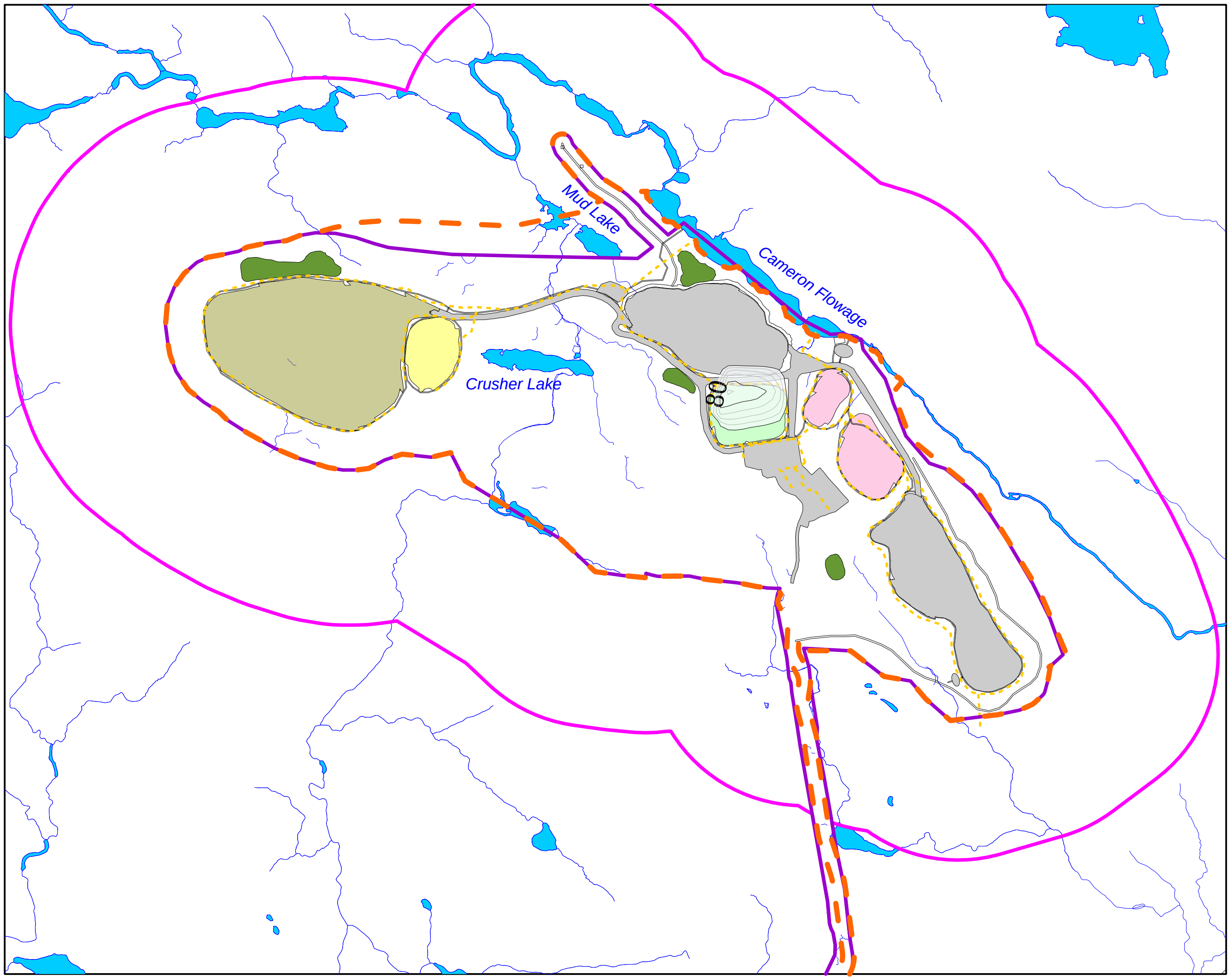

LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 — SIMULATED BORON CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The boron Tier 1 EQS for potable groundwater is 5,000 ug/L.

0 300 600 900m

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BEAVER DAM MINE

SIMULATED BORON CONCENTRATION VERSUS POTABLE CRITERIA
PC - BASE CASE SOURCE TERMS - BASE CASE CONDITION

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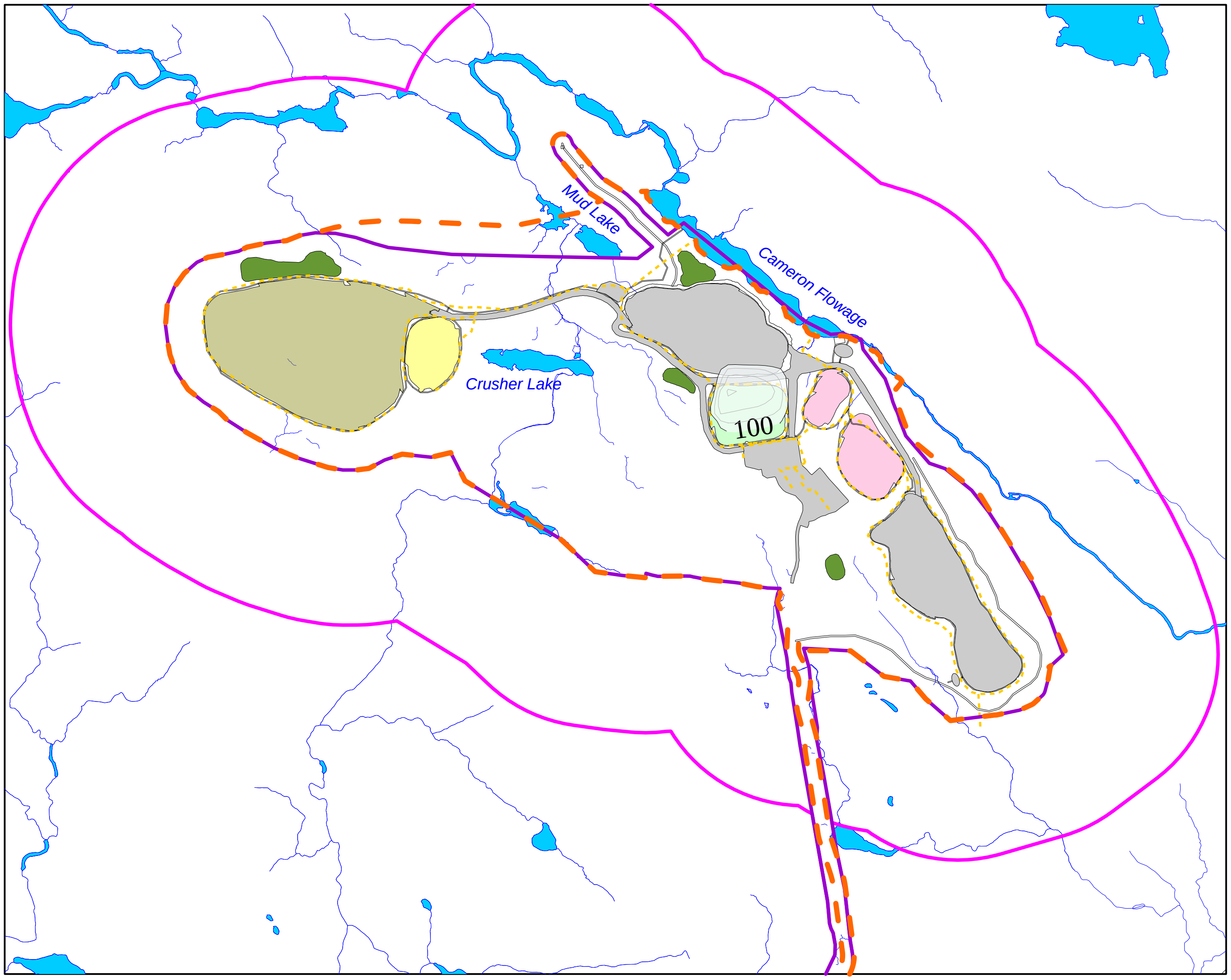
FIGURE CEAA-2-35-93

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.16 - Simulated Cobalt Concentration Versus Potable Criteria - PC - BC - AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 — SIMULATED BORON CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The boron Tier 1 EQS for potable groundwater is 5,000 ug/L.

0 300 600 900m

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SIMULATED PARAMETER CONCENTRATION VERSUS POTABLE CRITERIA
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

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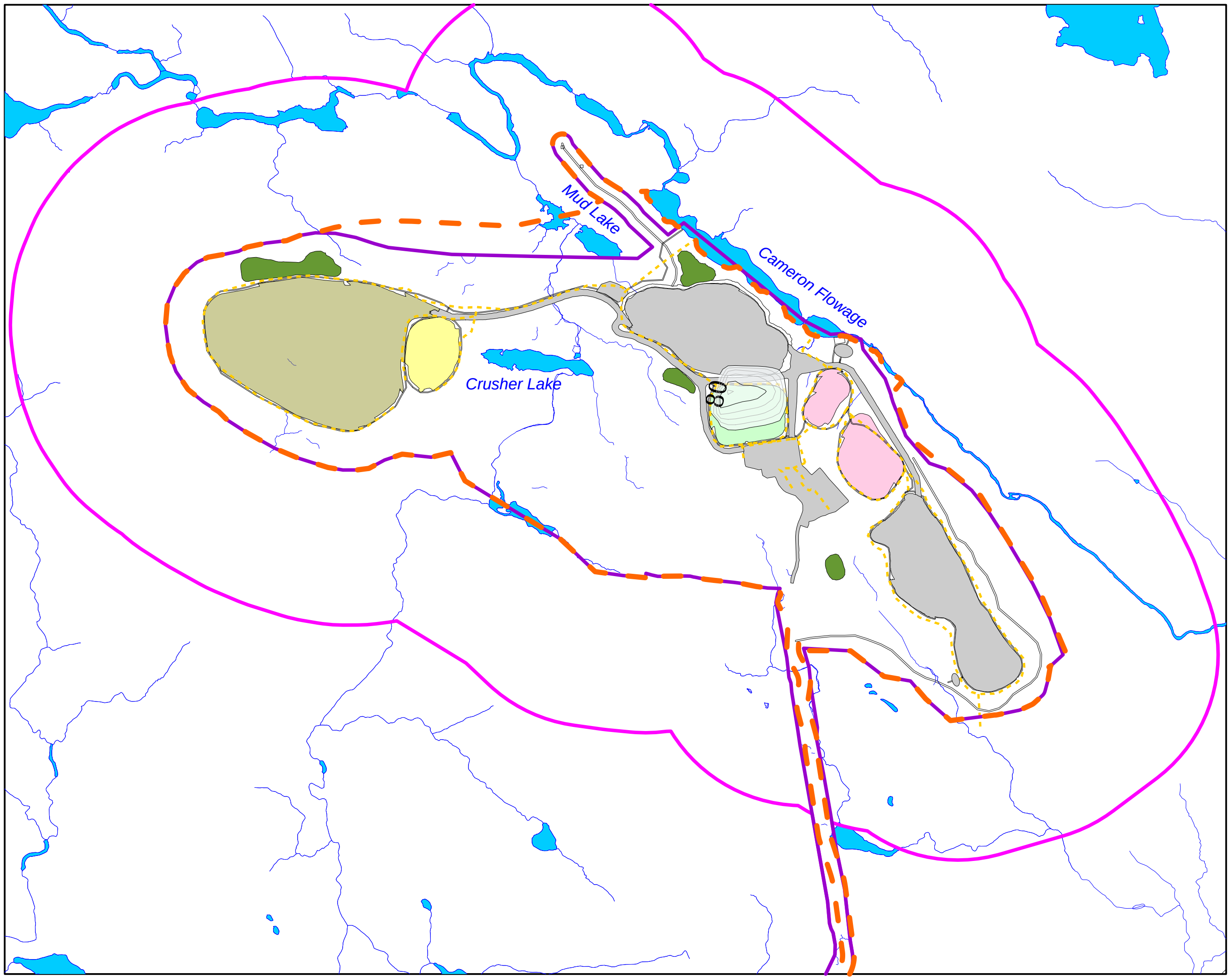
FIGURE CEAA-2-35-94

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\Figure 7.13 - Simulated Arsenic Concentration Versus Potable Criteria - PC - UC - AVG.srf



Note: The boron Tier 2 PSS for groundwater discharge to surface water (>10 m) is 12,000 ug/L.

0 300 600 900m

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SIMULATED BORON CONCENTRATION VERSUS TIER 2 PSS
PC - BASE CASE SOURCE TERMS - BASE CASE CONDITION

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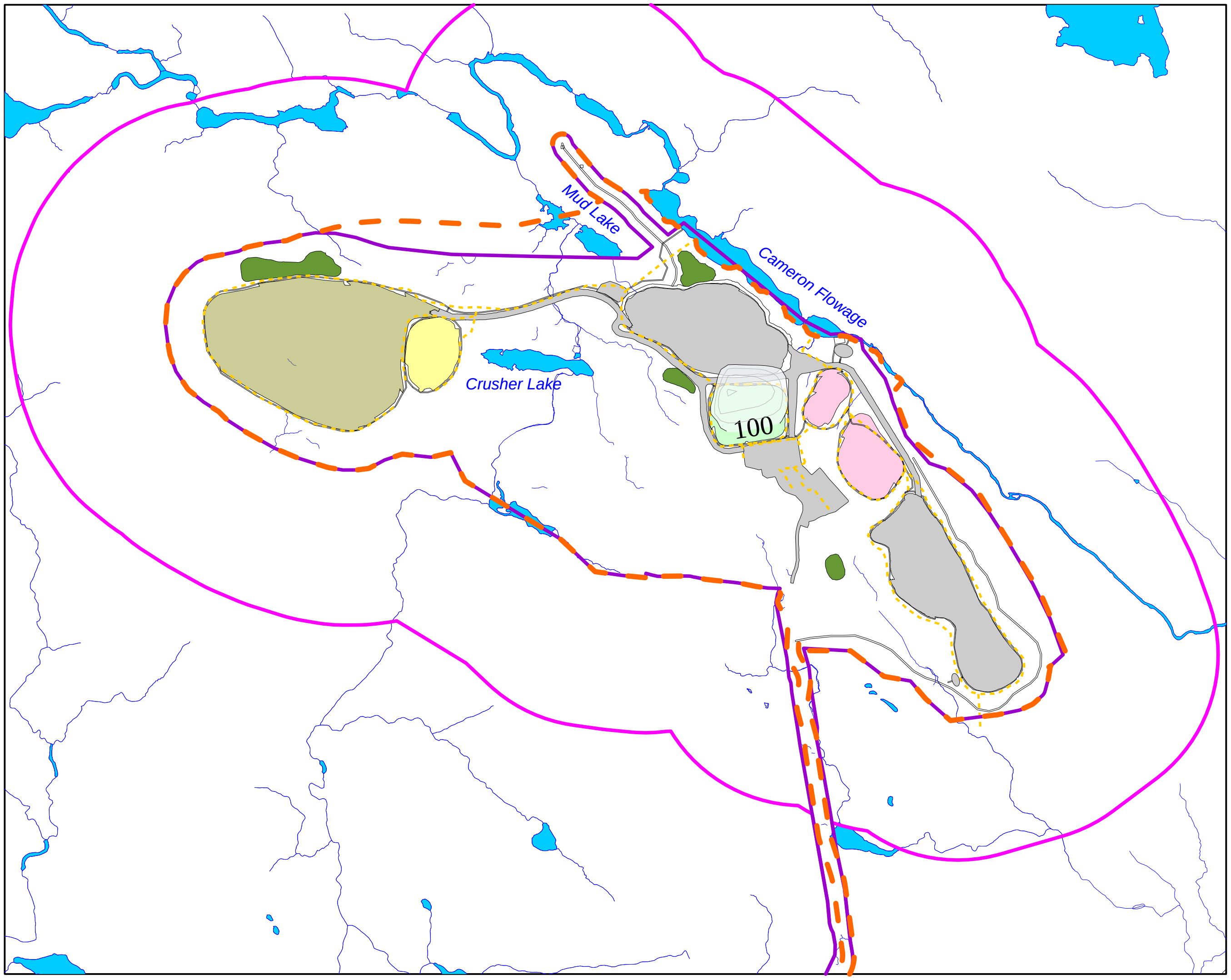
FIGURE CEAA-2-35-95

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.45 - Sim_Lead_PSS-PC-BC-AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 SIMULATED BORON CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The boron Tier 2 PSS for groundwater discharge to surface water (>10 m) is 12,000 ug/L.

0 300 600 900m

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SIMULATED BORON CONCENTRATION VERSUS TIER 2 PSS
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

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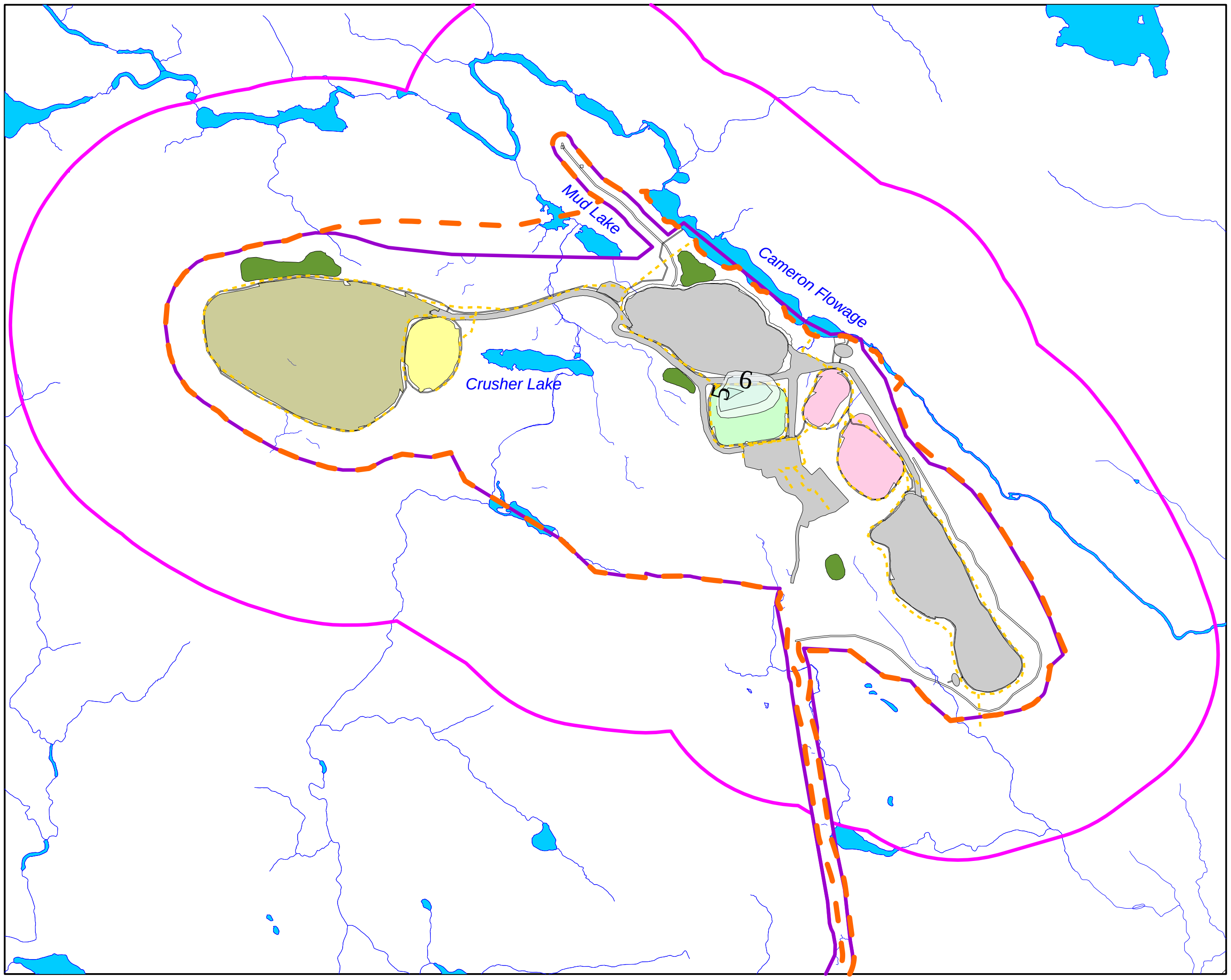
FIGURE CEAA-2-35-96

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.49 - Sim_Zinc_PSS-PC-UC-AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 — SIMULATED CADMIUM CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The cadmium Tier 1 EQS for potable groundwater is 5 ug/L.

0 300 600 900m

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SIMULATED CADMIUM CONCENTRATION VERSUS POTABLE CRITERIA
PC - BASE CASE SOURCE TERMS - BASE CASE CONDITION

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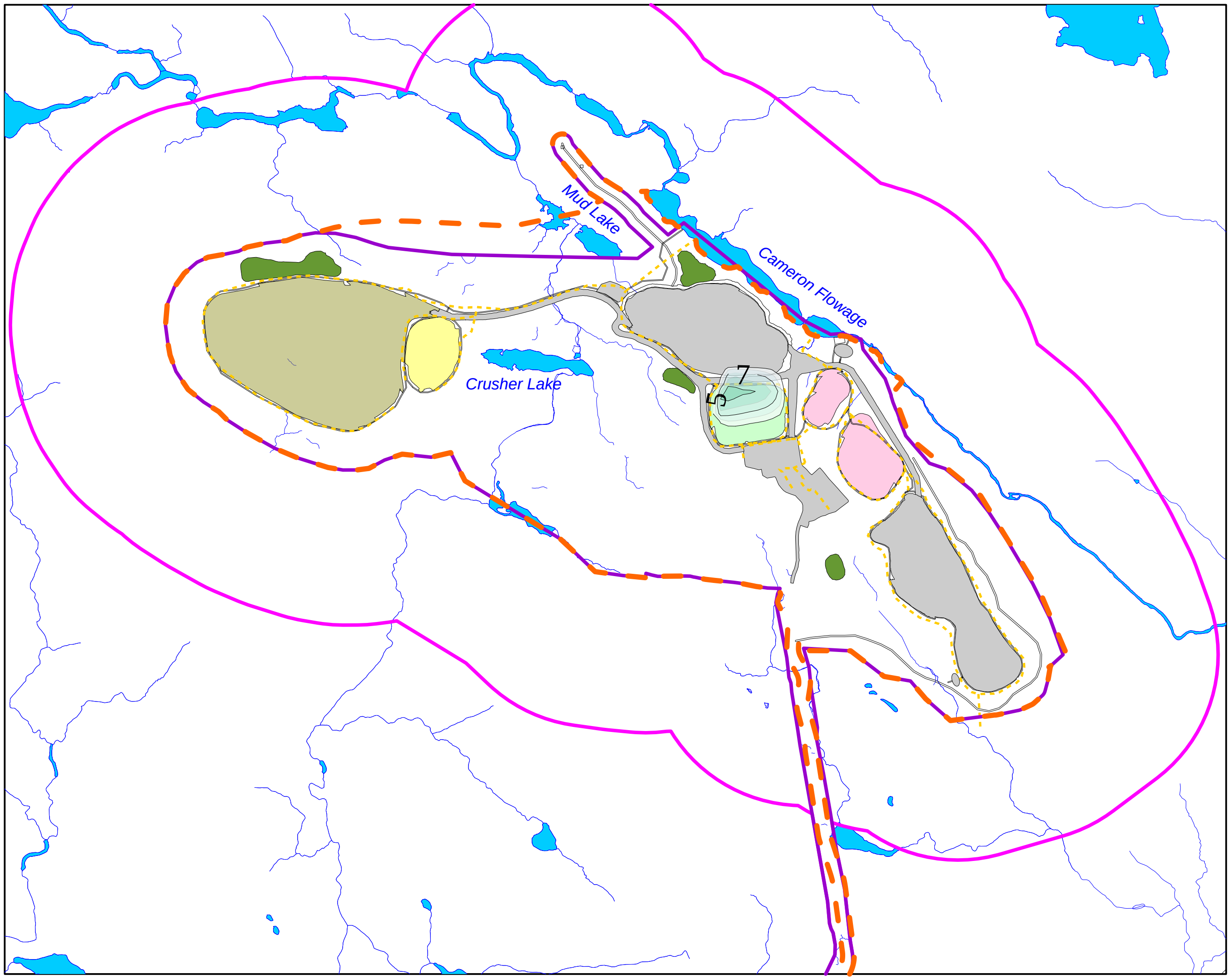
FIGURE CEAA-2-35-97

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.14 - Simulated Cadmium Concentration Versus Potable Criteria - PC - BC - AVG.srf



Note: The cadmium Tier 1 EQS for potable groundwater is 5 ug/L.

0 300 600 900m

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SIMULATED CADMIUM CONCENTRATION VERSUS POTABLE CRITERIA
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

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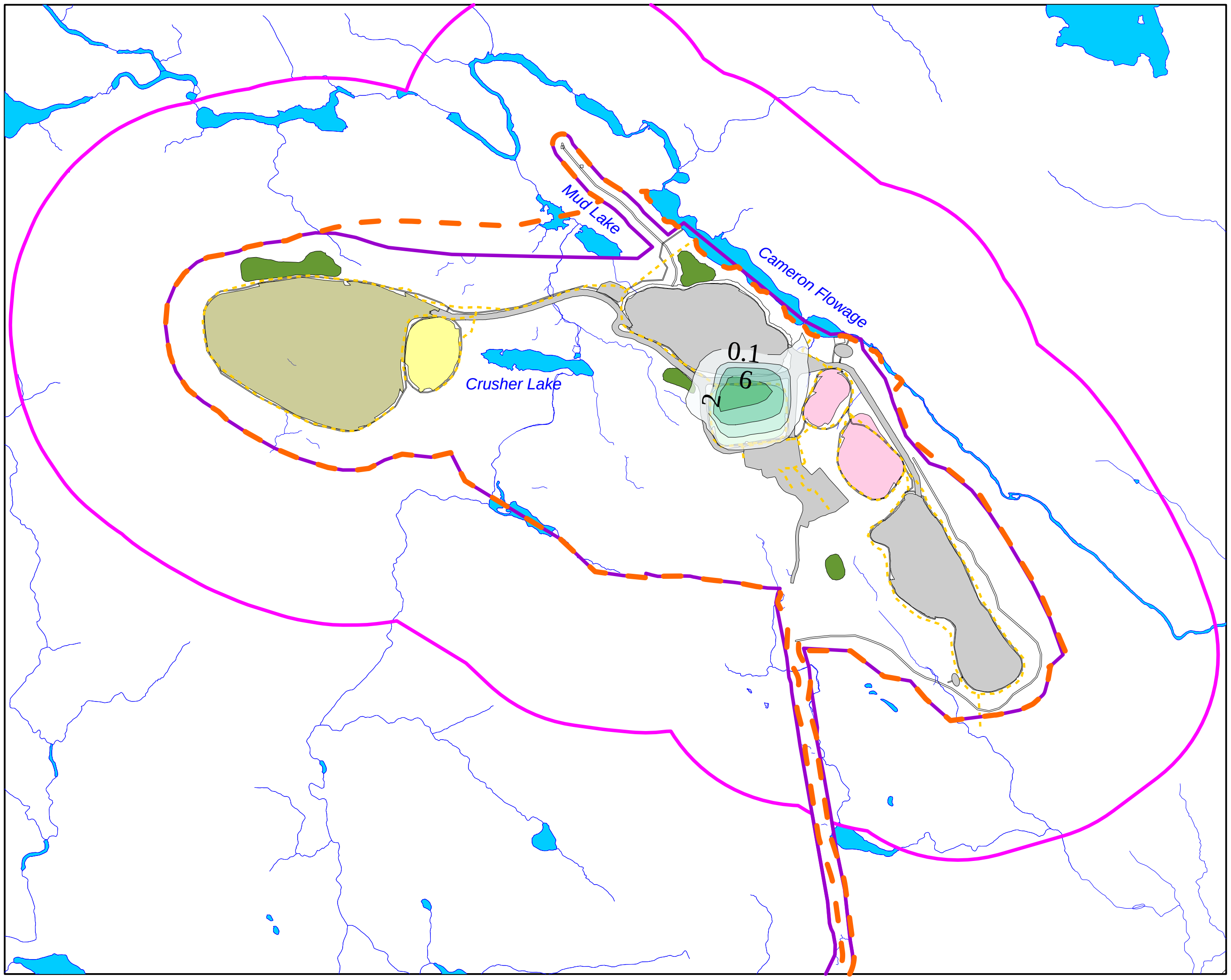
FIGURE CEAA-2-35-98

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.15 - Simulated Cadmium Concentration Versus Potable Criteria - PC - UC - AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 SIMULATED CADMIUM CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The cadmium Tier 2 PSS for groundwater discharge to surface water (>10 m) is 0.1 ug/L.

0 300 600 900m

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SIMULATED CADMIUM CONCENTRATION VERSUS TIER 2 PSS
PC - BASE CASE SOURCE TERMS - BASE CASE CONDITION

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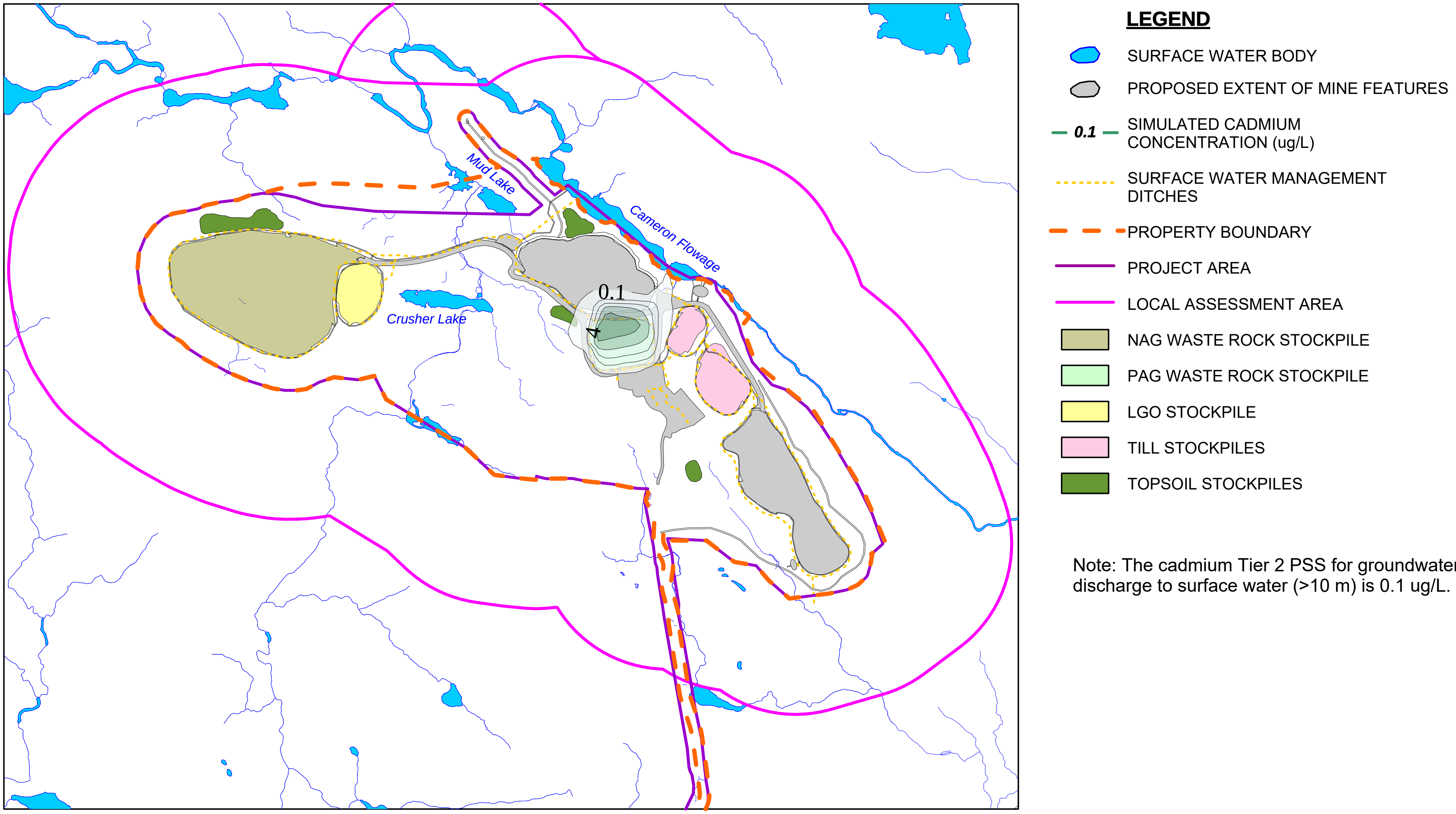
FIGURE CEAA-2-35-99

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.35 - Sim_Cadmium_PSS-PC-BC-AVG.srf



Note: The cadmium Tier 2 PSS for groundwater discharge to surface water (>10 m) is 0.1 ug/L.

0 300 600 900m

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SIMULATED CADMIUM CONCENTRATION VERSUS TIER 2 PSS
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

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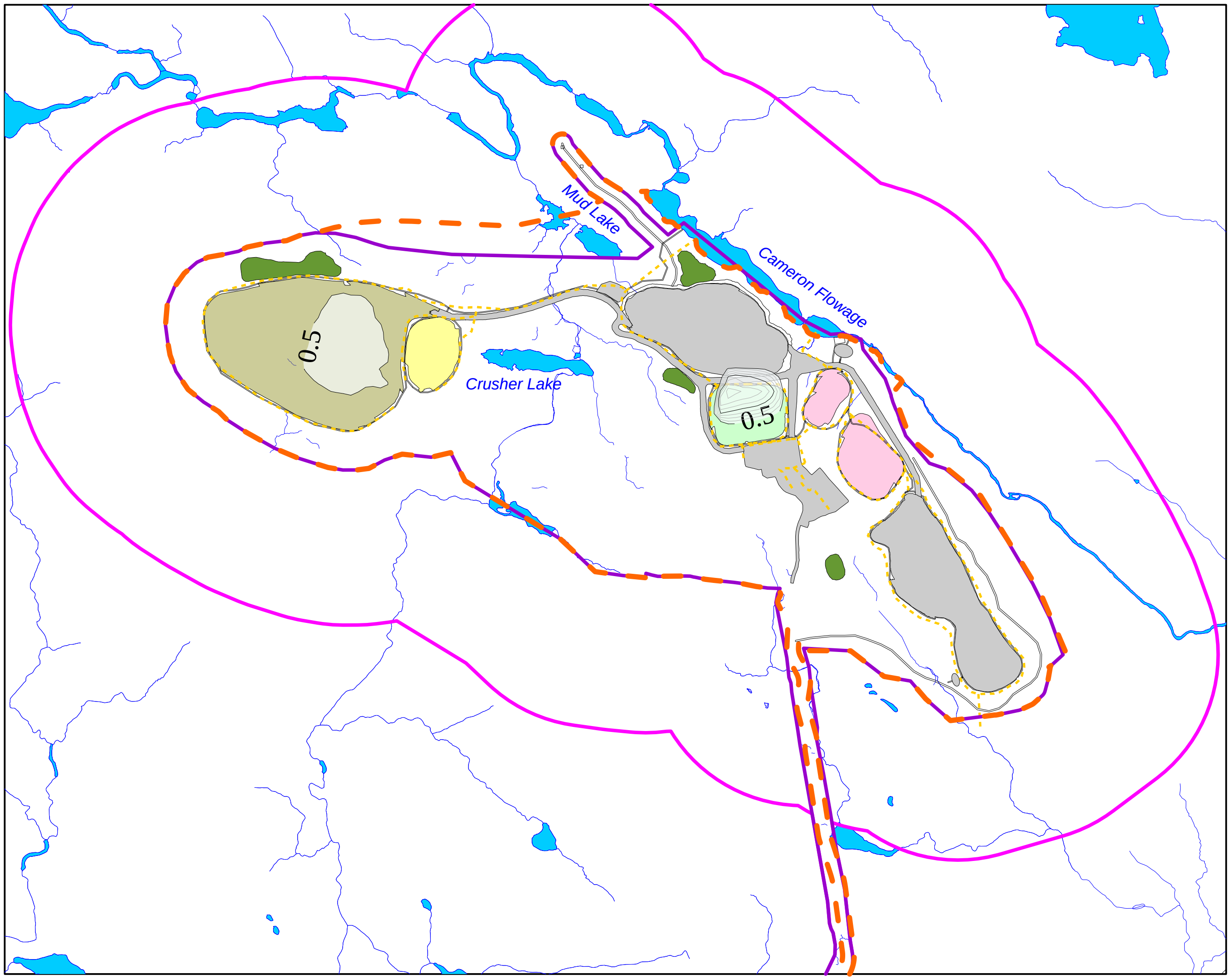
FIGURE CEAA-2-35-100

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.36 - Sim_Cadmium_PSS-PC-UC-AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 — SIMULATED CHROMIUM CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The chromium Tier 1 EQS for potable groundwater is 50 ug/L.

0 300 600 900m

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SIMULATED CHROMIUM CONCENTRATION VERSUS POTABLE CRITERIA
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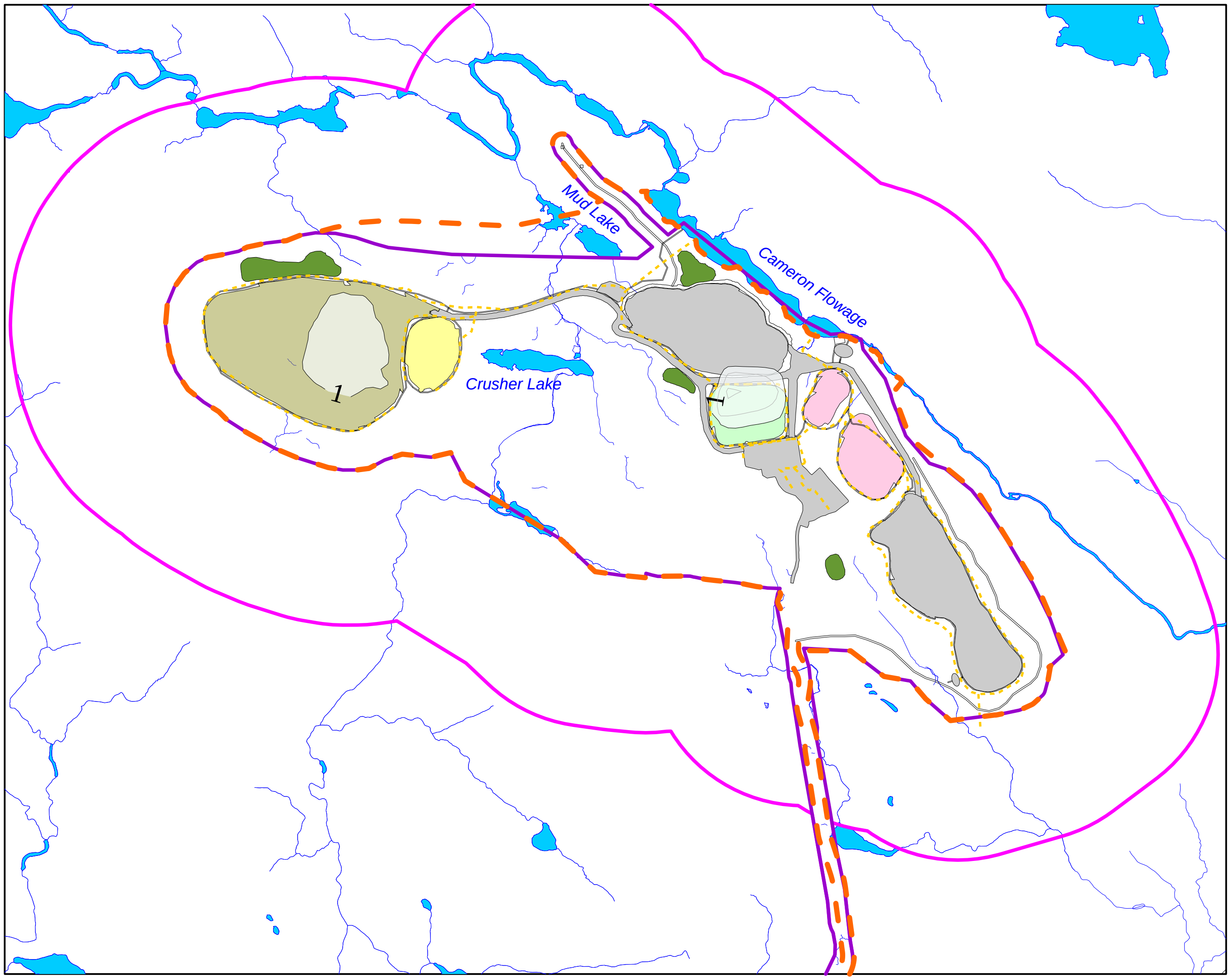
FIGURE CEAA-2-35-101

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.16 - Simulated Cobalt Concentration Versus Potable Criteria - PC - BC - AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 SIMULATED CHROMIUM CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The chromium Tier 1 EQS for potable groundwater is 50 ug/L.

0 300 600 900m

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SIMULATED CHROMIUM CONCENTRATION VERSUS POTABLE CRITERIA
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

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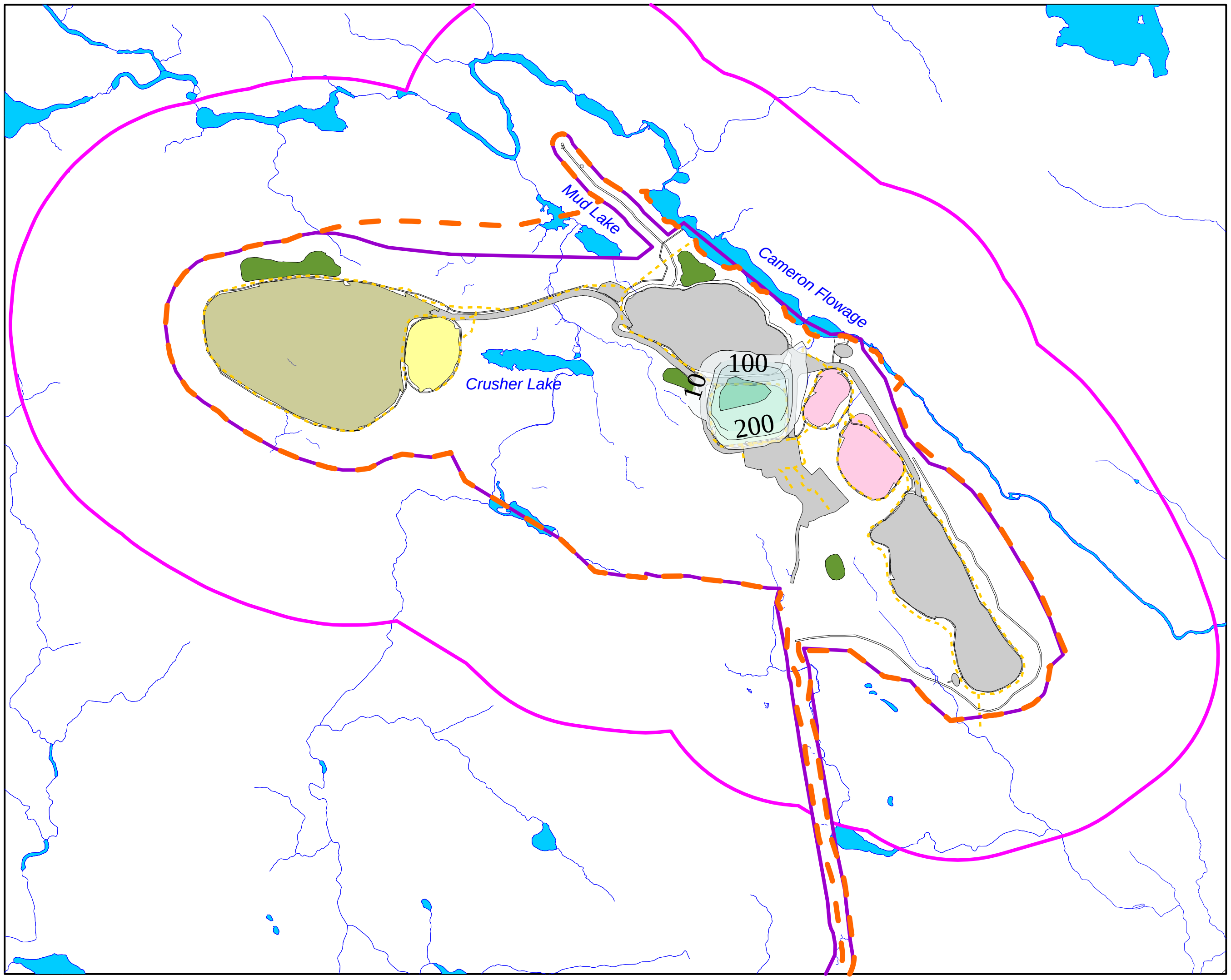
FIGURE CEAA-2-35-102

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\Figure 7.13 - Simulated Arsenic Concentration Versus Potable Criteria - PC - UC - AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 — SIMULATED COBALT CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The cobalt Tier 1 EQS for potable groundwater is 10 ug/L.

