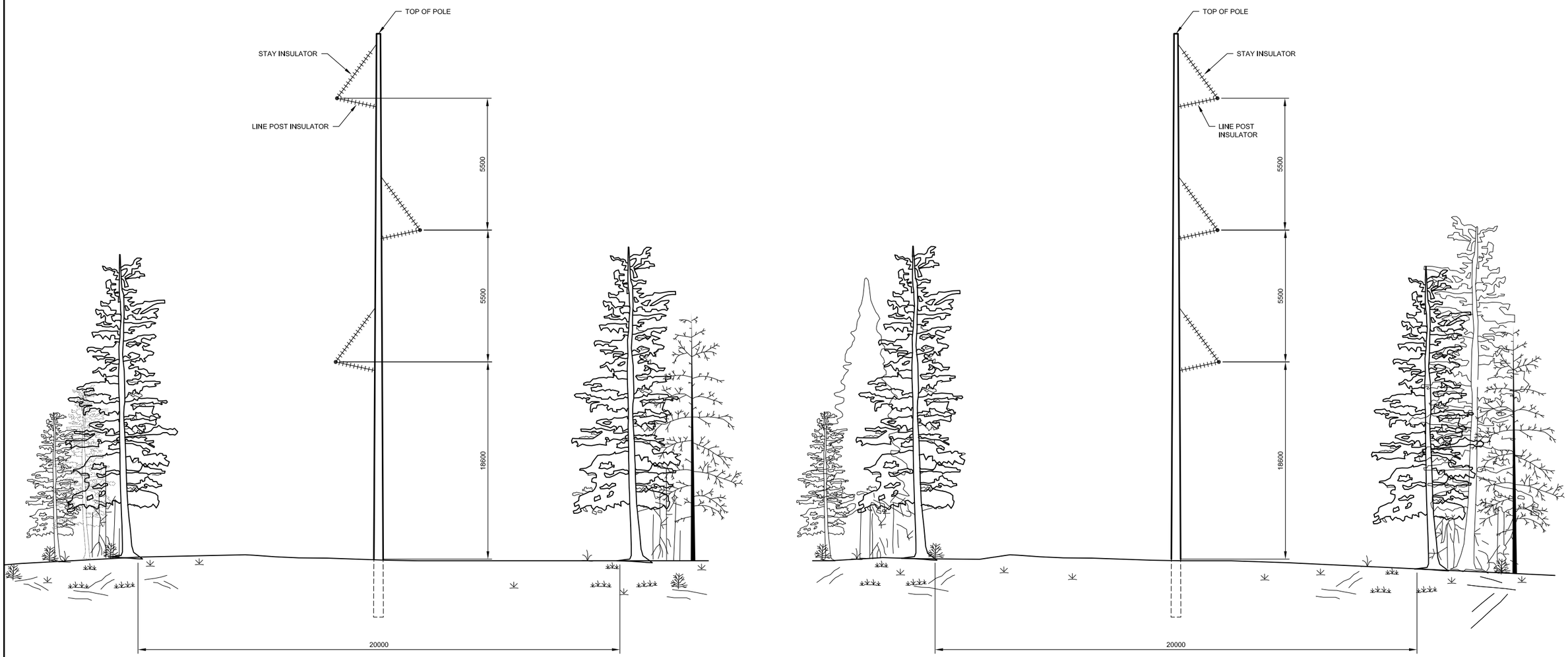
NOTE:

1. G = GROWTH FACTOR (10 YEAR TREE GROWTH).
2. PROPOSED CONDUCTOR IS 954 Kcmil ACSR "CARDINAL".
3. ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS OTHERWISE NOTED.



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NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION LINE
RIGHT OF WAY
TYPICAL MONOPOLE STRUCTURE

Knight Piésold CONSULTING

P/A NO.	REF NO.
VA101-457/6	3

FIGURE 5.18 REV 0

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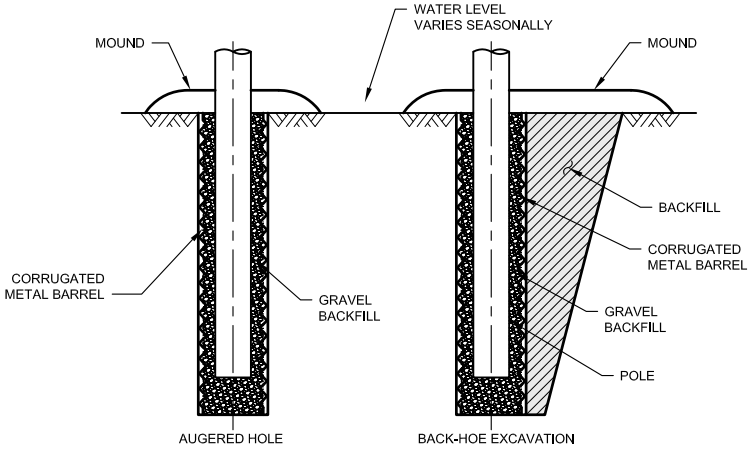
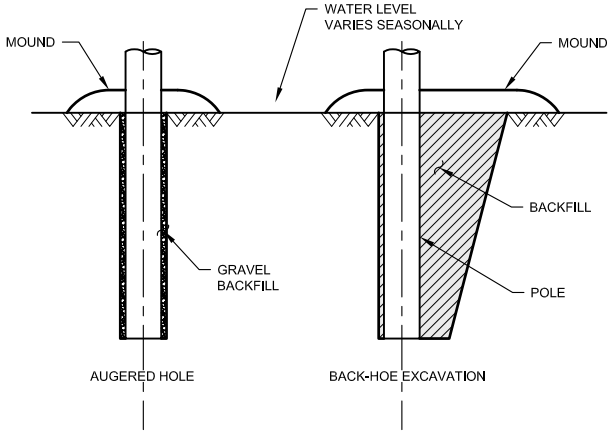


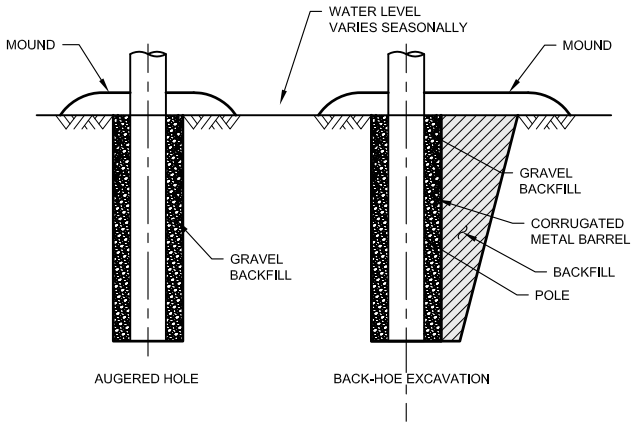
TYPE IV (4000 BARREL) & TYPE V (5000 BARREL)
SCALE A



TYPE III - EXTRA POLE EMBEDMENT
SCALE A

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS ARE FOR TYPICAL 230 kV INSTALLATION.



TYPE IIA - (1200 BARREL), 11B (2000 BARREL) & 11C (FULL LENGTH BARREL)
SCALE A

1000 500 0 1000 2000 3000 4000 5000 mm
SCALE A

NOT FOR CONSTRUCTION

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0	06AUG'13	ISSUED WITH REPORT	LD	LD	KLA	SRM

NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION LINE
TYPICAL SOIL FOUNDATION INSTALLATION

Knight Piésold CONSULTING

P/A NO. VA101-457/6 | REF NO. 3

FIGURE 4.19 | REV 0

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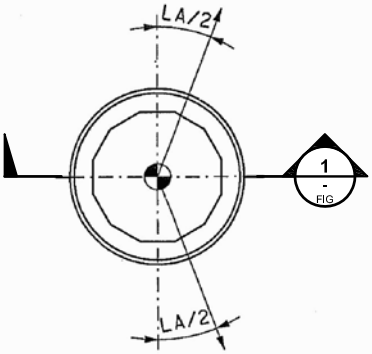
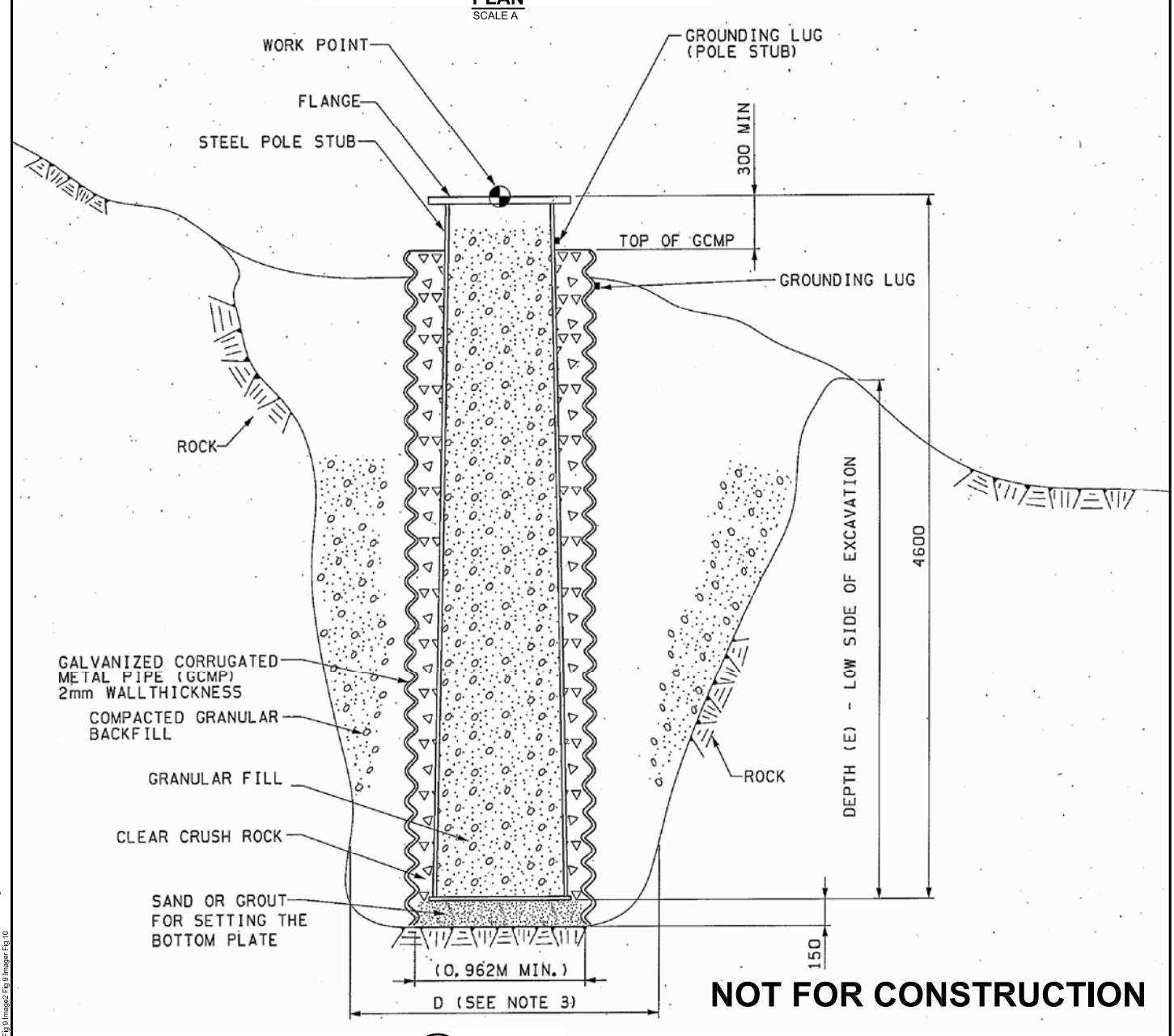


PLAN
SCALE A



NOT FOR CONSTRUCTION

1 - FIG **SECTION**
SCALE A

SCALE A 400 200 0 400 800 1200 1600 2000 mm

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS ARE FOR TYPICAL 230 kV INSTALLATION.
3. DEPTH OF HOLE IN SLOPING GROUND SHALL BE MEASURED FROM LOWER SIDE OF HOLE.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
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NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION LINE
DIRECT BURY ROCK FOUNDATION INSTALLATION

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P/A NO. VA101-457/6 | REF NO. 3

FIGURE 4.20 | REV 0

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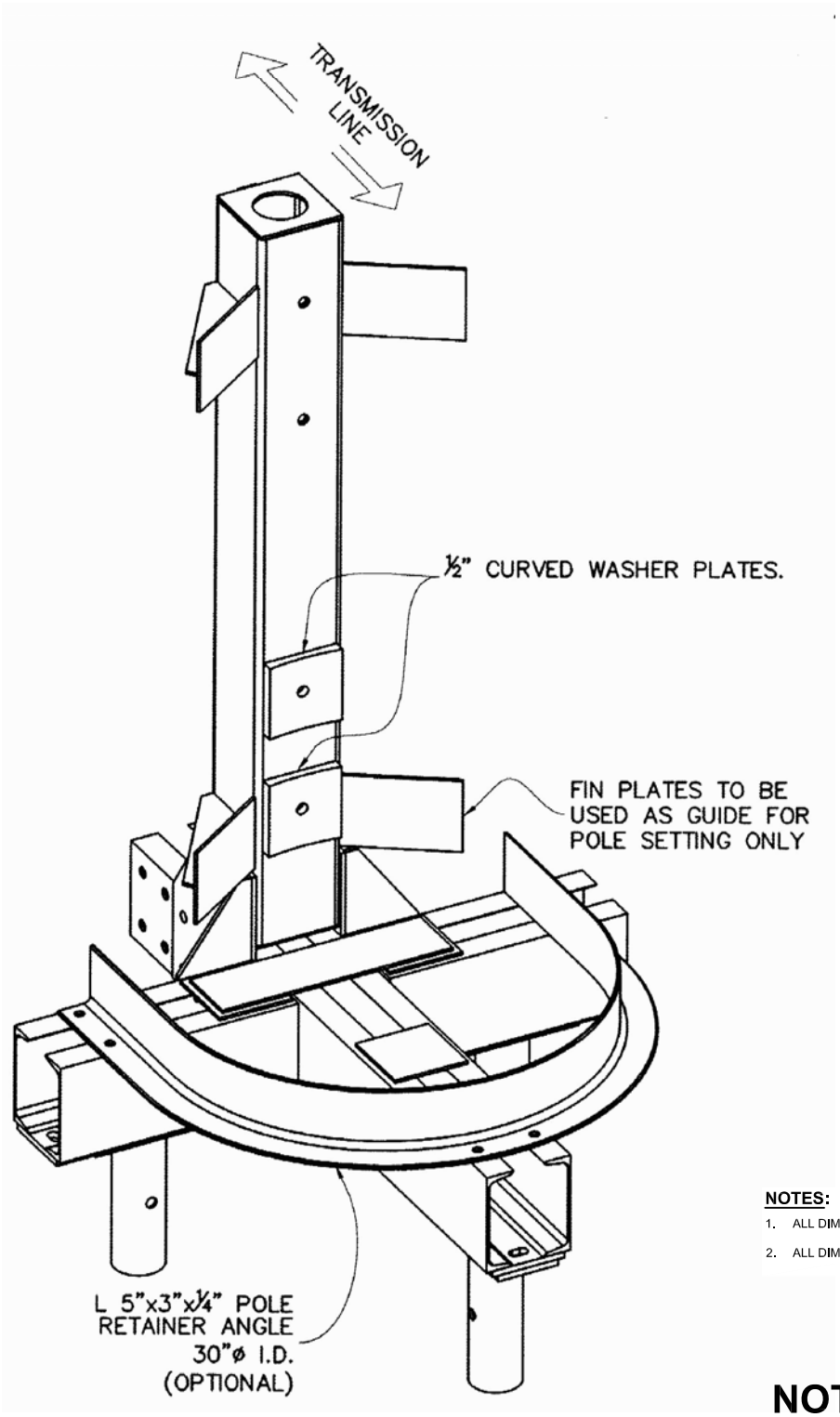

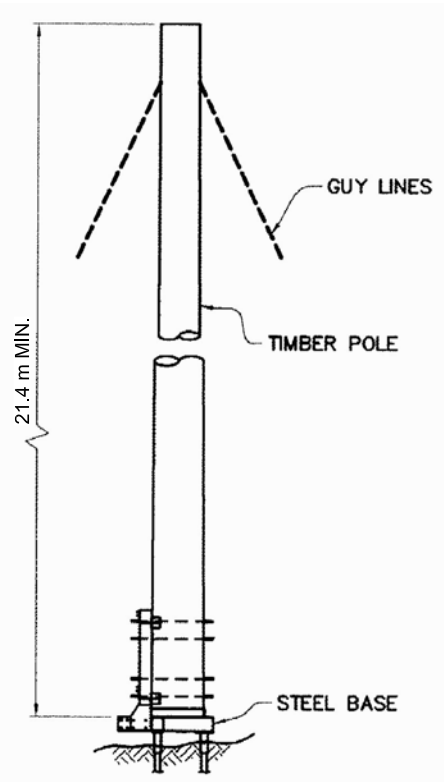

POLE ASSEMBLY
NTS

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS ARE FOR TYPICAL 230 kV INSTALLATION.

NOT FOR CONSTRUCTION

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0	06AUG'13	ISSUED WITH REPORT	LD	LD	KLA	SRM

NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION LINE
SOFT SOIL FOUNDATION INSTALLATION
POLE SUPPORT

Knight Piésold CONSULTING

P/A NO. VA101-457/6

REF NO. 3

FIGURE 4.21

REV 0

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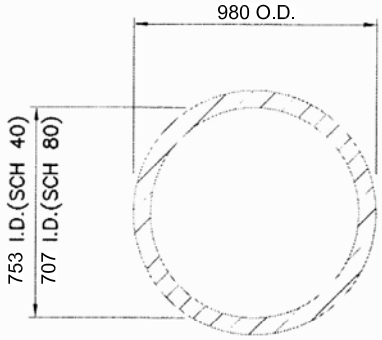
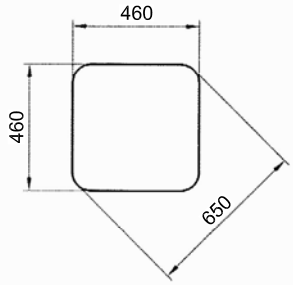
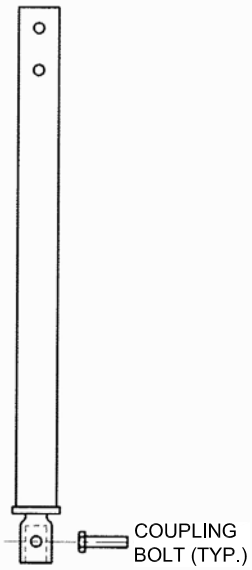
SECTION
PLAIN EXTENSION
NTS



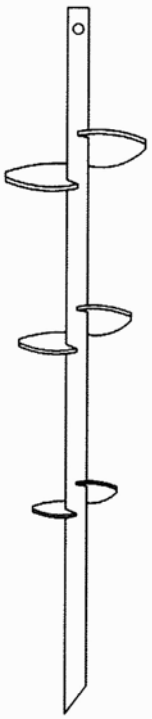
CROSS SECTION
EXTENSION SHAFT
NTS



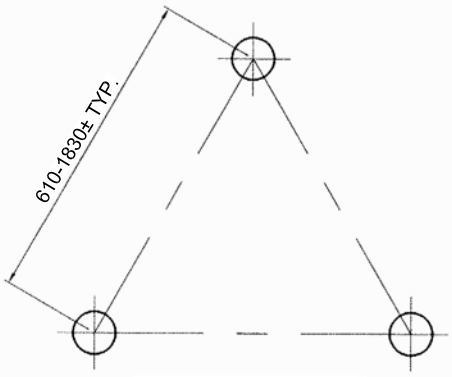
CROSS SECTION
LEAD SHAFT
NTS



SECTION
TRANSITION EXTENSION
NTS



LEAD SECTION
NTS



INSTALL KEY PLAN
NTS

NOT FOR CONSTRUCTION

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS ARE FOR TYPICAL 230 kV INSTALLATION.

