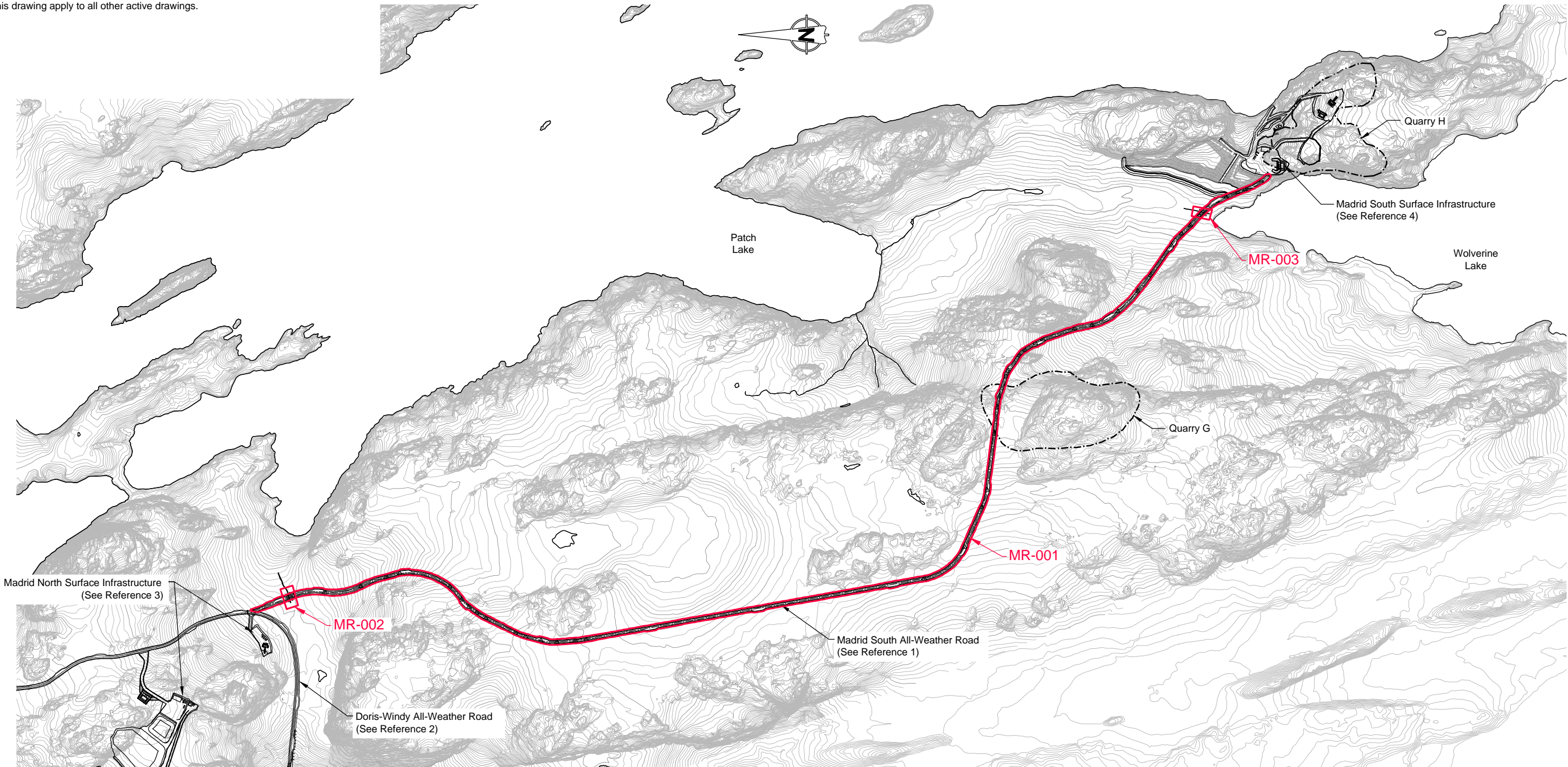


NOTES

- 1. Topographic contour data for the terrain model were provided by Hope Bay Mining, and is based on 2007 Aerial Photography. Contour intervals are 0.5m.
- 2. The co-ordinate system is UTM NAD 83, Zone 13.
- 3. All dimensions are in metric units, unless specifically mentioned.
- 4. Notes in this drawing apply to all other active drawings.

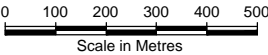


LEGEND

- Existing Approved and Permitted Quarry
- Proposed Development Quarry
- Road Alignment

REFERENCES

- 1. Engineering drawings for the Madrid South All-Weather Road, Hope Bay Project, Nunavut, Canada. Issued for Discussion. Revision D. Project No. 1CT022.001. October 31, 2014.
- 2. Engineering Drawings for the Doris-Windy All-Weather Road, Doris Infrastructure Project, Nunavut, Canada. Revision AB1. As-Built Drawings Prepared for Hope Bay Mining Ltd. Project Number: 1CH008.033/.058. May 11, 2012
- 3. Engineering drawings for the Madrid North Surface Infrastructure, Hope Bay Project, Nunavut, Canada. Issued for Discussion. Revision E. Project No. 1CT022.001. October 31, 2014.
- 4. Engineering drawings for the Madrid South Surface Infrastructure, Hope Bay Project, Nunavut, Canada. Issued for Discussion. Revision F. Project No. 1CT022.001. October 31, 2014.



Madrid Closure and Reclamation Plan

Madrid South All-Weather Road

HOPE BAY PROJECT

SRK JOB NO.: 1CH022.001
FILE NAME: 1CT022_001_Madrid South_Overview.dwg

DATE: Oct. 2014
APPROVED: LW
FIGURE: 5

C:\01_SITES\Hope Bay\Madrid Closure\1CT022_001_Madrid South_Overview.dwg

1. The design of the Madrid South Portal and Vent Raise is based on topographic contour information provided by HBML and is derived by 2007 aerial photography.
2. Contours are shown in 1m intervals.
3. The co-ordinate system is UTM NAD 83, Zone 13.
4. All dimensions are in metric units, unless specifically mentioned.
5. Notes in this drawing apply to all other active drawings.



 Proposed Quarry Boundary
 Water Line

1. Engineering drawings for the Madrid South All-Weather Road, Hope Bay Project, Nunavut, Canada. Issued for Discussion. Revision D. Project No. 1CT022.001. October 31, 2014.



SRK JOB NO.: 1CH022.001

FILE NAME: 1CT022.001_Madrid_South_Closure.dwg



HOPE BAY PROJECT

Madrid Closure and Reclamation Plan

Madrid South Site Layout

DATE: Oct. 2014

APPROVED:	LW
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FIGURE:

Attachment 1

Madrid Advanced Exploration Bulk Samples
Conceptual Closure and Reclamation Cost Estimate

Worksheet 1: Summary of Costs

Location	Facility	WBS Code	Cost (rounded to the nearest thousand)	
			By task	By work Area
Direct Cost Items				
Madrid North Surface Infrastructure			\$	1,834,000
Upper Portal Area				\$25,000
	Shop	MN-001	\$21,000	
	Diesel Generator			
	Office & Support Complex	MN-003	\$4,000	
Lower Portal Area				\$25,000
	Brine Mixing Facility	MN-004	\$1,000	
	Portal and Underground Works	MN-005	\$24,000	
Fuel Storage Facility				\$7,000
	Fuel Storage Facility	MN-006	\$7,000	
Pond Access Road				\$1,000
	Pond Access Road	MN-007	\$1,000	
Pollution Control Pond				\$12,000
	Pollution Control Pond	MN-008	\$12,000	
Portal Pad Road				\$6,000
	Portal Pad Haul Road	MN-009	\$1,000	
	Pipe Culvert	MN-010	\$5,000	
	Dual Water Line - Discontinued	MN-011	\$0	
Ore Stockpile Pad				\$1,000
	Ore Stockpile Pad	MN-012	\$1,000	
Waste Rock Pile				\$1,707,000
	Waste Rock Pile	MN-013	\$1,707,000	
Madrid North Vent Raise				\$48,000
	Vent Raise	MN-014	\$23,000	
	Ventilation and Heating Facilities	MN-015	\$4,000	
	Offices & Support Complex	MN-016	\$7,000	
	Diesel Generator	MN-017	\$2,000	
	Fuel Containment Area	MN-018	\$7,000	
	Vent Raise access road	MN-019	\$1,000	
	Pipe Culvert	MN-020	\$4,000	
Madrid South All-Weather Road			\$	17,000
Madrid South All-Weather Road				\$17,000
	Madrid South All-Weather Road	MR-001	\$5,000	
	Crossing #1	MR-002	\$6,000	
	Crossing #2	MR-003	\$6,000	
Madrid South Surface Infrastructure			\$	1,757,000
Infrastructure Pad Area				\$36,000
	Shop	MS-001	\$22,000	
	Fuel Storage Facility	MS-002	\$7,000	
	Offices & Support Complex	MS-003	\$5,000	
	Fresh Water Pipelines Leg 2 - Discontinued	MS-004	\$0	
	Diesel Generator	MS-005	\$2,000	
Laydown Pad				\$1,000
	Laydown Pad	MS-006	\$1,000	
Portal Area				\$25,000
	Portal and Underground Works	MS-007	\$24,000	
	Brine Mixing Facility	MS-008	\$1,000	
Primary Pollution Control Area				\$11,000
	Primary Pollution Control Pond	MS-009	\$11,000	
Haul Road and Water Supply Infrastructure				\$5,000
	Secondary Pollution Control Pond	MS-010	\$4,000	
	Haul and Access Roads	MS-011	\$1,000	
	Pumphouse - Discontinued	MS-012	\$0	
	Freshwater Pipeline Leg 1 - Discontinued	MS-013	\$0	
Infrastructure Access Road				\$1,000
	Infrastructure Access Road	MS-014	\$1,000	
Waste Rock Pile				\$1,648,000
	Waste Rock Pile	MS-015	\$1,648,000	
Ore Stockpile Pad				\$1,000
	Ore Stockpile Pad	MS-016	\$1,000	
Madrid South Vent Raise Area				\$26,000
	Vent Raise	MS-017	\$15,000	
	Ventilation and Heating Facilities	MS-018	\$4,000	
	Fuel Containment Area	MS-019	\$7,000	
Additional Direct Costs				
Off-site Shipping for Disposal	Ship Off-site for Disposal by Barge	DN-001	\$740,000	\$ 740,000
Off-Site Disposal Fees	Disposal Fees in Licensed Facility	DN-002	\$77,000	\$ 77,000
Water Management	Madrid North Water Management - Discontinued	WM-001	\$0	\$ -
	Madrid South Water Management - Discontinued	WM-002	\$0	\$ -
TOTAL DIRECT COSTS			\$	4,425,000
Indirect Cost Items				
Contingency			\$720,000	\$ 720,000
Mobilization & Demobilization			\$712,000	\$ 712,000
General and Administration costs			\$34,000	\$ 34,000
Field support			\$30,000	\$ 30,000
Hydrocarbon decontamination			\$150,000	\$ 150,000
Post-closure Monitoring			\$1,060,000	\$ 1,060,000
Subtotal Indirect Costs			\$	2,706,000
CLOSURE COSTS - TOTAL			\$	7,131,000

