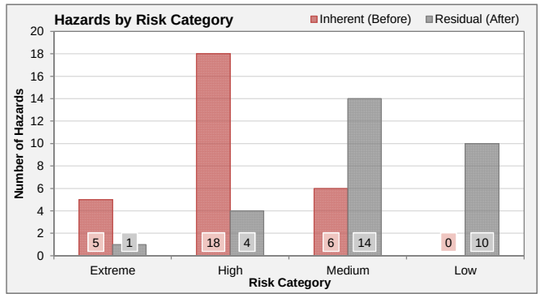
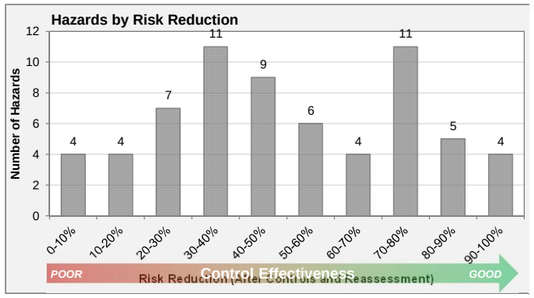
PROJECT	Iron Valley BWT Closure Risk Assessment	COMPANY	BC Iron Limited	FACILITATOR	Kim Knight (AECOM)	DATE	17/12/15

ATTENDEE	COMPAMY	POSITION

ATTENDEE	COMPAMY	POSITION

Inherent				Residual				Total Risks	E, H or M revised to LOW			
E	H	M	L	E	H	M	L		I	R	#	%
5	18	6	0	1	4	14	10	29	29	19	10	34%





Rev	Description / Changed sections	By Person	Date
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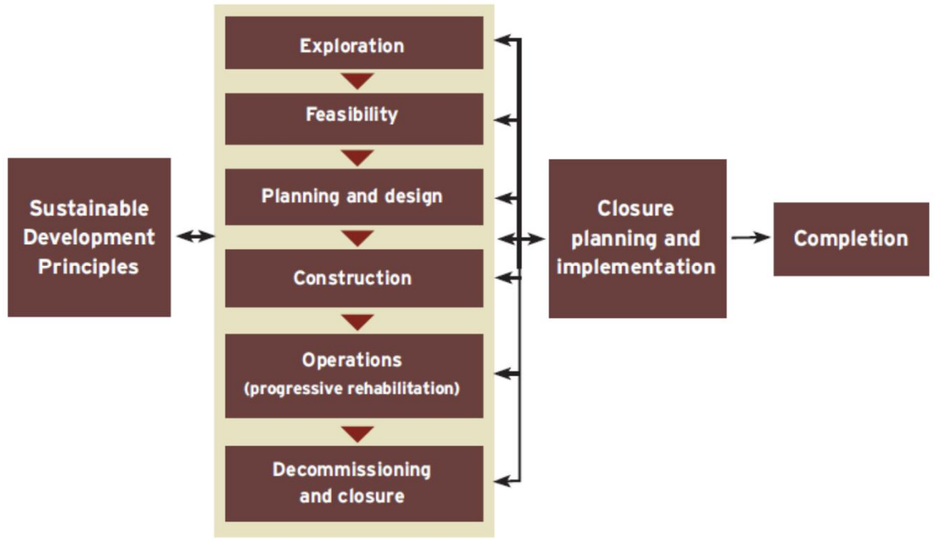

DEFINITIONS

EXPLORATION	Initial phase of a prospective mine's life
FEASIBILITY	Project evaluation process to determine whether a resource can be commercially mined, once mineral resources have been identified,
PLANNING & DESIGN	The goal of mine planning and design is to achieve an integrated mine systems design, whereby a mineral is extracted and prepared at a desired market specification and at a minimum unit cost within acceptable environmental, social, legal and regulatory constraints.
CONSTRUCTION	Activities that create a visual change and impacts on the environment and
OPERATIONS (progressive rehabilitation)	This includes the following three stages: Operations commissioning stage: the period after construction which can typically include initial commissioning, start up and pre-stripping for pits, construction of waste rock dumps and tailings storage facilities. Mature operations stage: the mid-mine phase where most of the disturbance has taken place and the mine is in steady operations. Pre-closure planning stage: this may be two years or more before known ore resources are exhausted.
DECOMMISSIONING AND CLOSURE	Implementation of the closure plan developed in the earlier stages, conduct of the necessary investigations and studies to identify potential contamination, and conformation that the agreed outcomes and criteria have been met.

