

DRAFT REPORT

**PHASE I
ENVIRONMENTAL SITE ASSESSMENT**

**ZOHT IR #5,
Lower Nicola Indian Band
Merritt, British Columbia**

Prepared for

Lower Nicola Indian Band
181 Nawishaskin Lane
Merritt, B.C. V1K 0A7

Submitted by

Columbia Environmental Consulting Ltd.
RR#2, Site 55, Compartment 10
Penticton, BC. V2A 6J7

Project No: 10-0374
April, 2011





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April 30, 2011

Lower Nicola Indian Band
181 Nawishaskin Lane
Merritt, B.C. V1K 0A7

Attention: John Keating and Sharon Parsons, LNIB Lands and Leasing Office

**Subject: Draft Phase I Environmental Site Assessment (ESA) of the Zoht IR #5,
Lower Nicola Indian Band, Merritt, BC.**

We trust that this draft report meets your present needs. One hard copy of the final report and a CD-ROM including the source files and an Adobe pdf version will be provided upon receipt of your review. Please do not hesitate to call if you have any questions or comments, or if you require anything further.

Yours truly,

Columbia Environmental Consulting Ltd.

Per: _____
Dwight Shanner, R.P.Bio
Project Manager

EXECUTIVE SUMMARY

Columbia Environmental Consulting Ltd. (Columbia) was contracted by the Lower Nicola Indian Band (LNIB) on behalf of Indian and Northern Affairs Canada (INAC) to conduct a Phase I Environmental Site Assessment (ESA) of the Zoht Indian Reserve #5, herein referred to as the “Site”.

The first step in site characterization is to conduct a Phase I ESA. During this phase, information is gathered about site layout and previous activities and/or operations that may have caused contamination at the Site.

The Phase I ESA consisted of the following:

- records review;
- interviews with regulatory officials and personnel knowledgeable about the Site;
- site reconnaissance; and
- information evaluation and preparation of the report provided herein.

The Phase I ESA was conducted as per the requirements of the CSA document *Z768-01 Phase I Environmental Site Assessment, April 2003*. The Phase 1 ESA focused on preliminary areas of interest identified through historical document review, and interviews. In general, all residential structures were excluded unless information was gathered to suggest contamination or external visual observations indicated potential contamination. Specific residential structures listed for inspection at the request of the First Nation or INAC require the permission from the First Nation and the Certificate of Possession holder.

Zoht IR#5 is square in shape and is 160 acres in size, located 17 km northeast of Merritt, BC. Coordinates for the Site are zone 10 669803E, 5566592N on NTS map sheet 092I02. The reserve consists of one cabin for temporary use with no services utilities and some selective logging. The reserve has a Right of Way for a buried oil pipeline. The Site is accessible by automobile via Mill Creek Road. The current land use is categorized as wild lands.

Interviewees included 7 elders, the lands department, and potentially residents from the LNIB familiar with the reserves. Interviews with LNIB members identified a concern regarding the oil pipeline that goes through the reserve for potential line breaks or leaks.

No on-site APECs were identified during this investigation. The Pipeline right of way is an off-site APEC. No further environmental assessment is recommended for the Site at this time.

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1.0 INTRODUCTION

Columbia Environmental Consulting Ltd. (Columbia) was contracted by the Lower Nicola Indian Band (LNIB) on behalf of Indian and Northern Affairs Canada (INAC) to conduct a Phase I Environmental Site Assessment (ESA) of the Zoht Indian Reserve #5, herein referred to as the “Site”.

The Site is located on Mill Creek Road approximately 7 km north of the township of Nicola B.C., on 1:50,000 NTS mapsheet 092102. The Site’s geographic position relative to surrounding features is shown on Figure 1 included in Appendix A.

The Phase I ESA follows procedures outlined in the Canadian Standards Association (CSA) document *Z768-01 Phase I Environmental Site Assessment, April 2003*. This report will be used in making decisions concerning whether further investigation is necessary. John Keating and Sharon Parsons (LNIB Lands and Leasing Office) provided written authorization for the project.

1.1 OBJECTIVE

The objective of this Phase I ESA is to identify and document any actual or potential human health or environmental risks associated with the Site and provide recommendations for further assessment and/or risk management. Such risks define “Areas of Potential Environmental Concern” (APECs), with their associated “Contaminants of Potential Concern” (COPC), and the person(s) or agencies that may be responsible for causing the contamination.

1.2 SITE BACKGROUND

The Zoht IR#5 is comprised of approximately 160 acres on one reserve. The reserve is square in shape and is located approximately 7 km north of Nicola B.C. This reserve is in an undeveloped state, with anthropogenic features limited to one cabin with no serviced utilities and a buried oil pipeline.

2.0 SCOPE OF WORK

The first step in site characterization is to conduct a Phase I ESA. During this phase, information is gathered about site layout and previous activities and/or operations which may have caused contamination at the Site.

The Phase I ESA consisted of the following:

- records review;
- interviews with regulatory officials and personnel knowledgeable about the Site;
- site reconnaissance; and
- information evaluation and preparation of the report provided herein.

The Phase I ESA was conducted as per the requirements of the CSA document *Z768-01 Phase I Environmental Site Assessment, April 2003*.

The Phase 1 ESA used historical document review and interviews with persons knowledgeable about the Site to determine preliminary areas of interest. A list of these areas is included in Section 5.1.1. The interior and exterior of community structures or improvements within the subject area were excluded for indications of contamination unless information was gathered to suggest contamination or external visual observations indicated potential contamination. In such instances, it was the responsibility of the First Nation to provide the Assessor with access to the identified area of interest. In general, all residential structures were excluded unless information was gathered to suggest contamination or external visual observations indicated potential contamination.

3.0 METHODOLOGY

3.1 RECORDS REVIEW

Records included a search for previous environmental reports, historical aerial photographs, city directories, fire insurance maps, federal and provincial agency review, Lower Nicola Indian Band records, and regional district records. The applicable search distance for the records review included properties immediately adjacent to the Site, and other properties (as identified by aerial photographs, etc) where the potential for environmental contamination to impact the Site was apparent (i.e. petroleum hydrocarbon storage in the immediate area). A reference of personal communications is included at the end of this report in Section 11.0.