0 300 600 900m

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SIMULATED COBALT CONCENTRATION VERSUS POTABLE CRITERIA
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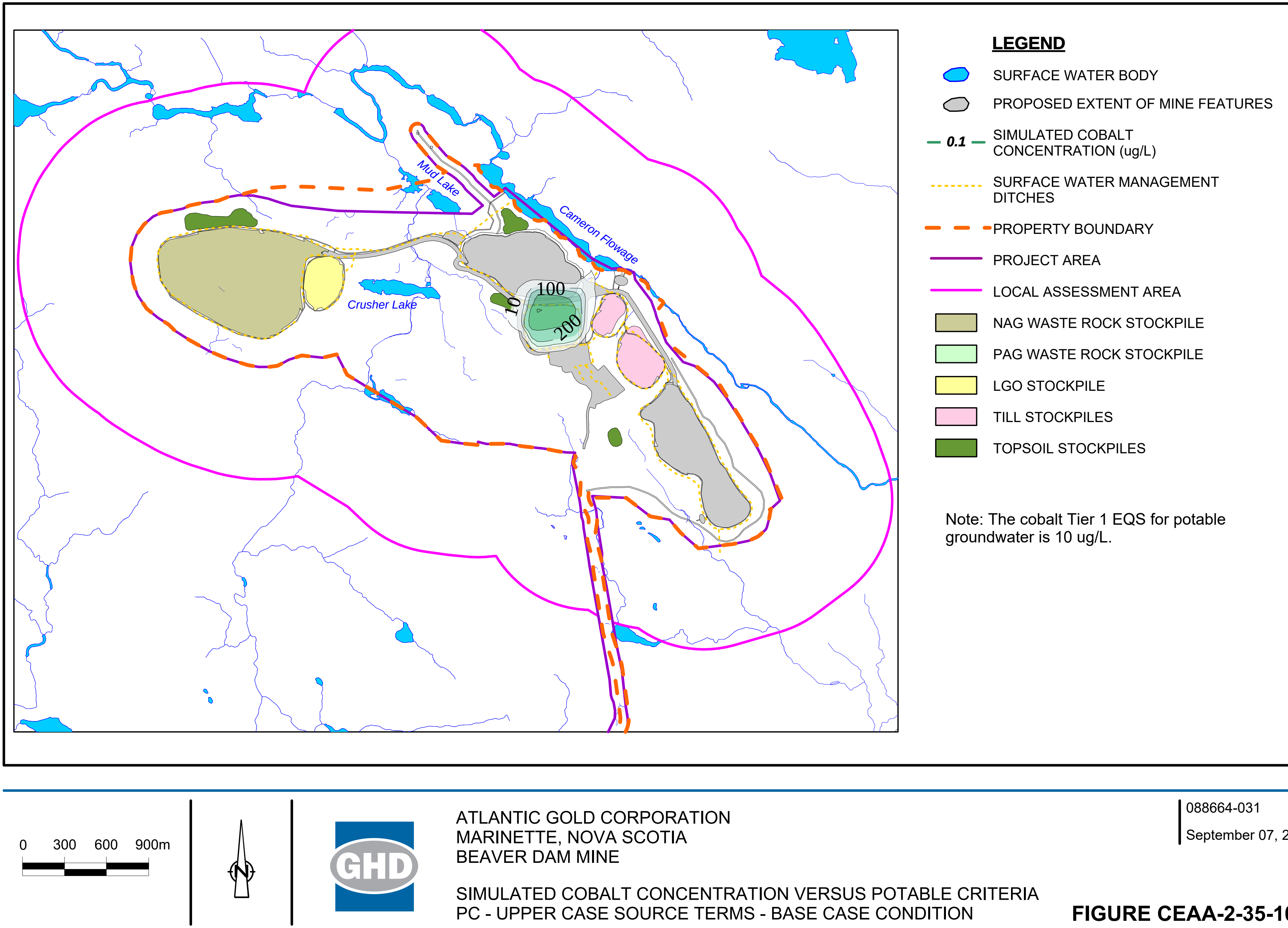
FIGURE CEAA-2-35-103

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.16 - Simulated Cobalt Concentration Versus Potable Criteria - PC - BC - AVG.srf



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MARINETTE, NOVA SCOTIA
BEAVER DAM MINE

SIMULATED COBALT CONCENTRATION VERSUS POTABLE CRITERIA
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

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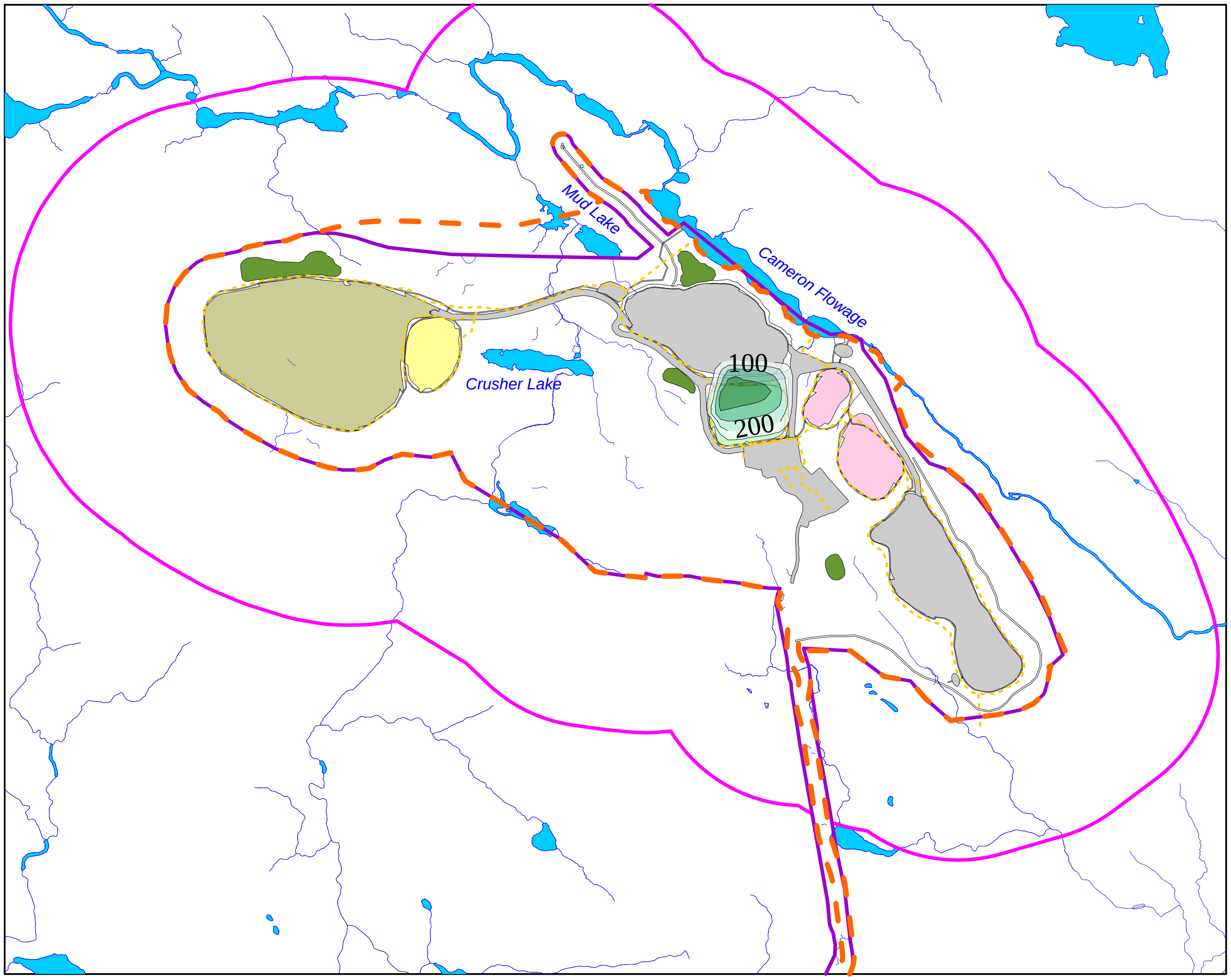
FIGURE CEAA-2-35-104

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.17 - Simulated Cobalt Concentration Versus Potable Criteria - PC - UC - AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 SIMULATED COBALT CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The cobalt Tier 2 PSS for groundwater discharge to surface water (>10 m) is 100 ug/L.

0 300 600 900m

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SIMULATED COBALT CONCENTRATION VERSUS TIER 2 PSS
PC - BASE CASE SOURCE TERMS - BASE CASE CONDITION

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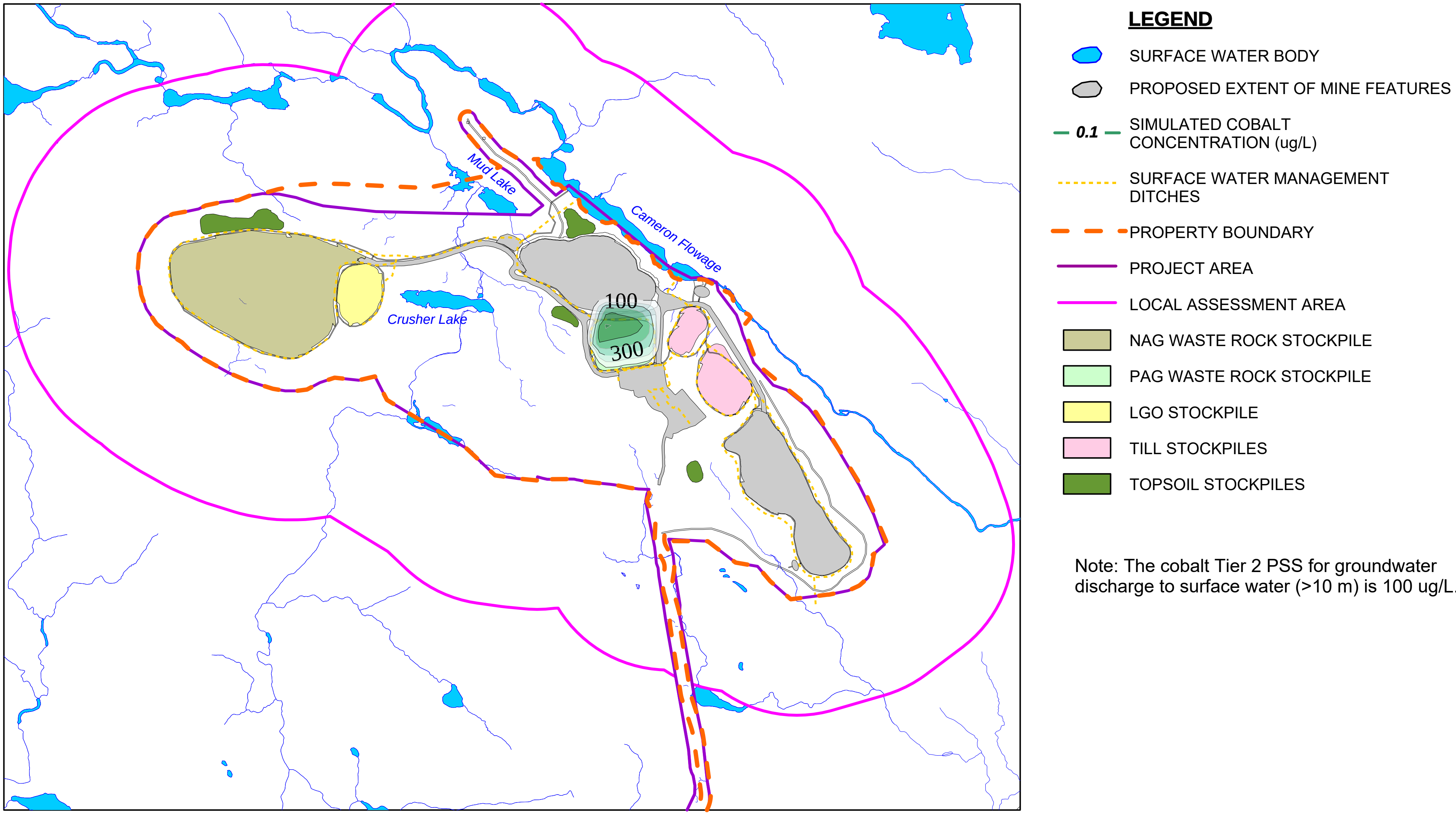
FIGURE CEAA-2-35-105

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.37 - Sim_Cobalt_PSS-PC-BC-AVG.srf



Note: The cobalt Tier 2 PSS for groundwater discharge to surface water (>10 m) is 100 ug/L.

0 300 600 900m

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SIMULATED COBALT CONCENTRATION VERSUS TIER 2 PSS
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

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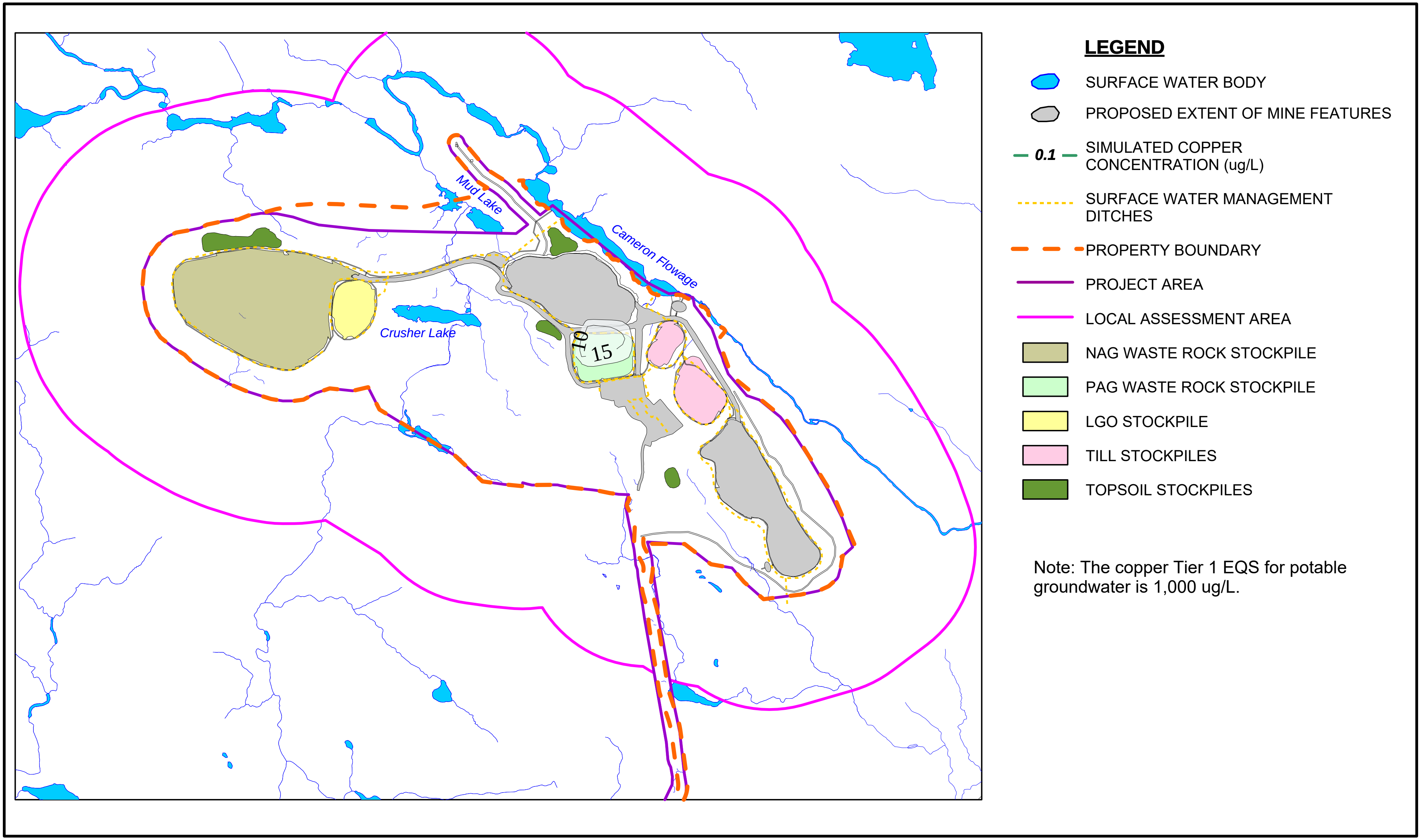
FIGURE CEAA-2-35-106

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.38 - Sim_Cobalt_PSS-PC-UC-AVG.srf



Note: The copper Tier 1 EQS for potable groundwater is 1,000 ug/L.

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SIMULATED COPPER CONCENTRATION VERSUS POTABLE CRITERIA
PC - BASE CASE SOURCE TERMS - BASE CASE CONDITION

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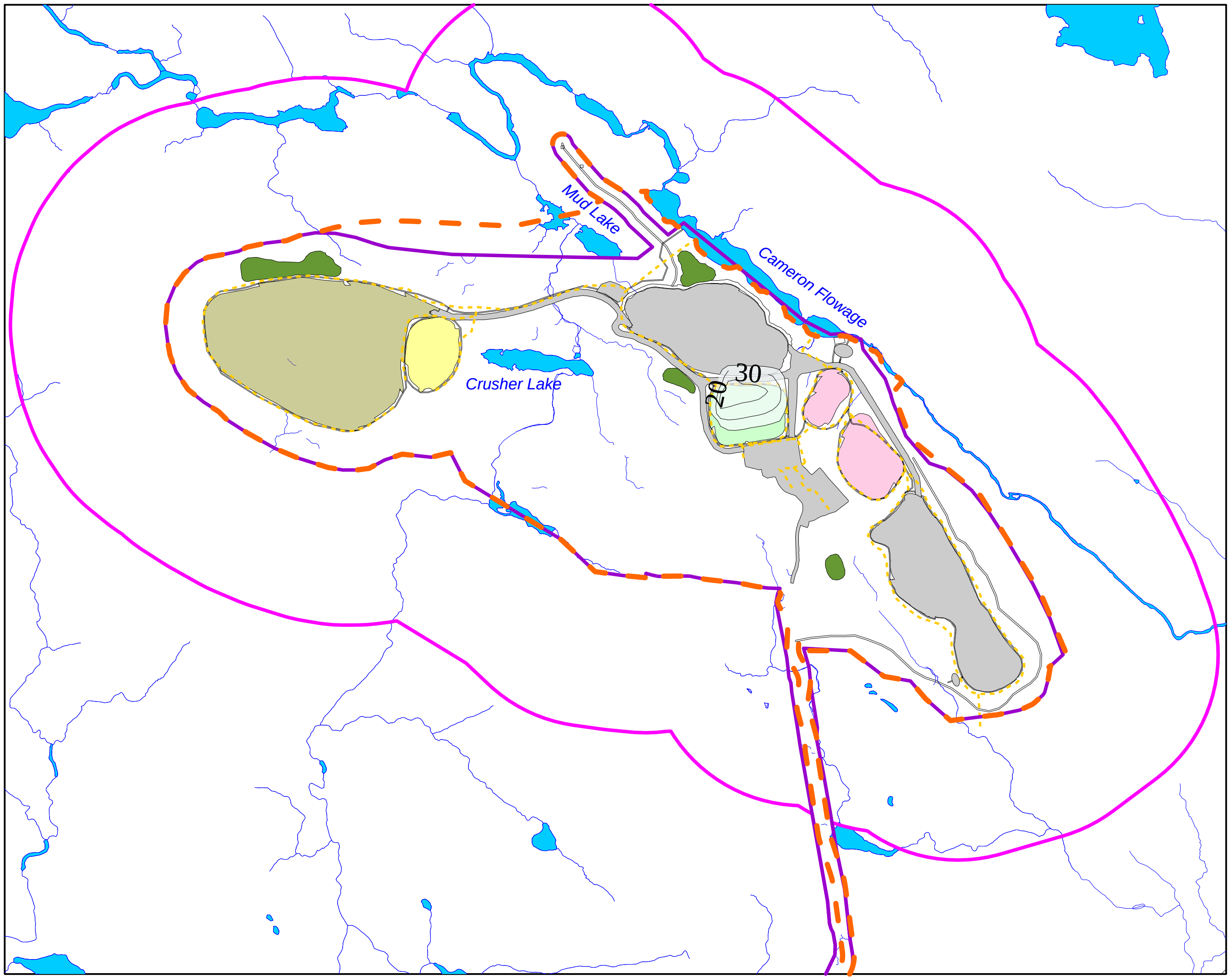
FIGURE CEAA-2-35-107

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.16 - Simulated Cobalt Concentration Versus Potable Criteria - PC - BC - AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 SIMULATED COPPER CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The copper Tier 1 EQS for potable groundwater is 1,000 ug/L.

0 300 600 900m

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BEAVER DAM MINE

SIMULATED COPPER CONCENTRATION VERSUS POTABLE CRITERIA
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

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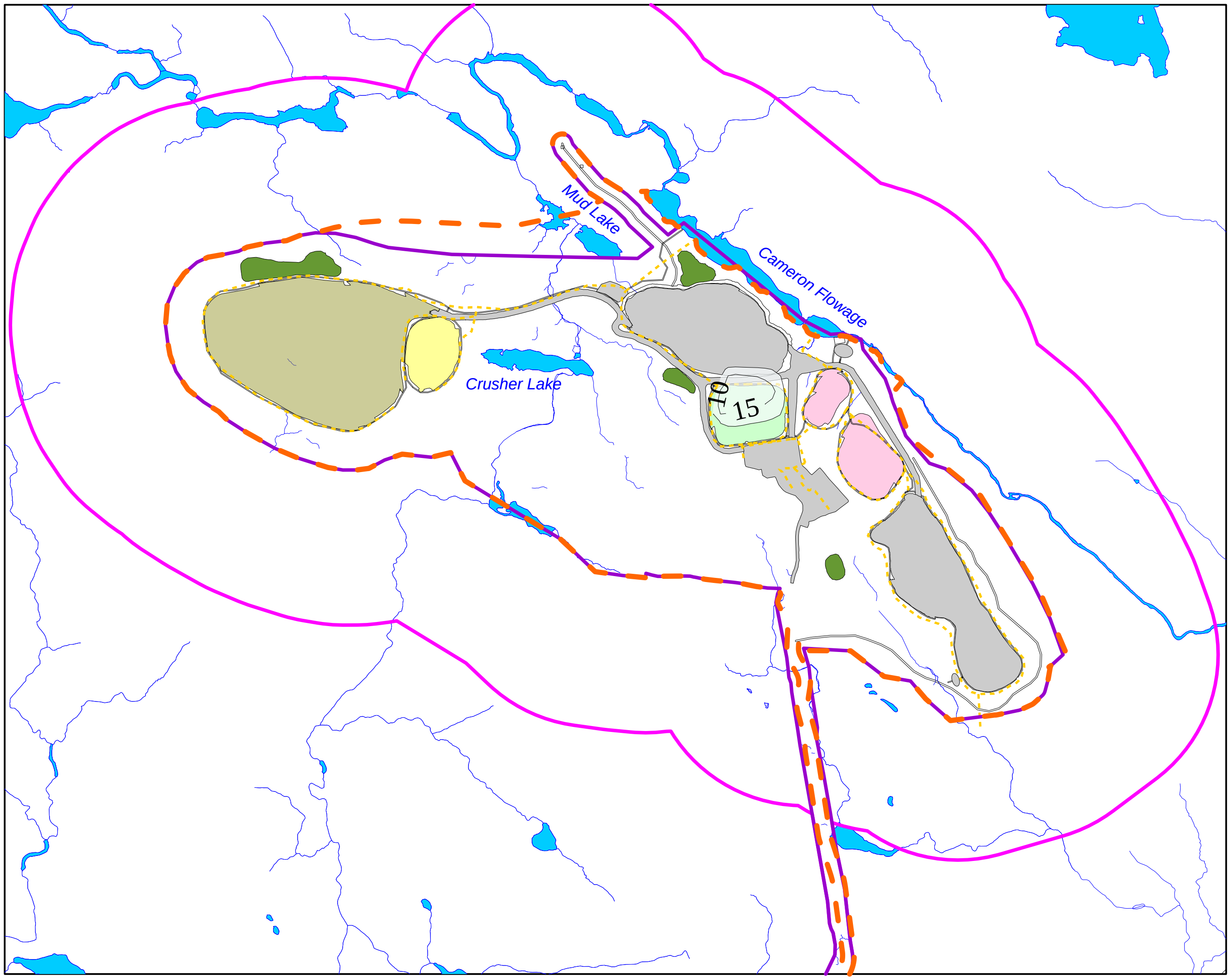
FIGURE CEAA-2-35-108

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\Figure 7.13 - Simulated Arsenic Concentration Versus Potable Criteria - PC - UC - AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 — SIMULATED COPPER CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The copper Tier 2 PSS for groundwater discharge to surface water (>10 m) is 20 ug/L.

0 300 600 900m

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SIMULATED COPPER CONCENTRATION VERSUS TIER 2 PSS
PC - BASE CASE SOURCE TERMS - BASE CASE CONDITION

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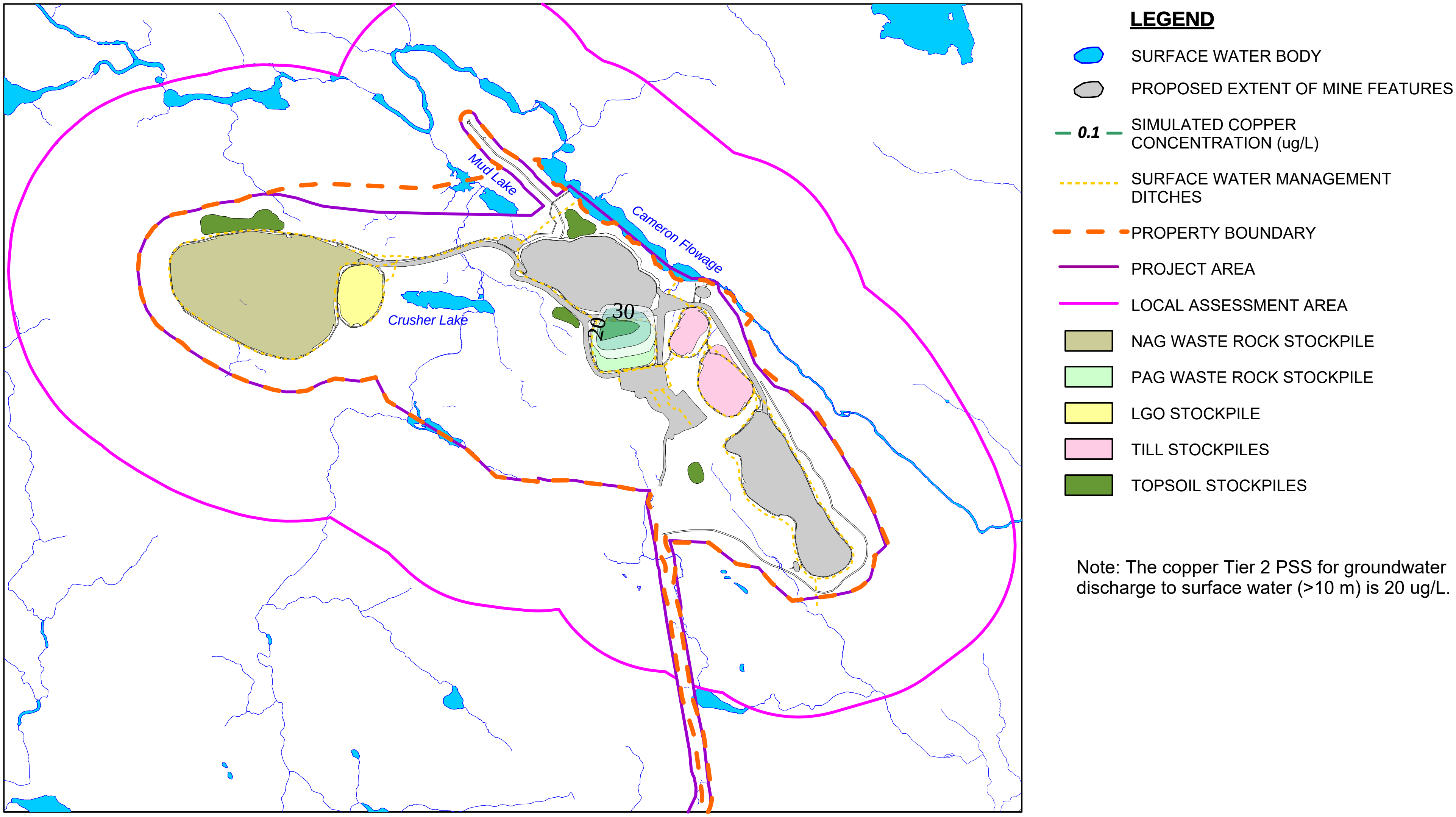
FIGURE CEAA-2-35-109

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.45 - Sim_Lead_PSS-PC-BC-AVG.srf



Note: The copper Tier 2 PSS for groundwater discharge to surface water (>10 m) is 20 ug/L.

0 300 600 900m

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SIMULATED COPPER CONCENTRATION VERSUS TIER 2 PSS
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

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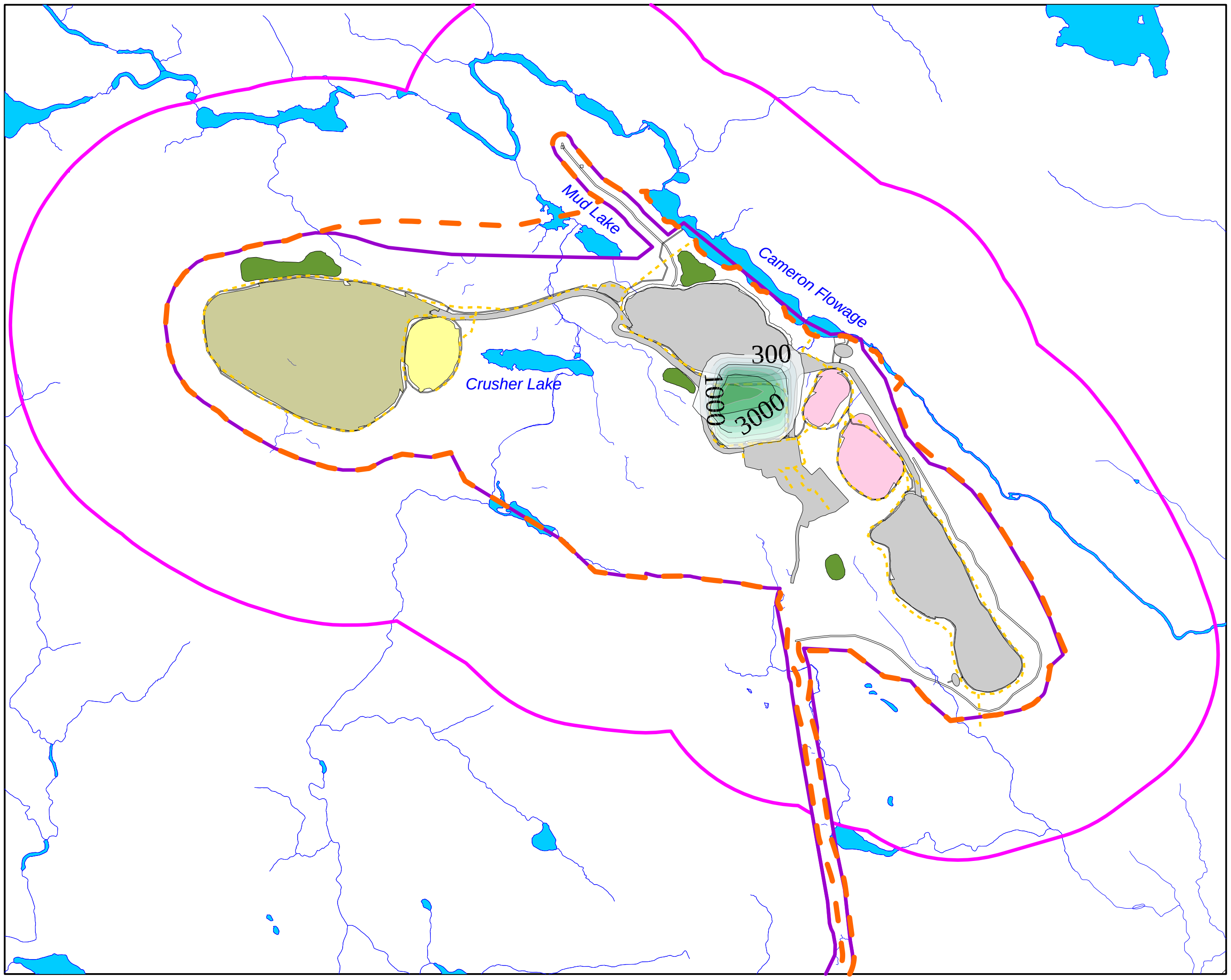
FIGURE CEAA-2-35-110

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.40 - Sim_Copper_PSS-PC-UC-AVG.srf



LEGEND

SURFACE WATER BODY

PROPOSED EXTENT OF MINE FEATURES

0.1 SIMULATED IRON CONCENTRATION (ug/L)

SURFACE WATER MANAGEMENT DITCHES

PROPERTY BOUNDARY

PROJECT AREA

LOCAL ASSESSMENT AREA

NAG WASTE ROCK STOCKPILE

PAG WASTE ROCK STOCKPILE

LGO STOCKPILE

TILL STOCKPILES

TOPSOIL STOCKPILES

Note: The iron Tier 1 EQS for potable groundwater is 300 ug/L.

0 300 600 900m

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BEAVER DAM MINE

SIMULATED IRON CONCENTRATION VERSUS POTABLE CRITERIA
PC - BASE CASE SOURCE TERMS - BASE CASE CONDITION

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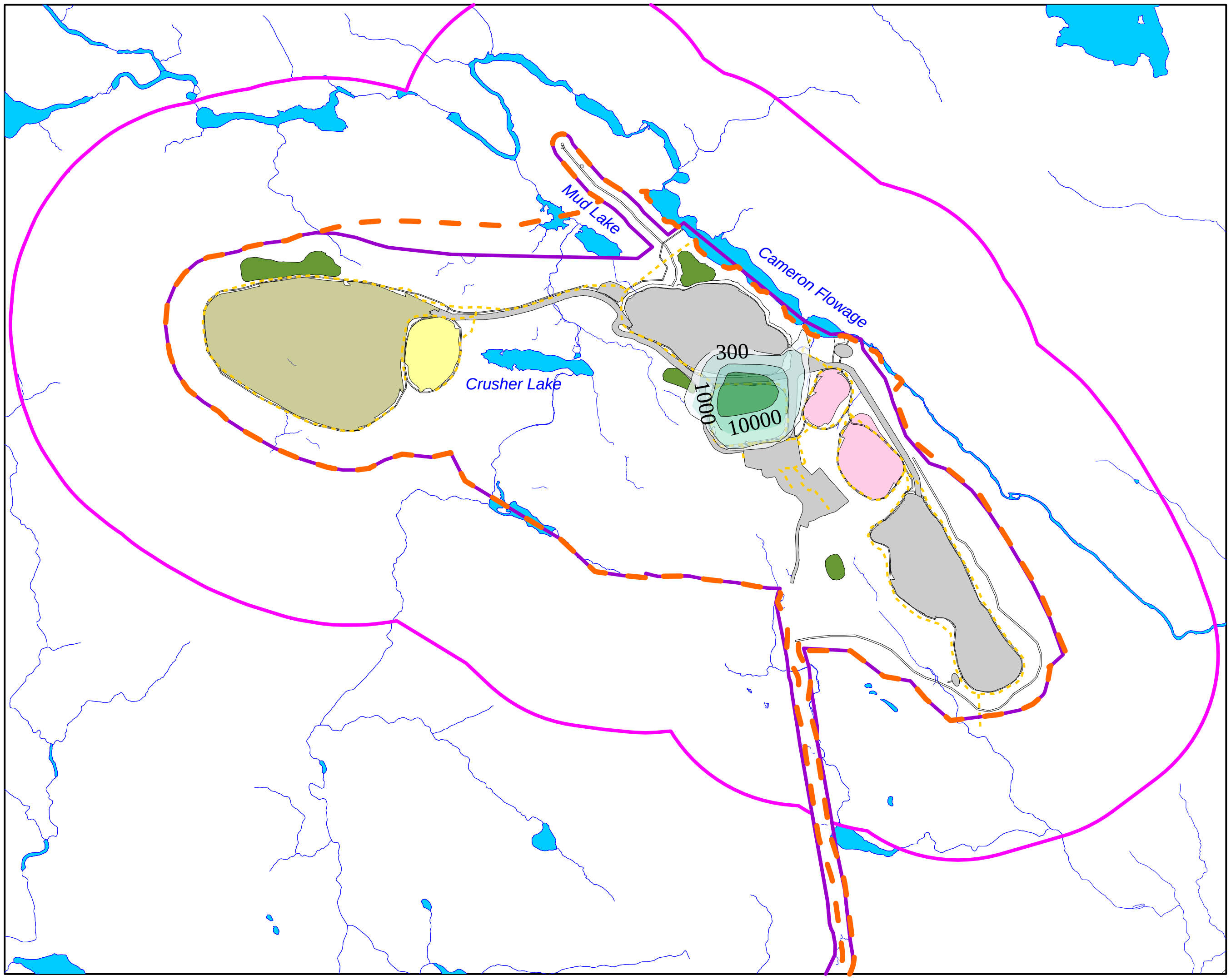
FIGURE CEAA-2-35-111

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.16 - Simulated Cobalt Concentration Versus Potable Criteria - PC - BC - AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 — SIMULATED IRON CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The iron Tier 1 EQS for potable groundwater is 300 ug/L.

0 300 600 900m

N

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BEAVER DAM MINE

SIMULATED IRON CONCENTRATION VERSUS POTABLE CRITERIA
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

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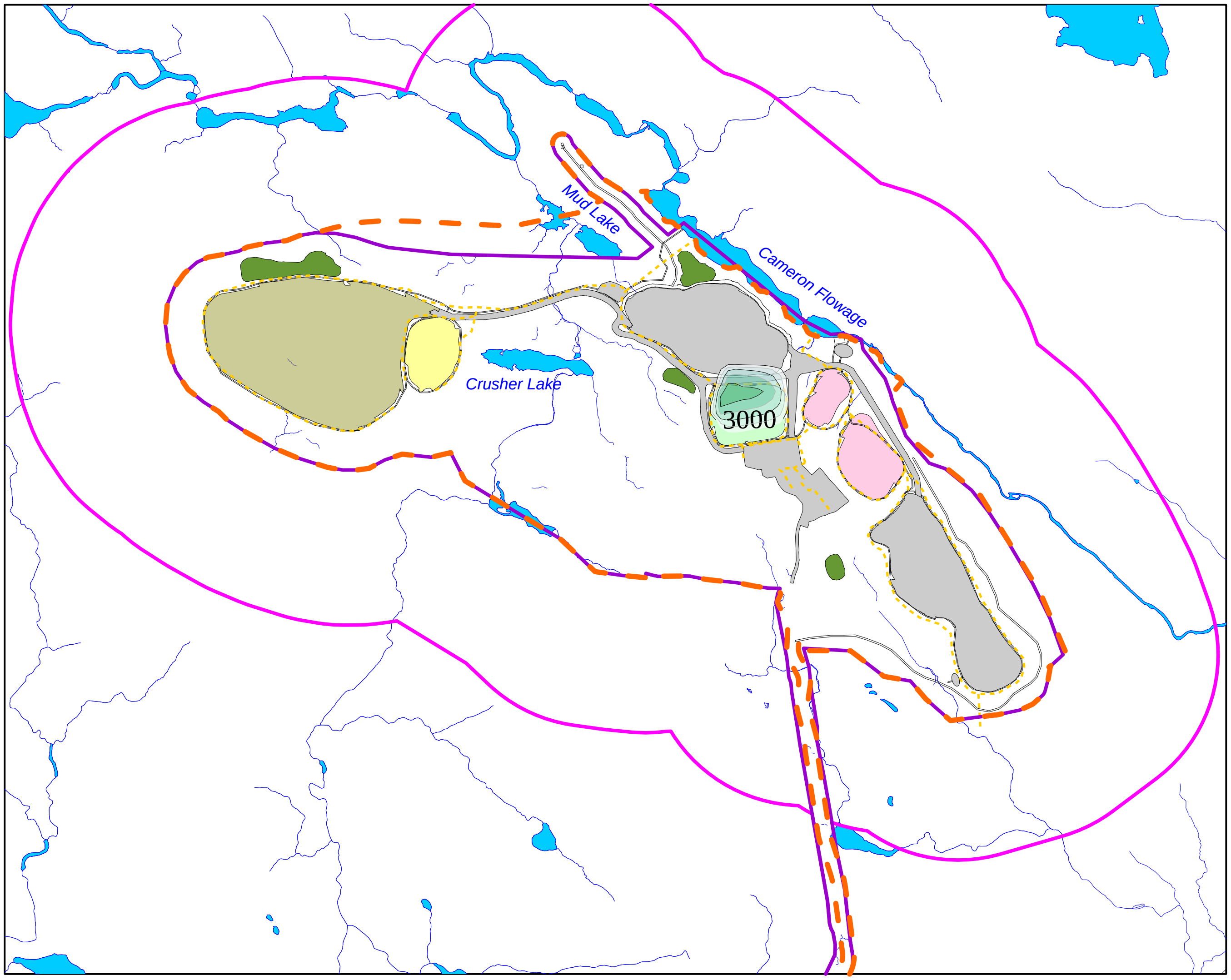
FIGURE CEAA-2-35-112

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\Figure 7.13 - Simulated Arsenic Concentration Versus Potable Criteria - PC - UC - AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 SIMULATED IRON CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The iron Tier 2 PSS for groundwater discharge to surface water (>10 m) is 3,000 ug/L.

0 300 600 900m

N

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BEAVER DAM MINE

SIMULATED IRON CONCENTRATION VERSUS TIER 2 PSS
PC - BASE CASE SOURCE TERMS - BASE CASE CONDITION

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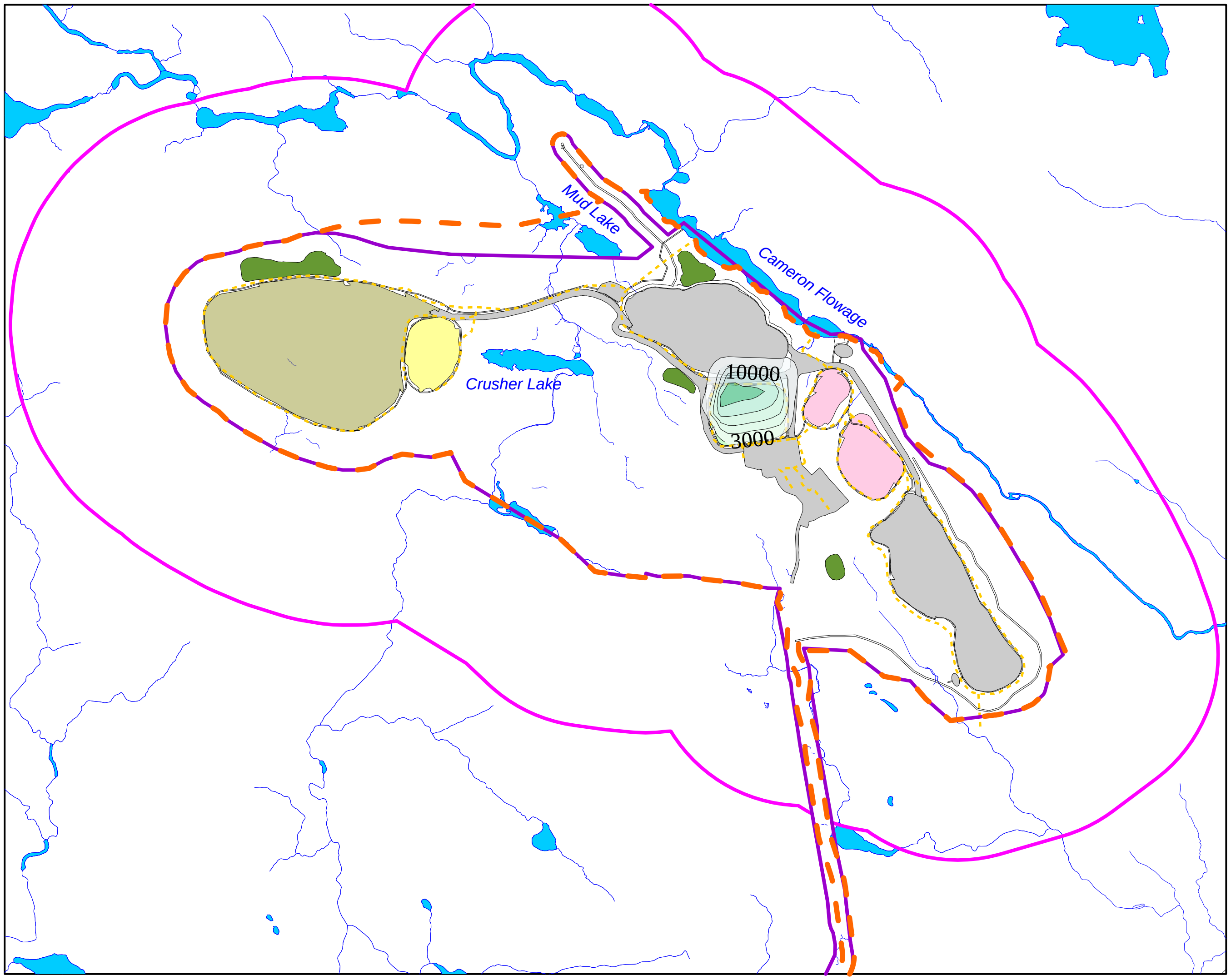
FIGURE CEAA-2-35-113

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.41 - Sim_Iron_PSS-PC-BC-AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 SIMULATED IRON CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The iron Tier 2 PSS for groundwater discharge to surface water (>10 m) is 3,000 ug/L.

