



**Western Copper
Corporation**

Project Proposal
Carmacks Copper Project
Yukon Territory

Appendix K

**Updated Summary of the Assessment of Potential
Environmental Effects, Proposed Mitigation Measures
and Significance Assessment
(2006)**

Project Proposal for the Carmacks Copper Project

Appendix K - Updated Summary of the Assessment of Potential Environmental Effects, Proposed Mitigation Measures and Significance Assessment

Potential Effect on VECC	Project Component*	Proposed Mitigation Measures	Residual Effects										Likelihood		
			Direction	Duration	Geographic Extent	Magnitude	Reversibility	Ecological Context	Economic & Social Context	Risk	Frequency	Significance	Probability of Occurrence	Uncertainty	
ATMOSPHERIC															
Direct Effect - Release of SO ₂ or volatile hydrocarbons could cause injury or mortality to living organisms by fire, explosion, toxicity, or asphyxiation.	AF	Process controlled production of sulphuric acid to minimize gaseous emissions. Any gaseous emission will meet national emission standards.	-	2	2	2	2	2	2	3	1	1	NS	2	3
Indirect Effect - emissions contribute to pollution of regional air quality in the form of smog.	AF	Process plant and laboratory area equipped with gaseous scrubbers and ventilation systems to remove particulate matter and gaseous emissions. Spray irrigation on the heap limited by local low wind conditions.	n	1	1	1	1	2	3	1	1	NS	2	3	
	AF	Gas monitoring meters, to measure L.E.L., SO ₂ , and O ₂ level, and equipped with both audio and visual alarms, will be used at all times in process facilities. Safety procedures will be initiated in the event of L.E.L. > 10%, SO ₂ > 450 mg/m ³ , and O ₂ < 19% or > 23% by volume in air.													
	AF	Gas meters will be calibrated regularly to ensure accuracy.													
	AF	Personnel trained in the appropriate safety measures will be on site at all times during operations to manage emergency response plans.													
	AF	Wind direction will be monitored to ensure appropriate zone of safety established in the event of an uncontrolled release of gas.													

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Direct Effect - Settling of SO ₂ produced by acid plant can cause high ground level concentrations that could damage vegetation and soils and affect human and animal health.	AF	Gas meters will be calibrated regularly to ensure accuracy.	-	1	2	2	2	2	2	3	1	2	NS	2	3
Indirect Effect - emissions contribute to pollution of regional air quality in the form of smog.	AF	Emergency Response Plan will be followed as required.	-	1	1	2	2	2	2	3	1	1	NS	2	3
	AF	Personnel trained in the appropriate safety measures will be on site at all times during operations to manage Emergency Response Plans.													
	AF	Wind direction will be monitored to ensure appropriate zone of safety established in the event of an uncontrolled release of gas.													
	AF	Acid plant emissions will be strictly regulated to ensure emissions standards are adhered too.													
	AF	Sulfur dioxide monitors will be used. Ground level concentrations will not exceed 450 mg/m ³ .													
	AF	Air contaminants will be monitored.													
Direct Effect - Burning of diesel, gasoline, and propane causes emissions of air polluting gases.	All	Equipment installed with approved manufactures devices for controlling air emissions.	-	2	2	2	2	2	2	3	1	2	NS	3	3
Indirect Effect - emissions contribute to pollution of regional air quality in the form of smog.	All	Proper maintenance of vehicles, pumps, compressors, generators, and other internal combustion engines will minimize emissions of polluting gases.	-	1	1	2	2	2	2	3	1	2	NS	2	3
	All	Exhaust gases must be vented to outside of enclosed spaces and adequate ventilation supplied.													