References:
Department of Industry Tourism and Resources, October 2006, *Leading Practice Sustainable Development Program*

This row	select(aspect)	select(SUBCATS)	select(task)			risk			risk	doc		select(Role)
CRAW: Iron Valley BWT Closure Risk Assessment - BC Iron Limited (17/12/15)							Hierarchy of Control Measures					
ID	Environmental Aspect	Environmental Aspect Sub-category	Project Phase	Identified Hazard (Description)	Hazard Outcome (Unwanted Event)	Inherent Risk (Rank)	HIGHER CONTROLS Elimination, Substitution or Engineering	Administrative or PPE	Residual Risk (Rank)	Procedure Reference (BCIN & Contract Partner)	Further Action / Comments (How will the hazard be monitored and controls improved?)	Responsible Role
1	GENERAL CLOSURE REQUIREMENTS (ALL DOMAINS - SITE WIDE)											
1.01	Rehabilitation	Weeds	Construction Operations (Progressive Rehabilitation) Decommissioning & Closure	Presence of weeds, resulting in;	Inability to rehabilitate to regulator expectation. Delayed regulator sign- off. Failure to revegetate as per approvals commitments. Loss of reputation. Vegetation fails to emerge or establish due to species competition.	HIGH (13)		1) Rehabilitation will be managed in accordance with the BCIN Mine Closure Plan. 2) Ongoing monitoring and management of landforms. 4) Appropriate topsoil management during construction/operations. 5) Undertake consultation in accordance with stakeholder.	MEDIUM (9)	BCIN-EHMS-WI-005 Ground Disturbance and Topsoil Stockpiling Work Instruction BCIN-EHMS-WI-010 Weed Management Work Instruction BCIN-EHMS-MCP-001 Mine Closure Plan BCI-EHMS-CG-007 Land and Biodiversity Management Guideline		Environmental Coordinator Superintendent - Mining
1.02	Rehabilitation Soil Resource	Topsoil Surface Water Erosion/Gully's	Planning & Design Construction Operations (Progressive Rehabilitation) Decommissioning & Closure	Inappropriate landform design (steep batters) and proximity to Weeli Wolli Creek, resulting in;	Loss of surface soils compromising landform stability. Loss of surface soils impacting nearby surface waters (turbidity). Loss of surface soils, thereby impacting revegetation success. Inability to rehabilitate to regulator expectation. Delayed regulator sign- off. Failure to revegetate as per approvals commitments. Loss of reputation. Vegetation fails to emerge or establish due to species competition.	HIGH (13)	1) Locate TSF and WRL's away from creek line. 2) Engineer landforms to specification.	1) Rehabilitation will be managed in accordance with the IV Mine Closure Plan. 2) Ongoing monitoring and management of landforms.	MEDIUM (9)	BCIN-EHMS-WI-005 Ground Disturbance and Topsoil Stockpiling Work Instruction BCI-EHMS-REG-007 BCI-EHMS-WI-002 Environmental and Heritage Induction Work Instruction BCI-EHMS-WI-003 Inspections and Audits Work Instruction BCI-EHMS-WI-004 Risk Assessment Work Instruction BCIN-EHMS-MCP-001 Mine Closure Plan		Environmental Coordinator Superintendent - Mining
1.03	Fauna Stakeholder Management	Fences Feral Animals Landfill Public Safety Roads Vehicles	Decommissioning & Closure	Presence of people and/or feral animals on-site during the closure period resulting in;	Safety risks. Loss of life or injury (people or animal).	HIGH (13)	1) Removal of access road. 2) Security bunding around mine pit. 3) Signage.	1) Removal of access, security bunding and signage will be managed in accordance with the BCIN Mine Closure Plan.	MEDIUM (9)	BCIN-EHMS-MCP-001 Mine Closure Plan BCIN-EHMS-MP-004 Fauna Management Plan BCIN-EHMS-REG-006 Weed and Feral Animal Control Register		Environmental Coordinator Superintendent - Mining
1.04	Rehabilitation	Feral Animals	Construction Operations (Progressive Rehabilitation) Decommissioning & Closure	Fauna access to rehabilitation, resulting in:	Vegetation fails to emerge or establish.	MEDIUM (8)	1) Remove access to food sources, such as exposed landfill. 2) Remove access to water sources post operations period.	1) Rehabilitation will be managed in accordance with the BCIN Mine Closure Plan. 2) Progressive rehabilitation during operational phase. 3) Rehabilitation trials, potential modification of species list.	MEDIUM (8)	BCIN-EHMS-MCP-001 Mine Closure Plan BCIN-EHMS-MP-009 Waste Management Plan BCIN-EHMS-REG-006 Weed and Feral Animal Control Register BCIN-EHMS-MP-004 Fauna Management Plan BCI-EHMS-CG-008 Stakeholder Engagement Guideline		Environmental Coordinator Superintendent - Mining

