

TABLE OF CONTENTS

Executive Summary.....	ES-1
Introduction	ES-1
Project Location	ES-1
Project Coordinates	ES-1
Project Site Address	ES-1
The Proponent	ES-5
Osisko Mining Corporation	ES-5
Summary of New Work	ES-6
Report Versions	ES-6
Environmental Assessment Methods	ES-7
Selection of Valued Ecosystem Components	ES-7
Existing Conditions.....	ES-17
Geology, Geochemistry and Soils.....	ES-17
Atmospheric Environment.....	ES-18
Hydrology.....	ES-18
Hydrogeology.....	ES-19
Water and Sediment Quality	ES-19
Aquatic Environment.....	ES-20
Terrestrial Environment.....	ES-22
Socio-economic Environment	ES-23
Aboriginal Interests	ES-24
Assessment of Alternatives	ES-27
Project Description	ES-28
Effects Assessment	ES-37
Physical and Biological Environment	ES-37
Potential Effects to the Physical Environment.....	ES-55
Geology, Geochemistry and Soils.....	ES-55
Atmospheric Environment.....	ES-55
Water Quantity and Quality.....	ES-56

Mitigation Measures for the Physical Environment.....	ES-58
Geology, Geochemistry and Soils.....	ES-58
Atmospheric Environment.....	ES-58
Water Quantity and Quality.....	ES-59
Potential Effects to the Biological Environment.....	ES-60
Mitigation for the Biological Environment	ES-62
Social Environment	ES-64
Socio-economics	ES-64
Aboriginal Interests	ES-66
Physical and Cultural Heritage Resources.....	ES-66
Human Health Risk Assessment	ES-67
Mitigation for the Social Environment.....	ES-67
Cumulative Impacts.....	ES-69
Accidents and Malfunctions	ES-70
Public Consultation and Aboriginal Engagement	ES-71
Government.....	ES-71
Ministry of Natural Resources (MNR).....	ES-72
Water Quality.....	ES-72
Aquatic Biology.....	ES-72
Closure Planning	ES-72
Public	ES-73
Aboriginal Engagement.....	ES-74
Summary of Aboriginal Concerns	ES-74
Métis Nation of Ontario.....	ES-77
Cultural Concerns.....	ES-77
Environmental and Social Management Planning.....	ES-79
Health and Safety	ES-80
Physical Environment	ES-80
Biological Environment	ES-81
Emergency Planning.....	ES-82
Social Management Planning	ES-82

Commitments	ES-83
Other Approvals	ES-84
Benefits of The Project.....	ES-84
Conclusions	ES-86
Physical Effects	ES-86
Biological Effects	ES-87
Social Effects	ES-88
Socio-economic Benefits	ES-91
Closing Statement	ES-92

Glossary of Terms	xxxvii
--------------------------------	---------------

List of Abbreviations, Acronyms and Initialisms.....	xlv
---	------------

List of Units	li
----------------------------	-----------

Chapter 1 – Introduction	1-1
---------------------------------------	------------

1.1 Project Location	1-1
1.1.1 Project Coordinates	1-2
1.1.2 Project Site Address	1-2
1.2 The Proponent.....	1-6
1.2.1 Osisko Mining Corporation.....	1-6
1.2.2 Corporate Management Structure	1-7
1.2.3 Insurance and Liability Management	1-8
1.2.4 Environment Health and Safety	1-8
1.2.4.1 Joint Health and Safety Committee	1-10
1.3 Need for and Purpose of the Project	1-10
1.4 Project Overview	1-10
1.5 Project Schedule	1-15
1.6 Overview of Project Phases.....	1-17
1.6.1 Construction Phase	1-17

1.6.2	Operations Phase	1-18
1.6.3	Closure and Post-closure Phases.....	1-19
1.7	Current Land Use	1-19
1.7.1	Mineral Exploration	1-20
1.7.2	Forestry.....	1-20
1.7.3	Aggregate Extraction	1-20
1.7.4	Water Users	1-20
1.7.5	Outdoor Tourism and Recreation.....	1-21
1.7.6	Trapping.....	1-21
1.7.7	Designated Environmental or Cultural Sites	1-21
1.7.8	Traditional Land Use.....	1-21
1.8	Land Tenure	1-22
1.8.1	Osisko Hammond Reef Gold Ltd.	1-22
1.8.2	Crown Land	1-22
1.8.3	Private Land.....	1-22
1.8.4	Aboriginal Communities	1-22
1.9	Participants in the Environmental Assessment.....	1-23
1.9.1	Aboriginal Communities	1-23
1.9.2	Federal Government.....	1-24
1.9.3	Provincial Government.....	1-24
1.9.4	Municipal Government	1-25
1.9.5	Public and Non-governmental Organizations.....	1-25
1.10	Regulatory Framework and the Role of Government	1-26
1.10.1	Environmental Approvals and Legislation	1-26
1.10.1.1	Federal Environmental Assessment Requirements	1-26
1.10.1.2	Provincial Environmental Assessment Requirements	1-29
1.10.2	Environmental Assessment Integration.....	1-32
1.10.3	Pre-Environmental Assessment Planning.....	1-33
1.10.4	Environmental Assessment Commencement	1-33
1.10.5	Environmental Studies and Preparation of the Environmental Assessment Report.....	1-34
1.10.6	Environmental Assessment Decision.....	1-35

1.10.7	Relevant Government Policies and Guidelines.....	1-35
1.10.8	Aboriginal Policies and Guidelines.....	1-36
1.10.9	Aboriginal Treaties.....	1-37
1.10.10	Land Use Plans and Zoning.....	1-37
1.11	Report Organization	1-38

Chapter 2 – Environmental Assessment Methods.....2-1

2.1	Overall Assessment Approach	2-1
2.2	Definition of the Project.....	2-2
2.2.1	Scope of the Project	2-2
2.2.2	Scope of the Factors.....	2-2
2.2.2.1	Temporal Boundaries	2-2
2.2.2.2	Spatial Boundaries	2-2
2.3	Approach to Baseline Studies.....	2-43
2.4	Identifying and Assessing Alternatives	2-43
2.5	Selection of Valued Ecosystem Components.....	2-45
2.5.1	Identification of Key Issues	2-45
2.5.2	Physical Environment Valued Ecosystem Component Selection Criteria	2-46
2.5.3	Biological Environment Valued Ecosystem Component Selection Criteria	2-47
2.5.4	Socio-economic Valued Social Components Selection Criteria	2-49
2.5.5	Aboriginal Interests Valued Social Components Selection Criteria.....	2-49
2.5.6	Summary of Valued Ecosystem Components used in the Environmental Assessment.....	2-49
2.5.7	Environmental and Social Components Considered.....	2-59
2.6	Assessment Methodology.....	2-59
2.6.1	Screening Project and Environment Interactions	2-59
2.6.2	Prediction and Assessment of Likely Effects	2-60
2.6.2.1	Assessment Measures	2-61
2.6.2.2	Magnitude Levels for Specific Environment Components.....	2-65
2.6.2.3	Risk Assessment Framework	2-67
2.6.3	Identification of Mitigation Measures.....	2-67
2.6.4	Identification of Residual Effects.....	2-68

2.6.5	Significance of Residual Effects.....	2-69
2.6.5.1	Method for Determining Significance.....	2-69
2.7	Environmental and Social Management Plans	2-72
2.8	Community Consultation and Aboriginal Engagement	2-73
2.8.1	Government.....	2-73
2.8.2	Public.....	2-74
2.9	Aboriginal.....	2-74

Chapter 3 – Existing Conditions.....3-1

3.1	Project Site Overview	3-1
3.2	Physical and Biological Environment.....	3-2
3.2.1	Regional Geology	3-2
3.2.2	Geology	3-2
3.2.2.1	Study Area.....	3-2
3.2.2.2	Methods.....	3-2
3.2.2.3	Results.....	3-3
3.2.2.3.1	Geology and Physiography	3-3
3.2.2.3.2	Seismic Activity	3-3
3.2.2.3.3	Influence of Geology and Physiography on Project Infrastructure.....	3-3
3.2.3	Geochemistry.....	3-7
3.2.3.1	Study Area.....	3-8
3.2.3.2	Methods.....	3-8
3.2.3.3	Results.....	3-13
3.2.4	Terrain and Soil	3-19
3.2.4.1	Study Area.....	3-19
3.2.4.2	Methods.....	3-19
3.2.4.3	Results.....	3-23
3.2.4.3.1	Soil Erosion Risk	3-29
3.2.4.3.2	Soil Chemistry	3-30
3.2.5	Atmospheric Environment.....	3-33
3.2.5.1	Climate	3-33

3.2.5.1.1	Study Area	3-33
3.2.5.1.2	Methods	3-33
3.2.5.1.3	Results	3-33
3.2.5.2	Air Quality	3-40
3.2.5.2.1	Study Areas	3-40
3.2.5.2.2	Methods	3-40
3.2.5.2.3	Results	3-40
3.2.5.3	Noise	3-44
3.2.5.4	Vibration	3-44
3.2.5.5	Light.....	3-44
3.2.6	Hydrology.....	3-45
3.2.6.1	Study Areas	3-48
3.2.6.2	Methods.....	3-53
3.2.6.3	Results.....	3-57
3.2.7	Hydrogeology.....	3-69
3.2.7.1	Study Area.....	3-69
3.2.7.2	Methods.....	3-69
3.2.7.3	Results.....	3-75
3.2.8	Water and Sediment Quality	3-91
3.2.8.1	Study Areas	3-91
3.2.8.2	Local Study Area	3-92
3.2.8.3	Results.....	3-96
3.2.8.3.1	Mitta Lake Water Quality	3-101
3.2.8.3.2	Lizard Lake Water Quality	3-106
3.2.8.3.3	Turtle Bay Water Quality	3-110
3.2.8.3.4	Lynxhead Bay Water Quality	3-114
3.2.8.3.5	Sawbill Bay Water Quality	3-118
3.2.8.3.6	Upper Marmion Reservoir Downstream of Sawbill Bay and Lynxhead Bay - Water Quality	3-120
3.2.8.3.7	Hawk Bay Water Quality	3-120
3.2.8.3.8	Tributary Streams Water Quality	3-120
3.2.8.3.9	Sediment Quality.....	3-121

3.2.9	Aquatic Environment.....	3-123
3.2.9.1	Study Areas.....	3-124
3.2.9.2	Methods.....	3-124
3.2.9.3	Results.....	3-126
3.2.9.3.1	Aquatic Habitats.....	3-126
3.2.9.3.2	Fish Species.....	3-133
3.2.9.3.3	Benthic Communities.....	3-134
3.2.9.3.4	Fish Tissue Analysis.....	3-135
3.2.10	Terrestrial Environment.....	3-138
3.2.10.1	Study Areas.....	3-138
3.2.10.2	Methods.....	3-139
3.2.10.3	Results - Vegetation.....	3-139
3.2.10.3.1	Land Cover Types.....	3-139
3.2.10.3.2	Ecosite Classification.....	3-145
3.2.10.3.3	Plant Species.....	3-149
3.2.10.4	Results – Avifauna.....	3-154
3.2.10.4.1	Upland Breeding Bird Surveys.....	3-154
3.2.10.5	Results – Mammals.....	3-165
3.2.10.6	Results – Amphibians and Reptiles.....	3-169
3.2.10.7	Results – Invertebrates.....	3-171
3.2.10.8	Results – Wildlife Corridors.....	3-172
3.3	Socio-economic Environment.....	3-172
3.3.1	Study Areas.....	3-173
3.3.2	Methods.....	3-177
3.3.3	Results.....	3-177
3.3.3.1	Population and Demographics.....	3-177
3.3.3.1.1	Population Change.....	3-177
3.3.3.1.2	Age and Gender.....	3-178
3.3.3.1.3	Dependency Ratios.....	3-181
3.3.3.2	Labour Market.....	3-181
3.3.3.3	Regional and Local Supplier Base.....	3-182