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Direct Effect - Noise generated during operations may have a negative effect on the quality of life for residents and wildlife in the vicinity of operations.	OP, AF	Worker Health and Safety program monitored so that sound levels will be maintained below worker safety requirements.	-	1	1	2	2	2	2	3	1	2	NS	2	3
Indirect Effect - noise generated contribute to regional noise levels.	AR	No public vehicle access will be allowed to the site.	-	1	1	1	1	2	3	1	2	NS	2	3	
	All	Peak traffic operations occur during brief periods (project construction).													
	All	Traffic through Village of Carmacks residential areas day time hours only.													
	All	No known sensitive habitats in the project area.													
Direct Effect - particulate matter during operations (fugitive dust) may have a negative effect on worker health and safety and the local environment (vegetation, wildlife, aquatic)	All	Road watering and other dust suppression measures used to control dust release.	-	1	1	2	2	2	3	1	2	NS	2	3	
Indirect Effect - emissions contribute to pollution of regional air quality in the form of smog.	All	No public vehicle access will be allowed to the site.	-	1	1	2	2	2	3	1	2	NS	2	3	
	AR	Personnel safety protection devices													
	All	No known sensitive habitats in the project area.													

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Direct or Indirect Effects															
TOPOGRAPHY/ TERRAIN AND SOILS															
Direct Effect - loss or disturbance to topography or ground due to equipment. Disturbance to the soil profile (i.e. soil loss, compaction, admixing, etc.).	All	Stockpiling of soils for future reclamation.	-	3	2	2	3	2	3	2	1	NS	2	3	
Indirect Effect - erosion of soils due to vegetation removal.	AR, AF, HLP	Existing trails and disturbed areas will be used where suitable to minimize environmental effect.	-	1	1	2	2	2	3	1	2	NS	2	3	
	All	No unnecessary disturbance to ground. Environmental Management System (EMS) will be followed as required.													
	All	Surface disturbance will be re-sloped and covered with soil or revegetated as appropriate.													
	All	Vehicle movement will be restricted to access or haul roads to prevent permafrost and organic mat disturbance.													
	All	No recreational off-road use of wheeled vehicles will be allowed.													
	OP, HLP, WR	Permanent alteration to local topography (OP, HLP, WR) - recontouring and revegetation to enhance changes to topographic relief.													
	HLP	An evaporative transpiration cover will be applied over the heap to minimize water infiltration and provide for vegetation growth on closure of the mine.													
	WR, HLP, AR, AF	Revegetation of disturbed soils and vegetation where appropriate.													

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Direct Effect - disturbance to erosion prone banks and slopes.	WR, HLP, AR, AF	Facilities located to minimize erosion prone banks and slopes.	-	1	1	2	2	2	3	2	1	NS	2	3
Indirect Effect - erosion of soils due to vegetation removal.	WR, HLP, AR, AF	Erosion protection measures (rip rap, cross ditches, breaks) along roads and facilities.	-	1	1	2	2	2	3	1	1	NS	2	3
	WR, HLP, AR, AF	Recontour and re-sloping of disturbed areas and progressive reclamation.												
	All	No recreational off-road use of wheeled vehicles will be allowed.												
	All	EMS plans not to disturb the organic mat and soils. All activity will be conducted on constructed roadways. Facilities and waste rock area located to reduce the possibility of inadvertent surface disturbance.												
Direct Effect - disturbance of surface and subsurface drainage systems.	All	Facilities located in areas away from surface water drainage systems to minimize environmental effect.	n	1	1	2	2	2	3	2	1	NS	2	3
	AR	Hand cutting will be employed near access road stream crossings to reduce disturbance to riparian areas.												
	AR	Access road with clear span bridge structure across Merrice Creek to reduce disturbances.												
	AR, AF	Ensure drainage channels are maintained and free of debris.												
	AR, AF	Reclaim surface drainage to original condition (recontour, revegetation).												
	All	Routine monitoring and maintenance in accordance with EMS to prevent disturbances.												