0 300 600 900m

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SIMULATED IRON CONCENTRATION VERSUS TIER 2 PSS
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

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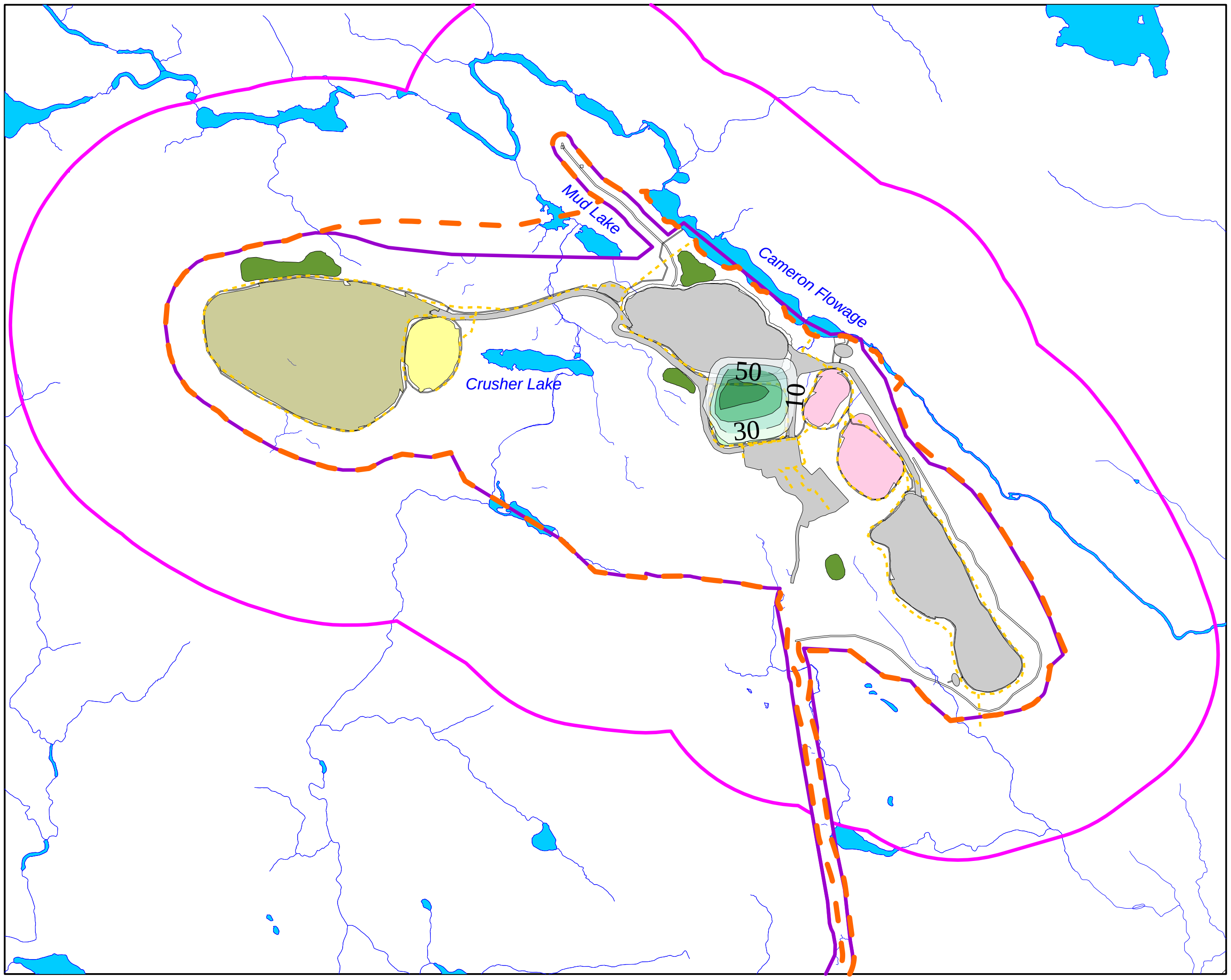
FIGURE CEAA-2-35-114

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.42 - Sim_Iron_PSS-PC-UC-AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 SIMULATED LEAD CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The lead Tier 1 EQS for potable groundwater is 10 ug/L.

0 300 600 900m

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SIMULATED LEAD CONCENTRATION VERSUS POTABLE CRITERIA
PC - BASE CASE SOURCE TERMS - BASE CASE CONDITION

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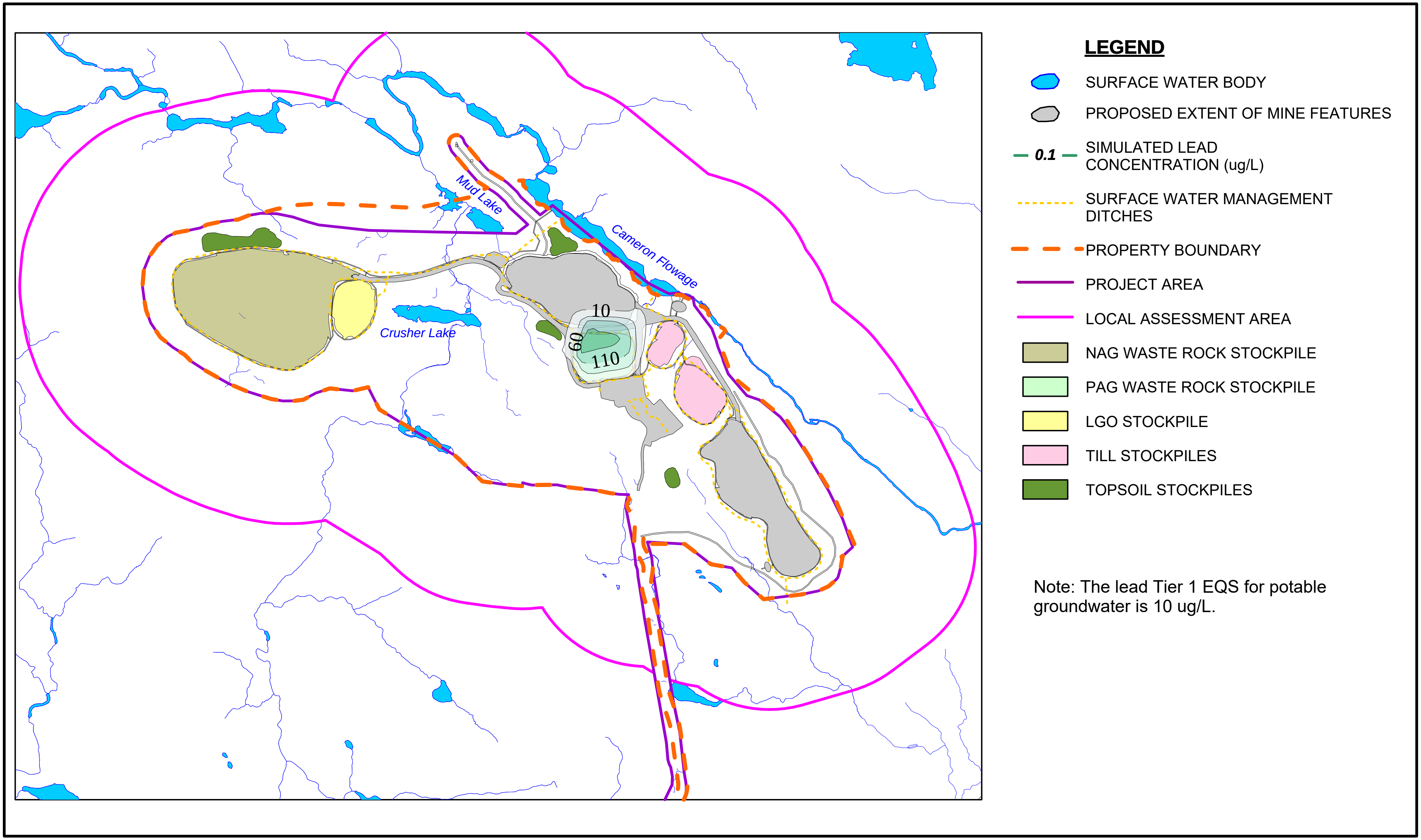
FIGURE CEAA-2-35-115

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.22 - Simulated Lead Concentration Versus Potable Criteria - PC - BC - AVG.srf



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BEAVER DAM MINE

SIMULATED LEAD CONCENTRATION VERSUS POTABLE CRITERIA
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

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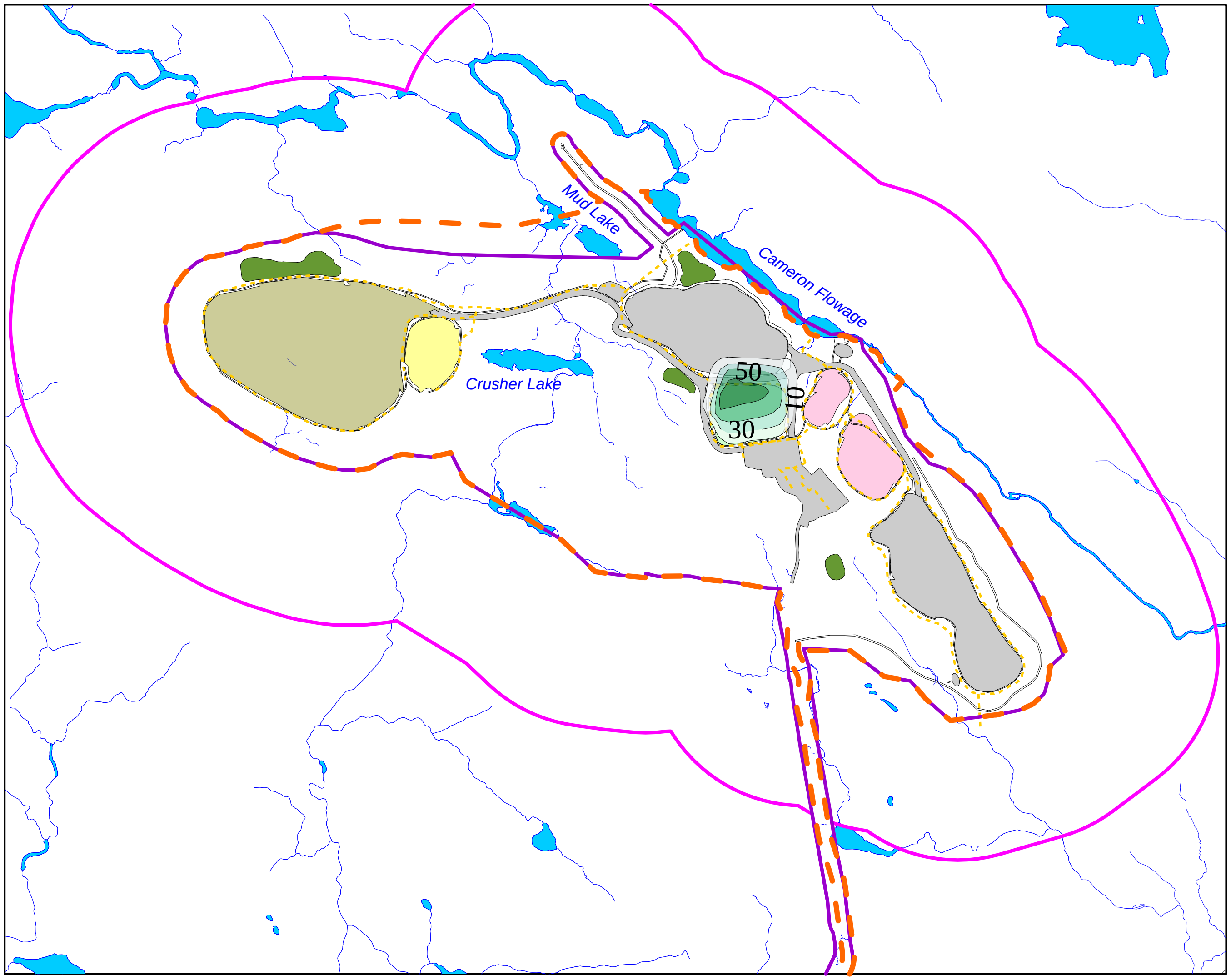
FIGURE CEAA-2-35-116

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.23 - Simulated Lead Concentration Versus Potable Criteria - PC - UC - AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 — SIMULATED LEAD CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The lead Tier 2 PSS for groundwater discharge to surface water (>10 m) is 10 ug/L.

0 300 600 900m

N

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SIMULATED LEAD CONCENTRATION VERSUS TIER 2 PSS
PC - BASE CASE SOURCE TERMS - BASE CASE CONDITION

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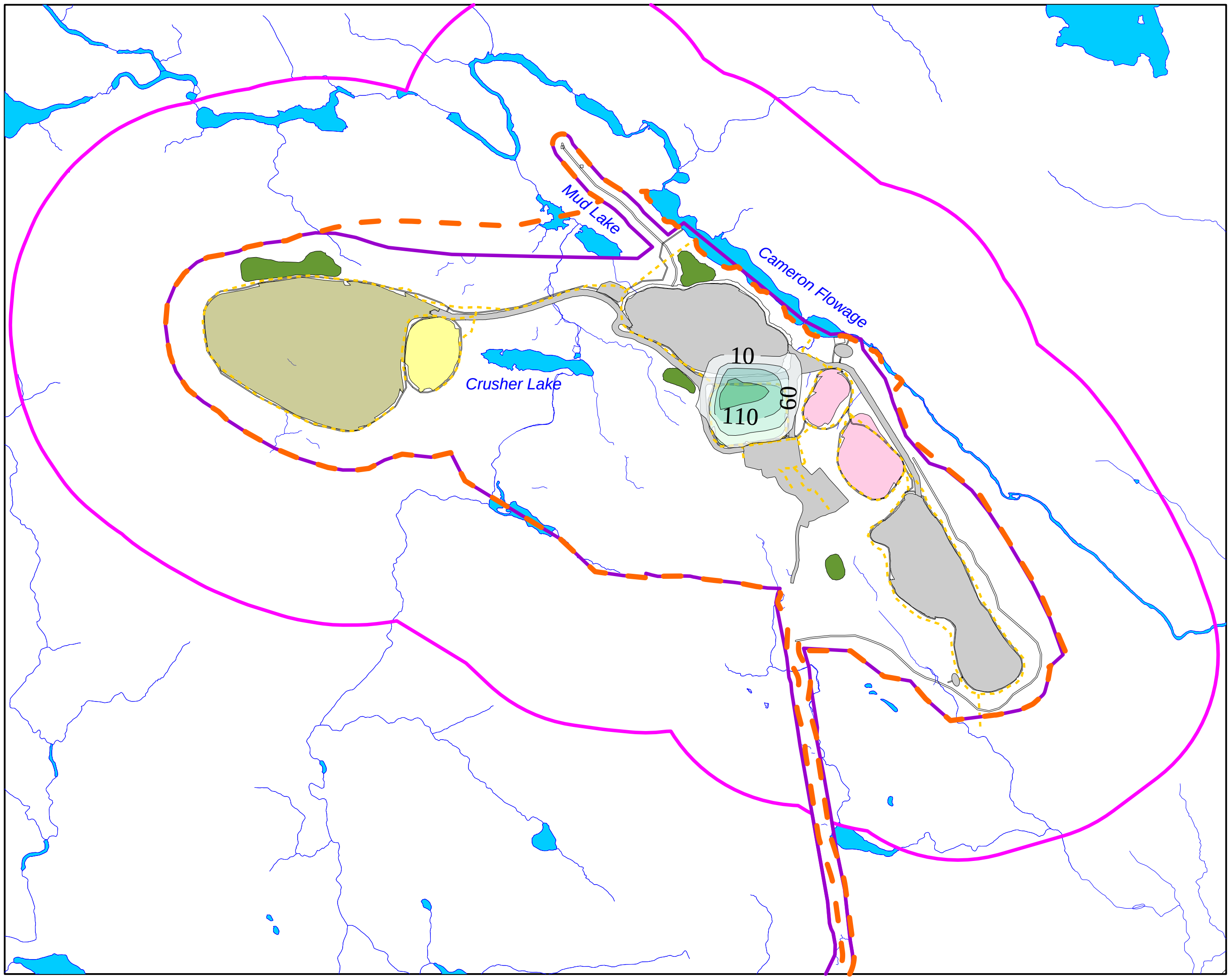
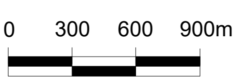
FIGURE CEAA-2-35-117

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.45 - Sim_Lead_PSS-PC-BC-AVG.srf



Note: The lead Tier 2 PSS for groundwater discharge to surface water (>10 m) is 10 ug/L.



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SIMULATED LEAD CONCENTRATION VERSUS TIER 2 PSS
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

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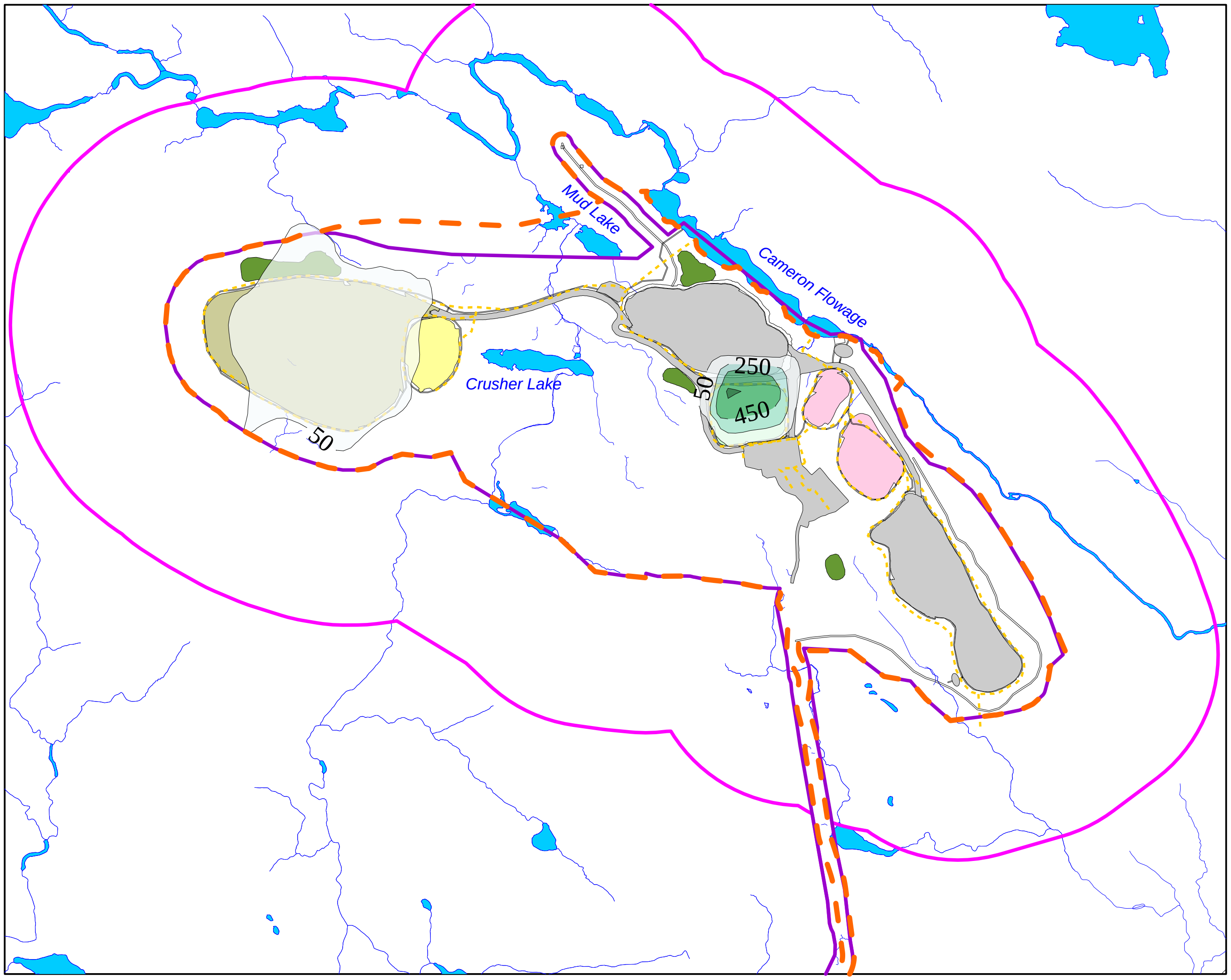
FIGURE CEAA-2-35-118

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.45 - Sim_Lead_PSS-PC-BC-AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 — SIMULATED MANGANESE CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The manganese Tier 1 EQS for potable groundwater is 50 ug/L.

0 300 600 900m

N

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SIMULATED MANGANESE CONCENTRATION VERSUS POTABLE CRITERIA
PC - BASE CASE SOURCE TERMS - BASE CASE CONDITION

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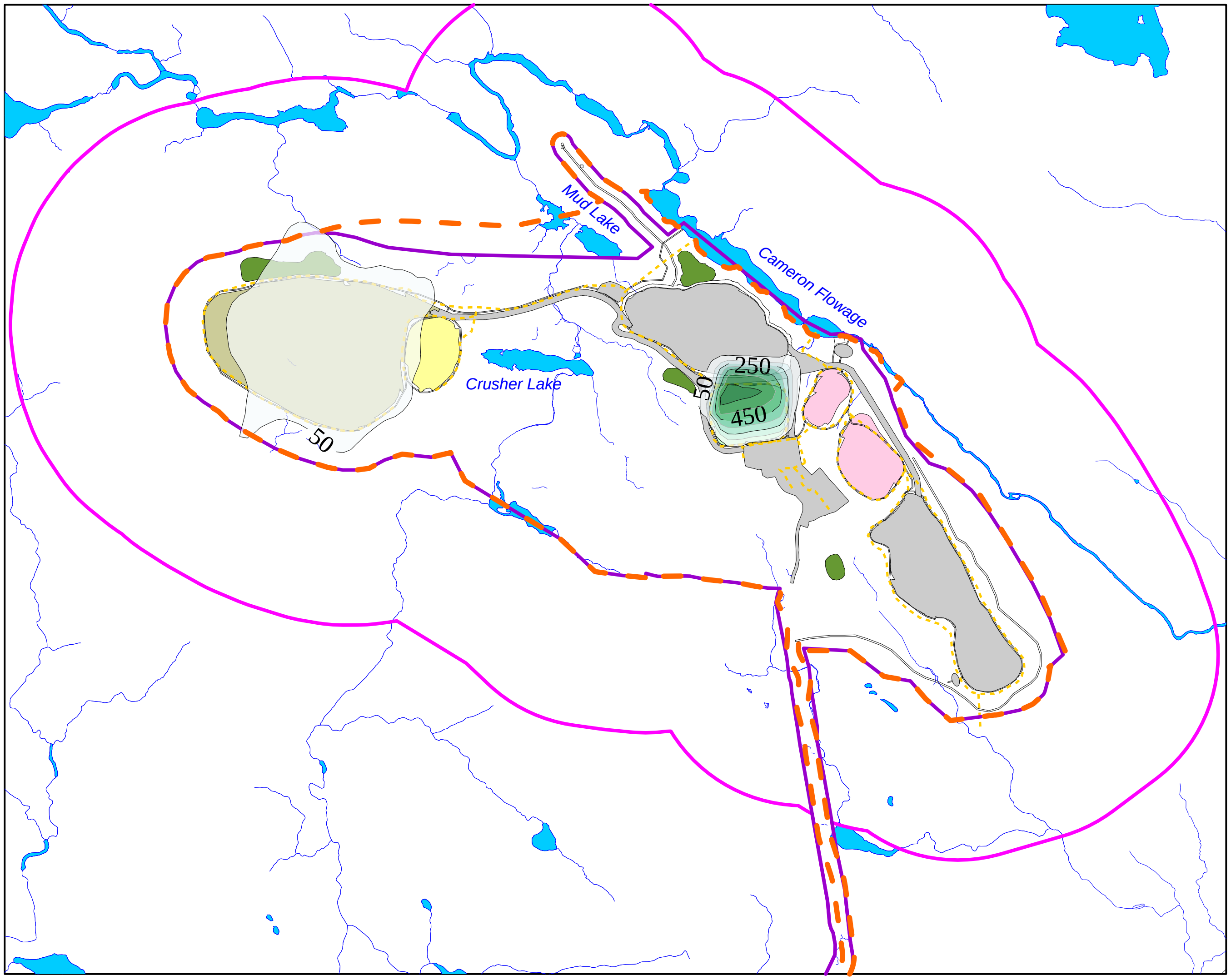
FIGURE CEAA-2-35-119

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.18 - Simulated Manganese Concentration Versus Potable Criteria - PC - BC - AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 SIMULATED MANGANESE CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The manganese Tier 1 EQS for potable groundwater is 50 ug/L.

0 300 600 900m

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SIMULATED MANGANESE CONCENTRATION VERSUS POTABLE CRITERIA
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

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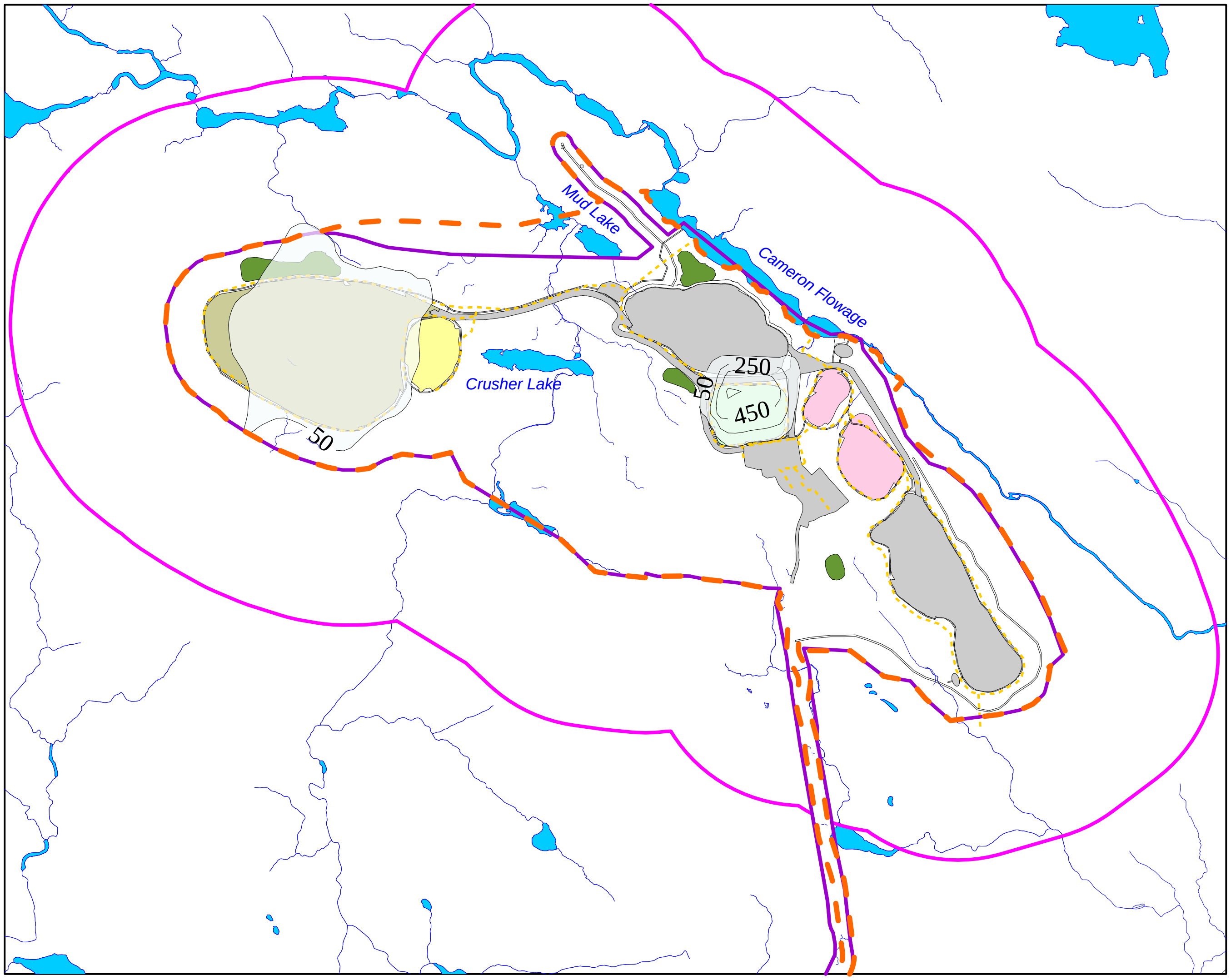
FIGURE CEAA-2-35-120

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.19 - Simulated Manganese Concentration Versus Potable Criteria - PC - UC - AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 SIMULATED MANGANESE CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The manganese Tier 2 PSS for groundwater discharge to surface water (>10 m) is 8,200 ug/L.

0 300 600 900m

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SIMULATED MANGANESE CONCENTRATION VERSUS TIER 2 PSS
PC - BASE CASE SOURCE TERMS - BASE CASE CONDITION

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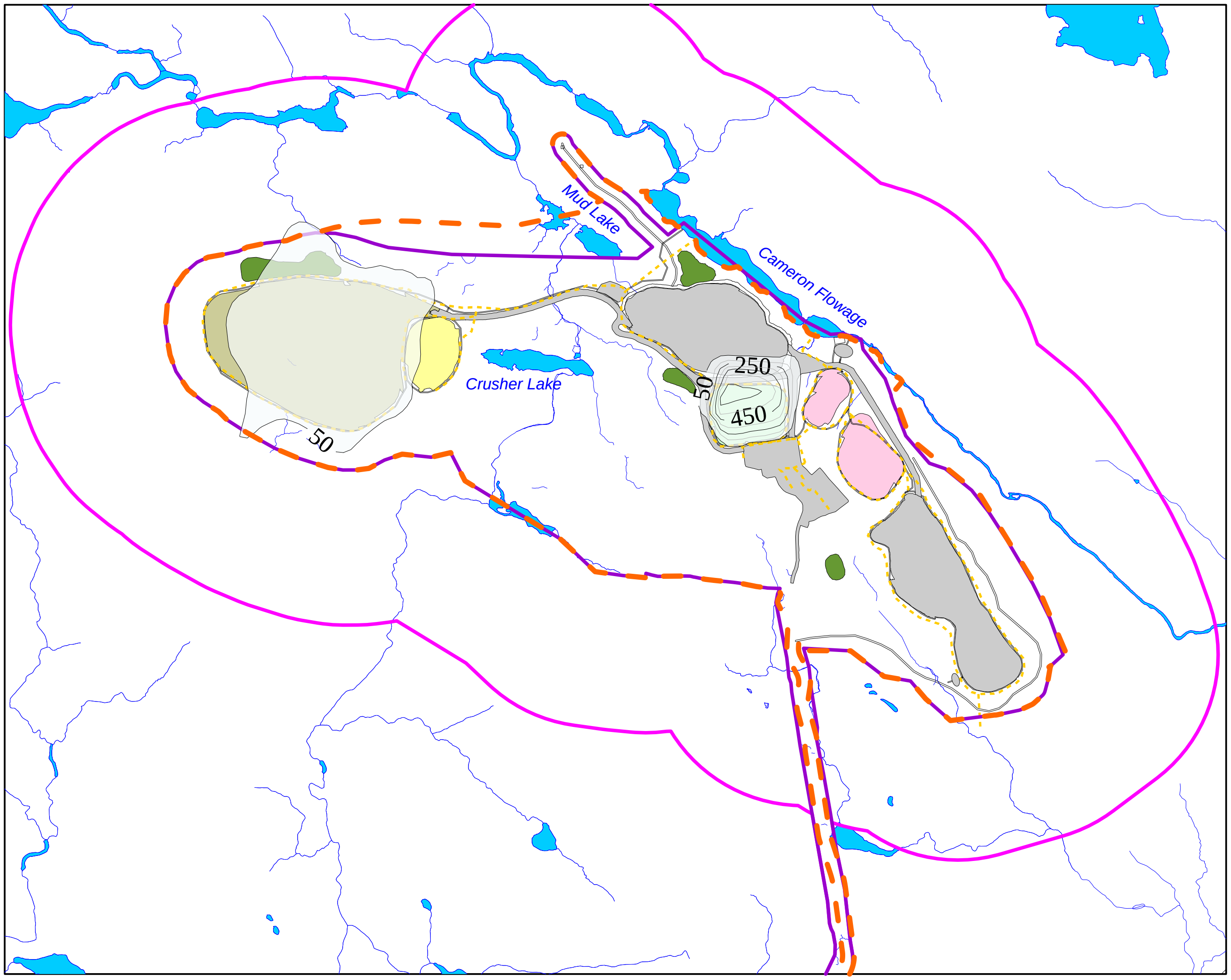
FIGURE CEAA-2-35-121

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.45 - Sim_Lead_PSS-PC-BC-AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 SIMULATED MANGANESE CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The manganese Tier 2 PSS for groundwater discharge to surface water (>10 m) is 8,200 ug/L.

0 300 600 900m

N

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SIMULATED MANGANESE CONCENTRATION VERSUS TIER 2 PSS
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

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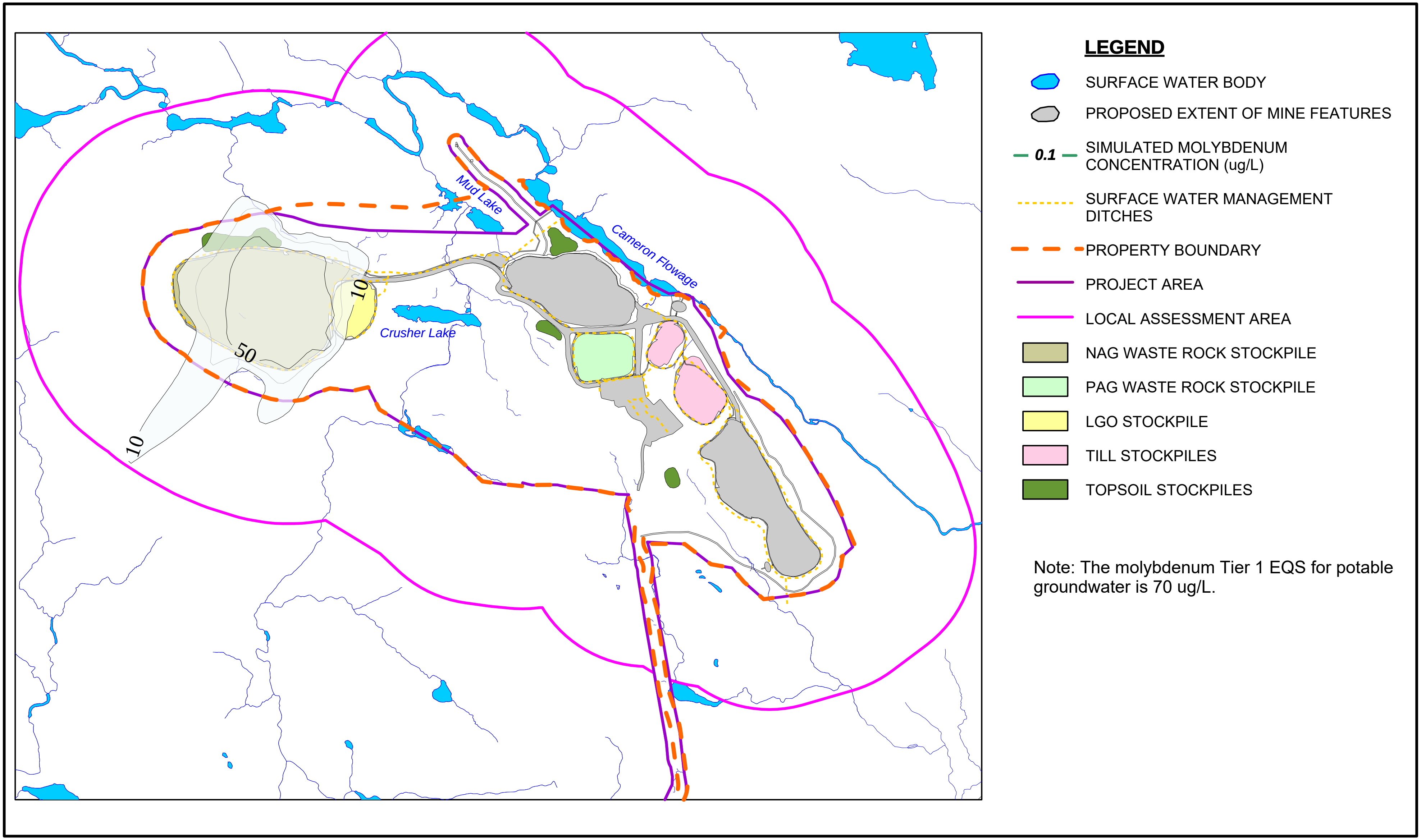
FIGURE CEAA-2-35-122

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.49 - Sim_Zinc_PSS-PC-UC-AVG.srf



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SIMULATED MOLYBDENUM CONCENTRATION VERSUS POTABLE CRITERIA
PC - BASE CASE SOURCE TERMS - BASE CASE CONDITION

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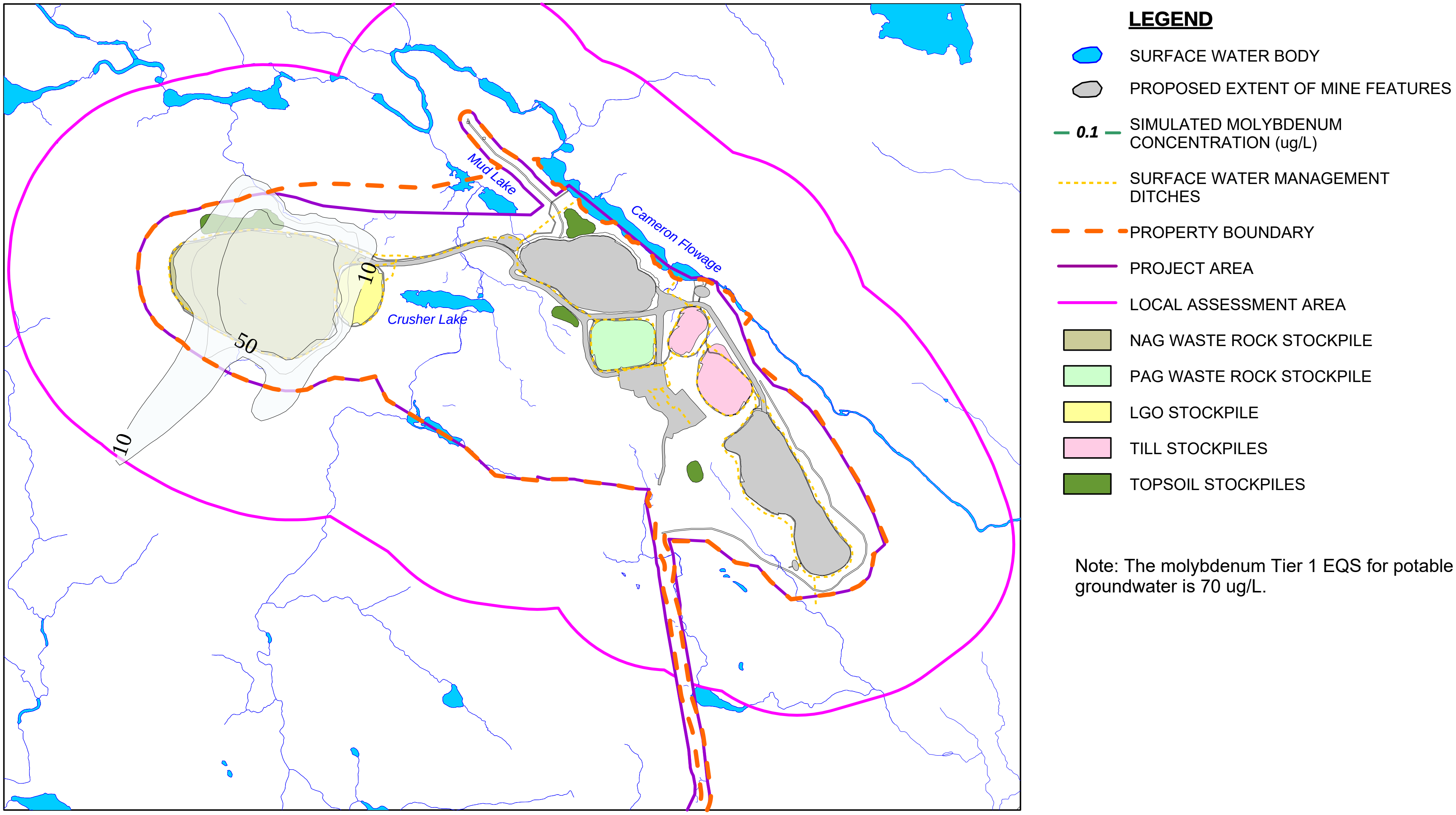
FIGURE CEAA-2-35-123

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.16 - Simulated Cobalt Concentration Versus Potable Criteria - PC - BC - AVG.srf



Note: The molybdenum Tier 1 EQS for potable groundwater is 70 ug/L.

0 300 600 900m

N

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SIMULATED MOLYBDENUM CONCENTRATION VERSUS POTABLE CRITERIA
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

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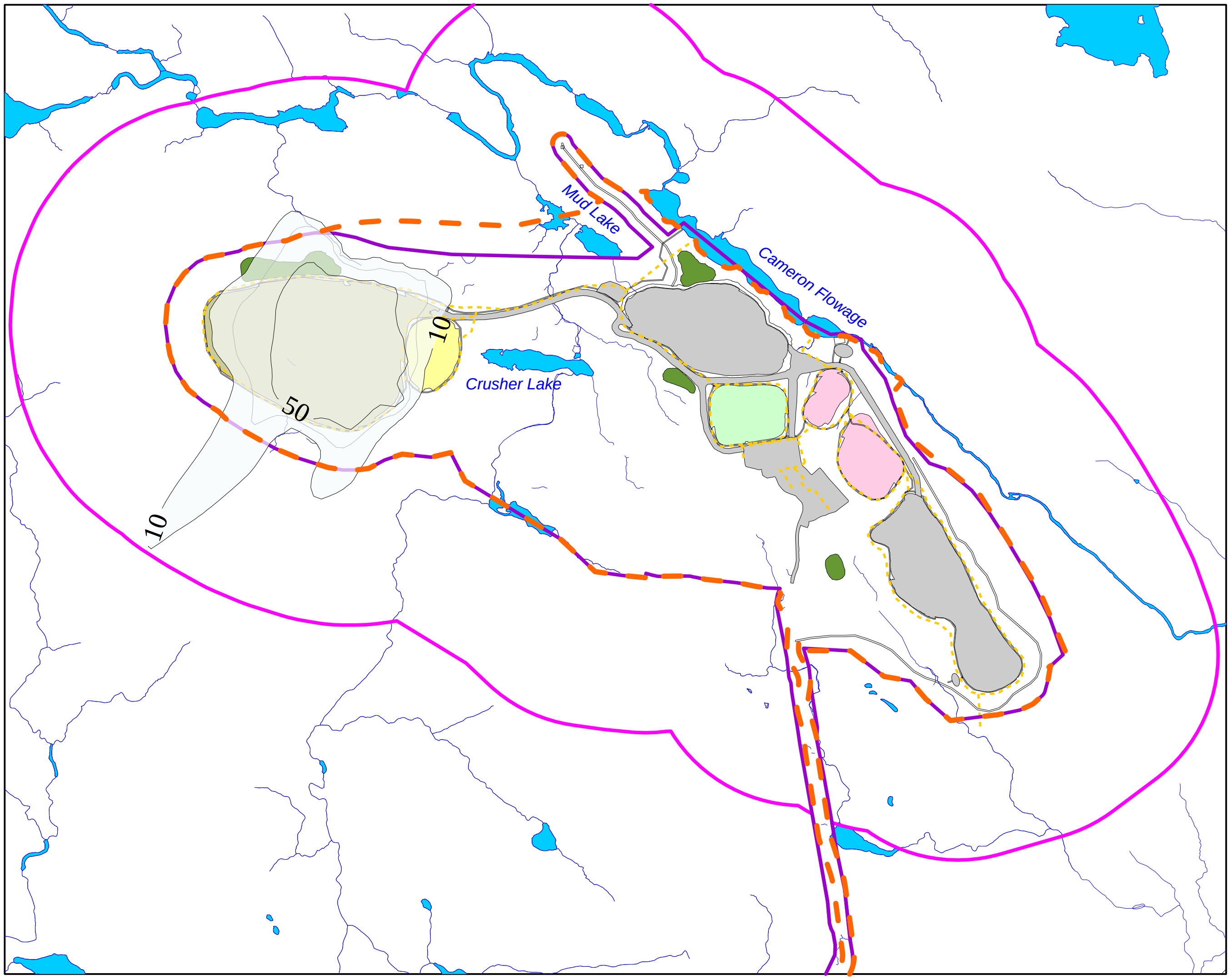
FIGURE CEAA-2-35-124

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\Figure 7.13 - Simulated Arsenic Concentration Versus Potable Criteria - PC - UC - AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 — SIMULATED MOLYBDENUM CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The molybdenum Tier 2 PSS for groundwater discharge to surface water (>10 m) is 730 ug/L.