Worksheet 2: Detailed Cost Estimate															
Work Area Code	Item	Task	Sub-task	Activity	Task	Quantity	Unit	Cost Code	Unit Cost	Task Total	Activity Total	Subtotals	Source / Comments		
DIRECT COSTS															
Madrid North Portal and Vent Raise															
\$1,830,377															
\$25,959															
MN-001	1	1	1	Shop	Decommission electrical, mechanical (including connectors to generator house & transformer)	2	each	C.1.05		\$603.78	\$	1,207.57	\$	20,899.37	Assume large tent structure
	1	1	2		Demolish building	2,250	m ³	C.3.05		\$7.93	\$	17,835.91			
	1	1	3		Collect debris	450	m ³	C.3.10		\$0.14	\$	61.29			
	1	1	4		Load waste into containers for shipping off-site	198	m ³	C.4.01		\$4.97	\$	985.38			
	1	1	5		Haul debris to Roberts Bay laydown	198	m ³	C.4.14		\$4.09	\$	809.22			
MN-002	1	2	1	#N/A	Decommission (electrical)	1	each	C.1.05		\$603.78	\$	603.78	\$	1,366.64	Mobile Generator
	1	2	2		Disconnect generator units and prep for shipping off-site	1	each	C.1.06		\$636.82	\$	636.82			
	1	2	3		Haul units to Roberts Bay laydown	1	each	C.4.16		\$94.94	\$	94.94			
	1	2	4		Collect all debris	30	m ³	C.3.10		\$0.14	\$	4.06			
	1	2	5		Load waste into containers for shipping off-site	3	m ³	C.4.01		\$4.97	\$	14.84			
MN-003	1	2	6	Office & Support Complex	Haul containers to Roberts Bay laydown	3	m ³	C.4.14		\$4.09	\$	12.19			
	1	3	1		Decommission (electrical, mechanical, plumbing)	2	each	C.1.05		\$603.78	\$	1,207.57	\$	3,693.39	
	1	3	2		Disconnect trailers and prep for moving (remove boards, cladding, etc.; wrap in plastic)	2	each	C.1.08		\$1,110.00	\$	2,220.01			ATCO trailers
	1	3	3		Haul trailers to Roberts Bay for shipping off-site	2	each	C.4.16		\$94.94	\$	189.88			
	1	3	4		Demolish cribbing, stairs, entryways, etc.	-	m ³	C.3.05		\$7.93	\$	-			Demolish extras around ATCO trailers
	1	3	5		Collect all debris	60	m ³	C.3.10		\$0.14	\$	8.17			
	1	3	6		Load waste into containers for shipping off-site	-	m ³	C.4.01		\$4.97	\$	-			
	1	3	7		Haul containers to Roberts Bay laydown	-	m ³	C.4.14		\$4.09	\$	-			
	1	3	8		Regrade area for positive drainage	5,800	m ²	C.5.18		\$0.01	\$	67.77			
Lower Portal Area															
MN-004	1	4	1	Brine Mixing Facility	Drain and decommission 5000L water storage tank	1	each	C.1.12		\$241.82	\$	241.82	\$	515.80	
	1	4	2		Haul water tank to Roberts Bay Laydown	1	each	C.4.17		\$113.57	\$	113.57			
	1	4	3		Load excess CaCl2 into container for shipping off-site	2	m ³	C.4.01		\$4.97	\$	9.95			Assume open skid on site
	1	4	4		Collect all debris	54	m ³	C.3.10		\$0.14	\$	7.41			
	1	4	5		Haul water tank to Roberts Bay Laydown	1	each	C.4.17		\$113.57	\$	113.57			
	1	4	6		Load waste into containers for shipping off-site	2	m ³	C.4.01		\$4.97	\$	9.95			Base waste quantities
	1	4	7		Haul containers to Roberts Bay laydown	4	m ³	C.4.15		\$4.89	\$	19.55			
MN-005	1	5	1	Portal and Underground Works	Remove ducts, pipes, electrical cables	100	lm	C.3.16		\$105.70	\$	10,570.01	\$	23,896.73	Estimate based on Doris estimate
	1	5	2		Construct portal plug	707	m ³	C.5.03		\$18.83	\$	13,309.78			
	1	5	3		Regrade area for positive drainage	1,450	m ²	C.5.18		\$0.01	\$	16.94			Entire Lower Pad area
Fuel Storage Facility															
MN-006	1	6	1	Fuel Storage Facility	Decommission Enviro Tank	1	each	C.2.03		\$241.82	\$	241.82	\$	7,379.48	Estimate based on Doris estimate
	1	6	2		Haul Enviro Tank to Roberts Bay	1	each	C.4.16		\$94.94	\$	94.94			
	1	6	3		Load contained contaminated soils into megalbags for shipping off-site	80	m ³	C.4.12		\$69.79	\$	5,610.96			
	1	6	4		Remove liner and cut into manageable pieces	2,302	m ²	C.3.02		\$0.15	\$	347.92			Design quantities
	1	6	5		Load all debris and waste into containers	21	m ³	C.4.01		\$4.97	\$	103.06			
	1	6	6		Haul containers to Roberts Bay	101	m ³	C.4.14		\$4.09	\$	413.08			
	1	6	7		Backfill area to prevent permanent ponding	750	m ³	C.5.05		\$0.76	\$	567.71			
Pond Access Road															
MN-007	1	7	1	Pond Access Road	Crown road for positive drainage	0	km	C.5.17		\$1,017.65	\$	455.91	\$	455.91	
Pollution Control Pond															
MN-008	1	8	1	Pollution Control Pond	Disconnect piping and electrical wiring, remove sump pumps	2	each	C.1.05		\$603.78	\$	1,207.57	\$	12,491.80	
	1	8	2		Remove and cut liner into manageable pieces	14,300	m ²	C.3.02		\$0.15	\$	2,161.25			Liner+Geotextile
	1	8	3		Load waste into containers for shipping off-site	465	m ³	C.4.01		\$4.97	\$	2,314.59			Liner+Geotextile in breach area
	1	8	4		Haul containers to Roberts Bay laydown	465	m ³	C.4.15		\$4.89	\$	2,273.78			
	1	8	5		Breach Pollution Control pond	2,500	m ²	C.5.05		\$0.76	\$	1,892.36			
	1	8	6		Remove and cut liner into manageable pieces (breach only)	4,400	m ²	C.3.02		\$0.15	\$	665.00			Liner+Geotextile in breach area
	1	8	7		Rip-rap breach for erosion protection	105	m ³	C.5.03		\$18.83	\$	1,977.26			
Portal Pad Road															
MN-009	1	9	1	Portal Pad Haul Road	Crown road for positive drainage	0	km	C.5.17		\$1,017.65	\$	247.29	\$	247.29	
MN-010	1	10	1	Pipe Culvert	Remove pipe culvert at Doris Windy Road entrance	51	lm	C.5.15		\$92.11	\$	4,697.39	\$	4,832.42	
	1	10	2		Load all debris and waste into containers and	15	m ³	C.4.01		\$4.97	\$	74.14			
	1	10	3		Haul containers to Roberts Bay	15	m ³	C.4.14		\$4.09	\$	60.89			
MN-011	1	11	1	Dual Water Line - Discontinued	Cut pipelines into manageable pieces	-	lm	C.3.03		\$30.38	\$	-	\$	-	
	1	11	2		Decommission electrical (heat tracing)	-	each	C.1.05		\$603.78	\$	-		-	
	1	11	3		Collect electrical cables and controllers and prep for shipping off-site	-	m ³	C.3.10		\$0.14	\$	-		-	1 m either side of pipeline
	1	11	4		Load debris into containers for transport to Roberts Bay	-	m ³	C.4.01		\$4.97	\$	-		-	
	1	11	5		Haul debris to Roberts Bay	-	m ³	C.4.14		\$4.09	\$	-		-	
Ore Storage Pad															
MN-012	1	12	1	Ore Stockpile Pad	Regrade area for positive drainage	8,000	m ²	C.5.18		\$0.01	\$	93.47	\$	93.47	\$93 Assume no ore was left on surface after end of operation
Waste Rock Pile															
MN-013	1	13	1	Waste Rock Pile	Regrade top surface for positive drainage	12,300	m ²	C.5.05		\$0.76	\$	9,310.41	\$	1,707,411.53	no waste rock left on surface
	1	13	2		Resloping from 2:1 to 3:1	20,200	m ²	C.5.06		\$1.01	\$	20,387.01			
	1	13	3		Cover entire dump with HDPE liner;	35,750	m ³	M.01		\$29.81	\$	1,065,705.13			
	1	13	4		Place 0.3 m thick liner protection layer of crushed rock	32,500	m ³	C.5.03		\$18.83	\$	612,008.98			
Madrid North Vent Raise															
MN-014	1	14	1	Vent Raise	Remove ducts, pipes, and cables	100	lm	C.3.16		\$105.70	\$	10,570.01	\$	23,119.65	
MN-015	1	14	2	Ventilation and Heating Facilities	Construct a concrete cap (0.5 m thick reinforced concrete) to seal the top	1	each	C.4.03		\$12,549.65	\$	12,549.65			
	1	15	1		Decommission and dismantle all ventilation and heating facilities	2	each	C.1.05		\$603.78	\$	1,207.57	\$	3,658.81	
	1	15	2		Prepare units for shipping off-site	2	each	C.1.08		\$1,110.00	\$	2,220.01			
	1	15	3		Haul units to Roberts Bay	2	each	C.4.16		\$94.94	\$	189.88			
MN-016	1	15	4	Offices & Support Complex	Regrade pads for positive drainage	3,540	m ²	C.5.18		\$0.01	\$	41.36			
	1	16	1		Decommission (electrical, mechanical, plumbing)	4	each	C.1.05		\$603.78	\$	2,415.13	\$	7,285.13	
	1	16	2		Disconnect trailers and prep for moving (remove boards, cladding, etc.; wrap in plastic)	4	each	C.1.08		\$1,110.00	\$	4,440.02			Modular trailers / Seacans
	1	16	3		Haul trailers to Roberts Bay for shipping off-site	4	each	C.4.16		\$94.94	\$	379.75			
	1	16	4		Demolish cribbing, stairs, entryways, etc.	2	m ³	C.3.05		\$7.93	\$	15.85			
	1	16	5		Collect all debris	119	m ³	C.3.10		\$0.14	\$	16.26			
	1	16	6		Load waste into containers for shipping off-site	2	m ³	C.4.01		\$4.97	\$	9.95			
	1	16	7		Haul containers to Roberts Bay laydown	2	m ³	C.4.14		\$4.09	\$	8.17			Accounted for in MN-015
MN-017	1	16	8	Diesel Generator	Regrade area for positive drainage	-	m ²	C.5.18		\$0.01	\$	-		-	
	1	17	1		Decommission (electrical)	1	each	C.1.06		\$636.82	\$	636.82	\$	1,872.86	Mobile generator
	1	17	2		Disconnect containers and prep for shipping off-site	1	each	C.1.08		\$1,110.00	\$	1,110.00			
	1	17	3		Haul containers to Roberts Bay laydown	1	each	C.4.16		\$94.94	\$	94.94			
	1	17	4		Collect all debris	30	m ³	C.3.10		\$0.14	\$	4.06			
	1	17	5		Load waste into containers for shipping off-site	3	m ³	C.4.01		\$4.97	\$	14.84			
	1	17	6		Haul containers to Roberts Bay laydown	3	m ³	C.4.14		\$4.09	\$	12.19			
MN-018	1	18	1	Fuel Containment Area	Drain and decommission Enviro Tank	1	each	C.2.03		\$241.82	\$	241.82	\$	7,276.42	
	1	18	2		Haul Enviro Tank to Roberts Bay	1	each	C.4.16		\$94.94	\$	94.94			
	1	18	3		Load contained contaminated soils into megalbags for shipping off-site	80	m ³	C.4.12		\$69.79	\$	5,610.96			
	1	18	4		Remove liner and cut into manageable pieces	2,302	m ²	C.3.02		\$0.15	\$	347.92			
	1	18	5		Haul containers to Roberts Bay	101	m ³	C.4.14		\$4.09	\$	413.08			
MN-019	1	18	6	Vent Raise access road	Backfill area to prevent permanent ponding	750	m ³	C.5.05		\$0.76	\$	567.71			
	1	19	1		Crown road for positive drainage	0	km	C.5.17		\$1,017.65	\$	71.24	\$	71.24	
MN-020	1	20	1	Pipe Culvert	Remove pipe culvert at Doris Windy Road entrance	40	lm	C.5.15		\$92.11	\$	3,702.65	\$	3,809.08	Double Culvert
MN-021	1	20	2	Pipe Culvert	Load all debris and waste into containers and	12	m ³	C.4.01		\$4.97	\$	58.44			
	1	20	3		Haul containers to Roberts Bay	12	m ³	C.4.14		\$4.09	\$	47.99			
	1	20	3												
Madrid South All-weather Road															
\$17,239															
\$17,239															
MR-001	2	1	1	Madrid South All-Weather Road	Crown road for positive drainage	5	km	C.5.17		\$1,017.65	\$	5,134.04	\$	5,134.04	
	2	2	1		Remove pipe culvert at crossing #1	61	lm	C.5.15		\$92.11	\$	5,618.45	\$	6,052.48	Double Culvert
MR-002	2	2	2	Crossing #1	Load all debris and waste into containers and	48	m ³	C.4.01		\$4.97	\$	238.32			
	2	2	3		Haul containers to Roberts Bay	48	m ³	C.4.14		\$4.09	\$	195.72			
	2	3	1		Remove pipe culvert at Crossing #2	61	lm	C.5.15		\$92.11	\$	5,618.45	\$	6,052.48	Double Culvert
	2	3	2		Load all debris and waste into containers and	48	m ³	C.4.01		\$4.97	\$	238.32			
MR-003	2	3	3	Crossing #2	Haul containers to Roberts Bay	48	m ³	C.4.14		\$4.09	\$	195.72			
	2	3	3												

Worksheet 2: Detailed Cost Estimate																	
Work Area Code	Item	Task	Sub-task	Activity	Task	Quantity	Unit	Cost Code	Unit Cost	Task Total	Activity Total	Subtotals	Source / Comments				
Madrid South Portal and Vent Raise													\$1,751,218				
Infrastructure Pad Area													\$35,666				
MS-001	3	1	1	Shop	Decommission electrical, mechanical (including connections to generator house & transformer)	3	each	C.1.05	\$603.78	\$	1,811.35	\$	21,661.94				
	3	1	2			2,250	m³	C.3.05	\$7.93	\$	17,835.91						
	3	1	3			450	m³	C.3.10	\$0.14	\$	61.29						
	3	1	4			198	m³	C.4.01	\$4.97	\$	985.38						
	3	1	5			198	m³	C.4.15	\$4.89	\$	968.01						
MS-002	3	2	1	Fuel Storage Facility	Drain and decommission Enviro Tank	1	each	C.2.03	\$241.82	\$	241.82	\$	7,131.24				
	3	2	2			1	each	C.4.17	\$113.57	\$	113.57						
	3	2	3			80	m³	C.4.12	\$69.79	\$	5,610.96						
	3	2	4			21	m³	C.4.01	\$4.97	\$	103.86						
	3	2	5			101	m³	C.4.15	\$4.89	\$	494.13						
MS-003	3	3	1	Offices & Support Complex	Decommission electrical, mechanical, plumbing	4	each	C.1.05	\$603.78	\$	2,415.13	\$	5,001.89				
	3	3	2			2	each	C.1.08	\$1,100.00	\$	2,220.01						
	3	3	3			2	each	C.4.17	\$113.57	\$	227.13						
	3	3	4			-	m³	C.3.05	\$7.93	\$	-			Demolish Office Building, Minedry, and Admin Building			
	3	3	5			60	m³	C.3.10	\$0.14	\$	8.17						
MS-004	3	3	6	Fresh Water Pipelines Leg 2 - Discontinued	Load waste into containers for shipping off-site	-	m³	C.4.01	\$4.97	\$	-						
	3	3	7			-	m³	C.4.15	\$4.89	\$	-						
	3	3	8			11,250	m³	C.5.18	\$0.01	\$	131.44						
	3	4	1			-	lm	C.3.03	\$10.38	\$	-	\$	-				
	3	4	2			-	each	C.1.05	\$603.78	\$	-						
MS-005	3	4	3	Diesel Generator	Collect electrical cables and controllers and prep for shipping off-site	-	m³	C.3.10	\$0.14	\$	-						
	3	4	4			-	m³	C.4.01	\$4.97	\$	-						
	3	4	5			-	m³	C.4.15	\$4.89	\$	-						
	3	5	1			1	each	C.1.06	\$636.82	\$	636.82	\$	1,870.66	Mobile Generator			
	3	5	2			1	each	C.1.08	\$1,100.00	\$	1,110.00						
MS-006	3	5	3	Laydown Pad	Disconnect containers and prep for shipping off-site	1	each	C.4.17	\$113.57	\$	113.57						
	3	5	4			3	m³	C.3.10	\$0.14	\$	0.41						
	3	5	5			1	m³	C.4.01	\$4.97	\$	4.97						
	3	5	6			1	m³	C.4.15	\$4.89	\$	4.89						
	Laydown Pad													\$58			
MS-006	3	6	1	Laydown Pad	Regrade area for positive drainage	5,000	m²	C.5.18	\$0.01	\$	58.42	\$	58.42				
Portal Area													\$24,293				
MS-007	3	7	1	Portal and Underground Works	Remove ducts, pipes, electrical cables	100	lm	C.3.16	\$105.70	\$	10,570.01	\$	23,890.31	assuming 100m length			
	3	7	2			707	m³	C.5.03	\$18.83	\$	13,409.78						
	3	7	3			900	m²	C.5.18	\$0.01	\$	10.52						
	3	8	1			1	each	C.1.12	\$241.82	\$	241.82	\$	402.23				
	3	8	2			1	each	C.4.17	\$113.57	\$	113.57						
MS-008	3	8	3	Brine Mixing Facility	Haul water tank to Roberts Bay Laydown	2	m³	C.4.01	\$4.97	\$	9.95						
	3	8	4			2	m³	C.3.10	\$0.14	\$	7.41						
	3	8	5			2	m³	C.4.01	\$4.97	\$	9.95						
	3	8	6			4	m³	C.4.15	\$4.89	\$	19.55						
	Primary Pollution Control Area													\$10,902			
MS-009	3	9	1	Primary Pollution Control Pond	Disconnect piping and electrical wiring, remove sump pumps	2	each	C.1.05	\$603.78	\$	1,207.57	\$	10,901.68				
	3	9	2			300	m²	C.5.02	\$0.76	\$	227.08						
	3	9	3			27,359	m³	C.3.05	\$0.15	\$	4,134.94			Liner+Geotextile			
	3	9	4			340	m³	C.4.01	\$4.97	\$	1,692.34			Liner+Geotextile			
	3	9	5			340	m³	C.4.15	\$4.89	\$	1,662.50						
MS-010	3	9	6	Haul Road and Water Supply Infrastructure	Rip-rap breach for erosion protection	105	m³	C.5.03	\$18.83	\$	1,977.26						
	Secondary Pollution Control Pond													\$5,038			
	3	10	1			2	each	C.1.05	\$603.78	\$	1,207.57	\$	4,055.14				
	3	10	2			300	m²	C.5.05	\$0.76	\$	227.08						
	3	10	3			2,586	m²	C.3.02	\$0.15	\$	390.84			Liner+Geotextile			
MS-011	3	10	4	Haul and Access Roads	Load waste into containers for shipping off-site	26	m³	C.4.01	\$4.97	\$	129.34						
	3	10	5			26	m³	C.4.15	\$4.89	\$	125.06			Liner+Geotextile			
	3	10	6			105	m³	C.5.03	\$18.83	\$	1,977.26						
	3	11	1			1	km	C.5.17	\$1,071.65	\$	978.98			Haul road + VR access road (haul road width * 4x standard 2 lane			
	Pumphouse - Discontinued													\$978.98			
MS-012	3	12	1	Pumphouse - Discontinued	Remove water intake line from Patch Lake	-	lm	C.3.03	\$10.38	\$	-						
	3	12	2			-	each	C.1.03	\$1,237.87	\$	-						
	3	12	3			-	each	C.1.08	\$1,100.00	\$	-						
	3	12	4			-	m³	C.3.10	\$0.14	\$	-						
	3	12	5			-	m³	C.4.01	\$4.97	\$	-						
MS-013	3	12	6	Freshwater Pipeline Leg 1 - Discontinued	Load debris into containers for transport (to Roberts Bay)	-	m³	C.4.01	\$4.97	\$	-						
	3	12	6			-	m³	C.4.15	\$4.89	\$	-						
	3	13	1			-	lm	C.3.03	\$10.38	\$	-						
	3	13	2			-	each	C.1.05	\$603.78	\$	-						
	3	13	3			-	m³	C.3.10	\$0.14	\$	-						
MS-014	3	13	4	Infrastructure Access Road	Collect electrical cables and controllers and prep for shipping off-site	-	m³	C.4.01	\$4.97	\$	-						
	3	13	5			-	m³	C.4.15	\$4.89	\$	-						
	Infrastructure Access Road													\$247			
	MS-014	3	14			1	Infrastructure Access Road	Crown road for positive drainage	0	km	C.5.17	\$1,071.65	\$	247.29	\$	247.29	
	Waste Rock Pile													\$1,648,470			
MS-015	3	15	1	Waste Rock Pile	Regrading from 2:1 to 3:1	26,470	m³	C.5.06	\$1.01	\$	26,715.06	\$	1,648,469.53	no waste rock left on surface			
	3	15	2			15,738	m³	C.5.05	\$0.76	\$	14,883.61						
	3	15	3			46,002	m³	M.01	\$29.81	\$	\$1,371,316.57						
	3	15	4			12,546	m³	C.5.03	\$18.83	\$	236,254.30						
	One Storage Pad													\$143			
MS-016	3	16	1	One Stockpile Pad	Regrade area for positive drainage	12,200	m²	C.5.18	\$0.01	\$	142.54	\$	142.54	Assume no ore was left on surface after end of operation			
Madrid South Vent Raise Area													\$26,402				
MS-017	3	17	1	Vent Raise	Remove ducts, pipes, and cables	25	lm	C.3.16	\$105.70	\$	2,642.50	\$	15,192.15				
	3	17	2			1	each	C.6.03	\$12,549.65	\$	12,549.65						
	3	18	1			4	each	C.1.05	\$603.78	\$	2,415.13	\$	3,731.00				
	3	18	2			1	each	C.1.08	\$1,110.00	\$	1,110.00						
	3	18	3			1	each	C.4.17	\$113.57	\$	113.57						
MS-019	3	18	4	Fuel Containment Area	Haul units to Roberts Bay	7,900	m²	C.5.18	\$0.01	\$	92.30						
	3	19	1			1	each	C.2.03	\$241.82	\$	241.82	\$	7,479.16				
	3	19	2			1	each	C.4.17	\$113.57	\$	113.57						
	3	19	3			80	m³	C.4.12	\$69.79	\$	5,610.96						
	3	19	4			2,302	m³	C.3.02	\$0.15	\$	347.92						
MS-020	3	19	5	Fuel Containment Area	Load waste into containers for shipping off-site	21	m³	C.4.01	\$4.97	\$	103.86						
	3	19	6			101	m³	C.4.15	\$4.89	\$	494.13						
	3	19	7			750	m³	C.5.05	\$0.76	\$	567.71						
	Additional Direct Costs													\$816,544			
	On-site Shipping for Disposal													\$816,544			
DN-001	4	1	1	Ship off-site for disposal by barge	Hazardous waste	37	m³	S.03	\$212.35	\$	7,772.06						
	4	1	2			1,450	m³	S.03	\$212.35	\$	307,910.22						
	4	1	3			241	m³	S.01	\$1,050.08	\$	253,278.75			Major areas within fuel containment berms; remainder to be identified by inspector on site			
	4	1	4			21	each	S.04	\$8,134.12	\$	170,816.54						
	4	1	5			-	each	S.04	\$8,134.12	\$	-						
DN-002	4	2	1	Disposal fees in licensed facility	Hazardous waste	1	LS	H.05	\$25,000.00	\$	25,000.00						
	4	2	2			1,450	m³	M.10	\$5.68	\$	8,229.96						
	4	2	3			410	ft	H.05	\$106.18	\$	43,536.29						
	Water Management													\$0			
	WM-001	4	1			1	Madrid North Water Management - Discontinued		0	LS	x	\$	-	\$	\$0		
WM-002	4	2	1	Madrid South Water Management - Discontinued		0	LS	x	\$	-	\$	\$0		90 day seasons assumed for each year of post-closure water management			
TOTAL DIRECT COSTS													\$4,415,378				
INDIRECT CLOSURE COSTS													\$719,767				
Contingency													\$719,767				
Mobilization & Demobilization													\$711,993				
General and Administration costs													\$34,313				
Field support													\$30,499				
Hydrocarbon decontamination													\$150,000				
Post-closure Monitoring													\$1,860,000				
Other													\$0				
Subtotal Indirect Costs													\$2,706,572				
CLOSURE COSTS - TOTAL													\$7,121,950				

Worksheet 3: Indirect Cost Calculations

Mob/Demob Costs
Crew mobilization costs included in loaded labour rates.
The barging fee for equipment is calculated on a square foot basis.