3.3.3.4	Labour Force by Industry and Occupation.....	3-182
3.3.3.5	Employment and Unemployment Rates	3-183
3.3.3.6	Median Income	3-184
3.3.3.7	Education and Training.....	3-184
3.3.3.8	Local Government Finances.....	3-185
3.3.3.9	Public Services and Infrastructure	3-186
3.3.3.9.1	Protection and Emergency Services	3-186
3.3.3.9.1.1	Police	3-186
3.3.3.9.1.2	Ambulance.....	3-187
3.3.3.9.1.3	Fire Protection	3-187
3.3.3.9.2	Health Services	3-187
3.3.3.9.3	Social Services.....	3-188
3.3.3.9.4	Education	3-188
3.3.3.9.5	Recreation.....	3-188
3.3.3.9.6	Water, Wastewater and Waste Management.....	3-191
3.3.3.9.7	Utilities.....	3-191
3.3.3.10	Housing and Accommodation.....	3-191
3.3.3.10.1	Housing Supply	3-191
3.3.3.10.2	Occupancy Rates.....	3-192
3.3.3.10.3	Housing Costs and Listings.....	3-192
3.3.3.11	Transportation Valued Ecosystem Component	3-192
3.3.3.11.1	Existing Network	3-192
3.3.3.11.2	Traffic Volumes and Levels of Services	3-197
3.3.3.12	Land and Resource Use.....	3-197
3.3.3.12.1	Outdoor Recreation and Tourism Valued Ecosystem Component.....	3-198
3.3.3.12.2	Hunting.....	3-205
3.3.3.12.3	Trapping.....	3-209
3.3.3.12.4	Fishing.....	3-213
3.3.3.12.5	Mining.....	3-217
3.3.3.12.6	Forestry.....	3-223
3.3.3.13	Water Use and Access Valued Ecosystem Component.....	3-227

3.4	Physical and Cultural Heritage Resources	3-231
3.4.1	Study Area	3-231
3.4.2	Method	3-231
3.4.3	Results	3-232
3.5	Aboriginal Interests	3-233
3.5.1	Study Areas	3-233
3.5.2	Methods	3-234
3.5.2.1	Aboriginal Engagement	3-234
3.5.2.2	Traditional Use Study Design	3-234
3.5.2.3	Community Open Houses	3-235
3.5.2.4	Individual Interviews	3-235
3.5.3	Results - Aboriginal Setting	3-235
3.5.3.1	Aboriginal and Treaty Rights	3-235
3.5.3.2	Language and Culture	3-236
3.5.3.3	Aboriginal Communities	3-237
3.5.4	Results – Aboriginal Valued Ecosystem Components	3-239
3.5.4.1	Aboriginal Communities Characteristics Valued Ecosystem Component	3-239
3.5.4.2	Aboriginal Heritage Resource Valued Ecosystem Component	3-241
3.5.4.3	Traditional Land Use Valued Ecosystem Component	3-242

Chapter 4 – Assessment of Alternatives4-1

4.1	Alternatives to the Project	4-1
4.1.1	Proceeding with the Project	4-1
4.1.1.1	Advantages of the Project	4-2
4.1.1.2	Disadvantages of the Project	4-2
4.1.2	“Do Nothing” Alternative	4-3
4.1.3	Selection of Preferred Alternative	4-3
4.2	Alternative Means of Carrying out the Project	4-4
4.2.1	Preliminary Screening	4-4
4.2.2	Assessment Criteria	4-8

4.2.3	Ore Processing Method	4-11
4.2.3.1	Selection of Preferred Ore Processing Method	4-11
4.2.4	Sewage Treatment Technology	4-11
4.2.4.1	Selection of Preferred Sewage Treatment Alternative	4-12
4.2.5	Sewage Treatment Facility Location	4-12
4.2.5.1	Selection of Preferred Sewage Treatment Facility Location	4-12
4.2.6	Water Discharge	4-13
4.2.6.1	Selection of Water Discharge Alternative	4-17
4.2.7	Access Road	4-18
4.2.7.1	Selection of Preferred Access Road Alignment	4-21
4.2.8	Power Supply	4-22
4.2.8.1	Selection of Preferred Power Supply Alternative	4-25
4.2.9	Worker Accommodation	4-26
4.2.9.1	Selection of Preferred Worker Accommodation Alternative	4-31
4.2.10	Tailings Deposition Technology	4-33
4.2.10.1	Selection of Preferred Tailings Deposition Alternative	4-34
4.2.11	Summary of Preferred Non Mine Waste Alternative Means of Carrying Out the Project	4-35
4.3	Mine Waste Disposal Alternatives	4-36
4.3.1	Alternative Characterization	4-42
4.3.2	Multiple Accounts Assessment	4-42
4.3.3	Public, Aboriginal and Government Consultation	4-43
4.3.3.1	Public	4-43
4.3.3.2	Government	4-45
4.3.3.3	Aboriginal	4-46
4.3.4	Waste Rock Management Facility Siting	4-48
4.3.4.1	Environmental Account	4-49
4.3.4.2	Technical Account	4-50
4.3.4.3	Economics Account	4-50
4.3.4.4	Socio-Economics Account	4-51
4.3.4.5	Non-differentiating Indicators	4-51
4.3.4.5.1	Potential for Acid Rock Drainage	4-51

4.3.4.5.2	Potential for Metal Leaching	4-51
4.3.4.5.3	Seismic Risks	4-51
4.3.4.5.4	Impacts on Protected Areas and Conservation Lands	4-51
4.3.5	Tailings Management Facility Siting	4-53
4.3.5.1	Environmental Account	4-55
4.3.5.2	Technical Account	4-56
4.3.5.3	Economics Account	4-56
4.3.5.4	Socio-Economics Account	4-57
4.3.5.5	Non-differentiating Indicators	4-57
4.3.5.5.1	Potential for Acid Rock Drainage	4-57
4.3.5.5.2	Potential for Metal Leaching	4-57
4.3.5.5.3	Seismic Risks	4-57
4.3.5.5.4	Impacts on Protected Areas and Conservation Lands	4-57
4.3.5.6	Results and Sensitivity Analysis	4-58
4.3.6	Summary of Preferred Mine Waste Disposal Alternatives	4-59
4.4	Preferred Project Alternatives	4-63

Chapter 5 – Project Description5-1

5.1	Project Schedule and Phasing	5-9
5.1.1	Construction Phase	5-9
5.1.2	Operations Phase	5-14
5.1.3	Closure and Post-closure Phases	5-16
5.2	Project Components	5-18
5.2.1	Mine	5-18
5.2.1.1	Mine Plan	5-20
5.2.1.2	Mining Method	5-23
5.2.1.3	Low-grade Ore Stockpile	5-24
5.2.2	Waste Rock Management Facility	5-24
5.2.3	Overburden Stockpile	5-26
5.2.4	Ore Processing Facility	5-26
5.2.4.1	Crushing and Grinding Circuits	5-30

5.2.4.2	Flotation and Regrind Circuit	5-30
5.2.4.3	Leach Circuit.....	5-30
5.2.4.4	Carbon-in-Pulp Circuit	5-30
5.2.4.5	Gold Elution Circuit.....	5-31
5.2.4.6	Electrowinning Circuit and Refining to Gold Doré Bars	5-31
5.2.4.7	Cyanide Detoxification Circuit.....	5-31
5.2.4.8	Tailings Thickener	5-31
5.2.5	Tailings Management Facility	5-34
5.2.6	Support and Ancillary Infrastructure.....	5-40
5.2.6.1	Chemicals, Fuel and Explosives Storage	5-40
5.2.6.2	Hazardous and Non-hazardous Waste Management.....	5-40
5.2.6.3	Air Pollution Control Equipment.....	5-41
5.2.6.4	Office and Support Facilities.....	5-41
5.2.6.5	Worker Accommodation Camp.....	5-42
5.2.7	Water Management System	5-42
5.2.8	Linear Infrastructure.....	5-50
5.2.8.1	Roads	5-50
5.2.8.2	Power Supply and Fibre Optics	5-50
5.2.9	Aggregate Sites	5-54
5.3	Estimated Project Workforce	5-54
5.4	Progressive Reclamation and Closure	5-55
5.5	In-design Mitigation Measures.....	5-55
Chapter 6 – Effects Assessment		6-1
6.1	Physical Effects Assessment.....	6-1
6.1.1	Geology, Geochemistry and Soils.....	6-1
6.1.1.1	Terrain and Soils	6-10
6.1.1.1.1	Alteration or Loss of Soil and Terrain Units.....	6-10
6.1.1.1.2	Soil Assessment in Local Study Area.....	6-11
6.1.1.1.3	Effect of Soil and Terrain Alteration.....	6-12

6.1.2	Atmospheric Environment.....	6-12
6.1.2.1	Air Quality	6-12
6.1.2.1.1	Modelling.....	6-12
6.1.2.1.2	Dispersion Modelling Results	6-24
6.1.2.2	Noise	6-25
6.1.2.2.1	Modeling.....	6-25
6.1.2.3	Vibration	6-27
6.1.2.4	Light.....	6-28
6.1.3	Water Quantity and Quality.....	6-29
6.1.3.1	Hydrology	6-31
6.1.3.1.1	Streamflows and Lake Water Levels	6-31
6.1.3.1.2	Changes in Streamflows	6-32
6.1.3.1.3	Changes in Lake Water Levels	6-43
6.1.3.1.4	Navigability.....	6-48
6.1.3.2	Hydrogeology	6-51
6.1.3.2.1	Groundwater Levels	6-51
6.1.3.2.1.1	Pit Inflow	6-52
6.1.3.2.1.2	Effects Assessment – Hydrogeology	6-61
6.1.3.3	Water and Sediment Quality.....	6-63
6.1.3.3.1	Model Development	6-63
6.1.3.3.1.1	Upper Marmion Reservoir.....	6-63
6.1.3.3.1.2	Lizard Lake	6-66
6.1.3.3.2	Water Quality Predictions during Operations Phase	6-67
6.1.3.3.2.1	Upper Marmion Reservoir.....	6-67
6.1.3.3.2.2	Lizard Lake	6-80
6.1.3.3.3	Water Quality Predictions for Post-Closure Phase.....	6-89
6.1.3.3.3.1	Pit Water Quality.....	6-89
6.1.3.3.3.2	Runoff Water Quality.....	6-101
6.1.3.3.3.3	Lizard Lake	6-106

6.1.4	Summary of Potential Effects to the Physical Environment	6-110
6.1.4.1	Geology, Geochemistry and Soils	6-110
6.1.4.2	Atmospheric Environment.....	6-110
6.1.4.3	Water Quantity and Quality.....	6-111
6.1.5	Summary of Mitigation Measures for the Physical Environment	6-113
6.1.5.1	Geology, Geochemistry and Soils	6-113
6.1.5.2	Atmospheric Environment.....	6-113
6.1.5.3	Water Quantity and Quality.....	6-114
6.2	Biological Effects Assessment.....	6-115
6.2.1	Terrestrial Ecology.....	6-115
6.2.1.1	Vegetation	6-115
6.2.1.1.1	Wetland Vegetation	6-115
6.2.1.1.2	Forest Cover	6-116
6.2.1.1.3	Flows and Drainage Patterns in Wetlands	6-118
6.2.1.1.4	Flows and Drainage Patterns In Forests	6-119
6.2.1.1.5	Lake Water Levels	6-119
6.2.1.1.6	Surface and Groundwater Quality	6-120
6.2.1.1.7	Invasive Plant Species	6-120
6.2.1.2	Wildlife.....	6-121
6.2.1.2.1	Moose	6-121
6.2.1.2.2	Furbearers.....	6-123
6.2.1.3	Upland Breeding Birds.....	6-125
6.2.1.4	Species at Risk.....	6-127
6.2.1.5	Dust Deposition and Emissions	6-130
6.2.1.6	Water Quality in the TMF and PPCP	6-131
6.2.2	Aquatic Ecology	6-131
6.2.2.1	Construction Phase	6-132
6.2.2.2	Operations Phase.....	6-140
6.2.2.3	Closure and Post-Closure Phases.....	6-143
6.2.3	Summary of Potential Effects to the Biological Environment	6-145
6.2.4	Summary of Mitigation for the Biological Environment.....	6-147

6.3	Social Effects Assessment	6-149
6.3.1	Socio-Economic Effects Assessment.....	6-149
6.3.1.1	Screening of Project Activities and VEC Interactions	6-149
6.3.1.2	Effects Assessment of the Construction Phase.....	6-152
6.3.1.2.1	Population and Demographics	6-152
6.3.1.2.2	Labour Market.....	6-154
6.3.1.2.3	Government Finances.....	6-157
6.3.1.2.4	Public Services and Infrastructure.....	6-158
6.3.1.2.5	Housing and Accommodation	6-159
6.3.1.2.6	Transportation.....	6-160
6.3.1.2.7	Outdoor Tourism and Recreation	6-161
6.3.1.2.8	Hunting.....	6-162
6.3.1.2.9	Trapping.....	6-163
6.3.1.2.10	Fishing.....	6-163
6.3.1.2.11	Mining.....	6-164
6.3.1.2.12	Forestry.....	6-164
6.3.1.2.13	Water Use and Access.....	6-164
6.3.1.3	Effects Assessment of the Operations Phase.....	6-165
6.3.1.3.1	Population and Demographics VEC.....	6-165
6.3.1.3.2	Labour Market.....	6-167
6.3.1.3.3	Government Finances.....	6-169
6.3.1.3.4	Public Services and Infrastructure.....	6-170
6.3.1.3.5	Housing and Accommodation VEC.....	6-170
6.3.1.3.6	Transportation.....	6-171
6.3.1.3.7	Outdoor Tourism and Recreation	6-171
6.3.1.3.8	Hunting.....	6-172
6.3.1.3.9	Trapping.....	6-173
6.3.1.3.10	Fishing.....	6-173
6.3.1.3.11	Forestry.....	6-173
6.3.1.3.12	Water Use and Access.....	6-173