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1.05	Water	Dewatering Surface Water	Operations (Progressive Rehabilitation) Decommissioning & Closure	Excess water discharge to Weeli Wolli Creek, resulting in;	Cumulative ecological impacts including changes in quality and quantity of water within the system.	HIGH (17)	1) Direct discharge to various output locations. 2) Discharge via a schedule (informed by baseline studies).	1) Monitoring during operation of mine to ascertain appropriate baseline.	LOW (5)	BCI-EHMS-WI-001 Emissions Reporting Work Instruction BCI-EHMS-CG-007 Land and Biodiversity Management Guideline BCIN-EHMS-MP-005 Flora and Vegetation Management Plan	1) Determine an appropriate baseline for monitoring cumulative impacts.	Environmental Coordinator Superintendent - Mining
1.06	Dust Vegetation & Flora Rehabilitation	Monitoring Licences & Approvals	Decommissioning & Closure	Vegetation fails to emerge or establish, resulting in:	Increase dust impacting on local sensitive receptors. Loss of reputation. Inability to meet regulator expectations.	HIGH (13)		1) Ongoing monitoring post-rehabilitation. 2) Vegetation health monitoring post-rehabilitation.	MEDIUM (9)	BCIN-EHMS-MCP-001 Mine Closure Plan BCI-EHMS-CG-007 Land and Biodiversity Management Guideline BCIN-EHMS-MP-005 Flora and Vegetation Management Plan	1) Develop completion criteria so that post closure monitoring programs can be effectively implemented.	Environmental Coordinator Superintendent - Mining
1.07	Rehabilitation Soil Resource	Surface Water	Decommissioning & Closure	Hydrological events causing soil compaction, erosion, gullying etc. within rehabilitated areas, resulting in;	Failure to meet rehabilitation standards. Failure to revegetate as per approvals commitments. Loss of reputation. Revegetation unsuccessful. Vegetation fails to emerge or establish due to poor growth medium. Remedial costs.	HIGH (16)	1) Deep ripping of compacted soils appropriate to location, prior to topsoil placement. 2) Rehabilitated areas designed to be free draining and erosion resistant. 3) Natural drainage patterns to be re established as far as practicable. 4) Slope lengths and angles incorporated into design so thatrehabilitation objectives can be met.		MEDIUM (9)	BCIN-EHMS-MCP-001 Mine Closure Plan BCIN-EHMS-WI-009 Waste Water Tratement Plant Management Work Instruction BCIN-EHMS-FM-009 Groundwater Sampling Log Sheet BCI-EHMS-CG-010 Water Management Guideline BCIN-EHMS-MP-010 Water Management Plan	1) Develop completion criteria so that post closure monitoring programs can be effectively implemented.	Environmental Coordinator Superintendent - Mining
1.08	Rehabilitation Hazardous Materials	Chemicals Hydrocarbons	Planning & Design Decommissioning & Closure	Hydrocarbon, or chemical spills caused by closure activities, resulting in;	Remedial work required. Ongoing closure management. Inability to meet regulator expectations.	HIGH (13)		1) Existing operational control measures in place. 2) Operational checks of hydrocarbon management areas during the closure period. 3) In accordance with the Contaminated Sites Act 2003, report any contaminated or suspected contaminated sites to the Department of Environment Regulation (DER).	MEDIUM (9)	BCIN-EHMS-MCP-001 Mine Closure Plan		