No. of units	Description	Units	Quantity	Unit cost	Task cost	Notes
Camp Demolition	Construction equipment	Footprint				
1	Bobcat	m²	11.0	\$ 332.96	\$ 3,657.90	From Hay River to Roberts Bay
1	Loader	m²	10.2	\$ 332.96	\$ 3,400.45	From Hay River to Roberts Bay
1	Dozer	m²	20.3	\$ 332.96	\$ 6,750.26	From Hay River to Roberts Bay
1	Excavator	m²	38.1	\$ 332.96	\$ 12,687.55	From Hay River to Roberts Bay
1	small equipment	m²	24.1	\$ 332.96	\$ 8,025.01	From Hay River to Roberts Bay
1	Trucks (CAT 735)	m²	41.6	\$ 332.96	\$ 13,860.35	From Hay River to Roberts Bay
1	Tractor trailer	m²	86.8	\$ 332.96	\$ 28,907.95	From Hay River to Roberts Bay
1	Crewcab pickup (Ford F350)	m²	33.8	\$ 332.96	\$ 11,254.35	From Hay River to Roberts Bay
8	Haul equipment to Shipping	each	8	\$ 15,000.00	\$ 120,000.00	hauling 8 trailers from Edmonton to Hay River / source: Doris cost estimate
Subtotal Mobilization				\$	208,544	
Subtotal Demobilization				\$	218,971	Assumes same cost as mobilization, updated by 5%
Total				\$	427,515	
Dam Breach	Construction equipment	Footprint				
0	Bobcat	m²	11.0	\$ 364.67	\$ -	From Hay River to Roberts Bay
1	Loader	m²	10.2	\$ 364.67	\$ 3,724.30	From Hay River to Roberts Bay
1	Dozer	m²	20.3	\$ 364.67	\$ 7,393.14	From Hay River to Roberts Bay
1	Excavator	m²	38.1	\$ 364.67	\$ 13,895.89	From Hay River to Roberts Bay
0	small equipment	m²	24.1	\$ 364.67	\$ -	From Hay River to Roberts Bay
1	Trucks (CAT 735)	m²	41.6	\$ 364.67	\$ 15,180.38	From Hay River to Roberts Bay
0	Tractor trailer	m²	86.8	\$ 364.67	\$ -	From Hay River to Roberts Bay
1	Crewcab pickup (Ford F350)	m²	33.8	\$ 364.67	\$ 12,326.20	From Hay River to Roberts Bay
5	Haul equipment to Shipping	each	5	\$ 17,250.00	\$ 86,250.00	hauling 8 trailers from Edmonton to Hay River / source: Doris cost estimate
Subtotal Mobilization				\$	138,770	
Subtotal Demobilization				\$	145,708	Assumes same cost as mobilization, updated by 5%
Total				\$	284,478	

Camp Cost

Description	Units	Cost Code	Unit Cost	Quantity										Total	Task Cost	Notes
				Year 1 (Site Demolition+ Water Management)	Year 2 (Water Management)	Year 3 (Water Management+Berm Breaches)	Year 4 (Water Management)	Year 5 (Water Management)	Year 6 (Water Management)	Year 7 (Water Management)	Year 8 (Water Management)	Year 9 (Water Management)	Year 10 (Water Management)			
Camp Management	day	OC.01	\$697.59	0	0	0	0	0	0	0	0	0	0	0	\$0	
Camp Operations	per day per person	OC.02	\$154.56	131	0	16	0	0	0	0	0	0	0	147	\$22,721	the cost accrued for water management is accounted for under the WM section, Dam breach crew 3 people over 5 days
Camp Rents	year	OC.03	\$412,166.38	0	0	0	0	0	0	0	0	0	0	0	\$0	
Travel allowance	charter flights	OC.05	\$10,304.16	0	0	0	0	0	0	0	0	0	0	0	\$0	charter flights for 15 person crews
	commercial flights	OC.04	\$772.81	12	0	3								15	\$11,592	3 person crew for dam breach, including engineer/surveyor
				\$ 29,521.42	\$ -	\$ 4,791.43	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 34,312.85	\$34,313	

Worksheet 4: Unit Rates

Cost Code	Item	2014 Unit rate	Unit	Comment	Source
Equipment					
E.01	Dozer (CAT D7)		hr	hourly equipment rate (less operator)	Nuna 2012 Equipment Rates; Adjusted to 2014
E.02	Dozer (CAT D4)	\$ 91.95	hr	hourly equipment rate (less operator)	Nuna 2012 Equipment Rates; Adjusted to 2014
E.03	Dozer (CAT D4) w/ Tiller	\$ 105.74	hr	15% added for tiller attachment	Nuna 2012 Equipment Rates; Adjusted to 2014
E.04	Truck (CAT 730)	\$ 147.27	hr	hourly equipment rate (less operator)	Nuna 2012 Equipment Rates; Adjusted to 2014
E.05	Excavator (CAT 330 CL)	\$ 196.43	hr	hourly equipment rate (less operator)	Nuna 2012 Equipment Rates; Adjusted to 2014
E.06	Loader (CAT IT38/930)	\$ 87.38	hr	hourly equipment rate (less operator)	Nuna 2012 Equipment Rates; Adjusted to 2014
E.07	Skidder (CAT Bobcat)	\$ 85.05	hr	hourly equipment rate (less operator)	Nuna 2012 Equipment Rates; Adjusted to 2014
E.08	Helicopter	\$ 2,229.69	hr	fuel surcharge applies	IMiskolczi (from Angela Holtzapfel@HBML ESR); Adjusted to 2014
E.09	Welding Equipment	\$ 61.08	day	300 Amps, gas/diesel driven	2009 BC Blue Book + 10% Northern Allowance, 10% fuel factor; Adjusted to 2014
E.10	Power washer	\$ 72.00	day	Hot water pressure washer - 3000 PSI	www.abtoolrentals.com/equipment.asp?action=category&category=190&key=190%2D0079
E.11	Drum crusher	\$ 37.80	hr	30 tones, mobile	2012 cost; Adjusted to 2014
E.12	Oil-water separator	\$ 29.20	hr	10 GPM, underground	2012 cost; Adjusted to 2014
E.13	Air Track Drill	\$ 302.50	hr	200 cfm compressor, 196 HP diesel engine	2013-2014 BC Blue Book + 10% Northern Allowance+10% fuel factor
E.14	Tractor Trailer (6 axle lowbed+booster)	\$ 81.73	hr	hourly equipment rate (less operator)	2013-2014 BC Blue Book + 10% Northern Allowance
E.15	Flatbed truck (6x4, 5 tonne)	\$ 23.05	hr	hourly equipment rate (less operator)	2013-2014 BC Blue Book + 10% Northern Allowance
E.13	Clemro Crusher	\$ 836.03	hr	200 tons/hr (less operator)	Nuna 2012 Equipment Rates; Adjusted to 2014
E.14	Motor Grader CAT 16M	\$ 169.67	hr	hourly equipment rate (less operator)	Nuna 2012 Equipment Rates; Adjusted to 2014
Materials					
M.01	Liner - HDPE	\$ 29.81	m ²	supply and install	from JDS (Surface Water Management Options Analysis); Adjusted to 2014
M.02	Liner - geotextile	\$ 27.44	m ²	supply and install	from JDS (Surface Water Management Options Analysis); Adjusted to 2014
M.03	Fuel (Diesel)	\$ 1.40	L	2014 Landed fuel cost at Hope Bay	Lowell (from site @ TMAC, April 2014)
M.04	Explosives	\$ 64.38	lbs	15% freight cost added	Costmine 2012; Adjusted to 2014
M.05	Silt Fencing	\$ 1.44	m	15% freight cost added	Cost Mine 2011; original price quoted in linear ft; Adjusted to 2014
M.06	Coco-matting	\$ 1.96	m ²	15% freight cost added	Cost Mine 2011; original price quoted in sq. yards; Adjusted to 2014
M.07	Seed/Fertilizer	\$ 17.12	kg	15% freight cost added	Arctic Alpine seed mix+ fertilizer (2009 increase by 6% to 2013 based on inflation); Adjusted to 2014
M.08	Winter road	\$ 17,697.65	km	open and maintain for 2 months	NUNA Logistics (from Court Smith) + 18% cost increase to 2013; Adjusted to 2014
M.09	Hazardous Waste Disposal fee	\$ 10,304.16	m ³	Disposal + handling and cleaning fee	SRK estimate; Adjusted to 2014
M.10	Demolition Debris Disposal Fee (@Hay River)	\$ 5.68	m ³	Disposal + handling fee	Personal communication with Rob Jamieson@Hay River Disposals Ltd.; Adjusted to 2014
M.12	Bentonite chips	\$ 588.33	m ³	In 50 pound bags, 15% freight cost added	Holly North Production Supplies Limited; Adjusted to 2014
M.13	Plastic wrapping	\$ 1.06	m ²	in 14 ft wide rolls	web search; shrinkit-inc.com accessed June15, 2012; Adjusted to 2014
Labour					
L.01	Labour general	\$ 60.45	hr		Nuna Blended 2012 rate, POH included; Adjusted to 2014
L.02	Labour - Trades	\$ 90.49	hr	Electrician, Welder, plumber etc.	Nuna Blended 2012 rate, POH included; Adjusted to 2014
L.05	Supervision	\$ 103.70	hr		Nuna Blended 2012 rate, POH included; Adjusted to 2014
L.06	Truck Drivers	\$ 69.85	hr	Heavy Equipment	Nuna Blended 2012 rate, POH included; Adjusted to 2014
L.07	Heavy Equipment Operator	\$ 75.69	hr	Light equipment	Nuna Blended 2012 rate, POH included; Adjusted to 2014
L.08	Technician (Consultant)	\$ 135.00	hr	Staff Consultant	SRK-Estimate (all inclusive)
L.09	Note: Loading Rate includes allowances for (EI, CPP, MSP/Benefits/Travel/OT)				
Shipping					
S.01	Outbound Shipping - Soils	\$ 1,050.08	m ³	1.7 t/m ³ bulk density	(7.75 m ³ /seacan based on 29,000 lbs limit per seacan, seacan is 38.5 m ³) - from NTCL 17APR 12; Adjusted to 2014
S.02	Outbound Shipping - Haz Waste	\$ 212.35	m ³	1.0 t/m ³ bulk density	(7.75 m ³ /seacan based on 29,000 lbs limit per seacan, seacan is 38.5 m ³) - from NTCL 17APR 12; Adjusted to 2014
S.03	Outbound Shipping - Demolition	\$ 212.35	m ³	0.733 t/m ³ bulk density	\$7661/seacan (seacan is 38.5 m ³) - from NTCL 17APR 12; Adjusted to 2014
S.04	Shipping cost per seacan	\$ 8,134.12	each		NTCL 17Apr 2012; Adjusted to 2014
Hydrocarbon Soils and Haz Waste					
H.01	Excavate impacted soil	\$ 19.76	m ³		WESA estimate say reference; Adjusted to 2014
H.02	Low temperature thermal desorption	\$ 103.04	m ³		WESA estimate say reference; Adjusted to 2014
H.03	Rehydrate and backfill	\$ 11.02	m ³		WESA estimate say reference; Adjusted to 2014
H.04	Regrade and reshape	\$ 2.45	m ²		WESA estimate say reference; Adjusted to 2014
H.05	Tipping Fee for HC Soils at Hay River	\$ 106.18	tonne		Communication with Hay River Landfill Tsharp 18APR12; Adjusted to 2014
Owner's cost					
OC.01	Camp management	\$ 697.59	day		Newmont; Adjusted to 2014
OC.02	Camp operations	\$ 154.56	day	includes food and camp maintenance	Newmont; Adjusted to 2014
OC.03	Camp rental	\$ 412,166.38	year	25 man mobile camp	Newmont; Adjusted to 2014
OC.04	Commercial flight	\$ 772.81	person	flight from Yellowknife to Cambridge Bay and re	Adjusted to 2014
OC.05	Charter flight	\$ 10,304.16	flight	Return from Yellowknife	