0 300 600 900m

N

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BEAVER DAM MINE

SIMULATED MOLYBDENUM CONCENTRATION VERSUS TIER 2 PSS
PC - BASE CASE SOURCE TERMS - BASE CASE CONDITION

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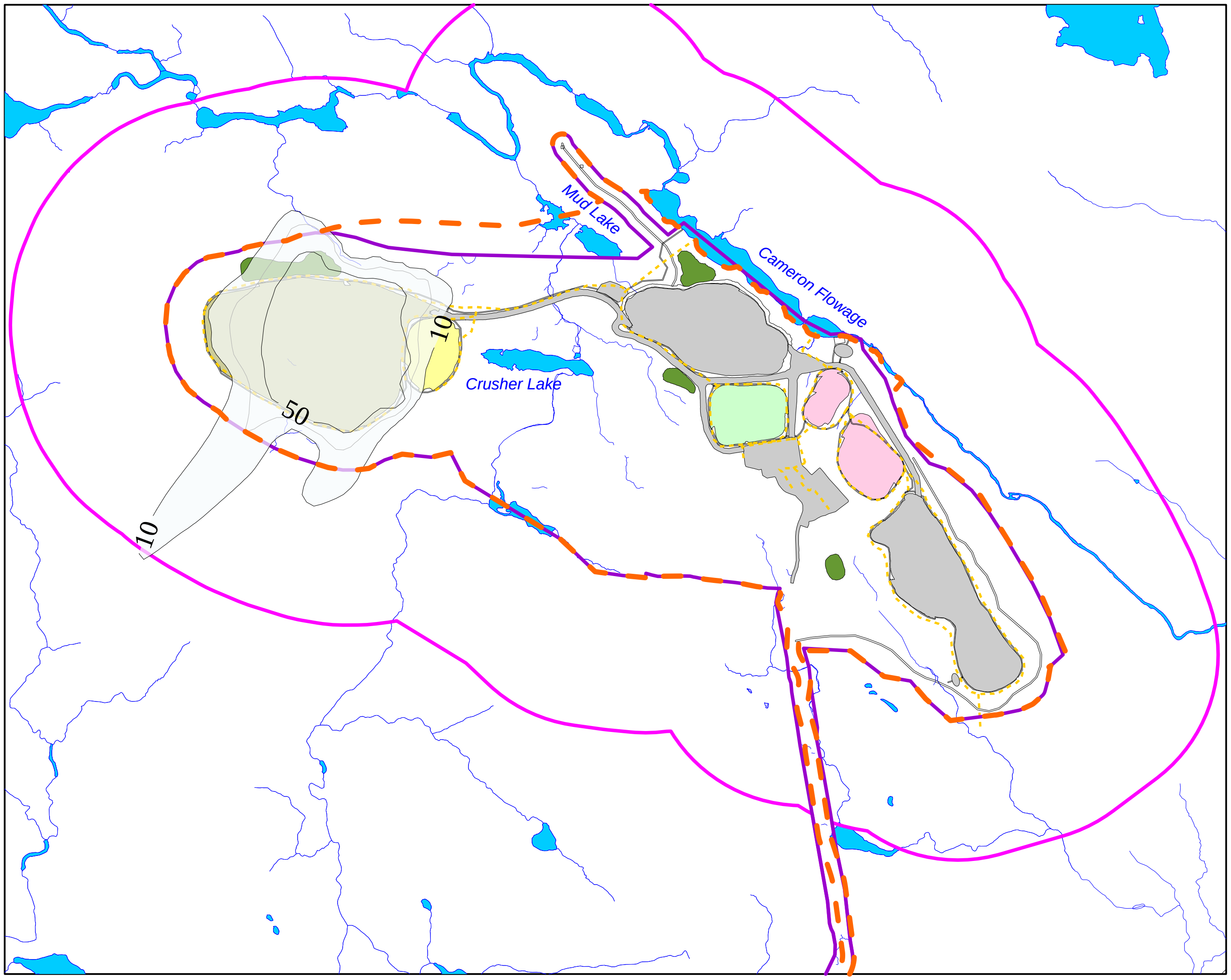
FIGURE CEAA-2-35-125

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.45 - Sim_Lead_PSS-PC-BC-AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 — SIMULATED MOLYBDENUM CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The molybdenum Tier 2 PSS for groundwater discharge to surface water (>10 m) is 730 ug/L.

0 300 600 900m

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SIMULATED MOLYBDENUM CONCENTRATION VERSUS TIER 2 PSS
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

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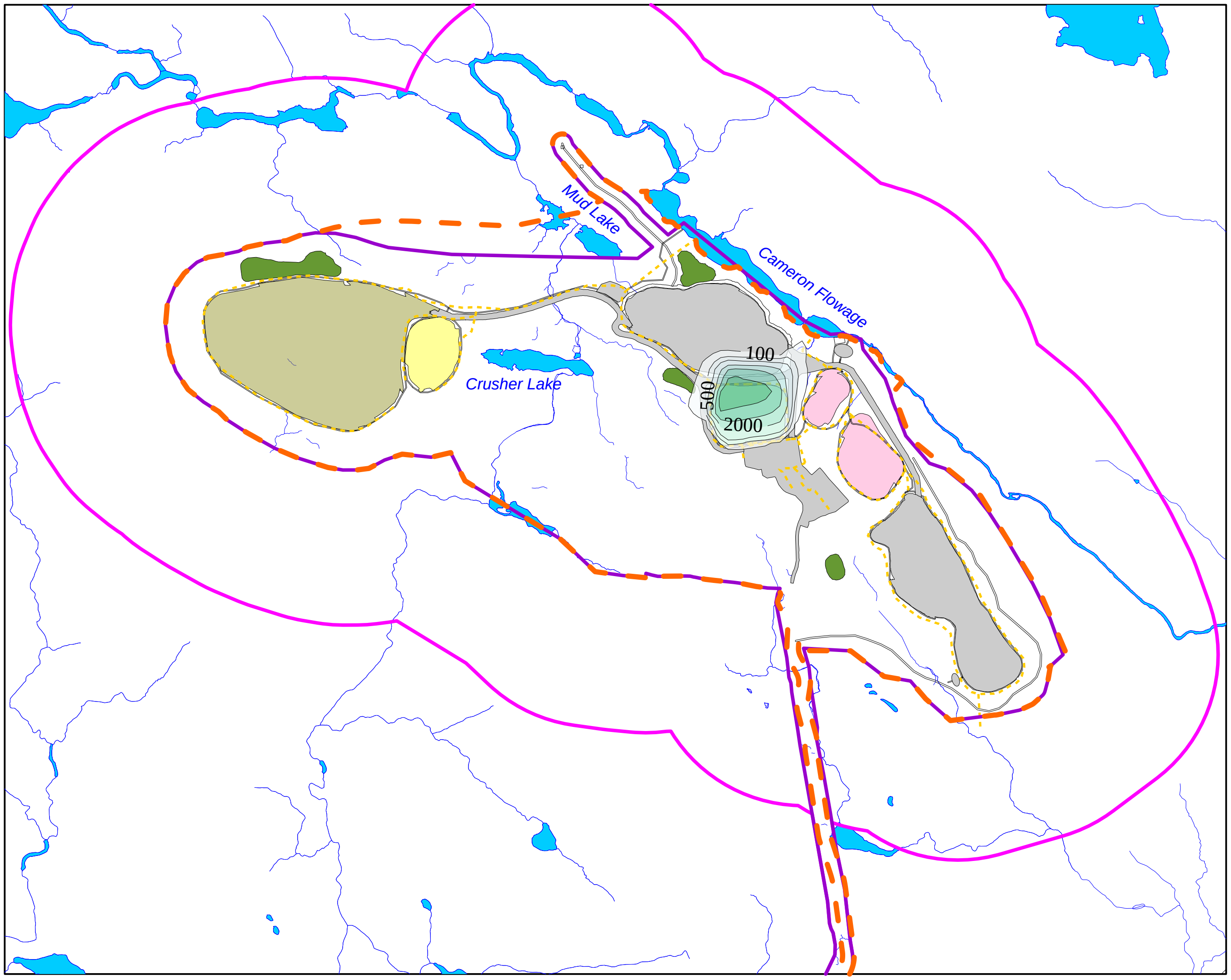
FIGURE CEAA-2-35-126

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.49 - Sim_Zinc_PSS-PC-UC-AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 SIMULATED NICKEL CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The nickel Tier 1 EQS for potable groundwater is 100 ug/L.

0 300 600 900m

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BEAVER DAM MINE

SIMULATED NICKEL CONCENTRATION VERSUS POTABLE CRITERIA
PC - BASE CASE SOURCE TERMS - BASE CASE CONDITION

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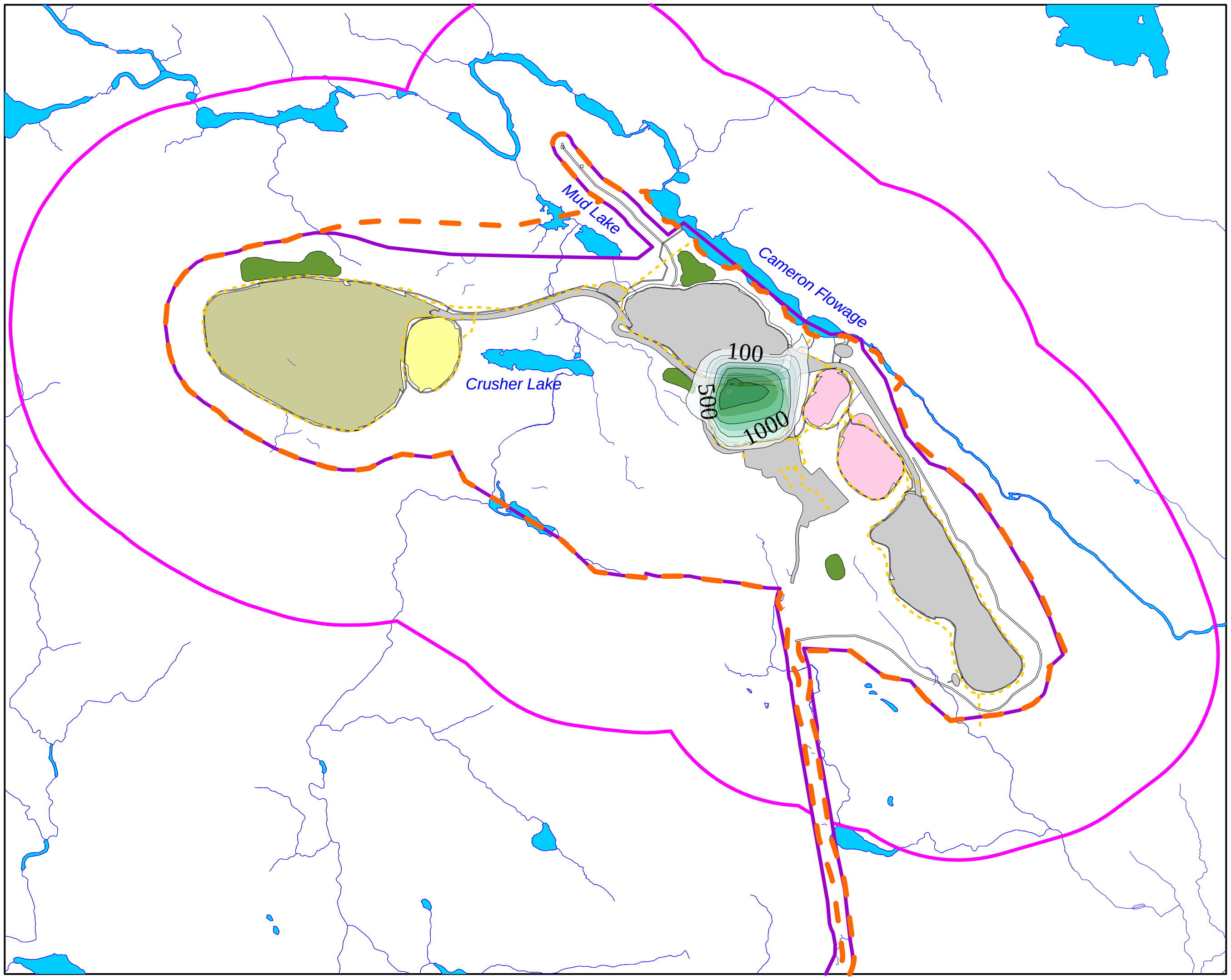
FIGURE CEAA-2-35-127

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.20 - Simulated Nickel Concentration Versus Potable Criteria - PC - BC - AVG.srf



Note: The nickel Tier 1 EQS for potable groundwater is 100 ug/L.

0 300 600 900m

N

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SIMULATED NICKEL CONCENTRATION VERSUS POTABLE CRITERIA
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

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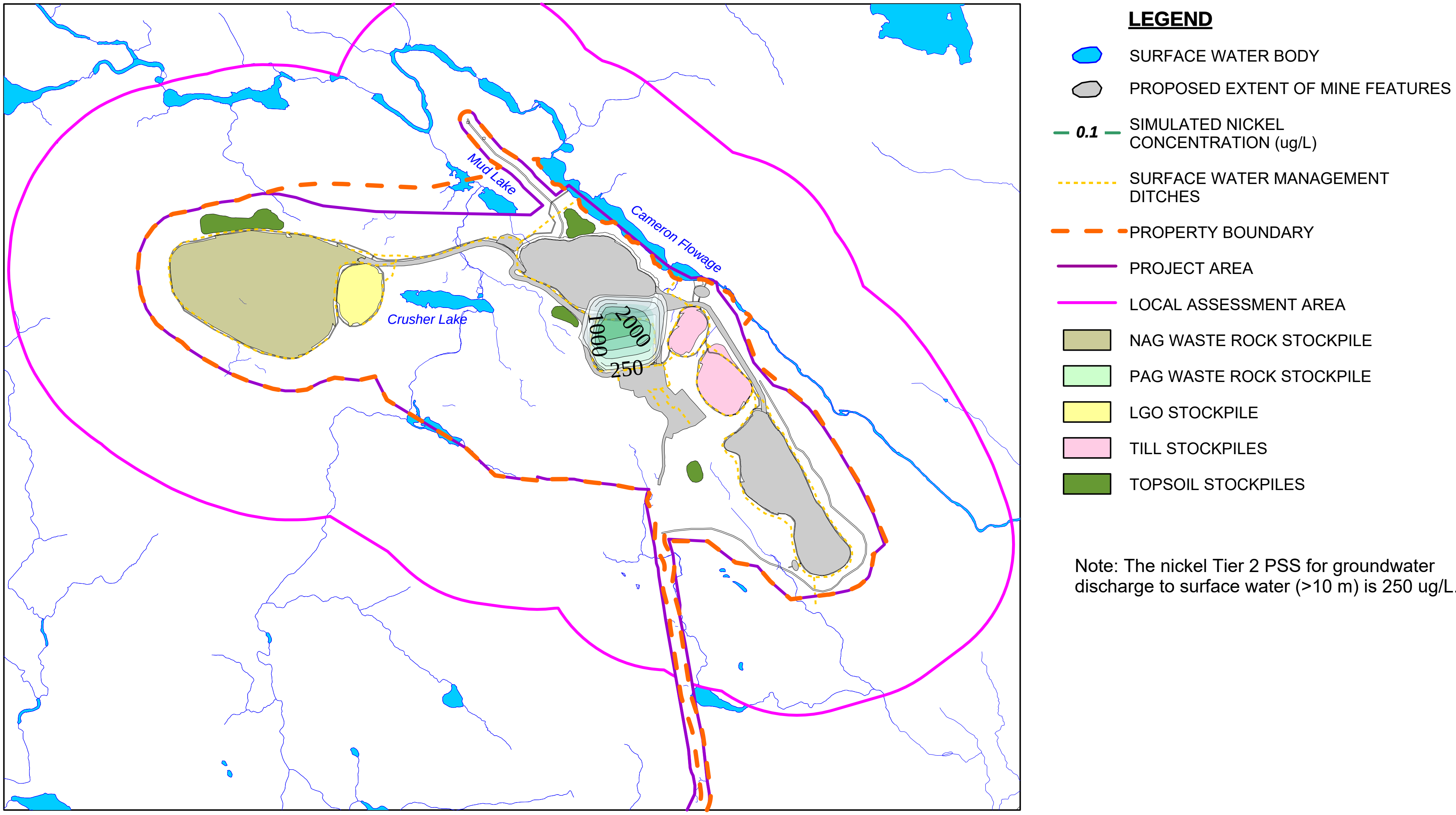
FIGURE CEAA-2-35-128

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.21 - Simulated Nickel Concentration Versus Potable Criteria - PC - UC - AVG.srf



Note: The nickel Tier 2 PSS for groundwater discharge to surface water (>10 m) is 250 ug/L.

0 300 600 900m

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BEAVER DAM MINE

SIMULATED NICKEL CONCENTRATION VERSUS TIER 2 PSS
PC - BASE CASE SOURCE TERMS - BASE CASE CONDITION

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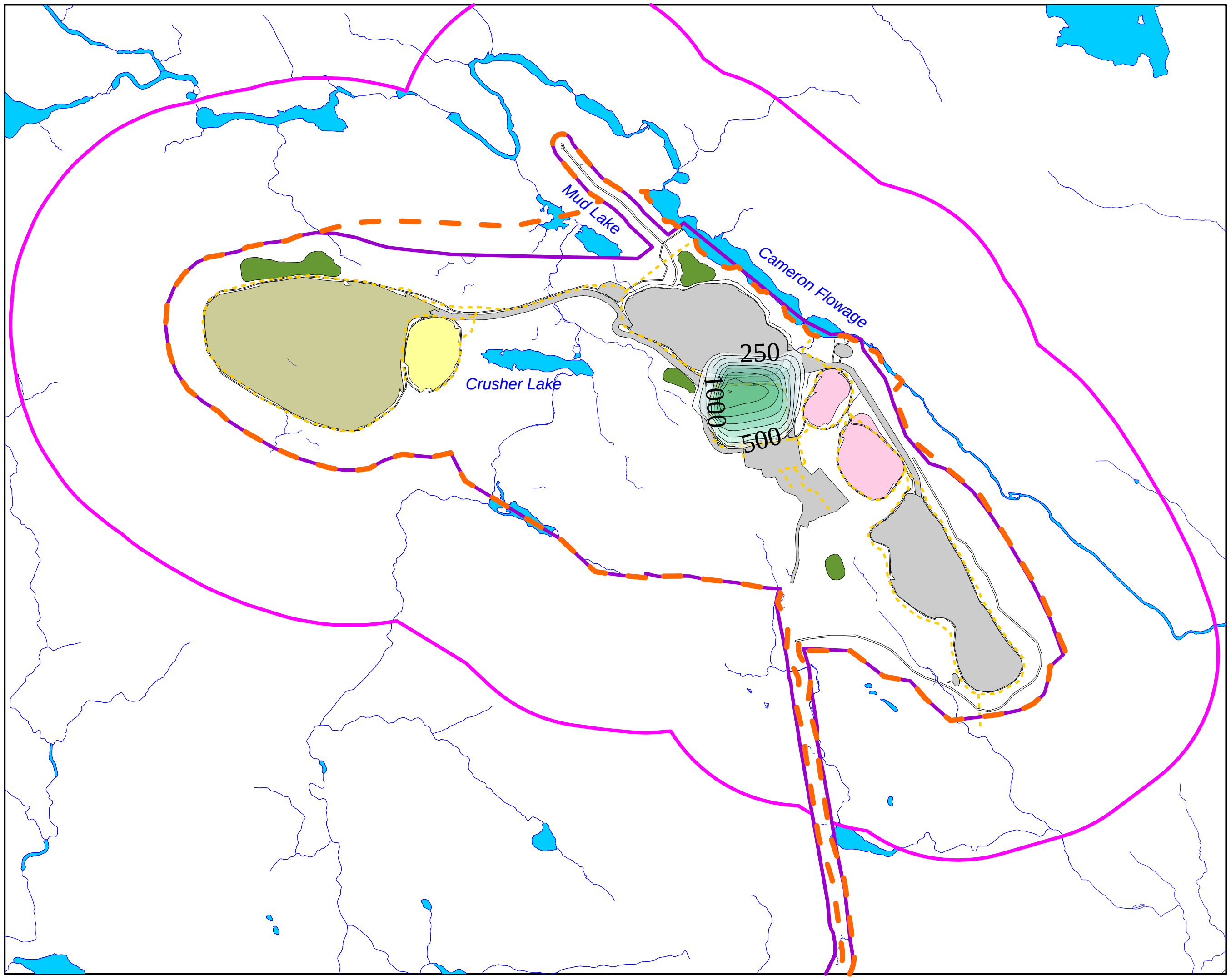
FIGURE CEAA-2-35-129

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.43 - Sim_Nickel_PSS-PC-BC-AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 SIMULATED NICKEL CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The nickel Tier 2 PSS for groundwater discharge to surface water (>10 m) is 250 ug/L.

0 300 600 900m

N

GHD

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MARINETTE, NOVA SCOTIA
BEAVER DAM MINE

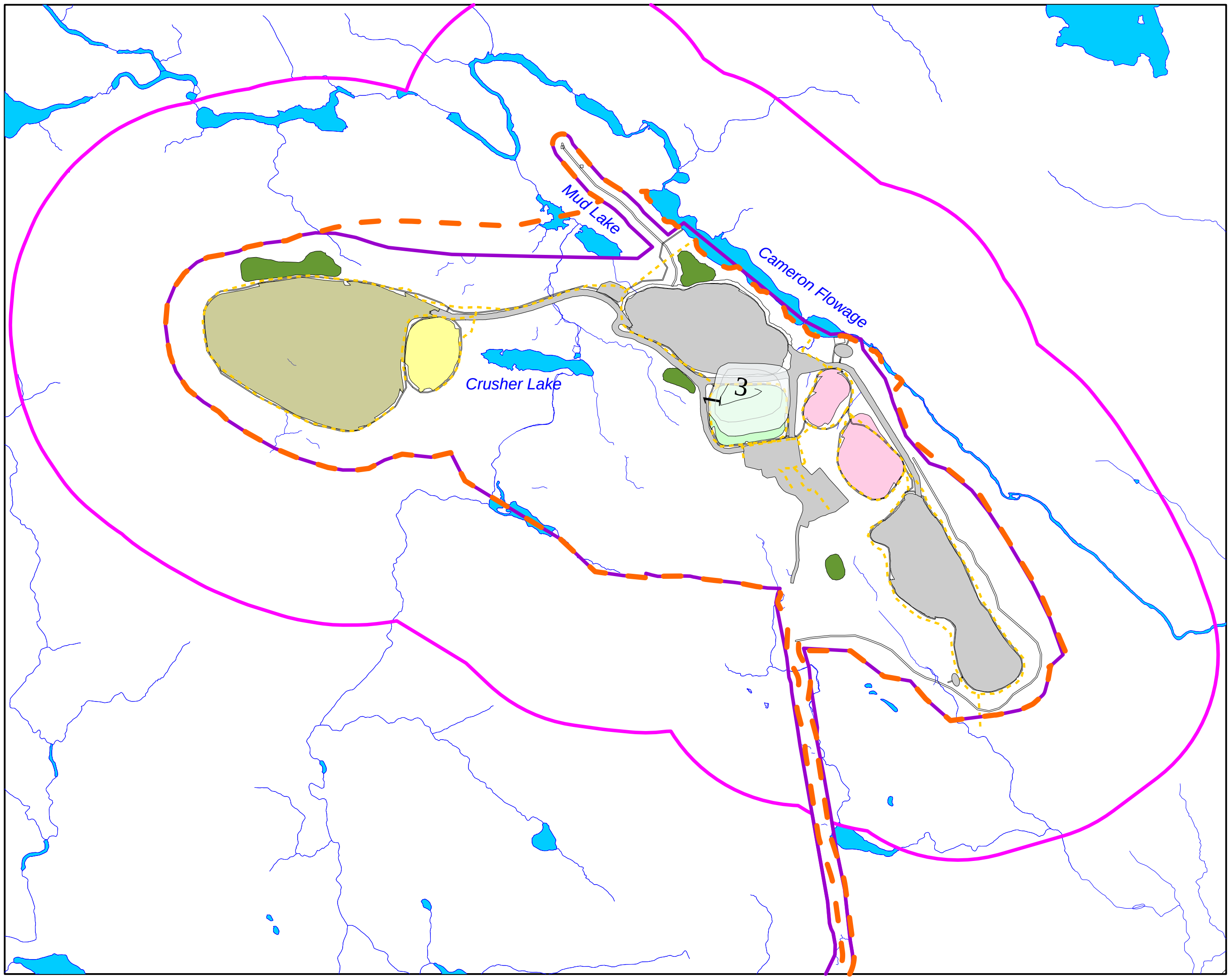
SIMULATED NICKEL CONCENTRATION VERSUS TIER 2 PSS
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

088664-031

September 07, 2021

FIGURE CEAA-2-35-130

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.44 - Sim_Nickel_PSS-PC-UC-AVG.srf



LEGEND

SURFACE WATER BODY

PROPOSED EXTENT OF MINE FEATURES

0.1 SIMULATED SELENIUM CONCENTRATION (ug/L)

SURFACE WATER MANAGEMENT DITCHES

PROPERTY BOUNDARY

PROJECT AREA

LOCAL ASSESSMENT AREA

NAG WASTE ROCK STOCKPILE

PAG WASTE ROCK STOCKPILE

LGO STOCKPILE

TILL STOCKPILES

TOPSOIL STOCKPILES

Note: The selenium Tier 1 EQS for potable groundwater is 10 ug/L.

0 300 600 900m

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BEAVER DAM MINE

SIMULATED SELENIUM CONCENTRATION VERSUS POTABLE CRITERIA
PC - BASE CASE SOURCE TERMS - BASE CASE CONDITION

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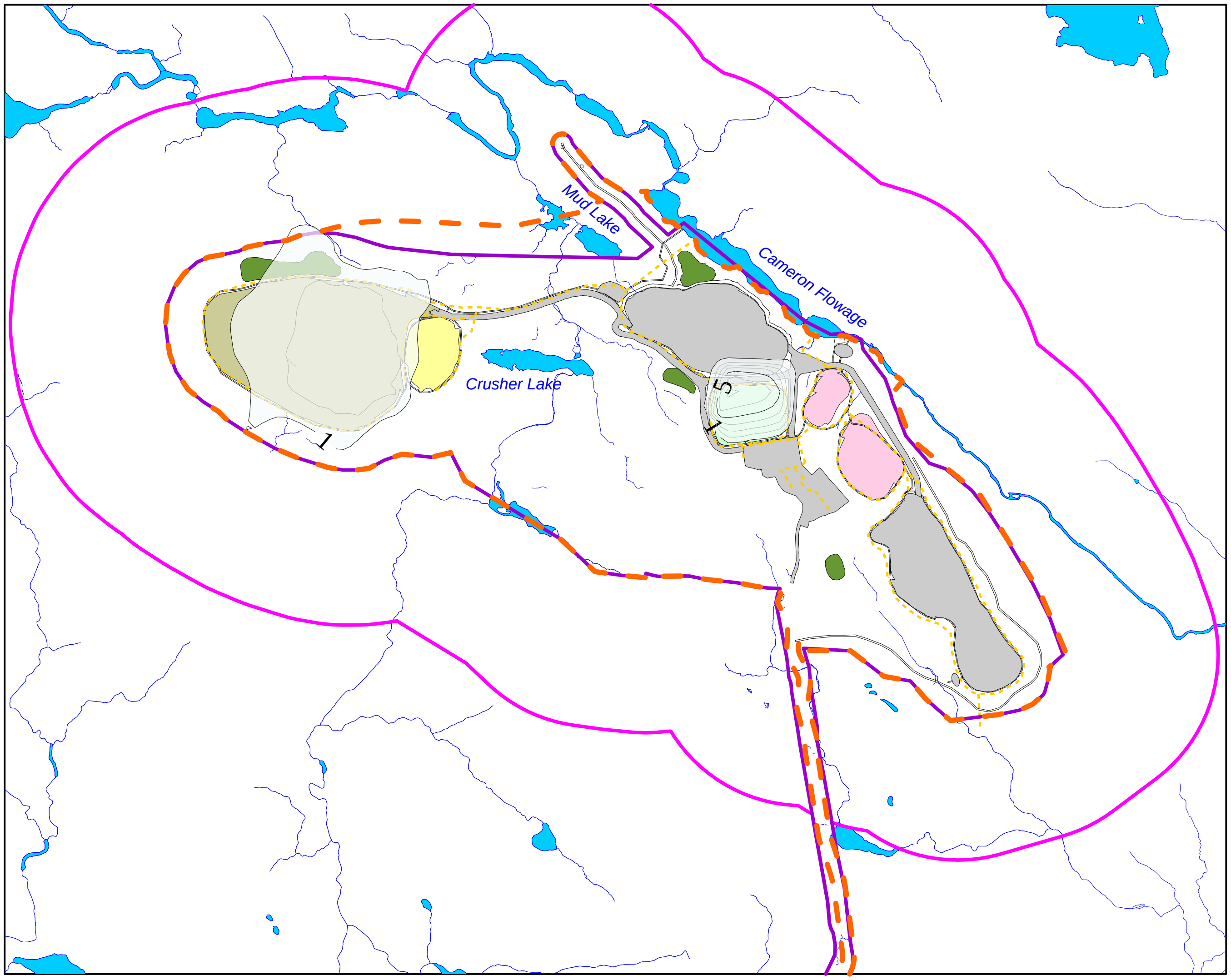
FIGURE CEAA-2-35-131

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.16 - Simulated Cobalt Concentration Versus Potable Criteria - PC - BC - AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 — SIMULATED SELENIUM CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The selenium Tier 1 EQS for potable groundwater is 10 ug/L.

0 300 600 900m

ATLANTIC GOLD CORPORATION
MARINETTE, NOVA SCOTIA
BEAVER DAM MINE

SIMULATED SELENIUM CONCENTRATION VERSUS POTABLE CRITERIA
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

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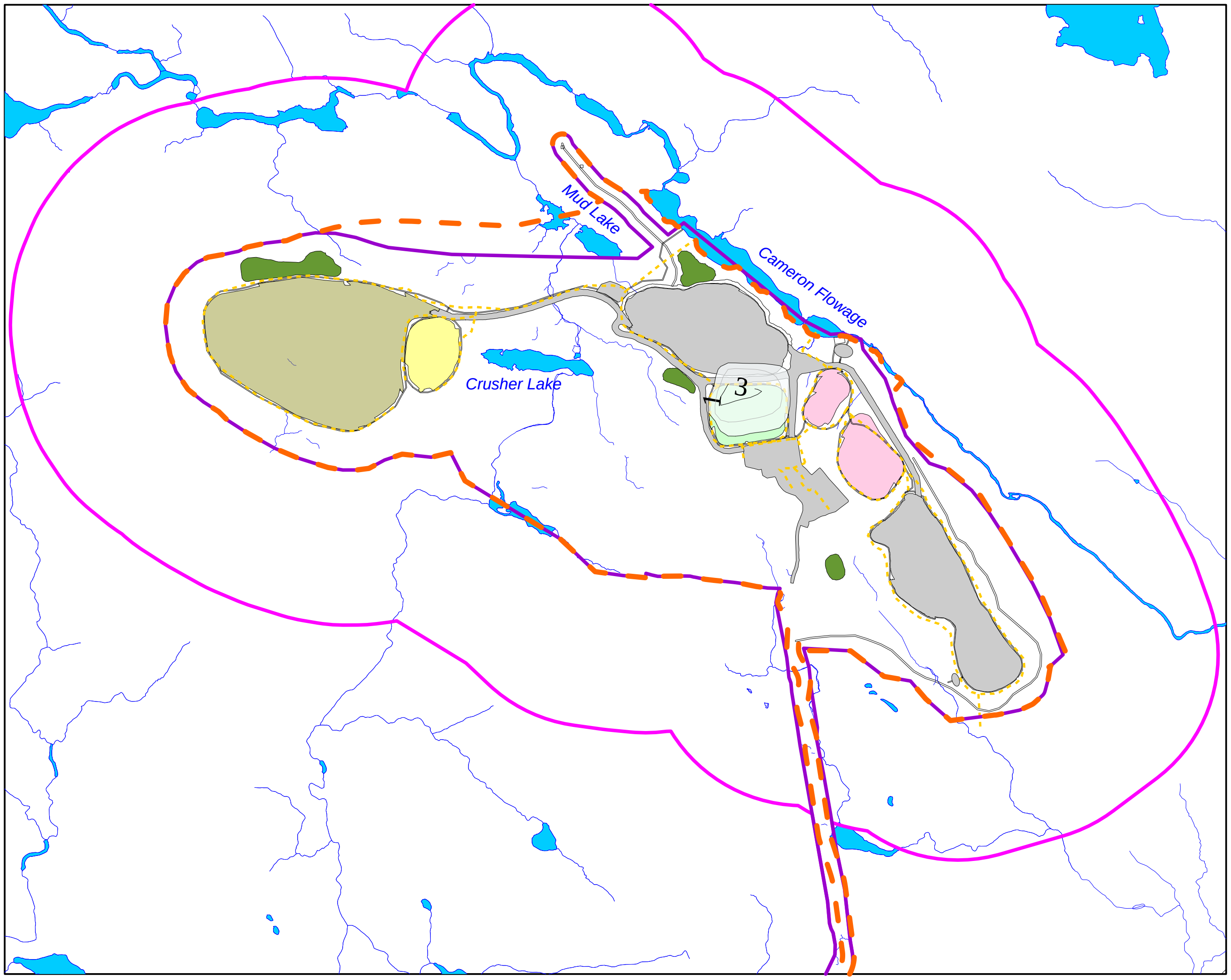
FIGURE CEAA-2-35-132

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\Figure 7.13 - Simulated Arsenic Concentration Versus Potable Criteria - PC - UC - AVG.srf



Note: The selenium Tier 2 PSS for groundwater discharge to surface water (>10 m) is 10 ug/L.

0 300 600 900m

ATLANTIC GOLD CORPORATION
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BEAVER DAM MINE

SIMULATED SELENIUM CONCENTRATION VERSUS TIER 2 PSS
PC - BASE CASE SOURCE TERMS - BASE CASE CONDITION

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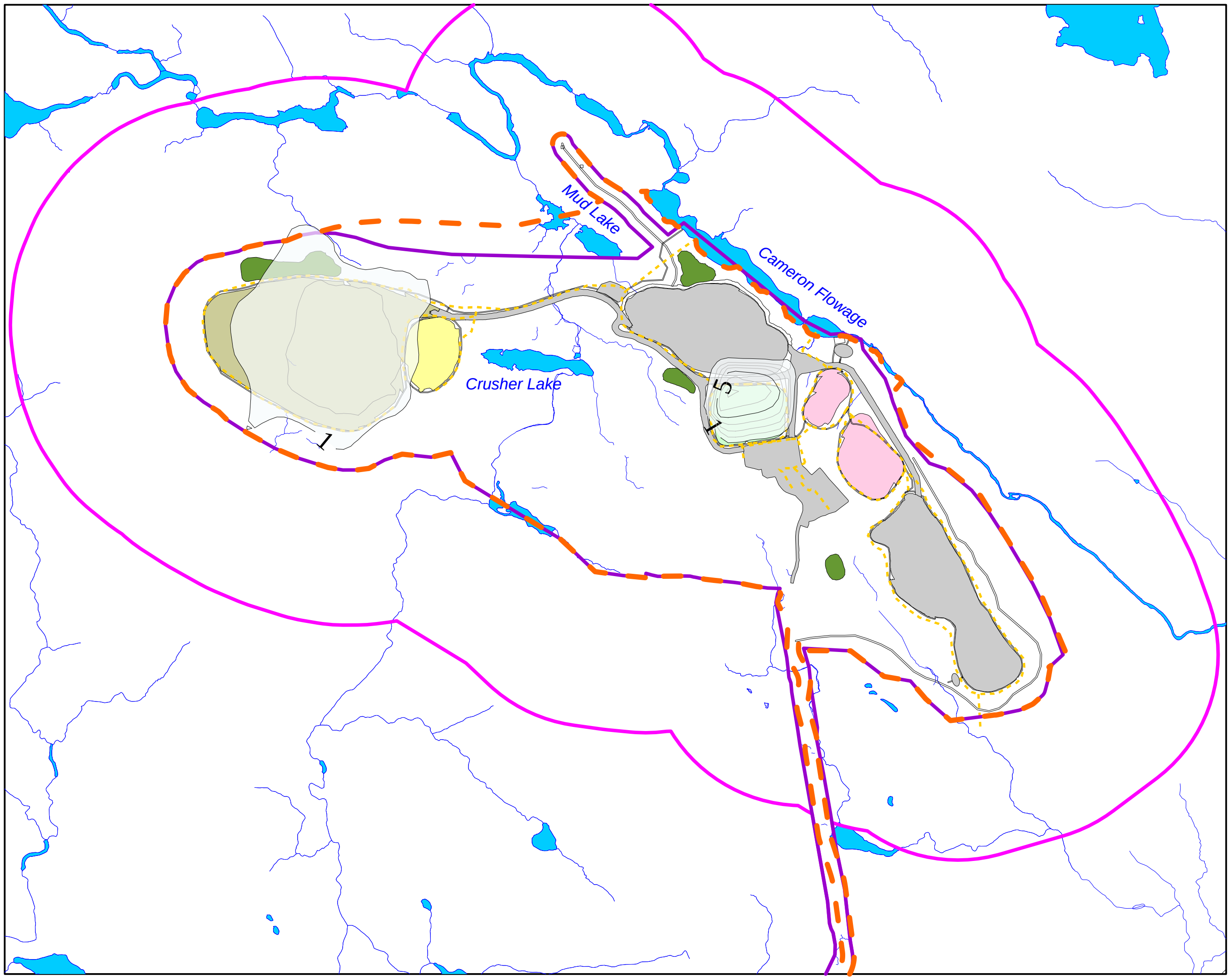
FIGURE CEAA-2-35-133

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.45 - Sim_Lead_PSS-PC-BC-AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 SIMULATED SELENIUM CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The selenium Tier 2 PSS for groundwater discharge to surface water (>10 m) is 10 ug/L.

0 300 600 900m

N

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BEAVER DAM MINE

SIMULATED SELENIUM CONCENTRATION VERSUS TIER 2 PSS
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

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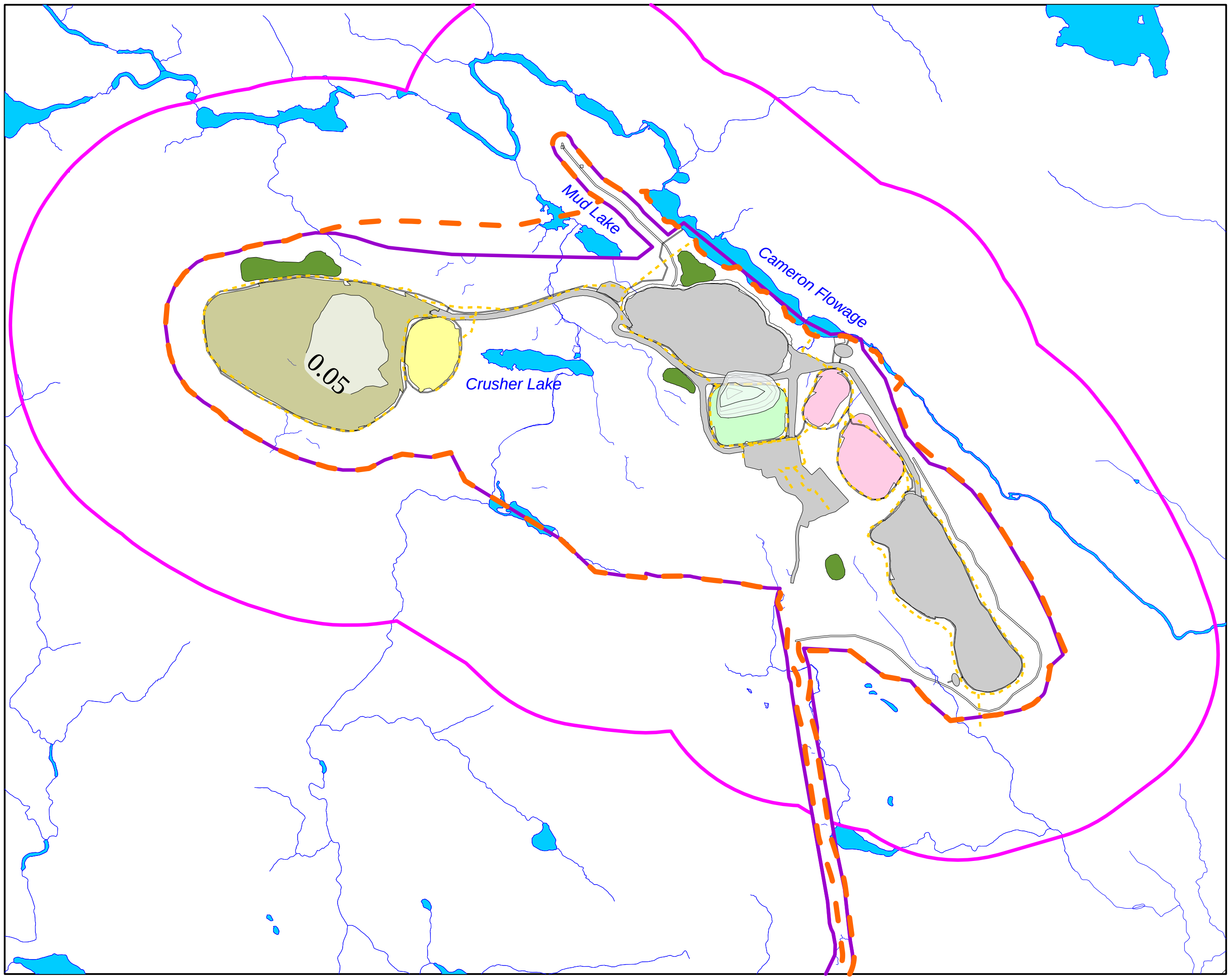
September 07, 2021

FIGURE CEAA-2-35-134

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.49 - Sim_Zinc_PSS-PC-UC-AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 SIMULATED SILVER CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The silver Tier 1 EQS for potable groundwater is 100 ug/L.

0 300 600 900m

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BEAVER DAM MINE

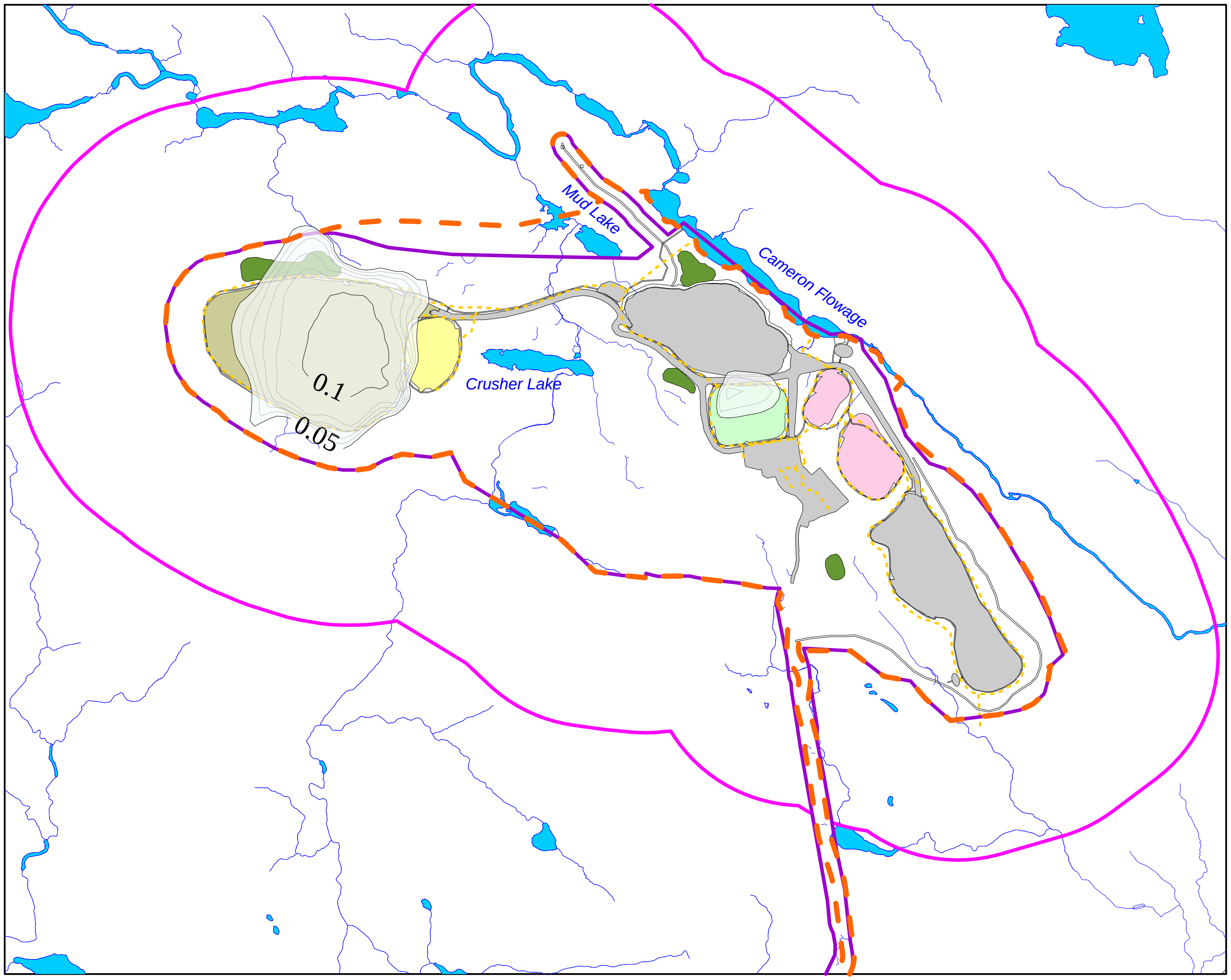
SIMULATED SILVER CONCENTRATION VERSUS POTABLE CRITERIA
PC - BASE CASE SOURCE TERMS - BASE CASE CONDITION

088664-031

September 07, 2021

FIGURE CEAA-2-35-135

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.16 - Simulated Cobalt Concentration Versus Potable Criteria - PC - BC - AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 SIMULATED SILVER CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The silver Tier 1 EQS for potable groundwater is 10 ug/L.