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Direct Effect - Contamination of soil/potential for fuel and/or other substance spillage.	HLP	Heap leach pad and events ponds constructed with double liner and LDRS system to prevent solution migration to soils and groundwater. Facilities located greater than 50 m from any watercourse.	-	1	1	2	2	2	2	3	2	1	NS	2	3
Indirect Effect - contamination of local surface or groundwater from soil contamination	HLP	Heap leach pad and events pond LDRS will be monitored and sampled regularly.	-	1	1	2	2	2	2	3	1	1	NS	2	3
	AF	Liquid hydrocarbons, acids, and other chemicals will be stored in appropriate containers during transportation. No fuels or chemicals will be stored within 100 m of a watercourse.													
	AF	Main fuel, acid, and chemical storage facilities located at the plant site. Storage tanks with secondary containment. Segregation and controlled storage of plant chemicals. All hazardous materials located within controlled facility and routinely inspected and monitored as part of EMS.													
	All	A Spill Contingency Plan is in place, as part of the Environmental Management System.													
	All	In the event of a spill, the Spill Contingency Plan will be implemented. Spills will be immediately reported to the Spill Report Line.													
	All	Upon closure, assessment of soils for local contamination and completion of remediation activities.													
	AF	All hydrocarbons, chemicals, and waste materials resulting from the project will be removed from the area and cleaned up.													

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PERMAFROST														
Direct Effect - potential for localized melting of permafrost in isolated portions of the heap leach pad, waste rock storage area, and roads.	HLP	HLP site has been previously cleared and stripped to enable local thaw. Additional geotechnical drilling to confirm permafrost existence under leach pad area to minimize environmental effects.	-	3	1	2	2	2	3	2	1	NS	2	3
Indirect Effect - erosion of soils due to vegetation removal.	WR	Stripping of WRSA to allow permafrost thawing and construction of drainage ditches and sediment ponds to control water. Staged WRSA construction and monitoring with contingency berm.	-	1	1	2	2	2	3	1	1	NS	2	3
	AR	Road alignments chosen and constructed to maintain permafrost conditions. Gravel road base to be approximately 3 m thick directly on top of existing soils.												
	All	Wheeled vehicles will be used only on access roads and mine areas. No recreational off-road use of wheeled vehicles will be allowed.												
	All	Equipment operators will be instructed not to disturb ground unnecessarily.												
	HLP, WR	HLP and WR physical stability routinely monitored. EMS inspection and monitoring plans.												

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AQUATIC RESOURCES (hydrology, water quality, fisheries, and benthic macro invertebrates)														
Direct Effect - erosion of stream banks from construction, operation and closure activities.	All	Project components and operations will be located away from watercourses, except at Merrice and Williams Creek stream crossings.	-	1	1	2	2	3	3	2	1	NS	2	3
	All	Construction minimized around streams during critical spawning periods (May-June for grayling).												
	AR	Bridge crossing (Merrice Creek) and culvert (Williams Creek) designed to protect watercourse and prevent erosion.												
	AR	Ditch construction along roadways will incorporate settling ponds and baffles to reduce erosion and settle out sediments.												
	AR	Existing trails and disturbed areas will be used where suitable to minimize environmental effect.												
	All	No recreational off-road use of wheeled vehicles will be allowed.												
	HLP, AR, AF	Any material that accidentally falls into watercourses will be removed.												
	AR, AF	Erosion protection measures (rip rap, cross ditches, breaks) along roads and facilities.												
	HLP, WR, AF	Project footprint with buffer zone around riparian areas. Sediment ponds to control water releases.												
HLP, WR, AR, AF	If the surface is disturbed in an area such as drainage channels where erosion is a possibility, control measures may include using earth breaks or cross ditches.													