Worksheet 5: Task Unit Rate Calculations

				Unit Rates				Labour				Equipment																					
Cost Code	Item	Unit	Productivity (Unit/hr)	Total Unit Cost	Material Unit Rate	Labour Unit Rate	Equipment Unit Rate	General Labour	Trades - Electrical	Trades - Mechanic	Trades - Plumbing	Engineer / Technician	Light Equipment Operator	Heavy Equipment Operator	Dozer - CAT D7	Excavator - Cat 330	Loader - CAT 966	Motor grader CAT 14M	Skidder CAT 242	Truck - CAT 730	Tractor Trailer	Flabed truck (5 tonne)	Helicopter	Drill	Drum crusher	Power washer	Welding Equipment	Crusher	Note / Source				
Decommissioning																																	
C.1.01	Decommission and remove all heating fuel tanks and place into lined facility	each	4.00	\$ 71.00	\$ -	\$ 49.15	\$ 21.85	2						1			1												Disconnect and remove all fuel drums and disconnect all Tidy Tanks from all structures				
C.1.02	Decommission above ground storage tanks	each	0.5	\$ 422.80	\$ -	\$ 422.80	\$ -	2	1																				Disconnect all fuel lines and electrical parts				
C.1.03	Decommission potable water supply	each	0.25	\$ 1,237.87	\$ -	\$ 1,041.44	\$ 196.43	1	1		1			0.25		0.25													Disconnect all electrical and plumbing (intake and distribution)				
C.1.04	Decommission waste incinerator	each	0.17	\$ 1,150.29	\$ -	\$ 1,019.22	\$ 131.07	1		1				0.25			0.25												Disconnect and remove fuel storage				
C.1.05	Decommission Main Camp Facility electricity	each	0.25	\$ 603.78	\$ -	\$ 603.78	\$ -	1	1																				De-energise main electrical board, disconnect auxiliary power (if exists)				
C.1.06	Decommission electrical generators	each	0.46	\$ 636.82	\$ -	\$ 541.84	\$ 94.98	2	1					0.5			0.5												De-energise main breaker board, disconnect external fuel tanks (if needed) / loader used for lifting; source - RSMeans (260505252100)				
C.1.07	Dismantle Satellite/Communication Equipment	each	0.5	\$ 332.31	\$ -	\$ 332.31	\$ -	2	0.5																				source - SRK estimate				
C.1.08	Prep portable trailers for moving (remove cladding, apply shrinkwrap etc.)	each	0.25	\$ 1,110.00	\$ 58.40	\$ 876.84	\$ 174.77	3						0.5			0.5												Assumed material cost for a high density plastic, nails and sandbags.				
C.1.09	Decommission Airstip - Place large X's at each end of strip	each	0.5	\$ 291.82	\$ 50.00	\$ 241.82	\$ -	2																									
C.1.10	Dismantle airstip approach lights	each	4	\$ 37.74	\$ -	\$ 37.74	\$ -	1	1																								
C.1.11	Dismantle Hoper, Crusher	each	0.05	\$ 3,018.91	\$ -	\$ 3,018.91	\$ -	1	1																								
C.1.12	Drain above ground water storage tank	each	0.5	\$ 241.82	\$ -	\$ 241.82	\$ -	2																					Drain 50000L water tank - SRK estimate				
Decontamination																																	
C.2.01	Collect hazardous chemical waste and place in suitable containers	m3	0.17	\$ 2,066.64	\$ -	\$ 1,542.35	\$ 524.30	3						1			1												Includes all chemicals on site / jm_Estimate				
C.2.02	Drain and power-wash heating fuel tanks (Tidy Tanks)	each	6.00	\$ 21.35	\$ -	\$ 20.15	\$ 1.20	2																		1			Drain fuel from tanks and wash exterior with hot water (collect water for treatment)				
C.2.03	Drain above ground fuel storage tank	each	0.5	\$ 241.82	\$ -	\$ 241.82	\$ -	2																					Drain fuel / source - SRK estimate				
C.2.04	Pressure wash above ground fuel tank	each	0.16	\$ 800.68	\$ -	\$ 755.68	\$ 45.00	2																			1						
C.2.05	Drain and power-wash empty fuel drums	each	12	\$ 16.98	\$ -	\$ 16.38	\$ 0.60	2						1													1		Drain fuel and tripple-rinse drum (collect water for treatment)				
C.2.06	Flush sewage treatment unit and collect sewage sludge	each	0.4	\$ 524.12	\$ -	\$ 396.89	\$ 127.23	2						0.5			0.5										1		Flush treatment unit with water (collect water for treatment)/source - SRK estimate				
C.2.07	Empty incinerator and collect ashes	m3	0.25	\$ 567.97	\$ -	\$ 393.21	\$ 174.77	1						0.5			0.5												Place ashes and unburned contents into containers / see C.6.04				
C.2.08	Operate oilwater separator	m3	6.80	\$ 28.57	\$ -	\$ 27.48	\$ 1.09	3																			1		Collect skimmed oil from separator and place in suitable container - 15 minutes per 55 gal. drum				
C.2.09	Empty soil from 45 gallon drums	each	4	\$ 98.26	\$ -	\$ 49.15	\$ 49.11	2						1		1																	
C.2.10	Liner pressure wash cleaning	m2	360	\$ 0.36	\$ -	\$ 0.34	\$ 0.02	2																			1						
Demolition																																	
C.3.01	Crush empty fuel drums	each	20.00	\$ 16.09	\$ -	\$ 9.83	\$ 6.26	2						1			1									1							
C.3.02	Cut Tank Farm geomembrane to manageable size	sq. m	1200.00	\$ 0.15	\$ -	\$ 0.15	\$ -	3																					source - SRK estimate				
C.3.03	Remove intake hoses and cut to manageable size	Lm	100	\$ 10.38	\$ -	\$ 1.59	\$ 8.80	2						0.5			0.5											1	source - SRK estimate				
C.3.04	Dismantle pollution control berm	each	0.50	\$ 241.82	\$ -	\$ 241.82	\$ -	2																									
C.3.05	Demolish office buildings/ shop structures/ living quarters	m3	53.00	\$ 7.93	\$ -	\$ 6.28	\$ 1.65	3						2	1		1												Demolish empty wood structures (offices, shacks, etc.)/ source - ECHOS				
C.3.06	Demolish helipads/ float plane dock	m3	75	\$ 2.98	\$ -	\$ 1.82	\$ 1.17	1						1	1		1												Demolish wood structure / source - SRK estimate				
C.3.07	Demolish Above ground storage tanks	m3	5	\$ 257.90	\$ -	\$ 51.41	\$ 206.49	3						1		1												1					
C.3.08	Dismantle Old Equipment (torch)	each	0.5	\$ 484.88	\$ -	\$ 362.73	\$ 122.16	3																				1					
C.3.08	Cut off top of drill casings	each	2.00	\$ 60.77	\$ -	\$ 30.23	\$ 30.54	1																									
C.3.10	Clean up debris from site	m2	2529	\$ 0.14	\$ -	\$ 0.10	\$ 0.03	3						1			1											1	source - SRK estimate				
C.3.11	Dismantle radio tower	each	0.04	\$ 14,844.47	\$ -	\$ 10,130.27	\$ 4,714.20	2		1																			source - SRK estimate				
C.3.12	Prep stacks for shipping	m	0.50	\$ 447.06	\$ -	\$ 272.30	\$ 174.77	1				1		1		1	1												Estimate				
C.3.13	Dismantle Power Generator Stacks	m	0.50	\$ 120.91	\$ -	\$ 120.91	\$ -	1																									
C.3.14	Removing Cables and Posts	each	1.00	\$ 393.03	\$ -	\$ 196.60	\$ 196.43	2						1		1																	
C.3.15	Remove Tank Insulation	each	0.30	\$ 686.52	\$ -	\$ 403.03	\$ 283.49	2										1															
C.3.16	Remove pipes, ducts, and electrical cables	m	2.00	\$ 105.70	\$ -	\$ 105.70	\$ -	2		1																							
C.3.17	Remove waste from Doris Mountain (helicopter support)	m3	1.00	\$ 2,485.60	\$ -	\$ 255.91	\$ 2,229.69	2				1											1										
Material Relocations																																	
C.4.01	Load demolition debris/solid waste in containers	m3	48.00	\$ 4.97	\$ -	\$ 3.15	\$ 1.82							2	1		1												source - SRK calculated from first principles				
C.4.02	Empty Seacan of debris at the landfill	each	5.7	\$ 60.92	\$ -	\$ 26.52	\$ 34.41							2	1	1																	
C.4.04	Haul waste to Roberts Bay jetty in 20 ft container (33.2 m3/container)	m³	59.67	\$ 2.54	\$ -	\$ 1.17	\$ 1.37						1								1								Productivity calculation shown on 'Relocation Unit Cost' Worksheet				
C.4.06	Haul Containers on skids from beach laydown to Roberts Bay Jetty	each	1.20	\$ 63.08	\$ -	\$ 63.08	\$ -							1	1																		
C.4.07	Haul Material From Doris Windy Road to Roberts Bay	m³	36.31	\$ 4.17	\$ -	\$ 1.92	\$ 2.25						1								1								Productivity calculation shown on 'Relocation Unit Cost' Worksheet				
C.4.08	Haul Material From North Dam To Roberts Bay	m³	51.64	\$ 2.94	\$ -	\$ 1.35	\$ 1.58						1								1								Productivity calculation shown on 'Relocation Unit Cost' Worksheet				
C.4.09	Haul Material From Reagent Pad To Roberts Bay	m³	66.90	\$ 2.27	\$ -	\$ 1.04	\$ 1.22						1								1								Productivity calculation shown on 'Relocation Unit Cost' Worksheet				
C.4.10	Haul Mateiral From Airstrip to Roberts Bay	m³	75.48	\$ 2.01	\$ -	\$ 0.93	\$ 1.08						1								1								Productivity calculation shown on 'Relocation Unit Cost' Worksheet				
C.4.11	Haul Mateiral to Jetty (Roberts Bay)	m³	85.74	\$ 1.77	\$ -	\$ 0.81	\$ 0.95						1								1								Productivity calculation shown on 'Relocation Unit Cost' Worksheet				
C.4.12	Load soils into megabags	m³	4.00	\$ 69.79	\$ -	\$ 47.69	\$ 22.10	2					1			0.45																	
C.4.13	Haul Material From South Dam to Roberts Bay	m³	41.85	\$ 3.62	\$ -	\$ 1.67	\$ 1.95						1								1												
C.4.14	Hauling bulk materials from Madrid North (Vent Raise) to Roberts Bay	m³	37.11	\$ 4.09	\$ -	\$ 1.88	\$ 2.20						1								1												
C.4.15	Hauling bulk materials from Madrid North to Roberts Bay	m³	31.02	\$ 4.88	\$ -	\$ 2.24	\$ 2.63						1								1												
C.4.16	Hauling containers from Madrid North (Vent Raise) to Roberts Bay	each	1.80	\$ 94.94	\$ -	\$ 43.75	\$ 51.19						1								1								Productivity calculation shown on 'Relocation Unit Cost' Worksheet				
C.4.17	Hauling containers from Madrid South to Roberts Bay	each	1.33	\$ 113.57	\$ -	\$ 52.33	\$ 61.23						1								1								Productivity calculation shown on 'Relocation Unit Cost' Worksheet				
C.4.18	Hauling discharge water from Madrid North (Vent Raise) to Tail Lake	m³	13.25	\$ 11.44	\$ -	\$ 5.27	\$ 6.17						1								1								Productivity calculation shown on 'Relocation Unit Cost' Worksheet				
C.4.19	Hauling discharge water from Madrid South to Tail Lake	m³	11.74	\$ 12.91	\$ -	\$ 5.95	\$ 6.96						1								1								Productivity calculation shown on 'Relocation Unit Cost' Worksheet				
Earth works																																	
C.5.01	Install HDPE Liner	m²	175	\$ 32.75	\$ 29.81	\$ 1.81	\$ 1.12	4						1			1																
C.5.02	Load, haul, dump, place: 1 truck with <0.5 km haul distance	m³	40	\$ 14.12	\$ -	\$ 5.53	\$ 8.59						1	2	1	1				1													
C.5.03	Load, haul, dump, place: 1 truck with <1.0 km haul distance	m³	30	\$ 18.83	\$ -	\$ 7.37	\$ 11.46						1	2	1	1				1													
C.5.04	Excavate: Spoil locally, no trucks	m³	100	\$ 2.72	\$ -	\$ 0.76	\$ 1.96							1																			
C.5.05	Regrade surface - rough grading, D7	m²	100	\$ 0.76	\$ -	\$ 0.76	\$ -							1	1																		
C.5.06	Reslope Stockpiles - D7	m²	75	\$ 1.01	\$ -	\$ 1.01	\$ -							1	1																		
C.5.07	Relocate core box pallet (<0.5 km)	ea	6	\$ 37.26	\$ -	\$ 22.69	\$ 14.56							1			1																
C.5.08	Install soil stabilization measures (straw/coconut matting)	m²	269	\$ 4.36	\$ 1.96	\$ 1.35	\$ 1.06	3.5						2		1	1																
C.5.09	Drill, blast Quarry	m³	65	\$ 43.72	\$ 34.77	\$ 4.30	\$ 4.65	1						2																			
C.5.10	Trackpack using loaded rock truck	m²	100	\$ 2.17	\$ -	\$ 0.70	\$ 1.47						1										1										

Worksheet 6: Relocation Unit Cost Calculations

Hauling Distance to Roberts Bay		
Doris Camp	5.3 km	One Way
Windy Camp	14.82	One Way
North Dam	7.6 km	One Way
Reagent Pads	3.7 km	One-Way
Airstrip	2.2 km	One-Way
Madrid North Portal	13.9 km	One-Way
Madrid North Vent Raise	14.3 km	One-Way
Madrid South AWR	18.97 km	One-Way
Water discharge to Tail Lake		
Doris Camp	2.15 km	One-Way
Madrid North	11.45 km	One-Way
Madrid South	15.82 km	One-Way

C.4.14 - Productivity of hauling bulk materials from Madrid North (Vent Raise) to Roberts Bay			
Equipment Cost	\$ 81.73	per hr	Includes fuel
Labour Cost	\$ 90.49	per hr	
Average speed	38	km/hr	Sleds assumed as being available on site
Hauling capacity	2	Containers	One container per skid
Cargo capacity	33.2	m ³	Standard 20 ft container
Space utilization ratio	0.7		
Load	46.48	m ³	CargoCapacity x #ofContainers x SpaceUtilizationRatio
Distance:	14.3	km	
Time Required 1 round trip:	1.25	hrs	Includes 0.5hr unloading time
Productivity:	37.11	m ³ /hr	

C.4.15 - Productivity of hauling bulk materials from Madrid South to Roberts Bay			
Equipment Cost	\$ 81.73	per hr	Includes fuel
Labour Cost	\$ 90.49	per hr	
Average speed	38	km/hr	Sleds assumed as being available on site
Hauling capacity	2	Containers	One container per skid
Cargo capacity	33.2	m ³	Standard 20 ft container
Space utilization ratio	0.7		
Load	46.48	m ³	CargoCapacity x #ofContainers x SpaceUtilizationRatio
Distance:	18.97	km	
Time Required 1 round trip:	1.50	hrs	Includes 0.5hr unloading time
Productivity:	31.02	m ³ /hr	

C.4.16 - Productivity of hauling containers units from Madrid North (Vent Raise) to Roberts Bay			
Equipment Cost	\$ 81.73	per hr	Includes fuel
Labour Cost	\$ 90.49	per hr	
Average speed	38	km/hr	Sleds assumed as being available on site
Hauling capacity	2	Containers	One container per skid
Distance:	14.3	km	
Time Required 1 round trip:	1.25	hrs	Includes 0.5hr unloading time
Productivity:	1.60	Containers/hr	

C.4.17 - Productivity of hauling container units from Madrid South to Roberts Bay			
Equipment Cost	\$ 81.73	per hr	Includes fuel
Labour Cost	\$ 90.49	per hr	
Average speed	38	km/hr	Sleds assumed as being available on site
Hauling capacity	2	Containers	One container per skid
Distance:	18.97	km	
Time Required 1 round trip:	1.50	hrs	Includes 0.5hr unloading time
Productivity:	1.33	Containers/hr	

C.4.18 - Productivity of trucking water from Madrid North (Vent Raise) to Tail Lake discharge			
Equipment Cost	\$ 81.73	per hr	Includes fuel
Labour Cost	\$ 90.49	per hr	
Average speed	45	km/hr	Sleds assumed as being available on site
Hauling capacity	1	Containers	One container per skid
Cargo capacity	20	m ³	Standard 20 ft container
Space utilization ratio	1		
Load	20	m ³	CargoCapacity x #ofContainers x SpaceUtilizationRatio
Distance:	11.45	km	
Time Required 1 round trip:	1.51	hrs	Includes 0.5hr fill/drain time
Productivity:	13.25	m ³ /hr	

C.4.19 - Productivity of trucking water from Madrid South to Tail Lake discharge			
Equipment Cost	\$ 81.73	per hr	Includes fuel
Labour Cost	\$ 90.49	per hr	
Average speed	45	km/hr	Sleds assumed as being available on site
Hauling capacity	1	Containers	One container per skid
Cargo capacity	20	m ³	Standard 20 ft container
Space utilization ratio	1		
Load	20	m ³	CargoCapacity x #ofContainers x SpaceUtilizationRatio
Distance:	15.82	km	
Time Required 1 round trip:	1.70	hrs	Includes 0.5hr fill/drain time
Productivity:	11.74	m ³ /hr	

Worksheet 7: Structure Quantities

Demolition Building Factors	
Tents - Empty	1.3
Wood Structures - Empty	
Wood Structures - w/ Interior Wall Allowance	2
Steel Structures - Empty	1.5
Steel Structures - w/ Interior Wall Allowance	2
Mechanical Equipment	1.1
Linens	3
Pipelines	