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NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION LINE
SOFT SOIL FOUNDATION INSTALLATION
HELICAL PILE

Knight Piésold CONSULTING

P/A NO. VA101-457/6

REF NO. 3

FIGURE 4.22

REV 0

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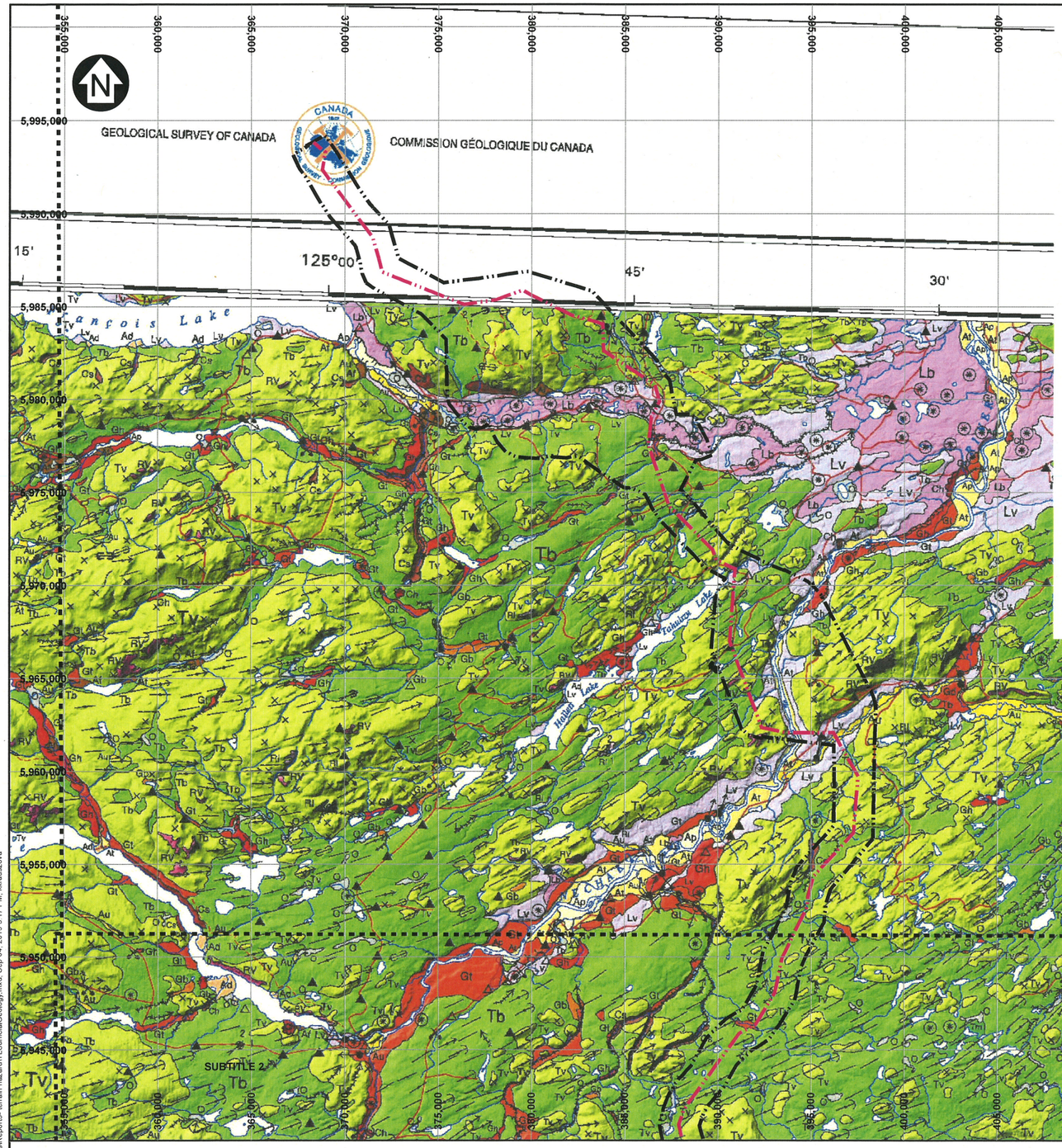
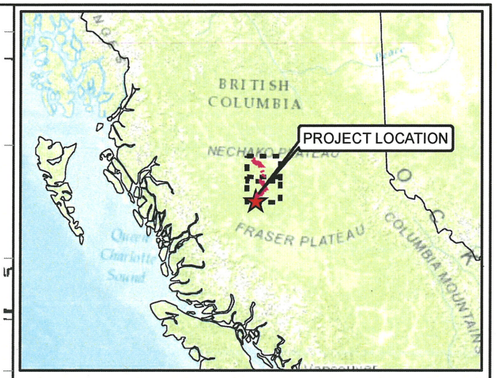


Geological boundary
Landslide scar (small, large)
Debris flow track
Paleocurrent direction (measured above the till of the last glaciation)
Meltwater channel, small (flow direction known, unknown)
Meltwater channel, large (flow direction known)
Kettle hole (small, large)
Esker (direction of flow known, unknown)
Moraine
Ribbed moraine
Glacial fluting
Crag and tail
Drumlin (direction of flow known, unknown)
Glacial striae (direction of flow known, unknown)
Arête (fresh)
Cirque (fresh)
Cirque (weathered)
Bedrock lineation
Outcrop
Gravel pit
Field observation site (with, without sample)



LEGEND:

GENERAL
- TRANSMISSION LINE
- TRANSMISSION LINE STUDY AREA

SURFICIAL GEOLOGY
QUATERNARY
POST FRASER GLACIATION
- ANTHROPOGENIC DEPOSITS
- ORGANIC DEPOSITS: PEAT AND MUCK
- FLOODPLAIN SEDIMENTS
- TERRACE SEDIMENTS
- DELTAIC SEDIMENTS
- FAN SEDIMENTS
- ALLUVIAL SEDIMENTS UNDIVIDED
- LANDSLIDE DEBRIS
- SLOPE COLLUVIUM
- TALUS

FRASER GLACIATION (WISCONSINAN)
- GLACIOLACUSTRINE PLAIN
- GLACIOLACUSTRINE BLANKET
- GLACIOLACUSTRINE VENEER
- GLACIOFLUVIAL TERRACE SEDIMENTS
- GLACIOFLUVIAL BLANKET
- PROGLACIAL DELTIC SEDIMENTS
- ICE CONTACT DEPOSITS (SAND AND GRAVEL)
- THICK TILL, ROLLING
- TILL, RIDGET
- TILL BLANKET
- TILL VENEER

PRE-QUATERNARY
- DOMINANTLY INTRUSIVE ROCKS
- DOMINANTLY VOLCANIC ROCKS
- DOMINANTLY SEDIMENTARY ROCKS

SCALE 10 5 0 1 2 3 4 5 km

NOTES:

1. BASE MAP: EXTRACTED FROM REGIONAL 1:250,000 SCALE SURFICIAL GEOLOGY MAP PUBLISHED BY THE GEOLOGICAL SURVEY OF CANADA (PLOUFFE, A. AND LEVSON, V.M., 1998).

2. COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N.

3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:265,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

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PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
J. E. HALEY
33730
SEPT 03, 2013

Knight Piésold CONSULTING

NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION LINE
REGIONAL SURFICIAL GEOLOGY
SHEET 1 OF 2

P/A NO.	DRAWING NO.	REVISION
VA101-457/6	G0060	0

DRG. NO.	DESCRIPTION
REFERENCE DRAWINGS	

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
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REVISIONS						

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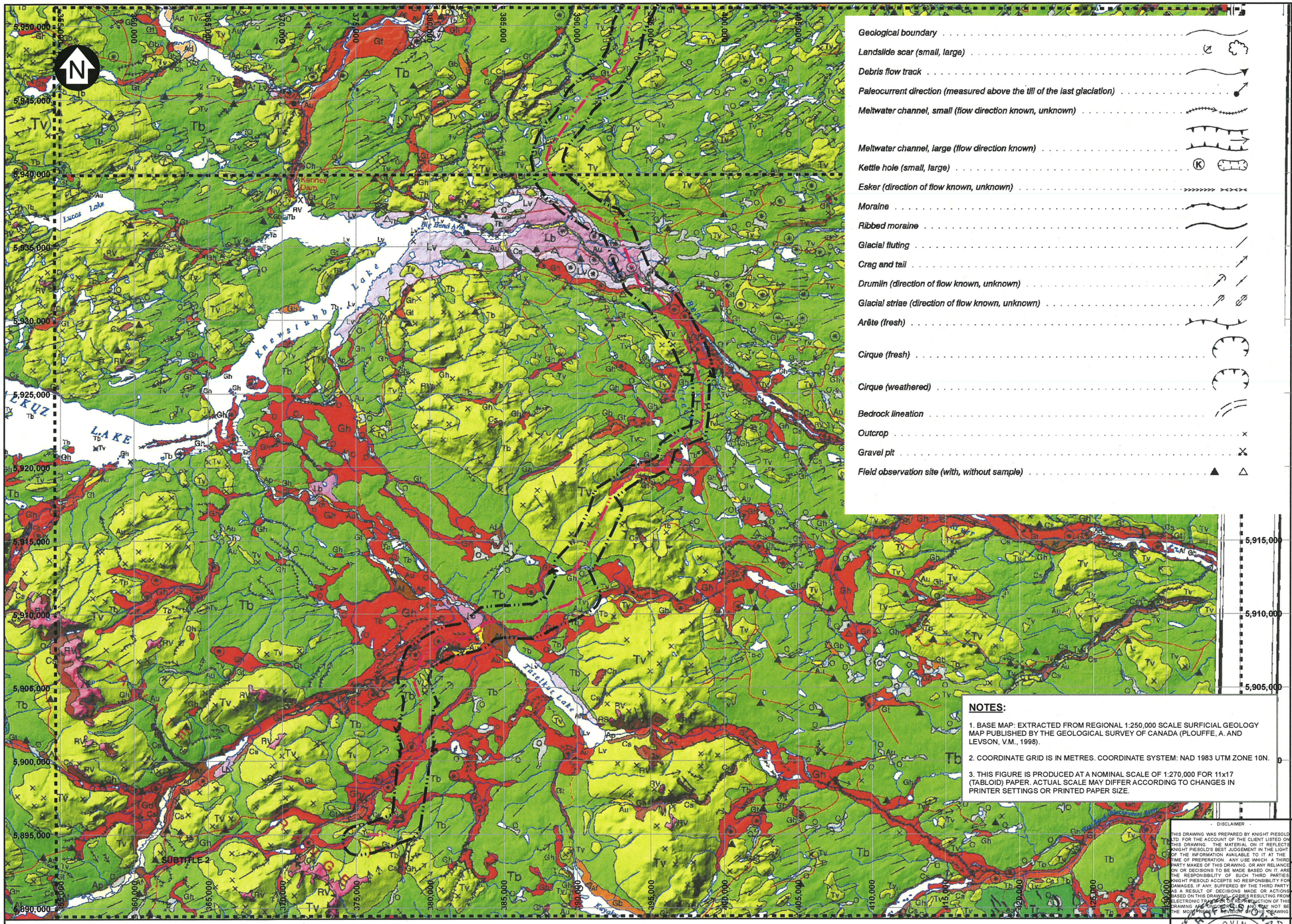
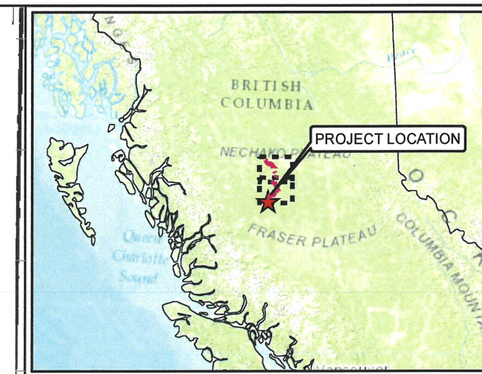


Geological boundary
Landslide scar (small, large)
Debris flow track
Paleocurrent direction (measured above the till of the last glaciation)
Meltwater channel, small (flow direction known, unknown)
Meltwater channel, large (flow direction known)
Kettle hole (small, large)
Esker (direction of flow known, unknown)
Moraine
Ribbed moraine
Glacial fluting
Crag and tail
Drumlin (direction of flow known, unknown)
Glacial striae (direction of flow known, unknown)
Arête (fresh)
Cirque (fresh)
Cirque (weathered)
Bedrock lineation
Outcrop
Gravel pit
Field observation site (with, without sample)



LEGEND:

GENERAL
- TRANSMISSION LINE
- TRANSMISSION LINE STUDY AREA

SURFICIAL GEOLOGY
QUATERNARY
POST FRASER GLACIATION
- ANTHROPOGENIC DEPOSITS
- ORGANIC DEPOSITS: PEAT AND MUCK
- FLOODPLAIN SEDIMENTS
- TERRACE SEDIMENTS
- DELTAIC SEDIMENTS
- FAN SEDIMENTS
- ALLUVIAL SEDIMENTS UNDIVIDED
- LANDSLIDE DEBRIS
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- TALUS

FRASER GLACIATION (WISCONSINAN)
- GLACIOLACUSTRINE PLAIN
- GLACIOLACUSTRINE BLANKET
- GLACIOLACUSTRINE VENEER
- GLACIOFLUVIAL TERRACE SEDIMENTS
- GLACIOFLUVIAL BLANKET
- PROGLACIAL DELTIC SEDIMENTS
- ICE CONTACT DEPOSITS (SAND AND GRAVEL)
- THICK TILL, ROLLING
- TILL, RIDGET
- TILL BLANKET
- TILL VENEER

PRE-QUATERNARY
- DOMINANTLY INTRUSIVE ROCKS
- DOMINANTLY VOLCANIC ROCKS
- DOMINANTLY SEDIMENTARY ROCKS

SCALE 10.50 1 2 3 4 5 km

NOTES:

1. BASE MAP: EXTRACTED FROM REGIONAL 1:250,000 SCALE SURFICIAL GEOLOGY MAP PUBLISHED BY THE GEOLOGICAL SURVEY OF CANADA (PLOUFFE, A. AND LEVSON, V.M., 1998).
2. COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N.
3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:270,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

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PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
J. E. HALEY
33730
SEPT 05, 2013

Knight Piésold
CONSULTING

NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION LINE
REGIONAL SURFICIAL GEOLOGY
SHEET 2 OF 2

P/A NO.	DRAWING NO.	REVISION
VA101-457/6	G0061	0

DRG. NO.	DESCRIPTION
REFERENCE DRAWINGS	

REV	DATE	DESIGN	DRAWN	CHK'D	APP'D
REVISIONS					

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
A	03AUG'13	ISSUED WITH REPORT	KK	KK		BB
REVISIONS						

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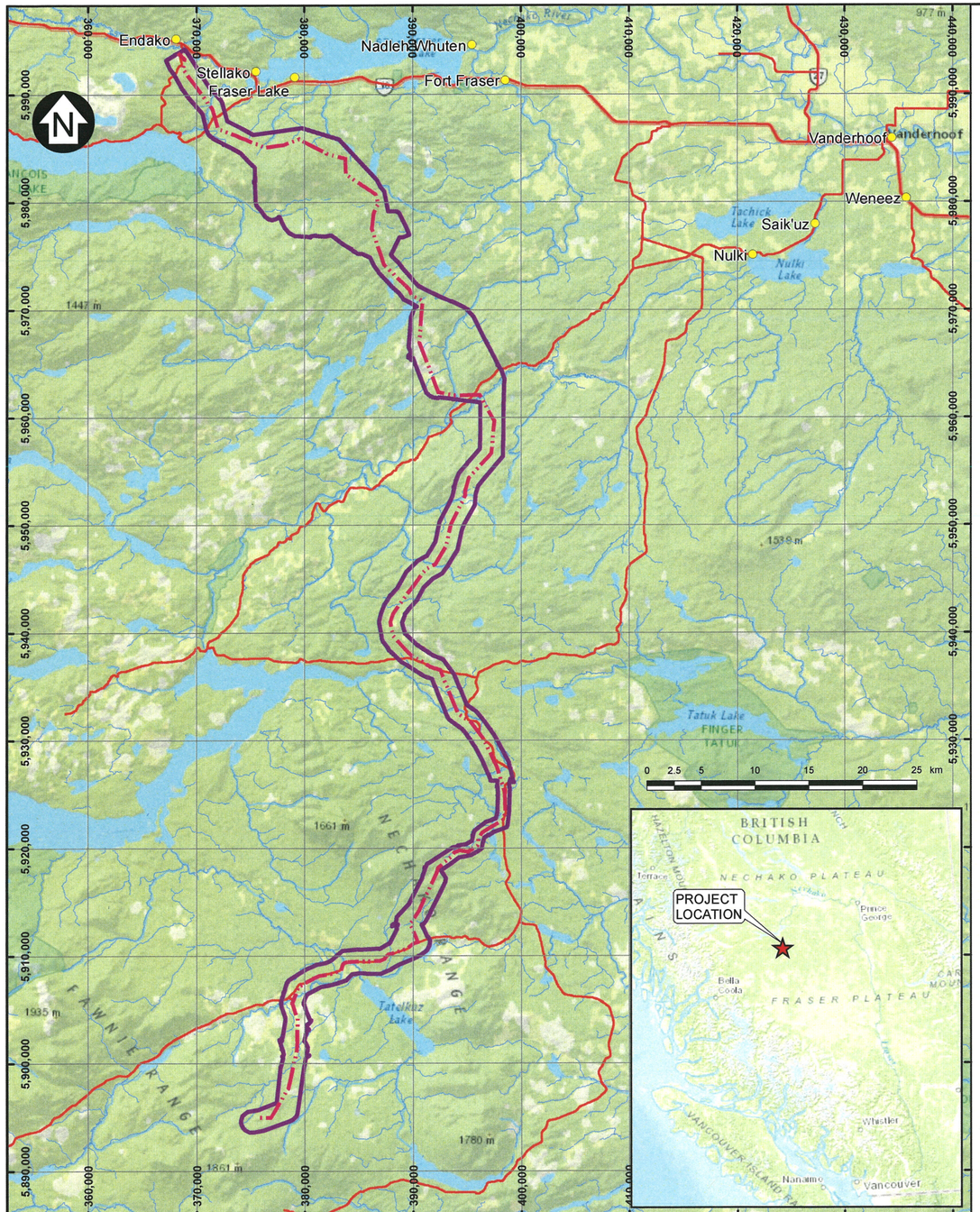

LEGEND:

- ROAD
- STREAM
- TRANSMISSION LINE
- STUDY AREA

NOTES:

1. BASE MAP: (C) MICROSOFT BING MAPS. INSET (C) ESRI ARCGIS ONLINE MAPPING.
2. COORDINATE GRID IS IN METRES.
   COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N.
3. THIS MAP IS PRODUCED AT A NOMINAL SCALE OF 1:500,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

DRG. NO.	DESCRIPTION
REFERENCE DRAWINGS	

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	03AUG'13	ISSUED WITH REPORT	JEH	CC		BB

REVISIONS

TERRAIN UNIT MAP LEGEND

Example: aCk - R
- a = texture
- C = surficial material
- k = geomorphological process
- R = surface expression

TEXTURE

- a blocks (>256 mm; angular)
- b boulders (>256 mm; round)
- c clay (<0.002 mm)
- d angular and rounded particles; >2 mm
- e fibric organics
- g gravel (rounded particles, >2mm)
- h humic organics
- k cobbles (64-256 mm, rounded)
- m mud (silt and /or clay)
- p pebbles (2-64 mm, rounded)
- r rubble (2-256 mm, angular)
- s sand (0.63-2 mm)
- u mesic organics
- x 2 to 256 mm, angular
- z silt (0.002-0.63 mm)

SURFICIAL MATERIALS

- A anthropogenic material
- C colluvium
- D weathered bedrock
- E aolian sediments
- F fluvial sediments
- FG glaciofluvial sediments
- I ice
- L lacustrine sediments
- LG glacial lake sediments
- M morainal material (glacial till)
- O organic materials
- R bedrock
- U undifferentiated materials
- V volcanic sediments

Superscripts: ^A = active, ^I = inactive

SURFACE EXPRESSION

- a moderate slope(s) (27-49%)
- b blanket
- c cone
- cl cliff
- d depression
- e plateau (no upslope catchment)
- f fan
- g gully slope
- h hummocky topography
- j gentle slope(s) (6-26%)
- k moderately steep slope(s) (50-70%)
- l lobe
- m rolling topography
- p plain (0-5%)
- r ridge topography
- s steep slope(s) (>70%)
- t terraced
- u undulating topography
- v veneer
- w mantle of variable thickness
- x thin veneer
- y1 topographically confined hill slope
- y2 topographically confined plain
- z1 hill top (rounded)
- z2 hill top (sharp)

GEOMORPHOLOGICAL PROCESSES

- A snow avalanches
- B braided channel
- E glacial meltwater channels
- F slow mass movement
- G glacial processes
- H kettled
- I irregularly sinuous channel
- J anstomosing channel
- L abundant seepage
- M meandering channel
- N nivation
- O decomposition of plant remains
- R rapid mass movement
- S solifluction
- U sheet erosion
- V gully erosion
- W weathering
- X permafrost processes
- Z general periglacial processes

GEOMORPHOLOGICAL PROCESSES: SUBCLASSES AND SUBTYPES

- F" slow mass movement, initiation zone
- Fc soil creep
- Fe slow earthflow(s)
- Fg rock creep
- Fk tension cracks
- Fr slow rockslide(s)
- Fs slow debris slide(s)
- R" rapid mass movement, initiation zone
- Rb rockfall(s)
- Rd debris flow(s)
- Rr rapid rockslide(s)
- Rs rapid debris slide(s)
- Rt debris torrent(s)

TERRAIN SYMBOLS

- . components on either side of the symbol are of approximately equal proportion
- / the component in front of the symbol is more extensive than the one that follows
- // the component in front of the symbol is considerably more extensive than the one that follows
- _ the component in front of the symbol overlays the one that follows

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PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — J. E. HALEY — # 33730 — SEPT 04 2013

Knight Piésold CONSULTING

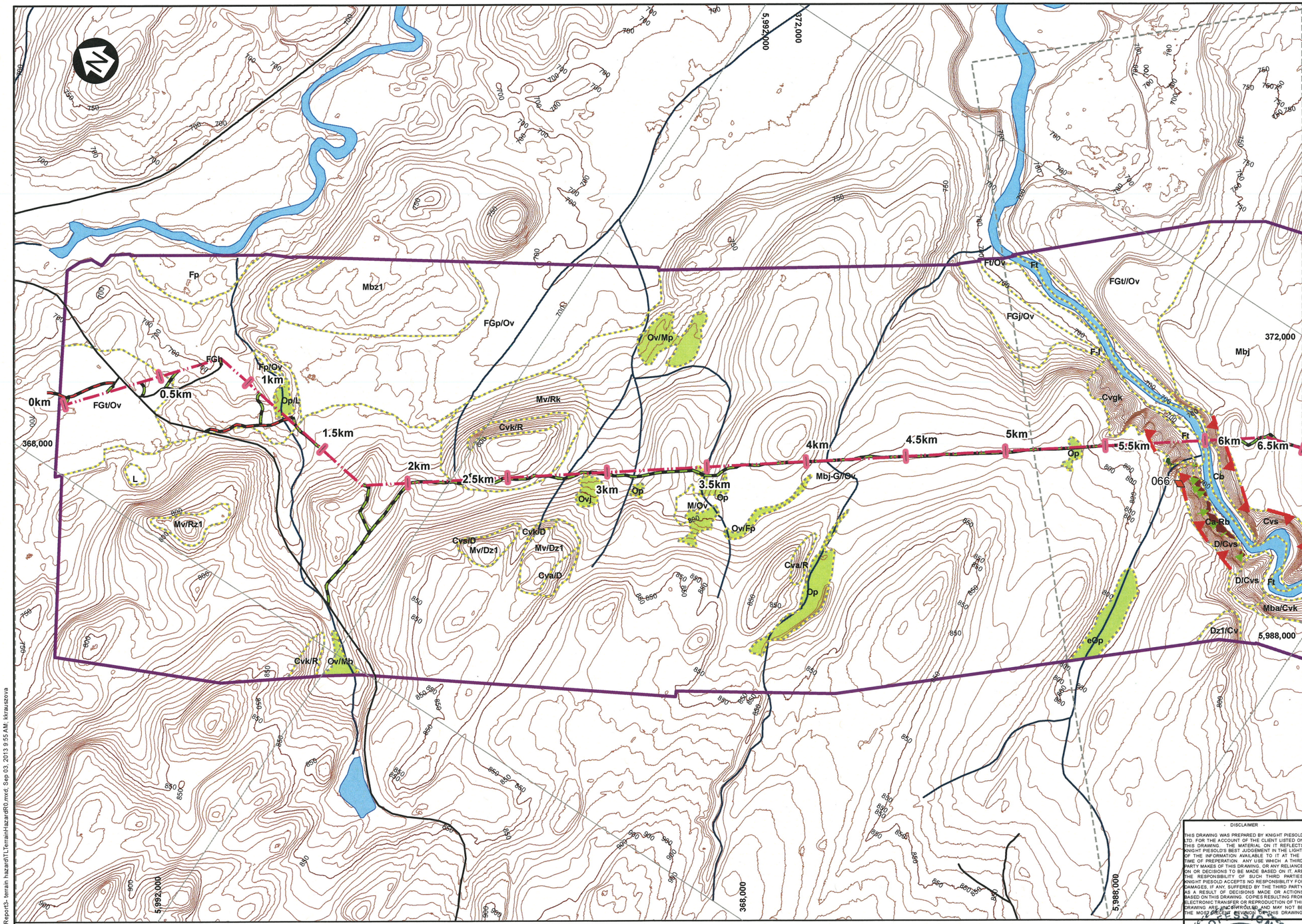
NEW GOLD INC.