3.2 INTERVIEWS

Interviews with persons knowledgeable about the Site were carried out to obtain or confirm information on the environmental characteristics of the property and historical use. Information provided by interviewees is detailed in Section 5, and included throughout the report. Dwight Shanner and Carmen Marshall from Columbia Environmental conducted the Interviews on September 14, 2010.

3.3 SITE VISIT

A site visit was not conducted at this reserve as it was not deemed warranted by the assessor given the undeveloped nature of the Site and the absence of environmental concerns identified during the records review and interviews.

4.0 HISTORICAL RECORDS REVIEW

4.1 RECORDS REVIEW

An outline of the history of land use on the subject property and adjacent properties was compiled through the review of the variety of information sources. These typically include historical records and a review of files retained by regulatory agencies, however; the following standard sources of information were not available:

- Fire insurance drawings;
- City/Business directories; and
- Historical Title search.

For the historical uses of the property, aerial photographs dating back to 1947, interviews, web searches, LNIB archives, and previous reports supplied by INAC were reviewed. The BC online Site Registry search results can be found in Appendix B. Correspondence can be found in Appendix C and examples of historical aerial photographs can be found in Appendix D. A list of Species at Risk potentially in the Site area can be found in Appendix E.

4.1.1 REVIEW OF AERIAL PHOTOGRAPHS

Aerial photographs dated 1947, 1960, 1966, and 1991 from the University of British Columbia's Geographic Information Centre (UBC GIC) were reviewed for information about land use at the subject property and adjacent lands. Copies of representative aerial photographs are included in Appendix D. Site details from the aerial photograph interpretation is briefly described below in the following table:

Table A. Air Photo Review Summary

Aerial photo Year	Description
1947	<i>Subject Property:</i> Clapperton Creek runs through the reserve from north east to south west. No development on reserve.
	<i>Adjacent Lands:</i> All adjacent lands are undeveloped.
1960	<i>Subject Property:</i> Cleared vegetation for an oil pipeline is visible through the south west section of the reserve. Less vegetation observed on the eastern portion of the site.
	<i>Adjacent Lands:</i> The oil pipeline runs south and west of the site.
1966	<i>Subject Property:</i> No visible changes noted.
	<i>Adjacent Lands:</i> An increase in logging roads and cut blocks are visible throughout the adjacent lands.
1991	<i>Subject Property:</i> Highway 5 is constructed west of the reserve. The eastern portion of the site appears to have an increase in vegetation.
	<i>Adjacent Lands:</i> Highway 5 and area of cleared vegetation (gravel pit) is constructed west of the reserve. An additional pipeline west of Highway 5 is also visible. The western edge of the reserve boundary is noted adjacent to the Ministry of Transportation “Kirby Pit” (details in section 5.7). There is no legal survey to determine if the gravel pit is off reserve and therefore uncertain.

4.1.2 CITY DIRECTORIES

The Merritt Public Library was contacted in regards to any business directories. City/Business directories were not available for the reserve.

4.1.3 MERRITT FIRE DEPARTMENT

The Merritt Fire Department and local museum archives were contacted regarding any historical information. No records were identified for Zoht IR#5.

4.1.4 HISTORICAL TITLE SEARCH

A historical title search was not considered relevant for this project, as the subject property has remained in the authority of the federal government since its inception as a reserve.

4.2 AGENCY REVIEW

Columbia contacted federal, provincial, regional, and municipal agencies to identify actual or potential environmental contamination issues on or near the subject site. The following sections of the report present the findings of the regulatory review conducted for the subject property.

4.2.1 LOWER NICOLA INDIAN BAND

LNIB maintains a file with the original surveys of the lot boundaries and utilities serviced to each lot. The one residence onsite has no utilities or services.

4.2.2 FEDERAL GOVERNMENT

The INAC Environmental Management System database, IEMS (formerly ESSIMS), had no records of environmental concerns within the Site.

4.2.3 MINISTRY OF TOURISM

The Ministry of Tourism's archeology branch was contacted regarding any archeological records for the Site. No sites were found within or surrounding the Site's borders. A map of the locations provided by the Ministry of Tourism is included in Appendix C.

4.2.4 BC MINISTRY OF ENVIRONMENT – SITE REGISTRY

The contaminated sites provisions under the *Environmental Management Act* (Formerly the *Waste Management Act*) and *Contaminated Sites Regulations*, effective April 1997, require the Province to provide public information about site investigations and cleanups. The Site Registry has been established to meet this requirement. The Site Registry documents milestones in the site assessment process and provides public access to this information. It contains information regarding which sites have been investigated and/or remediated since MoE began recording this activity. The Site Registry is not a registry of only contaminated sites; it also includes sites for which a Site Profile has been submitted.

The online version of the Site Registry database searches for records of sites within a 5 kilometer radius of the subject property. The Site Registry has been collecting data only since its inception in April 1997, and not all sites of known or potential contamination within the search area may have been captured. Therefore, the searches cannot be considered a definitive method of identifying all sites of potential contamination within the search area. The Site Registry search results are presented in Appendix B and are summarized below:

Subject Property:

There were no records in the Site Registry for the subject property.

Adjacent Properties

There were no records in the Site Registry for the adjacent properties when a 5 km radius search was completed using the center of the reserve as the search center.

4.2.5 CITY OF MERRITT

Sean O’Flaherty of the City of Merritt was contacted requesting any information regarding environmental or contamination issues or building permits for the lands of LNIB. The City has no records regarding the subject property and adjacent lands, and do not maintain any such records for facilities operating on Reserve Lands.

4.2.6 MERRITT MUSEUM & ARCHIVES

The Museum of Merritt was contacted via phone. The Museum did a search for lands within LNIB, with no records found for the Site.

4.2.7 THE THOMPSON NICOLA REGIONAL DISTRICT

Peter Hughs of the environmental department of the Thompson Nicola Regional District (TNRD) was contacted requesting any information regarding environmental issues on or near LNIB. Mr. Hughs stated that the district has no records regarding the subject property and do not maintain any such records for facilities operating on reserve lands.