6.3.1.4	Effects Assessment of the Closure and Post-Closure Phase	6-173
6.3.1.4.1	Population and Demographics	6-173
6.3.1.4.2	Labour Market	6-174
6.3.1.4.3	Government Finance	6-174
6.3.1.4.4	Housing and Accommodation VEC	6-174
6.3.1.4.5	Traffic and Transportation	6-174
6.3.1.4.6	Land and Resource Use VECs	6-174
6.3.2	Aboriginal Interests	6-174
6.3.2.1	Aboriginal Interests Effects Assessment.....	6-175
6.3.2.2	Project-Environment Interactions.....	6-175
6.3.2.3	Study Areas	6-176
6.3.2.4	Valued Social Components	6-176
6.3.2.5	Summary of Effects to Aboriginal Interests.....	6-178
6.3.2.6	Mitigation and Consideration of Aboriginal Interests.....	6-179
6.3.2.6.1	Aboriginal Community Characteristics.....	6-180
6.3.2.6.2	Aboriginal Heritage and Resources.....	6-180
6.3.2.6.3	Traditional Use of Land and Resources	6-180
6.3.3	Physical and Cultural Heritage Resources.....	6-180
6.3.4	Human Health Effects Assessment	6-181
6.3.5	Summary of Potential Effects to the Social Environment.....	6-183
6.3.5.1	Socio-Economics	6-183
6.3.5.2	Aboriginal Interests.....	6-184
6.3.5.3	Physical and Cultural Heritage Resources	6-184
6.3.5.4	Human Health Risk Assessment	6-185
6.3.6	Summary of Mitigation for the Social Environment	6-185
6.4	Residual Effects Assessment	6-187
6.4.1	Physical and Biological Environment	6-187
6.4.2	Social Environment.....	6-205
6.4.2.1	Socio-Economic.....	6-205
6.4.2.2	Human Health.....	6-206

6.5	Effects of the Environment on the Project.....	6-208
6.5.1	Forest Fires.....	6-208
6.5.2	Seismic Activity.....	6-208
6.5.3	Climate Change.....	6-209
6.6	Potential Effects of Malfunctions and Accidents.....	6-211
6.6.1	Diesel Fuel Spill from Road Accident.....	6-212
6.6.2	Fuel Storage Tank Rupture.....	6-213
6.6.3	Tailings Pipeline Rupture.....	6-213
6.6.4	Emergency Spill from TMF Reclaim Pond.....	6-213
6.6.5	Tailings Dam Failure.....	6-215
6.6.6	Fly Rock.....	6-216
6.7	Capacity of Renewable Resources.....	6-217
6.8	Cumulative Effects.....	6-217
6.8.1	Method for Identifying, Predicting and Assessing Cumulative Effects.....	6-217
6.8.2	Scope of Assessment.....	6-218
6.8.3	Environmental Effects.....	6-221
6.8.3.1	Steeprock Iron Mine.....	6-221
6.8.3.2	Existing Hydro-Electric Facilities.....	6-221
6.8.3.3	Atikokan Generating Station.....	6-222
6.8.3.4	Planned Wood Processing Facilities.....	6-222
6.8.3.5	Atiko-Sapawe Gold Mine.....	6-223
6.8.3.6	Rainy River Resources – Rainy River Gold Project.....	6-223
6.8.3.7	Bending Lake Iron Group – Josephine Cone Project.....	6-223
6.8.3.8	Treasury Metals – Goliath Project.....	6-224
6.8.3.9	Summary of Cumulative Environmental Effects.....	6-224
6.8.4	Socio-economic Effects.....	6-227

Chapter 7 – Public Consultation and Aboriginal Engagement.....7-1

7.1	Public Consultation.....	7-2
7.1.1	Identification of Interested Parties.....	7-2

7.1.2	Consultation Activities.....	7-3
7.1.2.1	Notifications.....	7-3
7.1.2.2	Community News Briefs.....	7-4
7.1.2.3	Community Open House Events.....	7-5
7.1.2.3.1	Open House Five – Baseline Studies.....	7-6
7.1.2.3.2	Open House Six – EA Results.....	7-15
7.1.2.4	Presentation of Project Details and Alternatives.....	7-20
7.1.2.4.1	Ontario Federation of Anglers and Hunters.....	7-20
7.1.2.4.2	Town of Ignace.....	7-21
7.1.2.4.3	On-Site Worker Accommodation Camp.....	7-21
7.1.2.5	Presentation of Baseline Studies.....	7-22
7.1.2.6	Social Management Planning.....	7-22
7.1.2.7	Comments Received on EA Process.....	7-23
7.1.2.7.1	H2O Power LP.....	7-23
7.1.2.7.2	Rainy Lake Conservancy.....	7-24
7.1.2.7.3	Ontario Coalition of Aboriginal People.....	7-24
7.1.2.7.4	Camp Quetico.....	7-25
7.1.2.7.5	Public Stakeholders.....	7-26
7.1.2.8	Publication of Draft EIS/EA Report.....	7-26
7.1.2.9	Presentations of EIS/EA Results.....	7-26
7.1.2.9.1	Town of Atikokan.....	7-26
7.1.2.9.2	Local Youth.....	7-27
7.1.2.10	Comments Received on Draft EIS/EA Report.....	7-27
7.1.2.10.1	Ontario Federation of Anglers and Hunters.....	7-27
7.1.2.10.2	The Atikokan Sportsmen’s Club.....	7-27
7.1.2.10.3	Tourist Outfitter.....	7-27
7.1.2.10.4	Local Stakeholders.....	7-28
7.1.2.10.5	Letters of Support.....	7-28
7.1.2.10.6	Responses to Draft EIS/EA Report Comments.....	7-29
7.1.2.10.7	Ontario Federation of Anglers and Hunters.....	7-29
7.1.2.10.8	Atikokan Sportsmen’s Club.....	7-30

7.1.2.10.9	Tourist Outfitters.....	7-30
7.1.3	Key Issues Identified by Public.....	7-31
7.1.3.1	Aquatic Health.....	7-31
7.1.3.2	Water Use.....	7-32
7.1.3.3	Land Use.....	7-32
7.1.3.4	Tourism.....	7-32
7.1.4	OHRG's Commitment to the Community.....	7-32
7.1.5	Outstanding Concerns from the Public.....	7-35
7.1.5.1	Social Management Planning.....	7-35
7.1.5.2	Water Use.....	7-35
7.1.5.3	Tourism.....	7-35
7.2	Government Consultation.....	7-35
7.2.1	Stakeholder Identification.....	7-35
7.2.2	Consultation Activities.....	7-36
7.2.2.1	Lead Agency Coordination.....	7-36
7.2.2.2	Presentations of Baseline Studies Results.....	7-42
7.2.2.3	Fish Compensation Planning.....	7-43
7.2.2.4	Publication of Draft EIS/EA Report.....	7-44
7.2.2.5	Presentation of EIS/EA Results.....	7-44
7.2.2.6	Comments Received on Draft EIS/EA Report.....	7-45
7.2.2.7	Responses to Comments on the Draft EIS/EA Report.....	7-46
7.2.2.7.1	Ministry of Natural Resources.....	7-46
7.2.2.7.2	Environment Canada.....	7-48
7.2.2.7.3	Water Quality.....	7-49
7.2.2.7.4	Groundwater Management.....	7-50
7.2.2.7.5	Alternatives Assessment.....	7-52
7.2.2.7.6	Environmental Monitoring.....	7-54
7.2.2.7.7	Terrestrial Ecology - Bats.....	7-55
7.2.3	Publication of Final EIS/EA Report.....	7-56
7.2.4	Ongoing Communications and Review.....	7-56
7.2.4.1	Closure Planning.....	7-56

7.3	Aboriginal Engagement	7-57
7.3.1	Identification of Communities	7-58
7.3.2	Aboriginal and Treaty Rights.....	7-59
7.3.2.1	Aboriginal Rights	7-59
7.3.2.2	Treaty Rights	7-60
7.3.2.3	Métis Rights.....	7-63
7.3.3	Aboriginal Engagement Activities	7-63
7.3.3.1	Crown Oversight.....	7-64
7.3.3.2	Notifications.....	7-65
7.3.3.3	Community News Briefs	7-65
7.3.3.4	Community Visits.....	7-65
7.3.3.5	Presentations to Chiefs.....	7-69
7.3.3.5.1.1	Fort Frances Chiefs Secretariat	7-70
7.3.3.5.1.2	Lac des Mille Lacs First Nation	7-71
7.3.3.6	Resource Sharing Committee Meetings	7-72
7.3.3.7	Elder Forums	7-76
7.3.3.8	Great Earth Law Meeting.....	7-78
7.3.3.9	Métis Nation of Ontario Consultation Protocol.....	7-78
7.3.3.9.1	Committee Meetings	7-79
7.3.3.9.2	Community Feasts	7-80
7.3.3.9.3	Household Mailing.....	7-81
7.3.3.9.4	Métis Voyageur Advertisements.....	7-81
7.3.3.10	Written Comments on EA Process	7-81
7.3.3.10.1	Letters of Acknowledgement of OHRG’s Consultation Efforts.....	7-81
7.3.3.10.2	Fort Frances Chiefs Secretariat	7-82
7.3.3.10.3	Lac des Mille Lacs First Nation	7-82
7.3.3.10.4	Wabigoon Lake Ojibway Nation	7-82
7.3.3.10.5	Métis Nation of Ontario.....	7-82
7.3.3.11	Written Comments on Draft EIS/EA Report.....	7-83
7.3.3.11.1	Seine River First Nation	7-83
7.3.3.11.2	Lac des Mille Lacs First Nation	7-83

7.3.3.11.3	Métis Nation of Ontario.....	7-83
7.3.3.12	Responses to Comments on Draft EIS/EA Report	7-83
7.3.3.12.1	Seine River First Nation	7-84
7.3.3.12.2	Lac des Mille Lacs First Nation	7-84
7.3.3.12.3	Métis Nation of Ontario.....	7-84
7.3.3.13	Publication of Final EIS/EA Report	7-84
7.3.4	Issues Identified through Aboriginal Engagement.....	7-85
7.3.4.1	Cultural Concerns	7-85
7.3.4.2	Environmental Concerns	7-86
7.3.4.3	Economic Concerns	7-98
7.3.5	OHRG's Commitments and Responses.....	7-98
7.3.5.1	Social and Cultural Commitments	7-98
7.3.5.1.1	Aboriginal Organizations	7-99
7.3.5.2	Environmental Commitments.....	7-100
7.3.5.2.1	Sharing of Reports	7-100
7.3.5.2.2	Technical Review of Reports.....	7-101
7.3.5.2.3	Traditional Use Information	7-101
7.3.5.3	Economic Commitments.....	7-101
7.3.5.3.1	Information Sharing	7-102
7.3.5.3.2	Contracts and Partnerships.....	7-102
7.3.5.3.3	Aboriginal Workforce	7-102
7.3.5.3.4	Direct Investment	7-103
7.3.6	Ongoing Aboriginal Engagement	7-103
7.3.6.1	Notifications	7-103
7.3.6.2	Community Visits	7-103
7.3.6.3	Committee Meetings.....	7-104
7.3.6.4	Field Studies and Environmental Monitoring	7-104
7.3.6.5	Technical Information Sharing	7-104

Chapter 8 – Environmental and Social Management Plan	8-1
8.1 Plan Implementation	8-2
8.1.1 Osisko’s Environmental and Social Objectives	8-2
8.1.2 Roles and Responsibilities	8-3
8.1.2.1 Government Agencies	8-3
8.1.2.2 Aboriginal Communities	8-3
8.1.2.3 Town of Atikokan	8-4
8.1.2.4 Osisko Hammond Reef Gold Ltd.	8-4
8.1.3 Reporting and Information Sharing	8-4
8.1.3.1 Compliance Monitoring Results	8-4
8.1.3.2 Stakeholder and Aboriginal Communications	8-4
8.2 Environmental Planning, Monitoring and Compliance	8-5
8.2.1 Health and Safety	8-6
8.2.2 Physical Environment	8-9
8.2.2.1 Air Quality and Vibration	8-15
8.2.2.2 Hydrology	8-19
8.2.2.3 Hydrogeology	8-23
8.2.2.4 Water Quality	8-27
8.2.2.4.1 Sampling Parameters	8-27
8.2.2.5 Geochemistry	8-31
8.2.3 Biological Environment	8-35
8.2.3.1 Terrestrial Environment	8-41
8.2.3.2 Aquatic Environment	8-41
8.2.3.2.1 Final No Net Loss Plan	8-47
8.2.3.2.2 Scheduling of Waterbodies under Metal Mining Effluent Regulation	8-47
8.2.3.2.3 Environmental Effects Monitoring (MMER)	8-47
8.2.3.2.4 Construction Monitoring	8-48
8.2.3.2.5 Blast Monitoring and Collection of Supplementary Fish Habitat Information (Sawbill Bay)	8-49
8.2.4 Emergency Preparedness and Response and Contingency Planning	8-49
8.2.4.1 Fire Safety	8-55