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1.09	Rehabilitation Soil Resource Vegetation & Flora	Seeds	Operations (Progressive Rehabilitation) Decommissioning & Closure	Inability to procure adequate quality and quantity seed for rehabilitation leading to:	Failure to meet rehabilitation standards specifically species abundance and diversity differs significantly to closure target. Failure to revegetate to regulator expectations. Loss of reputation. Vegetation fails to emerge or establish due to lack of viable seed bank, quality or quantity of procured seed.	HIGH (16)	1) Procure and contract supplier for early seed collection. 2) Store seed in an appropriate facility. 3) Have appropriate quality checks performed to ascertain viability.	1) Seed procurement strategy. 2)Topsoil to be reused immediately where practicable or otherwise, stockpiled and protected for use in rehabilitation. 2) Soil resource management plan. 3)Propagation trials. 4) Appropriate forward planning for seed procurement and storage. 5) Flora surveys to inform local provinance species list.	LOW (5)	BCIN-EHMS-WI-005 Ground Disturbance and Topsoil Stockpiling Work Instruction BCIN-EHMS-FM-006 Ground Disturbance Permit BCIN-EHMS-MCP-001 Mine Closure Plan BCIN-EHMS-IND-001 Environmental Induction BCI-EHMS-REG-002 Environmental and Heritage Inspections, Audits and Monitoring Schedule BCIN-EHMS-MP-005 Flora and Vegetation Management Plan	Seed collection procedure / guidance. Seed propagation trials.	Environmental Coordinator Superintendent - Mining
1.1	Stakeholder Management Rehabilitation	Landowners Licences & Approvals	Decommissioning & Closure	Inadvertent impact to heritage site during closure operations, leading to	Unhappy stakeholders (native title claimant group). Community dissatisfaction. Difficulty obtaining regulator sign off. Difficulty obtaining land access.	HIGH (17)		1) Stakeholder Management Plan. 2) Undertake consultation in accordance with the Stakeholder Management Plan. 3) Regulated controlled consultation.	LOW (5)	BCI-EHMS-FM-008 Stakeholder Contact Record Form BCI-EHMS-WI-005 Stakeholder Engagement Records Work Instruction BCI-EHMS-CG-008 Stakeholder Engagement Guideline BCIN-EHMS-MCP-001 Mine Closure Plan	Mick K to confirm outcomes of native title discussions, Les P to provide further information.	Environmental Coordinator Superintendent - Mining
1.11	Rehabilitation EHMS	Monitoring Stakeholders	Decommissioning & Closure	Onerous ongoing regulator commitments and conditions imposed during the closure period, resulting in;	Ongoing financial burden. Lack of resources to perform work requirements. Inability to rehabilitate according to existing rehabilitation standards. Failure to meet regulator rehabilitation expectations. Loss of reputation. Failure to meet all legal obligations. Effect future approvals related to other projects.	HIGH (16)	1) Early consultation with regulator.	1) Adhere to stakeholders and regulators agreed action plan. 2) Mine Closure Provisions.	MEDIUM (9)	BCI-EHMS-FM-008 Stakeholder Contact Record Form BCI-EHMS-WI-005 Stakeholder Engagement Records Work Instruction BCI-EHMS-CG-008 Stakeholder Engagement Guideline BCIN-EHMS-MCP-001 Mine Closure Plan	1) Update Mine Closure Plan 2) Developed a Mine Closure Model for all closure scenarios (Model water balance for western side of WRL along creek line)	
2	**PLANT SITE & INDUSTRIAL INFRASTRUCTURE**											