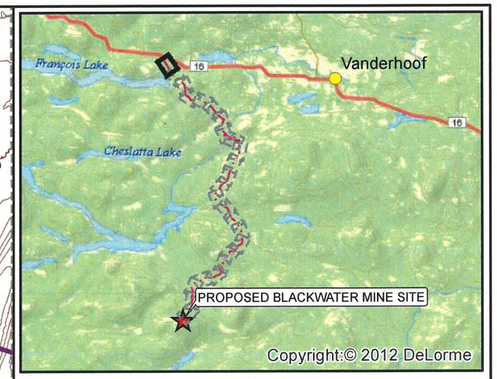
BLACKWATER GOLD PROJECT

PROJECT LOCATION MAP AND TERRAIN MAP LEGEND

P/A NO.	DRAWING NO.	REVISION
VA101-457/6	G0050	0

SAVED: M:\1101\00457\06\A\GIS\Figs\Report3- terrain hazard\TerrainHazardLegend.mxd Sep 03,2013 4:49 PM kkrauszova





LEGEND:

GENERAL
- WAYPOINTS
- EXISTING TRAIL
- EXISTING ROAD / FSR
- MAJOR CONTOUR (25 m)
- MINOR CONTOUR (5m)
- RIVER/CREEK
- LAKE
- STUDY AREA
- TERRAIN UNIT
- MAPSHEET EXTENT (SEE INSET)

PROPOSED FACILITIES
- POTENTIAL AIRSTRIP LOCATION
- TRANSMISSION LINE
- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE
- WATER SUPPLY PIPELINE AND ROAD

TERRAIN FEATURES
- CLIFF
- CONVEX BREAK OF SLOPE
- FLUVIAL/COLLUVIAL FAN
- ORGANIC SOILS
- TALLUS SLOPE

TERRAIN HAZARDS
- RECENT SLIDE
- RELICT SLIDE
- RECENT DEBRIS FLOW
- RELICT DEBRIS FLOW
- ROCK FALL PATH
- SHEET EROSION

NOTES:

1. BASE MAP: LIDAR BASED CONTOURS FROM EAGLE MAPPING. SATELITE DERIVED CONTOURS FROM PHOTOSAT.

2. COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N.

3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:20,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

4. REFER TO DRAWING G0050 FOR TERRAIN UNIT LEGEND.

5. TERRAIN MAPPING UNDERTAKEN TO TERRAIN SURVEY INTENSITY LEVEL E.

6. TRANSMISSION LINE ALIGNMENT DATED JULY 2013. TRANSMISSION LINE ACCESS ROAD FROM ALLNORTH 22JUL'13.

7. 'RECENT' LANDSLIDES ARE THOSE OBSERVED IN THE AIR PHOTO RECORD OR IN SITE RECONNAISSANCE AS BEING DEVOID OF VEGETATION, BEING ONLY PARTLY RE-VEGETATED OR BEING RE-VEGETATED WITH PIONEER SPECIES E.G. ALDER.

8. 'RELICT' LANDSLIDES PRE-DATE THE AIR PHOTO RECORD.

SCALE 200 100 0 200 400 600 800 Meters

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PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — J. E. HALEY — # 38730 — SEPT. 11, 2013

Knight Piésold CONSULTING

NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION LINE TERRAIN HAZARDS MAP Sheet 1 of 25

P/A NO.	DRAWING NO.	REVISION
VA101-457/6	G0070	0

DRG. NO.	DESCRIPTION	REV	DATE	DESIGN	DRAWN	CHK'D	APP'D
REFERENCE DRAWINGS							

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
REVISIONS						
0	30AUG'13	ISSUED WITH REPORT	BH	KK/JPN	JH	BB

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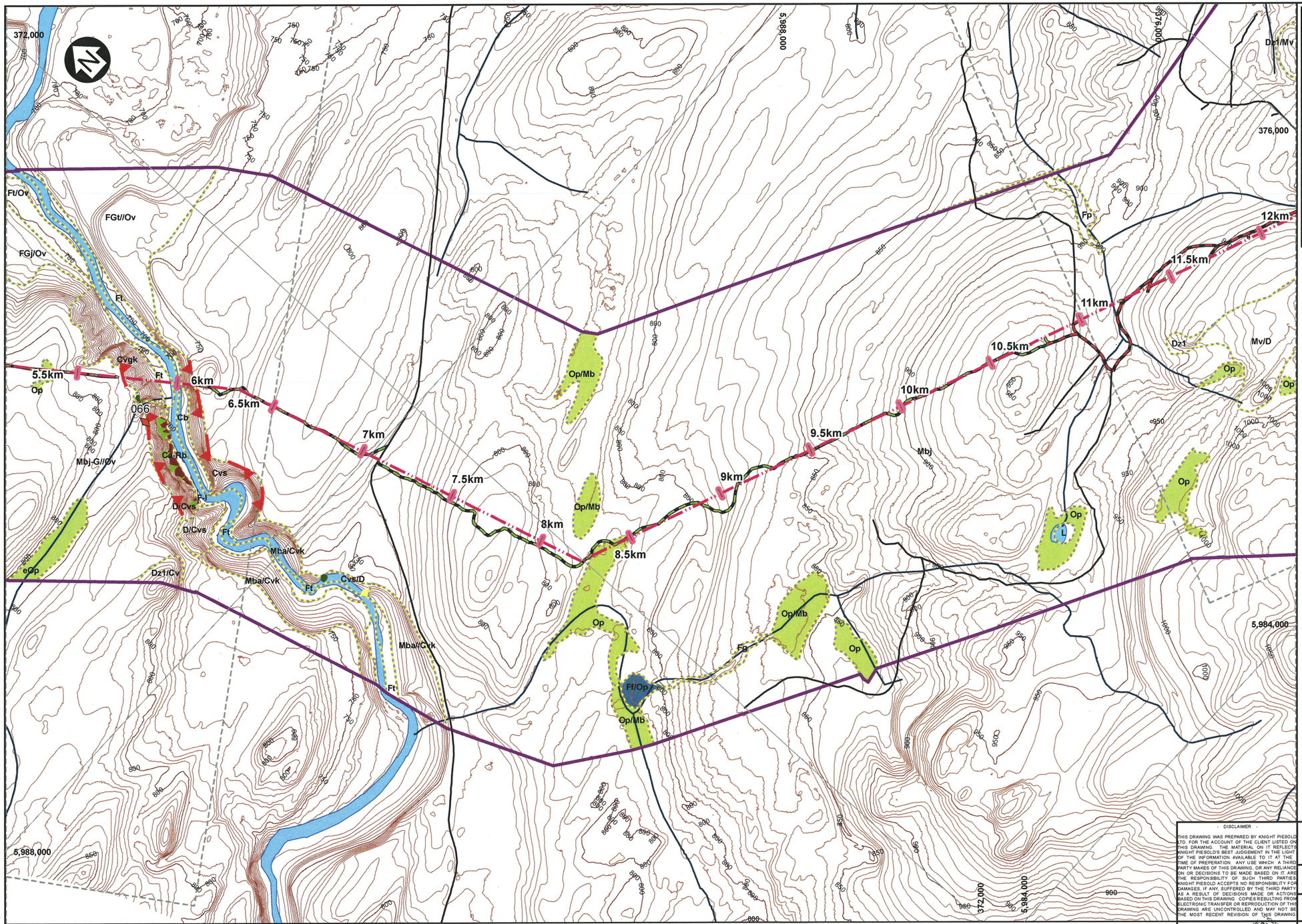

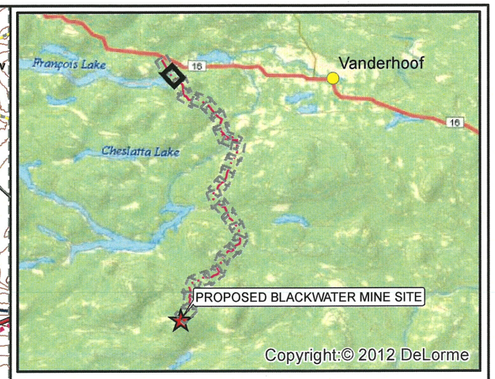

LEGEND:

GENERAL
- WAYPOINTS
- EXISTING TRAIL
- EXISTING ROAD / FSR
- MAJOR CONTOUR (25 m)
- MINOR CONTOUR (5m)
- RIVER/CREEK
- LAKE
- STUDY AREA
- TERRAIN UNIT
- MAPSHEET EXTENT (SEE INSET)

TERRAIN FEATURES
- CLIFF
- CONVEX BREAK OF SLOPE
- FLUVIAL/COLLUVIAL FAN
- ORGANIC SOILS
- TALLUS SLOPE

TERRAIN HAZARDS
- RECENT SLIDE
- RELICT SLIDE
- RECENT DEBRIS FLOW
- RELICT DEBRIS FLOW
- ROCK FALL PATH
- SHEET EROSION

PROPOSED FACILITIES
- POTENTIAL AIRSTRIP LOCATION
- TRANSMISSION LINE
- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE
- WATER SUPPLY PIPELINE AND ROAD

NOTES:

1. BASE MAP: LIDAR BASED CONTOURS FROM EAGLE MAPPING. SATELITE DERIVED CONTOURS FROM PHOTOSAT.
2. COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N.
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4. REFER TO DRAWING G0050 FOR TERRAIN UNIT LEGEND.
5. TERRAIN MAPPING UNDERTAKEN TO TERRAIN SURVEY INTENSITY LEVEL E.
6. TRANSMISSION LINE ALIGNMENT DATED JULY 2013. TRANSMISSION LINE ACCESS ROAD FROM ALLNORTH 22JUL'13.
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8. 'RELICT' LANDSLIDES PRE-DATE THE AIR PHOTO RECORD.

SCALE 200 100 0 200 400 600 800 Meters

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PROVINCE OF BRITISH COLUMBIA
J. E. HALEY
33730
PROFESSIONAL ENGINEER
SEPT 2013

Knight Piésold CONSULTING

NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION LINE TERRAIN HAZARDS MAP
Sheet 2 of 25

P/A NO.	DRAWING NO.	REVISION
VA101-457/6	G0071	0

DRG. NO.	DESCRIPTION
REFERENCE DRAWINGS	

REV	DATE		DESIGN	DRAWN	CHK'D	APP'D
REVISIONS						

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	30AUG'13	ISSUED WITH REPORT	BH	KK/JPN		BB
REVISIONS						

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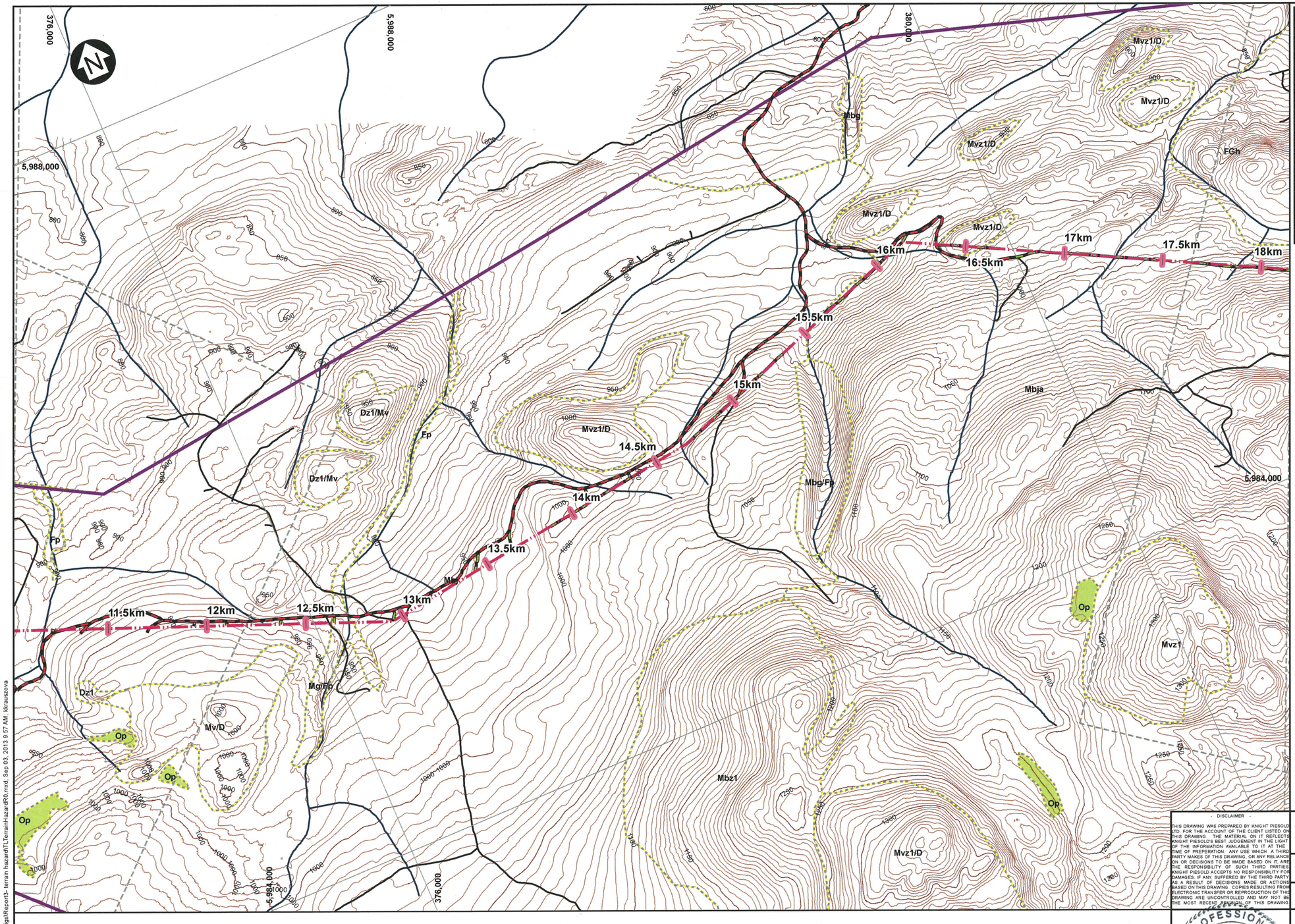

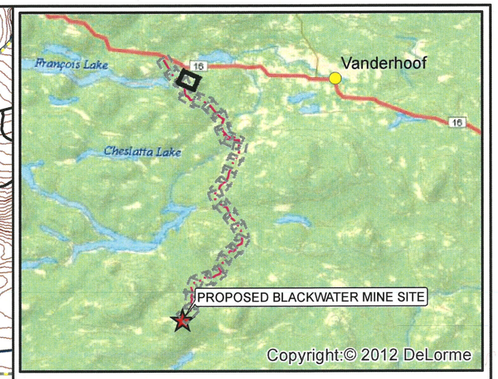

LEGEND:

GENERAL
- WAYPOINTS
- EXISTING TRAIL
- EXISTING ROAD / FSR
- MAJOR CONTOUR (25 m)
- MINOR CONTOUR (5m)
- RIVER/CREEK
- LAKE
- STUDY AREA
- TERRAIN UNIT
- MAPSHEET EXTENT (SEE INSET)

PROPOSED FACILITIES
- POTENTIAL AIRSTRIP LOCATION
- TRANSMISSION LINE
- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE
- WATER SUPPLY PIPELINE AND ROAD

TERRAIN FEATURES
- CLIFF
- CONVEX BREAK OF SLOPE
- FLUVIAL/COLLUVIAL FAN
- ORGANIC SOILS
- TALLUS SLOPE

TERRAIN HAZARDS
- RECENT SLIDE
- RELICT SLIDE
- RECENT DEBRIS FLOW
- RELICT DEBRIS FLOW
- ROCK FALL PATH
- SHEET EROSION

NOTES:

1. BASE MAP: LIDAR BASED CONTOURS FROM EAGLE MAPPING. SATELITE DERIVED CONTOURS FROM PHOTOSAT.
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8. 'RELICT' LANDSLIDES PRE-DATE THE AIR PHOTO RECORD.

SCALE 200 100 0 200 400 600 800 Meters

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PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — J. E. HALEY # 33730 — SEPT 04 2013

Knight Piésold CONSULTING

NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION LINE TERRAIN HAZARDS MAP
Sheet 3 of 25

P/A NO.	DRAWING NO.	REVISION
VA101-457/6	G0072	0

DRG. NO.	DESCRIPTION
REFERENCE DRAWINGS	

REV	DATE		DESIGN	DRAWN	CHK'D	APP'D
REVISIONS						

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	30AUG'13	ISSUED WITH REPORT	BH	KK/JPN		BB
REVISIONS						

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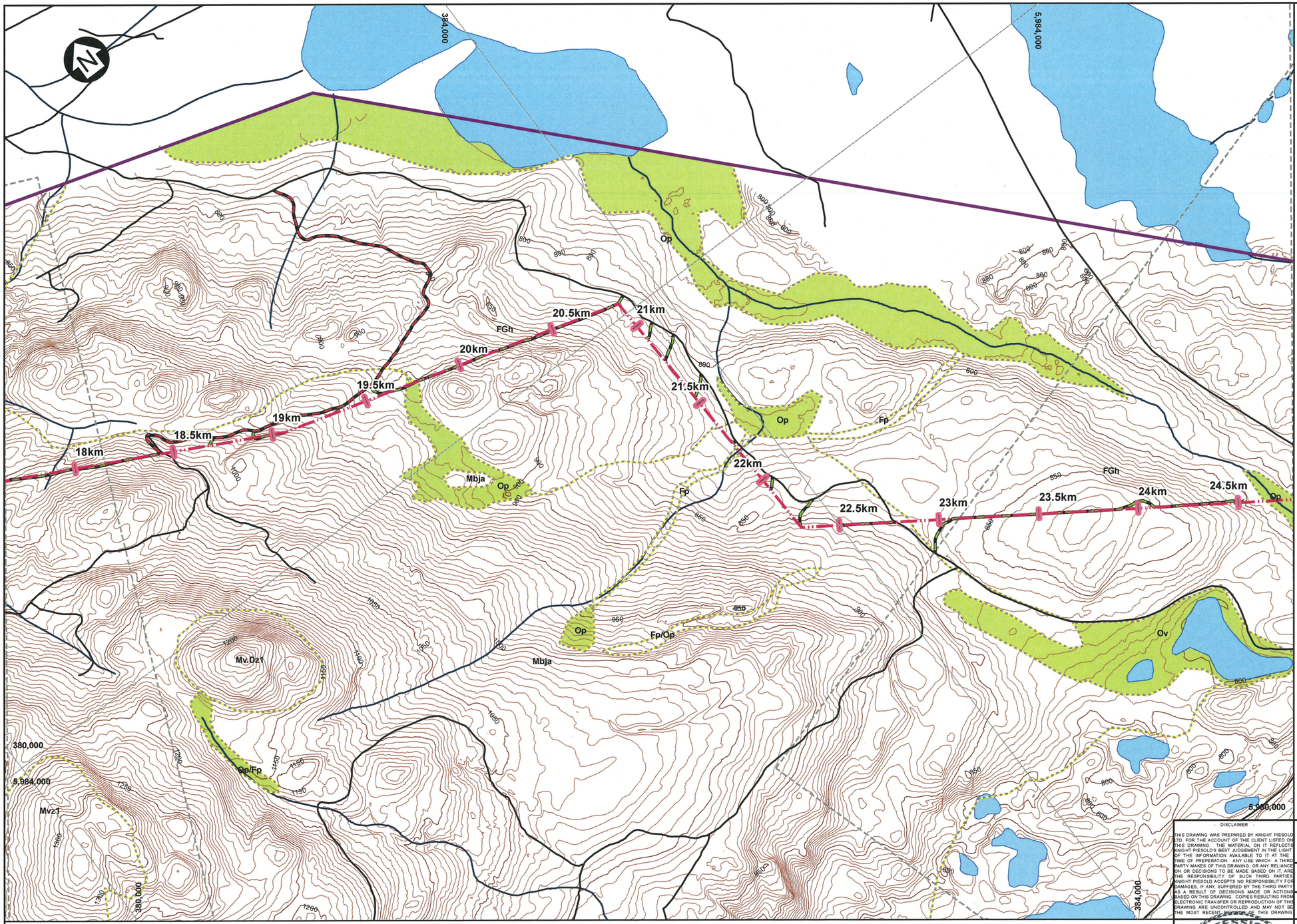

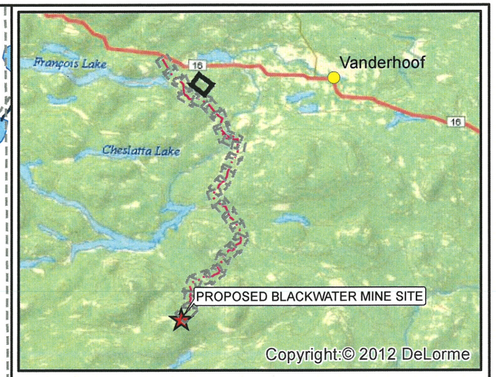

LEGEND:

GENERAL
- WAYPOINTS
- EXISTING TRAIL
- EXISTING ROAD / FSR
- MAJOR CONTOUR (25 m)
- MINOR CONTOUR (5m)
- RIVER/CREEK
- LAKE
- STUDY AREA
- TERRAIN UNIT
- MAPSHEET EXTENT (SEE INSET)

PROPOSED FACILITIES
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- TRANSMISSION LINE
- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE
- WATER SUPPLY PIPELINE AND ROAD

TERRAIN FEATURES
- CLIFF
- CONVEX BREAK OF SLOPE
- FLUVIAL/COLLUVIAL FAN
- ORGANIC SOILS
- TALLUS SLOPE

TERRAIN HAZARDS
- RECENT SLIDE
- RELICT SLIDE
- RECENT DEBRIS FLOW
- RELICT DEBRIS FLOW
- ROCK FALL PATH
- SHEET EROSION

NOTES:

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PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — J. E. HALEY # 33730 — SEP 6 2013

Knight Piésold CONSULTING

NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION LINE TERRAIN HAZARDS MAP

Sheet 4 of 25

P/A NO.	DRAWING NO.	REVISION
VA101-457/6	G0073	0

DRG. NO.	DESCRIPTION

REFERENCE DRAWINGS

REV	DATE		DESIGN	DRAWN	CHK'D	APP'D

REVISIONS

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	30AUG'13	ISSUED WITH REPORT	BH	KK/JPN		BB