4.2.8 TERASEN (FORMERLY BC GAS)

Toni Melliere of Terasen Gas was contacted regarding service connections to the subject property including any current or historical issues that are likely to have resulted in environmental impacts on the Reserve. Terasen has no record of environmental issues that may have occurred on the subject property or adjacent properties. Terasen does not keep records pertaining to the initiation and decommission of services as the companies standard policy.

4.2.9 FORTIS BC (FORMERLY BC HYDRO)

Louise Ouelett of Transmission Distribution and Environment at Fortis BC was contacted regarding the presence of service connections to the subject property including any current or historical issues that are likely to have resulted in environmental impacts on the reserve. Fortis has no record of environmental issues or transformer locations (possibly containing PCBs) that may have occurred on the subject property or adjacent properties.

4.3 PREVIOUS ENVIRONMENTAL INVESTIGATIONS

No previous environmental investigation reports were identified for the Site.

4.4 INTERVIEWS

Interviewees included: Marvin Shuter, Willie Basil, Francis Shuter, Delia Shuter, Ira Sterling, Maggie Shuter Harold Joe. Interviews with LNIB members identified the following concerns:

Table B. Summary of Information Obtained from Interviewees

Issue of Concern	Location	Description
Zoht #5,14	On Mill Creek Road north of Zoht #4	Contact Francis or Lawrence Shuter (Cabin Owner). Only Lawrence lives on the reserve. Oil pipeline may break or leak. No concerns identified for the property.

5.0 SITE DESCRIPTION

5.1 GENERAL PROPERTY DESCRIPTION

The Lower Nicola Indian Band is comprised of ten reserves that total 17,500 acres. Nine reserves are located within the Merritt area and the most northern parcel (Hihium IR #6) is located approximately 65 km northwest of the city of Kamloops B.C.

Zoht IR#5 is square in shape and is 160 acres in size, located 17 km northeast of Merritt, BC. Coordinates for the Site are zone 10 669803E, 5566592N on NTS map sheet 092I02. The reserve consists of one cabin for temporary use with no services utilities and some selective logging. The reserve has a Right of Way for a buried oil pipeline. The liquid petroleum pipeline was installed in 1950-1953. The Site is accessible by automobile via Mill Creek Road.

The current land use is categorized as wild lands with the exception of potential residential land use at the cabin area.

5.2 TOPOGRAPHY

LNIB Zoht IR#5 is located in the relatively flat upland portion of Pleasant Valley northwest of the Nicola Provincial Forest. Clapperton and Zoht Creeks flow southwest through the reserve. The Site is located approximately 1000 meters above sea level with relief ranging from 1036 m (on the north and southern borders) to 975 m within the valley bottom at the center of the reserve. The topography slopes gently down to the southwest, following the Clapperton River Valley.

5.3 GEOLOGY

The local geology within the Zoht IR#5 is comprised of a post accretionary terrain within an intermontane belt. The reserve is located on an unnamed formation of granodioritic and dioritic intrusive rock. The granodioritic formations consist of granodiorite, containing more plagioclase feldspar and abundant biotite mica and hornblende minerals. The granodiorite in this area is also found with tonalite and occasional potassium feldspar megacrysts. The diorite found within the area consists of a late Triassic biotite hornblende metadiorite typical of the Nicola Horst located to the South. The igneous rocks dominating the Site are covered with a surficial “Till Blanket” or Till Veneer” of varying thickness primarily made up of unconsolidated compositions of silts, sands, gravels, and cobbles (Ministry of Energy, Mines, & Resources, 2011). Soils within the region are grey luvisols typical of grassland-forest transition zones.

5.4 SURFACE DRAINAGE

Surface drainage at the Site is anticipated to be primarily infiltration into the underlying soils. The Site slopes downwards towards the southwest corner near Clapperton Creek that runs southwest through the Site ultimately draining into Nicola Lake.

5.5 CLIMATE DATA

The tables below provide climate values and monthly precipitation values as collected at the Merritt Metrological Station, based on data from 1971 to 2000¹. The average annual precipitation is 322.2 mm.

Table C. Precipitation Summary for 1971-2000

Meteorological Station Elevation:	609.0m
Daily Mean Temperature:	7.4°C
Annual Rainfall:	238.9mm
Annual Precipitation:	322.2mm
Highest Monthly Average Precipitation:	Dec, 39.6mm
Lowest Monthly Average Precipitation:	April, 14.5mm

Table D. Precipitation Monthly Values for 1971-2000

Month	Average Precipitation (mm)	Month	Average Precipitation (mm)	Month	Average Precipitation (mm)
January	37.2	May	26.8	September	23.6

¹ www.climate.weatheroffice.ec.gc.ca

Month	Average Precipitation (mm)	Month	Average Precipitation (mm)	Month	Average Precipitation (mm)
February	23.6	June	34.1	October	23.5
March	16.6	July	25.8	November	34.7
April	14.5	August	22.1	December	36.9

5.6 UTILITIES

No utilities such as septic services, underground water or overhead electrical power are onsite. In the southern portion of the Site an oil pipeline right of way that runs through the Site, although no services are connected to the pipeline.

5.7 ADJACENT PROPERTIES

To the north of the Site is the LNIB Zoht IR#14 which remains undeveloped. To the east is Mill Creek road and additional road networks. To the west is Highway 5 located 0.5 km from the Site (double-laned paved road) and the Kirby Gravel pit situated adjacent to the Site between Highway 5 and the reserve. The gravel pit contents were utilized to build the highway and is currently not active. There is no electricity service to the gravel pit. Only gravel remains onsite, without equipment or ASTs.

The oil pipeline right of way through the reserve has been in operation since 1953 for the Trans Mountain Oil Pipe Line Company (Kinder-Morgan). The oil pipeline varies from 24-36' diameter and transports heavy crude, light crude, distillates, and gasoline. The pipeline moves 48,000 m³/day². The pipeline at the right of way section is 61 cm in diameter and has no scheduled maintenance in the future. Kinder Morgan was contacted to request environmental records for the oil pipeline right of way adjacent to the reserve. Kinder Morgan responded that the company has no spills or environmental records for the area adjacent to the Zoht 5 reserve.