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Direct Effect - physical damage to fish habitat and spawning sites from construction, operation and closure activities.	HLP, WR, OP, AF	Upper Williams Creek does not support fish. Project mine components and operations will be located at least 50 m away from watercourses.	-	1	1	2	2	3	3	2	1	NS	2	3
Indirect Effect - physical damage to fish habitat and spawning sites from upstream site activities.	HLP, AR, AF	Existing trails and disturbed areas will be used where suitable to minimize environmental effect.	-	1	1	2	2	3	3	2	1	NS	2	3
	All	No recreational off-road use of wheeled vehicles will be allowed.												
	AR	Clear span bridge located at Merrice Creek to minimize disturbance to riparian zones.												
	All	Hazardous materials stored with secondary containment away from watercourse in controlled areas.												
	All	Spill Contingency and Emergency Response Plan in place to prevent materials from accidentally entering watercourses.												
	HLP	Heap leach pad and events ponds constructed with composite liner and LDRS system to prevent solution migration to surface and groundwater. Sediment pond located downstream from events pond. Facilities located greater than 50 m from any watercourse.												
	All	Water for mining and processing will be collected from deep wells in the Williams Creek drainage basin and numerous sediment ponds (WR, HLP, AF). No direct surface water use. Recycling of water from AF and sediment ponds to minimize groundwater well use.												
	HLP	At closure, controlled release of HLP solutions to prevent direct hydrological effects to local drainage.												
	All	Environmental monitoring program with stations on Williams Creek to monitor stream hydrology and water quality. Perform required MMER EMM program.												

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Direct Effect - contamination of watercourses or groundwater from sediment or metals.	HLP, AF	No direct discharge of process solutions or wastewater to surface waters during operations. Recycling of process solutions and wastewater for other water uses.	-	2	2	2	2	3	3	2	2	NS	2	3
	HLP	Heap leach pad and events ponds constructed with composite liner and LDRS system to prevent solution migration to surface and groundwater.												
	HLP, WR, AF	Sediment pond located below HLP, WR, AF to prevent sediment release and treat surface water if necessary. Construction of diversion ditches. Facilities located greater than 50 m from any watercourse.												
	AF	Heap leach pad and events ponds designed to withstand combinations of critical events (operating solution volume, plus excess runoff inflows from the critical duration 100-yr return period event occurring at the most critical point in time, plus an allowance for heap draindown as follows:												
	AF	During the first year of operation, 100% of the total potential heap draindown volume, or During subsequent years of operation, 48 hours of draindown at the full rate of solution application. For a solution application rate of 540 m ³ /hr this volume is 26 000 m ³ ; and												
	AF	Redundant systems (i.e. pumps, power, spare parts) to prevent direct release of process solutions.												
	AF	Heap leach pad and events pond LDRS will be monitored and sampled regularly.												
	AF	Contingency water treatment plant constructed on site using known technology to treat process solutions, if required.												

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	AF, WR	Sediment ponds will be monitored and sampled regularly to ensure wastewater quality.												
	AF	Liquid hydrocarbons, acids, and other chemicals will be stored in appropriate containers during transportation. No fuels or chemicals will be stored within 100 m of a watercourse.												
	AF	Main fuel, acid, and chemical storage facilities located at the plant site. Storage tanks with secondary containment. Segregation and controlled storage of plant chemicals. All hazardous materials located within controlled facility and routinely inspected and monitored as part of EMS.												
	All	A Spill Contingency Plan, as part of the EMS.												
	All	In the event of a spill, the Spill Contingency Plan will be implemented. Spills will be immediately reported to the Spill Report Line.												
	All	Any deleterious material that accidentally falls into a watercourse will be removed. A spill response plan will be implemented.												
	AF	Segregation of camp and AF wastewaters and treatment using in ground disposal and tile/absorption fields.												

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	HLP	At closure, covering, rinsing and detoxification of HLP and treating solutions in a controlled manner to prevent effects to Williams Creek. Long-term heap solutions directed to infiltration gallery to provide final solution polishing and prevent direct release to Williams Creek.												
	All	Environmental monitoring program with stations on Williams Creek to monitor stream hydrology and water quality. Perform required MMER EMM program.												
	All	Progressive cleanup and remediation will be completed where possible.												
	All	Construction during heavy rainfall or snowfall events will be minimized.												
	AF	All waste materials containing fuels, chemicals, and specials waste will be properly stored and removed from the area.												
	AR, AF, WR, HLP	A revegetation program using indigenous flora will be implemented for disturbed sites (AR, AF, WR, HLP) where native vegetation has been removed or destroyed to prevent degradation of stream water quality.												

