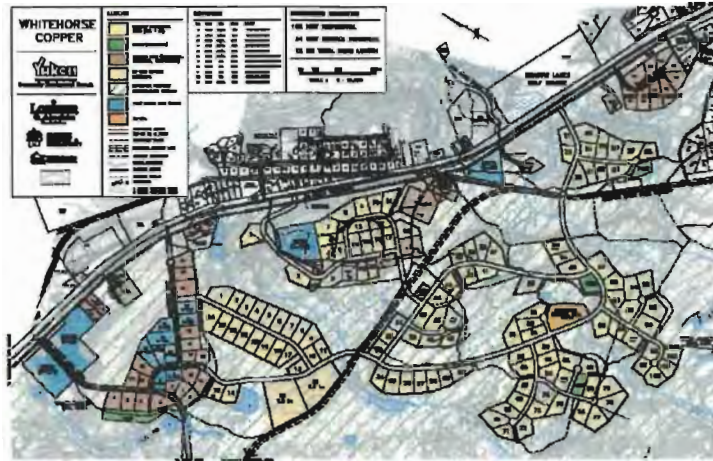


Yukon

Government



Environmental Assessment Act (EAA)

Environmental Screening Report

Whitehorse Copper Development Project

31 May 2004

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1. FILE INFORMATION

Proponent: Department of Community Services
Government of Yukon
P.O. Box 2703
Whitehorse, Yukon Y1A 2C6

Project Title: Whitehorse Copper Development Project

Type of Project: Country Residential and Service Industrial subdivision and related works.

Project Location: City of Whitehorse, Yukon

Lead Responsible Authority: Department of Community Services
Government of Yukon
P.O. Box 2703
Whitehorse, Yukon Y1A 2C6

Lead Responsible Authority Contact: Mr. G. Brian Ritchie, A.Sc.T
Manager, Land Development
Community Development Branch
Tel: (867) 667-3093

Other Responsible Authorities: Department of Energy, Mines and Resources
Government of Yukon
P.O. Box 2703
Whitehorse, Yukon Y1A 2C6

Contacts: Ms. Bryony McIntyre
Manager, Lands Client Services
Tel: (867) 667-5882

Ms. Marg White
Manager, Land Use
Tel: (867) 6673173

Project File Location: Land Development Unit
Community Development Branch
Government of Yukon
P.O. Box 2703
Whitehorse, Yukon Y1A 2C6

Contact: Heather Schneider
(867) 667-3433

2. BACKGROUND

The availability of land is fundamental to the economic development and social well being of the Yukon. Land development is required in order to either directly or indirectly support almost all economic activity. A variety of land use types exist, and the Government of Yukon develops and maintains an inventory of land suitable to each type. Municipalities also recognize that the availability of various classes of land within their communities is essential and that residents desire a variety of lands to address their needs, preferences, lifestyles and diversity.

Municipalities have obligations and responsibilities under the *Municipal Act* to provide for future development and land use within their communities. To meet these obligations, the Government of Yukon works with municipalities to develop and maintain an inventory for most classes of land within each community. A two-year inventory has generally been established as the desirable level, given the length of time it takes to plan and develop land, and the difficulties that result when there is insufficient land to meet demand. Currently within the City of Whitehorse, there is no remaining inventory of country residential lots, although some lots are available on the private market.

In the case of the City of Whitehorse, a residential land demand forecast carried out by the Government of Yukon in 2000 indicates a continued requirement for about 60 lots per year (country residential and urban residential). Recent experience has seen sales of about 10 country residential lots per year and an average of 56 urban residential lots per year. The same study indicates that about 56% of potential purchasers desire country or rural residential lots.

Municipalities, through their community planning and zoning processes, have control over all land development within their boundaries. The Government of Yukon, as a land developer, cannot proceed with any land development within municipal boundaries without the full support and approval of the municipality.

In 1997, the City of Whitehorse, with support of the Government of Yukon, began an Area Development Scheme (ADS) for the area known as "Whitehorse Copper". The ADS identified land suitable for a mix of uses including Country Residential, Commercial, Service Industrial, and Heavy Industrial, according to the classifications defined in the *Official Community Plan*.

In November 1999, the ADS was adopted by Whitehorse City Council following an extensive series of public open houses, City Council meetings and public meetings. The ADS was incorporated into the land use plan and policies of the City's new *Official Community Plan* (OCP) in 2002. Under the *Municipal Act*, it is illegal to authorize any type of land use that is not provided for in the *Official Community Plan*.

Within the context of the OCP, the Whitehorse Copper Development Project proposes the creation of a number of Service Industrial lots adjacent to the existing Mt. Sima Industrial Subdivision, and Country Residential lots to the north and northwest of the existing Wolf Creek and Wolf Creek North Country Residential Subdivisions. Redevelopment of the mostly abandoned residential area to the west of the Alaska Highway at McCrae for Country Residential purposes is also proposed.

The Whitehorse Copper Development is a land development project proposed by the Government of Yukon, Community Services to meet ongoing demands for country residential and service industrial properties within the City of Whitehorse. The project area is located generally between the Alaska Highway and the old Copper Haul Road and between the Mt. Sima Road and the existing Wolf Creek Subdivision.

3. OVERVIEW OF PROJECT

The Whitehorse Copper Development Project includes the development and sale of a total of 102 Country Residential lots and 24 Service Industrial lots. Also included is a school site and 5 community parks, all as indicated in the plan contained in Appendix A.

The project area is located generally between the Alaska Highway and the old Copper Haul Road and between the Mt. Sima Road and the existing Wolf Creek Subdivision. The land is currently vacant Crown Land, with several existing properties located in the area immediately to the west of McCrae and the Alaska Highway.

The Service Industrial lots proposed for the project will be located in the area immediately to the east of the existing Mt. Sima Industrial Subdivision. The lots will be serviced by two roads leading from the existing subdivision; one from McFadden Way (the old Mt. Sima Road) and one from Collins Lane. Beyond the limits of the new industrial subdivision, a road extension will lead into the Country Residential development area. The project plan clearly separates areas of country residential development from areas of industrial development by a minimum of 200 metres, consistent with the requirements of the *Official Community Plan (OCP)*.

Within the McCrae development area, a total of 20 new country residential lots will be created. Incorporated into the development plan are several existing country residential lots, an existing heavy industrial property, a Navcan air traffic control installation and a Ta'an Kwach'an Council settlement property. The main access to the area will be an existing entrance from the Alaska Highway located opposite Fraser Road which will be upgraded and relocated slightly southward to the area opposite the existing Petro Canada station. A road extension from the McCrae development area will lead into a larger country residential development area located to the south.

A new access from the Alaska Highway will be constructed opposite the existing Meadow Lakes Golf Course. The new road will run generally westward to cross the White Pass & Yukon Route railway and enter a country residential development area located between the railway and the Mt. Sima Ski Hill. Between the highway and the railway, a cul-de-sac off the main road will access 12 new country residential lots.

In the area to the west of the railway, country residential lots will be developed. Within this area, a loop road and several cul-de-sacs will access a total of 70 new country residential lots.

Provision has been made within the development plan for a right-of-way to accommodate a future railway extension from the existing White Pass & Yukon main rail line toward the abandoned Whitehorse Copper mine site. There are no plans to construct the line at this time and it is not included in the project.

The whole development will require the construction of a total of 12 km of new road. Roads will be built to rural industrial and rural residential standards as defined by the Transportation Association of Canada and the City of Whitehorse in its *Servicing Standards Manual*.

Road surfacing will be bituminous surface treatment (BST) which is typical for rural roads within the City of Whitehorse. Hot mix asphalt paving will be applied in cul-de-sac bulbs and at highway intersections.

Several small creeks and wet areas will be crossed by subdivision roads; however, inspections have indicated that none of these are of sufficient size to trigger requirements for Water Use Licenses.

Road drainage will be through roadside ditches that will discharge into open areas.

A number of existing trails in the area will either be maintained or relocated into open spaces. These are indicated on the plan contained in Appendix A.

Overhead electrical, telephone and cable television services will be provided by Yukon Electrical Co. Ltd., NorthwesTel Inc., and WHTV.

Water supply will be the responsibility of individual lot owners who may chose either to install wells or contract for private water delivery. Wastewater disposal will also be the responsibility of lot owners. Onsite sewage disposal (septic) systems will require licensing by Environmental Health Services, Department of Health and Social Services, Government of Yukon. Securing the licenses will be the responsibility of the individual property owners.

Detailed engineering design for the project is proposed to take place in 2004. The design of roadways and drainage will follow the guidelines of the Transportation Association of Canada's *Geometric Design Guidelines for Canadian Roads* and the requirements of the City of Whitehorse's *Servicing Standards Manual*. The *Servicing Standards Manual* has been adopted by resolution of City Council and serves as the key guiding document to road, water and sewer infrastructure within the City of Whitehorse.

Overhead power, telephone and cable television services will be designed by Yukon Electrical Co. Ltd., NorthwesTel Inc., and WHTV according to their standards.

The project will eventually see all roads, trails, greenbelts, parks and public utility lots transferred to the ownership of the City of Whitehorse.

4. SCOPE OF PROJECT

The project includes the following components:

- 102 Country Residential lots;
 - 24 Service Industrial lots;
 - Road right-of-way clearing, grubbing and stripping;
 - Construction of approximately 12 km of new road, including associated drainage ditches and culverts;
 - BST road surfacing and asphalt paving;
 - Construction of overhead power and telephone lines;
 - Legal survey of one future school lot;
 - Legal survey of five neighbourhood parks;
 - Legal survey of country residential and service industrial lots, utility easements, roads, walkways and public utility lots;
 - Construction of a new Alaska Highway access and related infrastructure, including turn lanes, acceleration lanes and street lighting, opposite the existing Meadow Lakes Golf Course;
 - Upgrading of the Alaska Highway access opposite Fraser Road at McCrae and installation of related highway lighting;
 - Construction of a railway crossing over the existing White Pass and Yukon Route railway;
 - Legal survey of a future railway line right-of-way from the existing White Pass and Yukon Route to the Mt. Sima Road, including allowances for two crossings of the line that are required for the subdivision development;
 - Clean up of an existing World War II dump site located adjacent to the development area immediately to the west of McCrae as required by the *Official Community Plan* and the *Area Development Scheme*;
 - Provision of a granular material borrow site east of Mt. Sima Road near the Whitehorse Copper Mine site;
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- Provision of two waste disposal sites within the development area for grubbing and stripping materials from road construction and building lot clearing;
 - Provision of approximately 12 km of trails within the development area;
 - Completion of a Fire Smart fuel modification program within the development area; and
 - Public tender, lottery and sale of lots.
-

5. SCOPE OF ASSESSMENT

The *Environmental Assessment Act* requires the Government of Yukon to conduct an environmental assessment of the proposed project because the Government of Yukon (Department of Community Services) is the project proponent and will be required to issue permits, finance infrastructure construction and dispose of land under the *Lands Act* (Department of Energy, Mines and Resources).

When more than one government department is involved in an environmental assessment, each department is a Responsible Authority (RA) as defined in the *Act*. To co-ordinate efforts and ensure a smooth and efficient process, a lead RA manages the environmental assessment. For the purposes of this project, Community Services, Government of Yukon is the lead RA.

A Responsible Authority under the *Environmental Assessment Act* is defined as a territorial authority that either is a project proponent, finances the project, disposes of land or an interest in land, or is a regulator for a function that appears on the *Law List*. The *Canadian Environmental Assessment Act* contains a similar definition for a federal Responsible Authority; however, there are no such agencies in this case.

The Whitehorse Copper Development Project has been in planning since 1994, with major design effort taking place over the last three years. The project was not subject to environmental assessment legislation until the devolution of responsibilities for land and water from the Government of Canada to the Government of Yukon which occurred on April 1, 2003.