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2.01	Soil Resource Water	Chemicals Demobilisation GDEs Hydrocarbons Ground Water Short Range Endemic Subterranean Fauna Surface Water	Planning & Design Operations (Progressive Rehabilitation) Decommissioning & Closure	Discharge/ spills to surface water and groundwater from plant site/ industrial infrastructure during closure activities, resulting in;	Delay or refusal to gain sign-off from regulator. Impact to GDE's in nearby Weeli Wolli Creek and subterranean fauna. Effect future approvals related to other projects.	MEDIUM (8)		1) Identification of environmental requirements. 2) Legal and Others Register. 3) Mine Closure Plan	LOW (5)	BCI-EHMS-WI-004 Risk Assessment Work Instruction BCIN-EHMS-MCP-001 Mine Closure Plan BCI-EHMS-WI-001 Emissions Reporting Work Instruction BCIN-EHMS-IND-001 Environmental Induction BCI-EHMS-CG-006 Hydrocarbon and Hazardous Substance Management Guideline BCIN-EHMS-MP-006 Hydrocarbon and Hazardous Substance Management Plan		Environmental Coordinator Superintendent - Mining
2.02	Water	Modelling	Planning & Design Operations (Progressive Rehabilitation)	Failure to consider surface water flows, and drainage management during design, resulting in:	Compaction of surrounding soils. Water logging/ pooling of surface waters. Adequate revegetation and rehabilitation criteria not met. Impacts to surrounding native vegetation via water logging and sediment erosion. Contaminant of ecosystem (breach of unauthorised discharge Regs) Flooding and damage of infrastructure.	EXTREME (21)	1) Engineer appropriate water control/ flood protection structure/ culvert (for a 1:100 yr rainfall event). 2) Remove the need for culvert. 3) Design TSF to be sited away from creek line / flow path.	1) Environmental liaison with project design engineers to ensure that potential indirect impacts to flora and vegetation are considered in detailed designs. 2) Detailed designs will include management strategies for surface water drainage to prevent disruption to surface water flow and prevent silt runoff into surrounding environment. (i.e. adequate sump size for volume of water). 3) Design carried into operations / construction. 4) Ensure adequate footprint for drainage infrastructure (design form).	LOW (5)	BCIN-EHMS-MP-010 Water Management Plan BCI-EHMS-CG-010 Water Management Guideline BCI-EHMS-FW-001 EHMS Framework	Site water balance to be completed.	Environmental Coordinator Superintendent - Mining
3	**LANDFORMS - TSF/ WASTE ROCK LANDFORM**											
3.01	Ground Disturbance Rehabilitation Soil Resource	Erosion/Gully's Topsoil Waste Rock Dump	Planning & Design Construction Operations (Progressive Rehabilitation)	Waste Rock Landform up to 100m height, thereby exposing top batters to weather, resulting in:	Stability compromised by intense rainfall events, increased velocity of run-off downslope. Gullying/ erosion. Loss of surface soils, thereby impacting revegetation success. Inability to rehabilitate to regulator expectation. Delayed regulator sign- off. Failure to revegetate as per approvals commitments.	HIGH (17)	Engineer landform for weather events, water shedding design. Decrease batter slopes or rock armour. Mulch batter Progressive rehabilitation during operational phase.	Appropriate engineering design (sign off by geotechnical engineering), TSF located away from drainage line, appropriate period of post closure monitoring - condition, operational monitoring, TSF manual, signage, security bunding.	HIGH (13)	Iron Valley Mine Closure Plan		Environmental Coordinator Superintendent - Mining
3.02	Ground Disturbance Rehabilitation	Erosion/Gully's		Failure of western batter of WRL caused by high volumes of water flowing down unnamed creek line resulting in:	Erosion or failure of WRL batter on western side, Loss of surface soils, thereby impacting revegetation success. Inability to rehabilitate to regulator expectation. Delayed regulator sign- off.	HIGH (13)	1) Engineer landform for weather events, water shedding design. 2) Decrease batter slopes or rock armour.	Appropriate engineering design (sign off by geotechnical engineering), TSF located away from drainage line, appropriate period of post closure monitoring - condition, operational monitoring, TSF manual, signage, security bunding.	MEDIUM (9)	BCIN-EHMS-MCP-001 Mine Closure Plan	Re-visit surface water studies to confirm level of risk (Soil and Water Group).	Environmental Coordinator Superintendent - Mining

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3.03	Rehabilitation		Operations (Progressive Rehabilitation) Decommissioning & Closure	TSF design fails to account for revegetation requirements (i.e. store and release layer), resulting in:	Revegetation unsuccessful. Rehabilitation does not meet regulator expectations.	MEDIUM (8)	Design and engineer TSF to accommodate for rehabilitation requirements.	1) Rehabilitation will be managed in accordance with the BCIN Mine Closure Plan.	LOW (5)	BCIN-EHMS-MCP-001 Mine Closure Plan		Environmental Coordinator Superintendent - Mining
3.04	Rehabilitation	Topsoil	Construction Operations (Progressive Rehabilitation) Decommissioning & Closure	Insufficient growth medium resulting in:	Failure of vegetation establishment. Rehabilitation does not meet regulator expectations.	HIGH (17)		1) Rehabilitation will be managed in accordance with the BCIN Mine Closure Plan. 2) Appropriate topsoil management during construction/operations. 5) Undertake consultation in accordance with stakeholder.	LOW (5)	BCIN-EHMS-WI-005 Ground Disturbance and Topsoil Stockpiling Work Instruction BCI-EHMS-FW-001 EHMS Framework BCIN-EHMS-MP-Construction Environmental Management Plan	Rehabilitation trials. Materials balance (topsoil and subsoil).	Environmental Coordinator Superintendent - Mining
3.05	Vegetation & Flora Water Ground Disturbance Hazardous Materials	Spills	Operations (Progressive Rehabilitation) Decommissioning & Closure	TSF impoundment breach , resulting in:	Impact to surrounding ecosystems, specifically Weeli Wolli Creek.	MEDIUM (8)	1) Appropriate engineering design (sign off by geotechnical engineering) 2) TSF located away from drainage line.	1) Ongoing monitoring and management of landforms. 2) TSF manual.	LOW (3)	BCIN-EHMS-MCP-001 Mine Closure Plan		Environmental Coordinator Superintendent - Mining
3.06	EHMS Fauna Stakeholder Management Vegetation & Flora	Spills	Operations (Progressive Rehabilitation) Decommissioning & Closure	TSF impoundment breach , resulting in:	Injury or loss of life	EXTREME (18)	1) Appropriate engineering design (sign off by geotechnical engineering) 2) TSF located away from drainage line.	1) Ongoing monitoring and management of landforms. 2) TSF manual. 3) Recent suitable signage. 4) Security bunding.	HIGH (10)	Iron Valley Mine Closure Plan		Environmental Coordinator Superintendent - Mining
3.07	Waste Rehabilitation	Modelling Overburden Waste Rock Dump	Planning & Design Operations (Progressive Rehabilitation) Decommissioning & Closure	Poor landform design, inconsistency with planning requirements.	Landform design and rehabilitation does not meet regulator expectations.	HIGH (16)		1) Rehabilitation practices and monitoring will be developed in accordance with the Mine Closure Plan, including: 2) Land-system specific. 3) Progressive rehabilitation. 4) Landform stability. 5) Landform visual amenity. 6) Establishment and maintenance of appropriate vegetation cover. 7) Adequate financial provision for closure.	LOW (5)	BCIN-EHMS-MCP-001 Mine Closure Plan	1) Develop completion criteria so that post closure monitoring programs can be effectively implemented.	Environmental Coordinator Superintendent - Mining
4	**MINING INFRASTRUCTURE - MINE PIT**											