Structure Volumes																		
Area	Structure	Quantity	Length (m)	Width/Dia. (m)	Footprint Area (m ²)	Avg Height (m)	Wall thickness (m)	Floor Thickness (m)	Roof Length (m)	Roof Thickness (m)	Wall Volume (m ³)	Floor Volume (m ³)	Roof Volume (m ³)	Total Collapse Volume (m3)	Loose Volume (m ³)	Standing Volume (m ³)	Surface area (m ²)	Source
Madrid North Portal	Portal Upper Pad																	
	Portable Trailers (ATCO)	2	10	3	30.0	5	0.15	0.3	14.72	0.16	19.5	9.0	7.1	71		150.0		SRK Estimate
	Cribbing, stairs, entry way	2	10	3	30.0	1	0.15	0.3			3.9	9.0		26	0.00			SRK Estimate - debris
	Compressor Building	1																
	Shop (tent)	1	30	15	450.0	5	0.01	0.3	17.17	0.05	4.5	135.0	12.9	152	198.09	2250.0		SRK Estimate - debris
Portal Lower Pad	Water Treatment Plant	1																
	50000L Water tank (Part of WTP)	1	7.25	2.5	18.1	2.75										49.8		SRK Estimate
	Diesel Generator	1	12.23	2.44	29.8	0.1									2.98			SRK Estimate - debris
	50,000L Water Tank th Containment	1																
	CaCl2 Laydown	1													2.00			Remaining CaCl2
Portal & UG Works	Brine Mixing Facility	1													2.00			SRK Estimate - debris
	Extent	1			1446.0											0.0		SRK Estimate
	Plug	1	15	7.6	114.0	6.2								707		706.8		Estimated
	Fuel Transfer Station																	
	75,000L Envirotank	1			797.0			0.003						2	7.17			SRK Estimate
Pollution Control Pond	Geotextile				1505.0			0.003						5	13.55			ACAD Estimate
	HDPE Liner																	
	Nonwoven Geotextile																	
	HDPE Liner	1			14300.0			0.003						43	128.70			ACAD Estimate
	Nonwoven Geotextile																	ACAD Estimate
Pollution Control Pond Breach	Non-woven Geotextile	4	220	10	8800.0			0.003						106	316.80			ACAD Estimate
	Breach Area Liner	1	220	10	2200.0			0.003						7	19.80			ACAD Estimate
	Breach (Berm)	1			300.0	3.5								600				ACAD Estimate
	Dual Water Line	Piping	1	760	0.18	0.03								19	58.02			ACAD Estimate
	Waterline to Patch lake discharge	Piping	1	1100	0.18	0.03								28	83.97			ACAD Estimate
Madrid North Vent Raise	Culvert - Madrid North Portal Entrance	24" Corrugated Steel Culvert	2	25.5	0.61	0.29		0.003						5	15			ACAD Estimate
	Vent Raise	1																
	Air Heating Facility	1																
	Support Facilities (Sea-can 40')	4	12.23	2.44	119.4	2.5	0.02	0.02	2.44	0.02	1.5	0.6	0.6	11		298.4		As built Acad. height/thickness est. from photo
	Support Facilities Debris	4													2.00			SRK Estimate - debris
Fuel Transfer Station	Diesel Generator	1	12.23	2.44	29.8	0.1									2.98			SRK Estimate - debris
	75,000L Envirotank	1																
	HDPE Sump																	
	HDPE Liner				797.0			0.003						2	7.17	0.0		SRK Estimate - debris
	Non-woven Geotextile				1505.0			0.003						5	13.55	0.0		SRK Estimate - debris
Culvert - Madrid North Portal Entrance	Fuel Tank Containment	1																
	Liner																	
	24" Corrugated Steel Culvert	2	20.1	0.61	0.29		0.003							4	12			SRK Estimate - debris
	Quarry G																	
	Quarry H																	
Crossing #1	24" Corrugated Steel Culvert	2	30.5	1	0.79		0.003							10	48			SRK Estimate - debris
	24" Corrugated Steel Culvert	2	30.5	1	0.79		0.003							10	48			SRK Estimate - debris
Madrid South Portal and Vent Raise	Infrastructure Pad																	
	Portable Trailers (ATCO)	2	10	3	30.0	5	0.15	0.3	14.72	0.16	19.5	9.0	7.1	71		150.0		SRK Estimate - debris
	Cribbing, stairs, entry way	2	10	3	30.0	1	0.15	0.3			3.9	9.0		26	0.00			SRK Estimate - debris
	Compressor Building	1																
	Shop	1	30	15	450.0	5	0.01	0.3	17.17	0.05	4.5	135.0	12.9	152	198.09	2250.0		ACAD Estimate
Upper Portal Pad	Water Treatment Plant	1																
	Diesel Generator	1	12.23	2.44	29.8	0.1									2.98			SRK Estimate - debris
	50,000L Water Tank with Containment																	
	CaCl2 Laydown																	
	Brine Mixing Facility																	
Portal & UG Works	Extent	1			1446.0											0.0		SRK Estimate
	Plug	1	15	7.6	114.0	6.2								707		706.8		Estimated
	50000L Water Tank	1	7.25	2.5	18.1	2.75										49.8		SRK Estimate
	CaCl2 Laydown																	
	Brine Mixing Facility														2.00			SRK Estimate - General debris
Pumphouse	Pumphouse	1																
	Waterlines																	
	Intake	1	25	0.18	0.03									1	1.91	0.0		ACAD Estimate
	Leg 1	1	225	0.18	0.03									6	17.18	0.0		ACAD Estimate
	Leg 2	1	188	0.18	0.03									5	14.35	0.0		ACAD Estimate
Fuel Transfer Station	75,000L Envirotank	1																SRK Estimate
	HDPE Sump																	
	HDPE Liner				797.0			0.003						2	7.17	0.0		ACAD Estimate
	Non-woven Geotextile				1505.0			0.003						5	13.55	0.0		ACAD Estimate
	Non-woven Geotextile																	
Pollution Control Pond	Non-woven Geotextile	2			10442.0			0.003						63	187.96			ACAD Estimate
	Pond Liner	1			16917.0			0.003						51	152.25			ACAD Estimate
	Breach (Berm)	1			300.0	3.5								600				ACAD Estimate
	Secondary Pollution Control Pond																	
	Non-woven Geotextile	2			798.0			0.003						5	14.36			ACAD Estimate
Madrid South Vent Raise	Pond Liner	1			1293.0			0.003						4	11.64			ACAD Estimate
	Breach (Berm)	1			300.0	3.5								600				ACAD Estimate
	Diesel Generator	1	12.23	2.44	29.8	0.25												SRK Estimate - debris
	Air Heating Facility	1																
	Vent Raise Ducting	1	25															
Fuel Transfer Station	60000L Envirotank	1	7.25	2.6		3.25												SRK Estimate
	HDPE Sump	1																
	HDPE Liner	1			797.0			0.003						2	7.17	0.0		ACAD Estimate
	Non-woven Geotextile	1			1505.0			0.003						5	13.55	0.0		ACAD Estimate
	Non-woven Geotextile																	

Worksheet 8: Earthwork Quantities

Earthwork Volumes/Quantities	
Bulking Factors	1.2
Soil/Rock Pad	
Cover shrinkage factor	1.1

Reclamation Areas

Work Area	Location	Total Area (m ²)	Area Scarified (m ²)	Area Regraded (m ²)	Area Requiring Fill (m ³)	Coconut-matting Area (m ²)	Seeding Area (m ²)	Source/Comment

Earthwork Areas

Work Area	Item	Qty	Length (m)	Width (m)	Height (m)	Side Slope (percent)	Area (m ²)	In-situ Volume (m ³)	Loose Volume (m ³)	Source / Comments
Madrid North Portal and Vent Raise										
Madrid North Vent Raise	Regrade area						3,540			ACAD Design estimate
Portal Upper Pad	Regrade area						5,800			ACAD Design estimate
Portal Lower Pad	Regrade area						1,450			ACAD Design estimate
Ore storage pad	Regrade area						8,000			ACAD Design estimate
Waste rock pile	Footprint						31,000			ACAD Design estimate
Waste rock pile	Sloped Footprint					0.4	12,400			ACAD Design estimate
Waste rock pile	Top Footprint					0.6	18,600			ACAD Design estimate
Waste rock pile	Place Crushed rock cover layer				0.3		31,000			ACAD Design estimate
3:1 Resloped WRP	Top Area						12,300			ACAD Design estimate
	3:1 Slope surface area						20,200			ACAD Design estimate
	WRP total Surface area (3:1)	1.1					32,500			ACAD Design estimate
Fuel Transfer Station	Liner/Geotextile Area	3					750			ACAD Design estimate
	Contaminated Gravel	1						67	80.4	Estimate from Drawing MNP-07
Fuel Tank Containment	Liner/Geotextile Area	3					750			ACAD Design estimate
	Contaminated Gravel	1						67	80.4	Estimate from Drawing MNP-07
Pond Access Road	Crown Road		448							ACAD Design estimate
Portal Pad Road	Crown Road		243							ACAD Design estimate
	Clean up spilled Ore		243	9.5	0.15			346	415.53	Assume 250m or total length, whichever is smaller
Vent Raise Access Road			70							ACAD Design estimate; Not including pad
Breach Riprap		1			0.3		350	105		Rough 2D area estimate (Single breach)
Pond discharge		1								See Water Management Tab
	Reject water; 30% of pond volume	0.3								
		0.7								
Madrid South AWR										
Madrid South AWR	Clean up spilled Ore		250	9.5	0.15			356	427.5	Assume 250m over total length
	Crown Road	1	5.045							Road length (9.5m wide) + area of pull outs
Madrid South Portal and Vent Raise										
Waste Rock Pile	Footprint						31,230			ACAD Design estimate
Ore storage pad	Footprint						12,200			ACAD Design estimate
16m Access Road	Crown Road		130							ACAD Design estimate
9.5m Haul road	Crown Road		238							ACAD Design estimate
9.5m Vent Raise Access Road	Crown Road		254							ACAD Design estimate
6m Berm / pumphouse access	Crown Road		210							ACAD Design estimate
Infrastructure Access Road	Crown Road		243							ACAD Design estimate
	Clean up spilled Ore		250	9.5	0.15			356	427.5	Assume 250m or total length, whichever is smaller
Pumphous Facilities	Debris removal		5	6			30			
Fuel Transfer Station	Liner/Geotextile Area	3					750			ACAD Design estimate
	Contaminated Gravel	1						67	80.4	Estimate from Drawing MNP-07
Infrastructure Pad	Regrade area						12,000			ACAD Design estimate
Upper Portal Pad	Regrade area						400			ACAD Design estimate
South Portal Pad	Regrade area						500			ACAD Design estimate
Laydown Pad	Regrade area						5,000			ACAD Design estimate
Vent Raise	Regrade area						7,900			ACAD Design estimate
Fuel Tank Containment	Liner/Geotextile Area	3					750			ACAD Design estimate
	Contaminated Gravel	1						67	80.4	Estimate from Drawing MNP-07
Ore storage pad	Regrade area						7,900			ACAD Design estimate
Waste Rock Pile	Footprint						31,230			ACAD Design estimate
	Top Area	0.6					18,738			ACAD Design estimate
	Sloped area	0.4					12,492			ACAD Design estimate
	Liner Cover				0.3		31,230	9369		ACAD Design estimate
3:1 Resloped WRP	Top Area						15,350			ACAD Design estimate
	3:1 Slope surface area						26,470			ACAD Design estimate
	WRP total Surface area (3:1)				0.3		41,820	12546.00		ACAD Design estimate
Breach Riprap (Primary Pond)		1			0.3		350	105		ACAD Design estimate
Breach Riprap (Secondary Pond)		1			0.3		350	105		ACAD Design estimate
Primary Pollution Control Pond										
Secondary Pollution Control Pond										See Water Management Tab
Total volume	Reject water; 30% of pond volume; discharged to Tail Lake	0.3								
	Permeate; 70% of total pond volume; discharged to Patch	0.7								

Worksheet 9a: Water Management

Activity	Task	Unit	Cost Code	Unit Cost	Quantity			Year4	Year5	Year6	Year7	Year8	Year9	Year10	Total	Activity Total
					Year 1	Year2	Year3									
Madrid North Water Management - Discontinued (WM-001)	Treatment water management	Yearly	--	\$ -	0	0	0	0	0	0	0	0	0	0	0	\$ -
Madrid South Water Management - Discontinued (WM-002)	Treatment water management	Yearly	--	\$ -	0	0	0	0	0	0	0	0	0	0	0	\$ -
	Site Services Support &Maintenance	LS	--	\$ 50,000	0	0	0	0	0	0	0	0	0	0	0	\$ -
	Spare Parts & Consumables	LS	--	\$ 20,000	0	0	0	0	0	0	0	0	0	0	0	\$ -
TOTAL																\$ -

Worksheet 9b: Direct Water Mangement Costs

Activity	WBS Code	Item	Task	Sub-task	Activity	Task	Quantity	Unit	Cost Code	Unit Cost	Task Total	Activity Total	Source / Comments
Madrid North Water Management	WM-001	1	2	1	Madrid North Wa	decommission RO plant	-	each	C.1.05	\$603.78	\$ -	\$ -	Esimate tasks based on Doris estimate
		1	1	2		disconnect RO plant containers and prep for shipping off-site	-	each	C.1.08	\$1,110.00	\$ -		Toggle between options below
		1	1	3		haul RO plant containers to Roberts Bay laydown	-	each	C.4.17	\$113.57	\$ -		
		1	1	4		Drain and decommission 50000L water tank	0	each	C.1.12	\$241.82	\$ -		
		1	1	5		Transport discharge water to Tail Lake	-	m³	C.4.18	\$11.44	\$ -		
		1	1	5		Haul water tank to Roberts Bay Laydown	-	each	C.4.17	\$113.57	\$ -		
Madrid South Water Management	WM-002	3	6	1	Madrid South W4	decommission RO plant	-	each	C.1.05	\$603.78	\$ -	\$ -	Esimate tasks based on Doris estimate
		3	1	2		disconnect RO plant containers and prep for shipping off-site	-	each	C.1.08	\$1,110.00	\$ -		Toggle between options below
		3	1	3		haul RO plant containers to Roberts Bay laydown	-	each	C.4.17	\$113.57	\$ -		
		3	1	4		Drain and decommission 50000L water tank	0	each	C.1.12	\$241.82	\$ -		
		3	1	5		Transport discharge water to Tail Lake	-	m³	C.4.19	\$12.91	\$ -		
		3	1	6		Haul water tank to Roberts Bay Laydown	-	each	C.4.17	\$113.57	\$ -		

Worksheet 10: Work Breakdown Structure

Location	Facility	WBS Code
Madrid North Surface Infrastructure		
Upper Portal Area		
	Shop	MN-001
	Diesel Generator	
	Office & Support Complex	MN-003
Lower Portal Area		
	Brine Mixing Facility	MN-004
	Portal and Underground Works	MN-005
Fuel Storage Facility		
	Fuel Storage Facility	MN-006
Pond Access Road		
	Pond Access Road	MN-007
Pollution Control Pond		
	Pollution Control Pond	MN-008
Portal Pad Road		
	Portal Pad Haul Road	MN-009
	Pipe Culvert	MN-010
	Dual Water Line - Discontinued	MN-011
Ore Stockpile Pad		
	Ore Stockpile Pad	MN-012
Waste Rock Pile		
	Waste Rock Pile	MN-013
Madrid North Vent Raise		
	Vent Raise	MN-014
	Ventilation and Heating Facilities	MN-015
	Offices & Support Complex	MN-016
	Diesel Generator	MN-017
	Fuel Containment Area	MN-018
	Vent Raise access road	MN-019
	Pipe Culvert	MN-020
Madrid South All-Weather Road		
Madrid South All-Weather Road		
	Madrid South All-Weather Road	MR-001
	Crossing #1	MR-002
	Crossing #2	MR-003
Madrid South Surface Infrastructure		
Infrastructure Pad Area		
	Shop	MS-001
	Fuel Storage Facility	MS-002
	Offices & Support Complex	MS-003
	Fresh Water Pipelines Leg 2 - Discontinued	MS-004
	Diesel Generator	MS-005
Laydown Pad		
	Laydown Pad	MS-006
Portal Area		
	Portal and Underground Works	MS-007
	Brine Mixing Facility	MS-008
Primary Pollution Control Area		
	Primary Pollution Control Pond	MS-009
Haul Road and Water Supply Infrastructure		
	Secondary Pollution Control Pond	MS-010
	Haul and Access Roads	MS-011
	Pumphouse - Discontinued	MS-012
	Freshwater Pipeline Leg 1 - Discontinued	MS-013
Infrastructure Access Road		
	Infrastructure Access Road	MS-014
Waste Rock Pile		
	Waste Rock Pile	MS-015
Ore Stockpile Pad		
	Ore Stockpile Pad	MS-016
Madrid South Vent Raise Area		
	Vent Raise	MS-017
	Ventilation and Heating Facilities	MS-018
	Fuel Containment Area	MS-019
Additional Direct Costs		
Off-site Shipping for Disposal	Ship Off-site for Disposal by Barge	DN-001
Off-Site Disposal Fees	Disposal Fees in Licensed Facility	DN-002
Water Management	Madrid North Water Management - Discontinued	WM-001
	Madrid South Water Management - Discontinued	WM-002

Appendix 10

(for Chapter 10, Predicted Environmental Effects)

10-A NIRB Application Form 1 and NIRB Screening Form 2

10-B Archaeology and Traditional Use Clearance

MADRID ADVANCED EXPLORATION PROGRAM

Type B Water Licence Application Supplemental Information Report

Appendix 10-A

NIRB Application Form 1 and NIRB Screening Form 2

MADRID ADVANCED EXPLORATION PROGRAM

Type B Water Licence Application Supplemental Information Report

PART 1 FORM

PROJECT PROPOSAL INFORMATION REQUIREMENTS

To access NIRB documents, project screenings, and project reviews please visit the Nunavut Impact Review Board's ftp site <http://ftp.nirb.ca/>. The NIRB's website (www.nirb.ca) is currently under construction. Please contact info@nirb.ca should you have any questions or require further information.

IMPORTANT!

Please be advised that your application will not be processed until the Sections 1 - 9 are completed in their entirety, in both English and Inuktitut (+ Inuinnaqtun, if in the Kitikmeot).

SECTION 1: APPLICANT INFORMATION

1. **Project Name** Madrid Advanced Exploration Project

2. **Applicant's full name and mailing address:**

TMAC Resources Inc.
95 Wellington Street West
Suite 1010, P.O. Box 44
Toronto, Ontario, M5J 2N7

3. **Primary contact's full name and mailing address:**

M. John Roberts
Vice President, Environmental Affairs
TMAC Resources Inc.
95 Wellington Street West
Suite 1010, P.O. Box 44
Toronto, Ontario, M5J 2N7
Phone: 416-628-0126
Fax: 416-644-9337
e-mail: john.roberts@tmacresources.com

SECTION 2: AUTHORIZATION NEEDED

1. **Indicate all authorizations associated with the project proposal:**

<input checked="" type="checkbox"/>	Regional Inuit Association (RIA)
<input checked="" type="checkbox"/>	Nunavut Water Board (NWB)
<input type="checkbox"/>	Nunavut Planning Commission (NPC)
<input checked="" type="checkbox"/>	Indian and Northern Affairs Canada (INAC)
<input type="checkbox"/>	Department of Fisheries and Oceans (DFO)
<input type="checkbox"/>	Community Government & Services (CG&S)
<input type="checkbox"/>	Nunavut Research Institute (NRI)
<input type="checkbox"/>	Department of Culture, Language, Elders, and Youth (CLEY)

<input type="checkbox"/>	Canadian Launch Safety (CLS)
<input type="checkbox"/>	Environment Canada (EC)
<input type="checkbox"/>	Government of Nunavut (GN)
<input type="checkbox"/>	Department of National Defense (DND)
<input type="checkbox"/>	Hamlet
<input type="checkbox"/>	Parks Canada (PC)
<input type="checkbox"/>	Canadian Wildlife Service (CWS)
<input type="checkbox"/>	Other (please specify):

2. List the active permits, licences, or other authorizations related to the project proposal, and their expiry date(s):

Hope Bay Belt Authorizations

Quarry Permits (KIA)

KTP308Q010 - Quarries A, B, D (expires Jan 20, 2015)
KTP307Q010 - Quarries 2, 3, 4 (expires Jan 20, 2015)
IOL Surface tenure - Quarries G and H (application pending)

Land Use Licences (KIA)

KTL303C056 - Hope Bay Land Use (expires Jan 20, 2015)
KTL306C003 - Boston Land Use Licence (expires Jan 20, 2015)
KTL306F007 - Winter Road Land Use (expires Jan 20, 2015)
IOL Surface tenure for advanced exploration - Madrid (application pending)

Mineral Lease (NTI)

IOL Exploration Agreement BB60-00-01:TOK 1 Renewal Anniversary Date Dec 31, 2014
IOL Exploration Agreement BB60-00-03:TOK 3 Renewal Anniversary Date Dec 31, 2014

Mining Lease (AANDC/INAC)

#4648 Madrid 1 and #4649 Madrid 2 Expires Oct 12, 2022

Commercial Lease (KIA)

KTCL313D001 - Commercial Lease (expires Sept 13, 2018)

Water Licences (NWB)

2BB-BOS1217 Boston Advanced Exploration Project (expires July 31, 2017)
2AM-DOH1323 Doris North Mining and Milling Undertaking (expires Aug 15, 2023)
2BE-HOP1222 Hope Bay Regional Exploration Program (June 30, 2022)
2BB-Madrid Advanced Exploration Program (application pending)

3. List the pending permits, licences, or other authorizations related to the project proposal:

NWB water licence and IOL surface tenure

4. Has this project or any components of this project been previously screened or reviewed by NIRB?

☒

YES

☐

NO

If YES, indicate the previous project name and NIRB File No.