5.8 VALUED ECOSYSTEM COMPONENTS (VECs)

The Site is located on the floodplain of Clapperton Creek, in the Bunchgrass and Interior Douglas Fir (IDF) biogeoclimatic zones north of Nicola Lake. Representative trees in this ecosystem include Douglas fir, trembling Aspen, lodgepole pine, ponderosa pine, hybrid spruce, Rocky Mountain juniper. Shrubs for the area include species such as snowberry, common juniper, Saskatoon, Kinnikinnik, red osier dogwood, black gooseberry, prickly rose and false box. Herbs common to the area include bluebunch wheatgrass, pinegrass, wheatflower, bunchberry, yarrow, sedges (spp) and spike rushes to name a few (Ministry of Forests 1991).

² Referenced from Kinder Morgan: <http://www.kne.com/business/canada/transmountain.cfm>

A list of species from the BC Conservation Data Center (CDC) search, indicating species found within the area has been included in Appendix E. Characteristic wildlife in the region (CDC) include, but is not limited to, moose, mule deer, black bear, cougar, elk, grizzly, eagle, big horn sheep, badger, coyote, wolf, marmot, raven, spruce grouse, and various waterfowl. Known fish species within Clapperton Creek include Chinook Salmon, Coho Salmon, Rainbow Trout, Steelhead (Freshwater Fisheries Society of BC).

A number of potential species on Site are considered Species at Risk by COSEWIC³ and receive special protection for critical habitats. Provincially, red listed (being considered for designation as threatened or endangered) or blue listed (considered vulnerable) species, by the BC Ministry of the Environment, means that they require special management attention. The semi-pristine natural lands within the area of the Site are favorable Species at Risk Act (SARA) listed species habitat. A biological inventory would be required to further investigate the potential presence of Species at Risk.

5.9 WATER WELLS

The BC MoE water well database⁴ was searched in a 5.0 km radius from the Site. One (1) off site well was identified through the search; usage unknown and belonging to Dan Hall located on Mill Creek. The well is located 2.5km southwest and down gradient of the cabin near the center of the Site. Well details are summarized in the table below:

Table E. Water Well Search Results

Well Tag Number	Well Depth (m)	Drill Date	Direction to Site	Distance from Site	Owner	Major Geology Encountered (m)
73	115.8	Unknown	On Mill Creek Road SW of the Cabin	2.5km SW from Cabin	Dan Hall	0-7.6 Sand & Gravel 7.6-51.8 Delimite w/ Copper Ore 51.8-57.9 Grey Shale & Quartz 57.9-115.8 Copper Ore w/ Delimite

5.10 HISTORICAL LAND USE

Zoht IR#5 historically has had a pipeline installed in the southwest corner and a residential cabin built onsite. Hunting, fishing and gathering were, and are, traditional uses of the Reserve land. Adjacent lands are extensively utilized for forestry harvesting and transportation on Highway 5.

³ COSEWIC means the Committee on the Status of Endangered Wildlife in Canada

⁴ Ministry of Environment. 2010. Water Resource Atlas Web Mapping Application http://www.env.gov.bc.ca/wsd/data_searches/wrbc/index.html

5.11 REGULATORY HISTORY

No previous notations from regulatory agencies were identified for the subject property.

6.0 FINDINGS

6.1 FUEL / CHEMICAL HANDLING AND STORAGE

No evidence of current or former above ground or underground storage tanks (ASTs/USTs) were identified during this assessment.

6.2 SOLID WASTE MATERIALS

There is no municipal method of solid waste disposal for the site. As reported in the interview, the cabin owner removes his own solid waste.

6.3 SPILLS AND STAIN AREAS

No surface stains or debris were identified by the cabin owner or those interviewed regarding the site condition.

6.4 WASTEWATER DISCHARGE

No concerns with regard to wastewater discharge were identified.

6.5 AIR DISCHARGES

No concerns with regard to air quality discharge were identified.

6.6 POLYCHLORINATED BIPHENYLS (PCB)

There were no records of PCB containing transformers or capacitors on-site. No environmental concerns regarding PCBs were determined during this investigation.

6.7 ASBESTOS

The use of friable asbestos as a building material was banned in the U.S. in the mid 1970s. The manufacture of building materials containing asbestos was generally phased out in North America by the mid 1980s. One cabin is located onsite with the contents of asbestos unknown. During the interview and discussion with the resident, no concerns pertaining to asbestos were presented.

6.8 HEAVY METALS

There was no identified sources of localized metal debris or storage on site or burning of metal and other wastes that may result in impacts to surface soils at the Site.

6.9 OZONE DEPLETING SUBSTANCES (ODS)

No environmental concerns relative to ODS were identified.

6.10 NOISE

No environmental issues concerning noise were identified during this investigation.

7.0 AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

No on-site APECs were identified during this investigation. The oil pipeline right of way is an off-site APEC.

8.0 RECOMMENDATIONS

No further environmental assessment is recommended for the Site at this time.

9.0 REPORT USE AND LIMITATIONS

This Phase I ESA report has been prepared for the exclusive use of INAC and the LNIB, and it is intended to provide INAC with an understanding of the potential for environmental contamination by hazardous materials at the property assessed. The scope of services performed in execution of this investigation may not be appropriate to satisfy the needs of other users, and any use or re-use of this document or the findings, conclusions, or recommendations presented herein is at the sole risk of said user. The findings and recommendations in this report are based upon data and information obtained during Site visits by Columbia and INAC personnel to the Site identified herein and the condition of the Site on the dates of such visits, supplemented by information and data obtained by Columbia described herein.

The findings and recommendations contained in this report are based on the expertise and experience of Columbia in conducting similar site assessments. In assessing the Site, Columbia has also relied upon representations and information furnished by individuals noted in the report with respect to existing operations and property conditions and the historical uses of the properties to the extent that the information obtained has not been contradicted by data obtained from other sources. Accordingly, Columbia accepts no responsibility for any deficiency, misstatements or inaccuracy contained in this report as a result of misstatements, omissions, misrepresentations or fraudulent information provided by others.

It should be recognized that this study was not intended to be a definitive investigation of contamination at the site. Given that the limited scope of services for this assessment as stated in the Terms of Reference for the Phase I ESA, it is possible that currently unrecognized contamination may exist at the site and, if present, that the levels of contamination may vary across the site. Opinions and recommendations presented herein apply to site conditions existing at the time of our assessment and those reasonably foreseeable. Should environmentally significant changes to the site or additional information become available, Columbia should be provided the opportunity to review this information/data and amend our opinions, as appropriate. Fungi, mycotoxins, bioaerosols and other indoor air quality issues were not included in the scope of work.