0 300 600 900m

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SIMULATED SILVER CONCENTRATION VERSUS POTABLE CRITERIA
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

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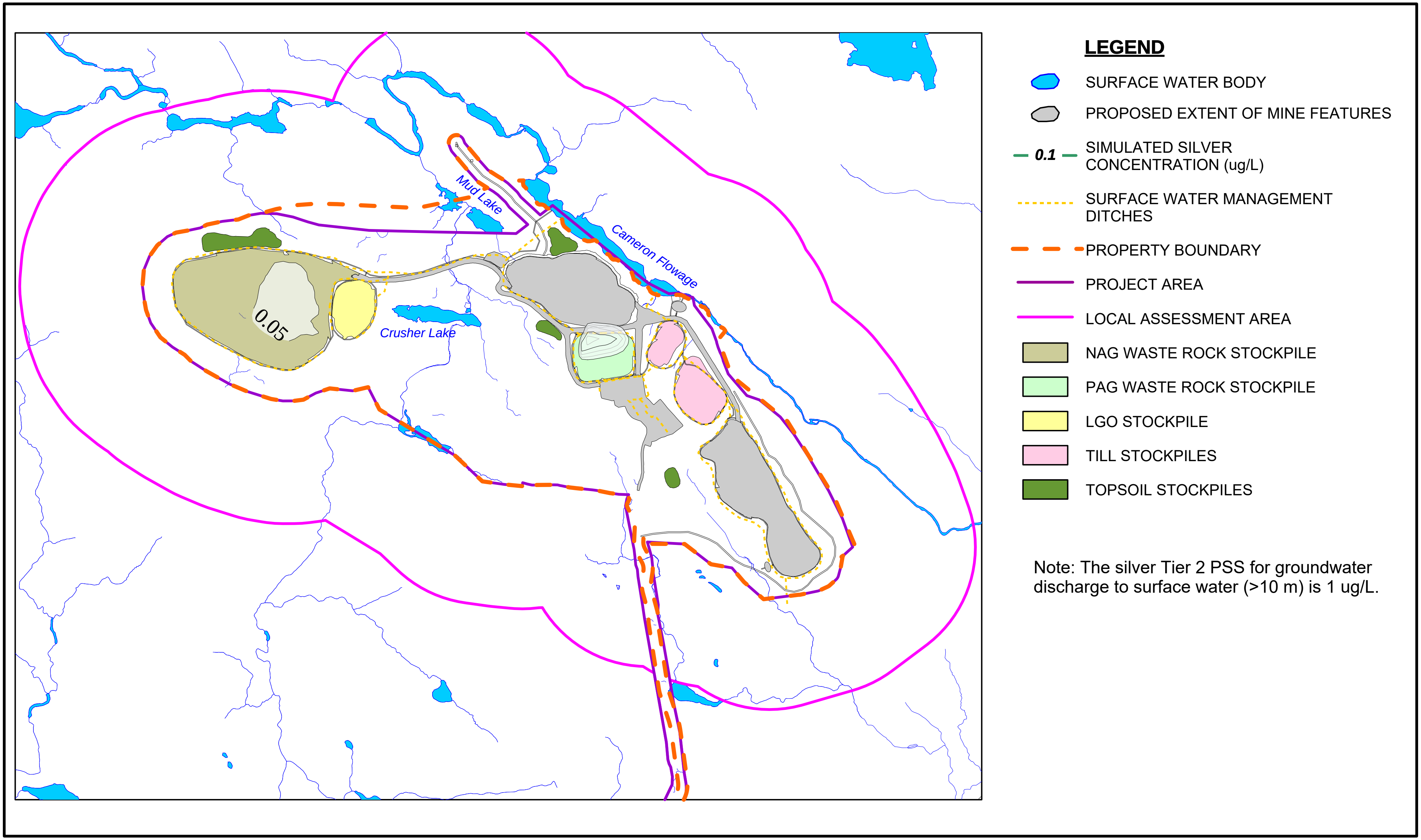
September 07, 2021

FIGURE CEAA-2-35-136

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\Figure 7.13 - Simulated Arsenic Concentration Versus Potable Criteria - PC - UC - AVG.srf



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BEAVER DAM MINE

SIMULATED SILVER CONCENTRATION VERSUS TIER 2 PSS
PC - BASE CASE SOURCE TERMS - BASE CASE CONDITION

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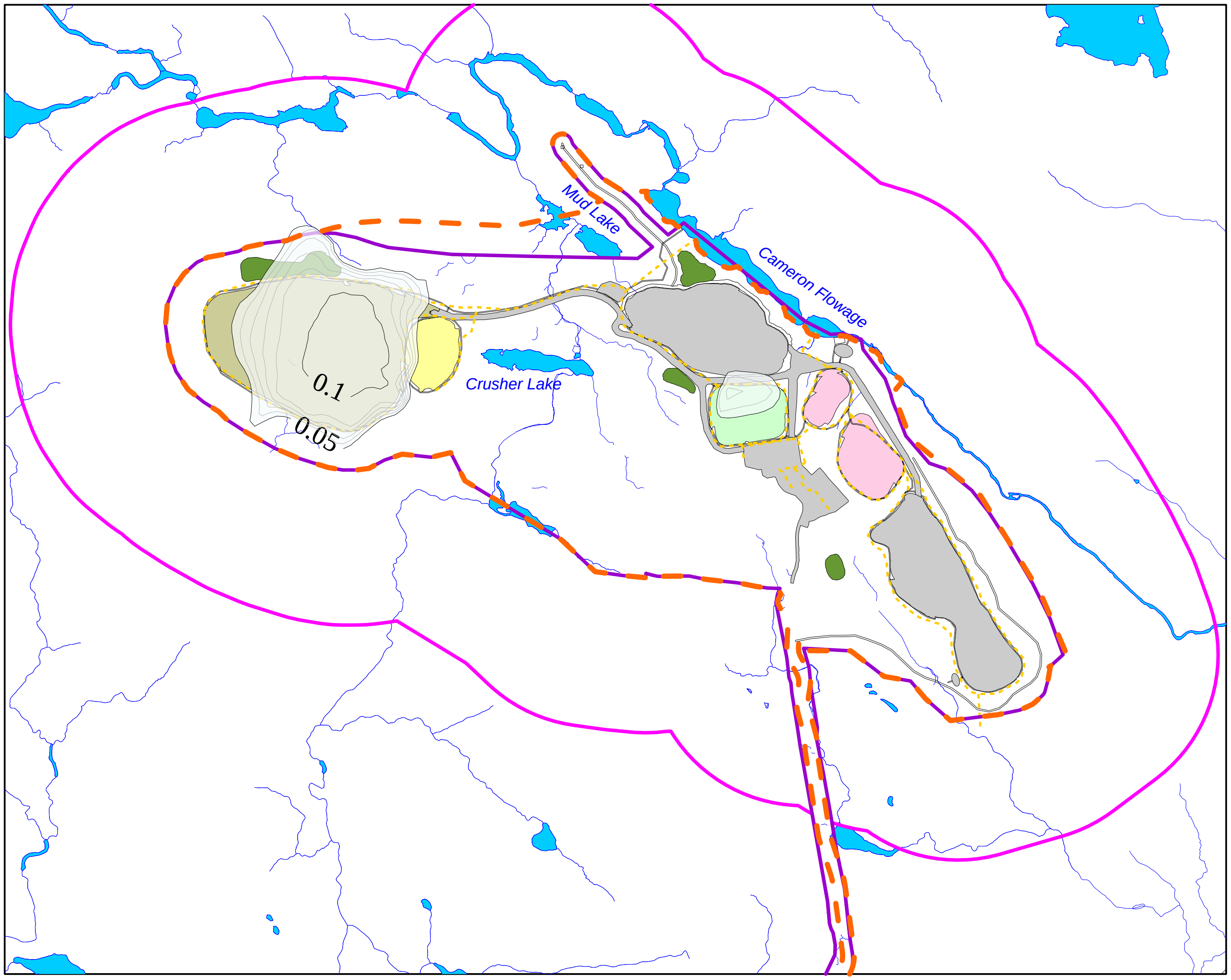
September 07, 2021

FIGURE CEAA-2-35-137

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.45 - Sim_Lead_PSS-PC-BC-AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 — SIMULATED SILVER CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The silver Tier 2 PSS for groundwater discharge to surface water (>10 m) is 1 ug/L.

0 300 600 900m

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SIMULATED SILVER CONCENTRATION VERSUS TIER 2 PSS
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

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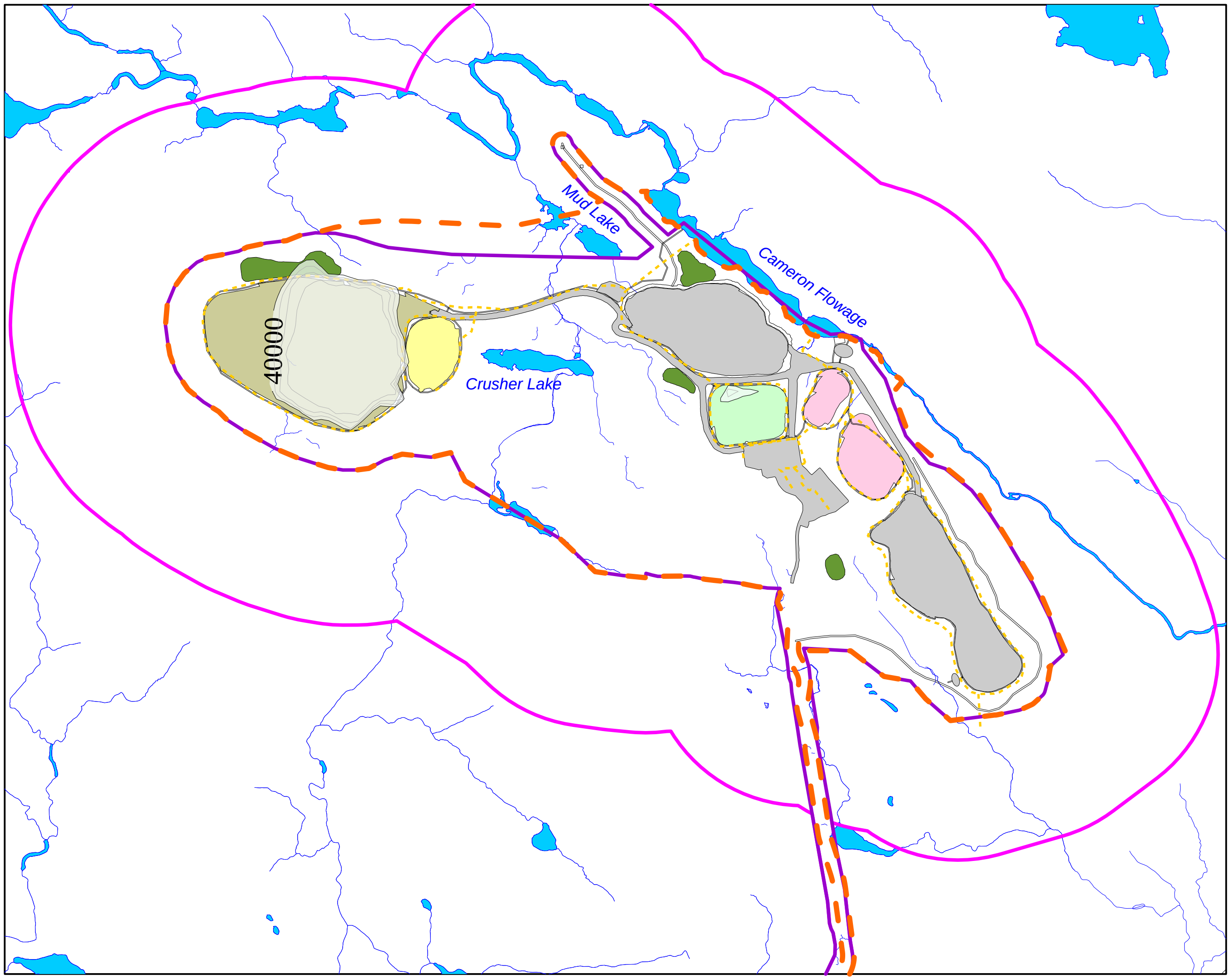
FIGURE CEAA-2-35-138

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.49 - Sim_Zinc_PSS-PC-UC-AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 — SIMULATED SODIUM CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The sodium Tier 1 EQS for potable groundwater is 200,000 ug/L.

0 300 600 900m

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SIMULATED SODIUM CONCENTRATION VERSUS POTABLE CRITERIA
PC - BASE CASE SOURCE TERMS - BASE CASE CONDITION

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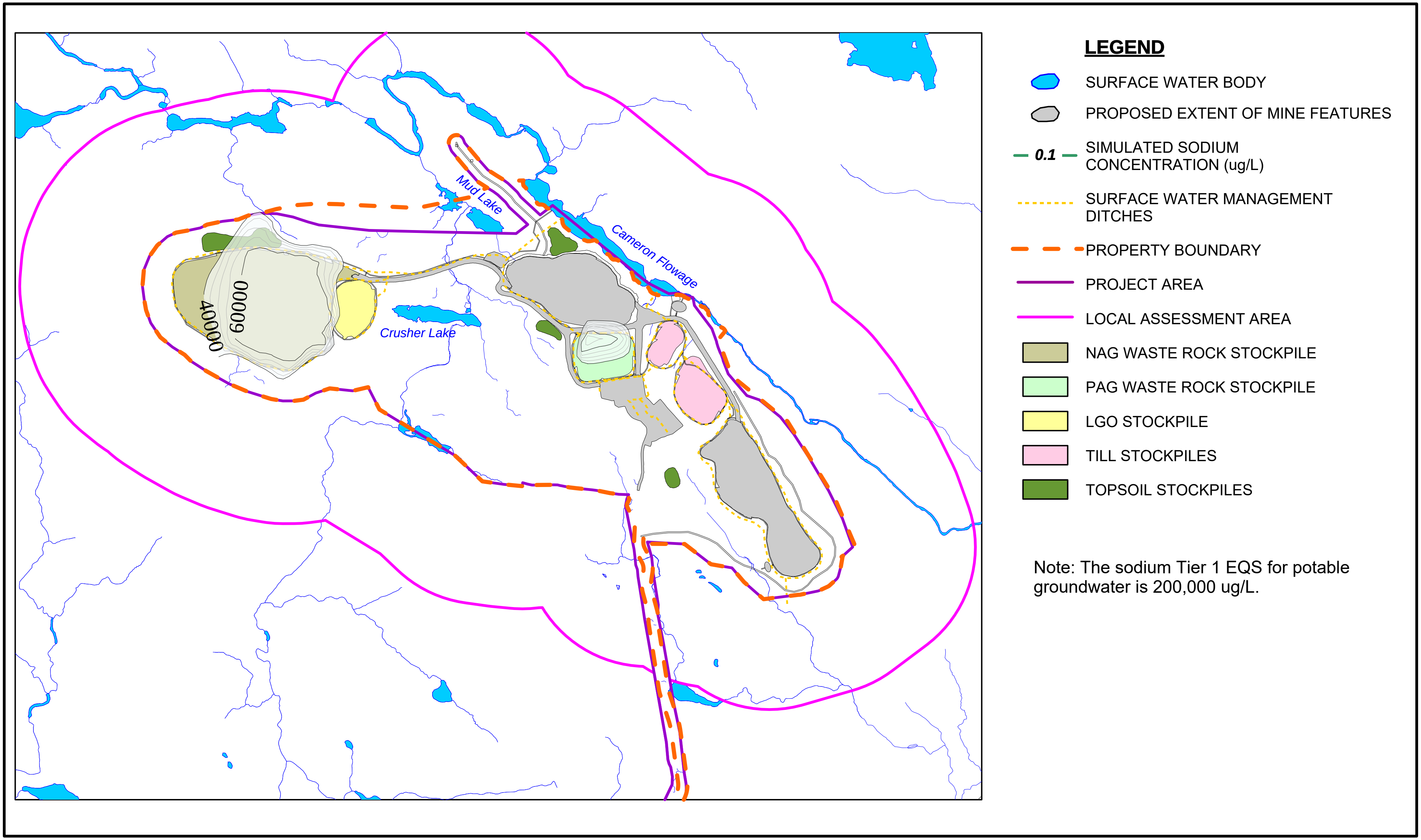
FIGURE CEAA-2-35-139

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.16 - Simulated Cobalt Concentration Versus Potable Criteria - PC - BC - AVG.srf



0 300 600 900m

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SIMULATED SODIUM CONCENTRATION VERSUS POTABLE CRITERIA
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

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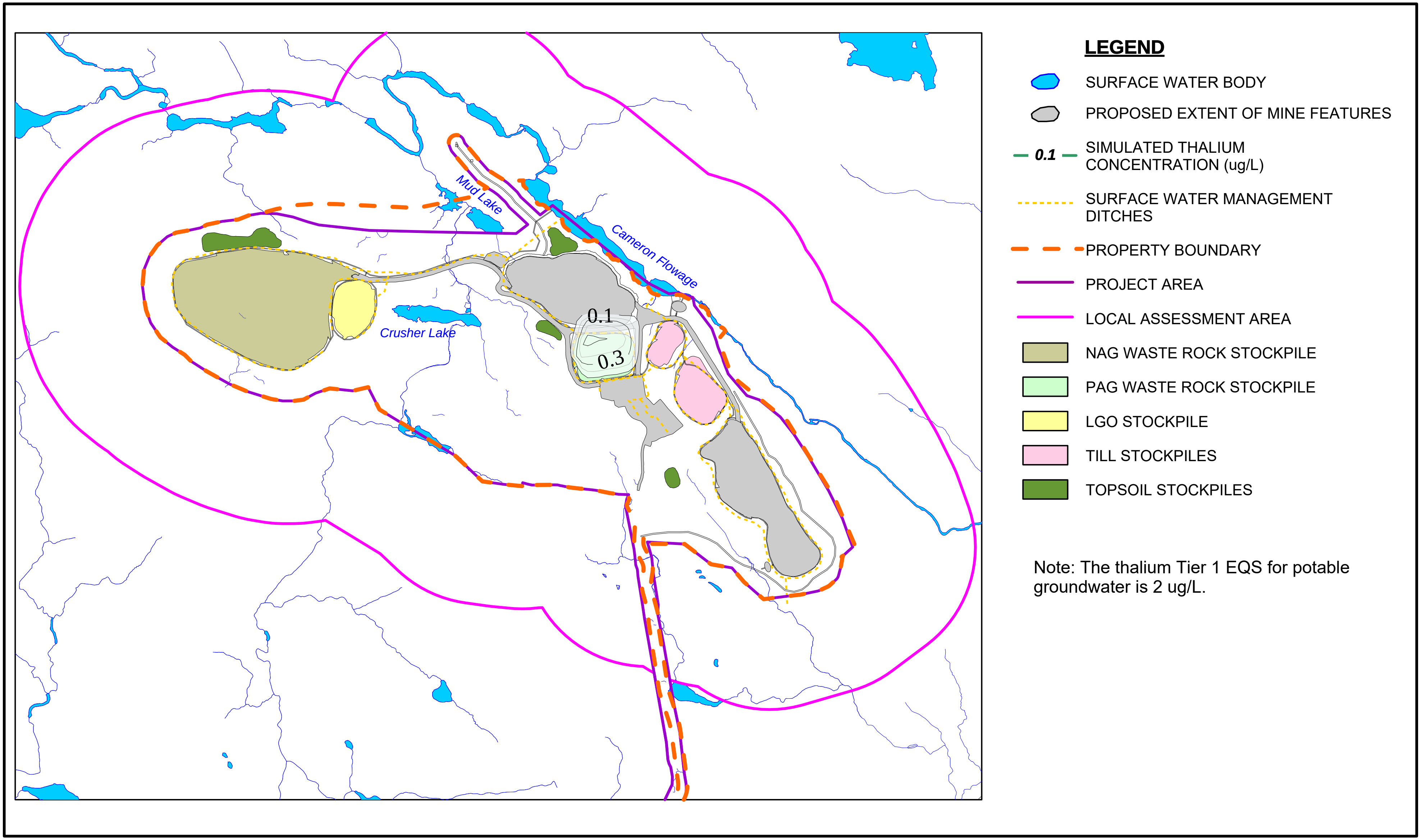
FIGURE CEAA-2-35-140

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\Figure 7.13 - Simulated Arsenic Concentration Versus Potable Criteria - PC - UC - AVG.srf



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SIMULATED THALIUM CONCENTRATION VERSUS POTABLE CRITERIA
PC - BASE CASE SOURCE TERMS - BASE CASE CONDITION

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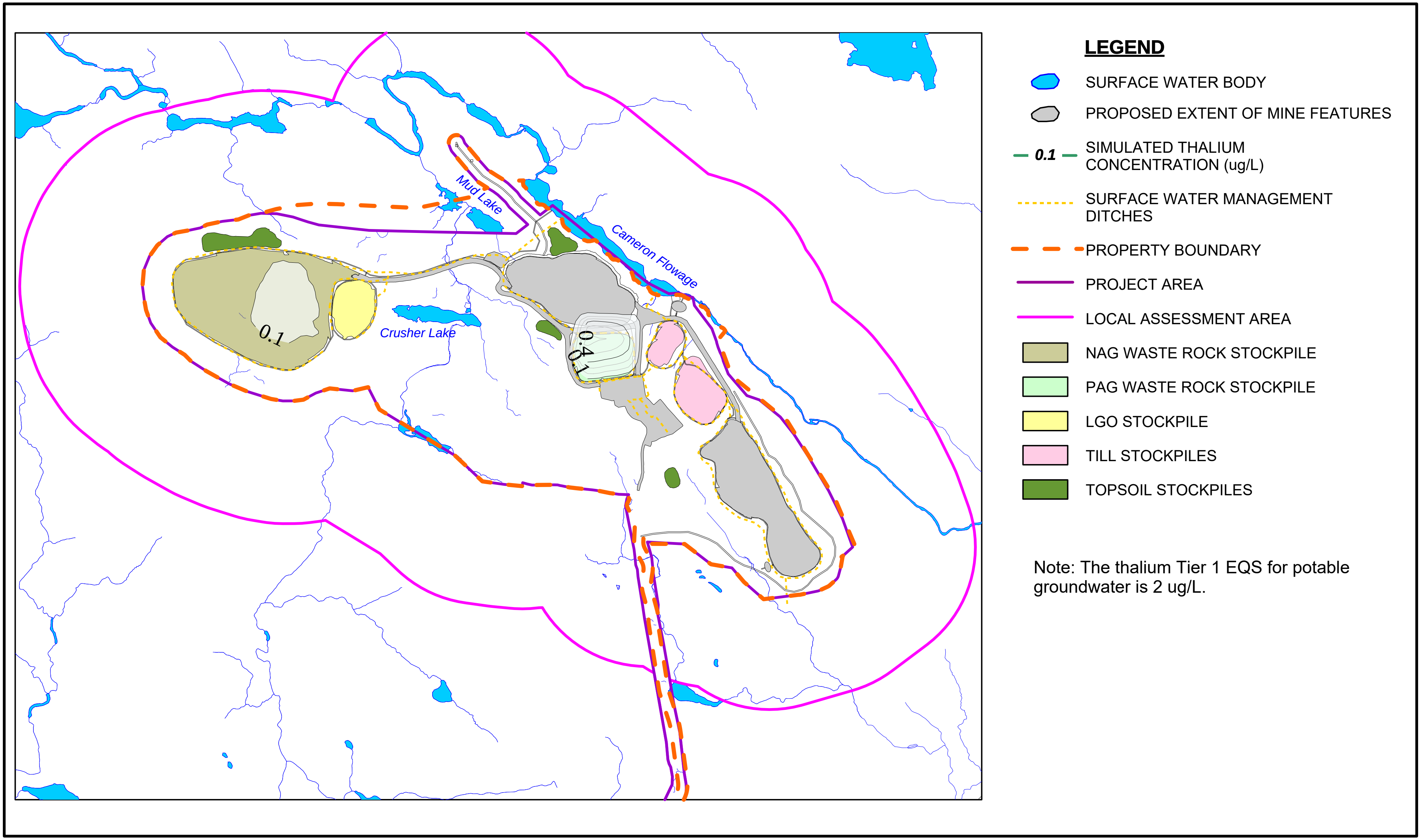
FIGURE CEAA-2-35-141

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.16 - Simulated Cobalt Concentration Versus Potable Criteria - PC - BC - AVG.srf



0 300 600 900m

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SIMULATED THALIUM CONCENTRATION VERSUS POTABLE CRITERIA
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

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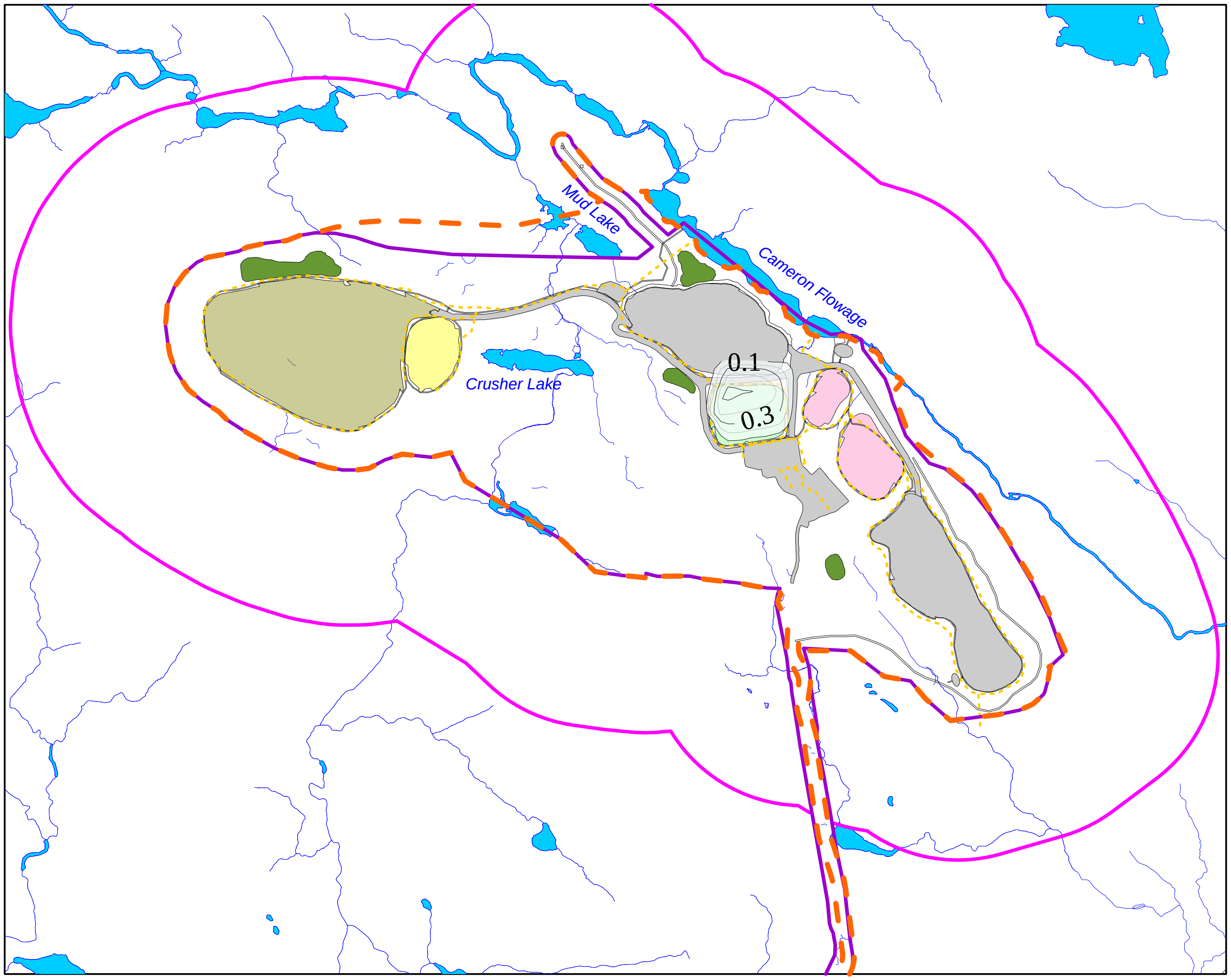
FIGURE CEAA-2-35-142

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\Figure 7.13 - Simulated Arsenic Concentration Versus Potable Criteria - PC - UC - AVG.srf



LEGEND

SURFACE WATER BODY
PROPOSED EXTENT OF MINE FEATURES
0.1 SIMULATED THALIUM CONCENTRATION (ug/L)
SURFACE WATER MANAGEMENT DITCHES
PROPERTY BOUNDARY
PROJECT AREA
LOCAL ASSESSMENT AREA
NAG WASTE ROCK STOCKPILE
PAG WASTE ROCK STOCKPILE
LGO STOCKPILE
TILL STOCKPILES
TOPSOIL STOCKPILES

Note: The thalium Tier 2 PSS for groundwater discharge to surface water (>10 m) is 8 ug/L.

0 300 600 900m

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BEAVER DAM MINE

SIMULATED THALIUM CONCENTRATION VERSUS TIER 2 PSS
PC - BASE CASE SOURCE TERMS - BASE CASE CONDITION

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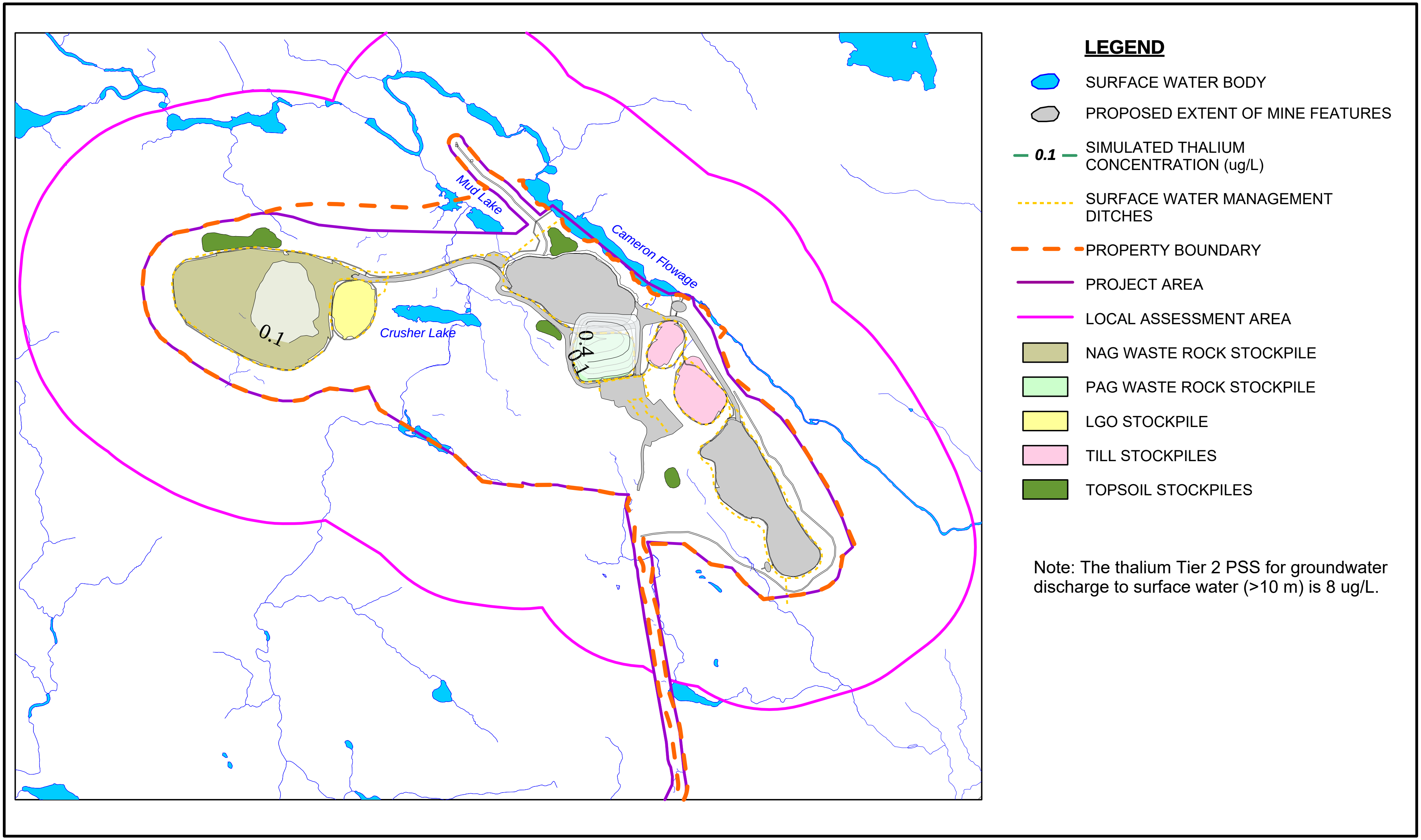
FIGURE CEAA-2-35-143

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.45 - Sim_Lead_PSS-PC-BC-AVG.srf



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BEAVER DAM MINE

SIMULATED THALIUM CONCENTRATION VERSUS TIER 2 PSS
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

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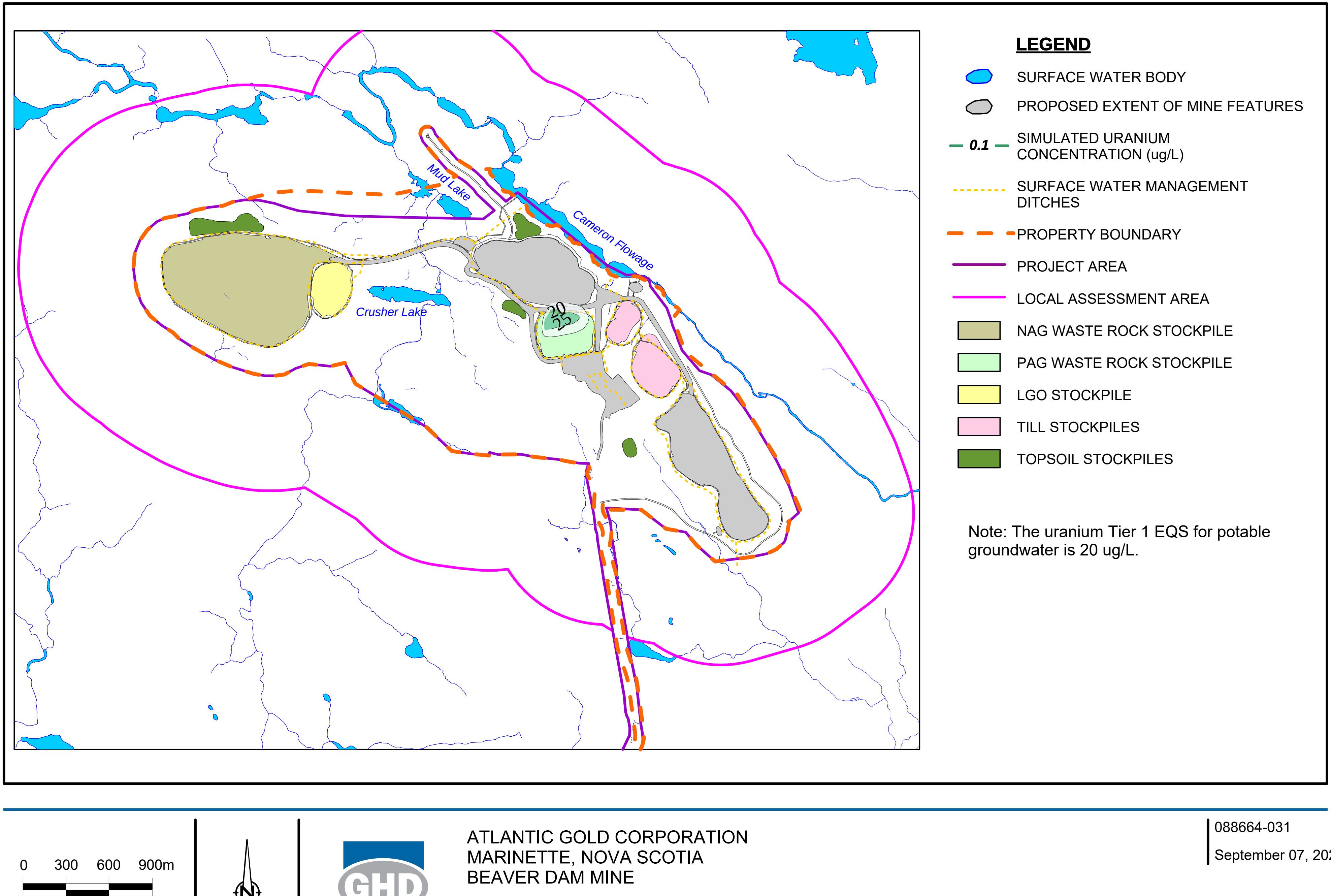
FIGURE CEAA-2-35-144

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.49 - Sim_Zinc_PSS-PC-UC-AVG.srf



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BEAVER DAM MINE

SIMULATED URANIUM CONCENTRATION VERSUS POTABLE CRITERIA
PC - BASE CASE SOURCE TERMS - BASE CASE CONDITION

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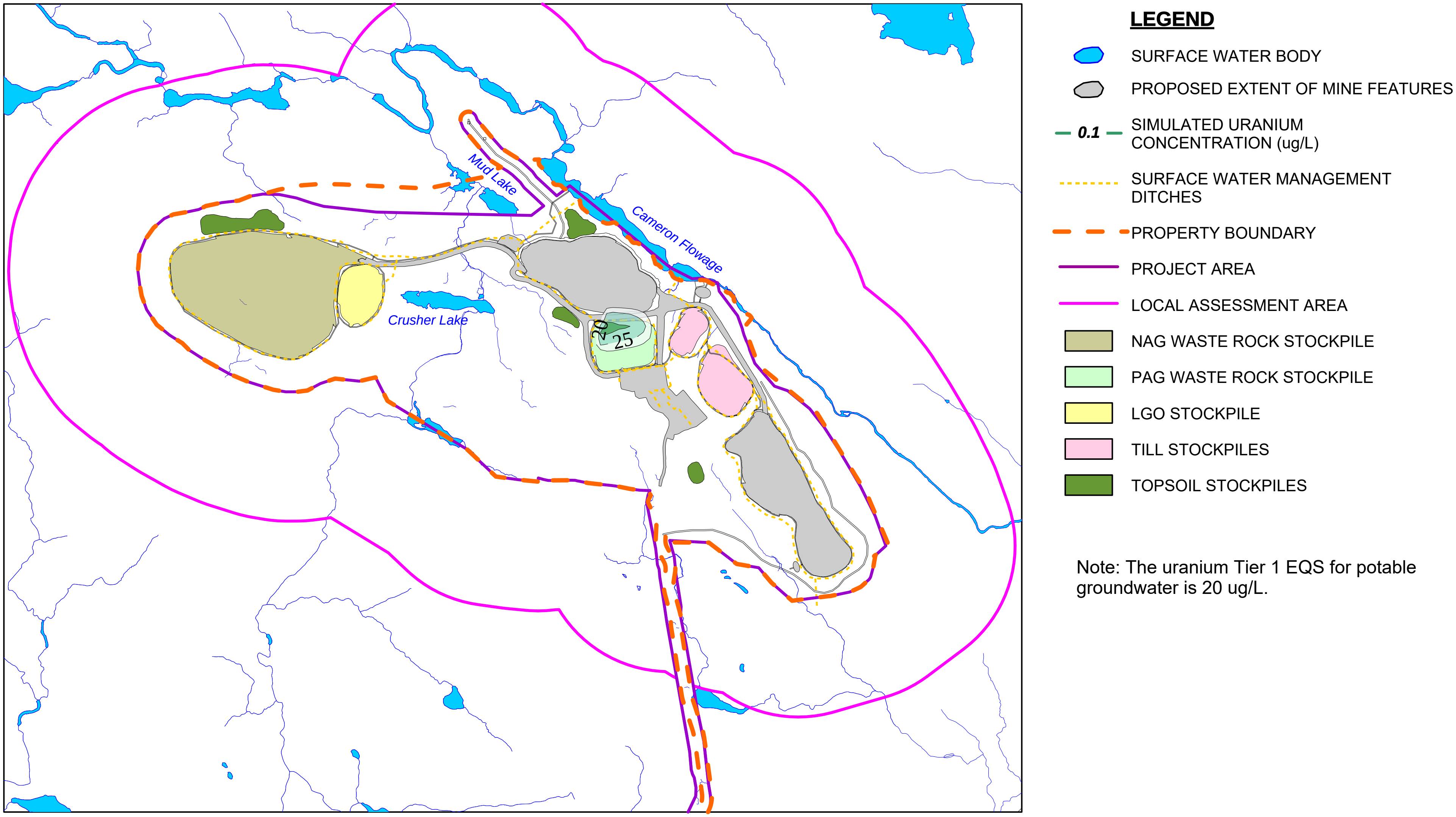
FIGURE CEAA-2-35-145

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.25 - Simulated Uranium Concentration Versus Potable Criteria - PC - BC - AVG.srf



Note: The uranium Tier 1 EQS for potable groundwater is 20 ug/L.

0 300 600 900m

N

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BEAVER DAM MINE

SIMULATED URANIUM CONCENTRATION VERSUS POTABLE CRITERIA
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

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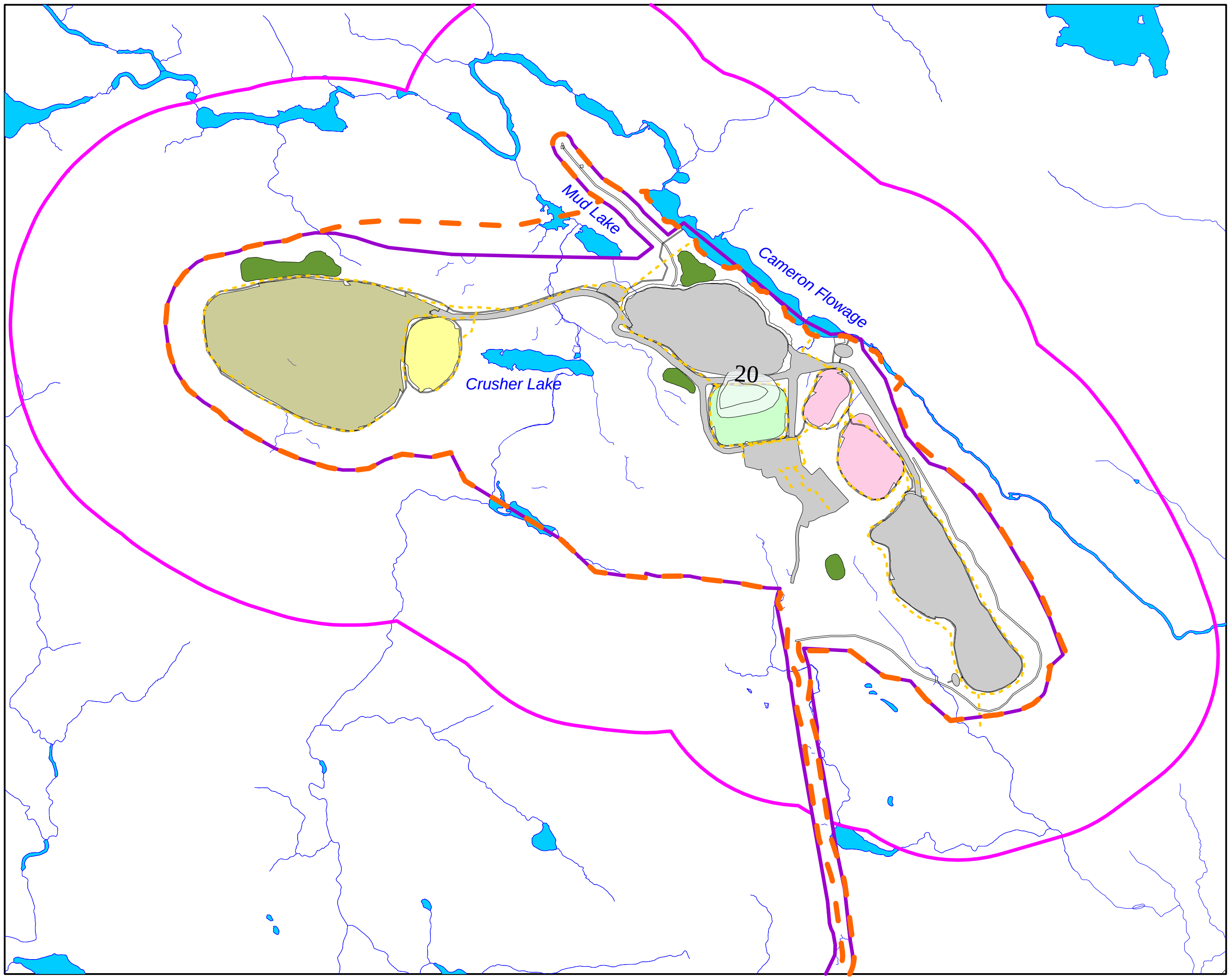
FIGURE CEAA-2-35-146

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.26 - Simulated Uranium Concentration Versus Potable Criteria - PC - UC - AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 SIMULATED URANIUM CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The uranium Tier 2 PSS for groundwater discharge to surface water (>10 m) is 3,000 ug/L.