Exploration and bulk sampling activities at Boston have been screened and determined to be exempt (EX148) and regional exploration activities across the Hope Bay Belt have also been screened and determined to be exempt. Advanced exploration and mine development at Doris North Project has been screened and undergone environmental assessment (screening 05MN047 and Project Certificate 003).

SECTION 3: PROJECT PROPOSAL DESCRIPTION

1. Indicate the type of project proposal (check all that apply)^(1,2).
(See Appendix A for Project Type Definitions)

1	All-Weather Road/Access Trail	<input checked="" type="checkbox"/>	9	Site Cleanup/Remediation	<input type="checkbox"/>
2	Winter Road/ Winter Trail	<input checked="" type="checkbox"/>	10	Oil and Natural Gas Exploration/Activities	<input type="checkbox"/>
3	Mineral Exploration	<input checked="" type="checkbox"/>	11	Marine Based Activities	<input type="checkbox"/>
4	Advanced Mineral Exploration	<input checked="" type="checkbox"/>	12	Scientific/International Polar Year Research*	<input type="checkbox"/>
5	Mine Development /Bulk Sampling	<input checked="" type="checkbox"/>	13	Harvesting Activities*	<input type="checkbox"/>
6	Pits and quarries	<input checked="" type="checkbox"/>	14	Tourism Activities*	<input type="checkbox"/>
7	Offshore Infrastructure (port, break water, dock)	<input type="checkbox"/>	15	Other ⁽²⁾ :	<input type="checkbox"/>
8	Seismic Survey	<input type="checkbox"/>			<input type="checkbox"/>

Please note:

1. All project types listed above, except those marked with an asterisk (*), will also require the Proponent to submit a **Part 2 Project Specific Information Requirement (PSIR) Form**. The NIRB application process will not be considered complete without the Part 2 PSIR Form.
2. Please be advised that in order to complete the NIRB process, the NIRB may request additional information at any time during the process.
3. If "Other" is selected, contact NIRB for direction on whether a Part 2 PSIR Form is required.

2. If Project Type 3, 4 or 5 was selected above, please indicate the mineral of interest that is being extracted. Include a brief description.

<input checked="" type="checkbox"/>	Base Metals (zinc, copper, gold, silver, etc) <u>GOLD</u>
<input type="checkbox"/>	Diamonds
<input type="checkbox"/>	Uranium
<input type="checkbox"/>	Other: _____

3a. If Project Type 12, 13 or 14 was selected above, complete the table and questions below.

Not applicable

Transportation Type	Quantity	Proposed Use	Length of Use
<i>E.g. Helicopter</i>	<i>1</i>	<i>Site to site pick ups and drop offs</i>	<i>6 days</i>

3b. Describe any docks, piers, air strips or related structures that are to be used in conjunction with the proposed project activities. **Please note:** the building of new structures may require a Part 2 Form.

3c. If a temporary camp site is to be established, describe the proposed structures in detail and indicate the type and source of power for the camp site if applicable.

4. Personnel

Total No. of personnel on site = (A)	Total No. of days on-site = (B)	Total No. of Person days (A) x (B) = <u>25,550 per year</u>
<u>Peak is 70</u>	<u>365</u>	

5. Timing

Period of operation: from Jan 1 to Dec 31 each year
Proposed term of authorization: from June 2015 to May 2025

6a. Region (check all that apply):

☐ North Baffin ☐ Kivalliq ☒ Kitikmeot ☐ Transboundary: _____
☐ South Baffin ☐ National Park

6b. Describe the location of the proposed project activities in a regional context, noting the proximity to the nearest communities and any protected areas.

The Madrid area of the belt is located approximately 130 km southwest of Cambridge Bay. The nearest communities are Umingmaktok (70 km to the southwest of the Property) and Kingaok (Bathurst Inlet; 150 km to the southwest of the Property).

6c. Discuss the history of the site if it has been used for any project activities in the past.

The Hope Bay Belt is a north-south trending greenstone belt, with economically viable zones of gold mineralization that can be divided into three areas: Doris, Madrid, and Boston. Over the past twenty years, the belt has undergone considerable exploration and development activities by TMAC and previous operators. The Doris North Project is Phase 1 of a belt-wide development, with gold production from an underground mine located near Doris Lake. The Hope Bay Belt has significant infrastructure including air strips, roads, fuel storage, a port facility, power plants, administration, geology, and lab buildings, and underground development at the Doris and Boston areas. Phase 2 includes the development of the Madrid and/or Boston areas, including infrastructure and waste management facilities to support underground and open pit mining and processing. The proposed advanced exploration at Madrid will help inform the planning and design of Phase 2 development.

6d. Indicate if there are any known archaeological/palaeontological historical sites in the area.

Sites identified in area will be recovered as per current GN requirements and a "chance find" policy will be implemented

7. Land Status (check all that applies):

☒ Crown ☐ Commissioners' ☐ Municipal
☒ Inuit Owned Surface Lands ☒ Inuit Owned Sub-Surface Lands

8a. Co-ordinates:

	Lat/Long		UTM	
NE	68° 06' 34" N	106° 32' 22" W	7555864	435954
NW	68° 08' 07" N	106° 37' 44" W	7555840	432309
SE	68° 00' 13" N	106° 29' 00" W	7544000	438000
SW	68° 00' 07" N	106° 40' 29" W	7544000	430000

NTS Map Sheet No: 077A03 Hope Bay (1:50 000)

(Please ensure that maps of the project are attached (1:50,000 if **available**, 1:250, 000 **Mandatory**) available from Natural Resources Canada)

8b. If the project proposal includes a **camp**, please provide the coordinates of the camp location

Not applicable

Min Lat (degree/minute) _____ Min Long (degree/minute) _____

Max Lat (degree/minute) _____ Max Long (degree/minute) _____

If different from above for the camp:

NTS Map Sheet No: _____

Please ensure that maps of the project are attached (1:50,000 if **available**, 1:250, 000 **Mandatory**) available from Natural Resources Canada

Please note that additional location information may be required in a subsequent Project Specific Information Requirement (PSIR) submission. This may take the form of a digital Geographic Information Systems (GIS) file.

SECTION 4: NON-TECHNICAL PROJECT PROPOSAL DESCRIPTION

Please include a non-technical description of the project proposal, no more than 500 words, in English and Inuktitut (+Inuinnaqtun, if in the Kitikmeot). The project description should outline the following:

- The project activities, their necessity and duration;
- Method of transportation;
- Any structures that will be erected (permanent/ temporary);
- Alternatives considered; and
- Long-term developments, the projected outcome of the development for the area and its timeline.

IMPORTANT: IF THE PROPOSED ACTIVITIES REQUIRE SUBMISSION OF A NIRB PART 2 PSIR FORM, PLEASE COMPLETE SECTION 8 ONLY, OTHERWISE CONTINUE ON WITH SECTION 5.

Refer to “Madrid Advanced Exploration Program Type B Water Licence Application Supplemental Information Report” Section 2.0 for a non-technical description of the project proposal and appropriate translations.

SECTION 5: MATERIAL USE

1. List equipment to be used (including drills, pumps, aircraft, vehicles, etc.):

Refer to Part 2 Project Specific Information Requirement (PSIR) Form.

2a. Detail fuel and hazardous material use:

Refer to Part 2 Project Specific Information Requirement (PSIR) Form

2b. Describe the proposed Spill Prevention Plan.

Spill Prevention and Response will be in accordance with the approved Hope Bay Spill Contingency Plan with updates as required to incorporate the Madrid Advanced Exploration Project.

3a. Detail the anticipated daily water consumption rates

Daily amount (m ³)	Proposed water retrieval methods	Proposed water retrieval location
Up to 295	Submersible pump and storage in portable tanks for transport via truck	Patch Lake, Windy Lake and lakes local to diamond drill locations (>15,000m ²)

3b. Have you applied for a water Licence with the Nunavut Water Board?

☒ YES

☐ NO

If yes, what class of licence?

☐ Class A Water Licence ☒ Class B Water Licence

SECTION 6: WASTE DISPOSAL AND TREATMENT METHODS

1. List the types of waste associated with the proposed project activities:

Refer to Part 2 Project Specific Information Requirement (PSIR) Form.

1. List the types of waste associated with the proposed project activities (continued):

Refer to Part 2 Project Specific Information Requirement (PSIR) Form.

2. Describe the proposed Waste Management Plan.

Waste management will be in accordance with the current Plans for the Doris North Project (2AM-DOH1323). Refer to Part 2 Project Specific Information Requirement (PSIR) Form.

SECTION 7: COMMUNITY INVOLVEMENT & REGIONAL BENEFITS

1. List the community representatives that have been contacted and provide the minutes of the meetings if available:

Refer to "Madrid Advanced Exploration Program Type B Water Licence Application Supplemental Information Report" Section 10.0

Community	Name	Organization	Date Contacted

SECTION 8: GENERAL QUESTIONS

1. Will you be disturbing any known archaeological sites?

☒ YES (see attached Points West memo)
☐ NO

SECTION 9: APPLICANT SIGNATURE

Please sign and date your application:



Signature

Vice President, Environmental Affairs
Title

December 8, 2014
Date

1. GENERAL PROJECT INFORMATION REQUIREMENTS		Location (section) within Madrid Advanced Exploration Type B Water license application Supplemental Report
Project Coordinates and Maps		
1	The preferred method for submitting project coordinates information is through the use of a Geographic Information System (GIS) compatible digital file.	Application, Supplemental Information Report: Section 2.1.1 (Table 2.1-1)
2	Map of the project site within a regional context indicating the distance to the closest communities.	Supplemental Information Report: Section 3.5.1 (Figure 3.5-1)
3	Map of any camp site including locations of camp facilities.	Supplemental Information Report: Section 3.5.1 (Figure 3.5-2)
4	Map of the project site indicating existing and/or proposed infrastructure, proximity to water bodies and proximity to wildlife and wildlife habitat.	Supplemental Information Report: Figure 3.5-2, 4.2-1, 4.3-1
Project General Information		
5	Discuss the need and purpose of the proposed project.	Supplemental Information Report: Section 3.7
6	Discuss alternatives to the project and alternative methods of carrying out the project, including the no-go alternative. Provide justification for the chosen option(s).	Supplemental Information Report: Section 10.10.1 to 10.10.4, Appendix 4
7	Provide a schedule for all project activities.	Application, Supplemental Information Report: Section 3.4
8	List the acts, regulations and guidelines that apply to project activities.	Supplemental Information Report: Section 1
9	List the approvals, permits and licenses required to conduct the project.	Application and Supplemental Information Report: Section 10.2 (Table 10.2-1)
DFO Operational Statement (OS) Conformity		
10	Indicate whether any Department of Fisheries and Oceans (DFO) Operational Statement (OS) activities apply to the project proposal	Supplemental Information Report: Section 4
11	If any of the DFO's OS apply to the project proposal, does the Proponent agree to meet the conditions and incorporate the measures to protect fish and fish habitat as outlined in the applicable OS? If yes, provide a signed statement of confirmation.	Supplemental Information Report: Section 4, Appendix 4, Section 6.5
Transportation		
12	Describe how the project site will be accessed and how supplies will be brought to site. Provide a map showing access route(s).	Supplemental Information Report: Section 4.2.1, 4.3.1 (Figure 4.2-1, 4.3-1)
13	If a previous airstrip is being used, provide a description of the type of airstrip (ice-strip/all-weather), including its location. Describe dust management procedures (if applicable) and provide a map showing location of airstrip.	not applicable
14	If an airstrip is being constructed, provide the following information: a. Discuss design considerations for permafrost b. Discuss construction techniques c. Describe the construction materials, type and sources, and the acid rock drainage (ARD) and metal leaching (ML) characteristics (if rock material is required for airstrip bed). d. Describe dust management procedures. e. Provide a map showing location of proposed airstrip.	not applicable
15	Describe expected flight altitudes, frequency of flights and anticipated flight routes.	not applicable
Camp Site		
16	Describe all existing and proposed camp structures and infrastructure	Supplemental Information Report: Section 4.1.4
17	Describe the type of camp: a. Mobile b. Temporary c. Seasonal d. Permanent e. Other	Supplemental Information Report: Section 4.1.4
18	Describe the maximum number of personnel expected on site, including the timing for those personnel involved with the project.	Supplemental Information Report: Section 4.1.4
Equipment		
19	Provide a list of equipment required for the project and discuss the uses for the equipment.	Supplemental Information Report: Section 4.2.6 and 4.3.6 (Tables 4.2-1 and 4.2-2)
20	If possible, provide digital photos of equipment.	Not available
Water		
21	Describe the location of water source(s), the water intake methods, and all methods employed to prevent fish entrapment. Provide a map showing the water intake locations.	Application, Supplemental Information Report: Section 4.2.6, 4.2.7, 4.3.6, 4.3.7, 6.1
22	Describe the estimated rate of water consumption (m ³ /day).	Application, Supplemental Information Report: Section 6.1 (Table 6.1-1)
23	Describe how waste water will be managed. If relevant, provide detail regarding location of sumps, including capacity of sumps and monitoring.	Application, Supplemental Information Report: Section 4.2.11.1, 4.3.11, 6.4, 7.1 to 7.5, 8.1 (Table 8.1-1) and 8.2
24	If applicable, discuss how surface water and underground water will be managed and monitored.	Supplemental Information Report: Section 6.3.1, 6.3.2, 10.4.3 and 10.4.5.1