Columbia's objective is to perform our work with care, exercising the customary thoroughness and competence of earth science, environmental, and engineering consulting professionals, in accordance with the standard for professional services at the time and location those services are rendered. It is important to recognize that even the most comprehensive scope of services may fail to detect environmental liability on a particular site. Therefore, Columbia cannot act as insurers and cannot "certify" or "underwrite" that a site is free of environmental contamination, and no expressed or implied representation or warranty is included or intended in our reports, except that our work was performed, within the limits prescribed by our client, with the customary thoroughness and competence of our profession.

10.0 PROFESSIONAL STATEMENT

The information compiled for this document has been prepared in accordance with the requirements of the INAC Scope of Work.

Columbia certifies that the persons signing this document have demonstrable experience in the assessment of commercial and industrial sites. The work has been performed by Columbia staff under the guidance and supervision of the signatories below.

Report prepared by:

COLUMBIA ENVIRONMENTAL CONSULTING LTD.

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11.0 REFERENCES

- Aerial Photographs dated 1947, 1960, 1966, and 1991 from the University of British Columbia's Geographic Information Center (UBC GIC)
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- NTS 1:50000 Map Sheet 092I02.

Valentine, K.W.G. & A.B. Dawson. 2008. The Soils Landscapes of BC. Ministry of Sustainable Resource Management, Victoria, B.C. <http://srmwww.gov.bc.ca/soils/landscape/part3.html> Accessed August 2010.

WRBC. 2008. BC Water Resource Atlas. http://www.env.gov.bc.ca/wsd/data_searches/wrbc/index.html. Accessed January 2011.

Personal Communications

Bob Alexanruck. Division Manager. Ministry of Transportation. Merritt B.C. Regarding Diesel spill and gravel pit on Highway 5.

Jason Turner. Kinder Morgan. Requesting Details on the pipe line that runs through the site. (250) 371-4017

Louise Ouelett. Environmental and Transmission and Distribution Department. Fortis BC. Vancouver B.C. Regarding records and locations of transformers and service dates.

Peter Hughs. Director of Environmental Services. Thompson Nicola Regional District. Regarding Environmental Records.

Sean O'Flaherty. Development Services Officer. City of Merritt. Merritt B.C. Regarding building permits on reserve or environmental issues.

Toni Melliere. Environmental Division. Terasen Gas. Vancouver B.C. Requesting Environmental records and service dates for LNIB.

Len Zenner. Pipeline Maintenance, Kinder Morgan Trans Mountain Pipe Line System. Kamloops, BC. – (250) 371-4040

APPENDIX A

FIGURES



LEGEND

RESERVE FOOTPRINT

NOTES:

Airphoto taken from Google Earth, December 2010

No.	Revision/Issue	Date



Figure 1
Site Location

LNIB / INAC
Phase I
Environmental Site Assessment
Zoht IR #5

Project	10-0374	Sheet
Date	January, 2011	
Drawn By:	SZ	Checked By:
		DS/DD



LEGEND

— RESERVE BOUNDARY

NOTES:

All elevations in metres (m)

Locations of site features were taken from:

1. Aerial photographs
2. GPS data points, and
3. Visual observations / adjustments of GPS waypoints and site features

No.	Revision/Issue	Date



**Figure 2
Site Plan**

LNIB / INAC
Phase I
Environmental Site Assessment
Zoht IR #5

Project	10-0374	Sheet
Date	January, 2011	
Drawn By:	SZ	Checked By:
		DS/DD

APPENDIX B

BC ONLINE SITE REGISTRY RESULTS

Zoh't's

Site Registry

Nil Search

For: [PA95213] [COLUMBIA ENVIRONMENTAL CONSULTING LTD]

Jan 04, 2011

As Of: JAN 02, 2011

Check for Prints

04:40:35 PM

Main Menu

Return

Print

Help?

Folio:

Area Nil Search

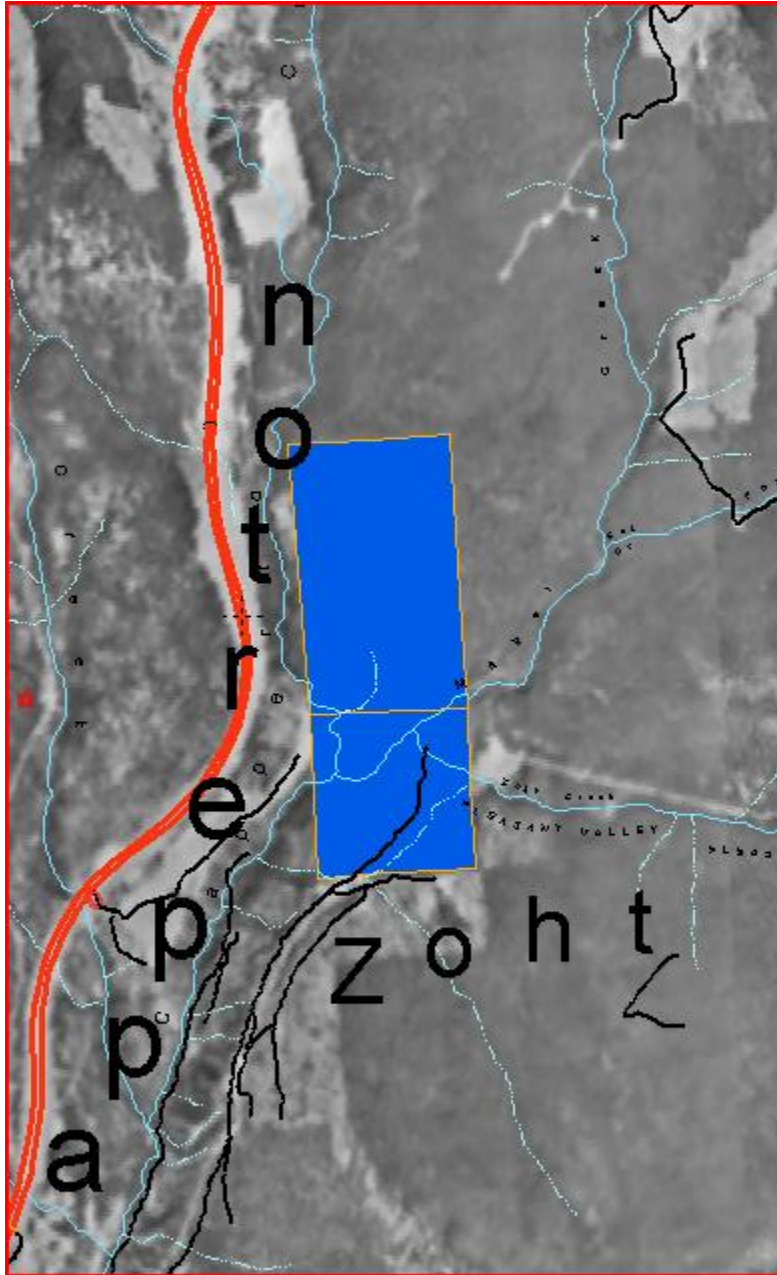
As of JAN 02, 2011, no records from Site Registry fall within 5.0 kilometers of coordinates
Latitude 50 degrees, 12 minutes, 10.7 seconds, and
Longitude 120 degrees, 38 minutes, 18.4 seconds.