An environmental assessment is a systematic process for identifying and mitigating significant adverse environmental effects. A project may not proceed if it is likely to cause significant adverse environmental effects that cannot be mitigated. Under the *Environmental Assessment Act*, the environment means the components of the Earth, and includes:

- (a) land, water, and air, including all layers of the atmosphere;
- (b) all organic and inorganic matter and living organisms; and
- (c) the interacting natural systems that include components referred to in (a) and (b) above.

An “environmental effect” means, in respect of a project:

- (a) any change that the project may cause in the environment, including any effects of any such change on health and socio-economic conditions, on physical and cultural heritage, on the current use of lands and resources for traditional purposes
-

by aboriginal persons, or on any structure, site, or thing that is of historical archaeological, paleontological, or architectural significance; and

(b) any change to the project that may be caused by the environment.

Environmental assessment under the *Environmental Assessment Act* can follow different formats depending on the nature and scale of a project and the level of public concern. Environmental assessments may be conducted as screenings, comprehensive studies, mediations and panel reviews. This project meets the legislated requirements for a screening.

Under a screening the Responsible Authority is required to consider the following factors in the assessment:

- (a) the environmental effects of the project, including the environmental effects of malfunctions or accidents that may occur in connection with the project and any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out;
- (b) the significance of the effects referred to in (a);
- (c) comments from the public that are received in accordance with the *Act* and the *Regulations*;
- (d) measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project; and
- (e) any other matter relevant to the screening, such as the need for the project and alternatives to the project, that the responsible authority may require to be considered.

An environmental screening follows a series of steps as follows:

- (a) preparation of a project description that includes a description of all aspects of the project and associated activities;
 - (b) establishment of the project scope, including the components of the project to be considered and the environmental issues to be considered;
 - (c) assessment of the likelihood and significance of adverse environmental effects;
 - (d) identification of appropriate methods to mitigate significant environmental effects; and
-

(e) the determination of the status of the project.

Only after an environmental assessment has been completed, and a finding has been made that the project is not likely to cause a significant adverse environmental effect after appropriate mitigation has been implemented, can the proponent proceed with the project.

5.1. Responsible Authority Identification

On July 7, 2003, an *Environmental Assessment Act (EAA)* notification was distributed to the following Government of Yukon departments:

- Community Services
- Economic Development
- Education
- Energy, Mines and Resources
- Environment
- Executive Council Office
- Health & Social Services
- Justice
- Tourism and Culture
- Transportation and Public Works
- Yukon Water Board

The notification was also sent to the Ta'an Kwach'an Council and the Kwanlin Dun First Nation.

At the federal level, the notification was sent to Fisheries and Oceans Canada, Environment Canada and the Yukon Environmental Review Committee. Fisheries and Oceans and Environment Canada subsequently advised that they were not RAs for the purposes of the project.

The Government of Yukon departments were requested to confirm their role in the environmental assessment of the project. The following departments declared themselves to be Responsible Authorities (RA) under Section 4 of the *EAA*:

- Community Services
- Energy, Mines and Resources

The following departments indicated that they are Technical Authorities (TA) able to provide specialist advice pursuant to Section 6 of the *EAA Coordinating Regulation*:

- Energy, Mines and Resources
-

- Environment
- Transportation and Public Works
- Tourism and Culture

Community Services was identified as the lead RA. The lead RA contact is:

Mr. G. Brian Ritchie, A.Sc.T
Manager, Land Development
Community Development Branch
Community Services
Government of Yukon
P.O. Box 2703
Whitehorse, Yukon
Y1A 2C6

Tel: (867) 667-3093

A Public Registry for the project was established at the office of the Land Development Unit, Community Development Branch, Department of Community Services, Government of Yukon.

5.2 Public Consultation

Consultation is an important part of the environmental assessment process. It ensures that a full suite of issues is considered and that all likely significant adverse effects are identified and understood.

In addition to the referral document sent to Government of Yukon departments, as described above, various public consultation activities were undertaken to solicit comment on the project and identify potential environmental effects.

On August 22, 2003, a Project Description was issued for public comment. A deadline for comments of September 30, 2003 was subsequently extended to October 31, 2003 in response to requests. The project description was circulated to:

- All Government of Yukon agencies identified on the EAA Notification List;
 - Fisheries and Oceans Canada;
 - The Yukon Environmental Review Committee;
 - Ta'an Kwäch'än Council;
 - Kwanlin Dun First Nation;
 - Wolf Creek Community Association; and
 - 450 members of the general public.
-

Public notification regarding the publication of the Project Description was placed in the *Whitehorse Star* on September 3 and 5, 2003, in the *Yukon News* on September 5 and 10, 2003, and in *L'aurore Boreale* on September 19, 2003. Notification of the extension to the period of comment was placed in the *Whitehorse Star* and the *Yukon News* on October 3 and 17, 2003, and in *L'aurore Boreale* on October 3, 2003.

On January 9, 2004, a draft Screening Report was issued to all of those groups and individuals noted above, with written comments to be received by February 19, 2004. The circulation was intended to determine if all the issues within the scope of the assessment had been accurately captured and fairly addressed. Public notification of the issuing of the draft Screening Report was placed in the *Whitehorse Star* and the *Yukon News* on January 14, 16 and 23, 2004.

Prior to the start of the environmental assessment process, *Area Development Scheme* (ADS) and the *Official Community Plan* (OCP) processes of the City of Whitehorse also involved various consultations. The preparation of the ADS included five open houses and a guided tour of the study area. In addition, the ADS was discussed at fourteen City Council Meetings and two public hearings and was adopted by City Council in November 1999. The land use plan and policies of the ADS were subsequently incorporated into the City of Whitehorse OCP in 2002.

The Government of Yukon also conducted public consultation, including three open houses (June 18, 2002, September 17, 2002 and January 8, 2003) held to present and review development options and the results of various site investigations and evaluations. In addition, project information was circulated to area residents and open house attendees, and onsite meetings were held with individual area residents to address particular concerns. Responses to questions and enquiries received by the Community Development Branch were also provided.

5.2.1 Issues Raised

A number of issues were raised at various stages during the consultation. The issues are listed below according to subject area. A number of the concerns that were raised were addressed by making various changes to the project during the planning process.

Lifestyle:

- The project will negatively impact the lifestyle of those living in the area.
-

Water Quality and Quantity:

- Industrial activities might contaminate the aquifer and sources of drinking water.
- New water users might deplete the aquifer for existing users.
- Water use and septic sewage systems might affect the City of Whitehorse water supply.
- Lots should be large enough to accommodate water supply and septic sewage systems.
- The development will negatively impact water quality in the well on Lot 1076.
- Water quality and quantity studies to date are inadequate as they have been mostly desk studies. There is no certainty that the development will not impact existing wells.
- Does permafrost exist in the area that could cause septic fields to not function as intended? Do installation regulations provide for buffers from slopes?
- What effect could existing wells and septic systems in other neighbouring subdivisions have on the proposed development?
- Some lots in the new subdivision could impact existing wells in Wolf Creek and Pineridge.
- A groundwater monitoring program should be implemented.

Wildlife:

- Wildlife habitat loss and degradation could occur.
 - Interference with wildlife travel corridors could occur.
 - Assessments of potential impacts to wildlife are not credible and do not reflect earlier evaluations.
 - The area sustains significant numbers of wildlife. Country residential developments are eliminating protected areas.
-

- The corridors that have been provided are not a viable solution.

Vehicular Traffic and Highway Access:

- Safety at highway access points could be compromised.
- Safety of mixed-use roads (industrial, commercial and residential) is questionable.
- Increased traffic could lead to safety issues.
- The proposed highway access will be unsafe. The area has its own weather system with black ice. The proposed turning lanes are confusing and have led to a number of accidents elsewhere. All of the school buses pass through the area.
- Traffic counts do not reflect the periodic nature of the traffic during the morning and evening rush.

Noise and Disturbance:

- The proximity of country residential lots to service industrial and commercial lots is not desirable.
- Residential lots are “boxed in” by service and heavy industrial areas.
- Mixed-use roads create noise and disturbance concerns.

Recreational Use and Trails:

- The new development might interfere with existing recreational and trail use.

Subdivision Location:

- Project alternatives have not been addressed.
 - The demand for such projects has not been demonstrated.
-

- Infill of existing subdivisions and urbanization should be considered as alternatives.

Radon:

- There is potential for radon gas in the Whitehorse area.
- Wolf Creek residents are specifically concerned about radon in the water.

Schools:

- Increasing population in the southern area of Whitehorse might exceed existing school capacity. (*)

Railway:

- The old rail spur to the Whitehorse Copper Mine site is an historical feature that should be preserved.

Level of Assessment:

- A screening level assessment is insufficient because of the large size and scope of the project. A comprehensive study or panel review should be undertaken.

Cumulative Effects:

- The cumulative effects of development in the Whitehorse Copper and McLean Lake Road areas should be addressed.

Future Opportunities:

- The subdivision might limit future resource extraction opportunities in the area.
 - Service and commercial lots are needed.
 - The effect on existing property values should be addressed. (*)
-

- Future access to natural gas should be addressed. (*)

Note: Items marked (*) are not within the scope of the environmental assessment.

6. ASSESSMENT

A number of investigations and studies were carried out as part of the project planning process and were used to prepare the development plan contained in Appendix A. The investigations and studies also addressed a number of issues raised by the public during the course of the consultative process. The studies and investigations included:

- Geotechnical Investigation
- Surface and Groundwater Inventory
- Wolf Creek/Pineridge Water Quality Study
- Wolf Creek Well Monitoring Study
- Preliminary Groundwater Assessment of the proposed Whitehorse Copper Development Area
- Jurisdictional Review of Hydrogeological Assessment Requirements for Rural Residential Developments
- Detailed Ecosystem Mapping and Wildlife Habitat Assessment
- Trails Identification
- Contour Mapping and Terrain Analysis
- Heritage Assessment and Report
- Fire Smart Planning
- Fire Fighting Water Supply Investigations for south Whitehorse Subdivisions
- Power and Telephone Servicing requirements
- Highway access investigations to Transportation Association of Canada guidelines

More information regarding the investigations and studies is provided in the following pages. These and other relevant documents pertaining to the project are listed in the bibliography contained in Appendix C. Copies of the various materials are contained in the Public Registry located in the Land Development Unit, Community Services, Government of Yukon. Arrangements to view the documents can be made by contacting Ms. Heather Schneider at 667-3433.

The work carried out has identified and assessed soil and terrain conditions, wildlife corridors and environmentally sensitive areas, road access points, heritage sites, and trails. Based on these considerations, the proposed development plan contained in Appendix A was prepared by the project planners and engineers, which consisted of the following team:

- Lorimer & Associates project management and civil engineering
 - Inukshuk Planning & Development land use planning
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- EBA Engineering Consultants terrain evaluation and geotechnical engineering
- Gartner Lee hydrogeology
- Applied Ecosystem Management terrain and wildlife
- Underhill Geomatics topographic mapping
- Doug Craig, P.Eng. copper mine workings and tailings
- Hammerstone Archaeological Consulting heritage
- Trans Northern Management Consulting fire fuel management

6.1 *Geotechnical Site Suitability*

In 2001 and 2002, EBA Engineering Consultants Ltd. (EBA) undertook an extensive geotechnical investigation and evaluation of the proposed development area. As various aspects of that work are related to some of the issues raised during the consultation, an overview of the geotechnical work and its findings is provided here. In summary, the work included:

- A review of the existing Wolf Creek North and Mt. Sima Industrial Subdivision Geotechnical Evaluations.
 - A review of historic and recent geology maps, air photographs, historic mining plans and existing geotechnical information to establish a baseline knowledge of pre-existing development prior to conducting the site reconnaissance.
 - Detailed terrain mapping of the study area on 1:10,000 scale air photographs to delineate polygons of differing surficial materials, texture, landforms, soil thickness and drainage, as well as the terrain stability hazard.
 - An assessment of the Whitehorse Copper mine site to identify potential hazards and risks associated with development in the vicinity of existing tailings ponds, open pits and location of underground structures associated with mining activity.
 - A field investigation program consisting of the excavation of 27 testpits throughout the areas identified as developable.
-

- An assessment of the results of the field investigation and the preparation of recommendations for engineering design.