Waste Water (Grey water, Sewage, Other)		
25	Describe the quantities, treatment, storage, transportation, and disposal methods for the following (where relevant): - Sewage - Camp grey water - Combustible solid waste - Non-combustible solid waste, including bulky items/scrap metal - Hazardous waste or oil - Contaminated soils/snow - Empty barrels/fuel drums - Any other waste produced	Supplemental Information Report: Section 7.1 (Table 7.1-1) and Section 8.1 (Table 8.1-1)
26	If the project proposal includes a landfill or landfarm, indicate the locations on a map, provide the conceptual design parameters, and discuss waste management and contact-water management procedures.	Supplemental Information Report: Section 4.2.11.3 and 8.1 (Table 8.1-1)
Fuel		
27	Describe the types of fuel, quantities (number of containers, type of containers and capacity of containers), method of storage and containment. Indicate the location on a map where fuel is to be stored, and method of transportation of fuel to project site.	Supplemental Information Report: Section 4.1.5, 4.2.4 (Figure 4.2-1), 4.2.10.3, 4.3.4 (Figure 4.3-1), 4.3.10 and 4.4.1
28	Describe any secondary containment measures to be employed, including the type of material or system used. If no secondary containment is to be employed, please provide justification.	Supplemental Information Report: Section 4.2.4, 4.3.4 and 4.4.1
29	Describe the method of fuel transfer and the method of refuelling.	Supplemental Information Report: Section 4.2.10.3 and 4.3.10
30	Describe spill control measures in place.	Supplemental Information Report: Section 4.2.10.3, 4.3.10, 4.4.1 and 8.1 (Table 8.1-1)
Chemicals and Hazardous Materials* <small>*includes but not limited to oils, greases, anti-mat, antifreeze, calcium or sodium chloride salt, lead acid batteries and cleaners</small>		
31	Describe the types, quantities (number of containers, the type of container and capacity of containers), method of storage and containment. Indicate the location on a map where material is to be stored, and method of transportation of materials to project site.	Supplemental Information Report: Section 4.2.10.2, 4.2.11.3, 4.3.10, 4.3.11, Appendix 4 Figure 4.2-1 and 4.3-1
32	Describe any secondary containment measures to be employed, including the type of material or system used.	Supplemental Information Report: Section 4.2.10.2, 4.3.10, Appendix 4
33	Describe the method of chemical transfer.	Supplemental Information Report: Section 4.2.10.2, 4.2.11.3, 4.3.10, 4.3.11, Appendix 4
34	Describe spill control measures in place.	Supplemental Information Report: Section 8.1 (Table 8.1-1) and 10.8
Workforce and Human Resources/Socio-Economic Impacts		
35	Discuss opportunities for training and employment of local Inuit beneficiaries.	Supplemental Information Report: Section 11.2
36	Discuss workforce mobilization and schedule, including the duration of work and rotation length, and the transportation of workers to site.	Supplemental Information Report: Section 11.2
37	Discuss, where relevant, any specific hiring policies for Inuit beneficiaries.	Supplemental Information Report: Section 11.2
Public Involvement/ Traditional Knowledge		
38	Indicate which communities, groups, or organizations would be affected by this project proposal.	Supplemental Information Report: Section 5.5 and Section 11.2
39	Describe any consultation with interested Parties which has occurred regarding the development of the project proposal.	Supplemental Information Report: Section 11.2
40	Provide a summary of public involvement measures, a summary of concerns expressed, and strategies employed to address any concerns.	Supplemental Information Report: Section 11.2
41	Describe how traditional knowledge was obtained, and how it has been integrated into the project.	Supplemental Information Report: Section 5.5 and Section 11.2
42	Discuss future consultation plans.	Supplemental Information Report: Section 11.2
2. PROJECT SPECIFIC INFORMATION		
SECTION A: Roads/Trails		
A-1. Project Information		
1	Describe any field investigations and the results of field investigations used in selecting the proposed route (e.g. geotechnical, snow pack)	Supplemental Information Report: Section 4.2, 4.3, Appendix 4C
2	Provide a conceptual plan of the road, including example road cross-sections and water crossings.	Supplemental Information Report: Section 4.2, 4.3, Appendix 4C
3	Discuss the type and volume of traffic using the road/trail (i.e. type of vehicles and cargo and number of trips annually).	Supplemental Information Report: Section 4.2, 4.3, Appendix 4C
4	Discuss public access to the road.	The roads within the Madrid area are not public roads - there is no public road access into the Hope Bay Project area.
5	Describe maintenance procedures.	Supplemental Information Report: Section 4.2, 4.3, Appendix 4C
6	Describe whether any portion of the road will be located outside of the Nunavut Settlement Area and whether any other regulatory requirements must be met (e.g. CEAA).	not applicable

A-2. All-Weather Road/Access Trail		
7	Discuss road design considerations for permafrost.	Supplemental Information Report: Section 4.2, 4.3, Appendix 4C
8	Describe the construction materials (type and sources for materials), and the acid rock drainage (ARD) and metal leaching characteristics of the construction materials.	Supplemental Information Report: Section 4.2, 4.3, Appendix 4C
9	Discuss construction techniques, including timing for construction activities.	Application, Supplemental Information Report: Section 4.2, 4.3, 4.4, Appendix 4C
10	Indicate on a map the locations of designated refuelling areas, water crossings, culverts, and quarries/borrow sources.	Supplemental Information Report: Section 4.2, 4.3, Appendix 4C
11	Identify the proposed traffic speed and measures employed to ensure public safety.	There are no public roads associated with the project. Otherwise 20 to 25km/hour in congested areas, up to 40km/hour for light vehicles in non-congested areas.
12	Describe dust management procedures.	Supplemental Information Report: Section 4.2, 4.3, Appendix 4, Section 6.1 and 10.5.1
SECTION B: Mineral Exploration/Advanced Exploration/Development		
B-1. Project Information		
1	Describe the type of mineral resource under exploration.	Application, Supplemental Information Report: Section 5.2, Appendix 5
B-2. Exploration Activity		
2	Indicate the type of exploration activity: - Bulk Sampling (underground or other) - Stripping - Trenching - Pitting - Delineation drilling - Preliminary delineation drilling - Exploration Drilling - Geophysical Work (ground and/or air) - Other	Application, Supplemental Information Report: Section 3.5, 3.6 and 4.4
3	Describe the exploration activities associated with this project: - Satellite remote sensing - Aircraft remote sensing - Soil sampling - Sediment sampling - On land drilling (indicate drill type) - On ice drilling (indicate drill type) - Water based drilling (indicate drill type) - Overburden removal - Explosives transportation and storage - work within navigable waters - On site sample processing - Off site sample processing - Waste rock storage - Ore storage - Tailings disposal - Portal and underground ramp construction - Landfilling - Landfarming	Application, Supplemental Information Report: Section 3.5, 3.6 and 4.2 to 4.4
B-3. Geosciences		
4	Indicate the geophysical operation type: a. Seismic b. Magnetic c. Gravimetric d. Electromagnetic e. Other	Supplemental Information Report: Section 4.4, Appendix 4
5	Indicate the geological operation type: a. Geological Mapping b. Aerial Photography c. Geotechnical Survey d. Ground Penetrating Survey e. Other	Supplemental Information Report: Section 4.4, Appendix 4
6	Indicate on a map the boundary subject to air and/or ground geophysical work.	Supplemental Information Report: Section 3.5.1 (Figure 3.5-2)
7	Provide flight altitudes and locations where flight altitudes will be below 610m.	TBD

B-4. Drilling		
8	Provide the number of drill holes and depths (provide estimates and maximums where possible).	Supplemental Information Report: Section 3.6, Section 4
9	Discuss any drill additives to be used.	Supplemental Information Report: Section 4.4.1
10	Describe method for dealing with drill cuttings.	Supplemental Information Report: Section 4.4.1
11	Describe method for dealing with drill water.	Supplemental Information Report: Section 4.4.2
12	Describe how drill equipment will be mobilized.	Supplemental Information Report: Section 4.4.1
13	Describe how drill holes will be abandoned.	Supplemental Information Report: Section 4.4.3
14	If project proposal involves uranium exploration drilling, discuss the potential for radiation exposure and radiation protection measures. Please refer to the <i>Canadian Guidelines for Naturally Occurring Radioactive Materials</i> for more information.	not applicable
B-5. Stripping/ Trenching/ Pit Excavation		
15	Discuss methods employed. (i.e. mechanical, manual, hydraulic, blasting, other)	not applicable
16	Describe expected dimensions of excavation(s) including depth(s).	not applicable
17	Indicate the locations on a map.	not applicable
18	Discuss the expected volume material to be removed.	not applicable
19	Discuss methods used to determine acid rock drainage (ARD) and metal leaching potential and results.	not applicable
B-6. Underground Activities		
20	Describe underground access.	Supplemental Information Report: Section 4, Appendix 4
21	Describe underground workings and provide a conceptual plan.	Supplemental Information Report: Section 4, Appendix 4
22	Show location of underground workings on a map.	Supplemental Information Report: Section 4, Appendix 4
23	Describe ventilation system.	Supplemental Information Report: Section 4, Appendix 4
24	Describe the method for dealing with ground ice, groundwater and mine water when encountered.	Supplemental Information Report: Section 4, Appendix 4, Section 10.4.3
25	Provide a Mine Rescue Plan.	TBD
B-7. Waste Rock Storage and Tailings Disposal		
26	Indicate on a map the location and conceptual design of waste rock storage piles and tailings disposal facility.	Supplemental Information Report: Section 4, Appendix 4
27	Discuss the anticipated volumes of waste rock and tailings.	Supplemental Information Report: Section 4.2.3, 4.3.3, Appendix 4
28	Discuss methods used to determine acid rock drainage (ARD) and metal leaching (ML) potential and results.	Supplemental Information Report: Section 4, Appendix 4
B-8. Stockpiles		
29	Indicate on a map the location and conceptual design of all stockpiles.	Supplemental Information Report: Section 4, Appendix 4
30	Describe the types of material to be stockpiled. (i.e. ore, overburden)	Supplemental Information Report: Section 4.2.2, 4.3.2, Appendix 4
31	Describe the anticipated volumes of each type of material to be stockpiled.	Supplemental Information Report: Section 4.2.2, 4.3.2, Appendix 4
32	Describe any containment measures for stockpiled materials as well as treatment measures for runoff from the stockpile.	Supplemental Information Report: Section 4.2.2, 4.2.7, 4.2.8, 4.3.2, 4.3.7, 4.3.8, Appendix 4
33	Discuss methods used to determine acid rock drainage (ARD) and metal leaching (ML) potential and results.	Supplemental Information Report: Section 8.3, Appendix 8B
B-9. Mine Development Activities		
34	Indicate the type(s) of mine development activity(s): - Underground BULK SAMPLE - Open Pit - Strip Mining - Other	Supplemental Information Report: Section 4
35	Describe mine activities.	Supplemental Information Report: Section 4.1 to 4.4
	<ul style="list-style-type: none"> - Mining development plan and methods - Mine development plan - Site access - Site infrastructure - Milling process - Water source(s) for domestic and industrial uses, required volumes, distribution and management - Solid waste, wastewater and sewage management - Water treatment systems - Hazardous waste management - Ore stockpile management - Tailings containment and management - waste rock management - Site surface Water management - Mine Water management - Pitting and quarrying activities - Explosives use, supply and storage - Power generation, fuel requirements and storage - Continuing exploration 	Supplemental Information Report: Section 4.1 to 4.4, 6.4, 8.1 to 8.4 and Table 8.1-1
36	Describe the explosive type(s), hazard class, volumes, uses, location of storage (show on map), and method of storage.	Supplemental Information Report: Section 4.2.10.1, 4.3.10

B-10. Geology and Mineralogy		
37	Describe the physical nature of the ore body, including known dimensions and approximate shape.	Supplemental Information Report: Section 5.2, Appendix 5
38	Describe the geology/ mineralogy of the ore deposit	Supplemental Information Report: Section 5.2, Appendix 5
39	Describe the host rock in the general vicinity of the ore body.	Supplemental Information Report: Section 5.2, Appendix 5
40	Discuss the predicted rate of production.	Supplemental Information Report: Section 4
41	Describe mine rock geochemical test programs which have been or will be performed on the ore, host rock, waste rock and tailings to determine acid generation and contaminant leaching potential. Outline methods and provide results if possible.	Supplemental Information Report: Section 4, Appendix 4, 5 and 8
B-11. Mine		
42	Discuss the expected life of the mine.	Supplemental Information Report: Section 3.4
43	Describe mine equipment to be used.	Supplemental Information Report: Section 4.2.6 and 4.3.6 (Tables 4.2-1 and 4.2-2)
44	Does the project proposal involve lake and/or pit dewatering? If so, describe the activity as well as the construction of water retention facilities if necessary.	not applicable
45	Discuss the possibility of operational changes occurring during the mine life with consideration for timing. (e.g. open pit to underground)	not applicable
46	If project proposal involves uranium mining, consider the potential for radiation exposure and radiation protection measures. Particular attention should be paid to <i>The Nuclear Safety and Control Act</i> .	not applicable
B-12. Mill		
47	If a mill will be operating on the property in conjunction with mining, indicate whether mine-water may be directed to the mill for reuse.	not applicable
48	Describe the proposed capacity of the mill.	not applicable
49	Describe the physical and chemical characteristics of mill waste as best as possible.	not applicable
50	Will or does the mill handle custom lots of ore from other properties or mine sites?	not applicable
SECTION C: Pits and Quarries		
1	Describe all activities included in this project: - Pitting - Quarrying - Overburden removal - Road use and/or construction - Explosives transportation and storage - Work within navigable waters - Blasting - Stockpiling - Crushing - Washing - Other	Supplemental Information Report: Section 4, Appendix 8C
2	Describe any field investigations and the results of field investigations used in determining new extraction sites.	Supplemental Information Report: Section 5, Section 8, Appendix 8C
3	Identify any carving stone deposits.	not applicable
4	Provide a conceptual design including footprint.	Supplemental Information Report: Section 4, Appendix 4 and 8C
5	Describe the type and volume of material to be extracted.	Supplemental Information Report: Section 4, Appendix 4
6	Describe the depth of overburden.	Supplemental Information Report: Section 4, Appendix 4
7	Describe any existing and potential for thermokarst development and any thermokarst prevention measures.	Supplemental Information Report: Section 5.2, Appendix 5, Section 7.3 and 10.4.3
8	Describe any existing or potential for flooding and any flood control measures.	Supplemental Information Report: Section 4.2.7, 4.2.8, 4.3.7, 4.3.8
9	Describe any existing or potential for erosion and any erosion control measures.	Supplemental Information Report: Section 6.4, 7.2, 10.4.2 and Table 10.3-1
10	Describe any existing or potential for sedimentation and any sedimentation control measures.	Supplemental Information Report: Section 10.4.2, 10.4.5.1 and Table 10.3-1
11	Describe any existing or potential for slumping and any slump control measures.	not applicable
12	Describe the moisture content of the ground.	Supplemental Information Report: Section 5.2, Appendix 5, Section 8, Appendix 8C
13	Describe any evidence of ice lenses.	not applicable
14	If blasting, describe methods employed.	Supplemental Information Report: Section 4.2.10.2, 4.3.10, Appendix 4, 6.2
15	Describe the explosive type(s), hazard class, volumes, uses, location of storage (show on map), and method of storage.	Supplemental Information Report: Section 4.2.10.2, 4.3.10
16	Discuss methods used to determine acid rock drainage (ARD) and metal leaching (ML) potential and results.	Supplemental Information Report: Section 8.3, Appendix 8B
17	Discuss safety measures for the workforce and the public.	Supplemental Information Report: Section 4, 8.1 (Table 8.1-1) and 10.5.2

3. DESCRIPTION OF THE EXISTING ENVIRONMENT		
Physical Environment		
	§ Proximity to protected areas, including:	Supplemental Information Report: Section 5.2 and Appendix 5
	§ Eskers and other unique landscapes (e.g. sand hills, marshes, wetlands, floodplains).	
	§ Evidence of ground, slope or rock instability, seismicity.	
	§ Evidence of thermokarsts.	
	§ Evidence of ice lenses.	
	§ Surface and bedrock geology.	
	§ Topography.	
	§ Permafrost (e.g. stability, depth, thickness, continuity, taliks).	
	§ Sediment and soil quality.	
	§ Hydrology/ limnology (e.g. watershed boundaries, lakes, streams, sediment geochemistry, surface water flow, groundwater flow, flood zones).	
	§ Tidal processes and bathymetry in the project area (if applicable).	
	§ Water quality and quantity.	
	§ Air quality.	
	§ Climate conditions and predicted future climate trends.	
	§ Noise levels.	
	§ Other physical Valued Ecosystem Components (VEC) as determined through community consultation and/or literature review.	
Biological Environment		
	§ Vegetation (terrestrial as well as freshwater and marine where applicable).	Supplemental Information Report: Section 5.3 and Appendix 5
	§ Wildlife, including habitat and migration patterns.	
	§ Birds, including habitat and migration patterns.	
	§ Species of concern as identified by federal or territorial agencies, including any wildlife species listed under the <i>Species at Risk Act (SARA)</i> , its critical habitat or the residences of individuals of the species.	
	§ Aquatic (freshwater and marine) species, including habitat and migration/spawning patterns.	
	§ Other biological Valued Ecosystem Components (VEC) as determined through community consultation and/or literature review.	
Socioeconomic Environment		
	§ Proximity to communities.	Supplemental Information Report: Section 3.5.1, 3.6
	§ Archaeological and culturally significant sites (e.g. pingos, soap stone quarries) in the project (Local Study Area) and adjacent area (Regional Study Area).	
	§ Palaeontological component of surface and bedrock geology.	
	§ Land and resource use in the area, including subsistence harvesting, tourism, trapping and guiding operations.	
	§ Local and regional traffic patterns.	
	§ Human Health, broadly defined as a complete state of wellbeing (including physical, social, psychological, and spiritual aspects).	
	§ Other Valued Socioeconomic Components (VSEC) as determined through community consultation and/or literature review.	
4. IDENTIFICATION OF IMPACTS AND PROPOSED MITIGATION MEASURES		
1	Please complete the attached Table 1 – Identification of Environmental Impacts, taking into consideration the components/ activities and project phase(s) identified in Section 4 of this document. Identify impacts in Table 1 as either positive (P), negative and mitigable (M), negative and non- mitigable (N), or unknown (U).	Supplemental Information Report: Section 10.3 and Table 10.3-1
2	Discuss the impacts identified in the above table.	Supplemental Information Report: Section 10.3 and Table 10.3-1
3	Discuss potential socioeconomic impacts, including human health.	Supplemental Information Report: Section 5.5, 10.6 and Appendix 5
4	Discuss potential for transboundary effects related to the project.	Supplemental Information Report: Section 10.9
5	Identify any potentially adverse effects of the project proposal on species listed under the <i>Species at Risk Act (SARA)</i> and their critical habitats or residences, what measures will be taken to avoid or lessen those effects and how the effects will be monitored.	Supplemental Information Report: Section 10.5.2
6	Discuss proposed measures to mitigate all identified negative impacts.	Supplemental Information Report: Section 10.4 and 10.5
5. CUMULATIVE EFFECTS		
	Discuss how the effects of this project interact with the effects of relevant past, present and reasonably foreseeable projects in a regional context.	Supplemental Information Report: Section 10.7