0 300 600 900m

ATLANTIC GOLD CORPORATION
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BEAVER DAM MINE

SIMULATED URANIUM CONCENTRATION VERSUS TIER 2 PSS
PC - BASE CASE SOURCE TERMS - BASE CASE CONDITION

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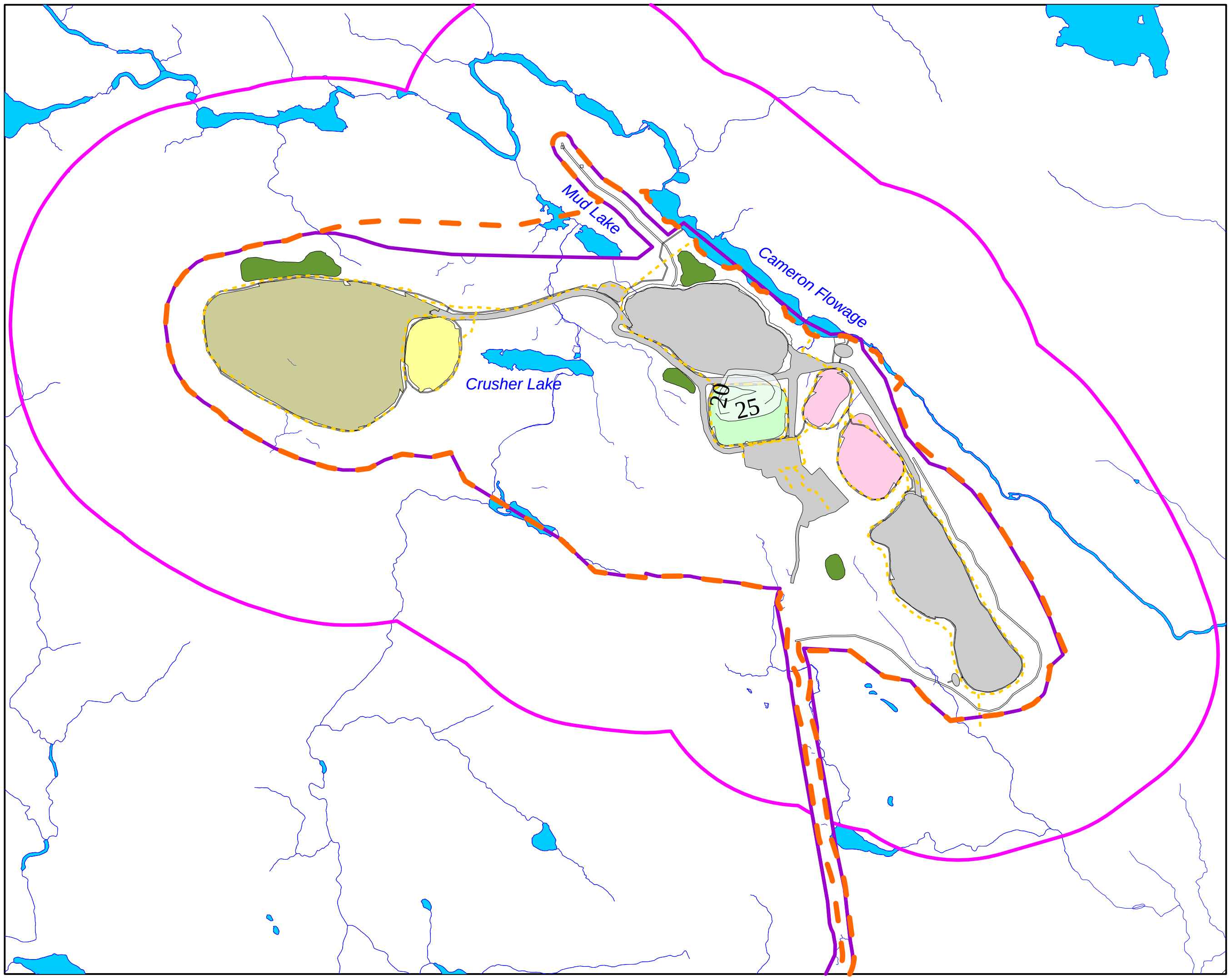
FIGURE CEAA-2-35-147

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.45 - Sim_Lead_PSS-PC-BC-AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 — SIMULATED URANIUM CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The uranium Tier 2 PSS for groundwater discharge to surface water (>10 m) is 3,000 ug/L.

0 300 600 900m

N

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BEAVER DAM MINE

SIMULATED URANIUM CONCENTRATION VERSUS TIER 2 PSS
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

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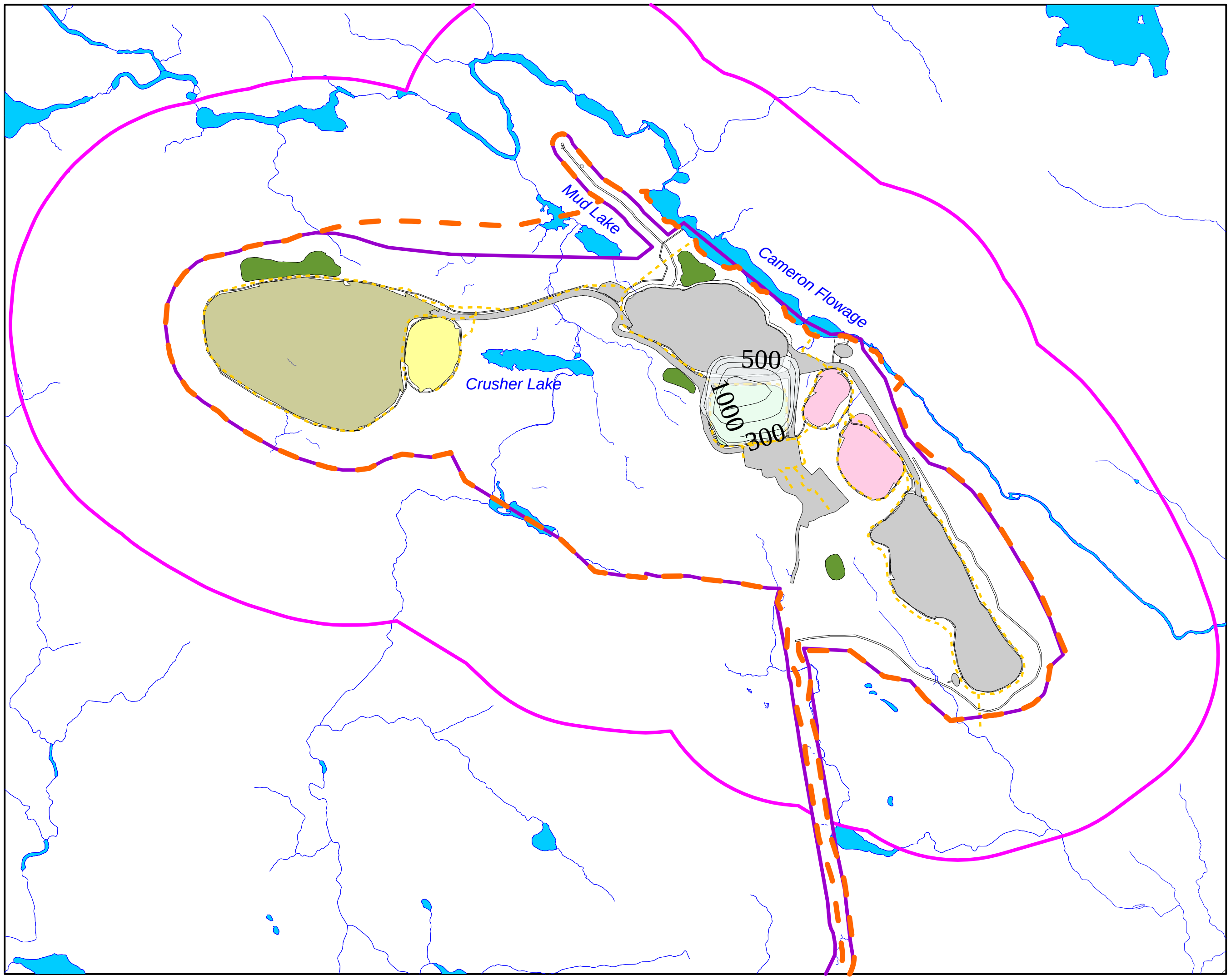
FIGURE CEAA-2-35-148

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.49 - Sim_Zinc_PSS-PC-UC-AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 SIMULATED ZINC CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The zinc Tier 1 EQS for potable groundwater is 5,000 ug/L.

0 300 600 900m

ATLANTIC GOLD CORPORATION
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BEAVER DAM MINE

SIMULATED ZINC CONCENTRATION VERSUS POTABLE CRITERIA
PC - BASE CASE SOURCE TERMS - BASE CASE CONDITION

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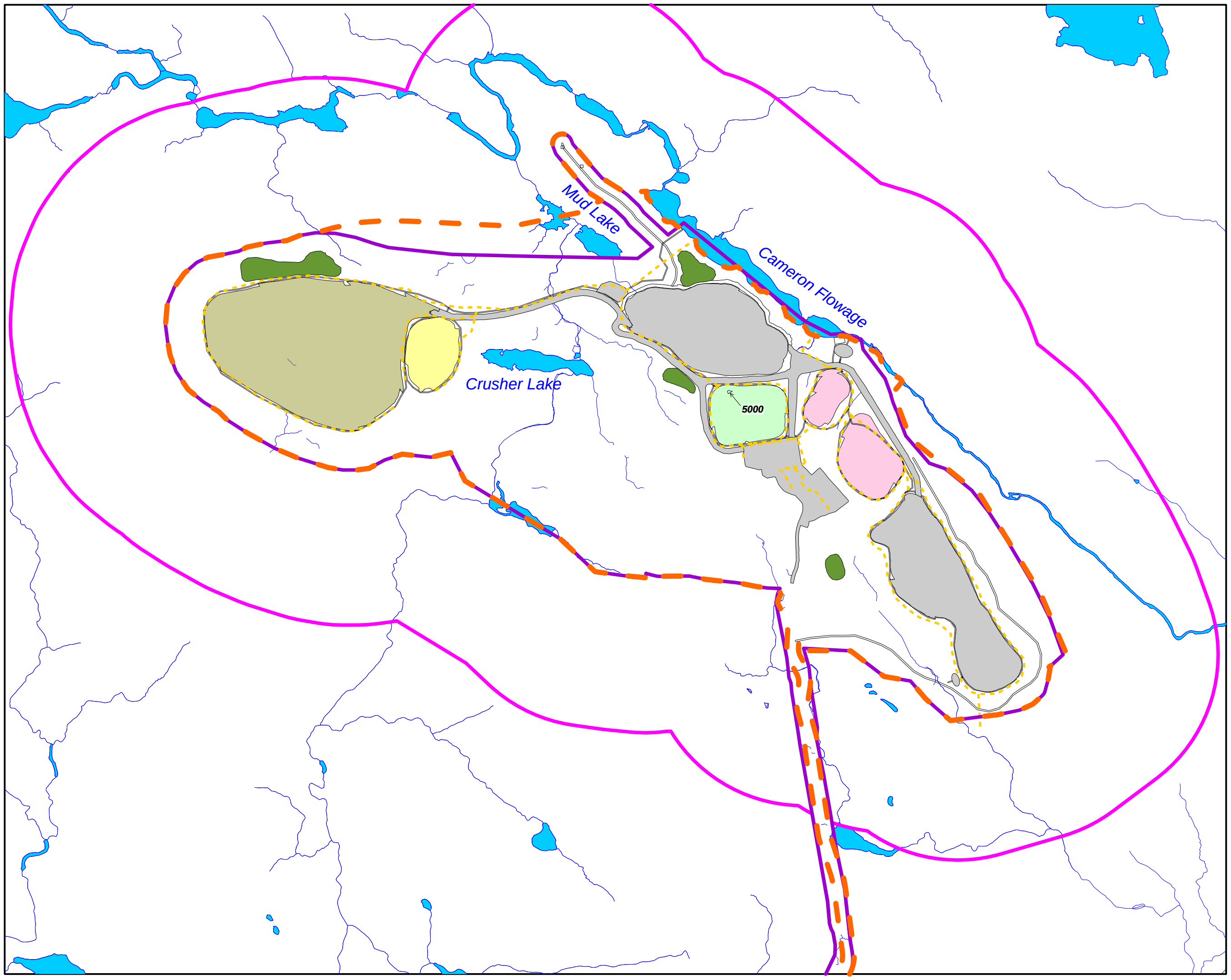
September 07, 2021

FIGURE CEAA-2-35-149

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.16 - Simulated Cobalt Concentration Versus Potable Criteria - PC - BC - AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 — SIMULATED ZINC CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The zinc Tier 1 EQS for potable groundwater is 5000 ug/L.

0 300 600 900m

N

GHD

ATLANTIC GOLD CORPORATION
MARINETTE, NOVA SCOTIA
BEAVER DAM MINE

SIMULATED ZINC CONCENTRATION VERSUS POTABLE CRITERIA
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

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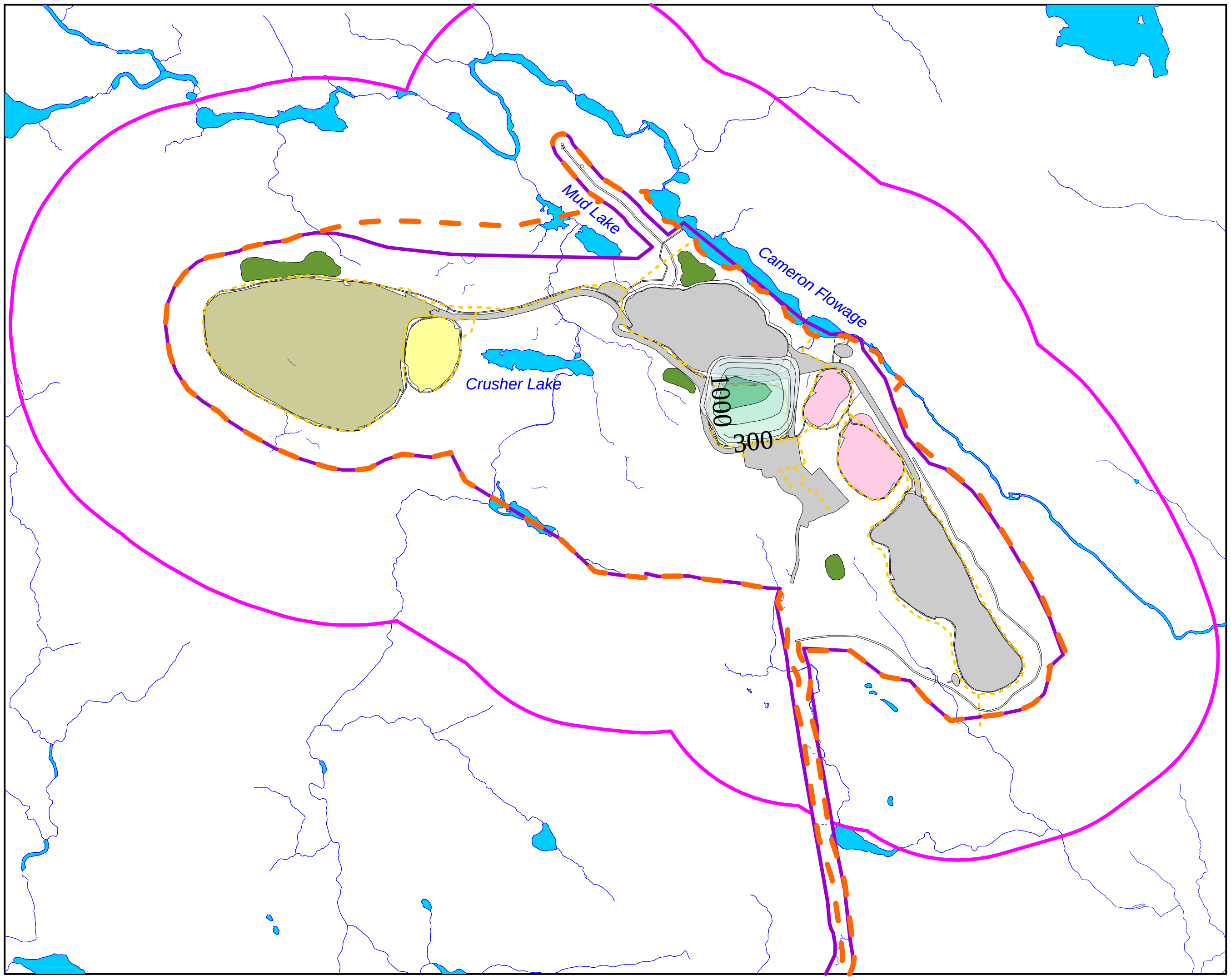
FIGURE CEAA-2-35-150

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.28 - Simulated Zinc Concentration Versus Potable Criteria - PC - UC - AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 SIMULATED ZINC CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The zinc Tier 2 PSS for groundwater discharge to surface water (>10 m) is 300 ug/L.

0 300 600 900m

N

GHD

ATLANTIC GOLD CORPORATION
MARINETTE, NOVA SCOTIA
BEAVER DAM MINE

SIMULATED ZINC CONCENTRATION VERSUS TIER 2 PSS
PC - BASE CASE SOURCE TERMS - BASE CASE CONDITION

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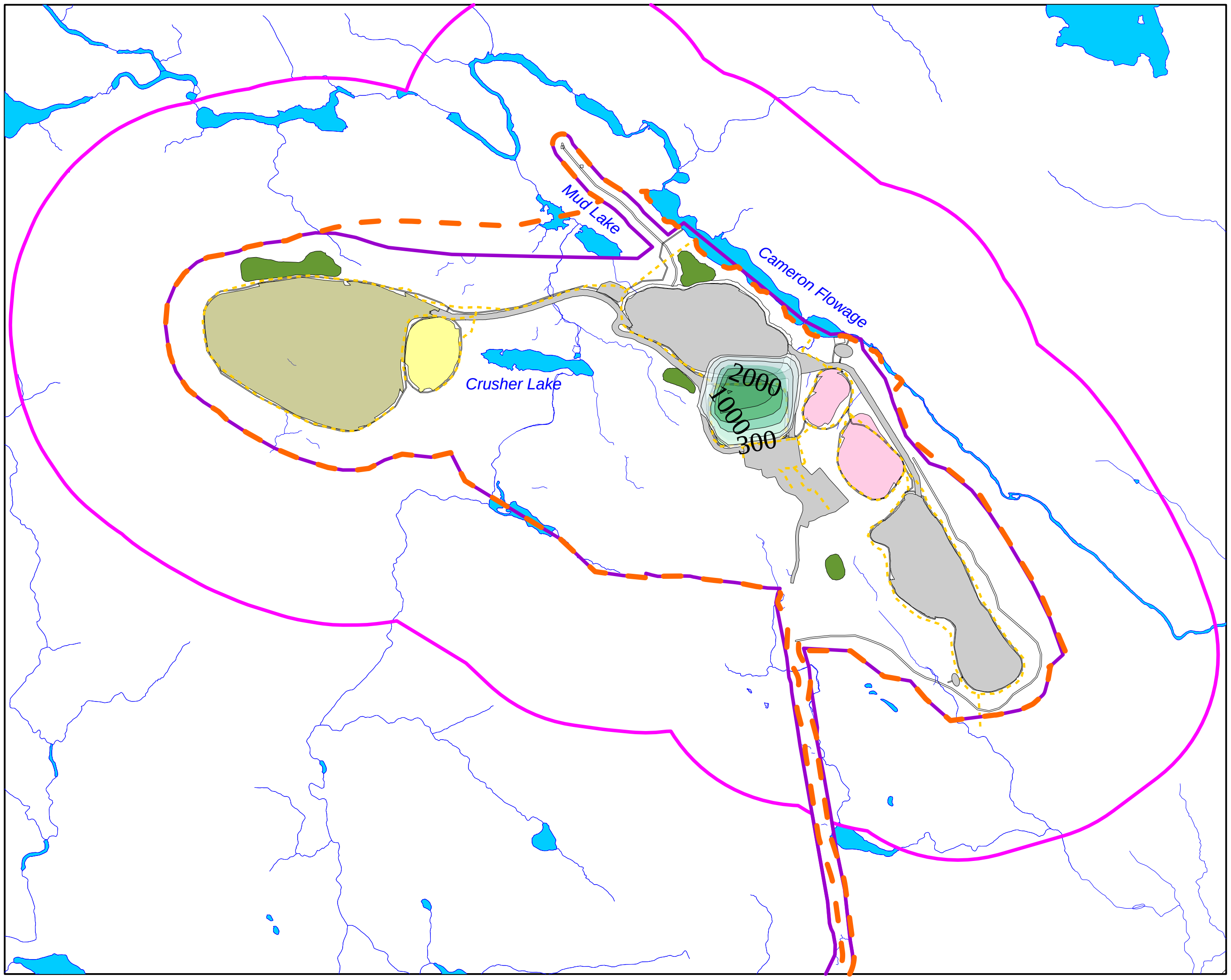
FIGURE CEAA-2-35-151

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.48 - Sim_Zinc_PSS-PC-BC-AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 SIMULATED ZINC CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The zinc Tier 2 PSS for groundwater discharge to surface water (>10 m) is 300 ug/L.

0 300 600 900m

N

GHD

ATLANTIC GOLD CORPORATION
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BEAVER DAM MINE

SIMULATED ZINC CONCENTRATION VERSUS TIER 2 PSS
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

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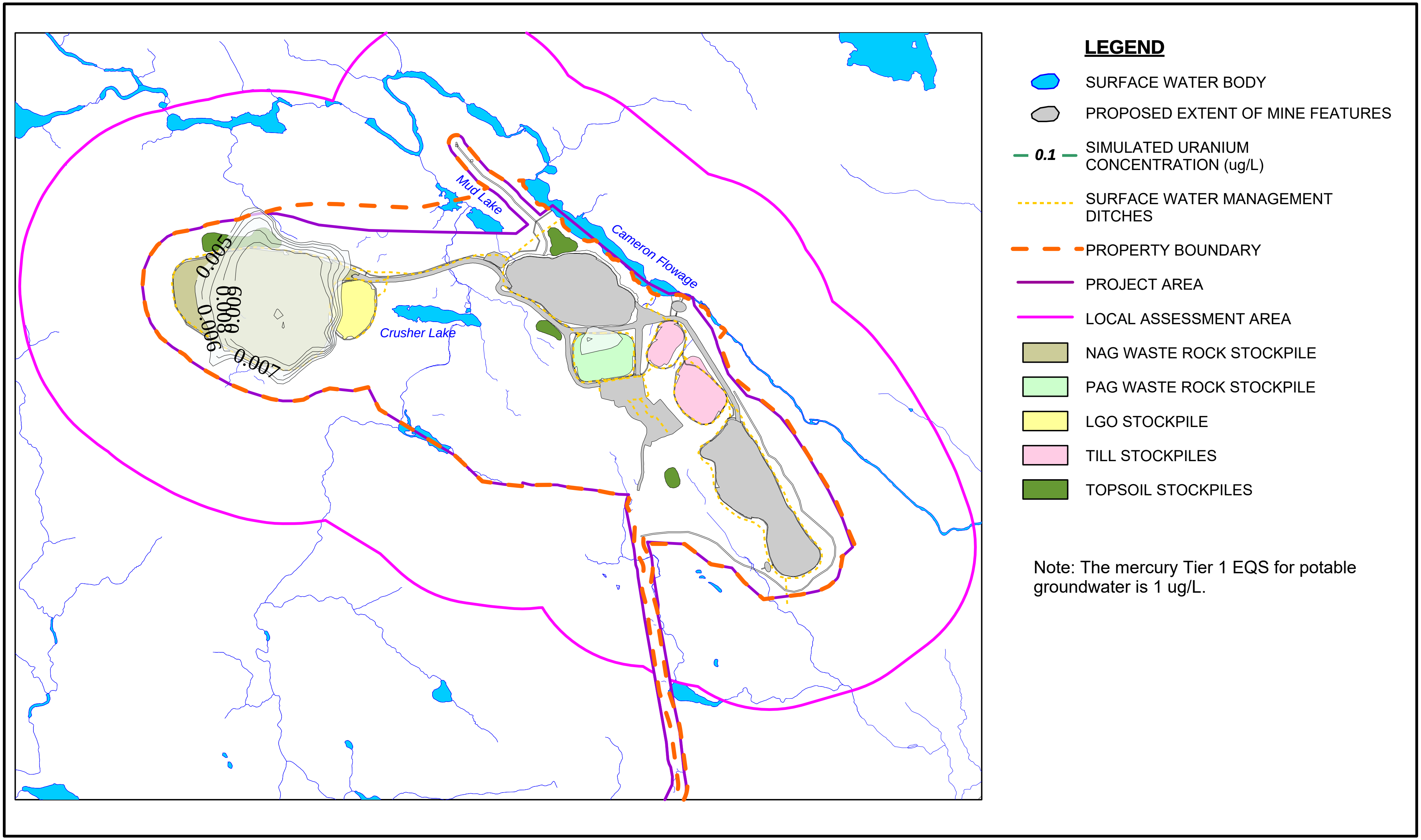
FIGURE CEAA-2-35-152

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.49 - Sim_Zinc_PSS-PC-UC-AVG.srf



0 300 600 900m

N

GHD

ATLANTIC GOLD CORPORATION
MARINETTE, NOVA SCOTIA
BEAVER DAM MINE

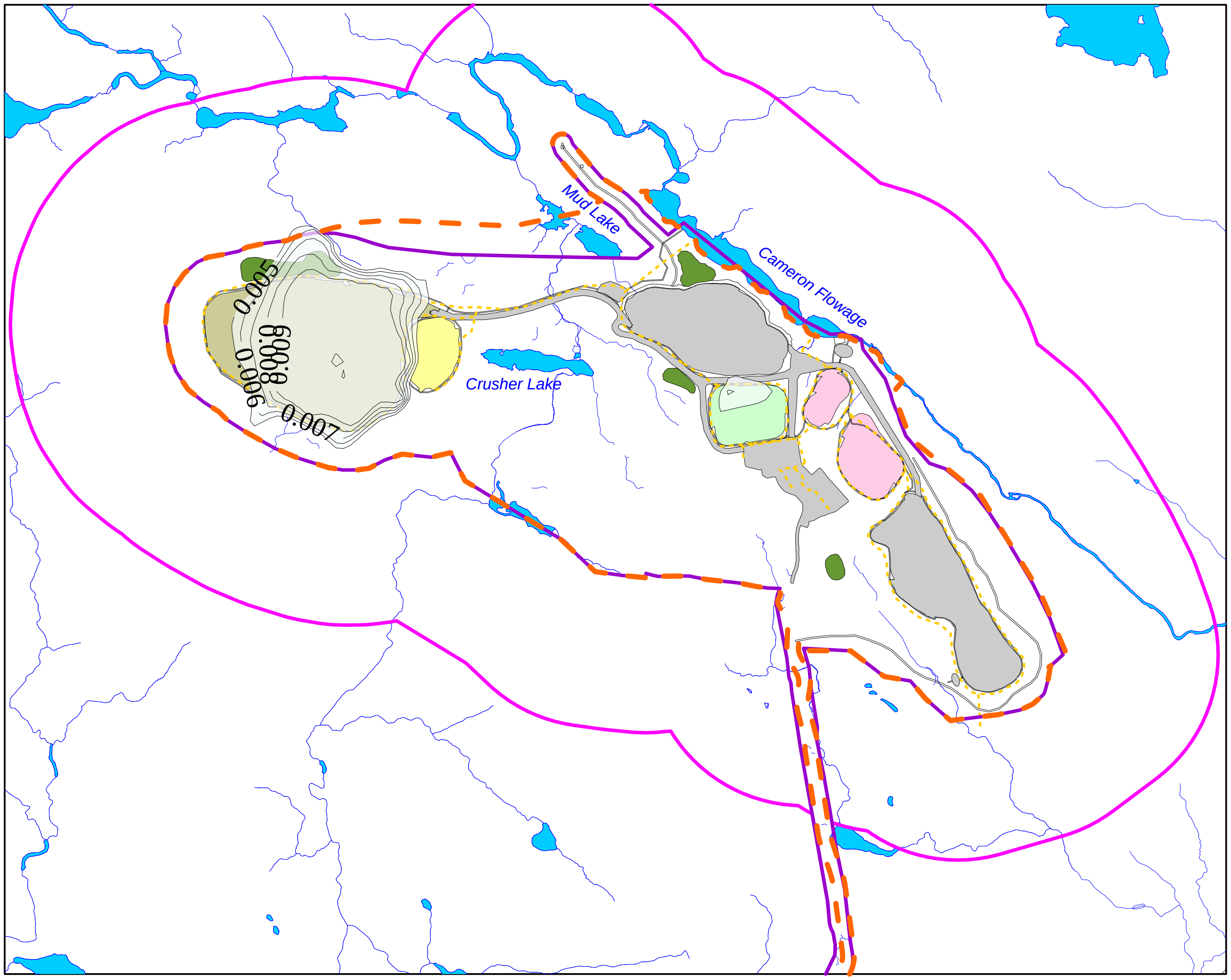
SIMULATED MERCURY CONCENTRATION VERSUS POTABLE CRITERIA
PC - BASE CASE SOURCE TERMS - BASE CASE CONDITION

088664-031

September 07, 2021

FIGURE CEAA-2-35-153

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.16 - Simulated Cobalt Concentration Versus Potable Criteria - PC - BC - AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 SIMULATED URANIUM CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The mercury Tier 1 EQS for potable groundwater is 1 ug/L.

0 300 600 900m

ATLANTIC GOLD CORPORATION
MARINETTE, NOVA SCOTIA
BEAVER DAM MINE

SIMULATED MERCURY CONCENTRATION VERSUS POTABLE CRITERIA
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

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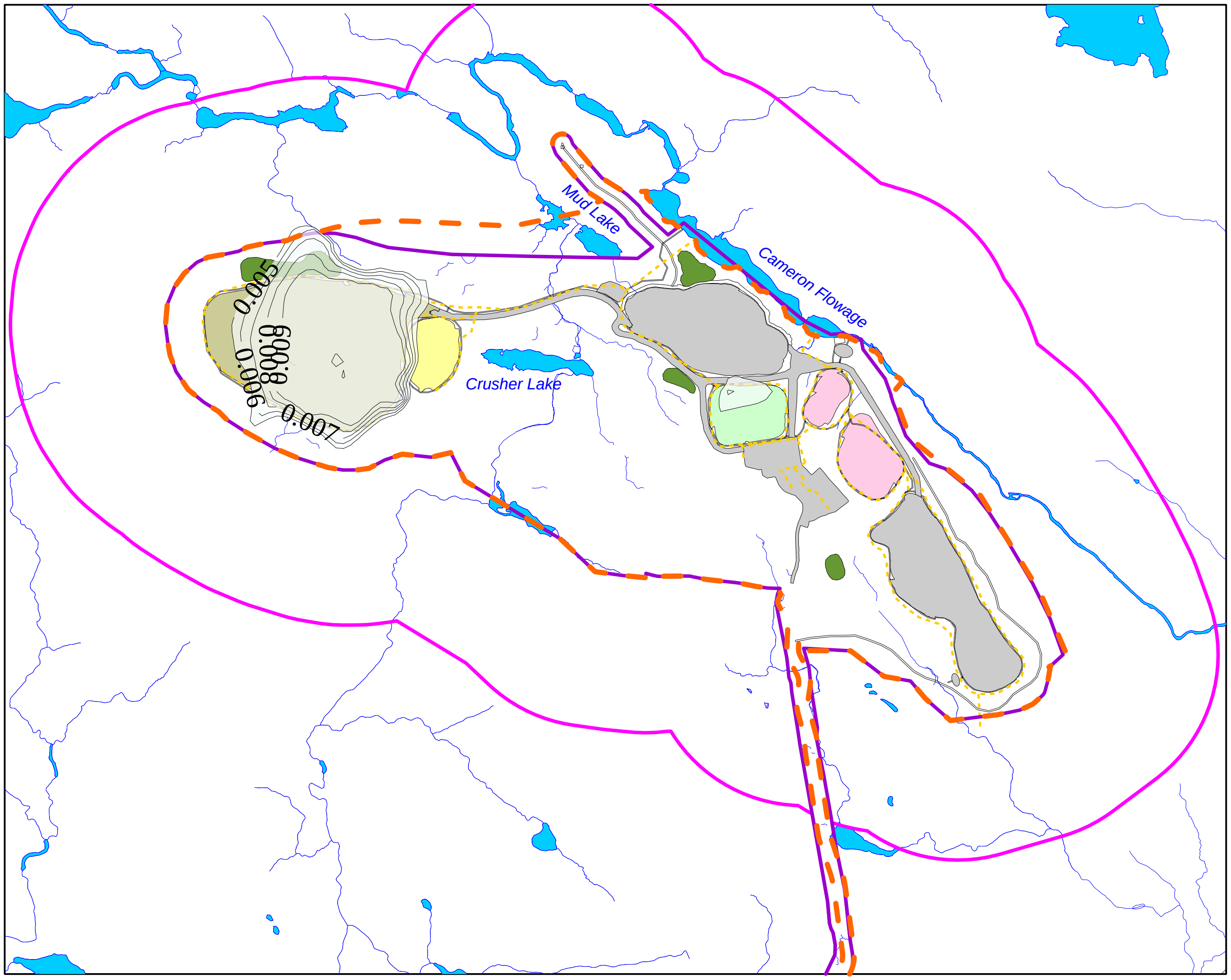
FIGURE CEAA-2-35-154

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\Figure 7.13 - Simulated Arsenic Concentration Versus Potable Criteria - PC - UC - AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 SIMULATED URANIUM CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The uranium Tier 2 PSS for groundwater discharge to surface water (>10 m) is 0.26 ug/L.

0 300 600 900m

N

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BEAVER DAM MINE

SIMULATED MERCURY CONCENTRATION VERSUS TIER 2 PSS
PC - BASE CASE SOURCE TERMS - BASE CASE CONDITION

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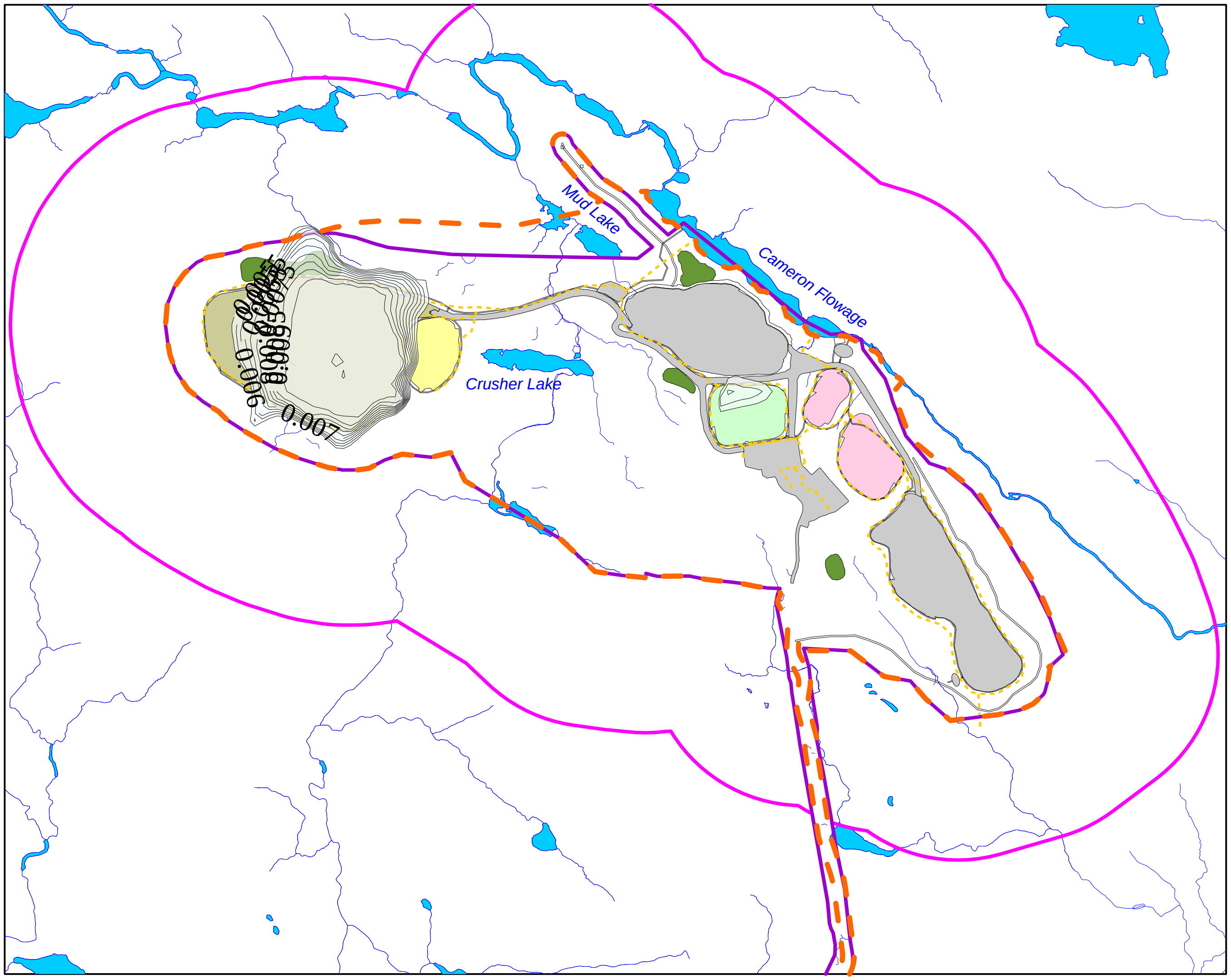
FIGURE CEAA-2-35-155

HEG file: Z:\HEG\088664\DOCUMENTATION\RPT\088664-RPT-13\FIGURES\Figure 7.45 - Sim_Lead_PSS-PC-BC-AVG.srf



LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 SIMULATED URANIUM CONCENTRATION (ug/L)
- SURFACE WATER MANAGEMENT DITCHES
- PROPERTY BOUNDARY
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES

Note: The mercury Tier 2 PSS for groundwater discharge to surface water (>10 m) is 0.26 ug/L.

0 300 600 900m

N

ATLANTIC GOLD CORPORATION
MARINETTE, NOVA SCOTIA
BEAVER DAM MINE

SIMULATED MERCURY CONCENTRATION VERSUS TIER 2 PSS
PC - UPPER CASE SOURCE TERMS - BASE CASE CONDITION

088664-031

September 07, 2021

FIGURE CEAA-2-35-156

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Round 2 Information Request Number:	CEAA-2-36
Regulatory Agency/Indigenous Community:	HC
Topic/Discipline:	Groundwater and Surface Water
EIS Guideline Reference:	Section 6.2 Predicted Changes to the Physical Environment
Revised EIS (February 28, 2019) Reference:	Section 6.6.6.2, p321 Section 2.3.1.2, p113; 6.6.8, p330

Context and Rationale

Potential effects to groundwater quality as a result of the application of magnesium chloride during operations are characterized simply as "highly localized" and "limited in extent".

Given that aggregate materials for construction of the Haul Road may be "sourced from either the Touquoy or Beaver Dam Mine Sites", a discussion is warranted on the use of tested, "clean" material. This is particularly important given the presence of potentially elevated levels of specific metals in the aggregate materials that may be used to construct the Haul Road.

The Proponent is Required to …

Specify whether the application of magnesium chloride or other dust suppressants on the Haul Road (or elsewhere depending on usage) or use of aggregate materials for road construction may impact domestic drinking water supplies such that the GCDWQ may be exceeded in nearby wells (including frequency and magnitude of any effects).

If impacts are predicted, provide a follow up plan that includes baseline sampling of nearby drinking water wells.

Response

Magnesium chloride as well as other suppressants will be used on the Haul Roads to reduce dust. There are no predicted impacts to nearby wells as per response to CEAA 2-36, CEAA 2-37, and NSE 2-130, additional details are provided in Appendix F.9 (Response to Information Request Nos. CEAA 2-36, CEAA 2-37, and NSE 2-130 Evaluation of Potential Impacts from Metals COCs to Groundwater and Surface Water from Dust Deposition along the Haul Road) included in the Updated 2021 EIS (AMNS 2021). In addition, a Human Health Risk Assessment (HHRA) concluded that there are no impacts to wells. Refer to response IR2 CEAA 2-38 and Appendix C.2 (Evaluation of Potential Human Exposures and Risks Related to Emissions from the Beaver Dam Mine Project (Dust Deposition; Recreational Water Usage; Country Foods) included in the Updated 2021 EIS (AMNS 2021) for additional details regarding the HHRA.

References

AMNS (Atlantic Mining NS Inc.). 2021. Updated Environmental Impact Statement. Beaver Dam Mine Project. Submitted to the Impact Assessment Agency of Canada and Nova Scotia Environment. October 2021. Middle Musquodoboit, NS.

Round 2 Information Request Number:	CEAA-2-37
Regulatory Agency/Indigenous Community:	HC
Topic/Discipline:	Groundwater and Surface Water
EIS Guideline Reference:	Section 3.3.1 Changes to the Environment
Revised EIS (February 28, 2019) Reference:	Section 6.7.3.1.2, p351 Figures 6.7-3I, 6.7-12; Section 6.7.6.2, p396

Context and Rationale

The water flow and fish passage discussion in the revised EIS is limited to the effects of Haul Road activities. However, receptors downstream of water crossings have the potential to be exposed to project related contaminants, including in the event of a spill, through recreational use or drinking water.

It is also unclear whether residents along Ferry Lake are located upstream or downstream of the Haul Road.

The Proponent is Required to …

Assess the potential effects of Haul Road activities on water quality downstream of the watercourse crossings.

Clarify whether human receptors who may live or use Ferry Lake (or any other locations downstream of any water crossings) may be affected due to project-related contaminants, including accidental chemical spills and the possible contamination of downstream drinking water supplies. If there is the potential for this to occur, update the assessment of related valued component as appropriate.

Response

There are no predicted impacts to human receptors who may live or use Ferry Lake (Appendix F.9 [Response to Information Request Nos. CEAA 2-36, CEAA 2-37, and NSE 2-130 Evaluation of Potential Impacts from Metals COCs to Groundwater and Surface Water from Dust Deposition along the Haul Road] of the Updated 2021 EIS (AMNS 2021)]). An assessment of accidental chemical spills is provided in the Section 6.18, page 6-934 Accidents and Malfunctions of the Updated 2021 EIS (AMNS 2021). In addition, Atlantic Mining NS Inc. (AMNS) has developed a draft Emergency Response Plan (Appendix P.1), which includes a draft Spill Contingency Plan as Appendix A, PDF page 70 of Appendix P.1 to mitigate and prevent impacts to receptors. These draft plans are included in the Updated 2021 EIA (AMNS 2021).

References

AMNS (Atlantic Mining NS Inc.). 2021. Updated Environmental Impact Statement. Beaver Dam Mine Project. Submitted to the Impact Assessment Agency of Canada and Nova Scotia Environment. October 2021. Middle Musquodoboit, NS.

Round 2 Information Request Number:	CEAA-2-38
Regulatory Agency/Indigenous Community:	HC
Topic/Discipline:	Air, Noise and Human Health
EIS Guideline Reference:	Section 6.3.4 Aboriginal Peoples
Revised EIS (February 28, 2019) Reference:	Section 6.14.5, p828 Section 6.14.6 Surface Water and Groundwater, p836 Example from 6.14.6 Geology, Soil and Sediment, p835

Context and Rationale

The EIS dismisses indirect effects on human health from each exposure pathway independently from all other pathways. For example: "No residual effects for geology, soils and sediment are anticipated … . Therefore, no indirect significant effects are expected as a result of the link between biophysical effects and effects to Indigenous peoples."

A human health risk assessment (HHRA) is required when elevated COPC concentrations are predicted in one or more environmental media for a proposed project. The following elevated COPC concentrations are noted:

Several contaminants are above criteria in air at receptors located further from the project than Indigenous traditional land users.

- Aluminum and boron concentrations in soil along the Haul Road are predicted above criteria.
- Concentrations of several parameters were predicted to be above criteria in the Beaver Dam and Touquoy pit lakes, and to a lesser extent the receiving watercourses. Note comment HC-10 regarding the use of site-specific water quality objectives for arsenic focused on effects to aquatic ecology and not on human health.
- Concentrations of several parameters were predicted above criteria in berries along the Haul Road. Note comment HC-01 regarding the limited scope of the country foods assessment.

Given the documented traditional land use of the area, the predicted COPC concentrations above criteria in several media, and the Millbrook First Nation request for an independent study regarding impacts to human health, a quantitative HHRA should be undertaken. Where there are pathways that may not result in increased exposure to the human receptors identified, a qualitative (screening) approach may be sufficient.

Further information on evaluating human health risks can be found in Health Canada's 2012 Guidance on Preliminary Quantitative Risk Assessment (PQRA).

Reference: Health Canada. 2012. Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA), Version 2.0

The Proponent is Required to …

Provide justification as to why an HHRA is not required to determine significance on Indigenous people.

OR

Conduct a human health risk assessment (HHRA) to provide an estimate of potential human health risks associated with chemicals released at various stages of the proposed project. This should include but is not limited to Indigenous and recreational land users, seasonal residents and/or permanent residents.

Response

An update to the Beaver Dam Mine Project Human Health Risk Assessment (HHRA) is provided in the Updated 2021 EIS (AMNS 2021) as Appendix C.2 (Evaluation of Potential Human Exposures and Risks Related to Emissions from the Beaver Dam Mine Project [Dust Deposition; Recreational Water Usage; Country Foods]) additional details regarding the HHRA.

The HHRA provides quantitative estimates of potential human health risks associated with chemicals released at various stages of the proposed Project including to Indigenous and recreational land users, seasonal residents and/or permanent residents.

Specific references to the context and rational provided above by IAAC within this IR2 (CEAA-2-38) are as follows:

- <u>Specific Comment</u>: Aluminum and boron concentrations in soil along the Haul Road are predicted above criteria <u>Response:</u> Aluminum and boron concentrations in soil along the Haul Road were predicted above criteria as a result of naturally occurring concentrations present in the environment in baseline (Table 6-6, PDF page 53 of Appendix C.2). The incremental additions as a result of the operations of the proposed mine are provided in Table 6-6, PDF page 53 of Appendix C.2, and indicate that at the Maximum Point of Impingement (MPOI) of the site boundary, and a receptor location with the highest dust deposition rate (Deepwood Estates) will add a small additional amount of both metals to the environment over life of operations. Table 8-4, PDF page 75 in Appendix C.2 provides the modelling outcomes for these two metals (and all other Chemicals of Potential Concern) related to cumulative effects. These small incremental changes in the soil concentrations as a result of operations and cumulative effects were included in a multipathway Human Health Risk Assessment (HHRA), and the results of this risk assessment are presented in Tables 7-4, PDF page 68 (operations) and 8-7, PDF page 80 (cumulative effects), with predicted risks being within acceptable levels, following Health Canada guidance.
- Specific comment: Concentrations of several parameters were predicted to be above criteria in Beaver Dam and Touquoy Pit lakes and to a lesser extent, the receiving watercourses. Comment HC-10 regarding the use of site-specific water quality objectives for arsenic focused on effects to aquatic ecology and not human health. Response: a recreational water quality assessment is presented in Appendix C.2 (HHRA), in Section 5, PDF page, following Health Canada guidance (Health Canada, 2016b). This assessment focuses on Cameron Flowage, as it is deep enough to allow for swimming, and provides a comparison of predicted future water concentrations from various prediction nodes to Canadian Drinking Water Quality Guidelines. Health Canada (2016b) states that, "*if the project will not result in any exceedance of applicable water quality guidelines or standards at the point of human consumption or exposure, it is reasonable to conclude that negative impacts on human health are not expected from exposure to drinking or recreational water*." The site specific water quality guideline developed for arsenic for aquatic health was not used in the human health assessment, but rather, the Canadian Drinking Water Quality Guideline for arsenic was used in the assessment. Tables 5-1, PDF page 35; 5-2, PDF page 36 and 5-3, PDF page 37 of Appendix C.2 provide the screening outcomes.
- <u>Specific comment</u>: Concentrations of several parameters were predicted above criteria in berries along the Haul Road. Note comment HC-01 regarding the limited scope of the country foods assessment. <u>Response:</u> Appendix C.2 provides a fulsome HHRA, and within that appendix, Table 6-7, PDF page 55 (operations) and Table 8-5, PDF page 77 (cumulative effects) provide predictions for future berry concentrations, along with measured baseline data. Some metals were predicted to

become elevated relative to baseline, due to project operations. These small incremental changes in the berry concentrations as a result of operations and cumulative effects were included in a multipathway Human Health Risk Assessment (HHRA), and the results of this risk assessment are presented in Tables 7-4, PDF page 68 (operations) and 8-7, PDF page 80 (cumulative effects), with predicted risks being within acceptable levels, following Health Canada guidance. Note that the HHRA provided in Appendix C.2 is a full multipathway risk assessment, and therefore addresses the IR comment related to the limited scope of the previous country food assessment.