8.2.4.2	Floods and Droughts	8-56
8.2.4.3	Tailings Dam Safety	8-56
8.2.4.4	Spill Management	8-57
8.2.4.4.1	Minimizing Negative Effects – Spills	8-57
8.2.4.5	Contingency Planning and Continuous Improvement	8-58
8.2.5	Preliminary Cost Estimate	8-59
8.3	Social Management Planning	8-60
8.3.1	Atikokan/OHRG Committee	8-60
8.3.2	Aboriginal Committees	8-61
8.3.3	Benefit Enhancement	8-62
8.3.4	Follow Up Plan	8-63
8.3.4.1	Construction Monitoring	8-63
8.3.5	Follow Up Consultation	8-63
Chapter 9 – Commitments Registry		9-1
Chapter 10 – Other Approvals		10-1
Chapter 11 – Economic and Social Benefits of the Project		11-1
11.1	Environmental Assessment Process	11-2
11.2	Economic Benefits from the Canadian Malartic Project	11-5
11.3	Employment and Payroll	11-6
11.4	Provincial and Federal Taxes	11-8
11.5	Workforce Training	11-8
11.5.1	On-job and On-site Training	11-9
11.5.2	Focussed Off-site Training	11-9
11.5.3	Community-based Training	11-9
11.6	Summary of Benefits	11-9
Chapter 12 – Conclusions		12-1
12.1	Effects Assessment	12-1
12.1.1	Physical Effects Assessment	12-1
12.1.2	Biological Effects Assessment	12-4

12.1.3	Social Effects Assessment.....	12-6
12.2	Mitigation and Compensation Measures	12-11
12.3	Environmental and Social Management Planning	12-12
12.4	Benefits of the Project	12-13
12.5	Closing Statement	12-14

Chapter 13 – References.....13-1

List of Tables

Table ES-1:	Hammond Reef Gold Project Valued Ecosystem Components/Valued Social Components	ES-9
Table ES-2:	Summary of Preferred Alternative Means of Carrying out the Hammond Reef Gold Project	ES-27
Table ES-3:	Project Activities.....	ES-33
Table ES-4:	Environmental Impacts Assessment Matrix for Construction Phase	ES-39
Table ES-5:	Environmental Impacts Assessment Matrix for Operations Phase.....	ES-45
Table ES-6:	Environmental Impacts Assessment Matrix for Closure and Post-Closure Phases.....	ES-51
Table ES-7:	Summary of Overall Socio-economic Effects Assessment Results.....	ES-64
Table ES-10:	Employment Opportunities for the Construction and Operations Phases of the Project	ES-91
Table 1-1:	Common Objectives between Great Earth Law and OHRG.....	1-36
Table 2-1:	Characterization Used in Evaluating Alternatives.....	2-44
Table 2-2:	Biological Criteria for the Selection of Valued Ecosystem Components.....	2-47
Table 2-3:	Hammond Reef Gold Project Valued Ecosystem Components/Valued Social Components	2-51
Table 2-4:	Assessment Measures Common to Environmental Components	2-62
Table 2-5:	Magnitude Levels for Aquatic Environment Valued Ecosystem Components Indicator Measures.....	2-65
Table 2-6:	Magnitude Levels for Terrestrial Ecology Valued Ecosystem Components	2-65
Table 2-7:	Magnitude Levels for Human Health.....	2-66
Table 2-8:	Magnitude Levels for Cultural Heritage Resources Valued Ecosystem Components	2-67
Table 2-9:	Assessment Criteria and Levels for Determining Significance	2-70
Table 2-10:	Magnitude Levels for Socio-economic Valued Ecosystem Components.....	2-70
Table 3-1:	Waste Rock and Tailings Sample List.....	3-9
Table 3-2:	Geochemical Testing Program Sample List	3-13
Table 3-3:	Acid Generation Potential Criteria	3-14
Table 3-4:	Summary of Shake Flask Extraction (SFE) Leach Test Results for Waste Rock.....	3-16
Table 3-5:	Summary of Net Acid Generation (NAG) Leach Test Results for Waste Rock	3-17
Table 3-6:	2012 Existing Conditions Soil Metal Analyses	3-20

Table 3-7:	Area of Terrain Map Units in the Terrain and Soil Local Study Area	3-23
Table 3-8:	Distribution of Soil Map Units in the Terrain and Soil Local Study Area	3-23
Table 3-9:	Erosion Sensitivity in the Terrain and Soil Local Study Area	3-29
Table 3-10:	Soil Chemistry Results 2012	3-31
Table 3-11:	Monthly Temperature Normals for Atikokan Marmion Meteorological Station	3-35
Table 3-12:	Seasonal Temperature Normals for Atikokan Marmion Meteorological Station	3-35
Table 3-13:	Monthly Precipitation Normals for Atikokan Marmion Meteorological Station	3-37
Table 3-14:	Seasonal Precipitation Normals for Atikokan Marmion Meteorological Station	3-37
Table 3-15:	Monitoring Station Information	3-43
Table 3-16:	Availability of Ambient Air Quality Data	3-43
Table 3-17:	Existing Air Quality for the Air Quality Regional Study Area	3-44
Table 3-18:	Long-Term Average and Range of Annual Mean Flows	3-61
Table 3-19:	Long-Term Average Seasonal Mean Flows	3-62
Table 3-20:	Long-Term Average Monthly Mean Flows (m ³ /s)	3-63
Table 3-21:	Long-Term Average and Range of Annual Mean Water Levels	3-65
Table 3-22:	Long-Term Average Seasonal Mean Water Levels	3-65
Table 3-23:	Long-Term Average Monthly Mean Water Levels	3-67
Table 3-24:	Summary of Watercourses and Water Bodies in Field and Desktop Assessment	3-69
Table 3-25:	Summary of Hydraulic Conductivity Estimates for Overburden and Bedrock in Mine Area	3-89
Table 3-26:	Summary of Hydraulic Conductivity Estimates for Overburden and Shallow Bedrock in Tailings Management Facility Area	3-89
Table 3-27:	Summary of CCME and PWQO Screening of Results for Surface Water Grab Sample	3-99
Table 3-28:	Summary of CCME and PWQO Screening of Results for Water Samples collected from Profile Stations	3-100
Table 3-29:	Summary of CSQG and PSQG Screening of Sediment Quality Results (Grab and Lake Bottom Samples)	3-123
Table 3-30:	Summary of Field Program Dates	3-124
Table 3-31:	Fish Species Captured During Baseline Studies	3-133
Table 3-32:	Selected Fish Tissue Trace Metal Results Summary (mg/kg ww)	3-137
Table 3-33:	Total Mercury Levels in Fish Tissue Samples (µg/g, Detection Limit 0.050 µg/g)	3-138
Table 3-34:	Ontario Land Cover Data in the Hammond Reef Regional Study Area	3-140
Table 3-35:	Upland Ecosite Classification and Area Summaries for the Mine Study Area and Local Study Area	3-145
Table 3-36:	Wetland Ecosite Classification and Area Summaries for the Mine Study Area and Local Study Area	3-147
Table 3-37:	Locally Rare Plant Species Observed in the Terrestrial Ecology Local Study Area	3-150
Table 3-38:	Potential for Ecosite Types to Support Traditional Use Plants	3-152

Table 3-39:	Most Frequently Detected Bird Species and Status during the 2010-2012 Upland Breeding Bird Surveys in the Mine Study Area and Local Study Area.....	3-154
Table 3-40:	Relative Abundance of Priority Species in the Various Habitat Types in the Project Local Study Area	3-156
Table 3-41:	Species Detected during the 2010-2012 Marsh Bird Surveys in the Mine Study Area and Local Study Area	3-157
Table 3-42:	Species Observed during 2010-2012 Lake Watch Surveys in the Mine Study Area and Local Study Area	3-158
Table 3-43:	Raptors, Owls and Vultures Observed or Potentially Occurring in the Mine Study Area and Local Study Area	3-158
Table 3-44:	Mammal Species Occurring or Potentially Occurring in the Mine Study Area and Local Study Area.....	3-165
Table 3-45:	Amphibian and Reptile Species Occurring and Potentially Occurring in the Mine Study Area and Local Study Area.....	3-170
Table 3-46:	Dragonfly and Butterfly Species Recorded during 2010-2012 Field Surveys in the Mine Study Area and Local Study Area.....	3-171
Table 3-47:	Study Area Populations (1996 – 2011)	3-177
Table 3-48:	Dependency Ratios (2006)	3-181
Table 3-49:	Regional and Local Study Area Labour Force indicators (2006).....	3-183
Table 3-50:	Municipal Government Revenues for Town of Atikokan 2009.....	3-185
Table 3-51:	Municipal Government Expenditures for Town of Atikokan 2009.....	3-186
Table 3-52:	Status, Remaining Capacity and Plans for Municipal Infrastructure.....	3-191
Table 3-53:	Identified First Nations Communities.....	3-238
Table 3-54:	Identified Métis Communities	3-239
Table 4-1:	Alternative Means of Carrying Out the Project Assessed for the Hammond Reef Gold Project.....	4-7
Table 4-2:	Summary of Preferred Alternative Means of Carrying out the Hammond Reef Gold Project	4-36
Table 4-3:	Mine Waste Disposal Alternatives Assessed for the Hammond Reef Gold Project.....	4-41
Table 4-4:	Indicators Added to the Assessment based on Consultation with the Government Review Team	4-45
Table 4-5:	Aboriginal Community Concern Concordance Table with MAA account/sub-account	4-46
Table 4-6:	Environmental MAA	4-49
Table 4-7:	Technical MAA.....	4-50
Table 4-8:	Economics MAA.....	4-50
Table 4-9:	Socio-economics MAA	4-51
Table 4-10:	Base Case and Sensitivity Analysis Results	4-52
Table 4-11:	Environmental MAA	4-55
Table 4-12:	Technical MAA.....	4-56
Table 4-13:	Economics MAA.....	4-56

Table 4-14:	Socio-economics MAA	4-57
Table 4-15:	Base Case and Sensitivity Analysis Results	4-58
Table 4-16:	Summary of Preferred Alternative Means of Carrying out the Hammond Reef Gold Project	4-63
Table 5-1:	Project Activities	5-5
Table 5-2:	Annual Estimated Mine Ore and Mine Rock Production	5-25
Table 5-3:	Process Plant Reagent Use, Supply and Storage	5-32
Table 6-1:	Location, Lithology, Acid Base Accounting and Net Acid Generation Test Results for 2009 Ore and Composite Samples	6-5
Table 6-2:	Summary of Elemental Composition, ABA and NAG testing of Combined Tailing Composite Sample	6-7
Table 6-3:	Summary of Short Term Leach Test Results for Combined Tailings Composite Sample	6-7
Table 6-4:	Aging Tests Results – Combined Tailing Composite Sample – Process Water	6-9
Table 6-5:	Loss/Alterations to Soil Series in Local Study Area	6-11
Table 6-6:	Loss/Alterations to Terrain units in the Local Study Area	6-12
Table 6-7:	Activities and Compounds Released for the Mine Site	6-14
Table 6-8:	Access Road (Hardtack/Sawbill) Fleet Traffic	6-16
Table 6-9:	Comparison of Mobile Emissions Sources in Construction and Operations Phases	6-16
Table 6-10:	Daily Emission Rates for the Mine Site	6-21
Table 6-11:	Percentage Contributions for Daily Emission Rates	6-23
Table 6-12:	Daily Emission Rates for the Access Road (Hardtack/Sawbill)	6-24
Table 6-13:	Ontario Compliance Status of the Project	6-24
Table 6-14:	Change in the Tributary Drainage Area to Lumby Creek	6-34
Table 6-15:	Changes to Monthly Mean Flows in Lumby Creek	6-34
Table 6-16:	Flows in Sawbill Creek	6-34
Table 6-17:	Freshwater Supply to the Processing Plant	6-36
Table 6-18:	Discharges of Treated Wastewater Effluent from the Mine Site	6-37
Table 6-19:	Changes in Annual Mean Inflows to Upper Marmion Reservoir	6-38
Table 6-20:	Combined Project Influences on Upper Marmion Reservoir Inflows (Net Reduction)	6-38
Table 6-21:	Predicted Changes in Upper Marmion Reservoir Outflows (Single-Year Lake Water Balances)	6-40
Table 6-22:	Predicted Changes in Upper Marmion Reservoir Outflows (Continuous Lake Water Balances)	6-41
Table 6-23:	Changes to Monthly Mean Water Levels in Unnamed Lake 5 (API #8)	6-43
Table 6-24:	Changes in Monthly Mean Water Levels in Lizard Lake	6-44
Table 6-25:	Frequency of Below-Minimum Water Levels in Upper Marmion Reservoir	6-45
Table 6-26:	Changes in Upper Marmion Reservoir Water Levels (Single Year Lake Water Balances)	6-46