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4.01	Water	Pit Lakes AMD Ground Water Salinity	Decommissioning & Closure	Development of hypersaline and/or high metal concentrations in pit lake water due to pit void being a flow-through system, resulting in;	Mobilising hypersaline or high metal concentrations off site. Death of local fauna due to high salt concentration in water. Potential density driven contaminant plume into groundwater system. Poor vegetation health of surrounding ecosystems. Poor community reputation. Remediation costs. Reporting against Contaminated Sites Act. Inability to relinquish tenements.	MEDIUM (8)		1) Groundwater levels and quality closely monitored at groundwater abstraction sites and mine pits during operation and as required post closure. 2) Periodic groundwater monitoring data review to regulators during operations, through triennial review of groundwater model.	MEDIUM (8)	BCI-EHMS-CG-010 Water Management Guideline BCIN-EHMS-MP-010 Water Management Plan BCIN-EHMS-MCP-001 Mine Closure Plan	Site water balance to be completed. Awaiting outcome of AQ2 study.	Environmental Coordinator Superintendent - Mining
4.02	Rehabilitation	Pit Lakes Public Safety Bunds	Decommissioning & Closure	Geotechnically unstable pit walls causing slumping, collapse of pit walls, resulting in;	Need to re-profile pit walls post mining. Additional remediation costs. Potential damage to safety bund and integrity. Community reputation. Regulator concerns and inability to relinquish tenements.	EXTREME (23)	1) Appropriate engineering design, Abandonment bund constructed outside of the zone of instability and in accordance with Mines Safety and Inspection Regulations 1995. 2) Use of competent rock for the construction of safety bund.	1) Geotechnical (i.e. Pit wall stability) will be monitored during operations and closure phase. 2) Erection of restricted access signage at appropriate locations. 3) Access tracks are suitably blocked off. 4) Routine inspections undertaken and documented. 5) Annual third party Audit. 6) Annual reporting to regulator.	LOW (5)	BCIN-EHMS-MCP-001 Mine Closure Plan		Resident Manager
4.03	Rehabilitation	Bunds Pit Lakes Public Safety Feral Animals	Decommissioning & Closure	Failure / poor construction of abandonment bund, resulting in:	Uncontrolled access to pit void by public or fauna. Potential human fatality or injury into pit void. Loss of company reputation. Prosecution.	HIGH (14)	1) Appropriate engineering design by suitably qualified Mine Engineers. 2) Use of competent rock and suitable materials for the construction of safety bund. 3) Construction in accordance with DMP guideline and Mining Proposal.	1) Erection of restricted access signage at appropriate locations. 2) Access tracks are suitably blocked off. 3) Routine inspections undertaken and documented. 4) Annual third party Audit. 5) Annual reporting to regulator.	MEDIUM (9)	BCIN-EHMS-MCP-001 Mine Closure Plan		