The work is documented in EBA's report entitled *Whitehorse Copper – Sima Road Area Development, June 2003*. The following summary of the report is provided:

An initial terrain assessment was carried out in December 2001 to provide preliminary information for project planning purposes. The assessment was based on an interpretation of available air photography and existing geotechnical information for the area, supplemented by ground reconnaissance. The mapping developed from the work included a legend describing terrain units; soil texture; geomorphological processes; materials; surface expression; and an assessment of terrain risk effecting development potential. In 2002, a second terrain map was developed with an additional terrain risk classification and adjustments to polygon locations based on the additional geotechnical data gathered during the testpitting program.

The assessment identified that, in general, the development area is characterized by a complex of features associated with deglaciation, including outwash channels and terraces, underlain by bedrock at varying depths. The texture of the glaciofluvial material includes gravelly sands and gravelly, silty, sand till with rounded cobbles and boulders, assumed to be a basal melt-out till. The area is generally well-drained, except on imperfectly to poorly-drained floors of glaciofluvial channels that host both permanent and perennial ponds. Permafrost is expected to be rare to absent in the study area.

EBA subsequently completed a site investigation program comprised of a total of 27 testpits throughout the study area. At each testpit location, detailed logs describing geotechnical conditions were prepared. Grab samples were collected at regular intervals throughout the depth of each testpit and all samples were returned to the laboratory for natural moisture content determination and visual classification.

Due to the size of the study area, geotechnical conditions were found to be quite variable. Detailed geotechnical conditions are presented in EBA's report. Generally, conditions encountered reflected the conditions within the units identified during the terrain analysis. A summary of the geotechnical conditions identified is presented in the following table:

SUMMARY of GEOTECHNICAL CONDITIONS

Designated Area & Testpits	General Geotechnical Site Conditions	Development Constraints	Development Potential
Wolf Creek North Phase II – Testpits 14337-TP03, -TP04 and TP05 (proposed Country Residential)	On bench where lot development is proposed, soil conditions vary from sand till to gravelly sand soils. Good potential for borrow for road construction but wet soils conditions will be encountered at the Alaska Highway exit	Seasonal surface water and poorly drained soils close to highway as well as moderately steep slopes overlooking the highway.	Good in areas where lot development is proposed
Old McCrae Military Subdivision Area – Testpits 15236-TP04, -TP05, -TP06, -TP07, and -TP08 (proposed Country Residential).	Area is predominantly sand till soils overlying siltier, dense tills. Area is well drained and there is a history of satisfactory soil conditions for on-site sewage disposal system installation.	Old dumpsite should be properly decommissioned.	Good development potential as long as lot size is suitable to support on-site sewage disposal system construction in till soils.
Large Centrally Located Country Residential Development Area – Testpits 15236-TP13, -TP14, -TP15, TP16, TP17 & TP18 (proposed country residential)	Soil conditions vary from wet silty sand soils in low-lying areas (-TP13 area) to granular in central portion of site to shallow bedrock along west edge of proposed development area (TP18 area). Large portion of this area was assessed by airphoto analysis with little ground proofing.	Isolated low lying areas may require additional granular structure for roadway construction and shallow bedrock areas may make on-site sewage disposal construction difficult.	Good throughout majority of area with isolated areas that will require additional attention during roadway construction and septic field construction.
South End Of Study Area – Testpits 15236-TP09, -TP10, -TP11 & -EXP12 (initially proposed as country residential but removed from final plan)	This portion of the study area is underlain with coarse granular soils. Terrain and geotechnical conditions are ideal for roadway construction and lot development. Shallow bedrock was noted along the west edge of the area.	Shallow bedrock would have been the only issue on some lots along the west edge.	Excellent potential for future country residential lot development.
Sima Road Industrial Subdivision Phase II Area – Testpits 14337-TP08, -TP09, & -TP10 (proposed industrial subdivision development area)	Previously completed geotechnical investigation noted sand till soils throughout majority of area with bedrock at east end and possibly west edge as well. Some low lying areas will be wet with significant organic soils at surface	Possible wet area may require additional granular structure for roadway construction & shallow bedrock may effect onsite sewage disposal.	Good potential for Industrial Subdivision development.
Sima Road Infill Areas – Testpits 15236-TP01 to TP03 and 15236-TP19 to -TP27 (proposed industrial subdivision in vicinity of Whitchorse Copper Mine Site)	Testpits 15236-TP01 excavated on a small granular terrace; 15236-TP02 & 03 excavated in a low lying wet area with up to a metre of organic cover and underlain by bedrock or saturated soils; 15236-TP19 to -TP27 have varying thicknesses of soil cover over bedrock and moderately steep slopes accessing this area from Sima Road.	Thick organics, soft subgrade conditions and shallow bedrock would make this area difficult to construct access roads and develop industrial lots.	Fair to poor as an Industrial Subdivision. Testpit 02 and 03 area has some potential as a topsoil source.

Based on the terrain and geotechnical conditions noted during the evaluation, EBA concluded that the development of the proposed country residential and light industrial development areas was feasible. Clean granular soils and silty sand till soils encountered during the field investigation are considered suitable for roadway subgrade construction and the 1 hectare minimum lot size chosen for the both the country residential subdivision and light industrial subdivision lots ensures adequate space for the construction of a house or shop structure and the subsequent placing of an on-site sewage disposal system and well for water supply. EBA noted, however, that within the proposed development areas, some geotechnical and/or environmental constraints do exist as described in the preceding table. The areas with geotechnical concerns may effect roadway construction, and accordingly, EBA recommended that additional evaluations of the areas with potential concerns be evaluated after the roadway right-of-ways are cleared.

EBA also provided various recommendations regarding roadway construction, building foundations and onsite sewage disposal. The recommendations are typical for developments of this type in the Whitehorse area and will be reflected in the detailed engineering design to be carried out later.

6.2 Assessment of Issues Raised

As described below, assessments have been made regarding the various issues raised during the consultation. Mitigation to address many of the issues was incorporated into the project during the design process by making various changes to the project. In some cases, the changes were based on additional site investigations and studies. The changes included:

- Detailed geotechnical investigations resulted in adjustments to road and lot locations, and the removal of some lots.
 - Detailed ecosystem mapping resulted in adjustments to road and lot locations to better accommodate wildlife habitat and other environmentally significant areas.
 - A proposed emergency access into the area from Harbottle Road in the Wolf Creek Subdivision was removed.
 - Lots in the area of the previous emergency access from the Wolf Creek Subdivision were reconfigured to reduce impacts to an existing trail at that location.
 - At the spot where the access road from the Alaska Highway crosses the railway, an adjustment to the road location was made to better protect the integrity of a creek commented on by a nearby lot owner at the first open house.
-

- An allowance for a future school site was added in response to concerns raised at an open house.
- In response to input from the first open house, the lots on the bench above McCrae were sized to be 1 hectare rather than 0.5 hectare country residential lots.
- Some previously proposed industrial and residential pockets along the Mt. Sima Road were removed because they are not reflected in the *Official Community Plan*.
- Additional trails and trail linkages were added to the development. New linkages to the Trans-Canada Trail were incorporated.
- Reflecting comments received from the public, a number of layout changes were made to provide better internal loop roads, fewer cul-de-sacs, preservation of environmental open spaces, and better linkages to environmental corridors and community resource lands.
- A hydrogeological assessment of the proposed development area was carried out to address concerns of area residents regarding potential impacts to groundwater quality and quantity in the existing Wolf Creek and Pineridge subdivisions.
- Lots in the area to the west of the existing Wolf Creek Subdivision were removed, resulting in the current 102-lot configuration.

Recognizing the changes listed above, the assessments described below have been made with regard to the remaining issues raised during the consultation. Summaries of the issues, responses, mitigation and residual effects are presented in the tables contained in Appendix B.

6.2.1 Water Quality and Quantity

Concern was raised by a number of existing area residents regarding potential impacts to water quality and quantity, particularly groundwater, in the existing Wolf Creek and Pineridge subdivisions. In response to these concerns, 30 proposed lots located upgradient of the existing subdivisions were removed from the development.

Additionally, a hydrogeological assessment was carried out to supplement other groundwater quality and quantity studies previously carried out in the area. The results of the assessment are documented in Gartner Lee's report titled *2002 Preliminary Groundwater Assessment of the Proposed Whitehorse Copper Development Area*. The conclusions of the evaluation are as follows:

- Most new wells in the proposed developments will likely be completed in bedrock.
-

- Over half of the proposed development area is likely to be underlain by granodiorite bedrock. Historically, the development of private wells in this rock type has proven to be difficult, expensive or unsuccessful. Trucked water delivery may be a more viable alternative for homes in areas underlain by granodiorite bedrock.
- The estimated annual groundwater recharge rate exceeds the estimated groundwater consumption rate, indicating that development of the proposed subdivision is unlikely to deplete groundwater resources in the area.
- None of the proposed development is located hydraulically up-gradient of the existing country residential subdivisions of Wolf Creek and Pineridge. Most of the wells and septic fields that may be installed in the proposed development are expected to have no effect on existing groundwater users in Wolf Creek and Pineridge because of the groundwater flow direction is away from those users.
- The nitrate concentrations in the Whitehorse Copper area following development are predicted to be lower than the predicted concentrations in groundwater resulting from the existing Wolf Creek Subdivision. Recently measured concentrations of nitrates in groundwater samples from the Wolf Creek Subdivision meet the *Canadian Drinking Water Quality Guidelines*, with a few exceptions. The source of the nitrates is uncertain, but it may derive in whole or in part from contamination at the well heads on those lots showing the elevated levels. These results indicate that nitrates introduced to groundwater from septic loading in the proposed development area are unlikely to pose health concerns. However, it is recommended that routine monitoring of groundwater quality from the area be conducted as the development proceeds.

Although not specifically carried out for the purposes of the Whitehorse Copper Development Project, two additional reports by Gartner Lee are referenced here. They are the *Wolf Creek and Pineridge Subdivisions Groundwater Quality Assessment, 2003* and *Long Term Monitoring Well #1, Wolf Creek Subdivision, 2003*. The two reports provide supplementary information regarding groundwater quality in the area but do not impact the conclusions of the 2002 evaluation summarized above.

Notwithstanding the work carried out, comments from the public indicate that there is still some concern regarding the behaviour of groundwater in the area. As a result, the RA proposes to implement a follow up groundwater monitoring plan as recommended by the Yukon Department of Environment. The department's recommendation is considered appropriate in this case. It is recommended that the groundwater monitoring program be developed and implemented as a part of the project construction and the post-construction activities. The results of the monitoring program shall be relayed to Health and Social Services and/or the Department of Environment for action to protect human health, if required. In addition, it is understood that Health and Social Services is currently

reviewing standards and regulations for potable water supply wells. This may provide further mitigation.

A specific concern has been raised regarding potential impacts to an existing well located on Lot 1096. It is understood that the well is a 1.2 metre diameter culvert installed vertically in an excavation approximately 5 metres in depth. This is considered to be a shallow well. Current best practices and the policy of Yukon Environmental Health Services regarding shallow wells suggest that it should be considered equivalent to a surface water supply and, accordingly, potentially unsafe without appropriate treatment.