6. SUPPORTING DOCUMENTS	
Where relevant, provide the following supporting documents:	
Abandonment and Decommissioning Plan	Supplemental Information Report: Section 8, Appendix 8C
Existing site photos with descriptions	Not available
Emergency Response Plan	Supplemental Information Report: Section 8.1 (Table 8.1-1)
Comprehensive Spill Prevention/Plan (must consider hazardous waste and fuel handling, storage, disposal, spill prevention measures, staff training and emergency contacts)	Supplemental Information Report: Section 8.1 (Table 8.1-1)
Waste Management Plan/Program	Supplemental Information Report: Section 4.2.11, 4.3.11, 7.1 (Table 7.1-1) and 8.1 (Table 8.1-1)
Monitoring and Management Plans (e.g. water quality, air pollution, noise control and wildlife protection etc.)	Supplemental Information Report: Section 8.1 (Table 8.1-1)
If project activities are located within Caribou Protection Areas or Schedule 1 Species at Risk known locations, please provide a Wildlife Mitigation and Monitoring Plan	not applicable
In addition, for Project Type 9 (Site Cleanup/Remediation), please provide the following additional supporting documents:	
§ Remediation Plan including cleanup criteria and how the criteria were derived.	not applicable
§ Human Health Risk Assessment of the contaminants at the site.	not applicable



Note: Please indicate in the matrix cell whether the interaction causes an impact and whether the impact is

If no impact is expected please leave the cell blank

Table 1 - TMAC Madrid Type B Application - Environmental Affects

Potential Effect	Project Phase				Summary of Mitigation Measures
	Construction	Operations	Temporary Closure / Closure	Post-Closure	
Air Quality					
Degradation of air quality due to exhaust emissions from vehicles, aircraft and other combustion equipment	M	M	M		Use of well-maintained, fuel efficient equipment and promotion of fuel conservation measures.
Degradation of air quality due to fugitive dust emissions from blasting and quarrying	M	M			Dust generated will be short term and localized in nature and may settle on nearby overburden/soils, vegetation and surface water. As needed, water will be applied during periods of dry weather and/or application of approved dust suppression chemicals.
Degradation of air quality due to fugitive dust emissions from increased use of the existing airstrip and road traffic	M	M	M		Dust generated will be localized in nature and may settle on nearby overburden/soils, vegetation and surface water. As needed, water will be applied during the summer periods of dry weather and/or application of approved dust suppression chemicals.
Greenhouse gas emissions contributing to climate change	M	M	M		Use of well-maintained, fuel efficient equipment and promotion of fuel conservation measures. The equivalent emissions of GHG from the Madrid Advanced Exploration Program during the peak year is approximately 0.002% of Canada’s annual emissions.
Noise					
Changes to background noise conditions due to movement of vehicles, aircraft and other equipment	M	M	M		Equipment fitted with appropriate mufflers and silencers. Use enclosures, berms, acoustic screening and shrouding where stationary sources requiring control are identified. Keeping equipment in a well maintained condition.
Increased noise and vibration due to blasting and exploration drilling	M	M			Use enclosures, berms, acoustic screening and shrouding where stationary sources requiring control are identified. Keeping equipment in a well maintained condition.
Ground Stability and Permafrost					
Alteration of the active layer	M/N	M/N	M/N	M/N	Effects to permafrost will be mitigated as far as practical by reducing the extent of cut and fill areas; cut and fill will be allowed in designated rock quarries Appropriate thermal insulation will be placed to prevent onset of thermal erosion. Where fill is required, it will be of sufficient thickness and quality such that the active layer is not reduced.
Acceleration of permafrost-related processes such as mass wasting and erosion	M	M	M	M	Minimizing areas of disturbance. Where disturbance occurs, erosion and sediment control measures including compaction, sediment fences, and erosion control blankets will be implemented.
Groundwater					
Changes in groundwater quality due to the interaction between talik groundwater and underground mine water	M	M			Minimize operations within talik zone. Underground water will be collected into sumps and re-used for underground drilling. If excess water accumulates, the collected water will be transported to the Pollution Control Pond on surface.
Changes in groundwater quality due to the interaction between deep groundwater and underground mine water					Mine operations do not extend below the base of the permanently frozen zone.
Degradation of active layer water due to contact with poor quality (contact) water	M	M			Surface water management strategies including diversion/collection systems have been incorporated to reduce the risk of degradation of very shallow groundwater in the active-layer.
Surface Water Quantity					
Surface water drawdown of area lakes as a result of use	M	M			Recycling of intercepted contact water for drilling purposes will reduce the demand for fresh water and lake drawdown. Compliance with DFO Guidelines for under ice water taking.
Alteration in surface runoff patterns due to diversions	M	M	M		Minimizing footprint and diversion of surface runoff, minimizes the alteration to runoff patterns. Diverted surface runoff is kept within the existing watershed.
Surface Water Quantity and Sediment Quality					
Changes in surface water quality from disposal of contact water at bulk sample sites		M	M	M	Contact water meeting discharge criteria will be released from the bulk sample pad to the tundra at least 31m away from the local waterways. If the discharge water does not meet the water quality criteria, it will be transported to the Doris North Project for disposal in TIA. Transport of treated or untreated contact water for discharge to the TIA at the Doris North Project may also be implemented.
Changes in water quality from fugitive dust emissions	M	M			Appropriate drainage and sediment control structures will be used to prevent sediment laden water from entering surrounding waters. Dust generation will be minimized by road watering or by using other non-toxic, non-wildlife attractant substances to suppress dust.
Changes in surface water quality from runoff from quarry sites	M	M			Contact water within the quarry boundaries will be collected in a sump. If this contact water meets discharge criteria it will be discharged to the environment. If it does not meet discharge criteria it will be trucked to the Pollution Control Pond for reuse, or trucked to Doris North Project for disposal in TIA. Management plans will outline the storage, handling and use of explosives to minimize excessive residue and nitrogen loading.
Changes in surface water quality from runoff water from roads, pads, and other infrastructure	M	M	M	M	Runoff from the pads will be directed to the Pollution Control Pond and runoff from the roads may be monitored for two years to confirm geochemical stability of the material. Roads and infrastructure pads have been sited to avoid water bodies and are designed to minimize the risk for erosion and use of silt fencing if and where necessary. Available spill and emergency response equipment.
Presence of hydrocarbons owing to fuel spills	M	M	M		The possibility of accidental spills or releases will be eliminated or reduced by implementation of management plans and standard operating procedures.
Changes in surface water quality from disposal of treated sewage effluent and/or sludge					The existing camp facilities at Doris North Project will be used and portable, latrine style toilet facilities at Madrid South and Madrid North. Toilet wastes will be returned to the Doris North Project for disposal at existing sewage treatment facilities.
Changes in surface water quality from disposal of underground mine water	M	M	M		Underground contact water will be collected in underground sumps and reused for drilling. Excess water will be pumped to the surface and discharged to the Pollution Control Ponds.

Potential Effect	Project Phase				Summary of Mitigation Measures
	Construction	Operations	Temporary Closure / Closure	Post-Closure	
Mobilization of particulate material dust-generating activities	M	M			Dust generation will be minimized by road watering or by using other non-toxic, non-wildlife attractant substances to suppress dust.
Changes in surface water quality from runoff from quarry sites	M	M	M	M	Disposal of the drilling wastes in either a local sump or pumped to a system allowing the solids to settle out and clarified water to be released to tundra away from any surface water body. The remaining solids (sludge) can then be left in place at the local sump and reclaimed, or can be deposited in a dedicated containment location.
Disturbance and suspension of sediments from in-water construction activities	M				Appropriate drainage and sediment control structures will be used to prevent sediment laden water from entering surrounding waters.
Changes in sediment quality from disposal of treated contact water at bulk sample sites	M	M	M	M	Contact water meeting discharge criteria will be released from the bulk sample pad to the tundra at least 31 m away from the local waterways. If the discharge water does not meet the water quality criteria, a treatment plant may be installed to treat to the required concentration and release to the tundra 31 m away from local waterways. Transport of treated or untreated contact water for discharge to the TIA at the Doris North Project may also be implemented.
Presence of hydrocarbons in sediment quality owing to fuel spills	M	M			The possibility of accidental spills or releases will be eliminated or reduced by implementation of management plans and standard operating procedures.
Changes in sediment quality from disposal of treated sewage effluent and/or sludge					The existing camp facilities at Doris North Project will be used and portable, latrine style toilet facilities at Madrid South and Madrid North. Toilet wastes will be returned to the Doris North Project for disposal at existing sewage treatment facilities.
Vegetation					
Loss of ecosystems and vegetation to infrastructure development	N	N			Loss of ecosystems and vegetation will be minimized by minimizing Project footprint and utilization of existing infrastructure and access corridors associated with the Doris North Project. The total area that will be converted to roads, pads, and laydown areas amounts to approximately 25 ha across the Madrid area.
Degradation of eco-systems and vegetation through increased dust deposition, chemical spills, alteration of local hydrology, or the introduction of invasive species	M	M	M	M	Implementation of dust mitigation measures and available spill and emergency response measures Where practical, road construction and maintenance will prevent the ponding of water to maintain local hydrological patterns. The introduction of invasive plant species to newly disturbed areas will be minimized by washing machinery and vehicles thoroughly prior to their use on site.
Degradation of ecosystems and vegetation through discharge to the tundra		M			Erosion will be mitigated through the use of silt curtains and Pollution Control Ponds, as required.
Terrestrial Fauna					
Habitat loss due to infrastructure development	M	M	M	M	Minimizing overall Project footprint and avoiding significant habitat. Avoiding clearing during wildlife sensitive periods or using qualified personnel to conduct pre-clearing surveys if clearing occurs within sensitive wildlife periods.
Changes in movement and behaviour due to sensory disturbance from blasting, human presence, vehicle and aircraft traffic	M	M	M		Equipment fitted with appropriate mufflers and silencers. Use enclosures, berms, acoustic screening and shrouding where stationary sources requiring control are identified. Keeping equipment in a well maintained condition.
Mortality due to vehicle and aircraft traffic	M	M	M		Vehicle speed limits will be implemented and enforced and vehicles restricted to site roads and quarry footprints.
Mortality or reduced vigor from ingestion of contaminants deposited in food and water sources due to construction activities, vehicle traffic, and drilling activities	M	M	M	M	A waste and wildlife attractant management protocol implemented such that wildlife do not have access to camp wastes, contaminated areas, and attractants.
Aquatic Fauna					
Reduction in habitat or de-oxygenation of water through water withdrawals for operations and dust suppression activities	M	M			Recycling of intercepted contact water for drilling purposes will reduce the demand for fresh water and lake drawdown. Compliance with DFO Guidelines for under ice water taking. Minimizing footprint and diversion of surface runoff, minimizes the alteration to runoff patterns. Diverted surface runoff is kept within the existing watershed.
Reduction in habitat quality through reduced water or sediment quality associated with the introduction of nutrients or contaminants, including elevated TSS levels through dust-generating and in-water construction activities	M	M			The mitigation measures already described for water and sediment quality will help minimize the potential effects to aquatic organisms, fish, and fish habitat by minimizing changes to water and sediment. Elevated levels of TSS will be mitigated through the use of silt curtains and Pollution Control Ponds, as required.
Removal or alteration of aquatic habitat for infrastructure, including the construction of bridges or culverts	M	M			Minimized accepted techniques for sediment control, riparian care, site isolation, and timing windows. Location of infrastructure to minimize the loss of aquatic systems, with a particular focus on avoiding important fish habitat. Infrastructure is designed with a minimum 30 m setback distance from adjacent water bodies and the water that comes into contact with these facilities will be intercepted for management prior to release to the environment.
Historical and Traditional Uses					
Disturbance or loss of recorded and unrecorded archaeological sites or significant heritage resources	M	M			The footprint has been surveyed and the recorded archaeological sites are mitigable with recovery in accordance with Territorial legislation and implementation of a "chance find" procedure.
Damage or removal of archaeological material	M	M			The footprint has been surveyed and the recorded archaeological sites are mitigable with recovery in accordance with Territorial legislation and implementation of a "chance find" procedure.
Decrease in access to land for land users	N	N	M	M	Communication will be a major component of mitigation to changes to access to the area. This would inform other land users of activities associated with Project construction and operations, including restricted areas, blasting activities, and wildlife management. Communication will enable land users to adjust their activities accordingly, and stay informed regarding Project development.
Changes to the aesthetic quality of the area	M	M	M	M	TMAC will also consider suggestions made by land users and residents of local communities in the development of mitigation and enhancements, in the interest of ensuring that these measures are meaningful and effective in the local context.

Note: P = Positive
N = Negative and non-mitigatable
M = Negative and mitigatable
U = Unknown
If no impact is expected cell is blank

Appendix 10-B

Archaeology and Traditional Use Clearance

Hope Bay Project Madrid Bulk Sample Application Archaeological Assessment

By Gabriella Prager
Points West Heritage Consulting Ltd.

Madrid South

The landform on which the Madrid South portal and vent raise infrastructure and laydowns are proposed has been thoroughly covered by surveys for archaeological resources several times over the past years of intensive exploration activity. Thus, there is a low possibility for undiscovered archaeological resources within the portal infrastructure development zone.

There are three recorded archaeological sites in the portal-vent raise development area. One site, NaNh-7, is within 30m of proposed infrastructure and laydown pads. This site contains three stone semi-circles and associated hearths. It was partly mitigated in 2011. Due to the close proximity and intensity of advanced exploration activities related to the proposed bulk sampling and exploration program, it is recommended that the small amount of mapping and excavation still required be completed in order to fully mitigate this site.

One site, NaNh-8, is within the Quarry H outline, approximately 85m from the proposed vent raise pad. It contains four features distributed over a large area. Mitigation possibilities could include protection by staking and fencing and not using that section of the quarry. However, given the wide distribution of the site features together with the proximity and intensity of activities such as quarrying and proposed advanced exploration, full data recovery consisting of mapping to scale and excavation is recommended prior to development.

NaNh-74 is a single stone circle on a small bench on Wolverine Lake. It is about 40m from the limits of the infrastructure. This site was fully mitigated by mapping to scale in 2011; therefore, it presents no further concerns.

The waste rock stockpile is proposed on a large expanse of open tundra which typically has low potential for archaeological remains in this area. The east side of the stockpile area was examined in 2014 by pedestrian transects, from the tundra level to the upper height of the adjacent bedrock outcrop. One new site, NaNh-101, was recorded which consists of a stone circle and hearth on the upper bedrock surface. It is approximately 20m from the outline of the toe of the stockpile and the height of that pile is proposed to be several metres below the upper edge of the bedrock height. It is recommended to complete detailed mapping of this site and to regularly monitor the site as the height of the stockpile increases.

Road to Madrid South

The entire length of this proposed road route was visually assessed by low and slow helicopter overflight. Much of this road route is proposed over low lying open tundra that generally does not contain archaeological remains in this region. It passes by occasional bedrock outcrops of various heights. Adjacent edges of those outcrops were surveyed for archaeological resources by ground reconnaissance in both 2011 and in 2014. One site recorded in 2011, NaNh-84, is approximately 140m from the road centre line and occurs on a higher bedrock outcrop, thus, is unlikely to be affected. Two sites were recorded in 2014. One, NaNh-102, contains a stone circle with hearth and is about 75m from the road centre line on low bedrock. The other, NaNh-103, consists of a rock cluster possibly representing a cache or collapsed inukshuk, and is about 200m away. These sites are unlikely to be directly affected by the simple presence of the road, but it is recommended to conduct detailed mapping of the stone circle site due to its proximity. Care will be necessary during design and construction to ensure that no construction or operation related activities would be situated closer to these sites.

Proposed quarry G is a large bedrock outcrop which was surveyed by limited pedestrian transects in past years and covered fairly intensively in 2014. One previously recorded site, NaNh-76, is within Quarry G. This is a large multi-feature site in the southeast part of the uppermost surface of the bedrock outcrop. There is an associated area of small rocks on a bedrock surface approximately 70m northwest of the other features, more or less central within the quarry outline. Due to the location, distance from the rest of the site, and small size, the northwest feature was mapped to scale in 2014. Since this group of rocks is on bare bedrock, no further work is judged necessary relative to this feature. The remainder of this site will require full site data recovery mitigation involving accurate mapping to scale and excavation prior to quarry use.

Madrid North

The area identified for proposed Madrid North portal infrastructure was walked and visually assessed in 2014. All bedrock outcrops within and adjacent to this outlined area were examined. Much of this infrastructure area is typified by tussock tundra which is typically rated as low potential for archaeological sites in this region. The Madrid North vent raise is proposed on low lying tundra some distance south of the portal area, adjacent to the existing Doris-Windy road. This locality has been frequently viewed, has no known sites and is considered low potential for archaeological resources. One new site, NaNh-99, was recorded approximately 150m from the portal pad. This site was mapped to scale upon discovery and because it is on bare bedrock, no further work is considered necessary.

One site, NaNh-59, is in a vegetated pass and summit on a bedrock outcrop on the northern edge of the identified location for the waste rock stockpile which is proposed to extend up the pass.

The waste rock stockpile was designed to reach no closer than 30m from the original features, but three new features were found during ground reconnaissance in 2014. One of those features is approximately 6m from the waste rock stockpile crest limits which is well within the required avoidance zone. Minimally, recommended mitigation is detailed mapping to scale with protection and monitoring if the buffer zone can be increased to greater than 30m. If the waste rock stockpile cannot be redesigned to increase the buffer zone, it is recommended that this site be mitigated by detailed mapping to scale and some excavation prior to development.