REVISIONS

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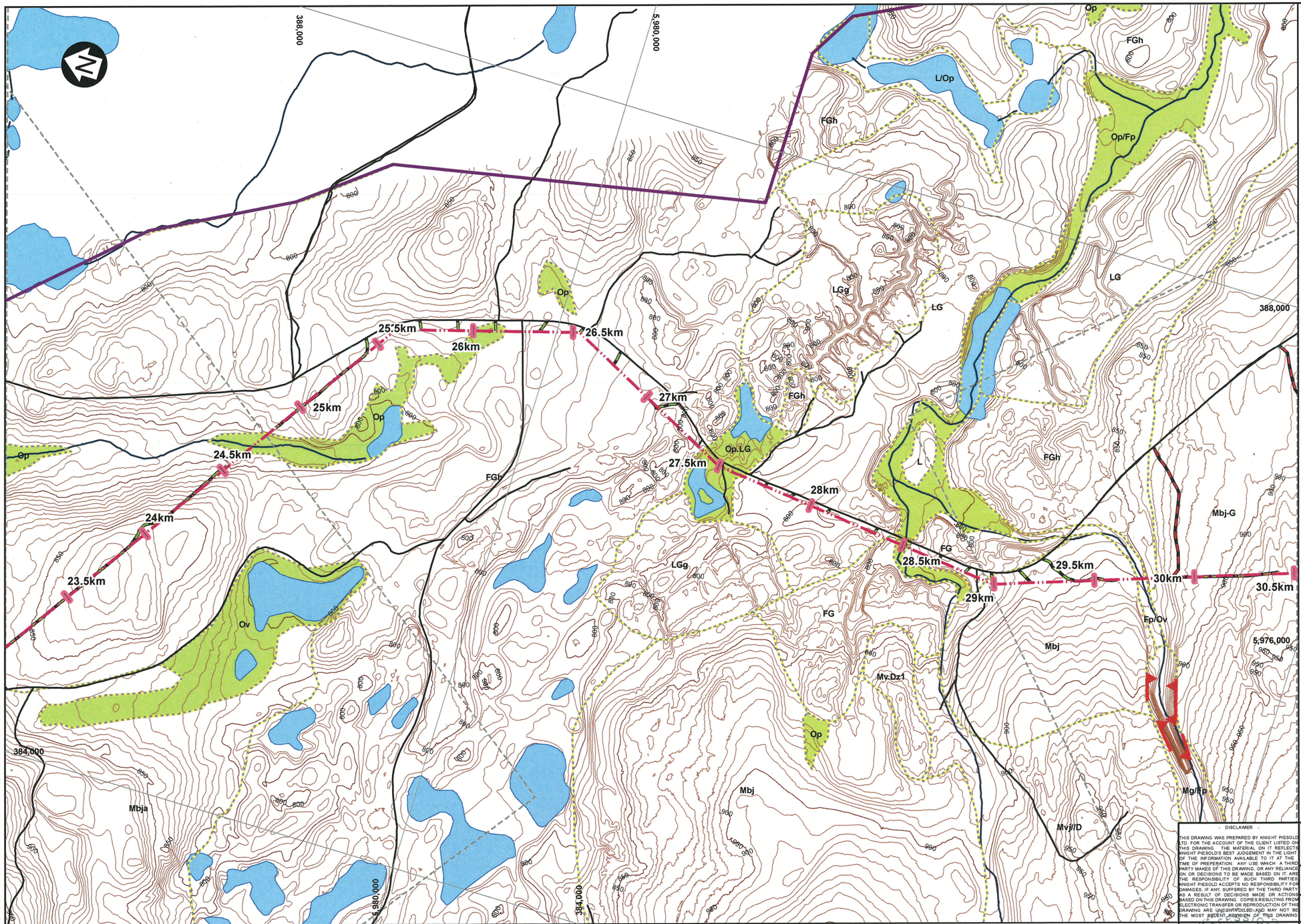

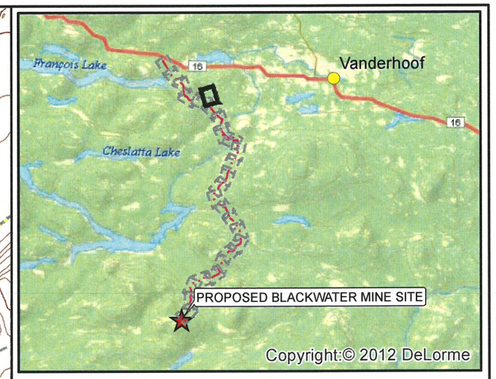

LEGEND:

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- EXISTING ROAD / FSR
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- MINOR CONTOUR (5m)
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- MAPSHEET EXTENT (SEE INSET)

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- POTENTIAL AIRSTRIP LOCATION
- TRANSMISSION LINE
- ACCESS ROAD NEW
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- WATER SUPPLY PIPELINE AND ROAD

TERRAIN FEATURES
- CLIFF
- CONVEX BREAK OF SLOPE
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TERRAIN HAZARDS
- RECENT SLIDE
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- SHEET EROSION

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PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — J. E. HALEY # 33730 — SEPT 6th 2013

Knight Piésold CONSULTING

NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION LINE TERRAIN HAZARDS MAP Sheet 5 of 25

P/A NO.	DRAWING NO.	REVISION
VA101-457/6	G0074	0

REFERENCE DRAWINGS

DRG. NO.	DESCRIPTION

REVISIONS

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	30AUG'13	ISSUED WITH REPORT	BH	KK/JPN	BB	

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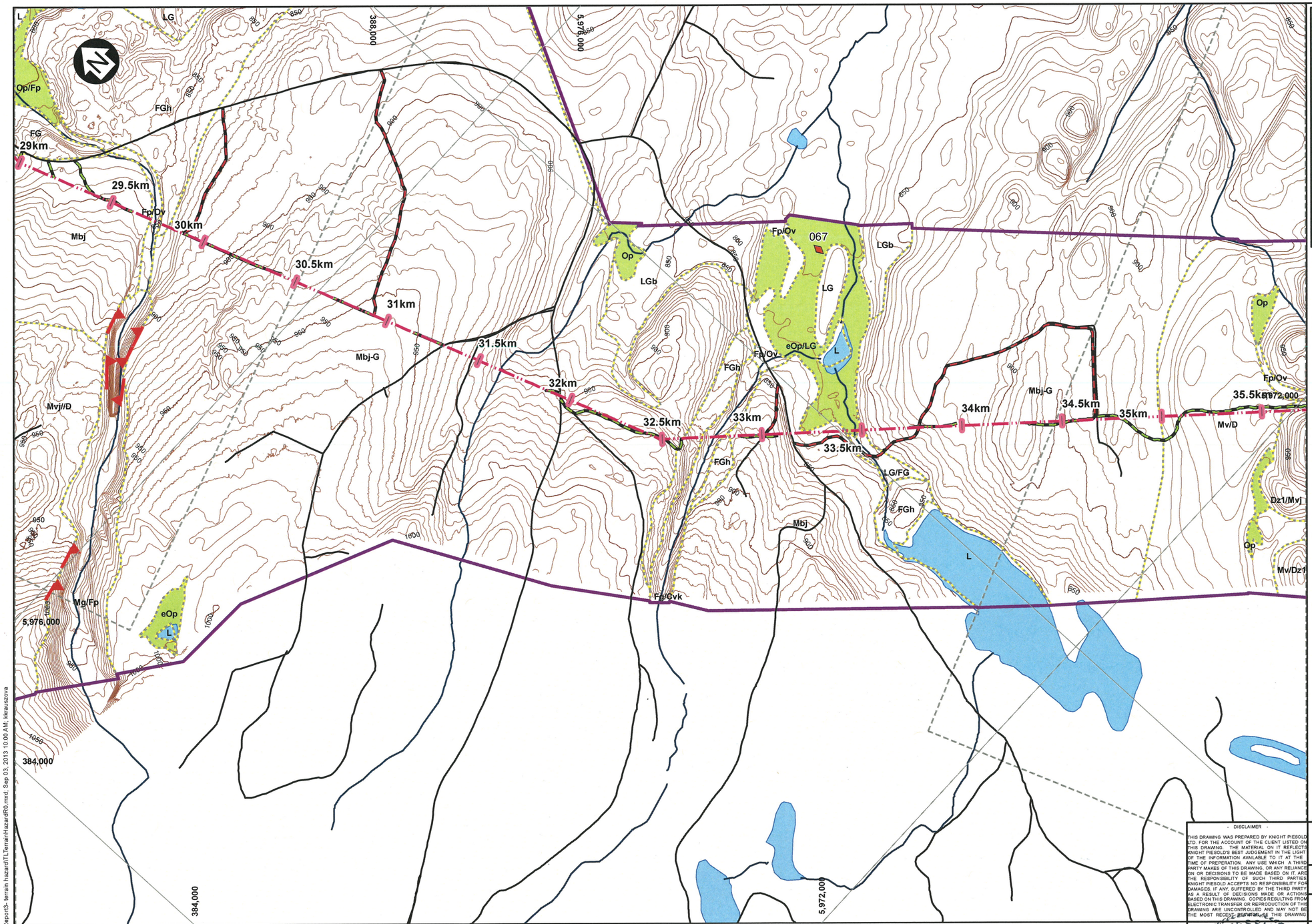

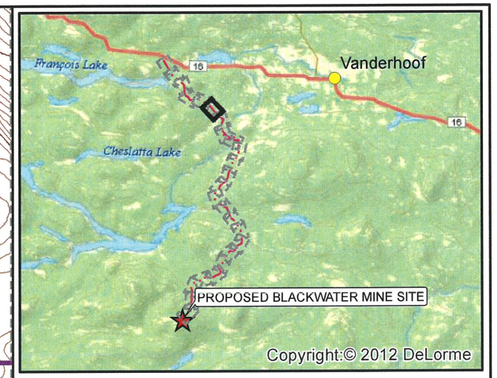

LEGEND:

GENERAL
- WAYPOINTS
- EXISTING TRAIL
- EXISTING ROAD / FSR
- MAJOR CONTOUR (25 m)
- MINOR CONTOUR (5m)
- RIVER/CREEK
- LAKE
- STUDY AREA
- TERRAIN UNIT
- MAPSHEET EXTENT (SEE INSET)

TERRAIN FEATURES
- CLIFF
- CONVEX BREAK OF SLOPE
- FLUVIAL/COLLUVIAL FAN
- ORGANIC SOILS
- TALLUS SLOPE

TERRAIN HAZARDS
- RECENT SLIDE
- RELICT SLIDE
- RECENT DEBRIS FLOW
- RELICT DEBRIS FLOW
- ROCK FALL PATH
- SHEET EROSION

PROPOSED FACILITIES
- POTENTIAL AIRSTRIP LOCATION
- TRANSMISSION LINE
- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE
- WATER SUPPLY PIPELINE AND ROAD

NOTES:

1. BASE MAP: LIDAR BASED CONTOURS FROM EAGLE MAPPING. SATELITE DERIVED CONTOURS FROM PHOTOSAT.
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4. REFER TO DRAWING G0050 FOR TERRAIN UNIT LEGEND.
5. TERRAIN MAPPING UNDERTAKEN TO TERRAIN SURVEY INTENSITY LEVEL E.
6. TRANSMISSION LINE ALIGNMENT DATED JULY 2013. TRANSMISSION LINE ACCESS ROAD FROM ALLNORTH 22JUL'13.
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8. 'RELICT' LANDSLIDES PRE-DATE THE AIR PHOTO RECORD.

SCALE 200 100 0 200 400 600 800 Meters

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NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION LINE TERRAIN HAZARDS MAP

Sheet 6 of 25

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — J. E. HALEY # 33730 — SEPT 11 2013

DRG. NO.	DESCRIPTION
REFERENCE DRAWINGS	

REV	DATE		DESIGN	DRAWN	CHK'D	APP'D
REVISIONS						

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	30AUG'13	ISSUED WITH REPORT	BH	KK/JPN		BB
REVISIONS						

P/A NO.	DRAWING NO.	REVISION
VA101-457/6	G0075	0

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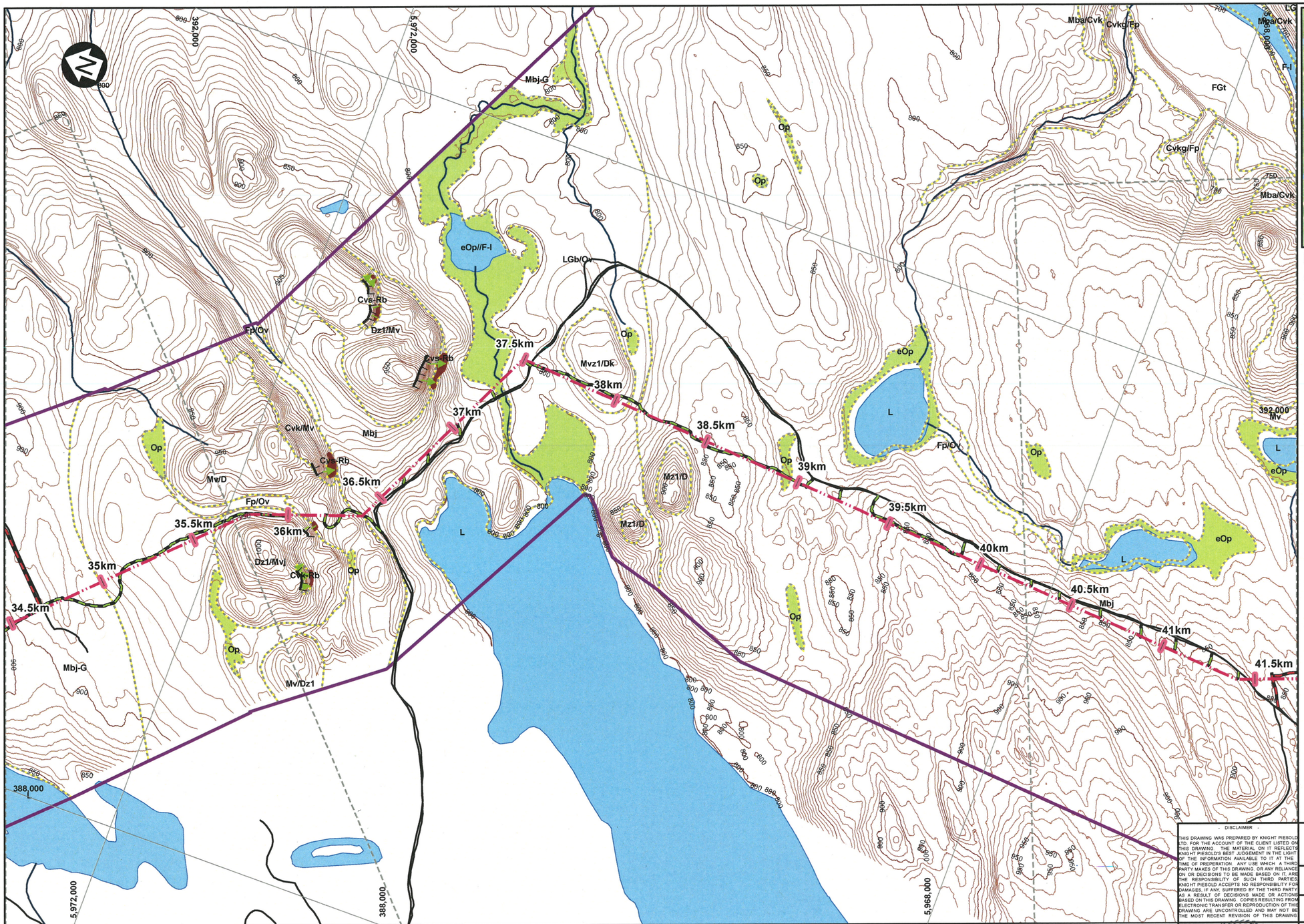

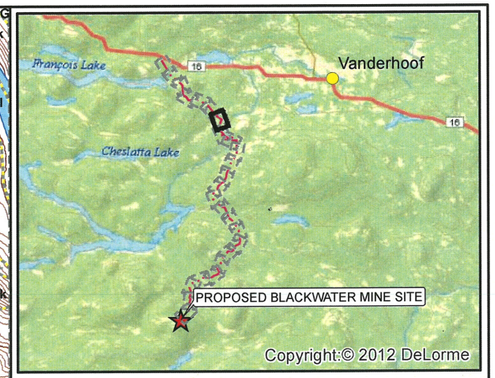

LEGEND:

GENERAL
- WAYPOINTS
- EXISTING TRAIL
- EXISTING ROAD / FSR
- MAJOR CONTOUR (25 m)
- MINOR CONTOUR (5m)
- RIVER/CREEK
- LAKE
- STUDY AREA
- TERRAIN UNIT
- MAPSHEET EXTENT (SEE INSET)

PROPOSED FACILITIES
- POTENTIAL AIRSTRIP LOCATION
- TRANSMISSION LINE
- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE
- WATER SUPPLY PIPELINE AND ROAD

TERRAIN FEATURES
- CLIFF
- CONVEX BREAK OF SLOPE
- FLUVIAL/COLLUVIAL FAN
- ORGANIC SOILS
- TALLUS SLOPE

TERRAIN HAZARDS
- RECENT SLIDE
- RELICT SLIDE
- RECENT DEBRIS FLOW
- RELICT DEBRIS FLOW
- ROCK FALL PATH
- SHEET EROSION

NOTES:

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8. 'RELICT' LANDSLIDES PRE-DATE THE AIR PHOTO RECORD.

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PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — J. E. HALEY #33730 — SEPTEMBER 2013

DRG. NO.	DESCRIPTION
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REV	DATE	DESIGN	DRAWN	CHK'D	APP'D
	REVISIONS				

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	30AUG'13	ISSUED WITH REPORT	BH	KK/JPN	BB	
		REVISIONS				

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NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION LINE TERRAIN HAZARDS MAP Sheet 7 of 25

P/A NO.	DRAWING NO.	REVISION
VA101-457/6	G0076	0

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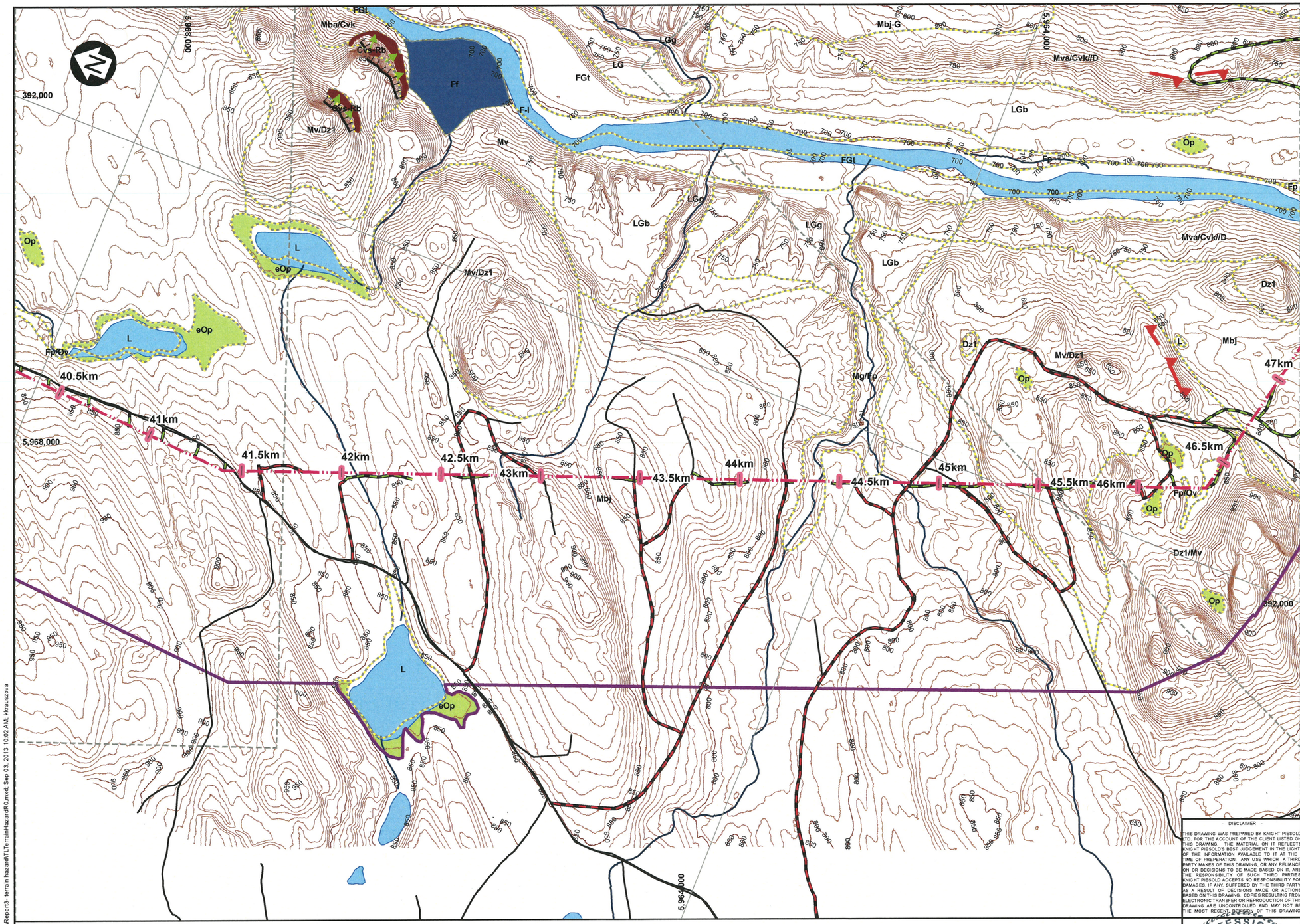

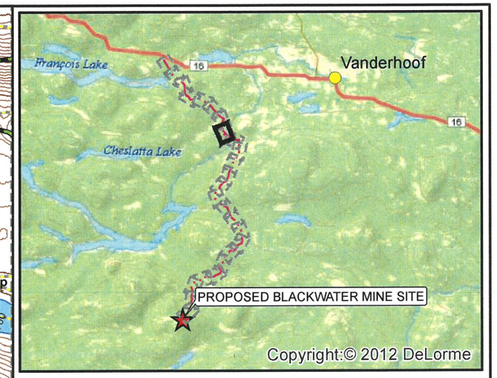

LEGEND:

GENERAL
- WAYPOINTS
- EXISTING TRAIL
- EXISTING ROAD / FSR
- MAJOR CONTOUR (25 m)
- MINOR CONTOUR (5m)
- RIVER/CREEK
- LAKE
- STUDY AREA
- TERRAIN UNIT
- MAPSHEET EXTENT (SEE INSET)

PROPOSED FACILITIES
- POTENTIAL AIRSTRIP LOCATION
- TRANSMISSION LINE
- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE
- WATER SUPPLY PIPELINE AND ROAD

TERRAIN FEATURES
- CLIFF
- CONVEX BREAK OF SLOPE
- FLUVIAL/COLLUVIAL FAN
- ORGANIC SOILS
- TALLUS SLOPE

TERRAIN HAZARDS
- RECENT SLIDE
- RELICT SLIDE
- RECENT DEBRIS FLOW
- RELICT DEBRIS FLOW
- ROCK FALL PATH
- SHEET EROSION

NOTES:

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PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — J. E. HALEY # 33730 — SEPTEMBER 2013