With regard to onsite septic systems, lots have been sized to be a minimum of approximately one hectare in area. Long experience in the Yukon has shown this size to be appropriate for the mitigation of potentially negative impacts from such systems. In addition, all new septic systems in the Yukon are required to be permitted by Yukon Environmental Health Services (EHS) which controls the installation and operation of such systems. In issuing permits for onsite sewage disposal systems, EHS considers conditions relating to the specific site. This includes the potential impacts of any permafrost that might be present, although none has been indicated in the case of this project, and any ground slopes that could affect performance.

No impacts to water quality in the proposed development from neighbouring subdivisions are likely because the proposed subdivision is not located down-gradient of the existing subdivisions.

6.2.2 Wildlife

A considerable amount of work relating to potential impacts to wildlife was carried out during the project planning process. This work comprised increasingly detailed assessments, including onsite investigations, carried out in 2002 and 2003 in specific areas of interest identified during the project planning and design.

In 2002, Applied Ecosystem Management Ltd. (AEM) carried out ecosystem mapping to provide information to the project planning team regarding areas with high wildlife values and/or site sensitivity that should be avoided as much as possible in the project development. The detailed mapping produced by AEM resulted in adjustments to road and lot locations to better accommodate wildlife corridors and other environmentally significant areas. In 2003, Gartner Lee Ltd. (following its merger with Applied Ecosystem Management) revised the evaluation to reflect the modified project plan presented in Appendix A.

The 2003 assessment is documented in Gartner Lee's report titled *Whitehorse Copper Area Development, Assessment of Revised Development Plan (Lot 102), 2003*. In summary, the conclusion of the evaluation is that some 94.4% of the development footprint falls outside of the high wildlife and/or high site sensitivity areas identified by

AEM. The report also concludes that the majority of areas of high wildlife and/or high site sensitivity have been avoided in the development plan and are contained within community/environmental reserves. The map indicating the project footprint and the high wildlife and site sensitive areas identified by AEM is reproduced in Appendix A. In the drawing, the abbreviation HS indicates high site sensitivity, HWHS indicates high wildlife value and high site sensitivity, HWMS indicates high wildlife value and moderate site sensitivity, and HWLS indicates high wildlife value and low site sensitivity.

Reflecting comments received from the public, together with the results of the ecosystem mapping, a number of changes were made to the proposed development to provide better internal loop roads, fewer cul-de-sacs, preservation of environmental open spaces, and better linkages between environmental corridors and community resource lands.

The Yukon Department of Environment, which identified itself as a Technical Authority under the *EAA Coordinating Regulation*, advised that it considers the work to be adequate and that it has no outstanding concerns. More specifically, the Department has determined that the lot configuration and development does not encompass any "critical" habitat, that no formal wildlife corridors are known to exist within the proposed development area, and that the layout maximizes the avoidance of wetland areas given the area's terrain limitations.

6.2.3 Vehicular Traffic and Highway Access

The development will entail two highway accesses.

One access will be an upgrading of the existing access located opposite Fraser Road at McCrae. This access will provide entry to the portion of the development area to the west of the Alaska Highway at McCrae. A slight southward relocation of the existing road along the highway will be carried out to reduce the gradient into the development area.

The second access, which will be new, will be constructed opposite the existing Meadow Lakes Golf Course at the bottom of a long vertical sag curve on the Alaska Highway in that area.

Concerns have been raised by area residents about the safety of the proposed highway access point at the Meadow Lakes Golf Course. More specifically, residents are concerned about icy winter conditions in the area, the safety of similar intersections and increasing traffic volumes during morning and evening rushes.

Yukon Transportation Engineering was consulted regarding the accesses and both locations were found to meet the basic design requirements for sight distances. In addition, both accesses will be designed and constructed in consideration of the

Transportation Association of Canada's *Geometric Design Guide for Canadian Roads* and the local requirements of the Transportation Engineering Branch. Although detailed designs for the two accesses have not yet been carried out, they will incorporate turning and acceleration/deceleration lanes and lighting for safety purposes, generally as exists at the Mt. Sima Road/Alaska Highway intersection.

With regard to traffic volumes, the following information is taken from *2002 Yukon Traffic Count Summary* prepared by the Department of Infrastructure (now Highways and Public Works):

Average daily traffic counts on the Alaska Highway at km 1457.8 (Cowley Creek Subdivision) were as follows over the last several years:

1997	3204	(Data incomplete)
1998	3299	
1999	3241	
2000	3013	
2001	2971	
2002	3105	

Average daily summer traffic counts at the same location were as follows:

1997	n/a	(Data incomplete)
1998	4073	
1999	3972	
2000	3782	
2001	3732	
2002	3887	

The average daily winter month counts (October to April) are as follows:

1997	2533	
1998	2650	
1999	2525	
2000	2389	
2001	2470	
2002	2635	(October to December only)

The traffic counts are made by sensors that are located in the highway surface. Yukon Transportation Engineering has advised that it believes that some of the eastbound traffic turning right into the Cowley Subdivision might be bypassing the sensor at this location. This is believed to have less impact in the winter months when snow along the sides of the highway restricts the ability of traffic to bypass the sensor. It should be noted that this does not impact westbound traffic counts (the counts listed above are totals for both directions). It should also be noted that although there may be a small effect on vehicle

numbers in the eastbound direction, there is little or no impact on the trends over time as the effects occur more or less equally each year.

The peak traffic volume occurs in July at about 4,000 vehicles per day. This is about the same as traffic counts in the Crestview area toward the north end of the city.

The proposed 102 country residential lots and 24 service industrial lots are expected to add approximately 300 to 400 total vehicle movements per day when they have been fully developed.

As indicated in the data above, traffic volumes in the area have shown an overall decline in the last several years, although some variations from the trend line have been noted. For example, 2002 volumes were about 4.5% higher than those in 2001. Yukon Transportation Engineering has also indicated that it has received anecdotal information regarding increasing peak period volumes, but it has no corroborating data at this time.

The anticipated increase in traffic volumes to approximately 4,500 vehicle movements per day is well within the capacity of the Alaska Highway, which is designed to meet the Transportation Association of Canada guideline of up to 12,000 vehicles per day for this class of road.

The proposed intersection location and conceptual design reflect the recommendations of the Transportation Association of Canada and Yukon Highways and Public Works, which has identified itself as a Technical Authority for the purposes of the project. Further mitigation of potential shall be undertaken during the detailed design phase of the project by involving the department in the identification and implementation of appropriate detailed design features and traffic flow measures.

6.2.4 Lifestyle, Noise and Disturbance, and Recreational Trails

Some area residents have expressed concern about impacts to their existing lifestyles. Factors identified that might affect lifestyle are noise, disturbance, recreational access and proximity to wilderness.

In arriving at the subdivision design presented in Appendix A, the requirements of the *Official Community Plan* (OCP) were followed with respect to buffers and separations between land use types. In addition, some lots were removed from the plan and others were reconfigured to address specific conflicts that were identified by the planning team and local residents. The locations of existing trails were identified and, where conflicts were identified, plans were made for their relocation as shown in the project layout contained in Appendix A. In some cases, additional trails and trail linkages were incorporated into the design. For example, at the request of the City of Whitehorse, new linkages to the Trans-Canada Trail were provided. These measures, combined with the significant amount of open space contained within the subdivision footprint and the

various linkages to undeveloped lands outside of the subdivision, will minimize the potential impacts of concern as well as reflect the requirements of the *Area Development Scheme* (ADS) and the *Official Community Plan*.

6.2.5 Heritage

In 2002, Hammerstone Archaeological Consulting carried out a heritage assessment of the development area in collaboration with the Heritage Resources Unit of the Government of Yukon, the Kwanlin Dun First Nation and the Ta'an Kwach'an Council. The assessment included archival research and field investigations. The evaluation is documented in Hammerstone Archaeological Consulting's reports titled *Preliminary Overview Heritage Impact Assessment of the Whitehorse Copper Development Area, Stage I Report, 2003* and *Whitehorse Copper Area Development Overview, Heritage Assessment, Stage II Final Report, 2003*.

The assessment identified five small sites, including two small lithic scatters likely of approximately 1,200 years age, two recent squatter sites, and a small cabin likely dating to the early 20th century. The evaluation concluded that the sites are not unusual in any way and that there are many other examples throughout the area. The sites were documented during the field work and it was concluded by the investigators that no preservation is required. The study recommends, however, that if additional sites are encountered during the development work, that the Heritage Resources Unit be contacted to carry out any additional documentation that may be appropriate. The assessment also identified an abandoned dump site near McCrae dating back to the 1940s. The dump site will be cleaned up as part of the project under the guidance of the Heritage Resources Unit of the Government of Yukon to ensure preservation of any significant artifacts.

A member of the public raised a concern regarding the potential loss of the abandoned railway grade located between the existing White Pass & Yukon mainline and the Whitehorse Copper Mine. This issue was not identified during the heritage evaluation described above. Accordingly, Yukon Tourism and Culture, which identified itself as a Technical Authority for the purposes of the project, was consulted with regard to the issue. The department indicated that the rail line had no special significance that would require its preservation. In this regard, it was noted that several hundred metres of the line have already been alienated by privately owned lots in the area. Nevertheless, it appears from the project plan that it is possible to preserve one or more representative segments of the line without compromising the project design. This approach is recommended. It is also suggested that these segments be marked with appropriate interpretative signage.

6.2.6 Radon Gas

Concern has been raised by members of the public regarding radon gas in the proposed development area.

The Whitehorse area is known to show elevated levels of radon gas in some houses in some areas. One of these areas is the Wolf Creek Subdivision. Yukon Housing Corporation has carried out measurements of radon gas in some houses in the area and has assisted in home repairs to mitigate the problem. In the case of existing dwellings, the typical solution has been to install a depressurization (i.e. ventilation) system in the lowest area of the foundation. For new dwellings, the preferred approach is to ensure that a ground seal (i.e. barrier) is installed before the concrete footings and floors are placed, and that a depressurization system is installed as part of the house construction. These measures are straightforward when included at the time of construction. Potential lot purchasers shall be advised of the possibility of radon gas in the prospectus.

No information has been identified regarding the existence of radon in water in the area; however, Yukon Housing Corporation has advised that it has identified cases where utility ducts from wells have provided routes for radon gas to enter houses. This problem has been addressed by providing ventilation of the ducts and ensuring proper sealing of the well heads and ducts.

6.2.7 School

Although not within the scope of the environmental assessment, provision has been made in the project design for a future school site in response to concerns raised about the possible future impacts on existing educational facilities.

6.2.8 Cumulative Effects

The *EAA* process requires that an assessment be made of “any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out”. The potential cumulative effects for this project are summarized in the following table.

Item	Potential Cumulative Effect	Extent of Impact (Time/Space)	Mitigation	Residual Impact
Natural gas pipeline	Wildlife impacts.	A pipeline right-of-way exists along the southern boundary of the project area. A pipeline would be an infrastructure installation of long duration.	No application has been made to construct a pipeline along the route and accordingly, there is no proposed project upon which to assess potential cumulative effects.	None can be assessed.
Railroad line.	Wildlife impacts, noise, grade crossing safety.	Allowance has been made in the project plan for a railway right-of-way extending from the existing White Pass & Yukon Route to the vicinity of the Whitehorse Copper Mine site. A rail line would be a semi-permanent structure.	Although a railway allowance has been provided, there are no plans to construct the line.	None can be assessed.
Mining.	Wildlife impacts, noise, dust, traffic,	Past mining has occurred in the area and active mining claims exist outside of the proposed subdivision.	The Whitehorse Copper Mine site has been decommissioned and some reclamation work has been carried out. No proposals for new mining in the area are known.	None can be assessed.
Reclamation of abandoned dump.	Aesthetics, safety.	An abandoned WW II dump site exists within the proposed subdivision near McCrae.	The dump will be cleaned up as part of the project, resulting in a positive environmental impact.	Permanent removal.
Reconfiguration of old subdivision.	Reuse of land.	A largely abandoned WW II subdivision immediately to the west of McCrae.	Old subdivision will be rationalized, reconfigured and redeveloped.	Permanent redevelopment.
Traffic.	Increased traffic on the Alaska Highway.	10% increase in traffic volumes when project is fully developed.	Turning and acceleration lanes at access points. With 10% traffic increase, highway continues to meet Transportation Association of Canada standards.	10% increase in traffic.