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4.04	Water Vegetation & Flora	Groundwater recovery Ground Water Short Range Endemic	Decommissioning & Closure	Cessation of groundwater discharge post mining, resulting in:	Reduction in health of GDEs and riparian located in Weeli Wolli Creek that have flourished during mining operations (due to presence of discharge mine water). Loss of baseline fauna and flora along Weeli Wolli Creek.	EXTREME (20)	1) Gradually reduce volume of mine water discharge towards the cessation of mining (rather than an abrupt stop to mine water discharge). 2) Effective mine planning. 3) Spread mine water discharge over various discharge points.	1) Groundwater monitoring. 2) Review of baseline vegetation for effective monitoring.	MEDIUM (9)	BCIN-EHMS-FM-009 Groundwater Sampling Log Sheet BCIN-EHMS-MP-010 Water Management Plan BCIN-EHMS-MP-005 Flora and Vegetation Management Plan BCI-EHMS-CG-010 Water Management Guideline	1) Implement a GDE vegetation health monitoring program 2) Regular visual inspection of vegetation health; Confirm appropriate discharge strategy with Astron, to reduce impacts to GDE's. Account for cumulative impacts from other mining companies in the vicinity. (Note that discharge into Weeli Wolli will continue from RTIO).	Environmental Coordinator Superintendent - Mining
4.05	Water Fauna	Groundwater recovery Ground Water Subterranean Fauna	Decommissioning & Closure	Groundwater change after mining ceases, leading to:	Troglofauna and stygofauna population impacts. Loss of subterranean fauna habitat.	MEDIUM (8)			MEDIUM (8)	BCI-EHMS-CG-010 Water Management Guideline BCIN-EHMS-MP-010 Water Management Plan BCIN-EHMS-MCP-001 Mine Closure Plan		Environmental Coordinator Superintendent - Mining
4.06	Rehabilitation Fauna	Pit Lakes Feral Animals	Decommissioning & Closure	The formation of a pit lake attracts fauna (cattle, kangaroos etc.)/feral animals, resulting in;	Potential fauna injury/deaths. Proliferation of feral animals. Poor rehabilitation performancedue to grazing. Inability to meet closure rehabilitation objectives. Eutrophication of pit lake. Long term financial liability.	HIGH (17)		1) Consultation with land managers in region to identify collaborative approach to feral animal management.	MEDIUM (8)	BCI-EHMS-WI-005 Stakeholder Engagement Records Work Instruction BCIN-EHMS-MCP-001 Mine Closure Plan BCI-EHMS-CG-008 Stakeholder Engagement Guideline BCIN-EHMS-MP-008 Heritage and Community Management Plan		Environmental Coordinator Superintendent - Mining
5	**OTHER - FLOOD PROTECTION STRUCTURE (creek line)**											
5.01	Water	Modelling Ponds Surface Water Water Balance	Operations (Progressive Rehabilitation) Decommissioning & Closure	OPTION 1 - Standard culvert under WRL becomes blocked resulting in:	Integrity of WRL compromised. Slumping of WRL on western side. Sediment building up on western side. Limiting flow to Weeli Wolli Creek effecting GDE's and riparian vegetation. Pooling of water effecting revegetation on WRL and ground surfaces.	HIGH (17)	Design culvert to 1 in 100 yr rainfall event. Sediment capture retention basins upstream. Design WRL to reduce percolation and increase evaporation. Rip-rap stability structures on west side of WRL. Early consultation with regulator.	1) Groundwater levels and quality closely monitored at groundwater abstraction sites and mine pits during operation and as required post closure. 2) Periodic groundwater monitoring data review to regulators during operations, through triennial review of groundwater model.	HIGH (13)	BCIN-EHMS-FM-009 Groundwater Sampling Log Sheet BCI-EHMS-CG-010 Water Management Guideline	Surface water and engineering studies required. Need to understand permeability of rock material - time for water to drain, time of pooling (MRL and AQ2). **HOLD** - Option not deemed viable. *Project design was changed subsequent to RA to avoid this risk.*	Environmental Coordinator Superintendent - Mining