- Specific Comment: Given the documented traditional land use of the area, the predicted COPC concentrations above criteria in several media, and the Millbrook First Nation request for an independent study regarding impacts to human health, a quantitative HHRA should be undertaken. Where there are pathways that may not result in increased exposure to the human receptors identified, a qualitative (screening) approach may be sufficient. Further information on evaluating human health risks can be found in Health Canada's 2012 Guidance on Preliminary Quantitative Risk Assessment (PQRA). Response: Appendix C.2 provides a fulsome HHRA which follows Health Canada guidance, including multiple exposure pathways (game meat; soil ingestion; berries and leafy vegetation; recreational swimming; air inhalation, etc.)

Reference

AMNS (Atlantic Mining NS Inc.). 2021. Updated Environmental Impact Statement. Beaver Dam Mine Project. Submitted to the Impact Assessment Agency of Canada and Nova Scotia Environment. October 2021. Middle Musquodoboit, NS.

Health Canada. 2016. Guidance for Evaluating Human Health Impacts in Environmental Assessment: Drinking and Recreational Water Quality. Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario

Round 2 Information Request Number:	CEAA-2-39
Regulatory Agency/Indigenous Community:	HC
Topic/Discipline:	Air, Noise and Human Health
EIS Guideline Reference:	Section 6.6 Significance of Residual Effects
Revised EIS (February 28, 2019) Reference:	Section 6.14.5.2, p830

Context and Rationale

Health Canada assesses biophysical changes in air quality, noise levels, drinking water effects, and contamination of country foods (and those impacts on human health).

Thresholds for the determination of significance on human health are defined as "effects on health … of affected Indigenous communities to the extent that there are associated detectable and sustained decreases in the quality of life of a community."

The proposed significance definition does not provide a quantitative measure to evaluate potential human health effects from the project. Furthermore, there is no evaluation of quality of life in the EIS and as such, it is not possible to evaluate significance in relation to human health. For example, 'detectable' and 'sustained decreases' in the 'quality of life' of 'a community' cannot be determined during the environmental assessment process.

Section 6.14.5.2 further states that non-permanent and/or geographically limited (i.e., small-scale) changes in harvest areas caused by displacement due to Project activities are not considered to be significant. The Agency requires that terms such as "geographically limited (i.e. small scale)" or "changes in harvest areas" must be clearly defined.

The Proponent is Required to …

Provide a quantitative definition of significance for human health that can be measured during the environmental assessment. If this is not feasible, provide a reasoned rationale for the proposed definition of significance for human health.

Define the "geographically limited (i.e. small scale) changes in harvest areas" relative to the assessment study areas and confirm that the movement of species of interest for harvest through the study areas has been considered.

Response

To support analysis of Project effects, and to respond to Round 2 Information Requests (IR2s) CEAA 2-02, CEAA 2-39 and CEAA 2-53, a significant adverse residual effect on the Mi'kmaq of Nova Scotia is defined as a Project-related environmental effect that results in one or more of the following outcomes:

- Long-term (greater than 20 years) or permanent loss of the availability of, or access to, land and resources currently relied on for traditional use practices; or if long-term or permanent loss is expected, no allowance for agreed-upon compensation with the affected Mi'kmaq community(s). A twenty-year temporal scale was chosen to represent a generational loss of access to an area.
- Human health risk assessments are inherently conservative, and hence, development of a threshold of significance for human health is complicated, since risk estimates tend to be biased high, based on the degree of conservatism included in any given risk assessment. The threshold for a significant residual effect has been defined as a potential adverse effect to health, identified through the conclusions presented in the Human Health Risk Assessment (HHRA) included as

Appendix C.2 (Evaluation of Potential Human Exposures and Risks Related to Emissions from the Beaver Dam Mine Project [Dust Deposition; Recreational Water Usage; Country Foods]) included in the Updated 2021 EIS (AMNS 2021).

- An unmitigated loss of a physical or cultural structure, site or thing that is of historical, archaeological, paleontological or architectural significance to the Mi'kmaq.
- Short-term (less than 20 years) loss of availability of land and resources caused by displacement due to Project activities are not considered to be significant.

This significance threshold includes a quantitative definition of significance for human health, specifically in the context of the Mi'kmaq of Nova Scotia, which can be extended to all people who might be utilizing the landscape for recreational purposes or partaking in the ingestion of country foods. The magnitude thresholds described below further support the significance threshold for human health (Low or High). The results of the HHRA are found in AMNS 2021 (Section 6.14, page 6-772 and Appendix C.2 of the Updated 2021 EIS [AMNS 2021]).

For the Mi'kmaq of Nova Scotia, the following was applied to assess the magnitude of a predicted change (one or more of these aspects):

- Negligible
  - no loss of a structure, site or thing that is of historical, archaeological, paleontological or architectural significance to the Mi'kmaq of Nova Scotia as a result of Project development;
  - no observable change in the availability and baseline condition of lands and resources for traditional purposes; and
  - no change in baseline socio-economic condition of the affected Mi'kmaq communities from Project activities.
- Low
  - loss of a structure, site or thing that is of historical, archaeological, paleontological or architectural significance to the Mi'kmaq of Nova Scotia as a result of Project development, but only after a comprehensive evaluation by Mi'kmaq archaeological teams determines the loss is considered appropriate and mitigation measures are employed;
  - an observable change in the availability and baseline condition of the lands and resources for traditional purposes for a short temporal window (less than 20 years) and with commitment to appropriate and negotiated accommodation and compensation with the affected Mi'kmaq community(s);
  - elevated risk of non-carcinogenic or carcinogenic health risk that do not exceed Risk Quotients and where Incremental Lifetime Cancer Risks (ILCR) related to the Project were not predicted to exceed the benchmark cancer risk level of 1 in 100,000; and
  - a positive potential change in baseline socio-economic condition of the affected Mi'kmaq communities from Project activities.
- Moderate
  - loss of a structure, site or thing that is of historical, archaeological, paleontological or architectural significance to the Mi'kmaq of Nova Scotia as a result of Project development, with mitigation measures;

  - an observable change in the availability and baseline condition of the lands and resources for traditional purposes for a short temporal window (less than 20 years) with no consideration of appropriate and negotiated accommodation and compensation with the affected Mi'kmaq community(s); and
  - elevated risk of non-carcinogenic or carcinogenic health risk that do not exceed Risk Quotients and where Incremental Lifetime Cancer Risks (ILCR) related to the Project were not predicted to exceed the benchmark cancer risk level of 1 in 100,000.
- High
  - loss of a structure, site or thing that is of historical, archaeological, paleontological or architectural significance to the Mi'kmaq of Nova Scotia as a result of Project development, without mitigation measures;
  - an observable change in the availability and baseline condition of the lands and resources for traditional purposes for a long-term temporal window (greater than 20 years);
  - elevated risk of non-carcinogenic or carcinogenic health risk that exceed Risk Quotients and/or where Incremental Lifetime Cancer Risks (ILCR) related to the Project were predicted to exceed the benchmark cancer risk level of 1 in 100,000; and
  - a negative potential change in baseline socio-economic condition of the affected Mi'kmaq communities from Project activities.

The effects assessment relating to traditional practices including Mi'kmaq hunting, gathering, trapping and spiritual use has been updated in the Updated 2021 EIS (AMNS 2021) to reflect a broader understanding of traditional practices in and surrounding the Project Area (PA), specifically as a result of the results of a Traditional Land and Resource Use Study (TLRUS) prepared by Moccasin Flower Consulting Inc. for Millbrook First Nation (MFC 2019 – Under Confidential Cover), and through on-going engagement with Millbrook First Nation and all Mi'kmaq of Nova Scotia communities. As a result of this updated assessment, the use of the term "geographically limited (i.e., small scale) changes in harvest areas" has been removed from the analysis of Project impacts. Movement of species for harvest through the local assessment area (LAA) has been considered in the analysis of Mi'kmaq of Nova Scotia impacts and a Wildlife Indirect Environmental Effects Zone has been established to demonstrate the maximum area outside of the Project boundaries where hunting activities may be affected by the Project due to potential sensory disturbance to fauna (noise and light).

References

AMNS (Atlantic Mining NS Inc.). 2021. Updated Environmental Impact Statement. Beaver Dam Mine Project. Submitted to the Impact Assessment Agency of Canada and Nova Scotia Environment. October 2021. Middle Musquodoboit, NS.

MFC (Moccasin Flower Consulting Inc.). 2019 – Under Confidential Cover. Atlantic Gold Corporation's Proposed Beaver Dam Mine: Traditional Land and Resource Use Study. Prepared for Millbrook First Nation. pp. 71.

Round 2 Information Request Number:	CEAA-2-40
Regulatory Agency/Indigenous Community:	NRCan
Topic/Discipline:	Hydrogeochemistry
EIS Guideline Reference:	Part 2, Section 6 Effects Assessment; 6.1.3 Topography and Soil
Revised EIS (February 28, 2019) Reference:	Page 203-204, Section 6.5.3.2 Soils and Sediments; Appendix C.2, Evaluation of Exposure Potential Related to Dust Deposition from Haul Road Traffic onto Soils, Berries, and Vegetation, Table 2-1; Appendix E.2, Beaver Dam Project – ML/ARD Assessment Report, Table 4-9

Context and Rationale

Section 6.5.3.2 provides a brief description of the surficial geology and geochemistry of soils and tills in the project area based on two reports from the Nova Scotia Department of Natural Resources summarizing exploration geochemistry data collected by NSDNR from 1977-1982 (3 samples; NSDNR 2006a) and by Seabright Resources from 1986-1989 (98 samples; NSDNR 2006). Additional soil sampling was completed along the proposed Haul Road in 2018 as discussed in Appendix C.2. Six overburden samples were also collected at the Beaver Dam Project Site for metal leaching/acid rock drainage (ML/ARD) testing, but are not discussed in section 6.5.3.2.

It is NRCan's view that a systematic survey of surface soils at the Beaver Dam site would help to establish more reliable site-specific baseline concentrations for a broader range of metal(loid)s within the project area, and may also help to identify areas containing historical mine tailings. The spatial distribution of some elements of concern, especially arsenic, will most likely vary significantly across the site and be influenced by various factors such as proximity to the ore zone, glacial transport, and soil depth (see Parsons and Little (2015) for examples from other gold mines in Nova Scotia). A better understanding of soil geochemistry could help the proponent manage areas contaminated by historical mining activity, and select the most appropriate materials for future reclamation efforts.

From 2007 to 2010, the NSDNR and Geological Survey of Canada collected samples of soil and till throughout Nova Scotia that could provide additional insight into the geochemistry of soils and dust along the proposed haul route (Rencz et al. 2011; Friske et al. 2014a, 2014b). These surveys sampled individual soil horizons, including the "Public Health" layer (0-5 cm) and would augment data for the 11 soil samples collected along the haul road in 2018 (Appendix C.2). Geochemical data from these surveys would also be useful for establishing background concentrations for a wide range of elements from other parts of the Meguma Supergroup with similar bedrock and surficial geology to the Beaver Dam site. Based on the results of these surveys, include discussion on the main processes that might control the spatial distribution of elements such as arsenic, which exceeds CCME soil quality guidelines in 29 of 98 till samples near the project site (page 203, section 6.5.3.2) and in all of the overburden samples collected for ML/ARD testing (Appendix E.2, Table 4-9). These data would serve as a baseline for future environmental monitoring activities and help guide reclamation efforts.

Soil geochemistry data are available from regional surveys carried out by the Geological Survey of Canada (GSC) and NSDNR from 2007-2010, and by the GSC around NS gold mine districts. These datasets could help the proponent to evaluate the ranges of arsenic (As) and Mercury (Hg) typically encountered around historical gold mine districts, and how their own soil geochemistry data compare to other parts of Nova Scotia. Incorporating these data into future environmental monitoring programs should help to distinguish mining impacts from natural variations in element concentrations within soils of the Meguma Terrane.

Friske, P.W.B., Ford, K.L., McNeil, R.J., Pronk, A.G., Parkhill, M.A., and Goodwin, T.A. (2014a) Soil Geochemical, Mineralogical, Radon and Gamma Ray Spectrometric Data from the 2007 North American Soil Geochemical Landscapes Project in New Brunswick, Nova Scotia and Prince Edward Island; Geological Survey of Canada, Open File 6433 (revised). doi:10.4095/293020

Friske, P.W.B., Ford, K.L., McNeil, R.J., Amor, S.D., Goodwin, T.A., Groom, H.D., Matile, G.L.D., Campbell, J.E., and Weiss, J.A. (2014b) Soil Geochemical, Radon and Gamma Ray Spectrometric Data from the 2008 and 2009 North American Soil Geochemical Landscapes Project Field Surveys; Geological Survey of Canada, Open File 7334 (revised). doi:10.4095/293019

Parsons, M.B. and Little, M.E. (2015) Establishing geochemical baselines in forest soils for environmental risk assessment at the Montague and Goldenville gold districts, Nova Scotia, Canada; Atlantic Geology, v. 51, pp364–386.

Rencz, A.N., Garrett, R.G., Kettles, I.M., Grunsky, E.C., and McNeil, R.J. (2011) Using soil geochemical data to estimate the range of range of background element concentrations for ecological and human-health risk assessments; Geological Survey of Canada, Current Research 2011-9, 22 p. doi:10.4095/288746

The Proponent is Required to …

Conduct a survey of soil geochemistry at the Beaver Dam Mine site to delineate soils contaminated by former mining activity, including historical tailing.

Response

Summary Response

Stantec Consulting Ltd. (Stantec) conducted a Phase I Environmental Site Assessment (ESA) (Appendix E.6 [Stantec 2019a] of the Updated 2021 EIS), Limited Phase II ESA (Appendix E.7 [Stantec 2019b] of the Updated 2021 EIS), and Extended Phase II ESA (Appendix E.8 [Stantec 2021] of the Updated 2021 EIS) of the proposed mining operations for the Beaver Dam Mine Project.

Scope and Findings of Phase I ESA

The Phase I ESA (Appendix E.6 [Stantec 2019a] of the Updated 2021 EIS [AMNS 2021]) included a records review, interviews, and site visit which revealed evidence of potential environmental contamination associated with the Site. Stantec also conducted LIDAR analysis to produce a Digital Elevation Model (DEM) of the Site which was used to approximately delineate potential historical tailings and waste rock storage areas prior to conducting the Phase I ESA site visit.

Based on the information gathered, there are suspected tailings and waste rock both within the area of the proposed open pit development as well the area of the adjacent pit operations, which are potentially impacted with arsenic and mercury and have potential acid generating potential. Additionally, the mine operation in the 1980s included power generation, maintenance work and underground fuel storage.

Scope of Phase II ESAs

The Limited and Extended Phase II ESAs assessed soil geochemistry at the Site and provided conclusions relating to naturally-occurring background concentrations and soil contamination associated with the historical mining activities identified in the Phase I ESA.

Soil sampling was conducted from test pits. Twenty-nine test pits were excavated as part of the Limited Phase II ESA, and 65 test pits as part of the Extended Phase II ESA (Appendix E.7 and E.8 of the Updated 2021 EIS [AMNS 2021]).

Rationale and Methodology

Test pit locations during the Limited Phase II ESA were chosen in the field based on areas of concern (i.e., tailings and waste rock storage areas) identified during review of the DEM and a visual assessment of the Site, and based on the location of proposed mine infrastructure. LIDAR data specific to the Beaver Dam area was requested from the Nova Scotia Department of Natural Resources in August 2019 which identified historical tailing areas within the settlement pond, Crusher Lake and Forge Hill mining and stamp mill area.

Test pit locations during the Extended Phase II ESA were selected to further delineate the arsenic previously detected in 2019 in the area of the proposed pit. Stantec used a grid to assess areas around and between areas that Stantec considered to have been impacted with arsenic based on 2019 soil analytical results and field observations, and to screen newly identified areas. Locations were also chosen to screen the revised proposed mine infrastructure areas.

Soil sampling methodology is detailed in Section 2.2, PDF page 14 of the Limited Phase II ESA (Appendix E.7 [Stantec, 2019b]) and Section 2.2, PDF page 18 of the Extended Phase II ESA (Appendix E.8 [Stantec, 2021]) of the Updated 2021 EIS (AMNS 2021).

Regulatory Framework

Analytical results for soil were compared to the applicable Tier 1 Environmental Quality Standards (EQS) from Nova Scotia Environment and Climate Change (NSECC)'s Contaminated Sites Regulations (NSECC, 2013) for an industrial site with non-potable groundwater use and coarse-grained soil (standards for coarse-grained soil are more conservative than standards for fine-grained soil). For metals, the Tier 1 EQS for a potable and non-potable site are equivalent.

The regulatory framework applied to data at the Site is detailed in Section 1.5, PDF page 15 of the Extended Phase II ESA (Appendix E.8 [Stantec, 2021]) of the Updated 2021 EIS (AMNS 2021).

Soil Observations and Results

Stratigraphy

The stratigraphy encountered in most test pits consisted of a layer of organics over poorly graded brown to grey silty sand with some gravel and cobbles.

Stratigraphy at test pits categorized as impacted by historical tailings was generally like the unimpacted locations with the addition of a layer of up to 0.65 m of distinct grey sand, gravelly sand, or silt (suspected tailings).

Stratigraphy at test pits categorized as impacted by historical waste rock was generally like the unimpacted locations with the addition of a layer of up to 0.62 m of gravel and/or cobbles, often infilled with brown or orange-brown sand (suspected waste rock).

Test pit stratigraphy is detailed within Section 3.2.1, PDF page 15 and Table B-1, PDF page 27, Appendix B of the Limited Phase II ESA (Appendix E.7 [Stantec, 2019b]) and Section 3.2.1.1, PDF page 21 and Appendix B, PDF page 43 of the Extended Phase II ESA (Appendix E.8 [Stantec, 2021]) of the Updated 2021 EIS (AMNS 2021).

Soil Analytical Results

Laboratory analysis for available (acid extractable) metals was conducted on 67 soil samples originating from 65 test pits, plus six field duplicate samples, collected in 2020 (Appendix E.8 [Stantec, 2021) and 29 soil samples originating from 29 test pits collected in 2019 (Appendix E.7 [Stantec, 2019]).[1] of the Updated 2021 EIS (AMNS 2021).

Results of the laboratory analysis of soil samples are summarized in Table CEAA 2-40-1 below:

Table CEAA 2-40-1: Summary of Soil Contamination (2019 to 2020)

Standard Exceedances	Tier 1 EQS	Exceeding (Samples)	Exceeding (Test Pits)
Arsenic	31 mg/kg	73 of 96 samples[(a)]	72 of 94 test pits*
Other Metals	Various	None	None

Notes: Numbers of exceedances do not include field duplicate samples.

(a) There are more soil samples than test pit locations as two soil samples, rather than one, were collected from two of the test pits.

Levels of arsenic ranged from non-detected to 3,900 mg/kg.

[1] Samples collected during Limited Phase II ESA activities were renamed within the Extended Phase II ESA to indicate the year of collection more clearly. For example, the sample previously reported as SA1 (collected from a test pit in 2019) has been renamed to TP19-01.

Lead and mercury have been associated with historical mining activities in Nova Scotia. Levels of lead and mercury in soil at the Project site were relatively elevated but did not exceed applicable Tier 1 EQS. The maximum identified lead concentration was 200 mg/kg versus a Tier 1 EQS of 740 mg/kg, and the maximum identified mercury concentration was 40 mg/kg versus a Tier 1 EQS of 99 mg/kg.

Results of the laboratory analysis of soil samples are presented on Drawing No. A-5, PDF page 40, Appendix A, PDF page 35 and Table C-1, PDF page 140, Appendix C, PDF page 139 and discussed in Section 3.3.1, PDF page 23 of the Extended Phase II ESA (Appendix E.8 [Stantec, 2021]) of the Updated 2021 EIS (AMNS 2021). Appendix E.8, Drawing No. A-5, PDF page 40 is also attached as Figure CEAA 2-40-1.

Soil Impact Classification

Based on field observations, including visible tailings within test pits and their proximity to Site features such as historical mining infrastructure/features (i.e., trenches, waste rock piles, stamp mill foundations, etc.), Stantec classified the test pit locations from both 2019 and 2020 as either non-impacted or impacted by historical mining activities. Of the impacted locations, Stantec further classified them as likely impacted by historical mine tailings or by mine waste rock. This impact classification assisted Stantec's assessment of background levels and delineation, discussed below.

Soil impact classifications are summarized in Table CEAA 2-40-2.

Table CEAA 2-40-2: Summary of Soil Impact Classification

Impact Classification at Proposed Mine Infrastructure Areas Based on Field Identification	Non-Impacted Test Pits	Impacted Test Pits	
		Tailings	Waste Rock
Crusher pad	2 of 2	0 of 2	0 of 2
LG (low grade) stockpiles	2 of 2	0 of 2	0 of 2
NAG (non-acid generating) stockpiles	4 of 4	0 of 4	0 of 4
Open pit	4 of 23*	6 of 23† [764]	13 of 23‡ [346]
Organic material stockpiles	6 of 6	0 of 6	0 of 6
PAG (potentially acid generating) stockpiles	2 of 2	0 of 2	0 of 2
Roadways and water management ditches	6 of 9	1 of 9 [230]	2 of 9 [125]
Settling pond	3 of 3	0 of 3	0 of 3
Till stockpiles	6 of 7	1 of 7 [130]	0 of 7
TSSPs (top-soil/sub-soil stockpiles)	4 of 6	1 of 6 [2,800]	1 of 6 [44]
Areas outside of proposed infrastructure	12 of 31	15 of 31 [294]	4 of 23 [104]

Notes:

[ ] The value in brackets represents the mean arsenic concentration (mg/kg) in the soil samples within this proposed mine infrastructure area and impact classification.

* Non-impacted test pits within the proposed open pit were either on the extreme northern edge of the footprint (TP19-10), observed to be composed of natural soil deposits in the field (TP20-34, TP20-35, and TP20-58) and/or contained low concentrations of arsenic (TP20-58).

† Tailings-impacted test pits within the proposed open pit are largely near the central historical settling pond. This includes the highest identified concentration of 3,900 mg/kg at TP19-28.

‡ Waste rock-impacted test pits were identified throughout the re-worked area composing the majority of the proposed open pit.

Sample photographs of observed suspected tailings and waste rock are included below, as well as in the photolog in Appendix E of the Extended Phase II ESA (Appendix E.8 [Stantec, 2021]) of the Updated 2021 EIS (AMNS 2021).

Photograph A **Suspected Tailings from TP20-63**

Photograph B **Suspected Waste Rock at Surface of TP20-27**

Soil impact classifications are highlighted in Appendix C, Table C-1, PDF page 140 and discussed in Section 4.1.1, PDF page 27 of the Extended Phase II ESA (Appendix E.8 [Stantec, 2021]) of the Updated 2021 EIS (AMNS 2021).

Background Levels

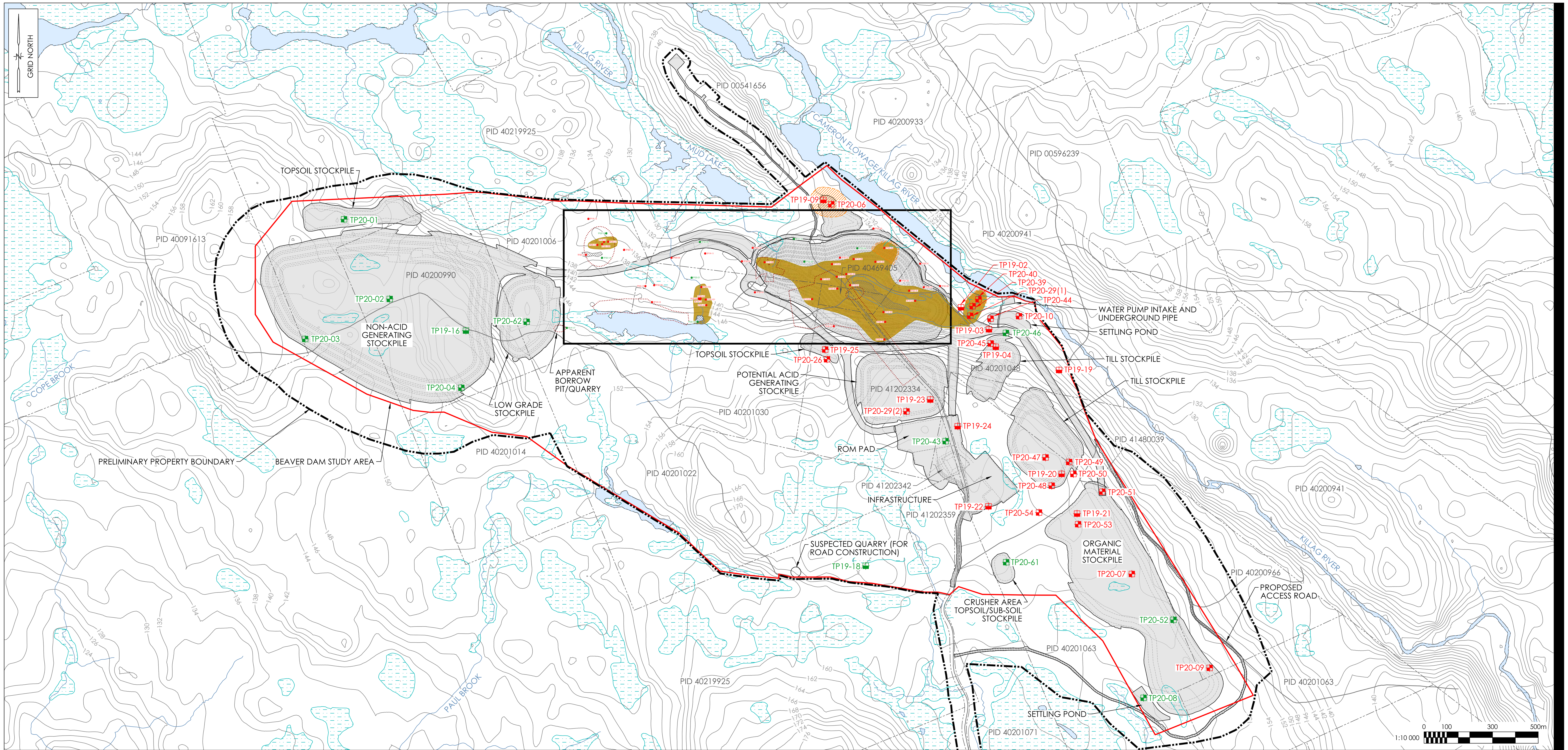
Some samples from non-impacted areas of the Site include arsenic concentrations higher than the Tier 1 EQS. Arsenic concentrations within non-impacted soil samples represent potential data on background levels in the Site area soil (i.e., arsenic in soil related to geology and not to historical mining activities).

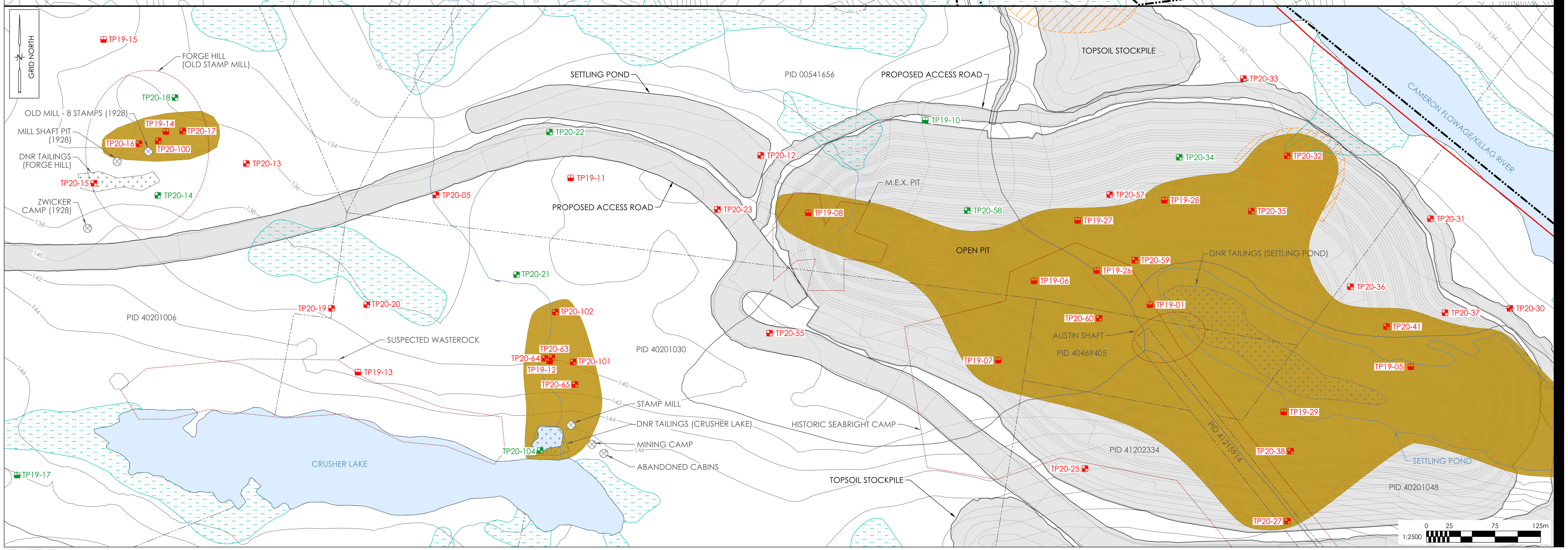
Table CEAA 2-40-3 presents statistical metrics calculated using the non-impacted soil concentrations, compared to the Tier 1 EQS. Statistical calculations, including distribution and outlier testing, were conducted using the United States Environmental Protection Agency's (US EPA) ProUCL statistics software package for environmental applications (USEPA 2016).

Table CEAA 2-40-3: Statistics from Background Non-Impacted Data Set

Concentration (mg/kg)	Tier 1 EQS	Maximum	Mean	Median	75th Percentile	95th Percentile
Arsenic	31	270	75.34	43.5	112.5	228.0

Arsenic levels below the 95th percentile value (228 mg/kg) of the background non-impacted data set were considered to represent arsenic not related to historical mining activities. Delineation based on this value, as well as on field observations, is shown on Drawing No. A-5, PDF page 40, Appendix A of the Extended Phase II ESA Appendix E.8 [Stantec, 2021]) of the Updated 2021 EIS (AMNS 2021). Drawing No. A-5, PDF page 40 is also attached as Figure CEAA 2-40-1.





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2021/02/08 1:24 PM By: Lockhart, Jeff

ORIGINAL SHEET - ISO A1

Stantec

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Fredericton NB
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Legend

- BEAVER DAM STUDY AREA
- TOPOGRAPHIC CONTOUR (2m INTERVAL)
- PROPERTY BOUNDARY
- PRELIMINARY PROPERTY BOUNDARY
- EXISTING ROAD
- WATERCOURSE
- WETLAND
- WATERBODY
- PROPOSED MINING INFRASTRUCTURE
- REPORTED TAILINGS - DNR
- HISTORIC MINING OPERATIONS AREA
- HISTORICAL MINING FEATURE LOCATION
- TEST PIT LOCATION (2020)
- TEST PIT LOCATION (2019)
- TEST PIT LOCATION - SOIL SAMPLE EXCEEDS NSE TIER I EQS FOR ARSENIC (>31 mg/kg) AT AN INDUSTRIAL SITE
- TEST PIT LOCATION - SOIL SAMPLE BELOW NSE TIER I EQS FOR ARSENIC (<31 mg/kg) AT AN INDUSTRIAL SITE
- POTENTIAL AREA OF ARSENIC IMPACTED SOIL RELATED TO HISTORICAL MINING OPERATIONS
- AREAS OF UNDELINEATED POTENTIAL ARSENIC IMPACTED SOIL RELATED TO HISTORICAL MINING OPERATIONS

Notes

1. DATA SOURCES: GOVERNMENT OF CANADA, GOVERNMENT OF NOVA SCOTIA, McCALLUM AND ATLANTIC MINING NS INC., AUSENCO (DRAWING No. 105227-0000-G-101, REV D, 07/DEC2020).
2. LOCATIONS OF HISTORICAL MINING FEATURES ARE APPROXIMATE.

1	INFRASTRUCTURE UPDATE	EA	MF	21.02.08
Revision		By	Appd.	YY.MM.DD
B	FINAL	EA	MF	21.02.XX
A	FOR REVIEW	EA	MF	20.11.09
Issued		By	Appd.	YY.MM.DD

File Name: 121619250.2500.995_A-5_REV1	JL	EA	GM	21.02.08
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project

ATLANTIC MINING NS INC.

BEAVER DAM PROJECT

HALIFAX COUNTY, NS

Title

ARSENIC CONCENTRATIONS COMPARED TO NSE TIER 1 EQS (INDUSTRIAL LAND USE) AND POTENTIAL EXTENT OF ARSENIC IN SOIL RELATED TO HISTORICAL MINING OPERATIONS

Project No.	Scale	
121619250	AS SHOWN	
Drawing No.	Sheet	Revision
A-5	5 of 7	0

Background levels are discussed in Section 4.1.2, PDF page 28 and detailed methodology on statistical methods used, including distribution and outlier testing, is included in Appendix F, PDF page 220 of the Extended Phase II ESA (Appendix E.8 [Stantec, 2021]) of the Updated 2021 EIS (AMNS 2021).

Contamination and Delineation Near Proposed Mine Infrastructure

Impacts above the calculated background value, considered to represent arsenic related to historical mining activities, were identified within the proposed open pit and to its east at the east end of the historical settling pond, as well as in the area of the proposed TSSPs to the north and northwest of the proposed open pit, and intersecting proposed roadways and water management ditches.

This level of impacted soil was also identified within an area spanning the proposed till stockpile and organic material stockpile; however, despite its high levels of arsenic which could affect soil management in this area, soil in this area was field-identified as non-impacted and may represent naturally elevated levels.

This level of impacted soil was also identified around the stream north of the suspected tailings at Crusher Lake (no proposed mine infrastructure in this area).

Proposed infrastructure in other areas may disturb soil or sediment with arsenic concentrations that naturally exceed the guidelines. This will be an important factor during construction for the management of soil and for the disturbance of sediments that may be mobilized on or off-site.

Historical mining-related arsenic contamination in soil identified during the Limited Phase II ESA and Extended Phase II ESA is horizontally delineated other than to the northeast of the proposed open pit near the Cameron Flowage, as shown by dashed lines on Drawing No. A-5, PDF page 40, Appendix A, PDF page 35 of the Extended Phase II ESA (Appendix E.8 [Stantec, 2021]) of the Updated 2021 EIS (AMNS 2021). Drawing No. A-5, PDF page 40 is also attached as Figure CEAA 2-40-1.

Identified contamination is not vertically delineated given refusal of hand-held tools during sampling events. Bedrock may limit vertical soil contamination. Stantec has previously reviewed reports on historical Nova Scotia gold mines identifying tailings several metres thick.

Contamination and delineation near proposed mine infrastructure is discussed in Section 4.1.3, PDF page 29 of the Extended Phase II ESA (Appendix E.8 [Stantec, 2021]) of the Updated 2021 EIS (AMNS 2021).

Conclusions

Based on the information gathered and on observations made during the Phase I ESA (Appendix E.6 [Stantec, 2019a]), Limited Phase II ESA (Appendix E.7 [Stantec, 2019b]), and Extended Phase II ESA (Appendix E.8 [Stantec, 2021]) of the Updated 2021 EIS (AMNS 2021), Stantec provides the following conclusions related to potential environmental contamination in soil associated with historical gold mining operations:

- Concentrations of arsenic in soil exceeding the applicable NSE Tier 1 EQS were identified. Some of these locations are considered non-impacted and are potentially indicative of background soil concentrations.

- Test pits were identified during the Limited and Extended Phase II ESA work in 2019 and 2020 that were classified as likely impacted by historical tailings or waste rock based on field observations, arsenic levels, and proximity to historical site features.
- Arsenic in soil at levels considered to represent impact from historical mining operations intersects with areas of proposed Project infrastructure, including the proposed open pit.

Closure

This report documents work that was performed in accordance with generally accepted professional standards at the time and location in which the services were provided. No other representations, warranties or guarantees are made concerning the accuracy or completeness of the data or conclusions contained within this report, including no assurance that this work has uncovered all potential liabilities associated with the identified property.

This report provides an evaluation of selected environmental conditions associated with the identified portion of the property that was assessed at the time the work was conducted and is based on information obtained by and/or provided to Stantec at that time. There are no assurances regarding the accuracy and completeness of this information. All information received from the client or third parties in the preparation of this report has been assumed by Stantec to be correct. Stantec assumes no responsibility for any deficiency or inaccuracy in information received from others.

The opinions in this report can only be relied upon as they relate to the condition of the portion of the identified property that was assessed at the time the work was conducted. Activities at the property subsequent to Stantec's assessment may have significantly altered the property's condition. Stantec cannot comment on other areas of the property that were not assessed.

Conclusions made within this report consist of Stantec's professional opinion as of the time of the writing of this report, and are based solely on the scope of work described in the report, the limited data available and the results of the work. They are not a certification of the property's environmental condition. This report should not be construed as legal advice.

This report has been prepared for the exclusive use of the client identified herein and any use by any third party is prohibited. Stantec assumes no responsibility for losses, damages, liabilities or claims, howsoever arising, from third party use of this report.

This report is limited by the following:

- This report summarizes results of investigations of soil geochemistry at the Beaver Dam Mine site and does not include a summary of results of investigations of other media including sediment or surface water.

The locations of any utilities, buildings and structures, and property boundaries illustrated in or described within this report, if any, including pole lines, conduits, water mains, sewers and other surface or sub-surface utilities and structures are not guaranteed. Before starting work, the exact location of all such utilities and structures should be confirmed and Stantec assumes no liability for damage to them.

The conclusions are based on the site conditions encountered by Stantec at the time the work was performed at the specific testing and/or sampling locations, and conditions may vary among sampling locations. Factors such as areas of potential concern identified in previous studies, site conditions (e.g., utilities) and cost may have constrained the sampling locations used in this assessment.

In addition, analysis has been carried out for only a limited number of chemical parameters, and it should not be inferred that other chemical species are not present. Due to the nature of the investigation and the limited data available, Stantec does not warrant against undiscovered environmental liabilities nor that the sampling results are indicative of the condition of the entire site. As the purpose of this report is to identify site conditions which may pose an environmental risk; the identification of non-environmental risks to structures or people on the site is beyond the scope of this assessment.

Should additional information become available which differs significantly from our understanding of conditions presented in this report, Stantec specifically disclaims any responsibility to update the conclusions in this report.

References

AMNS (Atlantic Mining NS Inc.). 2021. Updated Environmental Impact Statement. Beaver Dam Mine Project. Submitted to the Impact Assessment Agency of Canada and Nova Scotia Environment. October 2021. Middle Musquodoboit, NS.

NSE (Nova Scotia Environment). 2014. Nova Scotia Environment, Nova Scotia Contaminated Sites Regulations, Environmental Quality Standards for Contaminated Sites. Retrieved from: https://www.novascotia.ca/nse/contaminatedsites/. Last modified: 2015-08-20.

Stantec. 2019a. Final - Phase I Environmental Site Assessment - Beaver Dam Property. *IN: Atlantic Mining NS Inc. 2021. Updated Environmental Impact Statement. Appendix E.6 Phase I Environmental Site Assessment - Beaver Dam Property (2019). Beaver Dam Mine Project. Submitted to the Impact Assessment Agency of Canada and Nova Scotia Environment. October 2021. Middle Musquodoboit, NS.*

Stantec. 2019b. Limited Phase II Environmental Site Assessment - Beaver Dam Property. *IN: Atlantic Mining NS Inc. 2021. Updated Environmental Impact Statement. Appendix E.7 Limited Phase II Environmental Site Assessment - Beaver Dam Property (2019). Beaver Dam Mine Project. Submitted to the Impact Assessment Agency of Canada and Nova Scotia Environment. October 2021. Middle Musquodoboit, NS.*

Stantec. 2021. Final (Revised) - Extended Phase II Environmental Site Assessment - Beaver Dam Project Property. *IN: Atlantic Mining NS Inc. 2021. Updated Environmental Impact Statement. Appendix E.8 Extended Phase II Environmental Site Assessment - Beaver Dam Property (2021). Beaver Dam Mine Project. Submitted to the Impact Assessment Agency of Canada and Nova Scotia Environment. October 2021. Middle Musquodoboit, NS.*

US EPA (United States Environmental Protection Agency). 2016. Statistical Software ProUCL 5.1.00 for Environmental Applications for Data Sets with and without Nondetect Observations.

Round 2 Information Request Number:	CEAA-2-41
Regulatory Agency/Indigenous Community:	NRCan
Topic/Discipline:	Hydrogeochemistry
EIS Guideline Reference:	Section 6.1.4; 6.2.2
Revised EIS (February 28, 2019) Reference:	Appendix F.5 Parts I-II (Hydrogeologic Model Development and Application)

Context and Rationale

Dewatering scenario at Beaver Dam:

The simulation of the drawdowns caused by the dewatering activities was done using drains along the wall and at the bottom of the open pit. Figures 7.1a-b, 7.2a-b and 7.3a-b in Appendix F.5 show that resulting drawdowns close to the open pit will be in the order of 4 m. Given that the depth of the open pit will be up to 200 m, those drawdowns appear to be very low in comparison.

The proponent should indicate whether a seepage face will be present along the pit walls. If a seepage face is present, as stated in the Appendix F.1 (Assessment of Potential Open Pit Groundwater Inflows – Beaver Dam Gold Project), seepage along the pit walls may induce instability of the walls and complete dewatering of the walls would be safer. In this scenario, adding pumping wells or horizontal drains along the perimeter of the pit may be necessary. As a consequence, more groundwater would be pumped out of the aquifer, which may result in more water to dispose of, more drawdowns, more impact on the baseflow, as well as a different solute transport time.

The Proponent is Required to …

Provide a cross-section through the Beaver Dam open pit with drawdowns and hydraulic heads depicted as a figure to give a better perspective of the induced drawdowns.

Indicate whether a seepage face will be present along the pit walls. If so, simulate seepage along the pit walls and reassess impacts accordingly, particularly for the Cameron Flowage.

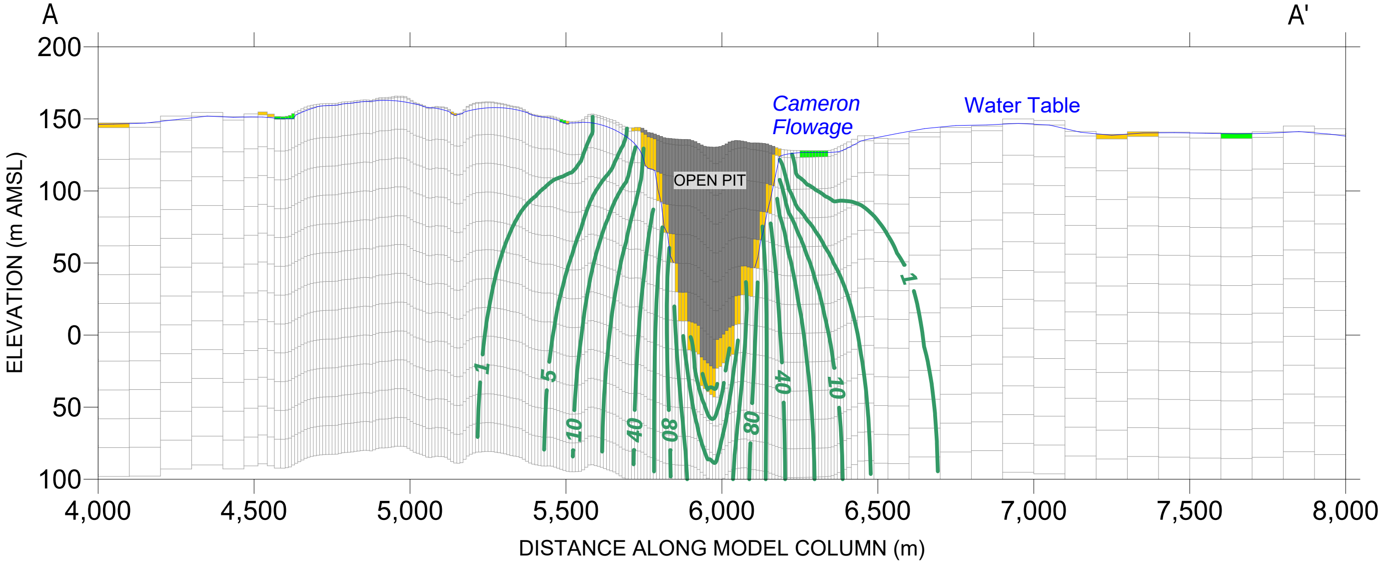
Response

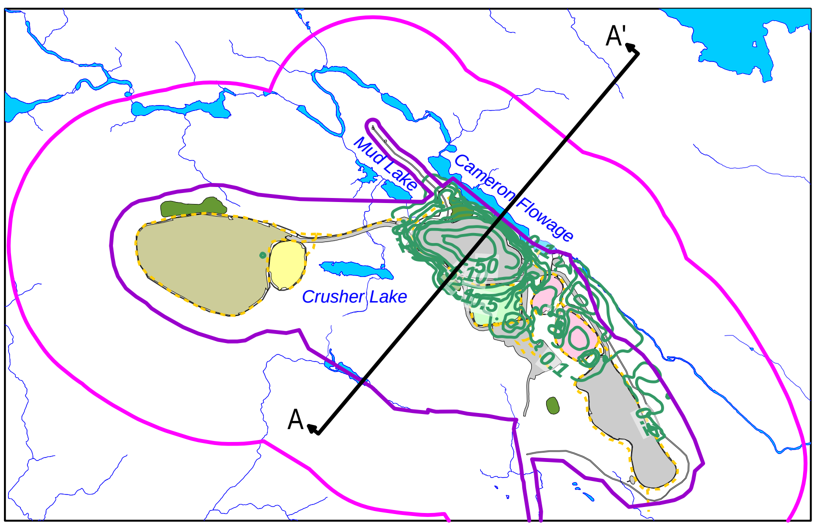
Figures 7.4a, PDF page 98 through 7.6b, PDF page 103 in Appendix F.5 (Hydrogeologic Modelling Report) of the Updated 2021 EIS (AMNS 2021) present cross-sections through the Beaver Dam open pit showing simulated drawdown. These figures are attached to this Round 2 Information Request response (IR2; CEAA-2-41) as Figures CEAA -2-41-1a to CEAA 2-41-3b for ease of reference.