Table 6-27:	Changes in Upper Marmion Reservoir Water Levels (Continuous Lake Water Balances).....	6-47
Table 6-28:	Predicted Groundwater Inflow to Open Pit.....	6-52
Table 6-29:	Predicted Seepage Losses from Stockpiles and PPCP.....	6-53
Table 6-30:	Simulated Subwatershed Groundwater Discharge to Seeps, Wetlands and Streams.....	6-61
Table 6-31:	Summary of Basin Volumes and Residence Time.....	6-66
Table 6-32:	Summary of Basin Volumes and Retention Times.....	6-66
Table 6-33a:	Estimated Monthly Mine Intake Flows for Return Period Conditions for Operations Phase.....	6-68
Table 6-33b:	Estimated Monthly Mine Discharge Flows for Return Period Conditions for Operations Phase.....	6-68
Table 6-34:	Point of Discharge Comparison to Discharge Guidelines.....	6-70
Table 6-35:	Results for Average Water Quality Predictions in Sawbill Bay, South End, During Operations.....	6-71
Table 6-36:	Upper Bound Water Quality Predictions in Sawbill Bay, South End, During Operations.....	6-77
Table 6-37:	Predicted Mixing and Predicted Total Nutrient Concentrations for Mixing In Sawbill Bay.....	6-80
Table 6-38:	Average TMF Seepage Water Quality Predictions for Lizard Lake during Operations.....	6-83
Table 6-39:	Upper Bound TMF Seepage Water Quality Predictions for Lizard Lake during Operations.....	6-87
Table 6-40:	Estimated Monthly Pit Lake Discharge Flows for Return Period Conditions for Post-closure Phase.....	6-93
Table 6-41:	Pit Lake Discharge Water Quality Predictions in Upper Marmion Reservoir under Average Conditions in Post-closure.....	6-94
Table 6-42:	Results for Upper Bound Pit Lake Discharge Water Quality Predictions in Basin 5 of Upper Marmion Reservoir for Post-Closure Scenario.....	6-99
Table 6-43:	Estimated Monthly Total Project Site Runoff for Return Period Conditions for Post-closure Phase.....	6-101
Table 6-44:	Assumed Partitioning of Facility Runoff to Upper Marmion Reservoir Model Basins.....	6-102
Table 6-45:	Site Runoff Discharge Water Quality Predictions in Basin 7C of Upper Marmion Reservoir for Post-closure Scenario.....	6-103
Table 6-46:	Average TMF Seepage Water Quality Predictions for Lizard Lake During Post-closure.....	6-107
Table 6-47:	Forest Losses in the Terrestrial Ecology RSA.....	6-117
Table 6-48:	Aquatic Habitats Directly Affected by Site Development.....	6-132
Table 6-49:	Project Phase Activities and Direct Interactions with the Socio-community VECs.....	6-150
Table 6-50:	Project Phase Activities and Direct Interactions with the Land and Resource Use VECs.....	6-151
Table 6-51:	Aboriginal Interests and Project Interactions in Construction Phase.....	6-174
Table 6-52:	Aboriginal Interests and Project Interactions in Operations Phase.....	6-175
Table 6-53:	Aboriginal Interests and Project Interactions in Closure and Post-closure Phase.....	6-175
Table 6-54:	Valued Social Components Selected for Aboriginal Interests.....	6-177
Table 6-55:	Environmental Impacts Assessment Matrix for Construction Phase.....	6-189
Table 6-56:	Environmental Impacts Assessment Matrix for Operations Phase.....	6-195
Table 6-57:	Environmental Impacts Assessment Matrix for Closure and Post-Closure Phases.....	6-201

Table 6-58:	Summary of Overall Socio-economic Effects Assessment Results	6-205
Table 6-59:	Human Health Residual Effects Evaluation by Assessment Criteria	6-206
Table 6-60:	Magnitude Levels for Human Health Residual Effects	6-207
Table 6-61:	Summary of Average Projected Climate Trend Deviations from Observed Historic Values	6-210
Table 6-62:	Climate Risk Matrix	6-210
Table 6-63:	Predicted Water Quality in Tailings Management Facility Reclaim Pond	6-214
Table 6-64:	Summary of Predicted Cumulative Environmental Effects	6-225
Table 6-65:	Potential Cumulative Effects to the Socio-economic Environment	6-229
Table 7-1:	Participant Funding for Hammond Reef	7-3
Table 7-2:	Open House Comment Form Results: Hopes for Hammond Reef	7-18
Table 7-3:	Open House Comment Form Results: Concerns about Hammond Reef	7-19
Table 7-4:	Commitments from the Terms of Reference	7-33
Table 7-5:	Consultation Update Meetings Summary with Lead Agencies	7-37
Table 7-6:	Baseline Meetings Summary	7-42
Table 7-7:	Aquatic Biology Meetings Summary	7-43
Table 7-8:	Indicators Added to the Mine Waste Alternatives Assessment based on Consultation with the Government Review Team	7-53
Table 7-9:	Summary of FFCS Presentations	7-70
Table 7-10:	Summary of LDMLFN Presentations	7-71
Table 7-11:	Resource Sharing Committee Meetings	7-74
Table 7-12:	Metis Nation of Ontario Region 1 Consultation Committee Meetings	7-79
Table 7-13:	EA Process Comments Received by Fort Frances Secretariat Communities	7-82
Table 7-14:	Aboriginal Community Concern Concordance Table with EIS/EA Report	7-87
Table 7-15:	Recipients of Aboriginal EA Funding	7-101
Table 7-16:	Direct Economic Investment in Aboriginal Communities (2012)	7-103
Table 8-1:	Health and Safety Planning, Monitoring and Compliance	8-7
Table 8-2:	Environmental Management Planning, Monitoring and Compliance – Physical Environment	8-11
Table 8-3:	Proposed Monitoring Program Considerations – Air Quality and Vibration	8-17
Table 8-4:	Proposed Monitoring Program Considerations – Site Flows and Hydrology	8-21
Table 8-5:	Proposed Monitoring Program Considerations – Hydrogeology	8-25
Table 8-6:	Proposed Monitoring Program Considerations – Water Quality	8-29
Table 8-7:	Proposed Monitoring Program Considerations – Geochemistry	8-33
Table 8-8:	Environmental Management Planning, Monitoring and Compliance - Biological Environment	8-37
Table 8-9:	Proposed Monitoring Program Considerations – Terrestrial Ecology	8-43

Table 8-10:	Proposed Monitoring Program Considerations – Aquatic Environment.....	8-45
Table 8-11:	Environmental Management Planning, Monitoring and Compliance – Emergency Response and Contingency	8-51
Table 8-12:	OHRG Wildfire Prevention Guidelines	8-55
Table 9-1:	Summary of Commitments Made by Osisko Hammond Reef Gold in the Hammond Reef Gold Project Environmental Impact Statement/Environmental Assessment Report	9-1
Table 10-1:	Summary of Permitting Requirements	10-1
Table 11-1:	Canadian Malartic Project Salaries	11-5
Table 11-2:	Canadian Malartic Project Financial Contributions (Life of Mine).....	11-5
Table 11-3:	Employment Opportunities for the Construction and Operations Phases of the Project	11-6
Table 11-4:	Summary of Payroll Expenditures for Construction and Operations Phases of the Project	11-7
Table 11-5:	Provincial and Federal Revenues from Personal Income Taxes (\$ millions)	11-8
Table 11-6:	Summary of Benefits of Hammond Reef Gold Project to Canadians	11-11

List of Figures

Figure ES-1:	Project Location, Scale of 1:10,000,000.....	ES-2
Figure ES-2:	Project Location, Scale of 1:100,000.....	ES-3
Figure ES-3:	Project Location, Scale of 1:50,000.....	ES-4
Figure ES 4:	Site Layout	ES-31
Figure ES-5:	View 1 Visual Simulation – View of Overburden and waste Rock Stock Piles from Trap Bay of Upper Marmion	ES-88
Figure ES-6:	View 3 Visual Simulation – View of Process Plant from Sawbill Bay.....	ES-89
Figure ES-7:	View 8 Visual Simulation – View of Tailings Management Facility from Trapper Cabin	ES-89
Figure ES-8:	View 6 Visual Simulation – View of Tailings Management Facility from Trapper Cabin	ES-90
Figure 1-1a:	Project Location, Scale of 1:10,000,000.....	1-3
Figure 1-1b:	Project Location, Scale of 1:100,000.....	1-4
Figure 1-1c:	Project Location, Scale of 1:50,000.....	1-5
Figure 1-2:	Osisko Mining Corporation Corporate Organization and Osisko Hammond Reef Gold Ltd. Responsibilities	1-7
Figure 1-3:	Mine Study Area and Linear Infrastructure Study Area	1-13
Figure 1-4:	Hammond Reef Gold Project Simplified Schedule	1-16
Figure 1-5:	Canadian Environmental Assessment Agency Comprehensive Study Process	1-28
Figure 1-6:	Ontario Provincial Individual Environmental Assessment Process.....	1-31
Figure 1-7:	Environmental Assessment Integration Approach.....	1-32
Figure 1-8:	Hammond Reef Gold Project Documentation	1-40

Figure 2-1:	Mine Study Area and Linear Infrastructure Study Area	2-5
Figure 2-2A:	Aboriginal Interests Local Study Area	2-7
Figure 2-2B:	Aquatic Environment Local Study Area	2-9
Figure 2-2C:	Air Quality and Human Health Local Study Area	2-11
Figure 2-2D:	Cultural Heritage Resources Local Study Area	2-13
Figure 2-2E:	Geochemistry Local Study Area	2-15
Figure 2-2F:	Terrain and Soil Local Study Area	2-17
Figure 2-2G:	Hydrogeology Local Study Area	2-19
Figure 2-2H:	Hydrology Local Study Area	2-21
Figure 2-2I:	Socio-economic Local Study Area	2-23
Figure 2-2J:	Terrestrial Ecology Local Study Area	2-25
Figure 2-2K:	Water Quality Local Study Area	2-27
Figure 2-3A:	Aboriginal Regional Study Area	2-29
Figure 2-3B:	Aquatic Environment Regional Study Area	2-31
Figure 2-3C:	Air Quality and Human Health Regional Study Area	2-33
Figure 2-3D:	Geology Regional Study Area	2-35
Figure 2-3E:	Socio-economic Regional Study Area	2-37
Figure 2-3F:	Terrestrial Ecology Regional Study Area	2-39
Figure 2-3G:	Water Quality Regional Study Area	2-41
Figure 2-4:	Decision Tree for Assigning Significance to Residual Effects on the Socio-economic Environment	2-72
Figure 3-1:	Quaternary Geology and Geology Regional Study Area	3-5
Figure 3-2:	Detailed Ore Deposit Cross-Sections with Ore Types	3-7
Figure 3-3:	Geochemistry Local Study Area	3-11
Figure 3-4:	Neutralization Potential (NP) versus Acid Potential (AP) for Waste Rock	3-15
Figure 3-5:	2012 Field Program Soil Sample Locations	3-21
Figure 3-6:	Terrain Map Units in the Terrain and Soil Local Study Area	3-25
Figure 3-7:	Soil Map Units in the Terrain and Soil Local Study Area	3-27
Figure 3-8:	Monthly Temperatures	3-36
Figure 3-9:	Atikokan Precipitation Data Summary	3-38
Figure 3-10:	Mean Monthly Wind Speeds	3-39
Figure 3-11:	Air Quality Monitoring Stations	3-41
Figure 3-12:	Seine River Watershed	3-47
Figure 3-13:	Site Watersheds	3-49