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BLACKWATER GOLD PROJECT

TRANSMISSION LINE TERRAIN HAZARDS MAP Sheet 8 of 25

P/A NO.	DRAWING NO.	REVISION
VA101-457/6	G0077	0

DRG. NO.	DESCRIPTION
REFERENCE DRAWINGS	

REV	DATE		DESIGN	DRAWN	CHK'D	APP'D
REVISIONS						

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0	30AUG'13	ISSUED WITH REPORT	BH	KK/JPN	BB	
REVISIONS						

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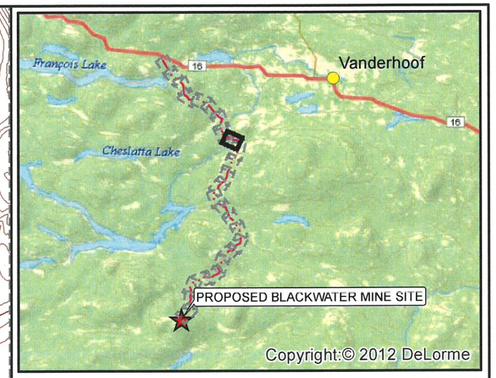

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- MAPSHEET EXTENT (SEE INSET)

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- TALLUS SLOPE

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- ROCK FALL PATH
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TRANSMISSION LINE TERRAIN HAZARDS MAP Sheet 9 of 25

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — J. E. HALEY — #33730 — SEPTEMBER 3, 2013

P/A NO.	DRAWING NO.	REVISION
VA101-457/6	G0078	0

DRG. NO.	DESCRIPTION
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REVISIONS						

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REVISIONS						

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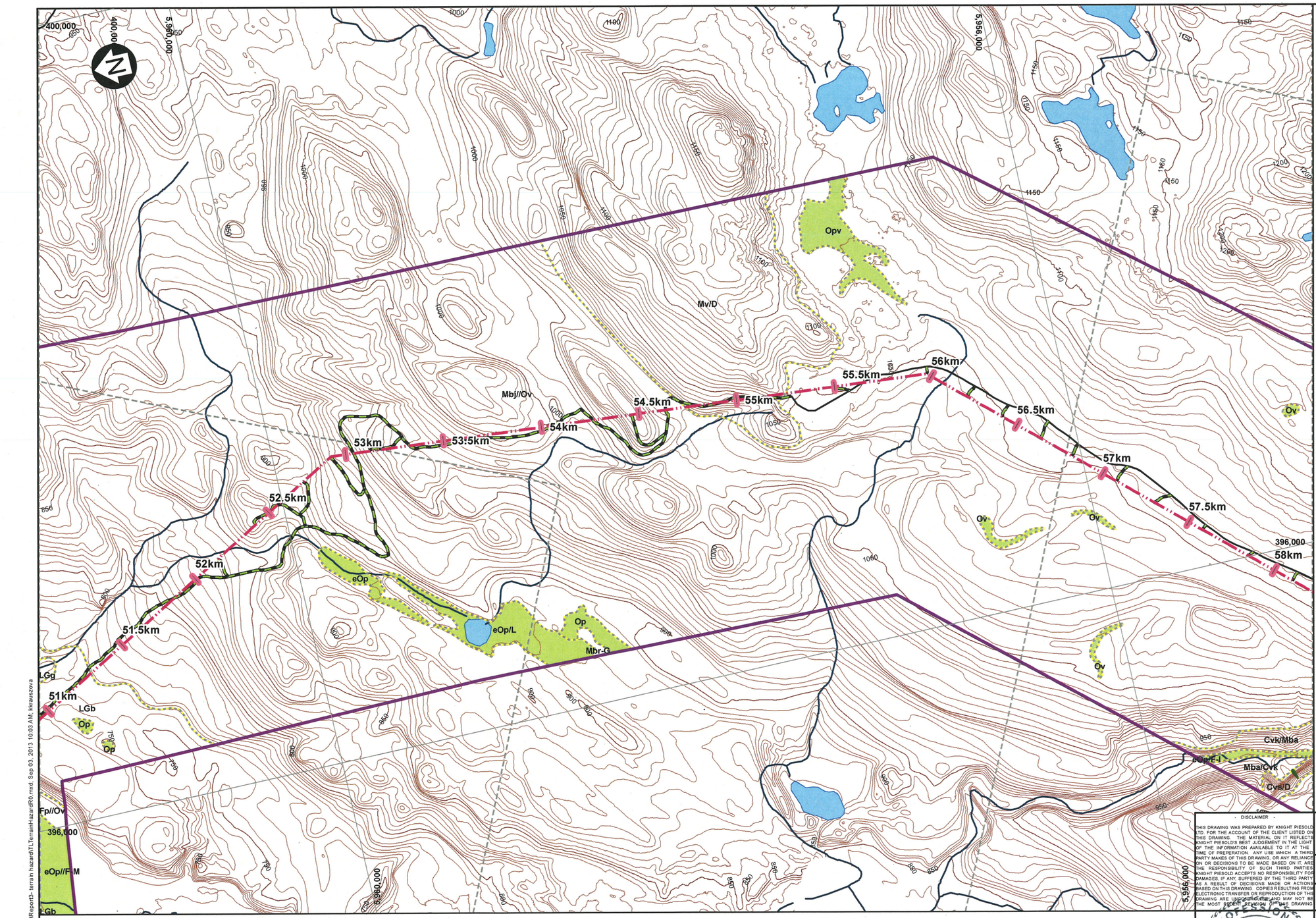

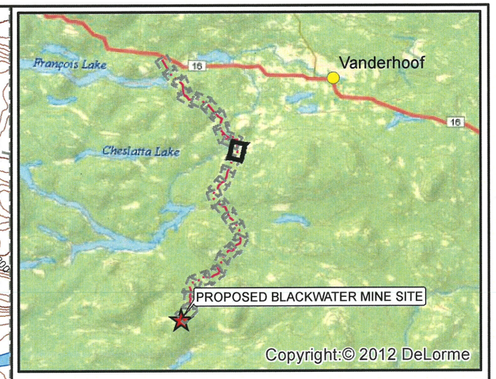

LEGEND:

GENERAL
- WAYPOINTS
- EXISTING TRAIL
- EXISTING ROAD / FSR
- MAJOR CONTOUR (25 m)
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- MAPSHEET EXTENT (SEE INSET)

PROPOSED FACILITIES
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- TRANSMISSION LINE
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- ACCESS ROAD UPGRADE
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TERRAIN HAZARDS
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- RELICT DEBRIS FLOW
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NOTES:

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PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — J. E. HALEY # 33730 — SEP 11 2013

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NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION LINE TERRAIN HAZARDS MAP Sheet 10 of 25

P/A NO.	DRAWING NO.	REVISION
VA101-457/6	G0079	0

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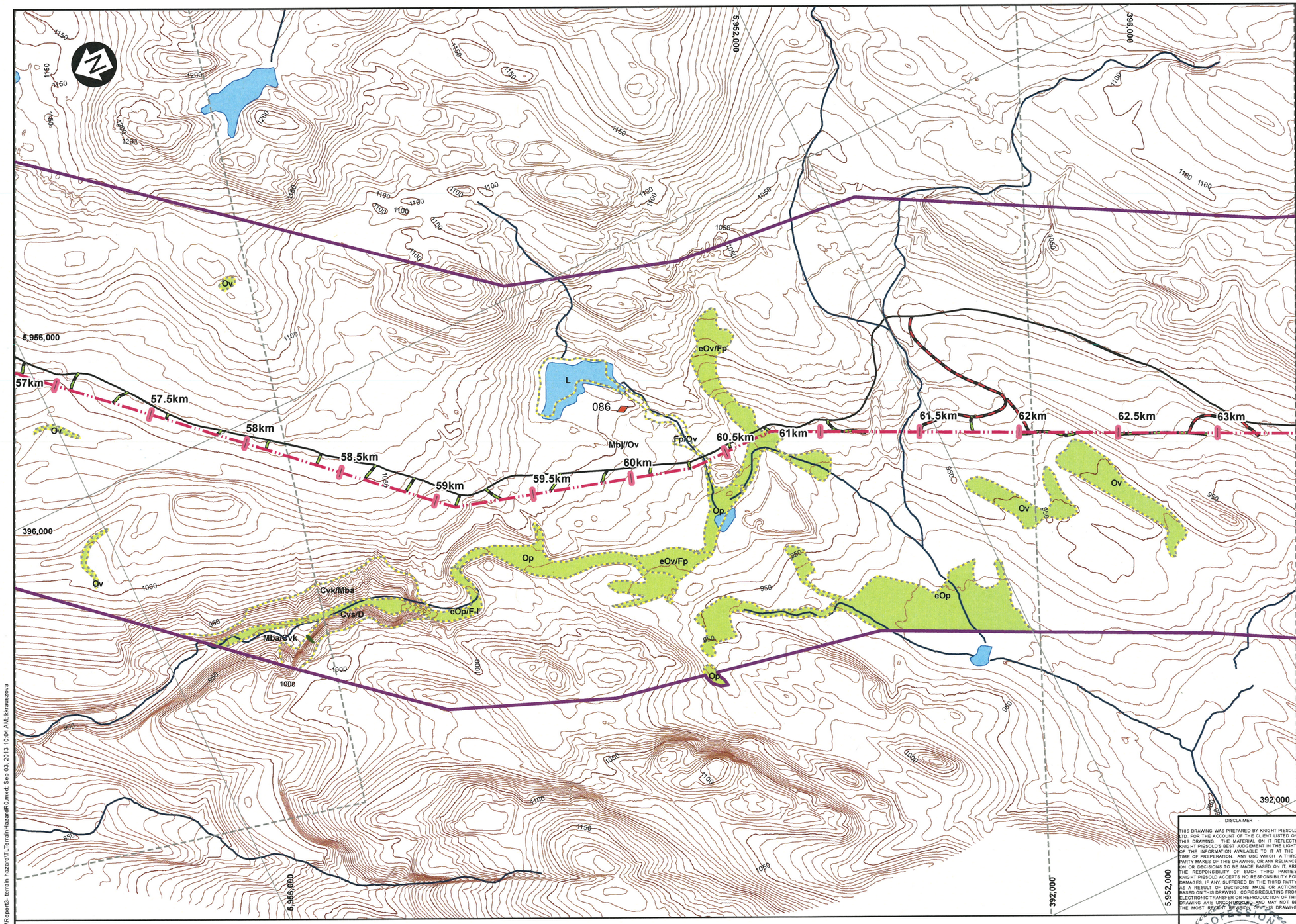

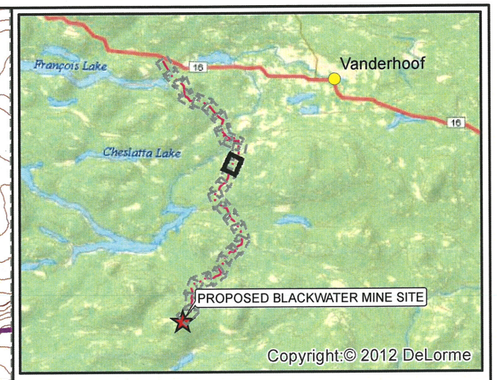

LEGEND:

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- MAPSHEET EXTENT (SEE INSET)

PROPOSED FACILITIES
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- TRANSMISSION LINE
- ACCESS ROAD NEW
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- WATER SUPPLY PIPELINE AND ROAD

TERRAIN FEATURES
- CLIFF
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TERRAIN HAZARDS
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PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — J. E. HALEY — # 33730 — SEPT 27, 2013

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NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION LINE TERRAIN HAZARDS MAP Sheet 11 of 25

P/A NO.	DRAWING NO.	REVISION
VA101-457/6	G0080	0

DRG. NO.	DESCRIPTION
REFERENCE DRAWINGS	

REV	DATE		DESIGN	DRAWN	CHK'D	APP'D
REVISIONS						

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	30AUG'13	ISSUED WITH REPORT	BH	KK/JPN	BB	BB
REVISIONS						

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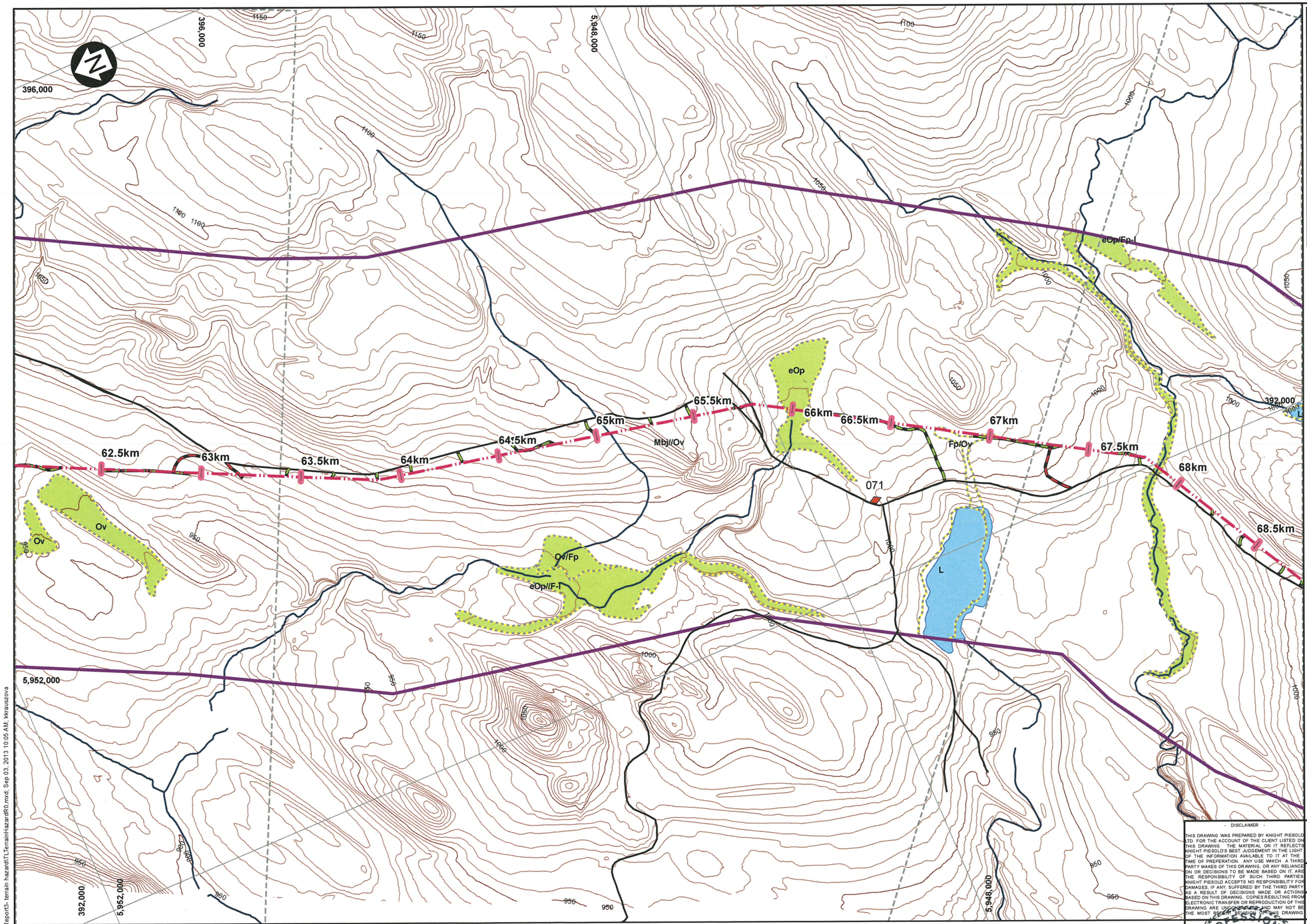

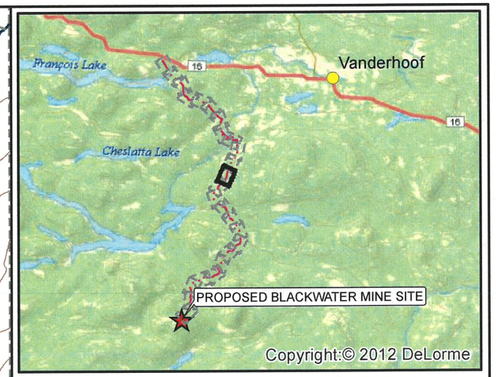

LEGEND:

GENERAL
- WAYPOINTS
- EXISTING TRAIL
- EXISTING ROAD / FSR
- MAJOR CONTOUR (25 m)
- MINOR CONTOUR (5m)
- RIVER/CREEK
- LAKE
- STUDY AREA
- TERRAIN UNIT
- MAPSHEET EXTENT (SEE INSET)

PROPOSED FACILITIES
- POTENTIAL AIRSTRIP LOCATION
- TRANSMISSION LINE
- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE
- WATER SUPPLY PIPELINE AND ROAD

TERRAIN FEATURES
- CLIFF
- CONVEX BREAK OF SLOPE
- FLUVIAL/COLLUVIAL FAN
- ORGANIC SOILS
- TALLUS SLOPE

TERRAIN HAZARDS
- RECENT SLIDE
- RELICT SLIDE
- RECENT DEBRIS FLOW
- RELICT DEBRIS FLOW
- ROCK FALL PATH
- SHEET EROSION

NOTES:

1. BASE MAP: LIDAR BASED CONTOURS FROM EAGLE MAPPING. SATELITE DERIVED CONTOURS FROM PHOTOSAT.
2. COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N.
3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:20,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.
4. REFER TO DRAWING G0050 FOR TERRAIN UNIT LEGEND.
5. TERRAIN MAPPING UNDERTAKEN TO TERRAIN SURVEY INTENSITY LEVEL E.
6. TRANSMISSION LINE ALIGNMENT DATED JULY 2013. TRANSMISSION LINE ACCESS ROAD FROM ALLNORTH 22JUL'13.
7. 'RECENT' LANDSLIDES ARE THOSE OBSERVED IN THE AIR PHOTO RECORD OR IN SITE RECONNAISSANCE AS BEING DEVOID OF VEGETATION, BEING ONLY PARTLY RE-VEGETATED OR BEING RE-VEGETATED WITH PIONEER SPECIES E.G. ALDER.
8. 'RELICT' LANDSLIDES PRE-DATE THE AIR PHOTO RECORD.

SCALE 200 100 0 200 400 600 800 Meters

- DISCLAIMER -

THIS DRAWING WAS PREPARED BY KNIGHT PIESOLD LTD. FOR THE ACCOUNT OF THE CLIENT LISTED ON THIS DRAWING. THE MATERIAL ON IT REFLECTS KNIGHT PIESOLD'S BEST JUDGEMENT IN THE LIGHT OF THE INFORMATION AVAILABLE TO IT AT THE TIME OF PREPERATION. ANY USE WHICH A THIRD PARTY MAKES OF THIS DRAWING, OR ANY RELIANCE ON OR DECISIONS TO BE MADE BASED ON IT, ARE THE RESPONSIBILITY OF SUCH THIRD PARTIES. KNIGHT PIESOLD ACCEPTS NO RESPONSIBILITY FOR DAMAGES, IF ANY, SUFFERED BY THE THIRD PARTY AS A RESULT OF DECISIONS MADE OR ACTIONS BASED ON THIS DRAWING. COPIES RESULTING FROM ELECTRONIC TRANSFER OR REPRODUCTION OF THIS DRAWING ARE UNCONTROLLED AND MAY NOT BE THE MOST RECENT REVISION OF THIS DRAWING.

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
J. E. HALEY
33730
SEP 2013

Knight Piésold CONSULTING

NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION LINE TERRAIN HAZARDS MAP
Sheet 12 of 25

P/A NO.	DRAWING NO.	REVISION
VA101-457/6	G0081	0

DRG. NO.	DESCRIPTION
REFERENCE DRAWINGS	

REV	DATE		DESIGN	DRAWN	CHK'D	APP'D
REVISIONS						

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	30AUG'13	ISSUED WITH REPORT	BH	KK/JPN		
REVISIONS						

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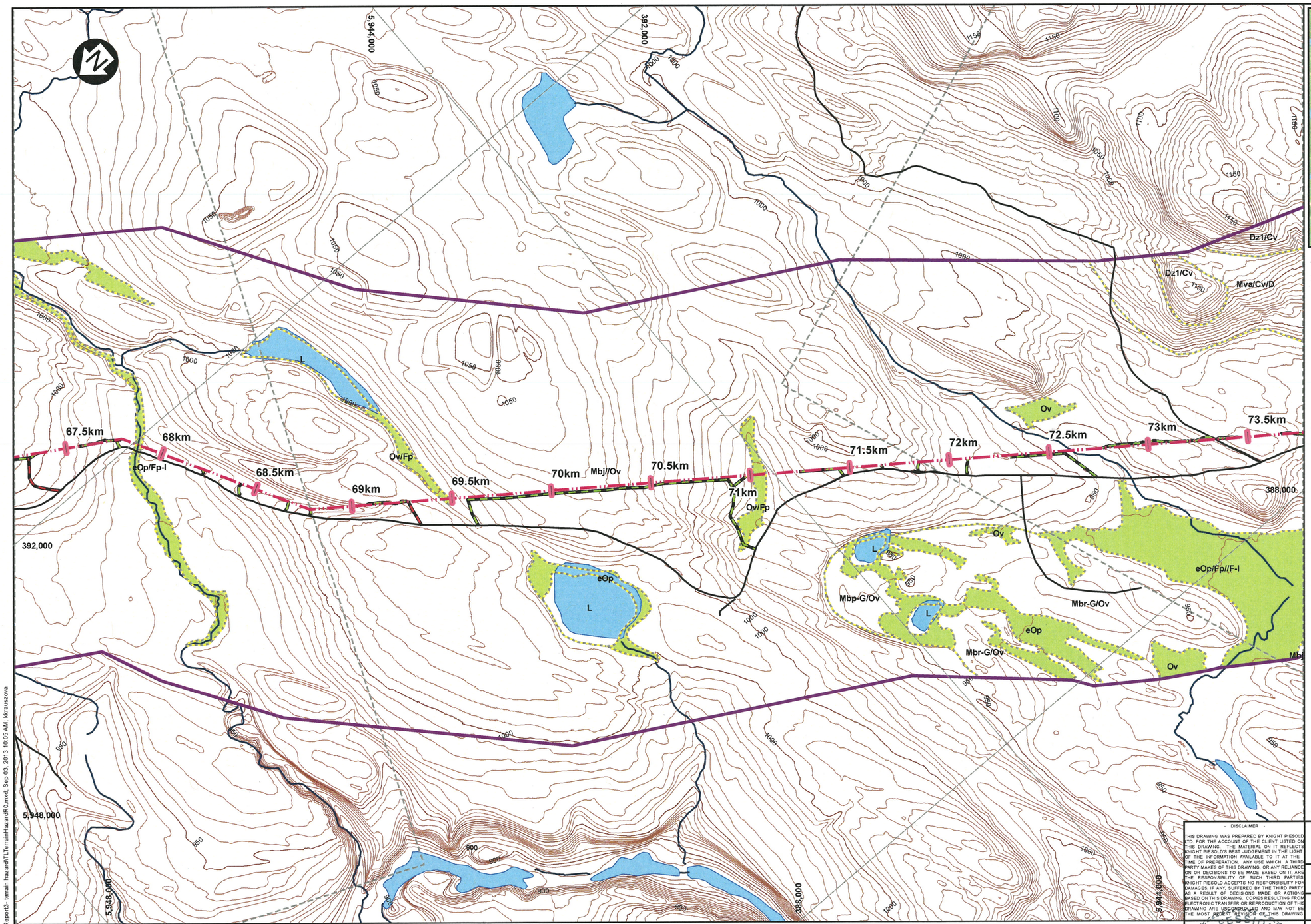