6.2.9 Level of Assessment

Concern was raised by a member of the public that a screening level assessment for the project is insufficient because of its large size and scope. The suggestion was made that a comprehensive study or panel review should be undertaken.

The level of assessment, whether screening, comprehensive study or panel is prescribed by the *Environmental Assessment Act*. In this case the *Act* requires a screening. The level of effort for this project in terms of research, planning, public consultation and supporting studies has been high for a screening level assessment and in keeping with the potential for environmental effects and public concern.

6.2.10 Property Values

Although the issue of property values is not within the scope of the environmental assessment, it is noted that considering the low lot density and the significant level of infrastructure required for the development, it is reasonable to expect that the final development costs and the corresponding lot prices in the subdivision will have no negative impact on current property values elsewhere.

7. DETERMINATION

EAA Determination:

Environmental Assessment Act, Section 16 (1) (a):

The project may proceed as it is not likely to cause significant adverse environmental effects.

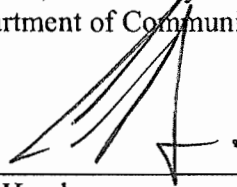
Authorized By:



Date: 04/06/14

Eric Magnuson
Director, Community Development Branch
Department of Community Services

Authorized By:



Date: June 15/04

Lyle Henderson
Director, Lands Branch
Department of Energy, Mines and Resources

APPENDIX A
Project Drawings

WHITEHORSE COPPER

Yukon
 Community Services
 Community Development Branch

LORIMER & Associates
 CONSULTANTS

INUKSHUK
 PLANNING &
 DEVELOPMENT

2008 Engineering & Construction Ltd.

LEGEND

- COUNTRY RESIDENTIAL LOTS (DEVELOPMENT)
- PARKS (DEVELOPED)
- EXISTING LOTS (RESIDENTIAL, INDUSTRIAL, INSTITUTIONAL)
- HT-SMA SERVICE INDUSTRIAL
- COMMUNITY RESERVE/ ENVIRONMENTAL RESERVE
- FIRST NATION LAND CLAIMS
- SCHOOL
- PROPOSED ROADS (30 TO 25 M ROW)
- PROPOSED TRAILS
- PROPOSED RAILWAY LINK
- PROJECT BOUNDARY
- WATER FEATURES
- EXISTING ROADS
- EXISTING TRAILS
- BUILDINGS
- 1 METRE CONTOUR LINES
- 5 METRE CONTOUR LINES

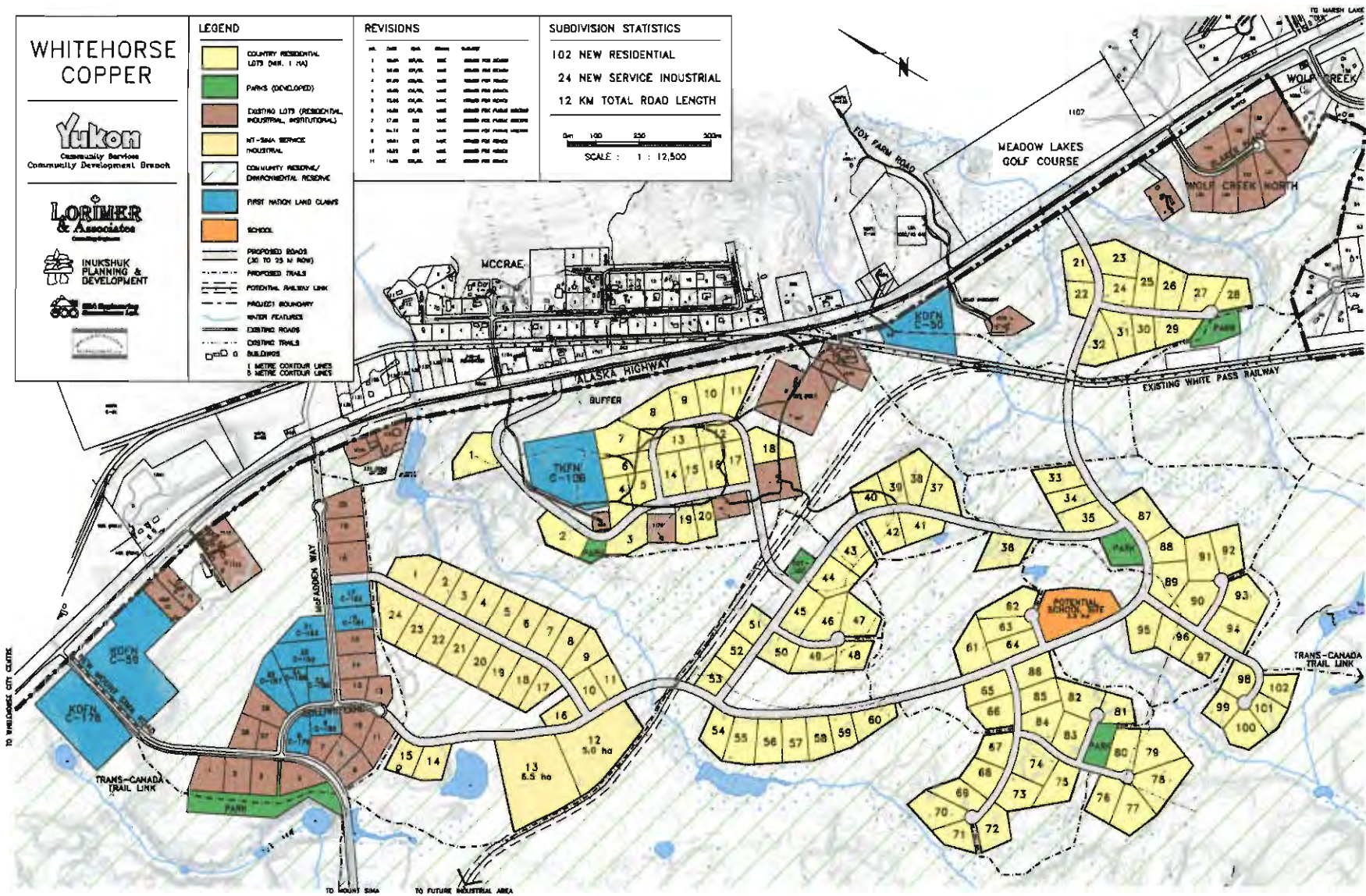
REVISIONS

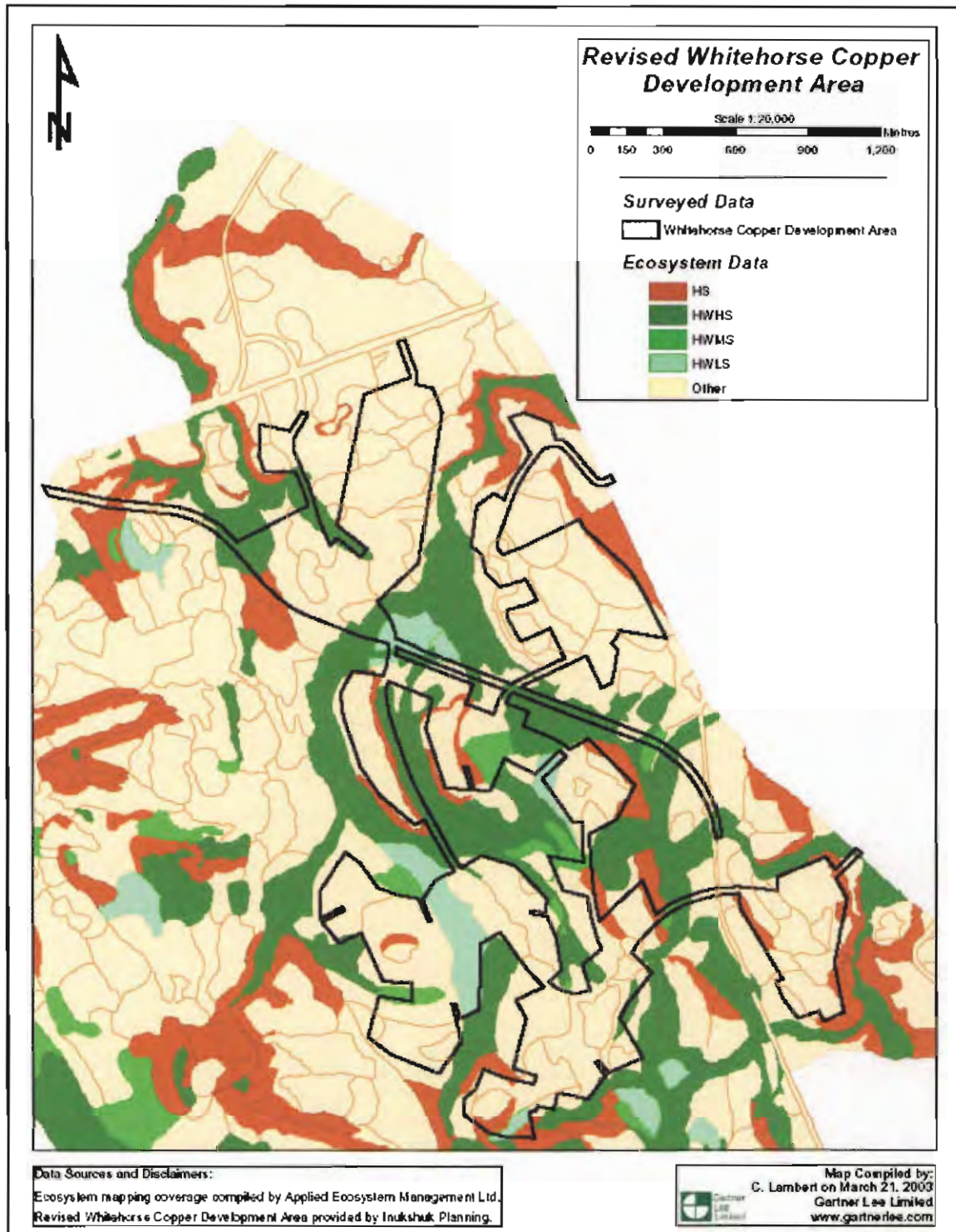
NO.	DATE	BY	REVISION
1	10/20/08	DL	ISSUE FOR REVIEW
2	11/10/08	DL	ISSUE FOR REVIEW
3	11/20/08	DL	ISSUE FOR REVIEW
4	12/01/08	DL	ISSUE FOR REVIEW
5	12/15/08	DL	ISSUE FOR REVIEW
6	12/22/08	DL	ISSUE FOR REVIEW
7	1/12/09	DL	ISSUE FOR REVIEW
8	1/21/09	DL	ISSUE FOR REVIEW
9	2/10/09	DL	ISSUE FOR REVIEW
10	2/17/09	DL	ISSUE FOR REVIEW
11	2/24/09	DL	ISSUE FOR REVIEW

SUBDIVISION STATISTICS

102 NEW RESIDENTIAL
 24 NEW SERVICE INDUSTRIAL
 12 KM TOTAL ROAD LENGTH

Dist: 100 200 300m
 SCALE: 1 : 12,500





APPENDIX B

Summary of Issues Raised

WHITEHORSE COPPER DEVELOPMENT PROJECT
Summary of Ecosystem Mapping and Wildlife Habitat Issues Raised