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Direct Effects - Extraction of groundwater lowers groundwater table.	OP	Water will be collected in the pit and pumped to the process plant as make-up water. Resulting flow conditions in Williams Creek will not be significantly altered. Expected that the pit will take >300 years to fill.	-	2	2	2	2	3	3	2	2	NS	3	3
Indirect Effects - Extraction of groundwater lowers groundwater table and effects surface water hydrology and aquatic habitat.	WR	Runoff that enters the WRSA will be minimal and will flow in the near surface groundwater at the base of the pile for collection in the toe drains and ultimately into the sediment control pond for use as make-up water.	-	1	1	2	2	3	3	2	1	NS	2	3
	HLP	Near-surface groundwater flows could be partially diverted in the HLP area; however, the effect is not expected to be significant, as the leach pad area has been cleared to allow permafrost to thaw.												
	AF	Water will be pumped from deep groundwater wells. Water Recycle and use of events and sediment ponds for make-up water.												

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Direct or Indirect Effects															
WILDLIFE															
Direct Effect - disturbance to wildlife from direct habitat loss.	HLP, AR, AF	Existing trails and disturbed areas will be used where suitable to minimize environmental effect.	-	2	2	2	2	2	2	3	2	2	NS	3	3
	All	All project activities will be limited to the project area.													
	All	No hunting, trapping or fishing will be allowed on the project. A "no firearms" policy will be enforced (banned except as authorized for protection of employee's safety while in the field). Employees will be instructed regarding the project's "no wildlife harassment" policy, which will encompass no wildlife feeding, employee wildlife education, and wildlife avoidance.													
	All	Environmental personnel on site to monitor project activities and modify operations to address wildlife concerns.													
	All	Wildlife surveys of the area indicate no sensitive habitats or unique wildlife habitat features. Avoidance of sensitive habitats, such as denning or nesting sites, if encountered during operations.													
	All	Routine garbage patrols will be undertaken to remove materials, (e.g., metals, plastics, grease) which may be potentially harmful to wildlife.													
	All	No recreational off-road use of wheeled vehicles will be allowed.													
	All	All encounters with wildlife, and/or mortalities, will be reported to a YG Conservation Officer.													

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Direct or Indirect Effects	HLP, AR, AF	Existing trails and disturbed areas will be used where suitable to minimize environmental effect.	-	2	2	2	2	2	2	3	2	2	NS	2	3
	AR, AF, WR	Avoidance and buffer zones between stream riparian areas and facilities to minimize wildlife disturbances and protect wildlife corridors.													
	All	Environmental personnel on site to monitor project activities and modify operations to address wildlife concerns.													
	All	Employees will be instructed regarding the project's "no wildlife harassment" policy, which will encompass no wildlife feeding, employee wildlife education, and wildlife avoidance.													
	All	Personnel movement will be restricted to the project area and access routes.													
Indirect Effect - project components may create fragmentation and alter wildlife movements.	All	Project footprint localized and buffer zone between riparian area and corridors. Wildlife movements will not be restricted.	-	2	2	2	2	2	2	3	2	2	NS	2	3
	All	No unnecessary disturbance to local surroundings (EMS).													
	HLP, WR, AR, AF	Surface disturbance will be re-sloped, covered with soil or revegetated as appropriate.													
	HLP, WR, AR, AF	Natural revegetation will be encouraged as part of the revegetation plan.													
	AR	Snow banks on access roads will be plowed back, with breaks in the bank to ensure adequate road wildlife sighting and escape.													