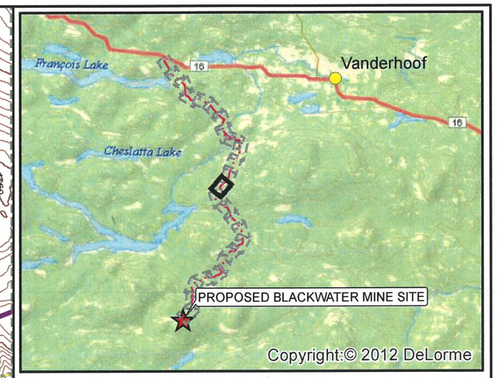

LEGEND:

GENERAL
- WAYPOINTS
- EXISTING TRAIL
- EXISTING ROAD / FSR
- MAJOR CONTOUR (25 m)
- MINOR CONTOUR (5m)
- RIVER/CREEK
- LAKE
- STUDY AREA
- TERRAIN UNIT
- MAPSHEET EXTENT (SEE INSET)

TERRAIN FEATURES
- CLIFF
- CONVEX BREAK OF SLOPE
- FLUVIAL/COLLUVIAL FAN
- ORGANIC SOILS
- TALLUS SLOPE

TERRAIN HAZARDS
- RECENT SLIDE
- RELICT SLIDE
- RECENT DEBRIS FLOW
- RELICT DEBRIS FLOW
- ROCK FALL PATH
- SHEET EROSION

PROPOSED FACILITIES
- POTENTIAL AIRSTRIP LOCATION
- TRANSMISSION LINE
- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE
- WATER SUPPLY PIPELINE AND ROAD

NOTES:

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SCALE 200 100 0 200 400 600 800 Meters

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Knight Piésold CONSULTING

NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION LINE TERRAIN HAZARDS MAP
Sheet 13 of 25

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — J. E. HALEY #33730 — SEPT 05, 2013

DRG. NO.	DESCRIPTION
REFERENCE DRAWINGS	

REV	DATE	DESIGN	DRAWN	CHK'D	APP'D
REVISIONS					

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
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REVISIONS						

P/A NO.	DRAWING NO.	REVISION
VA101-457/6	G0082	0

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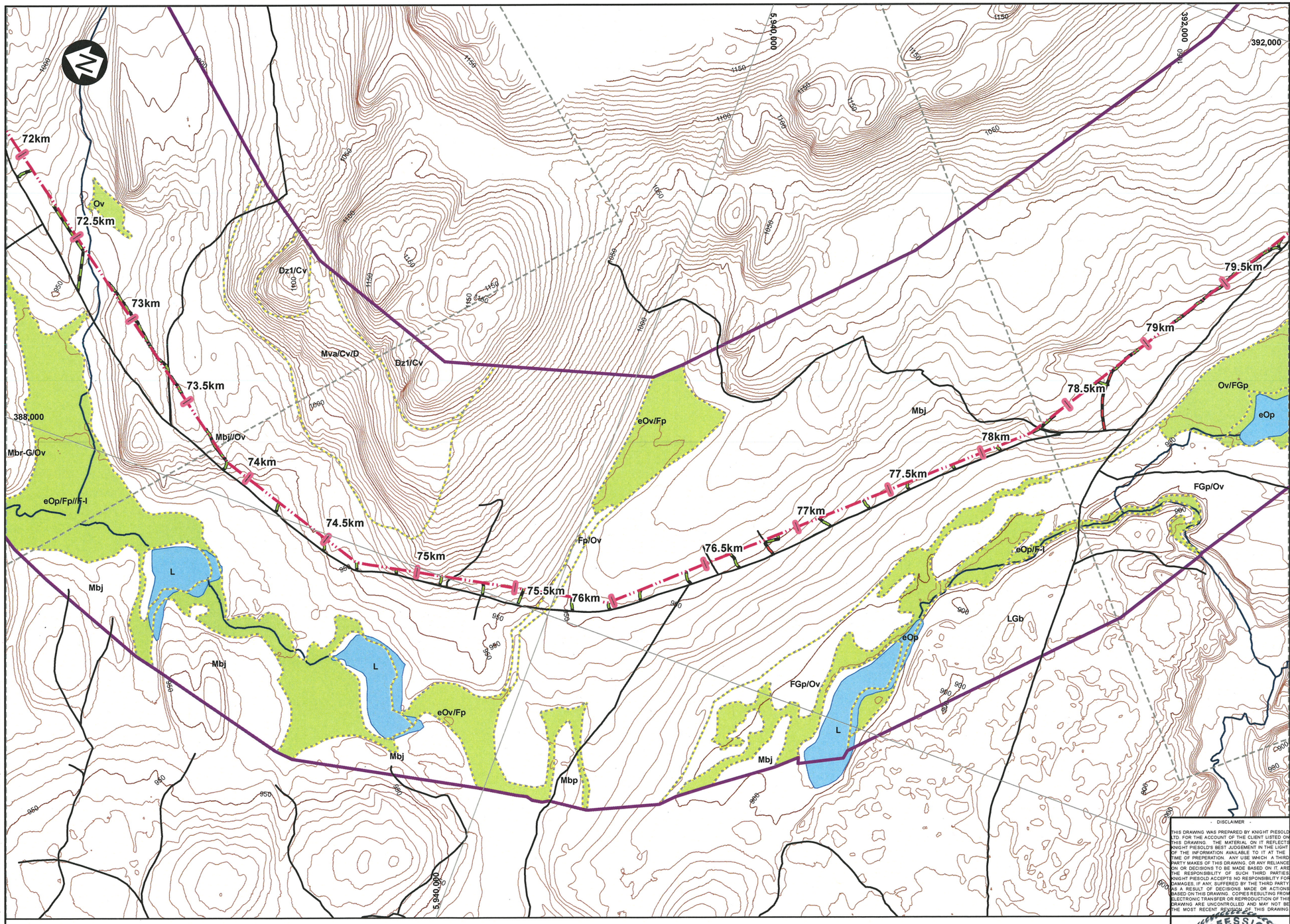

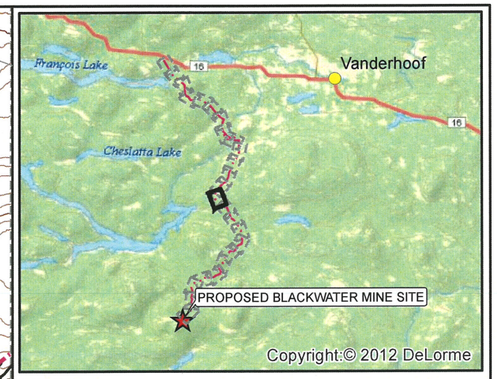

LEGEND:

GENERAL
- WAYPOINTS
- EXISTING TRAIL
- EXISTING ROAD / FSR
- MAJOR CONTOUR (25 m)
- MINOR CONTOUR (5m)
- RIVER/CREEK
- LAKE
- STUDY AREA
- TERRAIN UNIT
- MAPSHEET EXTENT (SEE INSET)

PROPOSED FACILITIES
- POTENTIAL AIRSTRIP LOCATION
- TRANSMISSION LINE
- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE
- WATER SUPPLY PIPELINE AND ROAD

TERRAIN FEATURES
- CLIFF
- CONVEX BREAK OF SLOPE
- FLUVIAL/COLLUVIAL FAN
- ORGANIC SOILS
- TALLUS SLOPE

TERRAIN HAZARDS
- RECENT SLIDE
- RELICT SLIDE
- RECENT DEBRIS FLOW
- RELICT DEBRIS FLOW
- ROCK FALL PATH
- SHEET EROSION

NOTES:

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SCALE 200 100 0 200 400 600 800 Meters

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PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
J. E. HALEY
33730

Knight Piésold
CONSULTING

NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION LINE
TERRAIN HAZARDS MAP
Sheet 14 of 25

DRG. NO.	DESCRIPTION
REFERENCE DRAWINGS	

REV	DATE	DESIGN	DRAWN	CHK'D	APP'D
REVISIONS					

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	30AUG'13	ISSUED WITH REPORT	BH	KK/JPN		BB
REVISIONS						

P/A NO.	DRAWING NO.	REVISION
VA101-457/6	G0083	0

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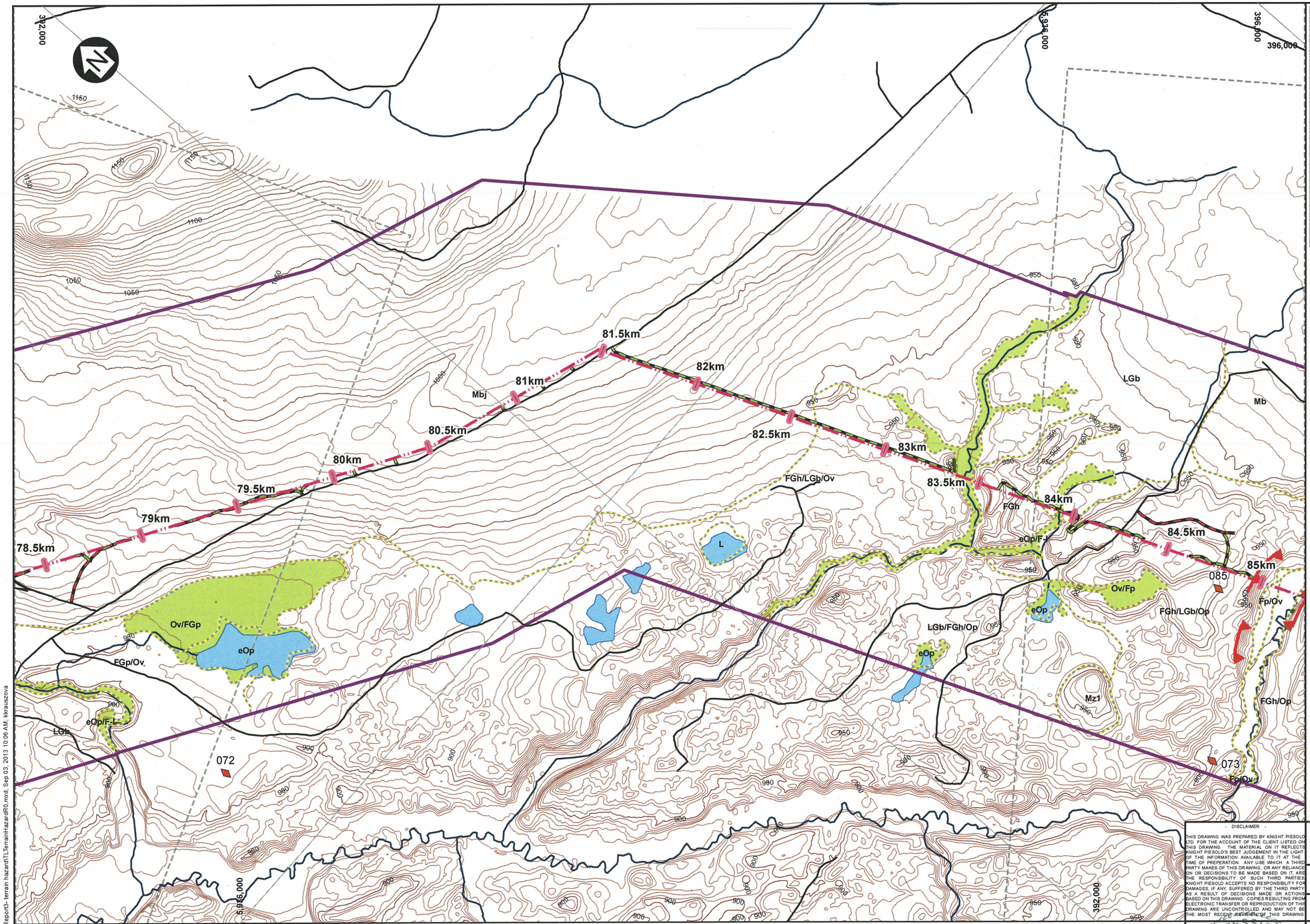

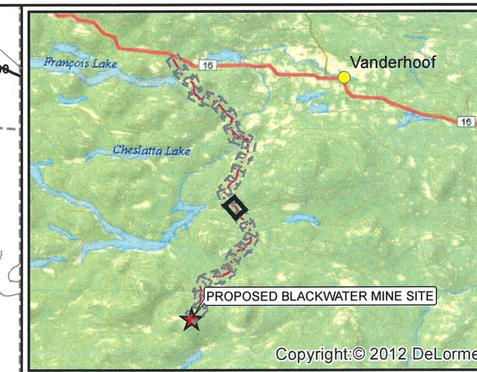

LEGEND:

GENERAL
- WAYPOINTS
- EXISTING TRAIL
- EXISTING ROAD / FSR
- MAJOR CONTOUR (25 m)
- MINOR CONTOUR (5m)
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- LAKE
- STUDY AREA
- TERRAIN UNIT
- MAPSHEET EXTENT (SEE INSET)

TERRAIN FEATURES
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- CONVEX BREAK OF SLOPE
- FLUVIAL/COLLUVIAL FAN
- ORGANIC SOILS
- TALLUS SLOPE

TERRAIN HAZARDS
- RECENT SLIDE
- RELICT SLIDE
- RECENT DEBRIS FLOW
- RELICT DEBRIS FLOW
- ROCK FALL PATH
- SHEET EROSION

PROPOSED FACILITIES
- POTENTIAL AIRSTRIP LOCATION
- TRANSMISSION LINE
- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE
- WATER SUPPLY PIPELINE AND ROAD

NOTES:

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SCALE 200 100 0 200 400 600 800 Meters

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PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — J. E. HALEY # 33730 — SEP 1 2013

Knight Piésold CONSULTING

NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION LINE TERRAIN HAZARDS MAP

Sheet 15 of 25

P/A NO.	DRAWING NO.	REVISION
VA101-457/6	G0084	0

DRG. NO.	DESCRIPTION
REFERENCE DRAWINGS	

REV	DATE		DESIGN	DRAWN	CHK'D	APP'D
REVISIONS						

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
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REVISIONS						

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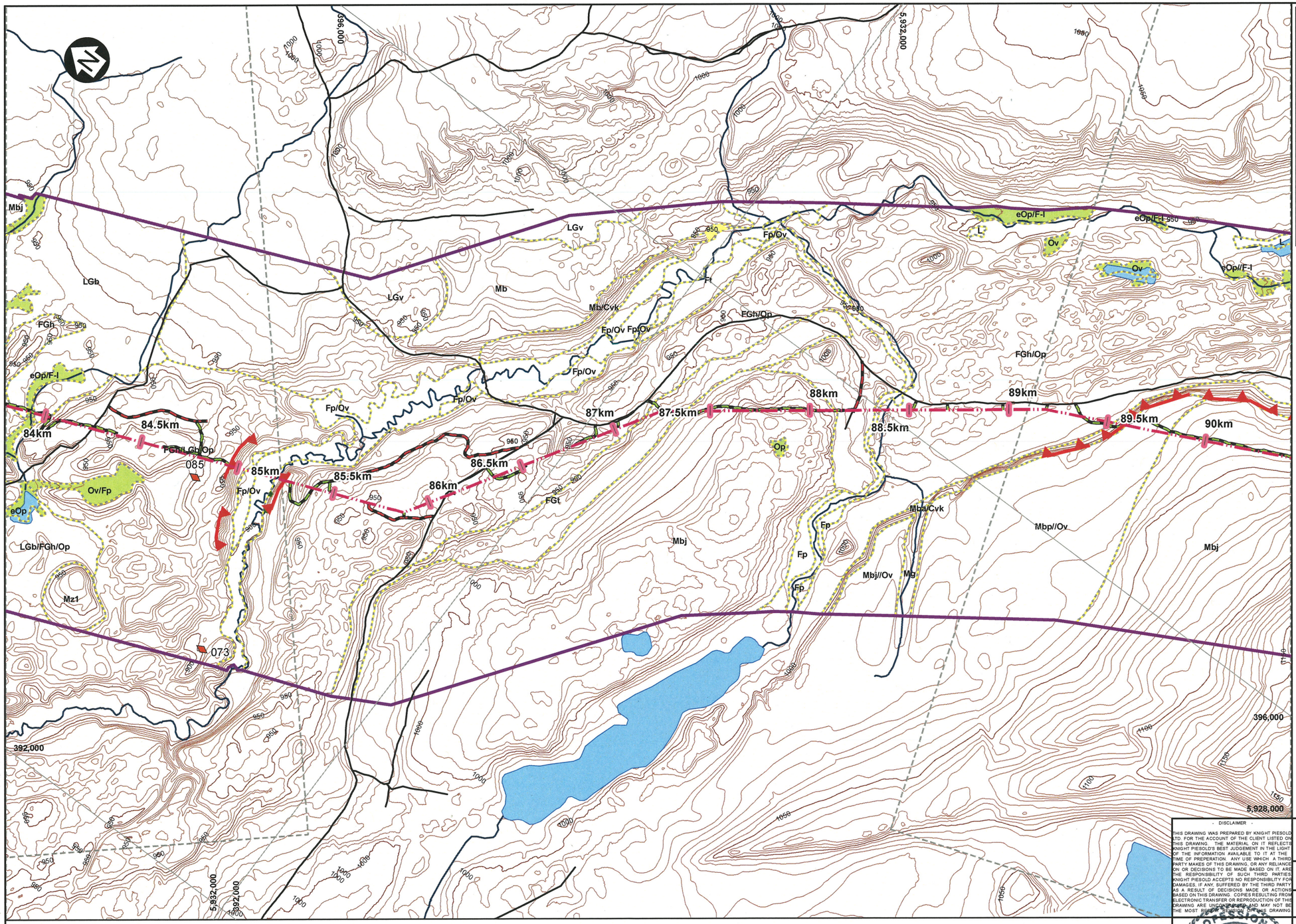

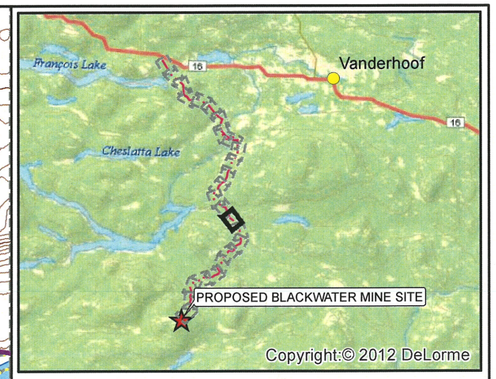

LEGEND:

GENERAL
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- EXISTING TRAIL
- EXISTING ROAD / FSR
- MAJOR CONTOUR (25 m)
- MINOR CONTOUR (5m)
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- TERRAIN UNIT
- MAPSHEET EXTENT (SEE INSET)

TERRAIN FEATURES
- CLIFF
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- FLUVIAL/COLLUVIAL FAN
- ORGANIC SOILS
- TALLUS SLOPE

TERRAIN HAZARDS
- RECENT SLIDE
- RELICT SLIDE
- RECENT DEBRIS FLOW
- RELICT DEBRIS FLOW
- ROCK FALL PATH
- SHEET EROSION

PROPOSED FACILITIES
- POTENTIAL AIRSTRIP LOCATION
- TRANSMISSION LINE
- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE
- WATER SUPPLY PIPELINE AND ROAD

NOTES:

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PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — J. E. HALEY # 33730

Knight Piésold CONSULTING

NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION LINE TERRAIN HAZARDS MAP

Sheet 16 of 25

DRG. NO.	DESCRIPTION
REFERENCE DRAWINGS	

REV	DATE		DESIGN	DRAWN	CHK'D	APP'D
REVISIONS						

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
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REVISIONS						

P/A NO.	DRAWING NO.	REVISION
VA101-457/6	G0085	0

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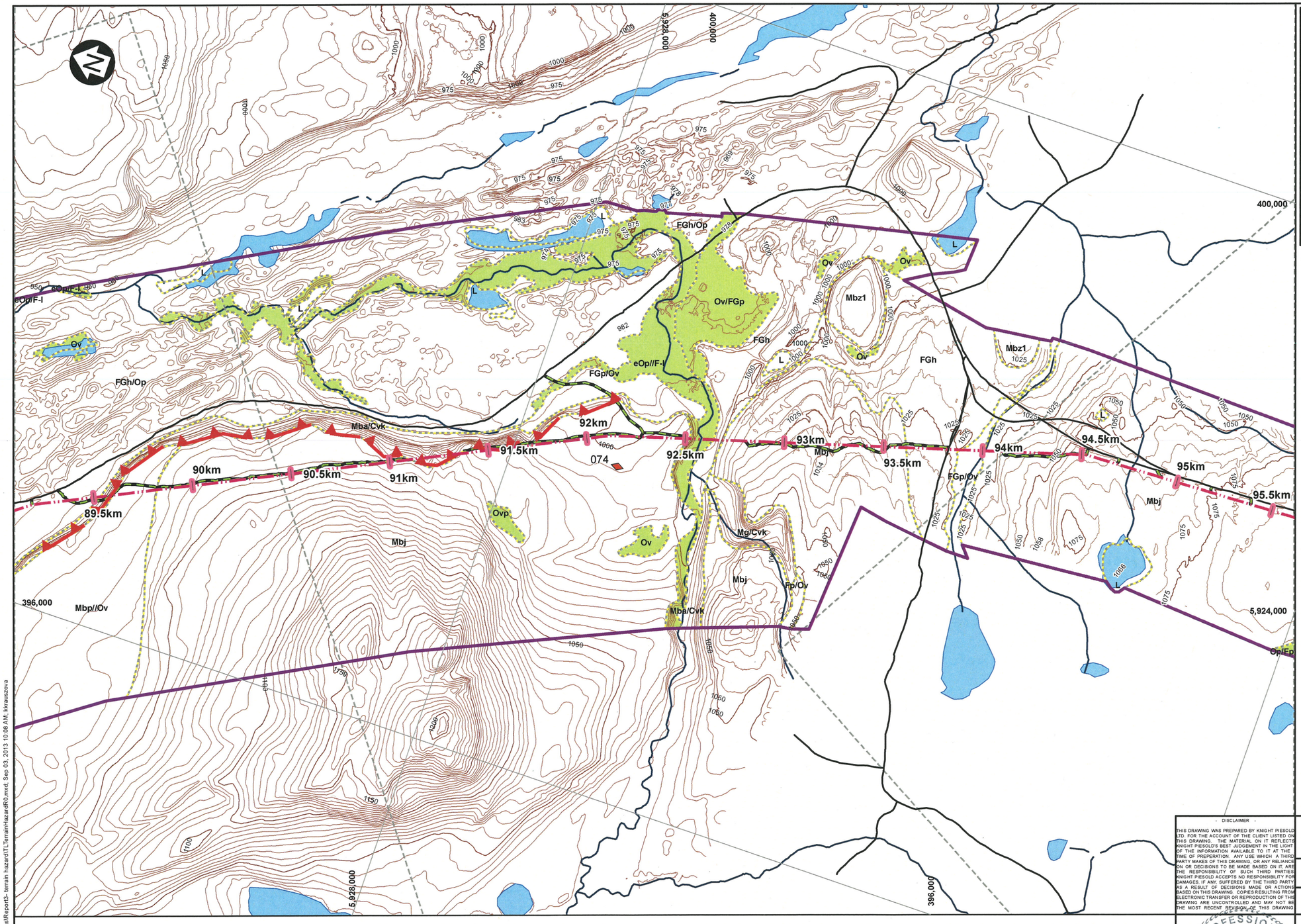

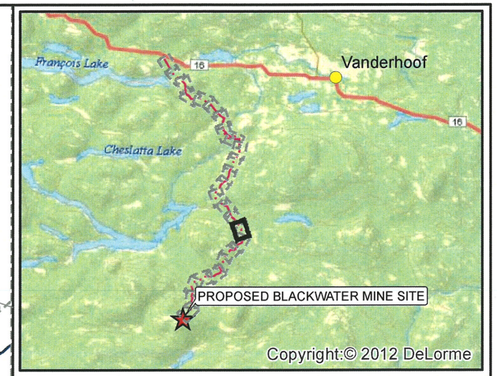

LEGEND:

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- EXISTING ROAD / FSR
- MAJOR CONTOUR (25 m)
- MINOR CONTOUR (5m)
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- TERRAIN UNIT
- MAPSHEET EXTENT (SEE INSET)

PROPOSED FACILITIES
- POTENTIAL AIRSTRIP LOCATION
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- ACCESS ROAD UPGRADE
- WATER SUPPLY PIPELINE AND ROAD

TERRAIN FEATURES
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- FLUVIAL/COLLUVIAL FAN
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TERRAIN HAZARDS
- RECENT SLIDE
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NOTES:

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SCALE 200 100 0 200 400 600 800 Meters

- DISCLAIMER -

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PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — J. E. HALEY # 33730 — SEPTEMBER 9, 2013

Knight Piésold CONSULTING

NEW GOLD INC.