CRAW: Iron Valley BWT Closure Risk Assessment - BC Iron Limited (17/12/15)							Hierarchy of Control Measures					
ID	Environmental Aspect	Environmental Aspect Sub-category	Project Phase	Identified Hazard (Description)	Hazard Outcome (Unwanted Event)	Inherent Risk (Rank)	HIGHER CONTROLS Elimination, Substitution or Engineering	Administrative or PPE	Residual Risk (Rank)	Procedure Reference (BCIN & Contract Partner)	Further Action / Comments (How will the hazard be monitored and controls improved?)	Responsible Role
5.02	Water	Modelling Ponds Surface Water Water Balance	Operations (Progressive Rehabilitation) Decommissioning & Closure	OPTION 2 - Permeable sub surface drain becomes blocked resulting in:	Integrity of WRL compromised. Slumping of WRL on western side. Sediment building up on western side. Limiting flow to Weeli Wolli Creek effecting GDE's and riparian vegetation. Pooling of water effecting revegetation on WRL and ground surfaces.	HIGH (17)	Design culvert to 1 in 100 yr rainfall event. Sediment capture retention basins upstream. Design WRL to reduce percolation and increase evaporation. Rip-rap stability structures on west side of WRL. Early consultation with regulator.	1) Groundwater levels and quality closely monitored at groundwater abstraction sites and mine pits during operation and as required post closure. 2) Periodic groundwater monitoring data review to regulators during operations, through triennial review of groundwater model.	HIGH (13)	BCIN-EHMS-FM-009 Groundwater Sampling Log Sheet BCI-EHMS-CG-010 Water Management Guideline	Surface water and engineering studies required. Need to understand permeability of rock material - time for water to drain, time of pooling (MRL and AQ2). **HOLD** - Option not deemed viable. *Project design was changed subsequent to RA to avoid this risk.*	Environmental Coordinator Superintendent - Mining
5.03	Water	Modelling Ponds Surface Water Water Balance	Operations (Progressive Rehabilitation) Decommissioning & Closure	OPTION 3 - No action, block unnamed creekline with WRL. No drain resulting in:	Pooling of excess water potentially developing a new ecosystem. Integrity of WRL compromised. Slumping of WRL on western side. Sediment building up on western side. Cessation of water flow to Weeli Wolli Creek effecting health of GDE's and riparian vegetation. Pooling of water effecting revegetation on WRL and ground surfaces.	EXTREME (20)	1) Design pooling retention area to 1 in 100 yr rainfall event. 2) Sediment capture retention basins upstream. 3)Design WRL to reduce percolation and increase evaporation. 4) Rip-rap stability structures on west side of WRL. 5) Early consultation with regulator.	1) Groundwater levels and quality closely monitored at groundwater abstraction sites and mine pits during operation and as required post closure. 2) Periodic groundwater monitoring data review to regulators during operations, through triennial review of groundwater model.	EXTREME (20)	BCIN-EHMS-FM-009 Groundwater Sampling Log Sheet BCI-EHMS-CG-010 Water Management Guideline	Surface water and engineering studies required. Need to understand permeability of rock material - time for water to drain, time of pooling (MRL and AQ2). HOLD - Option not deemed viable. *Project design was changed subsequent to RA to avoid this risk.*	Environmental Coordinator Superintendent - Mining

Critical Risk Assessment Worksheet (CRAW)

				Risk Assessment Matrix		Serious Potential Incident		
				Consequence				
				Insignificant	**Minor**	**Moderate**	**Major**	**Catastrophic**
				Injury	First Aid Treatment	Medical treatment	Lost Time Injury	Permanent Disability or Single Fatality	Multiple Fatalities
				Environment	No Impact on baseline environment. Localised to point source.	Localised within site boundaries. Recovery measurable within 1 month of impact.	Moderate harm with possible wider effect.	Significant harm with local effect.	Significant Impact that is widespread, unconfined impact, requiring long-term recovery, leaving major residual damage.
				Asset Damage	Up to $5k	$6k - $15,999	$16k - $30,999	$31k - $500k	Over $500k
				Reputation	Localised temporary impact	Localised, short term impact	Localised, long term impact but manageable	Localised, long term impact with unmanageable outcomes	Long term regional impact
				1	**2**	**3**	**4**	**5**
Likelihood	**Almost Certain**	Incident is expected to occur on this project, possibly several times	**A**	HIGH (11)	HIGH (16)	EXTREME (20)	EXTREME (23)	EXTREME (25)
	Likely	Incident may easily occur on this project	**B**	MEDIUM (7)	HIGH (12)	HIGH (17)	EXTREME (21)	EXTREME (24)
	Possible	Incident has occurred on a similar project	**C**	LOW (4)	MEDIUM (8)	HIGH (13)	EXTREME (18)	EXTREME (22)
	Unlikely	Incident unlikely to occur during this project	**D**	LOW (2)	LOW (5)	MEDIUM (9)	HIGH (14)	EXTREME (19)
	Rare	Incident highly unlikely to occur on this project	**E**	LOW (1)	LOW (3)	MEDIUM (6)	HIGH (10)	HIGH (15)