Issue	Response	Mitigation	Residual Effect	Report Reference
<p>MW1. Request for additional information on studies and field sampling conducted in support of ecosystem mapping efforts within Whitehorse Copper Development Area.</p>	<ul style="list-style-type: none"> AEM (2000) Significant Wildlife Areas Mapping and Report (Ninety-four plots were sampled in support of the creation of this ecosystem map (average of approximately 45 mins. per plot) between 1998 and 2000. Plots did not fall within the boundary of the Whitehorse Copper Development but were necessary for the determination of the relationships between site classification and aerial photograph interpretation and therefore for the completion of the ecosystem map in areas where ground sampling was not originally conducted, e.g., the Whitehorse Development Area); AEM (2002) Whitehorse Copper Development Area Mapping and Report (Fifty plots were sampled in support of the creation of this ecosystem map (average of approximately 45 mins. per plot) in the summer of 2002. All plots fell within the boundary of the Whitehorse Copper Development. Field site interpretations also utilized previous sampling conducted within the area by Charlotte Mougret (under subcontract by Garner Lee Ltd.). Previous sampling efforts included the investigation of 29 sites and the characterization of site conditions such as dominant soil association, parent material and dominant wetland classification); TransNorthern Management Consulting Ltd. and GLL (in prep.) Whitehorse Copper Development Area Fireweed Mapping and Report (Ten plots were sampled in support of this project (average of approximately 30 mins. per plot) in the summer of 2003. The objective of field sampling efforts was to field check ecosystem unit classification and assigned FBPC codes. No ecosystem unit classifications were modified following these checks, i.e., all polygons sampled in 2003 were accurately classified during AEM 2002 mapping efforts); GLL (2003) Whitehorse Copper Development Area Report (No field sampling was conducted as part of this study) 	<p>NA</p>	<p>NA</p>	<p>AEM 2000; AEM 2002; TransNorthern Management Consulting Ltd. and GLL (in prep.); GLL 2003.</p>
<p>MW2. Concerns were raised that previous ecosystem mapping and wildlife habitat assessment work has been based on the assumption that only wetlands are the most valuable and sensitive habitats in any ecosystem.</p>	<ul style="list-style-type: none"> Habitats containing high wildlife values and / or site sensitivity include the following ecosystem units: Highly structured Old Upland Forests that are characteristic of late (4 – 6) seral stages of the following ecosystem units: White spruce – feathermoss (SF); White spruce – willow (SW); White spruce – Labrador tea (ST); White spruce – golden luzzy fen (SG) and Lodgepole pine – paper birch (PC). Ecosystem units (at any seral stage) typically found within Riparian Corridors such as: White spruce – balsam poplar (SP); White spruce – willow (SW); White spruce – feathermoss (SF); Willow – alder (WA); Willow birch (WB) and River (RI) Aspect controlled ecosystem units such as Aspen – bearberry (AB) and Grass – sage (GS) typically found on steep, south facing slopes. Forested and non-forested wetlands and meadows such as White spruce – willow (SW); White spruce – Labrador tea (ST); White spruce – golden luzzy fen (SG); Willow birch (WB); Marsh (MR); Meadows (ME); Fen (FE) Open Water such as small lakes (LS) and open water (OW) 	<p>NA</p>	<p>NA</p>	<p>AEM 2000; AEM 2002.</p>

WHITEHORSE COPPER DEVELOPMENT PROJECT
Summary of Ecosystem Mapping and Wildlife Habitat Issues Raised

Issue	Response	Mitigation	Residual Effect	Report Reference
<p>MW3. Concerns were raised that the definition of areas of high wildlife value and / or site sensitivity cited in GLL (2003) and YTG (2004) fails to include areas of medium and low site sensitivity.</p>	<p>The definition of areas of high wildlife and / or high site sensitivity includes all occurrences of high wildlife value (ie., HWHS: high wildlife – high site sensitivity; HWMS: high wildlife – moderate site sensitivity and HWLS: high wildlife – low site sensitivity) and areas of only high site sensitivity (HS).</p>	NA	NA	AEM 2002.
<p>MW4. Concerns were raised that the recommendations outlined in AEM (2002) report have not been addressed in the planning of the Whitehorse Copper Development Area.</p>	<p>A total of 42.90 ha of areas of HWHS, HWMS, HWLS and HS lie under the direct footprint of the Whitehorse Copper Development Area (Lot 102). This represents a direct loss of 2.76% of the entire project area (delineated by the extent of 1:5,000 scale ecosystem mapping) and 5.6% of all HWHS, HWMS, HWLS and HS areas within the project area (GLL 2003). The Whitehorse Copper Development Area therefore avoids the majority (94.4%) of HWHS, HWMS, HWLS and HS ecosystem units within the project area (GLL 2003) as outlined in Recommendation One of AEM (2002) report: "To as large extent as possible, avoid placing subdivision lots on HWHS, HWMS, HWLS and HS ecosystem units".</p> <p>Community reserves / environmental reserves are classified as all areas other than those under the direct current or future footprint of the proposed Whitehorse Copper Development Area Plan (Whitehorse Copper Development Plan, March 2003; J. Boehmer, pers. comm., March, 2003). Therefore the majority (94.4%) of HWHS, HWMS, HWLS and HS ecosystem units within the project area (GLL 2003) are contained within community / environmental reserves. Recommendation Two of the AEM (2002) report recommends that: "Green Belts and Ecological Reserves should be designed around the HWHS, HWMS, HWLS and HS units." To clarify, the design and placement of green belts and ecological reserves should aim to capture the occurrence of concentrations of HWHS, HWMS, HWLS and HS ecosystem units rather than create a buffer around all individual occurrences of HWHS, HWMS, HWLS and HS ecosystem units.</p>	NA	NA	GLL 2003; AEM 2002.
<p>MW5. Concerns were raised regarding the utility of the term "critical habitat" used by YTG Department of Environment (YTG 2004) and the occurrence of identified wildlife corridors within the Whitehorse Development Area.</p>	<p>Significant wildlife areas were delineated within the City of Whitehorse (AEM 2000) based on wildlife and site sensitivity interpretations of ecosystem mapping and public input. This project received input from a number of sources including YTG Wildlife Viewing Program; DFO; Yukon Bird Club; Environment Canada and the City of Whitehorse. A significant wildlife area is defined as: "An area in a largely natural state that receives high levels of wildlife use and provides significant seasonal values to wildlife through either suitable habitat and / or providing travel corridors with adequate connectivity to the surrounding landscape". A total of 17 significant wildlife areas have been identified within the City of Whitehorse including Wolf Creek / Cowley Creek, Mary Lake / Wolf Creek, Croucher Creek and Little Takhini Creek. The Whitehorse Copper Development Area was not identified as a significant wildlife area as part of this exercise (AEM 2000). Although it was recognized that the Whitehorse Copper Development Area does contain areas of potentially high value wildlife, the area is not considered to contain a single corridor or node of high wildlife habitat (AEM 2002). Instead high value habitats are scattered throughout the planning area.</p>	NA	NA	AEM 2000; AEM 2002.

WHITEHORSE COPPER DEVELOPMENT PROJECT
Summary of Ecosystem Mapping and Wildlife Habitat Issues Raised

Issue	Response	Mitigation	Residual Effect	Report Reference
<p>MW6. Concerns were raised regarding the placement of the proposed main access road from the Alaska Highway and across the White Pass railway tracks in relation to the occurrence of rare ecosystem units.</p>	<ul style="list-style-type: none"> The site plot referred to (02 - 15) on page 12 of the Appendix to AEM (2002) report, samples two ecosystem units (SW: White spruce - willow and ST: White spruce - Labrador tea). Neither of these ecosystem units are identified as rare within the City of Whitehorse context. The two ecosystem units that are considered rare within the City are: PC: Lodgepole pine - paper birch and SG: White spruce - golden luzzy fen. Confusion may have arisen due to the observed presence of plant cover of Golden luzzy fen moss (AEM, 2002). 	NA	NA	AEM 2002
<p>MW7. Concerns were raised regarding the scope of ecosystem mapping conducted within the Whitehorse Development Area.</p>	<ul style="list-style-type: none"> The 1:5,000 scale ecosystem map and associated interpretations aimed to provide detailed ecological planning information appropriate for subdivision-level design. Recommendations provided attempt to minimize, to as large extent as possible, the potential negative effects of the proposed development on wildlife habitat and ecosystem conditions within the Whitehorse Copper Development Area by: 1) Identifying areas of high wildlife and / or site sensitivity through ecosystem mapping that should be avoided whenever possible; 2) providing information from ecosystem mapping that can be used to establish green belts and ecological reserves; 3) providing suggestions to mitigate impacts of stream crossings on riparian habitat, e.g., proper culvert installation. The studies conducted did not attempt to address the potential cumulative effects of the expansion of rural residential subdivisions in this area. 	NA	NA	AEM 2002
<p>MW8. Concerns were raised regarding the extent of direct habitat loss as a result of the proposed Whitehorse Development Area.</p>	<ul style="list-style-type: none"> The direct footprint of the proposed Whitehorse Copper Development Area (Lot 102) avoids 94.4% (i.e., 727.6 ha) of areas of high wildlife and / or high site sensitivity (GLL 2003). This area was quantified through calculations conducted in ESRI ArcMap using the following methods: 1) the spatial database was queried for the occurrence of ecosystem units of HWHS (high wildlife - high site sensitivity), HWMS (high wildlife - moderate site sensitivity), HWLS (high wildlife - low site sensitivity) and HS (high site sensitivity); 2) the occurrence of all areas of high wildlife and / or high site sensitivity units was expressed in hectares (and found to be 770,764 ha); 3) the spatial database was queried for the occurrence of ecosystem units of HWHS, HWMS, HWLS and HS under the direct footprint of the Whitehorse Copper Development Area (Lot 102); 4) the occurrence of areas of high wildlife and / or high site sensitivity units under the direct footprint of developed was expressed in hectares (and found to be 42,993 ha); 5) the occurrence of areas of high wildlife and / or high site sensitivity units under the direct footprint of developed was then expressed as a percentage of all areas of high wildlife and / or high site sensitivity units within the project area (and found to be 5.6%). 	NA	NA	AEM 2002; GLL 2003; YTG 2004