BLACKWATER GOLD PROJECT

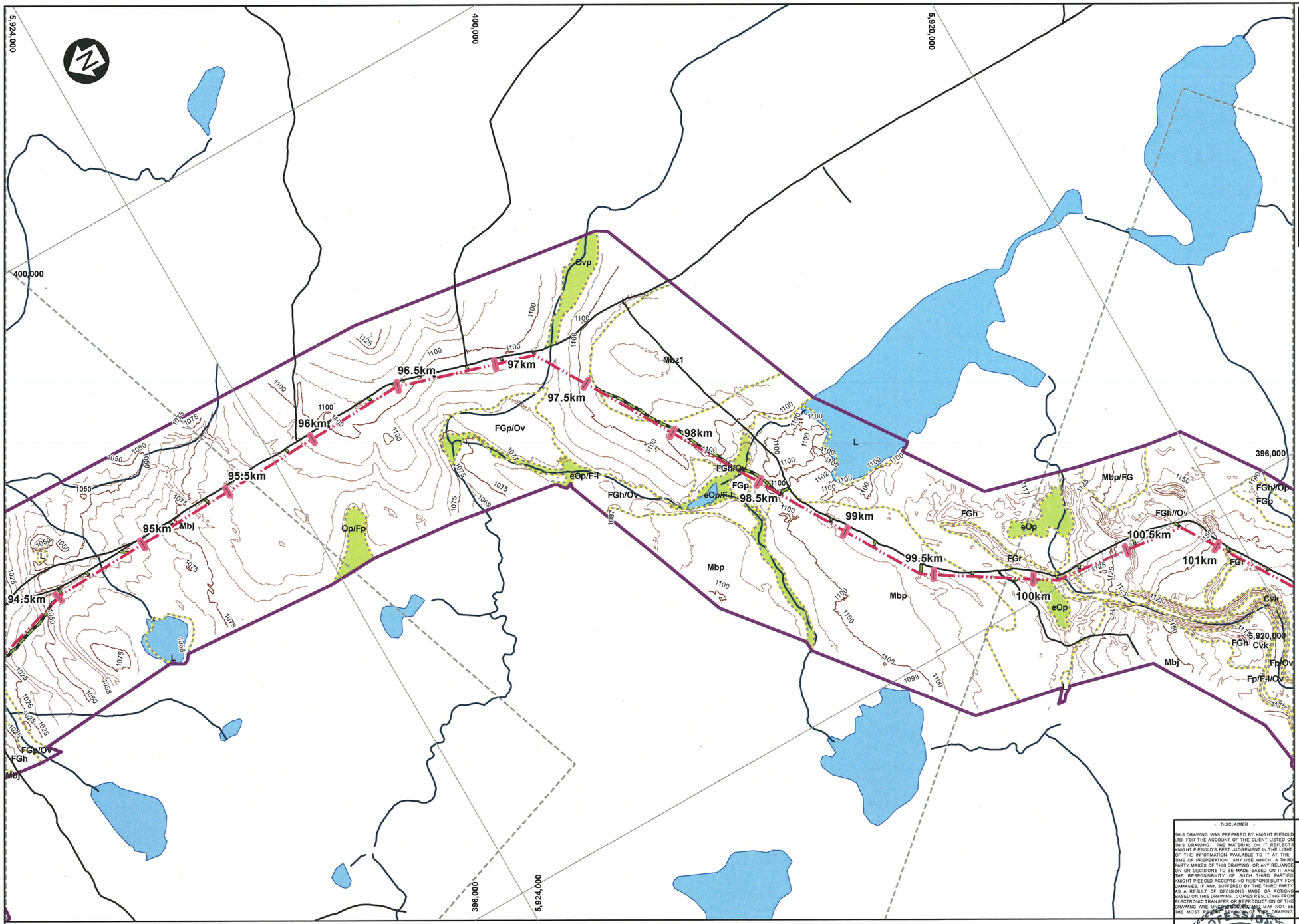
TRANSMISSION LINE TERRAIN HAZARDS MAP Sheet 17 of 25

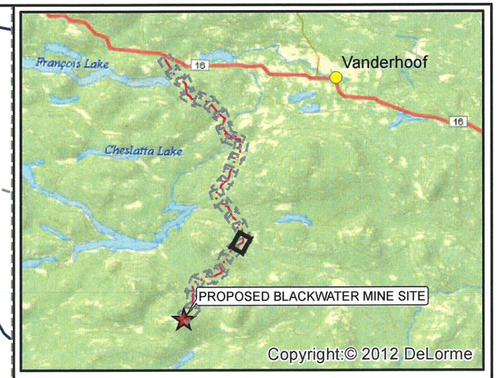
P/A NO.	DRAWING NO.	REVISION
VA101-457/6	G0086	0

DRG. NO.	DESCRIPTION	REV	DATE	DESIGN	DRAWN	CHK'D	APP'D
REFERENCE DRAWINGS							

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
REVISIONS						
0	30AUG'13	ISSUED WITH REPORT	BH	KK/JPN		

SAVED: M:\1\01\00457\06\A\GIS\Figs\Report3- terrain hazard\1\TerrainHazardR0.mxd, Sep 03, 2013 10:08 AM, kkrauszova





LEGEND:

GENERAL
- WAYPOINTS
- EXISTING TRAIL
- EXISTING ROAD / FSR
- MAJOR CONTOUR (25 m)
- MINOR CONTOUR (5m)
- RIVER/CREEK
- LAKE
- STUDY AREA
- TERRAIN UNIT
- MAPSHEET EXTENT (SEE INSET)

TERRAIN FEATURES
- CLIFF
- CONVEX BREAK OF SLOPE
- FLUVIAL/COLLUVIAL FAN
- ORGANIC SOILS
- TALLUS SLOPE

TERRAIN HAZARDS
- RECENT SLIDE
- RELICT SLIDE
- RECENT DEBRIS FLOW
- RELICT DEBRIS FLOW
- ROCK FALL PATH
- SHEET EROSION

PROPOSED FACILITIES
- POTENTIAL AIRSTRIP LOCATION
- TRANSMISSION LINE
- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE
- WATER SUPPLY PIPELINE AND ROAD

NOTES:

1. BASE MAP: LIDAR BASED CONTOURS FROM EAGLE MAPPING. SATELITE DERIVED CONTOURS FROM PHOTOSAT.
2. COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N.
3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:20,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.
4. REFER TO DRAWING G0050 FOR TERRAIN UNIT LEGEND.
5. TERRAIN MAPPING UNDERTAKEN TO TERRAIN SURVEY INTENSITY LEVEL E.
6. TRANSMISSION LINE ALIGNMENT DATED JULY 2013. TRANSMISSION LINE ACCESS ROAD FROM ALLNORTH 22JUL'13.
7. 'RECENT' LANDSLIDES ARE THOSE OBSERVED IN THE AIR PHOTO RECORD OR IN SITE RECONNAISSANCE AS BEING DEVOID OF VEGETATION, BEING ONLY PARTLY RE-VEGETATED OR BEING RE-VEGETATED WITH PIONEER SPECIES E.G. ALDER.
8. 'RELICT' LANDSLIDES PRE-DATE THE AIR PHOTO RECORD.

SCALE 200 100 0 200 400 600 800 Meters

- DISCLAIMER -

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PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — J. E. HALEY # 33730 — SEPT 2013

Knight Piésold CONSULTING

NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION LINE TERRAIN HAZARDS MAP
Sheet 18 of 25

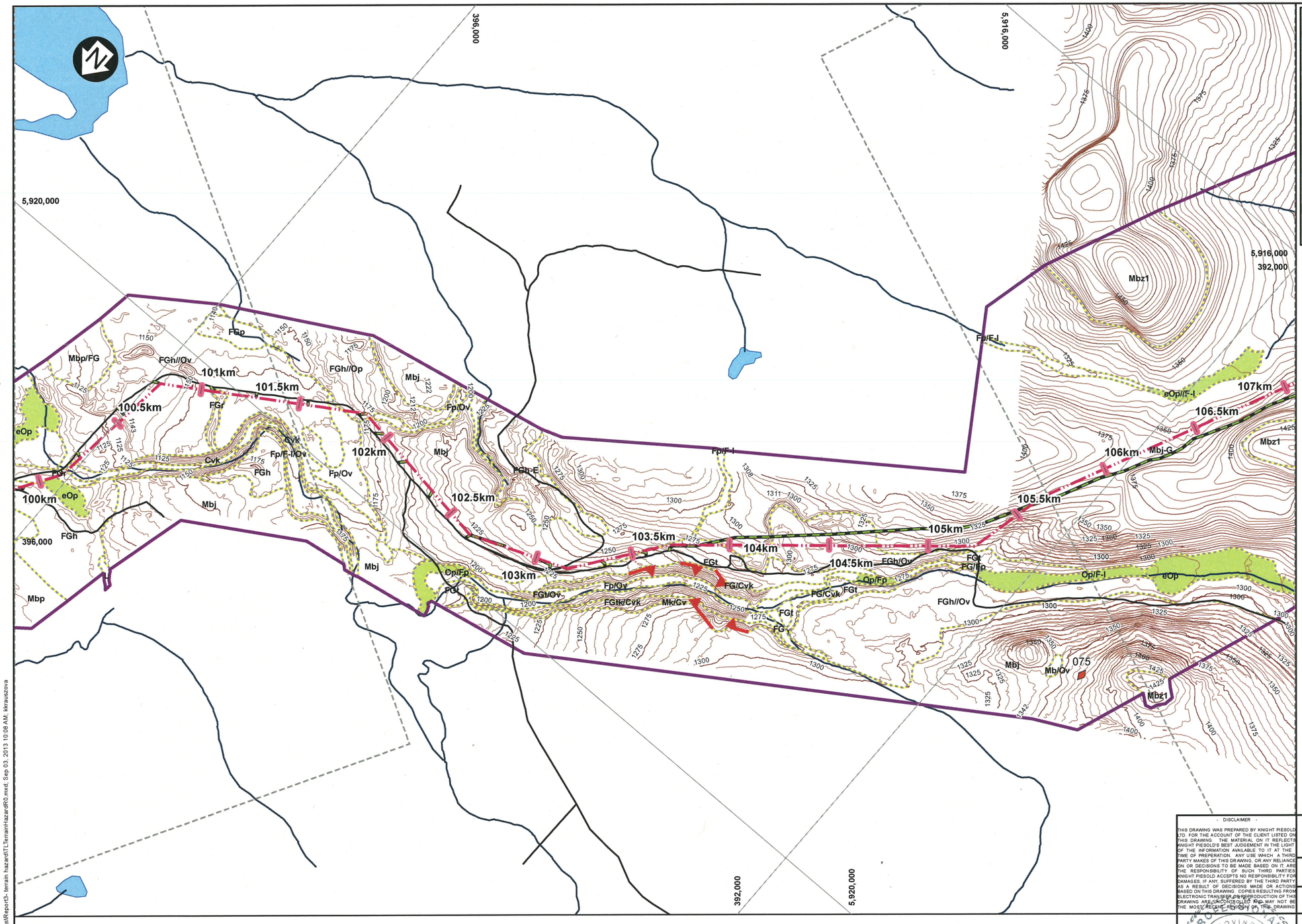
P/A NO.	DRAWING NO.	REVISION
VA101-457/6	G0087	0

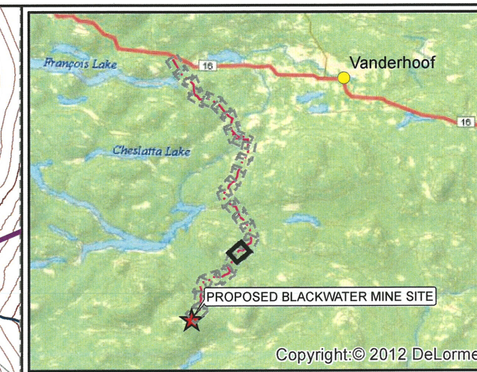
DRG. NO.	DESCRIPTION
REFERENCE DRAWINGS	

REV	DATE	DESIGN	DRAWN	CHK'D	APP'D
REVISIONS					

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	30AUG'13	ISSUED WITH REPORT	BH	KK/JPN		BB
REVISIONS						

SAVED: M:\1\01\00457\06\A\GIS\Figs\Report3- terrain hazard\TLTerrainHazardR0.mxd, Sep 03, 2013 10:08 AM, kkrauszova





LEGEND:

GENERAL
- WAYPOINTS
- EXISTING TRAIL
- EXISTING ROAD / FSR
- MAJOR CONTOUR (25 m)
- MINOR CONTOUR (5m)
- RIVER/CREEK
- LAKE
- STUDY AREA
- TERRAIN UNIT
- MAPSHEET EXTENT (SEE INSET)

TERRAIN FEATURES
- CLIFF
- CONVEX BREAK OF SLOPE
- FLUVIAL/COLLUVIAL FAN
- ORGANIC SOILS
- TALLUS SLOPE

TERRAIN HAZARDS
- RECENT SLIDE
- RELICT SLIDE
- RECENT DEBRIS FLOW
- RELICT DEBRIS FLOW
- ROCK FALL PATH
- SHEET EROSION

PROPOSED FACILITIES
- POTENTIAL AIRSTRIP LOCATION
- TRANSMISSION LINE
- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE
- WATER SUPPLY PIPELINE AND ROAD

NOTES:

1. BASE MAP: LIDAR BASED CONTOURS FROM EAGLE MAPPING. SATELITE DERIVED CONTOURS FROM PHOTOSAT.
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8. 'RELICT' LANDSLIDES PRE-DATE THE AIR PHOTO RECORD.

SCALE 200 100 0 200 400 600 800 Meters

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PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — J. E. HALEY — # 33730 — SEPT 09, 2013

Knight Piésold CONSULTING

NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION LINE TERRAIN HAZARDS MAP
Sheet 19 of 25

P/A NO.	DRAWING NO.	REVISION
VA101-457/6	G0088	0

DRG. NO.	DESCRIPTION
REFERENCE DRAWINGS	

REV	DATE		DESIGN	DRAWN	CHK'D	APP'D
REVISIONS						

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	30AUG'13	ISSUED WITH REPORT	BH	KK/JPN	JH	BB
REVISIONS						

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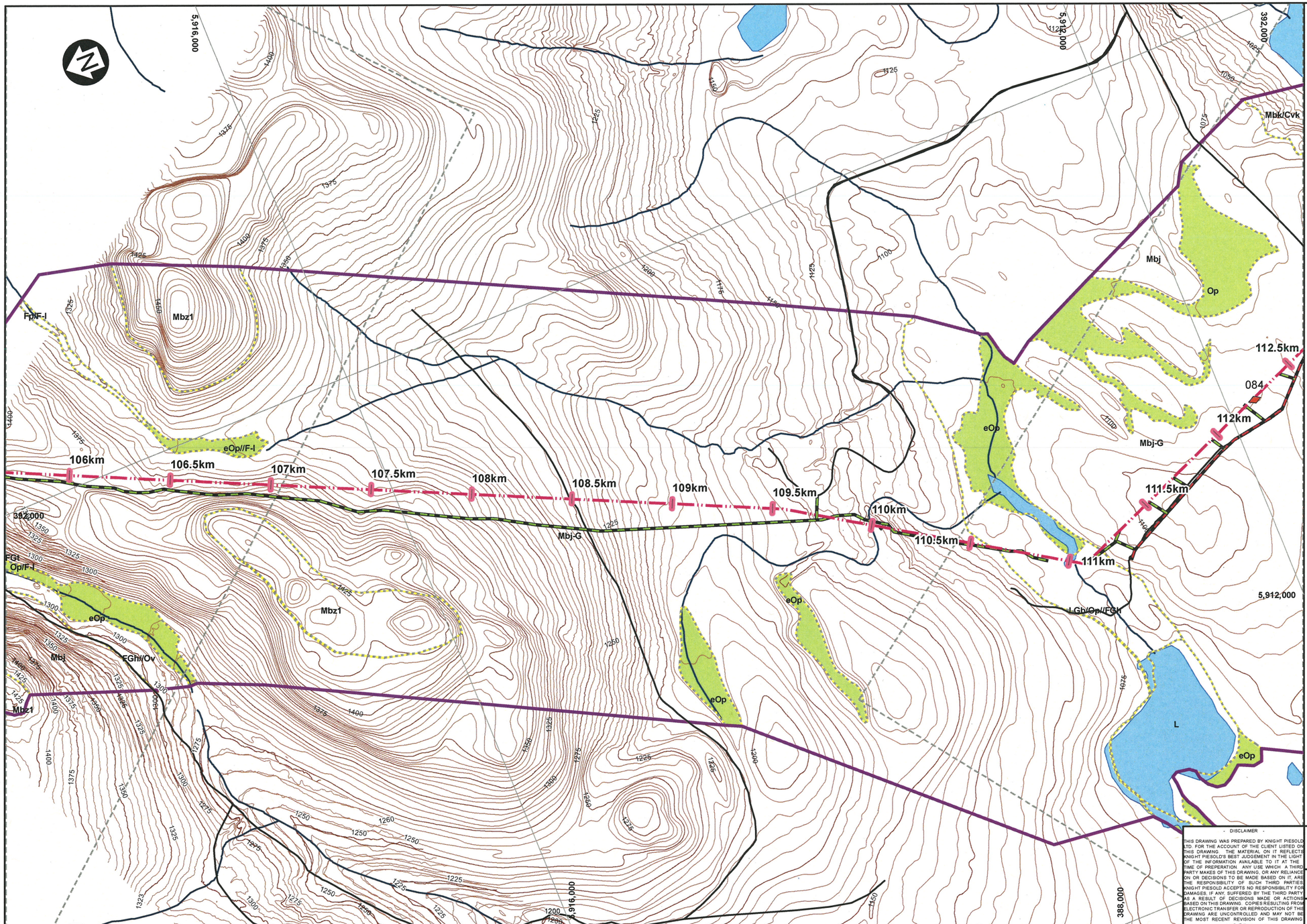

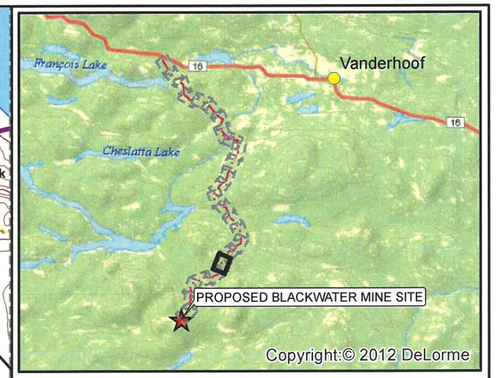

LEGEND:

GENERAL
- WAYPOINTS
- EXISTING TRAIL
- EXISTING ROAD / FSR
- MAJOR CONTOUR (25 m)
- MINOR CONTOUR (5m)
- RIVER/CREEK
- LAKE
- STUDY AREA
- TERRAIN UNIT
- MAPSHEET EXTENT (SEE INSET)

TERRAIN FEATURES
- CLIFF
- CONVEX BREAK OF SLOPE
- FLUVIAL/COLLUVIAL FAN
- ORGANIC SOILS
- TALLUS SLOPE

TERRAIN HAZARDS
- RECENT SLIDE
- RELICT SLIDE
- RECENT DEBRIS FLOW
- RELICT DEBRIS FLOW
- ROCK FALL PATH
- SHEET EROSION

PROPOSED FACILITIES
- POTENTIAL AIRSTRIP LOCATION
- TRANSMISSION LINE
- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE
- WATER SUPPLY PIPELINE AND ROAD

NOTES:

1. BASE MAP: LIDAR BASED CONTOURS FROM EAGLE MAPPING. SATELITE DERIVED CONTOURS FROM PHOTOSAT.

2. COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N.

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4. REFER TO DRAWING G0050 FOR TERRAIN UNIT LEGEND.

5. TERRAIN MAPPING UNDERTAKEN TO TERRAIN SURVEY INTENSITY LEVEL E.

6. TRANSMISSION LINE ALIGNMENT DATED JULY 2013. TRANSMISSION LINE ACCESS ROAD FROM ALLNORTH 22JUL'13.

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8. 'RELICT' LANDSLIDES PRE-DATE THE AIR PHOTO RECORD.