You have been charged for this information.

Sites may be revealed by searching with alternate search methods. For example, a site not revealed in an Area search may be revealed by searching with another piece of information such as PID, PIN, Address or Crown Lands File Number.

APPENDIX C
CORRESPONDENCE

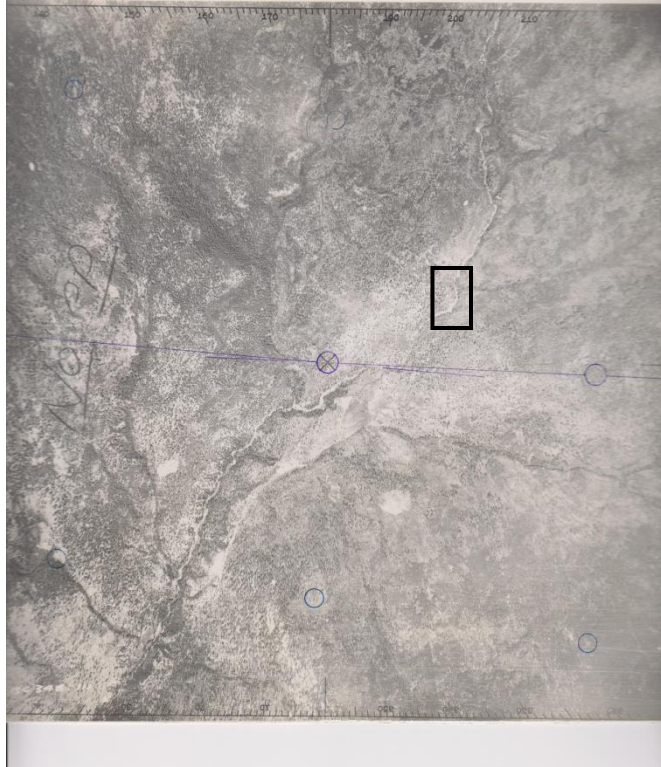
Zoht IR#5 (Center 669803.47 5566592.38) no archaeological sites, no AOA potential data available for this area



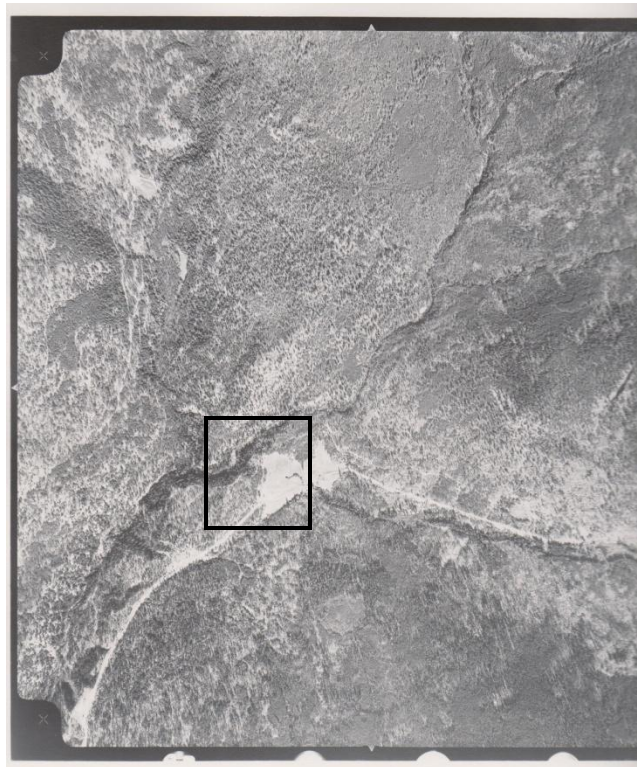
Zoht IR#14 (Center 669731.11 5567821.28) same as for Zoht IR#5. No archaeological sites, no AOA potential data for the area.
Refer to map above for Zoht IR#5.