Figure 3-14:	Local Watersheds	3-51
Figure 3-15:	Local Scale Lake Water Level Monitoring Stations	3-55
Figure 3-16:	Watercourses of Interest	3-59
Figure 3-17:	Long-term Average Monthly Mean Water Levels in Regional Scale Lakes	3-68
Figure 3-18:	Borehole and Monitoring Well Locations – Mine Area	3-71
Figure 3-19:	Borehole and Monitoring Well Locations – Tailings Management Facility Area	3-73
Figure 3-20:	Groundwater Elevations and Inferred Flow Directions – Mine Area	3-79
Figure 3-21:	Groundwater Elevations and Inferred Flow Directions – West Pit Area	3-81
Figure 3-22:	Groundwater Elevations and Inferred Flow Directions – Tailings Management Facility Area	3-83
Figure 3-23:	Marmion Reservoir and Nearby Groundwater Levels	3-85
Figure 3-24:	Areas of Observed Groundwater Seepage and Inferred Groundwater Discharge	3-87
Figure 3-25:	Water Quality, Sediment and Profile Sample Locations	3-93
Figure 3-26:	Contoured Depth of Lake Bottom Mitta Lake	3-103
Figure 3-27:	Field Parameter Results for Mitta Lake Water Column Profile	3-105
Figure 3-28:	Contoured Depth of Lake Bottom Lizard Lake	3-107
Figure 3-29:	Field Parameter Results for Lizard Lake Water Column Profile	3-109
Figure 3-30:	Contoured Depth of Lake Bottom Trap Bay to Hawk Bay (Trap, Turtle, Flood and Hawk Bays).....	3-111
Figure 3-31:	Field Parameter Results for Turtle Bay Water Column Profile	3-113
Figure 3-32:	Contoured Depth of Lake Bottom Sawbill Bay and Lynxhead Bay	3-115
Figure 3-33:	Field Parameter Results for Lynxhead Bay Water Column Profile	3-117
Figure 3-34:	Field Parameter Results for Sawbill Bay Water Column Profile	3-119
Figure 3-35:	Upper Marmion Reservoir Annual Water Level Fluctuations Post Seine River Management Plan	3-127
Figure 3-36:	Annual Water Level Fluctuation Upper Marmion Reservoir	3-131
Figure 3-37:	Distribution of Major Benthic Taxa	3-135
Figure 3-38:	Forest Management Units and Old Growth Forest.....	3-141
Figure 3-39:	Pie Chart Illustrating Regional Study Area Landcover Distribution.....	3-143
Figure 3-40:	Pie Chart Illustrating Local Study Area Landcover Distribution	3-144
Figure 3-41:	Pie Chart Illustrating Mine Study Area Landcover Distribution	3-144
Figure 3-42:	Species at Risk Observations	3-163
Figure 3-43:	Socio-economic Local Study Area	3-175
Figure 3-44:	Age Profile for the Regional Study Area (2011)	3-179
Figure 3-45:	Age Profile for Atikokan (2011)	3-180
Figure 3-46:	Labour Force Distribution by Industry in the Local Study Area (2006)	3-183

Figure 3-47:	Educational Attainment in the Socio-economic Environment RSA for Population over 15 years of Age (2006)	3-185
Figure 3-48:	Services and Infrastructure in the Local Study Area	3-189
Figure 3-49:	Transportation in the Socio-economic Environment Regional Study Area	3-193
Figure 3-50:	Transportation in the Local Study Area	3-195
Figure 3-51:	Existing Traffic Conditions.....	3-197
Figure 3-52:	Tourism and Recreation in the Regional Study Area	3-199
Figure 3-53:	Tourism and Recreation in the Local Study Area.....	3-203
Figure 3-54:	Hunting in the Local Study Area.....	3-207
Figure 3-55:	Trapping in the Local Study Area.....	3-211
Figure 3-56:	Fisheries Information in the Local Study Area.....	3-215
Figure 3-57:	Mining Claims in the Regional Study Area	3-219
Figure 3-58:	Mining Claims in the Local Study Area.....	3-221
Figure 3-59:	Forest Management Units in the Local Study Area	3-225
Figure 3-60:	Navigable Waters in the Local Study Area.....	3-229
Figure 3-61:	Which of these Land Use Activities Do you Practice?.....	3-244
Figure 4-1:	Assessment Approach for Alternative Means of Carrying Out the Project	4-10
Figure 4-2:	Water Discharge Location Alternatives	4-15
Figure 4-3:	Access Road Alignment Alternatives	4-19
Figure 4-4:	Transmission Line Alignment Alternatives	4-23
Figure 4-5:	On-Site Accommodation Camp Location	4-29
Figure 4-6:	Waste Rock Management Facility Siting Alternatives	4-37
Figure 4-7:	Tailings Management Facility Siting Alternatives	4-39
Figure 4-8:	Preferred Mine Waste Disposal Alternatives.....	4-61
Figure 4-9:	Summary of Alternatives	4-65
Figure 5-1:	Site Layout	5-3
Figure 5-2:	Processing Plant Slopes	5-12
Figure 5-3:	Pit Slope Design.....	5-19
Figure 5-5:	Pit Shells – Initial Phase of Operations	5-22
Figure 5-6:	Pit Shells – Final Phase of Operations.....	5-22
Figure 5-7:	Simplified Process Overview.....	5-28
Figure 5-8:	Process Flowsheet.....	5-29
Figure 5-9:	Stages of Tailings Deposition and Dam Construction	5-38
Figure 5-10:	Surface Water Drainage Plan	5-44

Figure 5-11:	Flow Logic Diagram	5-48
Figure 5-12:	Existing and New Water Crossings	5-52
Figure 6-1:	Climate Stations	6-19
Figure 6-2:	Simulated Regional Groundwater Elevations – Pre-Mining.....	6-55
Figure 6-3:	Simulated Regional Groundwater Elevations – End of Mining	6-57
Figure 6-4:	Simulated Regional Groundwater Elevations – End of Mining	6-59
Figure 6-5a:	Lake Water Mixing Model Results – Far Field in Upper Marmion Reservoir	6-73
Figure 6-5b:	Lake Water Mixing Model Results – Near Field at Diffuser Discharge	6-75
Figure 6-6:	Expected Long-term Post-closure Site Conditions	6-91
Figure 6-7:	Aquatic Areas of Potential Impact	6-135
Figure 6-8:	Assumed Place-of-Residence Distribution of Construction Workforce.....	6-153
Figure 6-9:	Assumed Distribution of Construction Expenditures	6-155
Figure 6-10:	Assumed Place of Residence Distribution of Operations Workforce.....	6-165
Figure 6-11:	Age Profile for Atikokan (2011)	6-167
Figure 6-12:	Distribution of Operations Expenditures.....	6-168
Figure 6-13:	Existing and Proposed Projects or Activities in the Vicinity of the Project Site.....	6-219
Figure 7-1:	Public Open House Comment Form Results: Fishing, Hunting and Harvesting.....	7-8
Figure 7-2:	Public Open House Comment Forms Results: What types of animals do you hunt?.....	7-9
Figure 7-3:	Public Open House Comment Forms Results: How often do you eat animals that you have caught?.....	7-10
Figure 7-4:	Public Open House Comment Forms Results: What types of fish do you catch?	7-11
Figure 7-5:	Public Open House Comment Forms Results: How often do you eat fish you have caught?	7-12
Figure 7-6:	Public Open House Comment Forms Results: What types of plant/berries do you harvest?.....	7-13
Figure 7-7:	Public Open House Comment Forms Results: How often do you eat the plants you have harvested?	7-14
Figure 7-8:	Public Open House Comment Forms Results: Project Information.....	7-16
Figure 7-9:	Public Open House Comment Forms Results: Project Information.....	7-17
Figure 7-10:	Public Open House Comment Forms Results: Planning to Minimize Environmental Impacts	7-17
Figure 7-11:	Public Open House Comment Forms Results: Support for the Project	7-18
Figure 7-12:	Treaty 3 Area Boundary	7-61
Figure 7-13:	Established Resource Sharing Committees.....	7-73
Figure 7-14:	Resource Sharing Committee Communication Links	7-75
Figure 12-1:	View 1 Visual Simulation - View of Overburden and Waste Rock Stock Piles from Trap Bay of Upper Marmion	12-7
Figure 12-2:	View 3 Visual Simulation - View of Process Plant from Sawbill Bay	12-7

Figure 12-3: View 6 Visual Simulation - View of Tailings Management Facility from Trapper Cabin..... 12-8
Figure 12-4: View 8 Visual Simulation - View of Tailings Management Facility from Trapper Cabin..... 12-8

List of Photos

Photo 6-1: Sawbill Bay – Large bay to the west of the Project Site, showing drawdown and exposure of littoral zone –April 2010..... 6-139

List of Appendices

APPENDIX 1.I

Hammond Reef Gold Project Individual Environment Assessment Terms of Reference – Amended Osisko Hammond Reef Gold Ltd. April 2012 (Approved July 2012)

APPENDIX 1.II

Guidelines for the Preparation of an Environmental Impact Statement Pursuant to the Canadian Environmental Assessment Act for the Hammond Reef Gold Mine Project Canadian Environmental Assessment Agency October 2011 (Published December 2011)

APPENDIX 1.III

Concordance Tables

APPENDIX 1.IV

Information Requests

APPENDIX 1.V

Osisko Mining Corporation Environment Health and Safety Policy

APPENDIX 1.VI

Canadian Malartic Project Health and Safety Management Plans
Osisko Mining Corporation

APPENDIX 1.VII

Osisko Hammond Reef Gold Ltd. Land Claims and Dispositions

APPENDIX 7.I

Notifications

APPENDIX 7.II

Community News Briefs

APPENDIX 7.III

Record of Communications – Public

APPENDIX 7.IV

Record of Communications – Government

APPENDIX 7.V

Record of Communications – Aboriginal

GLOSSARY OF TERMS

Term	Definition
Abiotic	The absence of living organisms. (U.S. Department of the Interior 2012)
Aeolian	Materials carried, deposited, produced, or eroded by the wind. (U.S. Department of the Interior 2012)
Aggregate	Crushed rock or gravel screened to sizes for use in road surfaces, concrete, or bituminous mixes. A mass or cluster of soil particles, often having a characteristic shape. (U.S. Department of the Interior 2012)
Alkaline	Having a pH of 7.0 or above. The condition of water or soil which contains a sufficient amount of alkali substances to raise the pH above 7.0. The quality of being bitter due to alkaline content. (U.S. Department of the Interior 2012)
Ambient	Surrounding natural conditions or environment at a given place and time. Environmental or surrounding conditions. (U.S. Department of the Interior 2012)
Anoxic	Without oxygen. (U.S. Department of the Interior 2012)
Anthropogenic	Generated by humans. Used to indicate soil conditions, disturbances, or stresses that are created by people. (USDA 2012)
Baseline	Conditions that would prevail if no actions were taken. (U.S. Department of Interior 2012)
Basin	An area having a common outlet for its surface runoff. (NOAA 2012)
Bedrock	The solid rock at the surface or underlying other surface materials. Rock of relatively great thickness and extent in its native location. A general term for any solid rock, not exhibiting soil-like properties, that underlies soil or other unconsolidated surficial materials. As distinguished from boulders. The consolidated body of natural solid mineral matter which underlies the overburden soils. The solid rock that underlies all soil, sand, clay, gravel, and other loose materials on the earth's surface. Any sedimentary, igneous, or metamorphic material represented as a unit in geology; being a sound and solid mass, layer, or ledge of mineral matter; and with shear wave velocities greater than 2500 feet per second. (U.S. Department of the Interior 2012)
Bench	A working level or step in a cut. (U.S. Department of the Interior 2012)
Benthic	Bottom of rivers, lakes, or oceans; organisms that live on the bottom of water bodies. Bottom- or depth-inhabiting. (U.S. Department of the Interior 2012)
Berm	A horizontal strip or shelf built into an embankment or cut to break the continuity of the slope, usually for the purpose of reducing erosion or to increase the thickness of the embankment at a point of change in a slope or defined water surface elevation. A horizontal step in the sloping profile of an embankment dam. A shelf that breaks the continuity of a slope, or artificial ridge of earth. A ledge or shoulder, as along the edge of a road or canal. An artificial ridge of earth. (U.S. Department of Interior 2012)
Biophysics	A branch of biology that applies the methods of physics to the study of biological structures and processes
Biota	Plant and animal life of a region. (U.S. Department of the Interior 2012)
Carcinogen	A substance capable of inducing cancer in an organism. (FAO 2012)
Carnivore	Any flesh-eating or predatory organism. (U.S. Department of the Interior 2012)

Glossary of Terms (Continued)