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Direct Effect - attraction of nuisance animals.	All	Garbage and debris will be collected routinely for disposal, or stored in wildlife proof containers for disposal at approved facilities.	-	2	1	2	2	2	2	3	2	2	NS	2	3
	All	Employees will be instructed regarding the project's "no wildlife harassment" policy, which will encompass no wildlife feeding, employee wildlife education, and wildlife avoidance.													
Direct Effect - encroachment on endangered species or important wildlife habitats.	All	Wildlife monitoring of site by environmental personnel.													
	All AF	Use of approved gas fired incinerator with high efficiency burner for camp facilities.													
	AR, HLP, AF	Existing trails and disturbed areas will be used where suitable to minimize environmental effect.	-	1	1	2	2	2	2	3	2	2	NS	2	3
	AR, AF	Wildlife surveys of the area indicate no sensitive habitats or unique wildlife habitat features. Avoidance of sensitive habitats, such as denning or nesting sites, if encountered during operations.													
	All	Project avoids key habitat areas (raptors, moose) along Yukon River.													
	All	Personnel movement will be restricted to the project area and access routes.													
	All	Local YG biologists and officers will be notified if a bear encounter occurs.													
	All	Very few waterbodies exist within the project area. However, no disturbance within 50 m of a watercourse will occur.													
All	Wildlife monitoring of site by environmental personnel to advise on environmental and wildlife concerns in the areas of operation.														

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Direct or Indirect Effects	All	No hunting, trapping, or fishing will be allowed on the project. A "no firearms" policy will be enforced (banned except as authorized for protection of employee's safety while in the field). Employees' will be instructed regarding the project's "no wildlife harassment" policy, which will encompass, no wildlife feeding, employee wildlife education, and wildlife avoidance.												
	All	No recreational off-road use of wheeled vehicles will be allowed.												
	AR, AF	Restrict direct access to mine site and project area by using a gate during operations to prevent opportunities for increased hunter access.	-	1	1	2	2	2	3	2	2	NS	2	3
	AR	Provide and encourage project busing and transportation to mine site to minimize hunting opportunities and direct road mortalities.	-	1	1	2	2	3	3	2	1	NS	2	3
	AR	Post speed limits and signage at wildlife crossings to minimize direct road mortalities.												
	All	No recreational off-road use of wheeled vehicles will be allowed.												
	AF	Fencing of HLP areas to minimize direct mortalities.												

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VEGETATION															
Direct Effect - loss of vegetation communities.	AR, AF, HLP	Existing trails and disturbed areas will be used where suitable to minimize environmental effect.	-	1	2	2	2	2	2	3	1	2	NS	2	3
Indirect Effect - possible invasion of exotic species and alteration of habitat type at closure.	All	No unnecessary disturbance to ground (EMS).	-/+	1	1	2	2	2	2	3	2	2	NS	2	3
	All	No recreational off-road use of wheeled vehicles will be allowed.													
	All	Access road width will be restricted to 8 m. Clearing for new access and facilities will be kept to the minimal amount required.													
	AR, AF	Hand cutting will be employed near access road stream crossings to reduce disturbance to riparian areas.													
	AR, AF	Windrows will not be created so that wildlife movements are not restricted, and fire hazards are minimized.													
	HLP, WR, AR, AF	Recontour and re-sloping of disturbed areas and progressive reclamation.													
	HLP, WR, AR, AF	Surface disturbance will be re-sloped, covered with soil or revegetated as appropriate.													
	All	Routine monitoring and maintenance in accordance with EMS to prevent disturbances.													

Project Proposal for the Carmacks Copper Project

Appendix K - Updated Summary of the Assessment of Potential Environmental Effects, Proposed Mitigation Measures and Significance Assessment

Potential Effect on VECC Direct or Indirect Effects	Project Component*	Proposed Mitigation Measures	Residual Effects									Significance	Likelihood		
			Direction	Duration	Geographic Extent	Magnitude	Reversibility	Ecological Context	Economic & Social Context	Risk	Frequency		Probability of Occurrence	Uncertainty	
Direct Effect - toss of timber.	AR, AF, HLP	Existing trails and disturbed areas will be used where suitable to minimize environmental effect.	-	1	2	2	2	2	2	3	1	1	NS	2	3
	AR, AF, HLP	In areas with denser woodlands (AR, AF, HLP), clearing will be kept to the minimal amount required.													
Direct Effect - project activities result in fire hazards.	HLP, WR, AR, AF	Surface disturbance will be re-sloped, covered with soil or revegetated as appropriate to promote natural revegetation.													
	All	Fire safety measures and responses, as provided in the EMS will be adhered to.	-	1	1	2	2	2	2	3	2	2	NS	2	3
	All	Fire protection and distribution systems and equipment will be located at the project area.													
	All	Trained personnel for fire response as part of EMS.													
	HLP, AF	Redundant systems for key operations (HLP, AF) as part of fire contingency plans.													
	All	If fire hazards exist in the area during operations, procedures will be implemented to avoid fire hazard areas and prevent inadvertent fires.													