SCALE 200 100 0 200 400 600 800 Meters

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PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — J. E. HALEY # 33730 — SEP 30 2013

Knight Piésold CONSULTING

NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION LINE TERRAIN HAZARDS MAP Sheet 20 of 25

P/A NO.	DRAWING NO.	REVISION
VA101-457/6	G0089	0

DRG. NO.	DESCRIPTION
REFERENCE DRAWINGS	

REV	DATE		DESIGN	DRAWN	CHK'D	APP'D
REVISIONS						

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
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REVISIONS						

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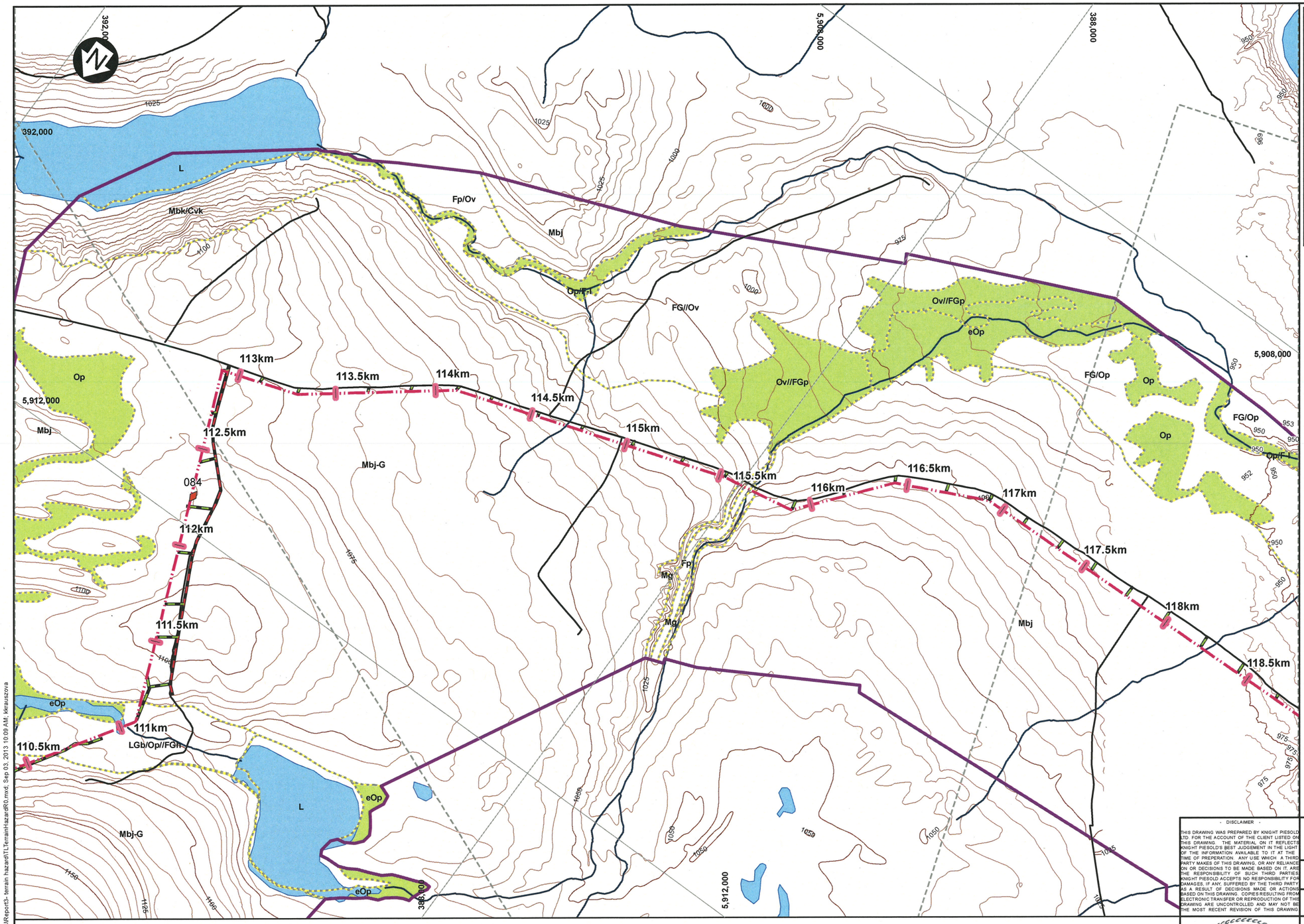

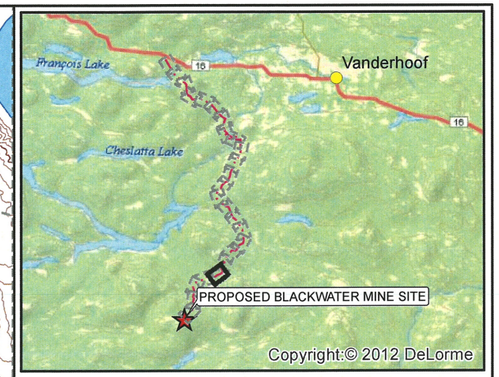

LEGEND:

GENERAL
- WAYPOINTS
- EXISTING TRAIL
- EXISTING ROAD / FSR
- MAJOR CONTOUR (25 m)
- MINOR CONTOUR (5m)
- RIVER/CREEK
- LAKE
- STUDY AREA
- TERRAIN UNIT
- MAPSHEET EXTENT (SEE INSET)

TERRAIN FEATURES
- CLIFF
- CONVEX BREAK OF SLOPE
- FLUVIAL/COLLUVIAL FAN
- ORGANIC SOILS
- TALLUS SLOPE

TERRAIN HAZARDS
- RECENT SLIDE
- RELICT SLIDE
- RECENT DEBRIS FLOW
- RELICT DEBRIS FLOW
- ROCK FALL PATH
- SHEET EROSION

PROPOSED FACILITIES
- POTENTIAL AIRSTRIP LOCATION
- TRANSMISSION LINE
- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE
- WATER SUPPLY PIPELINE AND ROAD

NOTES:

1. BASE MAP: LIDAR BASED CONTOURS FROM EAGLE MAPPING. SATELITE DERIVED CONTOURS FROM PHOTOSAT.
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SCALE 200 100 0 200 400 600 800 Meters

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Knight Piésold
CONSULTING

NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION LINE TERRAIN HAZARDS MAP
Sheet 21 of 25

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — J. E. HALEY #33730

DRG. NO.	DESCRIPTION
REFERENCE DRAWINGS	

REV	DATE		DESIGN	DRAWN	CHK'D	APP'D
REVISIONS						

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	30AUG'13	ISSUED WITH REPORT	BH	KK/JPN		BB
REVISIONS						

P/A NO.	DRAWING NO.	REVISION
VA101-457/6	G0090	0

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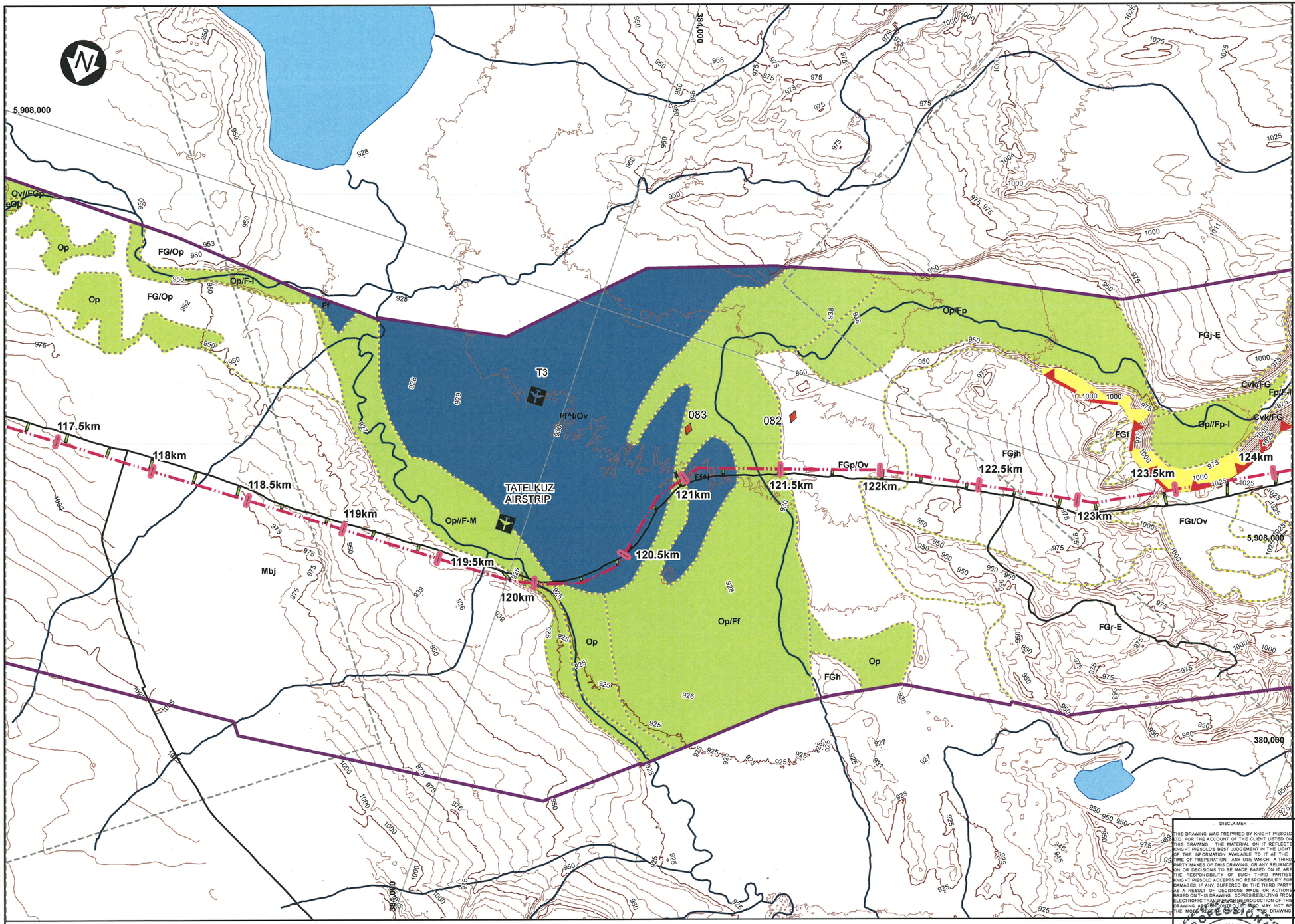

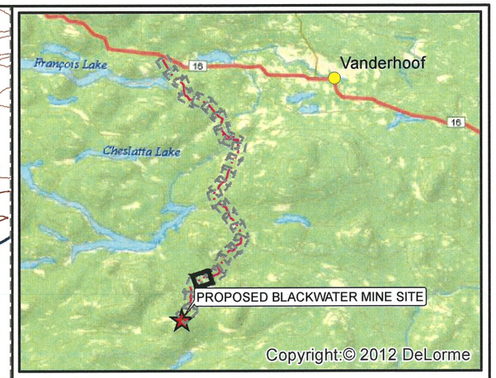

LEGEND:

GENERAL
- WAYPOINTS
- EXISTING TRAIL
- EXISTING ROAD / FSR
- MAJOR CONTOUR (25 m)
- MINOR CONTOUR (5m)
- RIVER/CREEK
- LAKE
- STUDY AREA
- TERRAIN UNIT
- MAPSHEET EXTENT (SEE INSET)

PROPOSED FACILITIES
- POTENTIAL AIRSTRIP LOCATION
- TRANSMISSION LINE
- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE
- WATER SUPPLY PIPELINE AND ROAD

TERRAIN FEATURES
- CLIFF
- CONVEX BREAK OF SLOPE
- FLUVIAL/COLLUVIAL FAN
- ORGANIC SOILS
- TALLUS SLOPE

TERRAIN HAZARDS
- RECENT SLIDE
- RELICT SLIDE
- RECENT DEBRIS FLOW
- RELICT DEBRIS FLOW
- ROCK FALL PATH
- SHEET EROSION

NOTES:

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PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — J. E. HALEY # 33730 — SEPT 27, 2013

Knight Piésold CONSULTING

NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION LINE TERRAIN HAZARDS MAP Sheet 22 of 25

P/A NO.	DRAWING NO.	REVISION
VA101-457/6	G0091	0

DRG. NO.	DESCRIPTION
REFERENCE DRAWINGS	

REV	DATE		DESIGN	DRAWN	CHK'D	APP'D
REVISIONS						

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	30AUG'13	ISSUED WITH REPORT	BH	KK/JPN	JH	BB
REVISIONS						

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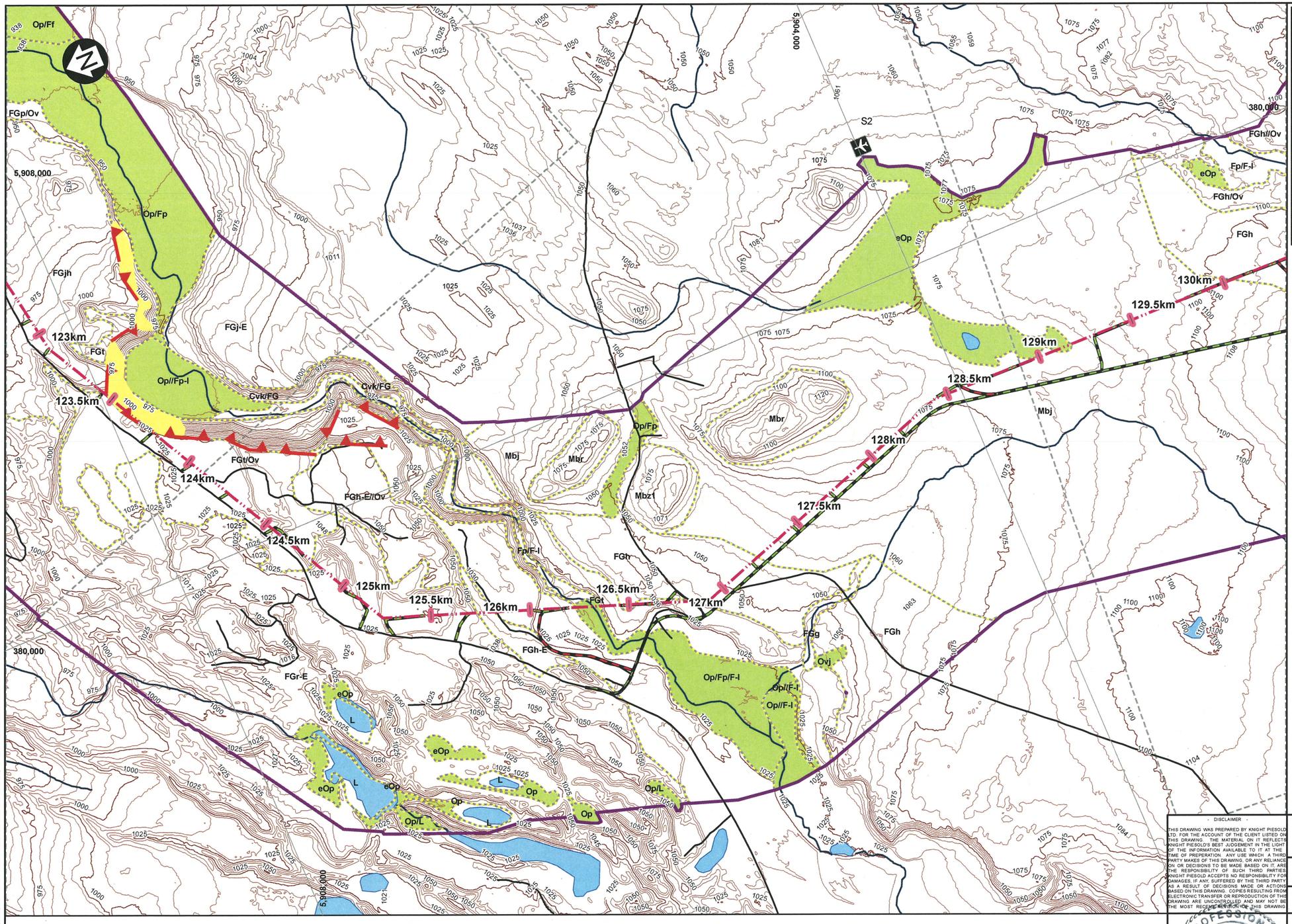

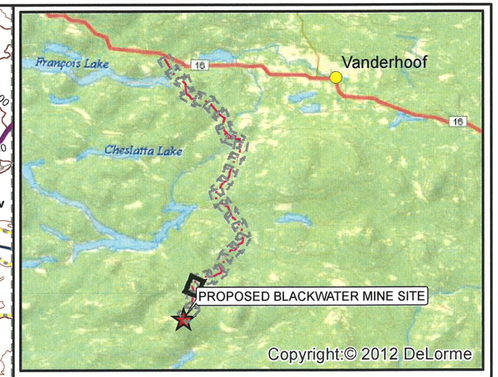

LEGEND:

GENERAL
- WAYPOINTS
- EXISTING TRAIL
- EXISTING ROAD / FSR
- MAJOR CONTOUR (25 m)
- MINOR CONTOUR (5m)
- RIVER/CREEK
- LAKE
- STUDY AREA
- TERRAIN UNIT
- MAPSHEET EXTENT (SEE INSET)

PROPOSED FACILITIES
- POTENTIAL AIRSTRIP LOCATION
- TRANSMISSION LINE
- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE
- WATER SUPPLY PIPELINE AND ROAD

TERRAIN FEATURES
- CLIFF
- CONVEX BREAK OF SLOPE
- FLUVIAL/COLLUVIAL FAN
- ORGANIC SOILS
- TALLUS SLOPE

TERRAIN HAZARDS
- RECENT SLIDE
- RELICT SLIDE
- RECENT DEBRIS FLOW
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- ROCK FALL PATH
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NOTES:

1. BASE MAP: LIDAR BASED CONTOURS FROM EAGLE MAPPING. SATELITE DERIVED CONTOURS FROM PHOTOSAT.
2. COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N.
3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:20,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.
4. REFER TO DRAWING G0050 FOR TERRAIN UNIT LEGEND.
5. TERRAIN MAPPING UNDERTAKEN TO TERRAIN SURVEY INTENSITY LEVEL E.
6. TRANSMISSION LINE ALIGNMENT DATED JULY 2013. TRANSMISSION LINE ACCESS ROAD FROM ALLNORTH 22JUL'13.
7. 'RECENT' LANDSLIDES ARE THOSE OBSERVED IN THE AIR PHOTO RECORD OR IN SITE RECONNAISSANCE AS BEING DEVOID OF VEGETATION, BEING ONLY PARTLY RE-VEGETATED OR BEING RE-VEGETATED WITH PIONEER SPECIES E.G. ALDER.
8. 'RELICT' LANDSLIDES PRE-DATE THE AIR PHOTO RECORD.

SCALE 200 100 0 200 400 600 800 Meters

- DISCLAIMER -

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PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — J. E. HALEY # 33730 — SEPTEMBER 30, 2013

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NEW GOLD INC.

BLACKWATER GOLD PROJECT

TRANSMISSION LINE TERRAIN HAZARDS MAP Sheet 23 of 25

P/A NO.	DRAWING NO.	REVISION
VA101-457/6	G0092	0

DRG. NO.	DESCRIPTION	REV	DATE	DESIGN	DRAWN	CHK'D	APP'D
REFERENCE DRAWINGS							

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
REVISIONS						
0	30AUG'13	ISSUED WITH REPORT	BH	KK/JPN	JJK	BB

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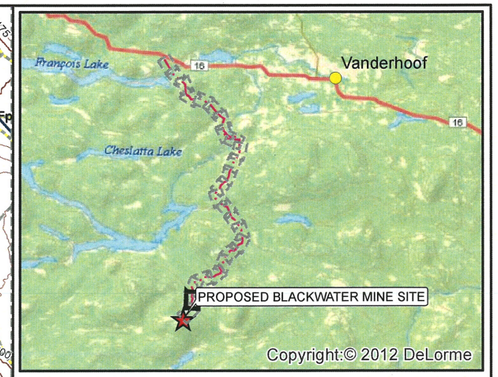

LEGEND:

GENERAL
- WAYPOINTS
- EXISTING TRAIL
- EXISTING ROAD / FSR
- MAJOR CONTOUR (25 m)
- MINOR CONTOUR (5m)
- RIVER/CREEK
- LAKE
- STUDY AREA
- TERRAIN UNIT
- MAPSHEET EXTENT (SEE INSET)

PROPOSED FACILITIES
- POTENTIAL AIRSTRIP LOCATION
- TRANSMISSION LINE
- ACCESS ROAD NEW
- ACCESS ROAD UPGRADE
- WATER SUPPLY PIPELINE AND ROAD

TERRAIN FEATURES
- CLIFF
- CONVEX BREAK OF SLOPE
- FLUVIAL/COLLUVIAL FAN
- ORGANIC SOILS
- TALLUS SLOPE

TERRAIN HAZARDS
- RECENT SLIDE
- RELICT SLIDE
- RECENT DEBRIS FLOW
- RELICT DEBRIS FLOW
- ROCK FALL PATH
- SHEET EROSION

NOTES:

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TRANSMISSION LINE TERRAIN HAZARDS MAP Sheet 24 of 25

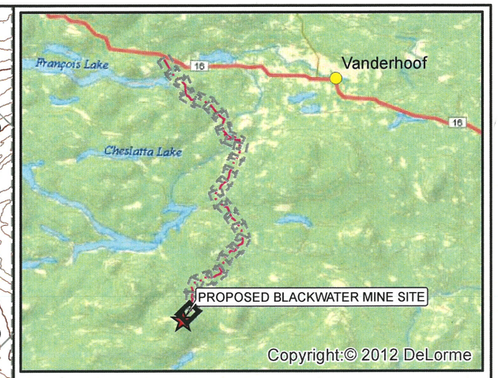
P/A NO.	DRAWING NO.	REVISION
VA101-457/6	G0093	0

DRG. NO.	DESCRIPTION
REFERENCE DRAWINGS	

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
REVISIONS						

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	30AUG'13	ISSUED WITH REPORT	BH	KK/JPN	JJK	BB
REVISIONS						

SAVED: M:\1101\100457\06\ArcGIS\FigsReport\- terrain hazard\TLTerainHazardR0.mxd: Sep 03, 2013 10:10 AM: kkrauszova



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- RECENT SLIDE
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BLACKWATER GOLD PROJECT

TRANSMISSION LINE TERRAIN HAZARDS MAP Sheet 25 of 25

P/A NO.	DRAWING NO.	REVISION
VA101-457/6	G0094	0

DRG. NO.	DESCRIPTION	REV	DATE	DESIGN	DRAWN	CHK'D	APP'D
REFERENCE DRAWINGS		REVISIONS					

REV	DATE	DESCRIPTION	DESIGN	DRAWN	CHK'D	APP'D
0	30AUG'13	ISSUED WITH REPORT	BH	KK/JPN	JH	RB
REVISIONS						

SAVED: M:\1\101\00457\06\A\GIS\FigsReport\3- terrain hazard\TLTerrainHazardR0.mxd: Sep 03, 2013 10:11 AM: kkrauszova