APPENDIX D

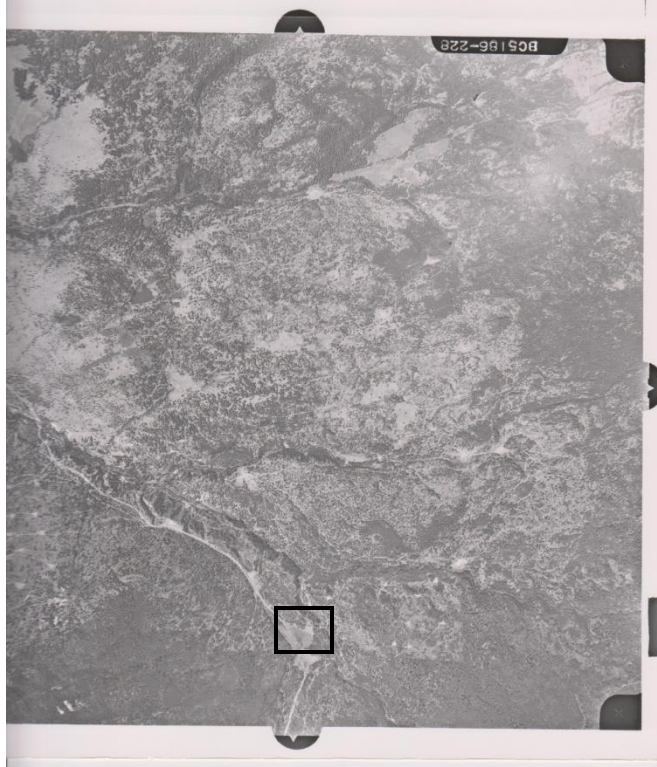
AERIAL PHOTOGRAPHS



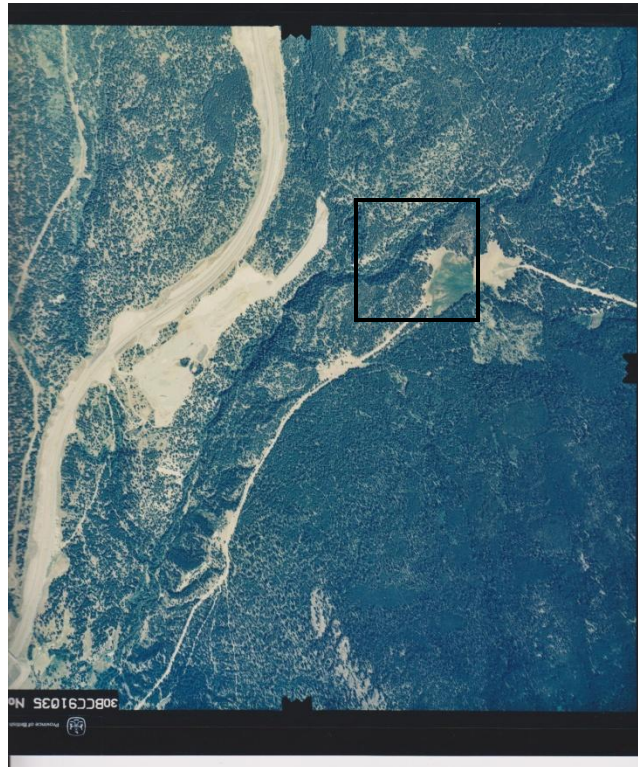
Photograph 1. 1947 Aerial Photograph BC 343-11



Photograph 2. 1960 Aerial Photograph A17204-94



Photograph 3. 1966 Aerial Photograph BC5186-228



Photograph 4. 1991 Aerial Photograph 30BCC91035-44 001

APPENDIX E

POTENTIAL SPECIES AT RISK

Table B: BC CDC Search Results for Species within the Bunchgrass Ecosystem (CDC, 2010)¹

Scientific Name	English Name	COSEWIC*	BC List**
Amphibians			
<i>Spea intermontana</i>	Great Basin Spadefoot	T (Apr 2007)	Blue
<i>Chrysemys picta pop. 2</i>	Western Painted Turtle - Intermountain - Rocky Mountain Population	SC (Apr 2006)	Blue
Fish			
<i>Acrocheilus alutaceus</i>	Chiselmouth	NAR (May 2003)	Blue
<i>Catostomus platyrhynchus</i>	Mountain Sucker	NAR (May 1991)	Blue
<i>Salvelinus confluentus</i>	Bull Trout		Blue
Reptiles			
<i>Coluber constrictor</i>	Racer	SC (Nov 2004)	Blue
<i>Pituophis catenifer deserticola</i>	Gopher Snake, <i>deserticola</i> subspecies	T (May 2002)	Blue
<i>Crotalus oreganus</i>	Western Rattlesnake	T (May 2004)	Blue
Birds			
<i>Ardea herodias herodias</i>	Great Blue Heron, <i>herodias</i> subspecies		Blue
<i>Buteo swainsoni</i>	Swainson's Hawk		Red
<i>Falco mexicanus</i>	Prairie Falcon	NAR (May 1996)	Red
<i>Falco peregrinus anatum</i>	Peregrine Falcon, <i>anatum</i> subspecies	SC (Apr 2007)	Red
<i>Grus canadensis</i>	Sandhill Crane	NAR (May 1979)	Yellow
<i>Numenius americanus</i>	Long-billed Curlew	SC (Nov 2002)	Blue
<i>Asio flammeus</i>	Short-eared Owl	SC (Mar 2008)	Blue
<i>Athene cunicularia</i>	Burrowing Owl	E (Apr 2006)	Red
<i>Megascops kennicottii macfarlanei</i>	Western Screech-Owl, <i>macfarlanei</i> subspecies	E (May 2002)	Red
<i>Otus flammeolus</i>	Flammulated Owl	SC (Apr 2010)	Blue
<i>Melanerpes lewis</i>	Lewis's Woodpecker	T (Apr 2010)	Red
<i>Sphyrapicus thyroideus thyroideus</i>	Williamson's Sapsucker, <i>thyroideus</i> subspecies	E (May 2005)	Red