Project Proposal for the Carmacks Copper Project

Appendix K - Updated Summary of the Assessment of Potential Environmental Effects, Proposed Mitigation Measures and Significance Assessment

Potential Effect on VECC Direct or Indirect Effects	Project Component*	Proposed Mitigation Measures	Residual Effects									Likelihood		
			Direction	Duration	Geographic Extent	Magnitude	Reversibility	Ecological Context	Economic & Social Context	Risk	Frequency	Significance	Probability of Occurrence	Uncertainty
Direct Effect - potential disturbance to rare, sensitive or unique plant species or vegetation communities.	AR, AF, HLP	Existing trails and disturbed areas will be used where suitable to minimize environmental effect.	-	1	1	2	2	2	3	1	1	NS	2	3
	All	No unnecessary disturbance to ground (EMS).												
	All	No recreational off-road use of wheeled vehicles will be allowed. Vegetation survey indicates that no rare or sensitive plant species are located in the project area; however, surface disturbances will be kept to a minimum.												
	AR, AF	Hand cutting will be employed near access road stream crossings to reduce disturbance to riparian areas.												
	HLP, WR, AR, AF	A revegetation program using indigenous flora will be implemented for disturbed sites (AR, AF, WR, HLP) where native vegetation has been removed or destroyed. Natural revegetation of disturbed areas will be promoted as part of revegetation plans.												

Project Proposal for the Carmacks Copper Project

Appendix K - Updated Summary of the Assessment of Potential Environmental Effects, Proposed Mitigation Measures and Significance Assessment

Potential Effect on VECC Direct or Indirect Effects	Project Component*	Proposed Mitigation Measures	Residual Effects										Likelihood		
			Direction	Duration	Geographic Extent	Magnitude	Reversibility	Ecological Context	Economic & Social Context	Risk	Frequency	Significance	Probability of Occurrence	Uncertainty	
EFFECTS OF THE ENVIRONMENT ON THE PROJECT															
Direct Effect - extreme climatic conditions can cause process upsets.	HLP, AF	HLP, events pond and facilities designed to retain and store excess precipitation events and 100 year snow melts. Redundant systems in place to ensure solution pumping and power systems operational during extreme events	-/+	1	2	2	2	2	2	3	2	2	NS	2	3
	HLP, AF	Onsite fuel storage and back up power generators to ensure pumping and process systems operational.													
	HLP, AF	Spare parts and equipment to ensure equipment failures are replaced and repaired and ensure continued solution processing.													
	HLP, AF	Sediment ponds and other water management structures designed for extreme events (10 yr return period 24 hr duration storm)													
	HLP, AF	Trained personnel onsite to maintain redundant systems during emergency situations.													
	HLP, AF	Monitoring of HLP solutions inventory and climatic conditions to forecast solution storage requirements.													
	HLP, AF	Contingency water treatment system in place if controlled release necessary.													