WHITEHORSE COPPER DEVELOPMENT PROJECT
Summary of Groundwater Issues Raised

Issue	Response	Mitigation	Residual Effect	Report Reference
<p>GW1. Will the proposed development deplete groundwater resources of the existing area</p>	<p>There is more than enough recharge through rainfall and snowmelt over the study area footprint to provide an adequate quantity of water for the proposed development. Groundwater resources of the existing area will not be depleted by the proposed development.</p>	<p>N/A</p>	<p>-</p>	<p>Gartner Lee Limited 2002, Section 3.</p>
<p>GW2. Most proposed wells and septic field are expected to have no effect on existing groundwater users. This implies that some wells and septic fields will have groundwater effects.</p>	<p>All uses of groundwater and disposal of septic waste will have some effect on groundwater resources. However, the assessment indicated that overall there will be no significant depletion of groundwater resources (no impairment of existing users access to groundwater) nor significant impact to groundwater quality (all water quality objectives will be met).</p> <p>However, in a rural residential setting, there is always a risk of well-septic field interference on a site-by-site basis. This can occur anywhere, and is more likely to occur within the existing subdivision. The proposed subdivision would not increase the risk of situation occurring.</p>	<p>All wells and septic field shall be sited according to YG Health requirements. All homeowners are responsible for ensuring their wells and septic fields are sited, constructed and maintained to reduce the risk of contaminating their own and their neighbors water supply.</p>	<p>Potential for individual well/septic field interactions on a site-by-site basis. This potential exists in any rural residential setting. The greatest risk to a private well is the septic field servicing the same property.</p>	<p>Preliminary Hydrogeological Assessment of the Proposed Whitehorse Copper & Mount Sims Development Area (GILL 2002) Section 4, pg 23.</p>
<p>GW3. Groundwater monitoring does nothing to protect human health</p>	<p>Groundwater contamination trends related to septic disposal evolve slowly over many years to tens of years. Therefore, routine monitoring will detect these trends, if they occur, and will be able to predict if a health risk will occur at that location. If so, the monitoring will provide adequate warning such that measures may be taken to address the issue. There are many possible options for managing the issue. However, based on the experience found in the existing Wolf Creek and Pine Ridge subdivisions, it is extremely unlikely that widespread septic contamination of groundwater in excess of the Canadian Drinking Water Quality Guidelines will occur.</p>	<p>Groundwater quality monitoring to ensure that acceptable water quality objectives are met.</p>	<p>None</p>	<p>None</p>
<p>GW4. Use of terms "likely" and "unlikely" are awfully vague</p>	<p>The goal of Environmental Assessment is to assess likely potential environmental effects, and mitigate those effects where possible. Furthermore, when dealing with complexity of the earth and environment, there is always potential for isolated and anomalous effects. With respect to groundwater, an example of this is the potential for on-site well-septic field interactions as outlined in W2 above and in Section 4 of the Preliminary Groundwater Assessment report (GILL 2002). Therefore, the goal of the assessment is to determine whether there are going to be wide spread, significant likely environmental effects.</p>	<p>N/A</p>	<p>None</p>	<p>See issue G2 and Section 4 of GILL 2002.</p>
<p>GW5. The groundwater assessment assumed most people may use trucked water deliver as opposed to on-site wells.</p>	<p>For the purposes of the groundwater assessment assumed, it was assumed that all lots in the new development would be completed with an on-site private well. This assumption is conservative and exercises the precautionary principal. If some residents choose trucked water supply the demand on the local groundwater would be reduced.</p>	<p>N/A</p>	<p>None</p>	<p>Section 3.3., GILL 2002.</p>
<p>GW6. The timing of the Whitehorse Copper development is poor, considering the City is in the process of a major watershed protection evaluation.</p>	<p>The City of Whitehorse is a major review of this project. The City's Planning department (lead on the Watershed Management Plan project) has provided their comments and issues in light of the Watershed Management Plan. These issues have been assessed and the development does not present a significant additional threat the City's surface water supply.</p>	<p>See Issues... (refer to turbidity and nutrient issues).</p>	<p>None</p>	<p>Letter report to concerns raised by City of Whitehorse, March 2004. (Gartner Lee Limited 2004)</p>
<p>GW7. The implementation of the new standards and regulations for potable water supply wells by YG Health and Social Services before the Whitehorse Copper Development screening would have brought the Development into closer scrutiny and would have generated as greater sense of security.</p>	<p>YG Health and Social Services new Drinking Water Regulations are applicable to public (e.g. municipal) water supplies only and do not apply to private water wells. Therefore, these new regulations would have no bearing on the proposed development.</p>	<p>N/A</p>	<p>None</p>	<p>None</p>
<p>GW8a. The City of Whitehorse Zoning Regulations provide very few restrictions to these properties. They are potential sources for an unlimited number of contaminants to the City of Whitehorse watershed</p>	<p>Significant groundwater contamination in Canada is historically associated primarily with manufacturing industry (which would require a Heavy Industry zoning). Based on the size of the Service Industrial lots and the nature of permitted uses, significant groundwater, widespread groundwater pollution is unlikely. Furthermore, the handling, storing and disposal of hazardous chemicals is regulated and controlled under the Transportation of Dangerous Goods Act, the Contaminated Sites Regulations and the Special Waste Regulations.</p>	<p>Handling, storing and disposal of hazardous chemicals is regulated and controlled under the Transportation of Dangerous Goods Act, the Storage Tank Regulations, the Contaminated Sites Regulations and the Special Waste Regulations</p>	<p>None</p>	<p>None</p>

WHITEHORSE COPPER DEVELOPMENT PROJECT
Summary of Groundwater Issues Raised

Issue	Response	Mitigation	Residual Effect	Report Reference
<p>GW8b Light or Service Industrial development, where more quantity and types of organic compounds are likely to be used and stored, is a risk that must be investigated and mitigated. The risk is amplified by the fact that these properties have the leachability under current regulations, to develop a "domestic" water well and are therefore exempt from stricter conditions on well construction -- such as grouting -- which should probably exist given the greater level of risk.</p>	<p>Currently there are no regulations in the Yukon governing well construction, decommissioning or a well log registry. It is agreed that good well construction practices should be applied to all wells to prevent risk of contamination of on-site wells, regardless if the land use is commercial, industrial or residential. Based on the distance and groundwater flow directions, it is extremely unlikely to any mishaps in the light industrial area would have any impact on groundwater in the concentrated rural residential areas of Wolf Creek and Pine Ridge.</p>	<p>N/A</p>	<p>None</p>	<p>Section 4.1.3, GLL 2002.</p>
<p>GW9a. The City of Whitehorse Watershed Management Plan notes that highly permeable soils... have little capacity for the adsorption or biodegradation of introduced substances</p> <p>GW9b. The unconsolidated material underlying the Whitehorse Copper Development are exactly the same as those of the Selkirk Aquifer. The City's Watershed Management Plan concluded that the [City's] groundwater supply is highly vulnerable to subsurface leaks or chronic leaks in sewage lines. Septic-discharge fields are nothing more than an engineered system of "breaks" and "leaks" in sewage lines.</p>	<p>The context of this comment in the Watershed Management Plan is referring primarily to the Selkirk Aquifer, which is a highly permeable, shallow unconsolidated aquifer underlying the urban subdivision of Riverdale. This aquifer is the City of Whitehorse's source of municipal groundwater. The scope of this statement is on a different scale than the Whitehorse Copper Development and is not strictly applicable to this context. The Riverdale area hosts a population of 4900, and therefore the impact of a sewage line break is much more significant point source than a series of widely dispersed households, not likely to exceed 350 people.</p> <p>Permeable sand and gravel deposits do have significant contaminant attenuation capacity, depending on the type of contaminant, thickness of saturated and unsaturated material, travel times and dilution opportunities. In a rural residential setting where potential contaminant sources (e.g. homes) densities are low, and correspondingly, water demands are low, there are good opportunities for natural attenuation of contaminants. Lastly, much of the Whitehorse Copper development area is underlain by glacial till (see Mouggest GeoAnalysis, 1996) which will retard the flow of waste waters, allowing for additional contaminant attenuation opportunities.</p> <p>A septic tile field is designed to treat septic effluent. A properly sited, constructed and operated septic field and associated attenuation area will deactivate all bacterial contamination and should convert ammonia to nitrate. Raw sewage leaking from a sewer line will have very little opportunity for treatment presented by a septic field.</p> <p>Based on experience with rural residential on-site water and waste water systems across North American and the Yukon, these systems have been proven to be effective and safe if sited, constructed and maintained properly. The most relevant example is the Wolf Creek and Pineridge subdivisions. These developments hosts at least 195 septic disposal fields and, many of which have been in place for over 20 years. Wide spread septic contamination does not exist in this area, demonstrating the effectiveness of these on-site water and waste water systems in this setting. As the Wolf Creek and Pineridge subdivisions have twice as many homes, at double the density, as the proposed Whitehorse Copper development, the proposed development will be equally successful in this regard.</p>	<p>None</p>	<p>None</p>	<p>Section 4.1.3, GLL 2002.</p>
<p>GW10. There is no intention to the possibility that more than one half of the lots to be sold of an economically un-attainability of ground-water in any pre-purchase prospectus.</p>	<p>As with previous rural residential developments, it is the Yukon Government's intention to undertake the drilling of test water wells in the subdivision area as part of the subdivision development. The reports summarizing the findings of such test well drilling is presented in buyer's information package such that they have the best available information to make an informed decision as to lot purchase.</p>	<p>Test wells will be drilled as part of the subdivision development and the results of these test will be made available to potential buyers.</p>	<p>None</p>	<p>None</p>

WHITEHORSE COPPER DEVELOPMENT PROJECT
Summary of Groundwater Issues Raised

Issue	Response	Mitigation	Residual Effect	Report Reference
<p>GW11. Safeguards such as chemical disinfection and routine biological monitoring is absent with domestic well systems</p>	<p>When choosing to live in a rural residential setting, a homeowner accepts the responsibility for their own water and waste water systems. The level of treatment, disinfection and monitoring is up to the homeowner. Routing water quality testing is recommended to all private water system users. The Yukon Government's Environmental Health branch offers a free bacteriological testing service to all Yukoner's with private wells.</p>	<p>Routing water quality testing is recommended to all private water system users. The Yukon Government's Environmental Health branch offers a free bacteriological testing service to all Yukoner's with private wells.</p>	<p>None</p>	
<p>GW12. Without relying on the crutch of septic-field recharge, it would be easy to demonstrate that a development consisting of 1-hectare sized lots would be in danger of either mining groundwater or requiring a significant hinterland recharge come as it's [sic] water source.</p>	<p>The water quantity assessment correctly assumes that most water used will return to the ground-water flow system via the septic field discharge. However, if the unrealistic assumption that none of the water used returned to the ground, the assessment shows that there is still adequate recharge through precipitation over the study area to meet the development needs. Specifically, the assessment estimated a total groundwater demand of 66,200 m³/year where the recharge over the same area is estimated at 91,000 m³/year. Therefore, groundwater "mining" would not occur even if all water used was not returned to the ground.</p> <p>Secondly, the assessment assumed that the recharge area available would only be the study area footprint. This assumption is unrealistic as in reality there is a significant recharge area upslope of the subdivision area - that is Mount McIntyre. The actual recharge available to the subdivision is more likely 7 times the size of the development study area used in the assessment.</p>	<p>N/a</p>	<p>None</p>	<p>Section 3, GLL 2002</p>
<p>GW13. Groundwater pumped from a deep aquifer and discharged to the near surface would be subject to an unknown but probably significant amount of evapotranspiration (loss from the groundwater system).</p>	<p>Septic tile fields are constructed well below the rooting zone of plants and therefore are subject to only a minor amount of evapotranspiration (ET) losses. Furthermore, at least half the year the ground is frozen above the septic field and ET losses cannot occur. However, the assessment did factor in a 10% loss for the near-surface disposal</p>	<p>N/a</p>	<p>None</p>	<p>Section 3.3.2, GLL 2002</p>
<p>GW14. Water returned to the shallow groundwater system may be unavailable to wells with deep bedrock wells due to the presence of low-permeable materials</p>	<p>It is likely that some of the water returned to the shallow groundwater flow system will not return to the bedrock flow systems. However, the bedrock flow systems are likely recharged by regional groundwater recharge to the upland areas and in reality are not recharged by local precipitation. The regional recharge area is the up slope area of Mount McIntyre to the west. In this interest of producing a conservative assessment, this regional recharge was not included in the assessment.</p>	<p>N/a</p>	<p>None</p>	