Scientific Name	English Name	COSEWIC*	BC List**
<i>Contopus cooperi</i>	Olive-sided Flycatcher	T (Nov 2007)	Blue
<i>Eremophila alpestris merrilli</i>	Horned Lark, <i>merrilli</i> subspecies		Blue
<i>Hirundo rustica</i>	Barn Swallow		Blue
<i>Catherpes mexicanus</i>	Canyon Wren	NAR (May 1992)	Blue
<i>Oreoscoptes montanus</i>	Sage Thrasher	E (Nov 2000)	Red
<i>Chondestes grammacus</i>	Lark Sparrow		Red
<i>Spizella breweri breweri</i>	Brewer's Sparrow, <i>breweri</i> subspecies		Red
<i>Dolichonyx oryzivorus</i>	Bobolink	T (Apr 2010)	Blue
<i>Euphagus carolinus</i>	Rusty Blackbird	SC (Apr 2006)	Blue
Mammals			
<i>Perognathus parvus</i>	Great Basin Pocket Mouse		Red
<i>Corynorhinus townsendii</i>	Townsend's Big-eared Bat		Blue
<i>Euderma maculatum</i>	Spotted Bat	SC (May 2004)	Blue
<i>Myotis ciliolabrum</i>	Western Small-footed Myotis		Blue
<i>Myotis thysanodes</i>	Fringed Myotis	DD (May 2004)	Blue
<i>Gulo gulo luscus</i>	Wolverine, <i>luscus</i> subspecies	SC (May 2003)	Blue
<i>Martes pennanti</i>	Fisher		Blue
<i>Taxidea taxus</i>	American Badger	E (May 2000)	Red
<i>Ursus arctos</i>	Grizzly Bear	SC (May 2002)	Blue
<i>Ovis canadensis</i>	Bighorn Sheep		Blue
Invertebrates			
<i>Stylurus olivaceus</i>	Olive Clubtail		Red
<i>Hesperia nevada</i>	Nevada Skipper		Blue
<i>Pholisora catullus</i>	Common Sootywing		Blue
<i>Satyrium californica</i>	California Hairstreak		Blue
<i>Danaus plexippus</i>	Monarch	SC (Apr 2010)	Blue
<i>Promenetus umbilicatellus</i>	Umbilicate Sprite		Blue
<i>Vallonia cyclophorella</i>	Silky Vallonia		Blue
<i>Hemphillia camelus</i>	Pale Jumping-slug		Blue
Vascular Plants			
<i>Azolla mexicana</i>	Mexican mosquito fern	T (Nov 2008)	Red

Scientific Name	English Name	COSEWIC*	BC List**
<i>Dryopteris cristata</i>	crested wood fern		Blue
<i>Ophioglossum pusillum</i>	northern adder's-tongue		Blue
<i>Agoseris lackschewitzii</i>	pink agoseris		Blue
<i>Arabis lignifera</i>	woody-branched rockcress		Blue
<i>Arabis sparsiflora</i>	sickle-pod rockcress		Red
<i>Astragalus lentiginosus</i>	freckled milk-vetch		Blue
<i>Atriplex argentea</i> ssp. <i>argentea</i>	silvery orache		Red
<i>Atriplex truncata</i>	wedgescale orache		Red
<i>Castilleja cusickii</i>	Cusick's paintbrush		Red
<i>Centaurium exaltatum</i>	western centaury		Red
<i>Chamaerhodos erecta</i> ssp. <i>nuttallii</i>	American chamaerhodos		Blue
<i>Chamaesyce serpyllifolia</i> ssp. <i>serpyllifolia</i>	thyme-leaved spurge		Blue
<i>Chenopodium atrovirens</i>	dark lamb's-quarters		Red
<i>Crepis atribarba</i> ssp. <i>atribarba</i>	slender hawksbeard		Red
<i>Crepis modocensis</i> ssp. <i>modocensis</i>	low hawksbeard		Red
<i>Crepis modocensis</i> ssp. <i>rostrata</i>	western low hawksbeard		Red
<i>Epilobium halleanum</i>	Hall's willowherb		Blue
<i>Gaura coccinea</i>	scarlet gaura		Red
<i>Gayophytum humile</i>	dwarf groundsmoke		Blue
<i>Hackelia diffusa</i>	spreading stickseed		Blue
<i>Hedeoma hispida</i>	mock-pennyroyal		Red
<i>Hutchinsia procumbens</i>	hutchinsia		Blue
<i>Hypericum scouleri</i> ssp. <i>nortoniae</i>	western St. John's-wort		Blue
<i>Iva axillaris</i>	poverty-weed		Red

Scientific Name	English Name	COSEWIC*	BC List**
<i>Leptosiphon septentrionalis</i>	northern linanthus		Blue
<i>Lupinus argenteus</i> var. <i>laxiflorus</i>	silvery lupine		Red
<i>Lupinus bingenensis</i> var. <i>subsaccatus</i>	Suksdorf's lupine		Red
<i>Mimulus breviflorus</i>	short-flowered monkey-flower		Red
<i>Myriophyllum ussuriense</i>	Ussurian water-milfoil		Blue
<i>Navarretia intertexta</i>	needle-leaved navarretia		Red
<i>Polygonum polygaloides</i> ssp. <i>kelloggii</i>	Kellogg's knotweed		Blue
<i>Pyrola elliptica</i>	white wintergreen		Blue
<i>Salix boothii</i>	Booth's willow		Blue
<i>Salix tweedyi</i>	Tweedy's willow		Blue
<i>Sidalcea oregana</i> var. <i>procera</i>	Oregon checker-mallow		Red
<i>Sphaeralcea coccinea</i>	scarlet globe-mallow		Red
<i>Allium geyeri</i> var. <i>tenerum</i>	Geyer's onion		Blue
<i>Carex hystericina</i>	porcupine sedge		Blue
<i>Carex sychnocephala</i>	many-headed sedge		Blue
<i>Cyperus squarrosus</i>	awned cyperus		Blue
<i>Epipactis gigantea</i>	giant helleborine	SC (May 1998)	Blue
<i>Hesperostipa spartea</i>	porcupinegrass		Red
<i>Juncus confusus</i>	Colorado rush		Red
<i>Melica spectabilis</i>	purple oniongrass		Blue
<i>Olsynium douglasii</i> var. <i>inflatum</i>	satinflower		Red
<i>Poa fendleriana</i> ssp. <i>fendleriana</i>	mutton grass		Red
<i>Sphenopholis obtusata</i>	prairie wedgegrass		Red
<i>Sporobolus compositus</i> var. <i>compositus</i>	rough dropseed		Blue

Scientific Name	English Name	COSEWIC*	BC List**
<i>Stuckenia vaginata</i>	sheathing pondweed		Blue
Non Vascular Plants			
<i>Bryoerythrophyllum columbianum</i>	Columbian carpet moss	SC (May 2004)	Blue
<i>Microbryum vlassovii</i>	nugget moss	E (Nov 2006)	Red
<i>Pterygoneurum kozlovii</i>	alkaline wing-nerved moss	T (Nov 2004)	Red

* SC=Special Concern; T=Threatened; E=Endangered; XT=extirpated

** Blue= of special concern, Red= extirpated, endangered or threatened in British Columbia