Term	Definition
Catchment	Unit watershed; an area from which all the drainage water passes into one stream or other body of water. (U.S. Department of the Interior 2012)
Channel	Natural or artificial watercourse of perceptible extent, with a definite bed and banks to confine and conduct continuously or periodically flowing water. Rivers and streams. A general term for any natural or artificial facility for conveying water. (U.S. Department of the Interior 2012)
Conifer	Cone-bearing trees or shrubs, mostly evergreens such as pine, cedar, and spruce. (U.S. Department of the Interior 2012)
Cyanidation	A method of extracting exposed gold or silver grains from crushed or ground ore by dissolving it in a weak solution of sodium- or calcium cyanide. Also known as cyanide leaching. May be carried out in tanks inside a mill or in heaps of ore outdoors. (INAP 2012)
Dam	A barrier built across a watercourse to impound or divert water. A barrier that obstructs, directs, retards, or stores the flow of water. Usually built across a stream. A structure built to hold back a flow of water. (U.S. Department of Interior 2012)
Delta	An alluvial sediment deposit normally formed where a river or stream enters a lake or estuary. Flat land mass of sediment deposit formed at the mouths of streams where they enter larger bodies of water. Sediment deltas are usually triangular in plan view, narrow at the upstream end and relatively wide at the downstream end. The sediment particles deposit because the river velocity and gradient are too low to keep the particles in motion. Active deltas contain diverging multiple channels that continually deposit sediment and migrate back and forth across the delta surface. The sediment particles of the delta deposit are usually well sorted such that the coarser particles (gravel and sand) deposit first at the upstream end, while finer particles (silt and clay) deposit farther downstream. A fan-shaped area at the mouth of a river. (U.S. Department of the Interior 2012)
Discharge	The release or extraction of water from an aquifer. Typical mechanisms of natural discharge are evapotranspiration by phreatophytes, springs, and drains to surface water bodies. Pumping is a man-caused discharge. (University of Idaho 2012)
Drawdown	Lowering of a reservoir's water level; process of depleting a reservoir or ground water storage. The drop in the water table or level of water in the ground when water is being pumped from a well. Vertical distance the free water surface elevation is lowered or the reduction of the pressure head due to the removal of free water. The difference between a water level and a lower water level in a reservoir within a particular time. The amount of water used from a reservoir. (U.S. Department of the Interior 2012)
Dyke (Dike)	A low embankment, usually constructed to close up low areas of the reservoir rim and thus limit the extent of the reservoir. Embankment for restraining a river or a stream. Embankments which contain water within a given course. Usually applied to dams built to protect land from flooding. (U.S. Department of the Interior 2012)
Effluent	Partially or completely treated wastewater flowing out of a treatment facility, reservoir, or basin. (U.S. Department of the Interior 2012)

Glossary of Terms (Continued)

Term	Definition
Erosion	A gradual wearing away of soil or rock by running water, waves, or wind. Concrete surface disturbance caused by cavitation, abrasion from moving particles in water, impact of pedestrian or vehicular traffic, or impact of ice floes. Surface displacement of soil caused by weathering, dissolution, abrasion, or other transporting. The gradual wearing away of material as a result of abrasive action. (U.S. Department of Interior 2012)
Evaporation	Water vapor losses from water surfaces, sprinkler irrigation, and other related factors. Loss of water to the atmosphere. The process by which water is changed from a liquid into a vapor. Water from land areas, bodies of water, and all other moist surfaces is absorbed into the atmosphere as a vapor. (U.S. Department of the Interior 2012)
Faulting	The movement which produces relative displacement along a fracture in rock. (U.S. Department of the Interior 2012)
Flocculant	A chemical agent that causes small particles to aggregate. (FAO 2012)
Flotation	A milling process using surface active chemicals to selectively modify some mineral surfaces causing them to become attached to air bubbles and float, while others do not and sink. This process allows the selective concentration and recovery of the valuable minerals. Pre-treatments include grinding and addition of the reagents. (INAP 2012)
Fluvial	Pertains to streams and stream processes. (U.S. Department of the Interior 2012)
Forage	Vegetation used for animal consumption. (U.S. Department of the Interior 2012)
Geochemistry	A science that deals with the chemical composition of and chemical changes in the solid matter of the earth.
Grubbing	Removal of stumps, roots, and vegetable matter from the ground surface after clearing and prior to excavation. (U.S. Department of Interior 2012)
Headwater	The source and upper part of a stream; water upstream of a dam or powerhouse. (U.S. Department of the Interior 2012)
Herbivore	Animal that feeds on plants. (U.S. Department of the Interior 2012)
Hummock	A hillock of broken ice which has been forced upward by pressure. (NOAA 2012)
Hydraulic Conductivity	A quantitative measure of how easily water flows through soil. (USDA 2012)
Hydrogeology	The geology of ground water, with particular emphasis on the chemistry and movement of water. (U.S. Department of the Interior 2012)
Hydrograph	A graphical representation of the stage or discharge as a function of time at a particular point on a watercourse; a time-discharge curve of the unsteady flow of water. A graph showing, for a given point on a stream, river, or conduit, the discharge, stage, velocity, available power, rate of runoff, or other property of water with respect to time. This can be measured or modeled. (U.S. Department of the Interior 2012)
Impermeable	Having a texture that does not permit water to move through quickly. Not easily penetrated. The property of a material or soil that does not allow, or allows only with great difficulty, the movement or passage of water. (U.S. Department of Interior 2012)
Inflow	Water that flows into a body of water. The amount of water entering a reservoir expressed in acre-feet per day or cubic feet per second. (U.S. Department of the Interior 2012)

Glossary of Terms (Continued)

Term	Definition
Invertebrate	All animals without a vertebral column. (U.S. Department of the Interior 2012)
Leach	To remove components from the soil by the action of water trickling through. (U.S. Department of the Interior 2012)
Leachate	A liquid that results from water collecting contaminants as it trickles through wastes, agricultural pesticides or fertilizers. Leachate may occur in farming areas, feedlots, and landfills, and may result in hazardous substances entering surface water, ground water, or soil. (U.S. Department of the Interior 2012)
Leaching	Removal of soluble material from soil or other permeable material by the passage of water through it. The removal of soluble soil material and colloids by percolating water. The process by which soluble substances are dissolved and transported down through the soil by recharge. (U.S. Department of the Interior 2012)
Lentic	Standing waters, such as lakes, ponds, and marshes. (U.S. Department of the Interior 2012)
Lichen	A composite of fungi and algae or cyanobacteria. The fungi capture and cultivate photosynthetic organisms which together provide themselves needed water and nutrients. Lichen species occur in many colors including black, brown, dark olive green, red, yellow and white. (USDA 2012)
Lineament	A rectilinear topographic feature. (U.S. Department of the Interior 2012)
Littoral	Pertaining to the shore. (U.S. Department of the Interior 2012)
Lotic	Flowing water, such as rivers and streams. (U.S. Department of the Interior 2012)
Low-grade ore	Extracted ore with a lower gold content.
Mineralization	The process by which minerals of interest are geologically or organically formed.
Mulch	Material spread on the ground to reduce soil erosion and evaporation of water. Any substance spread or allowed to remain on the soil surface to conserve soil moisture and shield soil particles from the erosive forces of raindrops and runoff. (U.S. Department of Interior 2012)
Oligotrophic	Reservoirs and lakes which are nutrient poor and contain little aquatic plant or animal life. (U.S. Department of the Interior 2012)
Ore	Rock or earth containing workable quantities of a mineral or minerals of commercial value. (U.S. Department of the Interior 2012)
Overburden	Soil or other unconsolidated materials overlying bedrock.
Pathogenic	A disease-causing organism (generally microbial: bacteria, fungi, viruses; but can extend to other organisms: e.g. nematodes etc.). (FAO 2012)
Peat	A fibrous mass of organic matter in various stages of decomposition, generally dark brown to black in color and of spongy consistency. A soft light swamp soil consisting mostly of decayed vegetation. (U.S. Department of the Interior 2012)
Perennial	A plant that flowers continuously for several years. (FAO 2012)
Permeability	The measure of the flow of water through soil. The ease (or measurable rate) with which gasses, liquids, or plant roots penetrate or pass through a layer of soil or porous media. The capacity or ability of a porous rock, sediment, or soil to allow the movement of water through its pores. (U.S. Department of the Interior 2012)
Permeable	Having pores or openings that permit liquids or gasses to pass through. (U.S. Department of the Interior 2012)

Glossary of Terms (Continued)

Term	Definition
Potable water	Water that is safe and satisfactory for drinking and cooking. (U.S. Department of Interior 2012)
Precipitation	As used in hydrology, precipitation is the discharge of water, in a liquid or solid state, out of the atmosphere, generally onto a land or water surface. It is the common process by which atmospheric water becomes surface, or subsurface water. The term "precipitation" is also commonly used to designate the quantity of water that is precipitated. Precipitation includes rainfall, snow, hail, and sleet, and is therefore a more general term than rainfall. (NOAA 2012)
Profundal	Deepest part of the ocean or lake where light does not penetrate. This layer usually has fewer nutrients, more silt, and fewer organisms than the surface. (U.S. Department of the Interior 2012)
Propane farm	A designated area used for the storage of propane tanks
Recharge	Mechanisms of inflow to the aquifer. Typical sources of recharge are precipitation, applied irrigation water, underflow from tributary basins and seepage from surface water bodies. (University of Idaho 2012)
Reservoir	A body of water impounded by a dam and in which water can be stored. Artificially impounded body of water. Any natural or artificial holding area used to store, regulate, or control water. Body of water, such as a natural or constructed lake, in which water is collected and stored for use. Dam design and reservoir operation utilize reservoir capacity and water surface elevation data. To ensure uniformity in the establishment, use, and publication of these data, the following standard definitions of water surface elevations shall be used. (U.S. Department of the Interior 2012)
Runoff	The portion of precipitation, snow melt, or irrigation that flows over the soil, eventually making its way to surface water supplies. Liquid water that travels over the surface of the Earth, moving downward due to the law of gravity; runoff is one way in which water that falls as precipitation returns to the ocean. (U.S. Department of Interior 2012)
Sedimentation	Deposition of waterborne sediments due to a decrease in velocity and corresponding reduction in the size and amount of sediment which can be carried. (U.S. Department of the Interior 2012)
Seep	A spot where ground water oozes slowly to the surface, usually forming a pool. (U.S. Department of the Interior 2012)
Seepage	The slow movement or percolation of water through soil or rock. Movement of water through soil without formation of definite channels. The movement of water into and through the soil from unlined canals, ditches, and water storage facilities. The slow movement or percolation of water through small cracks, pores, interstices, etc., from an embankment, abutment, or foundation. (U.S. Department of the Interior 2012)
Sluiceway	An opening in a diversion dam used to discharge heavy floating debris safely past the dam. (U.S. Department of the Interior 2012)
Slurry	Watery mixture of insoluble matter which is pumped beneath a dam to form an impervious barrier. Cement grout. (U.S. Department of Interior 2012)
Spawning	To lay eggs, refers mostly to fish. (U.S. Department of the Interior 2012)

Glossary of Terms (Continued)

Term	Definition
Spillway	A structure that passes normal and/or flood flows in a manner that protects the structural integrity of the dam. Overflow channel of a dam or impoundment structure. A structure over or through which flow is discharged from a reservoir. If the rate of flow is controlled by mechanical means such as gates, it is considered a controlled spillway. If the geometry of the spillway is the only control, it is considered an uncontrolled spillway. Any passageway, channel, or structure designed to discharge surplus water from a reservoir. (U.S. Department of Interior 2012)
Stratification	Thermal layering of water in lakes and streams. Lakes usually have three zones of varying temperature, the epilimnion, the metalimnion, and the hypolimnion. The formation of separate layers (of temperature, plant, or animal life) in a lake or reservoir. (U.S. Department of the Interior 2012)
Substrate	Surface on which a plant or animal grows or is attached. The base on which an organism lives; a substance acted upon. (U.S. Department of the Interior 2012)
Tailings	Second grade or waste material separated from pay material during screening or processing. (U.S. Department of the Interior 2012)
Thermocline	The middle layer of a lake, separating the upper, warmer portion (epilimnion) from the lower, colder portion (hypolimnion). The middle layer in a thermally stratified lake or reservoir. In this layer there is a rapid decrease in temperature with depth. (U.S. Department of the Interior 2012)
Till	A deposit of sediment formed under a glacier, consisting of an unlayered mixture of clay, silt, sand, and gravel ranging widely in size and shape. (U.S. Department of the Interior 2012)
Topsoil	The topmost layer of soil, usually containing organic matter. Usually refers to soil containing humus which is capable of supporting plant growth. (U.S. Department of the Interior 2012)
Transmissivity	The ability of an aquifer to transmit water. (U.S. Department of the Interior 2012)
Tributary	River or stream flowing into a larger river or stream. (U.S. Department of the Interior 2012)
Trophic Level	Levels of the food chain. The first trophic level includes photosynthesizers that get energy from the sun. Organisms that eat photosynthesizers make up the second trophic level. Third trophic level organisms eat those in the second level, and so on. It is a simplified way of thinking of the food web. In fact, some organisms eat members of several trophic levels. (USDA 2012)
Vascular	Plant tissue specialized for the conduction of water or nutrients. (U.S. Department of the Interior 2012)
Waste rock	Rock that does not contain economically recoverable gold that must be fractured and removed in order to gain access to ore.
Watercourse	An open conduit either naturally or artificially created which periodically, or continuously contains moving water, or forms a connecting link between two bodies of water. (NOAA 2012)