WHITEHORSE COPPER DEVELOPMENT PROJECT
Summary of Groundwater Issues Raised

Issue	Response	Mitigation	Residual Effect	Report Reference
<p>GW15. Relatively shallow wells have already experienced a decline in water supply, in part attributable to the new developments already in place</p>	<p>A typical well, if properly sited, constructed and maintained, has a design life expectancy of 20 years. Wells' yields decline over time with usage as the well screens (if any) become plugged and encrusted. Wells require routine rehabilitation to slow the effects of well clogging. When a well's yield declines to such a point that it cannot produce water at a rate sufficient to meet the well users' demand, it is often mistaken as "going dry". At this point, it is normal practice to have the well deepened or a second well drilled. Shallow wells are particularly sensitive to seasonal variations in the water table (e.g. dry years), local hydrological effects (e.g. beaver ponds and abandonment of such ponds), and over-utilization (e.g. watering livestock).</p> <p>In 2000 122 residents of Wolf Creek and Pineridge were interviewed and a total of 14 respondents reported seasonal low water problems. However most of these appear to be well construction issues (e.g. insufficient available draw down in the wells, low yield wells, etc.). Three of these homeowners reported having to either drill a new well or have their well deepened. No homeowners reported undertaking well maintenance activities such as well rehabilitation. Based on the age of the Wolf Creek Subdivision (>20 yrs), only 2% of wells have required replacement and it appears that well survivorship is much better than anticipated.</p>	<p>N/A</p>	<p>None</p>	<p>Section 5 I 2 of Wolf Creek/Pineridge Water Well Database Pilot Project. GLL 2000.</p>
<p>GW16. Hydrogeological monitoring will not take place before the development to establish a baseline, rather will be instituted with the development which is too late if there is a negative effect on the assessment.</p>	<p>The environmental assessment did not identify any significant, unmitigable, environmental issues with respect to water and waste water. Further work, although helpful and will increase the confidence in the assessment, is not likely to change the results of the assessment. Long-term groundwater monitoring was recommended as an additional level of security to better document the effects of rural residential developments on groundwater in a Yukon setting. Furthermore, the groundwater monitoring program will act as a sensory to detect the unlikely event of unacceptable changes occurring, and allow for sufficient time to implement mitigation measures, if required.</p> <p>As changes to groundwater quality and quantity occur slowly over many years, the initiation of the monitoring program at the time of subdivision construction will be adequate and representative of "background" or pre-development, native conditions.</p>	<p>Test wells and initiation of a long-term water level and quality monitoring program will implemented with subdivision construction.</p>	<p>None</p>	

WHITEHORSE COPPER DEVELOPMENT PROJECT
Summary of Other Issues Raised

<i>Issue</i>	<i>Response</i>	<i>Mitigation</i>	<i>Residual Effects</i>
<p>G11. <u>Highway Access at Meadow Lakes:</u> The safety of the proposed highway access point at the Meadow Lakes Golf Course is a concern. More specifically, residents are concerned about icy winter conditions in the area, the safety of similar intersections and increasing traffic volumes during morning and evening rushes. The area has its own weather system with black ice. The proposed turning lanes are confusing and have led to a number of accidents elsewhere. All of the school buses pass through the area.</p> <p>G12. <u>Highway Traffic Volumes:</u> The development will excessively increase traffic volumes on the Alaska Highway during rush periods</p>	<p>The access will be designed and constructed in consideration of the Transportation Association of Canada's <i>Geometric Design Guide for Canadian Roads</i> and the local requirements of the Transportation Engineering Branch. Yukon Transportation Engineering advises that it has received anecdotal information regarding peak period flows. In collaboration with Yukon Transportation Engineering, turning lanes, acceleration/deceleration lanes, and lighting for safety purposes, will be included in the design in a way which is specific to the site.</p> <p>The peak traffic volume in the area occurs in July at about 4,000 vehicles per day. This is about the same as the volume in the Crestview area toward the north end of the city. The proposed development is expected to add approximately 300 to 400 total vehicle movements per day when fully developed. The Transportation Association of Canada's design guideline for roads of the standard of the Alaska Highway is up to 12,000 vehicles per day.</p> <p>There is likely to be little mixed use of roads because the residential and industrial areas are separated. A road connection between the industrial and residential areas has been included mainly for safety reasons; however, it does not provide a particularly convenient route for most of the residential properties. Roads will be constructed to City of Whitehorse and Transportation Association of Canada guidelines which allow for mixed use.</p>	<p>Design to Transportation Association of Canada and Yukon Transportation Engineering requirements.</p> <p>Design highway intersection to Transportation Association of Canada and Yukon Transportation Engineering requirements.</p>	<p>None.</p> <p>10% increase in traffic when project is fully developed.</p>
<p>G13. <u>Mixed Use Roads:</u> The safety of mixed-use roads (industrial, commercial and residential) is questionable.</p>	<p>No commercial lots are included in the plan. The City of Whitehorse <i>Official Community Plan (OCP)</i> has been followed with respect to buffers and separations between land use types. In addition, some lots were removed from earlier versions of the plan and others were reconfigured to address specific conflicts that were identified by the planning team and local residents.</p>	<p>Design and construct roads to City of Whitehorse and Transportation Association of Canada guidelines.</p>	<p>Typical level of safety for properly designed roads.</p>
<p>G14. <u>Lifestyle, Noise and Disturbance, Trails:</u> Some area residents have expressed concern about impacts to existing lifestyles. Factors identified that might affect lifestyle are noise, disturbance, recreational access and proximity to wilderness.</p>	<p>Existing trails have been identified. Where conflicts have been noted, plans have been made for the re-location of the trails. In some cases, additional trails and trail linkages have been incorporated into the design. For example, at the request of the City of Whitehorse, new linkages to the Trans-Canada Trail have been provided. These measures, combined with the significant amount of open space contained within the subdivision footprint and the various linkages to undeveloped lands outside of the subdivision, will minimize the potential impacts of concern while reflecting the requirements of the <i>Area Development Scheme (ADS)</i> and the <i>Official Community Plan</i>.</p> <p>Some noise and disturbance may occur during construction; however, the area is generally remote from existing residences. After construction, noise levels will reflect those typical of existing country residential neighbourhoods. Buffers and separations from service industrial properties have been incorporated as specified in the OCP.</p>	<p>Relocate trails and build new trails as shown in the project plan. Include buffers and separations as required by the OCP. Avoid nighttime construction activities in areas near existing properties.</p>	<p>Some existing trails will be lost and some new ones will be built. Noise typical of a country residential community.</p>

WHITEHORSE COPPER DEVELOPMENT PROJECT
Summary of Other Issues Raised

Issue	Response	Mitigation	Residual Effects
<p>G15. Loss of Railway Spur Line: The abandoned railway grade located between the existing White Pass & Yukon mainline and the Whitehorse Copper Mine will be lost. It is a heritage feature.</p>	<p>This issue was not identified during the heritage evaluation carried out for the project. Yukon Tourism and Culture, which identified itself as a Technical Authority for the purposes of the project, was consulted with regard to the issue. The department indicated that the rail line had no special significance that would require its preservation. It also noted that several hundred metres of the line have already been alienated by privately owned lots in the area. Nevertheless, it will be possible to preserve at least one representative segment of the line without compromising the project design. This segment will be marked with appropriate interpretative signage.</p>	<p>Retain a representative portion of the railbed and erect interpretive signage.</p>	<p>Enhanced heritage awareness.</p>
<p>G16. Radon Gas: Radon gas may exist in the area.</p>	<p>Whitehorse is known to show elevated levels of radon gas in some houses in some areas. One of these areas is the Wolf Creek Subdivision. Yukon Housing Corporation has carried out measurements of radon gas in some houses in the area and has assisted in home repairs to mitigate the problem. In the case of existing dwellings, the typical solution has been to install a depressurization (i.e. ventilation) system in the lowest area of the foundation. For new dwellings, the preferred approach would be to ensure that a ground seal (i.e. barrier) is installed before the concrete footings and floors are placed and that a depressurization system is installed as part of the house construction. These measures are straightforward when included at the time of construction. Potential lot purchasers will be advised of the possibility of radon gas in the prospectus.</p> <p>No information has been identified regarding the existence of radon in water in the area. Yukon Housing Corporation has advised that it has identified cases where utility ducts from wells have provided routes for radon gas to enter houses. This problem has been addressed by providing ventilation of the ducts and ensuring proper sealing of the well heads and ducts.</p> <p>Although not within the scope of the environmental assessment, provision has been made in the project design for a future school site in response to concerns raised about the possible future impacts on existing educational facilities. At least one other potential school site also exists in the area.</p> <p>Although the issue of property values is not within the scope of the environmental assessment, it is noted that considering the low lot density and the significant level of infrastructure required for the development, the final development costs and corresponding lot prices in the subdivision will have no negative impact on current property values elsewhere. Recent experience has shown a demand for approximately 10 country residential lots per year. While the future demand cannot be predicted with certainty, a similar level of demand is expected to continue and lots will be released for sale at a rate appropriate to the demand.</p>	<p>Advise potential lot purchasers of the possibility of radon gas by including a notification in the prospectus.</p>	<p>None.</p>
<p>G17. School: A school might be required in the area at some time.</p>	<p>Although not within the scope of the environmental assessment, provision has been made in the project design for a future school site in response to concerns raised about the possible future impacts on existing educational facilities. At least one other potential school site also exists in the area.</p>	<p>Provide a lot for a potential future school.</p>	<p>None.</p>
<p>G18. Property Values: The development might reduce property values by increasing the number of lots available on the market.</p>	<p>Although the issue of property values is not within the scope of the environmental assessment, it is noted that considering the low lot density and the significant level of infrastructure required for the development, the final development costs and corresponding lot prices in the subdivision will have no negative impact on current property values elsewhere. Recent experience has shown a demand for approximately 10 country residential lots per year. While the future demand cannot be predicted with certainty, a similar level of demand is expected to continue and lots will be released for sale at a rate appropriate to the demand.</p>	<p>Release lots for sale as demand warrants.</p>	<p>None.</p>

WHITEHORSE COPPER DEVELOPMENT PROJECT
Summary of Other Issues Raised

Issue	Response	Mitigation	Residual Effects
<p>G19. Magnetite: It has been reported that there is magnetite in the tailings at the Whitehorse Copper Mine site and that wind could move the material into the development area. Is this a hazard associated with this material?</p>	<p>There is no hazard.</p> <p>Magnetite is a common, naturally occurring mineral of iron oxide. Its chemical formula is Fe₃O₄, meaning that its constituent elements are iron and oxygen in the proportions of three parts of iron to four parts of oxygen. By weight, it is about 72% iron and 28% oxygen.</p> <p>The distinctive characteristic of magnetite is that it is naturally magnetic, the only known mineral to strongly possess this quality. Magnetite is black with a metallic lustre, but will take on a rusty colour when exposed to air and moisture. It exists in both crystal and massive forms. Good examples of the crystal form are frequently found in mineral collections and are also used in some types of jewellery, as is its more common massive form. Magnetite is an important iron ore and is frequently mined for that purpose. The natural magnetism of magnetite resulted in its use in compasses in the early days of navigation.</p> <p>Magnetite is frequently found in igneous and metamorphic rocks, but may also occur in sedimentary rocks. In the Whitehorse Copper area, magnetite is associated with the igneous rocks that host the copper ores that were previously mined there. It is for this reason that it is found in the mine tailings. Although no testing has been carried out, it is likely that magnetite is also present in the Miles Canyon volcanic basalts that are common throughout the area.</p> <p>There is evidence that magnetite is also biogenically produced by some organisms, including humans, and research is ongoing on this subject.</p>	<p>None.</p>	<p>None.</p>

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Afan Jones

Notes of Presentation by Afan Jones at January 8, 2003 Public Open House, January 13, 2003.

Steve Cardiff

Non-conforming petition filed by Steve Cardiff, the Member for Mount Lorne, in the Legislative Assembly on March 20, 2003.

Lori Duncan

Presentation by Lori Duncan to January 8, 2003 Public Open House, undated.

Helen Slama

Presentation by Helen Slama to January 8, 2003 Public Open House, undated.