Project Proposal for the Carmacks Copper Project

Appendix K - Updated Summary of the Assessment of Potential Environmental Effects, Proposed Mitigation Measures and Significance Assessment

Potential Effect on VECC	Project Component*	Proposed Mitigation Measures	Residual Effects									Significance	Likelihood		
			Direction	Duration	Geographic Extent	Magnitude	Reversibility	Ecological Context	Economic & Social Context	Risk	Frequency		Probability of Occurrence	Uncertainty	
Direct Effect - unusually cold weather can cause process upsets.	AF, HLP	Heap leaching proven technology in winter conditions. Sulphuric acid heap leach an exothermic reaction and produces heat. Redundant systems in place as contingency measures.	-	1	2	2	2	2	2	3	2	2	NS	2	3
Direct Effects - reduced visibility due to winter storms and blowing snow can restrict access to or from the site.	All	Facilities and equipment design has been previously proven and personnel are trained to work under Arctic conditions.													
	AR	Government of Yukon is expected to maintain the Freegold Road year-round.	-	1	2	2	2	2	2	3	2	2	NS	2	3
	AR	Snow clearing equipment will be available on site to maintain mine access road.													
	All	Radio telephone or satellite phones will be on site to ensure communications links.													
	All	Trained first aid staff will be on site at all times during operations.													
	All	Scheduled changes and alternative delivery methods (aircraft) will be implemented in case environmental changes affect usability of the winter access.													

* Open Pit – OP; Waste Rock Storage Area – WR; Heap Leach Pad and Events Pond – HLP; Access and Haul Roads – AR; Ancillary Facilities – AF; All Mine Activities – All.

Appendix K - Significance of Effects Descriptors

Descriptor	Direction	Duration	Geographic Extent	Magnitude	Reversibility*	Ecological Context	Economic & Social Context	Risk Characterization**	Frequency	Significance
Very low (1)	+ = Beneficial Effect	<1 to 5 years (1)	<1 ha (1)	negligible effects to surrounding environment (1)	95-100% (1)	community with very good ecological fitness and a very high degree of resilience (1)	community with very good economic and social fitness and a very high degree of resilience (1)	negligible risk (1) : negligible to high hazard assessment; negligible to very low exposure assessment; and negligible consequence assessment	Occurs once (1)	Not significant adverse environmental effect (NS)
Low (2)	n = neutral effect	5 to 10 years (2)	1-75 ha (2)	low effects to surrounding environment (2)	75-95% (2)	community with good ecological fitness and a high degree of resilience (2)	community with good economic and social fitness and a high degree of resilience (2)	very low risk (2) : negligible to high hazard assessment; negligible to very low exposure assessment; and negligible consequence assessment	Occurs Rarely and at Sporadic Intervals (2)	Positive environmental effect (P)
Moderate (3)	- = negative effect	10 to 25 years (3)	75-200 ha (3)	moderate effects to surrounding environment (3)	60-75% (3)	community with moderate ecological fitness and a moderate degree of resilience (3)	community with moderate economic and social fitness and a moderate degree of resilience (3)	low risk (3): very low to high hazard assessment; low to medium exposure assessment; and very low to low consequence assessment	Occurs on a regular basis and a regular interval (3)	Significant adverse environmental effect (S)
High (4)	+/- = beneficial and negative effect	25 to 100 years (4)	200-300 ha (4)	extreme effects to surrounding environment (4)	40-60% (4)	community with poor ecological fitness and a low degree of resilience (4)	community with a poor economic and social fitness and low degree of resilience (4)	medium risk (4) : low to high hazard assessment; medium to high exposure assessment; and low to medium consequence assessment	Continuous (4)	
Very High (5)		100 years- permanent (5)	>300 ha (5)	catastrophic effects to surrounding environment (5)	<40% (5)	community with very poor ecological fitness and a low degree of resilience (5)	community with very poor economic and social fitness and a low degree of resilience (5)	high risk (5): low to high hazard assessment; medium to high exposure assessment; and medium to high consequence assessment		

Notes: Numbers in parenthesis () equals numerical weighting value. * Descriptors for reversibility are opposite to the effects descriptors.

** Risk characterization adapted from Van Zyl, Koval and Li (1992).

Likelihood:

Probability of Occurrence:

Based on professional judgment

- 1 = None
- 2 = Low probability of occurrence
- 3 = Medium probability of occurrence
- 4 = High probability of occurrence

Uncertainty:

Based on scientific information, social research or professional judgement

- 1 = Low level of confidence
- 2 = Medium level of confidence
- 3 = High level of confidence

NA = Not Applicable