Glossary of Terms (Continued)

Term	Definition
Watershed	Surface drainage area above a specified point on a stream. Area which drains into or past a point. A geographical portion of the Earth's surface from which water drains or runs off to a single place like a river. The area of land that drains its water into a stream or river. All the land and water within the confines of a certain drainage area. Vertically, it extends from the top of the vegetation to the underlying rock layers that confine water movement. An area of land that contributes runoff to one specific delivery point. (U.S. Department of the Interior 2012)
Wetland	Lands including swamps, marshes, bogs, and similar areas such as wet meadows, river overflows, mudflats, and natural ponds. An area characterized by periodic inundation or saturation, hydric soils, and vegetation adapted for life in saturated soil conditions. Any number of tidal and nontidal areas characterized by saturated or nearly saturated soils most of the year that form an interface between terrestrial and aquatic environments; including freshwater marshes around ponds and channels, and brackish and salt marshes. (U.S. Department of Interior 2012)

Page left intentionally blank

LIST OF ABBREVIATIONS, ACRONYMS AND INITIALISMS

Acronym	Definition
AANDC	Aboriginal Affairs and Northern Development Canada
ABA	Acid-Base Accounting
ADMGO	Air Dispersion Modelling Guideline for Ontario
AEDC	Atikokan Economic Development Corporation
AERMOD	An Air Emissions Dispersion Modeling Software
AGS	Atikokan Generating Station
ALS	ALS Environmental
AMIRA	AMIRA International Ltd
ANFO	Ammonium Nitrate Fuel Oil
AP	Acid Potential
API	Area of Potential Impact
ARD	Acid Rock Drainage
ATSDR	Agency for Toxic Substances and Disease Registry
ATV	All-Terrain Vehicle
AUT	Atikokan ON Airport
BCR	Bird Conservation Region
BIC	Benthic Invertebrate Community
BLM	Biotia Ligand Model
BRH	Borehole
BSC	Bird Studies Canada
CAA Process	Connection Assessment and Approval Process
CAMA	Canadian Aboriginal Minerals Association
CCME	Canadian Council of Ministers of the Environment
CDA	Canadian Dam Association
CEA Agency	Canadian Environmental Assessment Agency
CEAA	Canadian Environmental Assessment Act
CEAC	Cooperative Environmental Assessment Committee
CHER	Cultural Heritage Evaluation Report
CIM	Canadian Institute of Mining
CIP	Carbon in Pulp
CIPRP	Critical Incident Preparedness and Response Plan
CO	Carbon Monoxide
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
COSSARO	Committee on the Status of Species at Risk in Ontario
CPP	Canadian Pension Plan

List of Abbreviations, Acronyms and Initialisms (Continued)

Acronym	Definition
CWQG	Canadian Water Quality Guidelines
DEM	Digital Elevation Model
DFO	Fisheries and Oceans Canada
DNA	Deoxyribonucleic Acid
DO	Dissolved Oxygen
DOC	Dissolved Organic Carbon
DPM	Diesel Particulate Matter
EA	Environmental Assessment
EAA	Ontario Environmental Assessment Act
EAB	Environmental Approvals Branch
EC	Environment Canada
ECA	Environmental Compliance Approval
EDS	Environmental Storm Design
EEM	Environment Effects Monitoring
EH&S	Environmental Health and Safety
EI	Employment Insurance
EIS	Environmental Impact Statement
ELC	Ecological Land Classification
EMP	Environmental Management Plan
END	Endangered
EPA	US Environmental Protection Agency
EPRP	Emergency Preparedness and Response Plan
EPT	Ephemeroptera, Plecoptera, and Trichoptera
ERA	Ecological Risk Assessment
ESA	Electrical Safety Authority
ESMP	Environmental and Social Management Plan
ETP	Effluent Treatment Plant
EW	Electrowinning
FFCS	Fort Frances Chiefs Secretariat
FMP	Forest Management Plans
FN	First Nations
FTE	Full-Time Equivalent
FWCA	Fish and Wildlife Conservation Act
GIS	Geographical Information System
GMS	G Mining Services Inc.
GDP	Gross Domestic Product
GNP	Gross National Product

List of Abbreviations, Acronyms and Initialisms (Continued)

Acronym	Definition
GPS	Global Positioning System
GRT	Government Review Team
GS	Generating Station
HA	Highly Annoyed
HADD	Harmful Alteration, Disruption or Destruction
HC	Hydrocarbons
HCII	Specific Critical Noise Level
HCN	Hydrogen Cyanide
HCS	Highway Capacity Software
HHERA	Human Health and Ecological Risk Assessment
HHRA	Human Health Risk Assessment
HQ	Hazard Quotient
HRWQ	Hammond Reef Gold Project surface water/sediment stations
HRWQP	Hammond Reef Gold Project water column profile stations
HS&E	Health, Safety and Environment
ICP	Inductively Coupled Plasma Mass Spectrometry
IESNA	Illuminating Engineering Society of North America
IESO	Independent Electricity System Operator
ILCR	Incremental Lifetime Cancer Risks
IR	Information Request
IRS	Internal Responsibility System
ISO	International Organization for Standardization
ITIS	Integrated Taxonomic Information System
JHSC	Joint Health and Safety Committees
ISQG	Interim Sediment Quality Guideline
LDMLFN	Lac de Milles Lacs First Nations
LEL	Lowest Effect Level
LIO	Land Information Ontario
LISA	Linear Infrastructure Study Area
LOS	Level of Service
LP	Limited Partnership
LSA	Local Study Area
MAC	Mining Association of Canada
MDC	Marmion Deformation Corridor
MDL	Minimum Detection Limit
MIBC	Methyl Isobutyl Carbinol
MISA	Municipal Information Systems Association

List of Abbreviations, Acronyms and Initialisms (Continued)

Acronym	Definition
ML	Metal Leaching
MMER	Metal Mining Effluent Regulation
MNDM	Ministry of Northern Development and Mines
MNDMF	Mines and Forestry's Project Definition Template for Advanced Exploration and Mine Development Projects
MNO	Métis Nation of Ontario
MNR	Ontario Ministry of Natural Resources
MODFLOW	3d Groundwater Flow Modelling System
MOE	Ontario Ministry of the Environment
MOEE	Ministry of Energy and the Environment
MOL	Ontario Ministry of Labour
MPMO	Major Projects Management Office
MSA	Mine Study Area
MSDS	Material Safety Data Sheets
MTC	Ontario Ministry of Culture, Tourism and Sport
MTCS	Ministry of Tourism, Culture and Sports
MTO	Ministry of Transportation of Ontario
NAG	Net Acid Generation
NAPS	National Air Pollutant Surveillance
NNLP	No Net Loss Plan
NOX	Oxides of Nitrogen
NP	Neutralization Potential
NPR	Neutralization Potential Ratio
NRVIS	Natural Resources and Values Information System
NWHU	Northwest Health Unit
NWTAB	Northwest Training and Adjustment Board
OBBA	Ontario Breeding Bird Atlas
OCAP	Ontario Coalition of Aboriginal People
ODWS	Ontario Drinking Water Quality Standards
OFAH	Ontario Federation of Anglers and Hunters
OHRG	Osisko Hammond Reef Gold Ltd
OMA	Ontario Mining Association
OMEDT	Ontario Ministry of Economic Development and Trade
OMNR	Ontario Ministry of Natural Resources
OMOE	Ontario Ministry of the Environment
OMS	Operations Management and Surveillance
OPP	Ontario Provincial Police
ORP	Oxygen-Reduction Potential

List of Abbreviations, Acronyms and Initialisms (Continued)

Acronym	Definition
OSHA	Occupational Health and Safety Act
OSK	Osisko Mining Corporation
Osisko	Osisko Mining Corporation
OTR	Ontario Typical Range
PAH	Polycyclic aromatic hydrocarbons
PAX	Potassium Amyl Xanthate
PDAC	Prospectors and Developers Association of Canada
PEL	Probable effect level
PIF	Partners in Flight
POI	Point of Impingement
POR	Points of Reception
PPCP	Process Plant Collection Pond
PPV	Peak Particle Velocity
Project	Hammond Reef Gold Project
PSQG	Ontario Provincial Sediment Quality Guidelines
PTTW	Permit to Take Water
PWQO	Provincial Water Quality Objectives
QA/QC	Quality Assurance/Quality Control
RRDSB	Rainy River District School Board
RRDSSAB	Rainy River District Social Services Administration Board
RRSA	Resource Sharing Agreement
RSA	Regional Study Area
SAG	Semi-autogenous Grinding
SAR	Species at Risk
SARA	Canada Species at Risk Act
SDI	Simpsons Diversity Index
SEI	Simpsons Evenness Index
SEL	Severe Effect Level
SFE	Shake Flask Extraction
SMP	Social Management Plan
SOCC	Species Of Conservation Concern
SPM	Suspended Particulate Matter
SSWQO	Site-Specific Water Quality Objective
STP	Sewage Treatment Plant
TBRHSC	Thunder Bay Regional Health Sciences Centre
TGS	Thermal Generating Station
TIA	Tailings Impoundment Area

List of Abbreviations, Acronyms and Initialisms (Continued)

Acronym	Definition
TIS	Traffic Impact Study
TKN	Total Kjehldahl Nitrogen
TMF	Tailings Management Facility
TOC	Total Organic Carbon
TSD	Technical Support Document
TSE	Toronto Stock Exchange
TSP	Total Suspended Particulates
TSS	Total Suspended Solids
TSX	Toronto Stock Exchange
TUS	Traditional Use Study
ULR	Upward Light Ratio
UTM	Universal Transverse Mercator (coordinate system)
VEC	Valued Ecosystem Component
VSC	Valued Social Component
WHMIS	Workplace Hazardous Materials Information System
WHO	World Health Organization
WMU	Wildlife Management Unit
WQ	Water Quality
WRMF	Waste Rock Management Facility
WRS	Waste Rock Stockpile
WTF	Water Treatment Facility
YOY	Young of the Year

LIST OF UNITS

Unit	Abbreviation
centimetre	cm
cubic megametre	Mm ³
cubic megametres per year	Mm ³ /yr
cubic metre	m ³
cubic metres per day	m ³ /day
cubic metres per day	m ³ /d
cubic metres per hour	m ³ /hr
cubic metres per second	m ³ /s
cubic metres per year	m ³ /y
days per year	d/y
decibel	dB
decibel A	dBA
degrees Celsius	°C
grams	g
grams per cubic centimetre	g/cm ³
grams per cubic metre	g/m ³
grams per second	g/s
grams per square metre per year	g/m ² /y
grams per tonne	g/t
hectare	ha
horsepower	hp
Hounsfield Unit	HU
hour	hr
hours per day	h/d
kilogram	kg
kilograms per cubic metre	kg/m ³
kilograms per tonne	kg/t
kilometre	km
kilometres per hour	km/hr
kilopascal	kPa
kilovolt	kV
kilowatt	kW
linear decibel	dBL

List Of Units (Continued)

Unit	Abbreviation
litres per day	L/day
litres per second	L/s
litres per second per square kilometre	L/s/km ²
megatonne	Mt
megawatt	MW
metre	m
metres above sea level	masl
metres below ground surface	mbgs
metres per kilometre	m/km
metres per second	m/s
micrograms per cubic metre	µg/m ³
micrograms per gram	µg/g
micrograms per litre	µg/L
micrometre	µm
microSiemens per centimetre	µS/cm
milligrams	mg
milligrams per cubic metre	mg/m ³
milligrams per kilogram	mg/kg
milligrams per kilogram per day	mg/kg/d
milligrams per litre	mg/L
milligrams per litre as calcium carbonate	mg(CaCO ₃)/L
millilitre	mL
millimetre	mm
millimetres per second	mm/s
ounce	oz
parts per million	ppm
percent	%
square kilometres	km ²
square metre	m ²
square metres per day	m ² /d
thousand	k
thousand per year	K/yr
tonne	t
tonnes of calcium carbonate equivalent per thousand tonnes	t CaCO ₃ /1000t
tonnes per cubic metre	t/m ³

List Of Units (Continued)

Unit	Abbreviation
tonnes per day	tpd
Tonnes per year	t/y
volt	V
weight percent	wt %
weight percentage	wt %
year	y
year	yr
years	yrs

Page left intentionally blank