As shown on Figures CEAA 2-41-1a, CEAA 2-41-2a and CEAA 2-41-3a a seepage face is simulated along the pit walls at depth for end-of-mine (EOM) (i.e., approximately 75 to 95 m below ground surface to the bottom of the pit). The seepage face, and seepage along the pit walls, is simulated in all predictive scenarios presented in Section 7.4, PDF page 46 of Appendix F.5 and the impacts are assessed for nearby surface waterbodies, including Cameron Flowage, for both flow and contaminant transport assessments. Section 7.1, PDF page 41 in Appendix F.5 presents the methodology applied in the predictive scenarios (AMNS 2021). Section 7.4, PDF page 46 in Appendix F.5 presents the simulations results for each EOM and post-closure (PC) scenario including the simulation of groundwater inflow rates into the open pit (Section 7.4.1, PDF page 46 in Appendix F.5), simulation of drawdown at EOM and PC (Section 7.4.2, PDF page 46 in Appendix F.5), estimation of the pit infilling rate (Section 7.4.3, PDF page 46 in Appendix F.5), simulation of impacts to baseflow for EOM and PC (Section 7.4.4, PDF page 46 in Appendix F.5), and the simulations of contaminant transport for EOM and PC (Section 7.4.5, PDF page 47 in Appendix F.5). Each EOM scenario considers the seepage face presented on Figures CEAA 2-41-1a, CEAA 2-41-2a and CEAA 2-41-3a and each PC simulation considered the seepage as presented on Figures CEAA 2-41-1b, CEAA 2-41-2b, and CEAA 2-41-3b for Base Case, Dry, and Wet conditions, respectively. No reassessment of impacts is required as all predictive groundwater modelling scenarios for the Beaver Dam Mine Site considered the simulation of seepage along the pit walls.

References

AMNS (Atlantic Mining NS Inc.). 2021. Updated Environmental Impact Statement. Beaver Dam Mine Project. Submitted to the Impact Assessment Agency of Canada and Nova Scotia Environment. May 2021. Middle Musquodoboit, NS.





LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 SIMULATED DRAWDOWN (m)
- SURFACE WATER MANAGEMENT DITCHES
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES
- FINITE-DIFFERENCE GRID
- NO-FLOW BOUNDARY CONDITION
- DRAIN BOUNDARY CONDITION

0 500 1000 1500m

ATLANTIC GOLD CORPORATION
MARINETTE, NOVA SCOTIA
BEAVER DAM MINE

088664-031

March 11, 2021

FIGURE CEAA-2-41-1a

SIMULATED DRAWDOWN THROUGH OPEN PIT (EOM - BASE CASE CONDITION)

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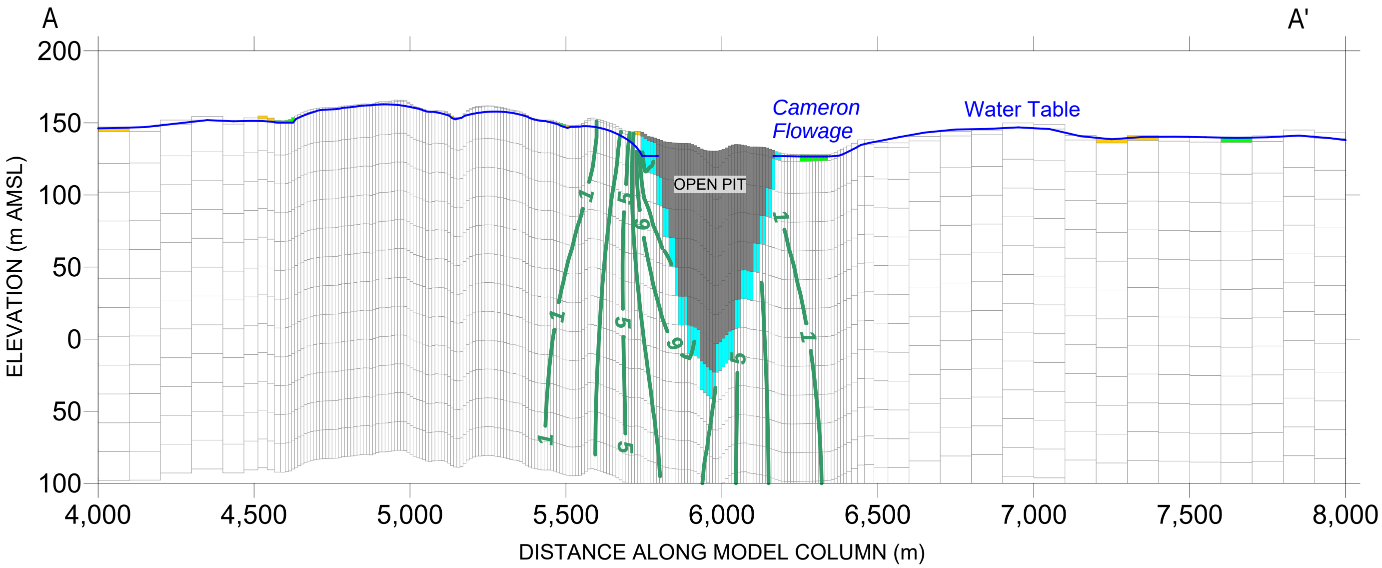

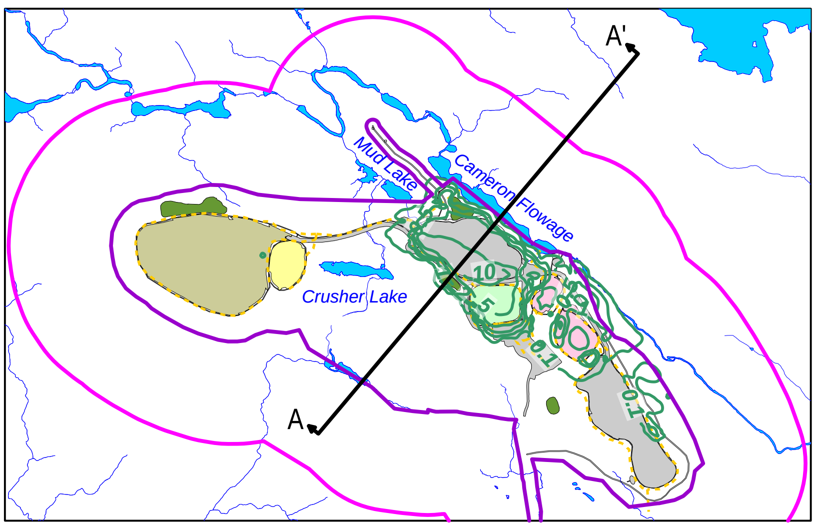

LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 SIMULATED DRAWDOWN (m)
- SURFACE WATER MANAGEMENT DITCHES
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES
- FINITE-DIFFERENCE GRID
- NO-FLOW BOUNDARY CONDITION
- DRAIN BOUNDARY CONDITION
- GENERAL HEAD BOUNDARY CONDITION

0 500 1000 1500m

ATLANTIC GOLD CORPORATION
MARINETTE, NOVA SCOTIA
BEAVER DAM MINE

088664-031

March 11, 2021

FIGURE CEAA 2-41-1b

SIMULATED DRAWDOWN THROUGH OPEN PIT (PC - BASE CASE CONDITION)

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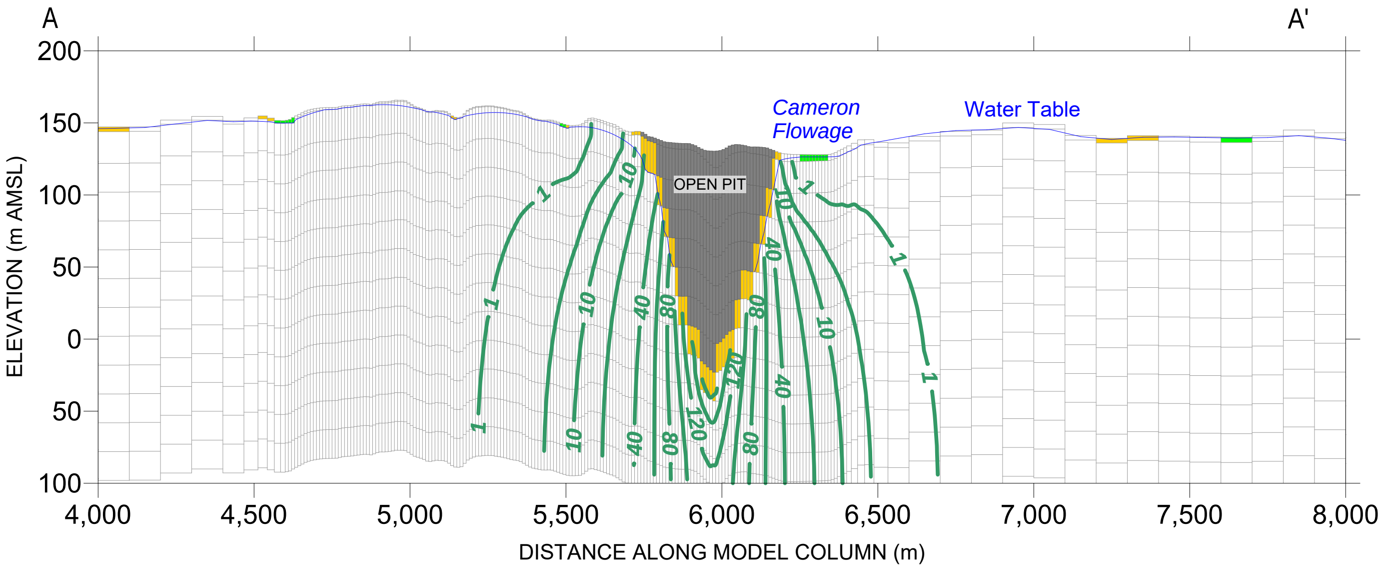

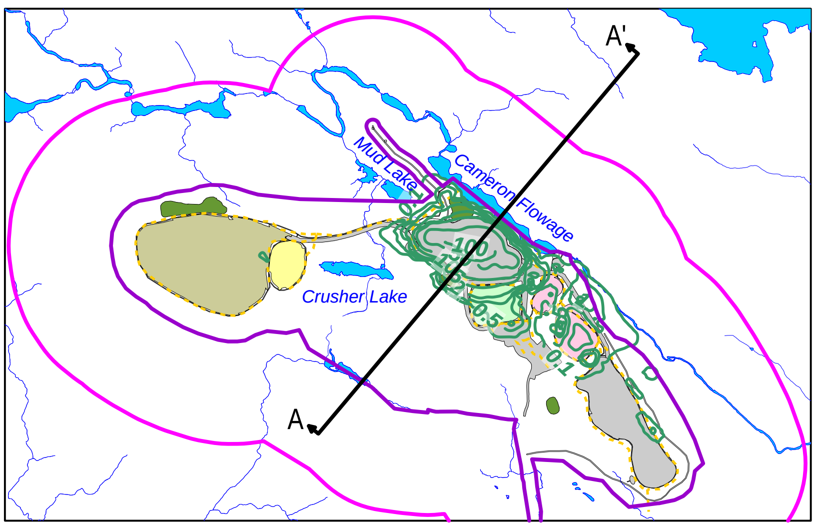

LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 SIMULATED DRAWDOWN (m)
- SURFACE WATER MANAGEMENT DITCHES
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES
- FINITE-DIFFERENCE GRID
- NO-FLOW BOUNDARY CONDITION
- DRAIN BOUNDARY CONDITION

0 500 1000 1500m

ATLANTIC GOLD CORPORATION
MARINETTE, NOVA SCOTIA
BEAVER DAM MINE

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March 11, 2021

FIGURE CEAA 2-41-2a

SIMULATED DRAWDOWN THROUGH OPEN PIT (EOM - DRY CONDITION)

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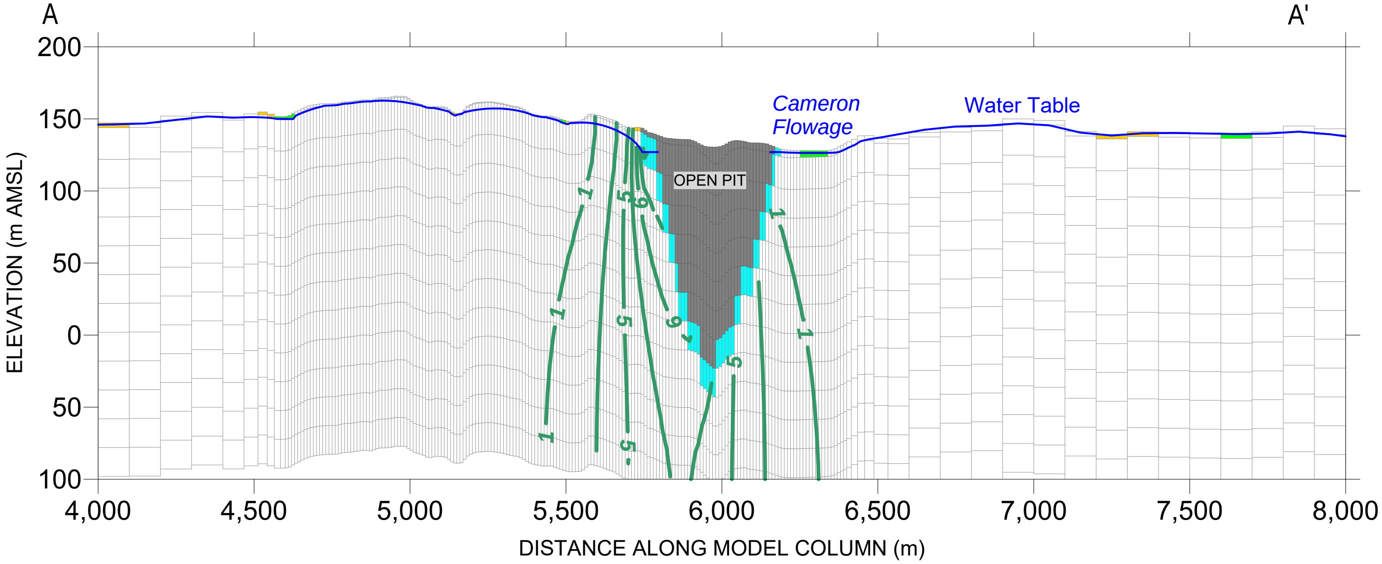

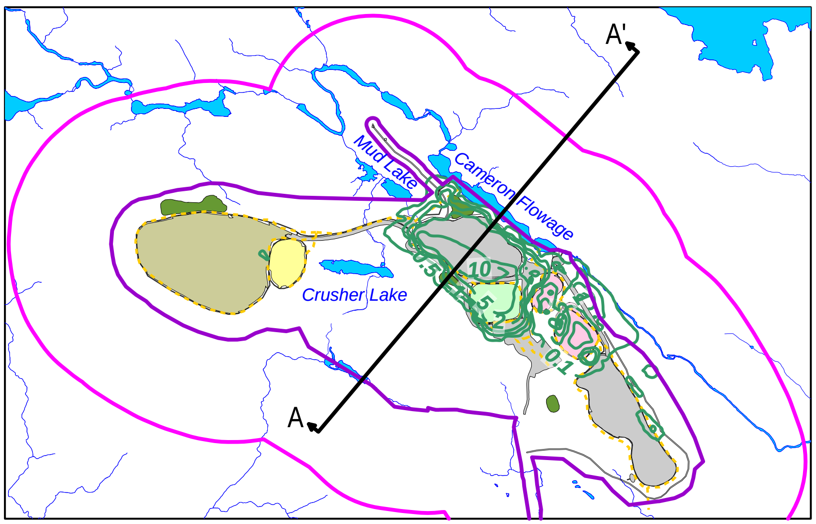

LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 SIMULATED DRAWDOWN (m)
- SURFACE WATER MANAGEMENT DITCHES
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES
- FINITE-DIFFERENCE GRID
- NO-FLOW BOUNDARY CONDITION
- DRAIN BOUNDARY CONDITION
- GENERAL HEAD BOUNDARY CONDITION

0 500 1000 1500m

ATLANTIC GOLD CORPORATION
MARINETTE, NOVA SCOTIA
BEAVER DAM MINE

SIMULATED DRAWDOWN THROUGH OPEN PIT (PC - DRY CONDITION)

088664-031

March 11, 2021

FIGURE CEAA 2-41-2b

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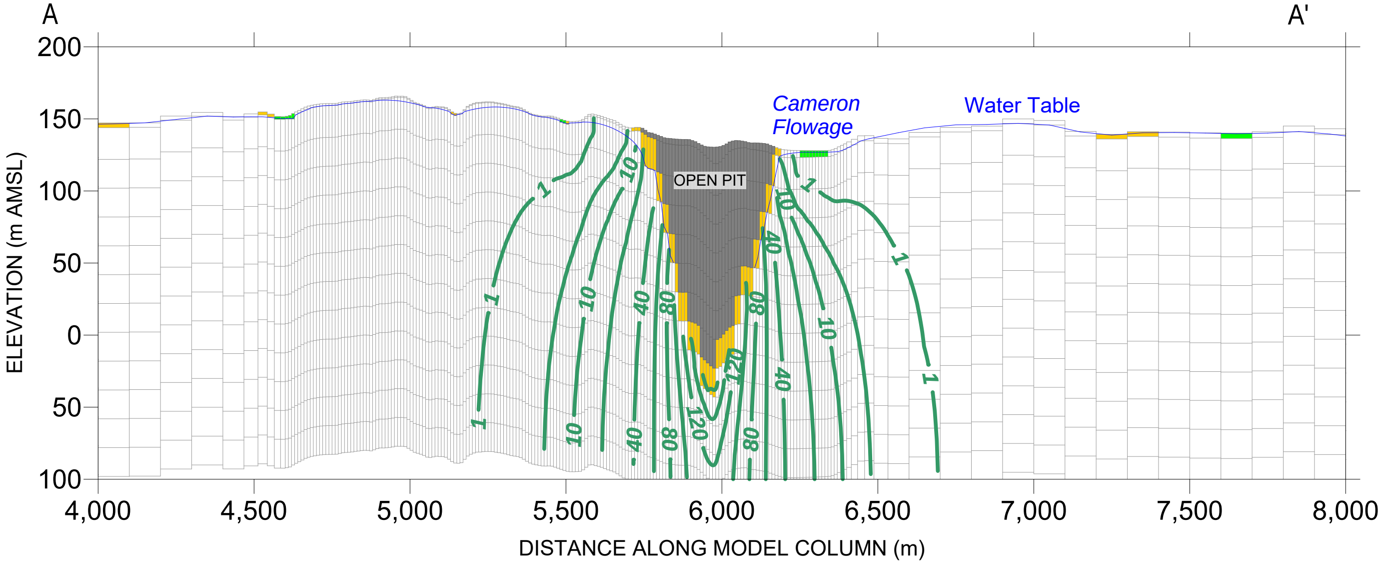
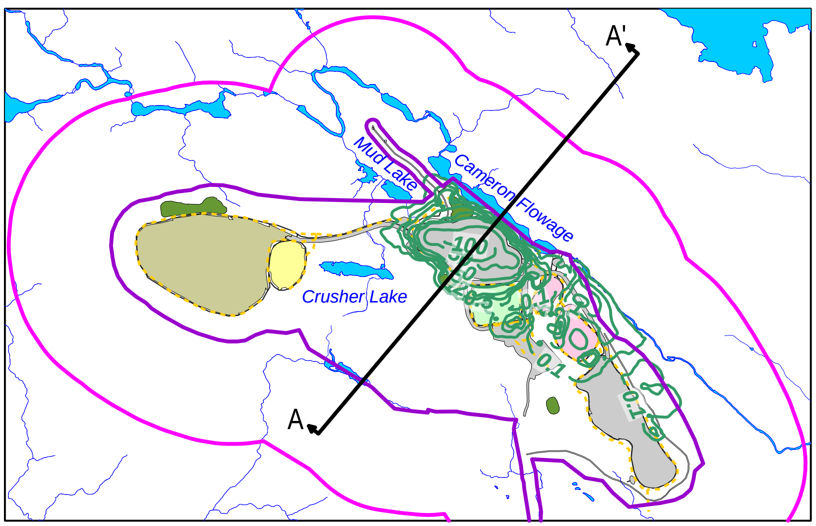


LEGEND

- SURFACE WATER BODY
- PROPOSED EXTENT OF MINE FEATURES
- 0.1 SIMULATED DRAWDOWN (m)
- SURFACE WATER MANAGEMENT DITCHES
- PROJECT AREA
- LOCAL ASSESSMENT AREA
- NAG WASTE ROCK STOCKPILE
- PAG WASTE ROCK STOCKPILE
- LGO STOCKPILE
- TILL STOCKPILES
- TOPSOIL STOCKPILES
- FINITE-DIFFERENCE GRID
- NO-FLOW BOUNDARY CONDITION
- DRAIN BOUNDARY CONDITION



0 500 1000 1500m

ATLANTIC GOLD CORPORATION
MARINETTE, NOVA SCOTIA
BEAVER DAM MINE

SIMULATED DRAWDOWN THROUGH OPEN PIT (EOM - WET CONDITION)

088664-031

March 11, 2021

FIGURE CEAA 2-41-3a

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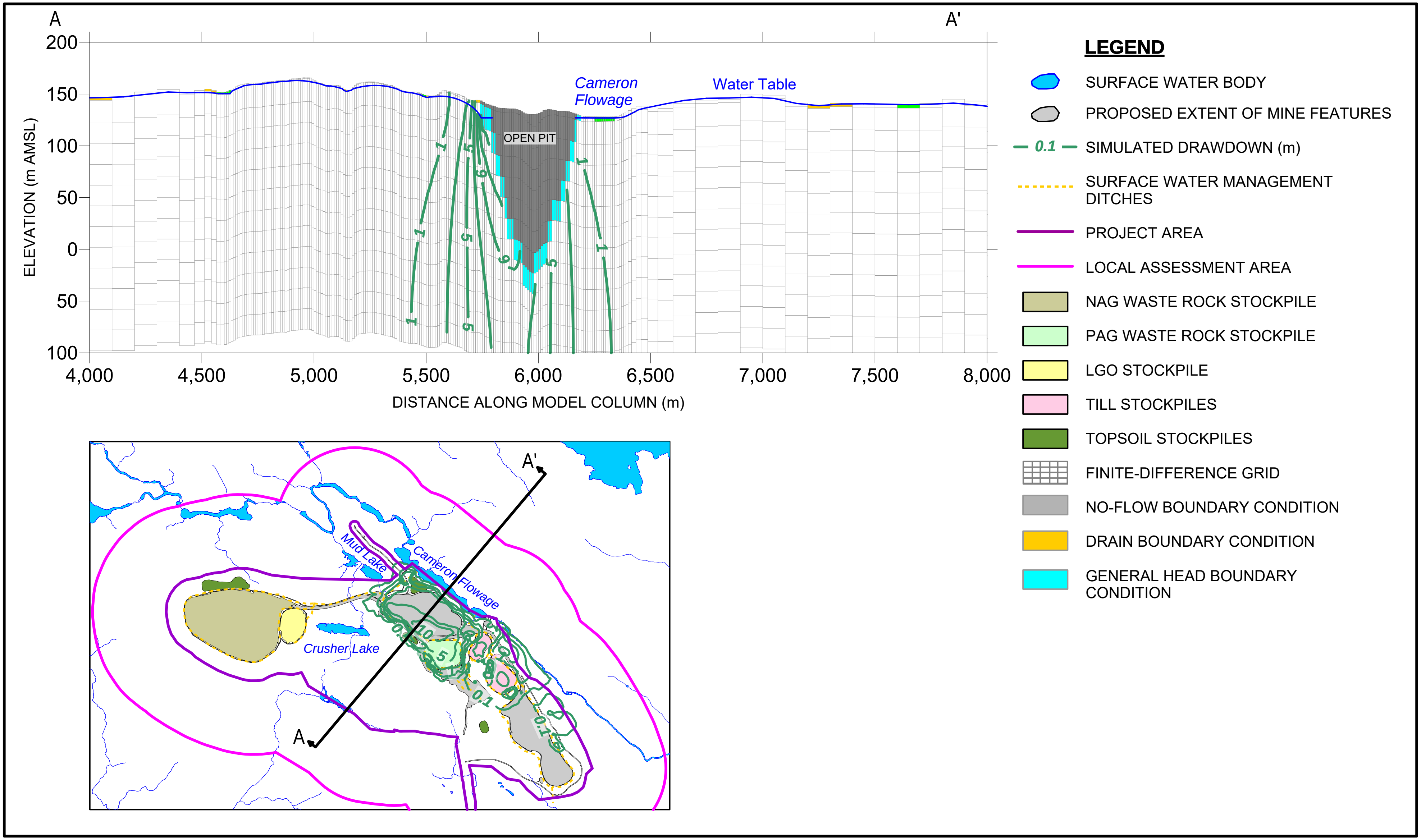

0 500 1000 1500m

ATLANTIC GOLD CORPORATION
MARINETTE, NOVA SCOTIA
BEAVER DAM MINE

088664-031

March 11, 2021

FIGURE CEAA 2-41-3b

SIMULATED DRAWDOWN THROUGH OPEN PIT (PC - WET CONDITION)

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Round 2 Information Request Number:	CEAA-2-42
Regulatory Agency/Indigenous Community:	NRCan
Topic/Discipline:	Hydrogeochemistry
EIS Guideline Reference:	Section 6.1.4; 6.2.2
Revised EIS (February 28, 2019) Reference:	Appendix F.5 Parts I-II (Hydrogeologic Model Development and Application) and Appendix F.6 (Groundwater Flow and Solute Transport Modelling to Evaluate Disposal of Beaver Dam Tailings in Touquoy Open Pit)

Context and Rationale

Bedrock porosity at Beaver Dam and Touquoy:

Transport simulations were conducted to assess the potential of contamination of the mining activities on the quality of the surface water. In these simulations, the porosity values used for the bedrock (shallow and deep) appear to be in the higher range of possible values for the formations present. For instance, values of 10% and 5% for shallow and deep bedrock were used, respectively (the same values were used for the Beaver Dam and Touquoy sites). Given the very low hydraulic conductivity of the bedrock, in the range of 10-7 and 10-9 m/s, much lower values of porosity are expected. Using much lower porosity values will increase groundwater velocity, which in turn may have a larger impact on water quality.

The Proponent is Required to …

Provide porosity measurements on cores to reduce the uncertainty on porosity values.

Reassess transport simulations particularly for the Cameron Flowage and the Moose River.

Response

Porosity measurements on cores are not required because they only capture the local scale primary porosity and not the field scale effective porosity that is controlled primarily by the secondary porosity of the rock. Furthermore, all post-closure (PC) simulations were run for 500 years to approximate a steady-state condition. Under a steady-state condition, the extent and concentration of simulated contaminants of concern (COCs) is insensitive to the porosity value. Therefore, changing the porosity values will not impact the simulated PC COC concentrations. For end-of-mine (EOM), significant conservative bias was built into the simulated COC concentration though the assumptions that COC sources were placed instantaneously at the start of the first year of operation and that the COC source would persist for approximately double the duration of the expected lifetime of the COC source. Therefore, due to the impracticality of measuring field scale effect porosity that governs contaminant transport from a core sample, and the significant conservative bias built into the COC transport simulations, porosity measurements are not required to reduce uncertainty in porosity values.

The bedrock is typically more weathered and fractured within the shallow bedrock; however, fractures were encountered at all depths during monitoring well installation. The typical range in porosity values for fractured crystalline rock is from 0 to 10% (Freeze and Cherry, 1979). It is expected that the weathered shallow bedrock will be towards the upper end of that range, while the deep unweathered fractured bedrock will be towards the bottom of that range. The assigned porosity values of 10% for the shallow weathered fractured bedrock and 2% for the deep fractured bedrock are consistent with the range in porosity values specified in Freeze and Cherry (1979).

At Touquoy, the porosity is provided in Appendix F.6, Table 5.2, PDF page 51 assigned and calibrated solute and transport model parameter values (Appendix F.6 Groundwater Flow and Solute Transport Modelling to Evaluate Disposal of Tailings in Touquoy Open Pit in the Updated 2021 EIS [AMNS 2021]). The values range from 0.05 for competent rock, 0.3 for overburden and tailings and 0.1 or (10%) for weathered bedrock. The sensitivity of the transport model results to the porosity of the bedrock was assessed in Appendix F.6, Sections 5.4.1.2, PDF page 52 and 5.4.2.2, PDF page 63 of the updated 2021 EIS. This analysis indicated that the timing of the solute transport from the Touquoy pit to Moose River is sensitive to the bedrock porosity. However, the magnitude of the final concentrations in Moose River between the scenarios are very similar, with slightly lower relative concentrations predicted in the lower porosity scenarios.

References

AMNS (Atlantic Mining NS Inc.). 2021. Updated Environmental Impact Statement. Beaver Dam Mine Project. Submitted to the Impact Assessment Agency of Canada and Nova Scotia Environment. May 2021. Middle Musquodoboit, NS.

Freeze, R.A., and Cherry, J.A., 1979, Groundwater: Englewood Cliffs, NJ, Prentice-Hall, 604 p.

Round 2 Information Request Number:	CEAA-2-43
Regulatory Agency/Indigenous Community:	NRCan
Topic/Discipline:	Hydrogeochemistry
EIS Guideline Reference:	Section 6.1.4; 6.2.2
Revised EIS (February 28, 2019) Reference:	Appendix F.6 (Groundwater Flow and Solute Transport Modelling to Evaluate Disposal of Beaver Dam Tailings in Touquoy Open Pit)

Context and Rationale

Hydraulic conductivity of the mapped faults at Touquoy:

As indicated by the sensitivity analysis provided, the presence of mapped faults not characterized during hydrogeological field testing may have important negative impacts on the water quality of the Moose River and Watercourse-4.

The Proponent is Required to …

Assess the potential for high hydraulic conductivity faults at Touquoy in the field.

Based on the results, update the modeling, including calibrating the model with the faults, and the effects assessment, as required.

Response

An assessment of the hydraulic conductivity of faults associated with the Touquoy pit has been assessed and is updated in the Groundwater Flow Solute Transport Modelling to Evaluate the Disposal of Beaver Dam Tailings, which is provided in Appendix F.6, Section 3.3, PDF page 19 of the Updated 2021 EIS (AMNS 2021). Groundwater Section 6.6.4.2.2, page 6-176 of the Updated 2021 EIS (AMNS 2021) states that the presence of faults in the vicinity of the Touquoy pit have been characterized by AMNS, including water bearing faults. Water bearing faults were identified on the pit wall in the vicinity of monitoring well OPM-2A/B. The faults are typically saturated relative to the rock mass surrounding the faults, significant volumes of flow to the Touquoy open pit have not been observed. The hydraulic conductivity of the shallow bedrock at OPM-2B based on single-well response testing was within the range of other bedrock wells installed at the Touquoy mine site. It should be noted that permeability monitoring is ongoing at the Touquoy Mine Site.

The last paragraph of Appendix F.6 (Groundwater Flow Solute Transport Modelling to Evaluate the Disposal of Beaver Dam Tailings), Section 3.3.2, PDF page 19 explains: "Faults in the bedrock were not specifically tested to assess the hydraulic conductivity at the Touquoy Mine Site. However, regular observations of the faults exposed in the Touquoy open pit have identified some discrete seepage at these faults. The total flow from these exposed faults are generally very low. Water bearing faults were identified on the pit wall, including in the vicinity of monitoring well OPM-2A/B. The faults are typically saturated relative to the rock mass surrounding the faults, large volumes of flow to the Touquoy open pit have not been observed. The hydraulic conductivity of the shallow bedrock at OPM-2B based on single-well response testing was within the range of other bedrock wells installed at the Touquoy mine site."

Groundwater seepage into the Touquoy open pit is largely through the surficial glacial till, and through fractures in the shallow bedrock. The more competent deep bedrock is not expected to contribute significant groundwater inflow to the open pit. As the pit dewatering progresses and groundwater levels in the vicinity of the open pit are lowered, a reduction in baseflow (i.e., the groundwater contribution to stream flow) is inferred in Moose River, although uncertainty in stream flow measurements in Moose River upstream and downstream the Touquoy site appear to overestimate the reduction in baseflow compared to the observed pit inflow rates.

The sensitivity of the model results to the hydraulic conductivity of the faults is presented in Appendix F.6, Section 5.4.2.1, PDF page 58 of the Groundwater Flow Solute Transport Modelling to Evaluate the Disposal of Beaver Dam Tailings Report. As discussed in this section, increasing the hydraulic conductivity of the faults by an order of magnitude increases the predicted concentrations in Moose River. The addition of higher permeability faults indicates that solute transport may proceed more quickly to Moose River than simulated in the case without higher permeability faults. The development of management, mitigation and contingency plans should consider the potential for higher permeability faulting, such as the grouting of high permeability faults, should observed concentrations exceed predictions during the post-closure period.

References

AMNS (Atlantic Mining NS Inc.). 2021. Updated Environmental Impact Statement. Beaver Dam Mine Project. Submitted to the Impact Assessment Agency of Canada and Nova Scotia Environment. May 2021. Middle Musquodoboit, NS.

Round 2 Information Request Number:	CEAA-2-44
Regulatory Agency/Indigenous Community:	NRCan
Topic/Discipline:	Hydrogeochemistry
EIS Guideline Reference:	Section 6.1.4; 6.2.2
Revised EIS (February 28, 2019) Reference:	Appendix F.6 (Groundwater Flow and Solute Transport Modelling to Evaluate Disposal of Beaver Dam Tailings in Touquoy Open Pit)

Context and Rationale

Baseflow calibration for Touquoy:

A baseflow value for the Moose River is estimated using the calibrated numerical model for the baseline conditions.

However, there is no baseflow calibration to ensure that the estimated value with the model is correct. While the calibration with the hydraulic heads is satisfactory, this does not guarantee that the mass balance of the model is realistic. Without baseflow calibration, several combinations of hydraulic conductivity and groundwater recharge can match observed heads, but with each combination having a different impact on the baseflow estimates.

Baseflow calibration should be done at least for the Moose River which is expected to be the most impacted by the Project.

The Proponent is Required to …

Using a similar approach to Touquoy, estimate baseflow for the Moose River using recursive filter on streamflow records.

Based on the results, update the modeling, including calibrating the model to Moose River baseflow, and the assessment of related valued component as appropriate.

Response

The Groundwater Flow and Solute Transport Modelling to Evaluate Disposal of Beaver Dam Tailings in Touquoy Open Pit has been updated and is provided in Appendix F.6 of the Updated 2021 EIS (AMNS 2021). The results from the modelling have been included in the assessment. Specifically, Section 6.6.4.2.2, page 6-176 of the Updated 2021 EIS states:

Both total stream flow and baseflow were estimated for Moose River at SW-2 through analysis and review of stream flow data collected at nearby hydrometric stations. Mean annual flow in Moose River is estimated to be 1.15 m^3/s. Baseflow indices were calculated using a recursive baseflow filter implemented in the BFLOW software code (Arnold et al., 1995) for annual and monthly streamflow rates observed in Moose River at SW-2. The mean annual baseflow index for Moose River is estimated to be 0.29, with summer baseflow indices 0.52 in 2019 and 0.34 in 2020. The calculated mean annual baseflow in Moose River is 28,814 m^3/d, and the mean summer baseflow for 2019 and 2020 are 9,848 and 9,143 m^3/d, respectively. The daily flow data in Moose River at SW-2, and the recursively filtered baseflow used to calculate these values are shown on Table CEAA-2-44-1.

The calibration of the groundwater flow model at Touquoy was updated to incorporate the summer and annual baseflow targets in Moose River, and included updated water level targets for the same periods. The calibration methodology is described in the updated Touquoy groundwater modelling report, i.e., Appendix F.6 (Groundwater Flow and Solute Transport Modelling to Evaluate

Disposal of Tailings in Touquoy Open Pit – Final Report), Section 4.4.1, PDF page 29 in the Updated 2021 EIS (AMNS 2021), with the calibration to groundwater flow rates (i.e., baseflow to Moose River) presented in Section 4.4.3, PDF page 38 of the same report.

Table CEAA-2-44-1: Streamflow and Recursively Filtered Baseflow Data for Moose River at SW-2

Date	Moose River Flow (m^3/s)	Filtered Baseflow (m^3/s)
2017-07-19	0.155	0.0775
2017-07-20	0.156	0.0777
2017-07-21	0.151	0.0783
2017-07-22	0.137	0.0793
2017-07-23	0.122	0.0804
2017-07-24	0.112	0.0816
2017-07-25	0.131	0.0828
2017-07-26	0.142	0.0841
2017-07-27	0.142	0.0856
2017-07-28	0.141	0.087
2017-07-29	0.14	0.0884
2017-07-30	0.131	0.0896
2017-07-31	0.118	0.0907
2017-08-01	0.11	0.0917
2017-08-02	0.104	0.0926
2017-08-03	0.103	0.0933
2017-08-04	0.113	0.0941
2017-08-10	0.135	0.0948
2017-08-11	0.133	0.0954
2017-08-12	0.14	0.096
2017-08-13	0.155	0.0965
2017-08-14	0.154	0.0969
2017-08-15	0.152	0.0972
2017-08-16	0.145	0.0974
2017-08-17	0.118	0.097
2017-08-18	0.104	0.0959
2017-08-19	0.098	0.0955
2017-08-20	0.123	0.0953
2017-08-21	0.124	0.0949
2017-08-22	0.132	0.0943
2017-08-23	0.132	0.0935
2017-08-24	0.156	0.0925

Date	Moose River Flow (m^3/s)	Filtered Baseflow (m^3/s)
2017-08-25	0.164	0.0911
2017-08-26	0.175	0.0892
2017-08-27	0.164	0.0869
2017-08-28	0.146	0.0841
2017-08-29	0.128	0.0809
2017-08-30	0.116	0.0777
2017-08-31	0.106	0.075
2017-09-01	0.084	0.0734
2017-09-02	0.073	0.073
2017-09-03	0.073	0.073
2017-09-04	0.114	0.0731
2017-09-05	0.129	0.0733
2017-09-06	0.177	0.0739
2017-09-07	0.367	0.0751
2017-09-08	1.37	0.079
2017-09-09	1.39	0.0849
2017-09-10	0.74	0.0902
2017-09-11	0.422	0.0941
2017-09-12	0.271	0.0968
2017-09-13	0.197	0.0985
2017-09-14	0.15	0.0995
2017-09-15	0.13	0.1
2017-09-16	0.129	0.101
2017-09-17	0.116	0.101
2017-09-18	0.107	0.101
2017-09-19	0.103	0.101
2017-09-20	0.139	0.101
2017-09-21	0.229	0.102
2017-09-22	0.289	0.103
2017-09-23	0.234	0.104
2017-09-24	0.186	0.105
2017-09-25	0.155	0.106

Table CEAA-2-44-1: Streamflow and Recursively Filtered Baseflow Data for Moose River at SW-2 (continued)

Date	Moose River Flow (m^3/s)	Filtered Baseflow (m^3/s)
2017-09-26	0.131	0.106
2017-09-27	0.111	0.106
2017-09-28	0.315	0.107
2017-09-29	1.7	0.11
2017-09-30	1.86	0.117
2017-10-01	1	0.123
2017-10-02	0.605	0.128
2017-10-03	0.405	0.131
2017-10-04	0.297	0.132
2017-10-05	0.235	0.133
2017-10-06	0.193	0.127
2017-10-07	0.166	0.123
2017-10-08	0.142	0.12
2017-10-09	0.128	0.119
2017-10-10	0.176	0.118
2017-10-11	0.306	0.117
2017-10-12	0.381	0.114
2017-10-13	0.301	0.11
2017-10-14	0.23	0.106
2017-10-15	0.19	0.0998
2017-10-16	0.176	0.0936
2017-10-17	0.154	0.0878
2017-10-18	0.143	0.0829
2017-10-19	0.134	0.0784
2017-10-20	0.127	0.0741
2017-10-21	0.121	0.0701
2017-10-22	0.114	0.0662
2017-10-23	0.096	0.0631
2017-10-24	0.069	0.0615
2017-10-25	0.064	0.0611
2017-10-26	0.061	0.061
2017-10-27	0.083	0.061
2017-10-28	0.083	0.0612
2017-10-29	0.085	0.0614
2017-10-30	0.121	0.0618

Date	Moose River Flow (m^3/s)	Filtered Baseflow (m^3/s)
2017-10-31	0.321	0.0626
2017-11-01	0.555	0.0649
2017-11-02	0.437	0.0691
2017-11-03	0.347	0.0748
2018-04-25	1.13	0.0824
2018-04-26	1.6	0.0944
2018-04-27	6.21	0.119
2018-04-28	6.86	0.169
2018-04-29	10.9	0.253
2018-04-30	11.3	0.352
2018-05-01	11.8	0.439
2018-05-02	7.27	0.511
2018-05-03	4.18	0.565
2018-05-04	2.86	0.601
2018-05-05	2.31	0.624
2018-05-06	1.78	0.636
2018-05-07	1.68	0.641
2018-05-08	1.62	0.578
2018-05-09	1.32	0.506
2018-05-10	1.01	0.453
2018-05-11	0.944	0.41
2018-05-12	0.793	0.373
2018-05-13	0.637	0.346
2018-05-14	0.501	0.327
2018-05-15	0.41	0.317
2018-05-16	0.396	0.31
2018-05-17	0.355	0.305
2018-05-18	0.338	0.301
2018-05-19	0.3	0.3
2018-05-20	0.54	0.3
2018-05-21	1.46	0.303
2018-05-22	1.33	0.31
2018-05-23	0.939	0.322
2018-05-24	0.718	0.335
2018-05-25	0.677	0.349

Table CEAA-2-44-1: Streamflow and Recursively Filtered Baseflow Data for Moose River at SW-2 (continued)

Date	Moose River Flow (m^3/s)	Filtered Baseflow (m^3/s)
2018-05-26	1.13	0.362
2018-05-27	1.46	0.374
2018-05-28	1.28	0.384
2018-05-29	0.986	0.392
2018-05-30	0.761	0.399
2018-05-31	0.606	0.404
2018-06-01	0.507	0.408
2018-06-02	0.492	0.41
2018-06-03	0.503	0.413
2018-06-04	0.485	0.415
2018-06-05	0.475	0.416
2018-06-06	0.914	0.417
2018-06-07	1.2	0.418
2018-06-08	0.978	0.411
2018-06-09	0.766	0.397
2018-06-10	0.617	0.38
2018-06-11	0.476	0.367
2018-06-12	0.391	0.362
2018-06-13	0.361	0.361
2018-06-14	0.497	0.361
2018-06-15	0.668	0.362
2018-06-16	0.623	0.364
2018-06-17	0.494	0.367
2018-06-18	0.397	0.369
2018-06-19	2.76	0.375
2018-06-20	7.56	0.396
2018-06-21	3.9	0.427
2018-06-22	2	0.454
2018-06-23	1.26	0.476
2018-06-24	0.927	0.494
2018-06-25	0.921	0.509
2018-06-26	1.39	0.521
2018-06-27	1.47	0.531
2018-06-28	1.13	0.538
2018-06-29	1.56	0.542

Date	Moose River Flow (m^3/s)	Filtered Baseflow (m^3/s)
2018-06-30	3.71	0.534
2018-07-01	2.94	0.478
2018-07-02	1.74	0.407
2018-07-03	1.17	0.337
2018-07-04	0.858	0.282
2018-07-05	0.649	0.243
2018-07-06	0.531	0.215
2018-07-07	0.487	0.192
2018-07-08	0.409	0.171
2018-07-09	0.342	0.154
2018-07-10	0.285	0.141
2018-07-11	0.236	0.132
2018-07-12	0.2	0.124
2018-07-13	0.159	0.12
2018-07-14	0.135	0.118
2018-07-15	0.127	0.117
2018-07-16	0.121	0.116
2018-07-17	0.116	0.116
2018-07-18	0.194	0.116
2018-07-19	0.211	0.117
2018-07-20	0.219	0.117
2018-07-21	0.203	0.119
2018-07-22	0.238	0.12
2018-07-23	0.26	0.122
2018-07-24	0.256	0.124
2018-07-25	0.225	0.126
2018-07-26	0.193	0.128
2018-07-27	0.195	0.129
2018-07-28	0.188	0.13
2018-07-29	0.21	0.131
2018-07-30	0.218	0.131
2018-07-31	0.206	0.132
2018-08-01	0.185	0.129
2018-08-02	0.162	0.126
2018-08-03	0.153	0.123

Table CEAA-2-44-1: Streamflow and Recursively Filtered Baseflow Data for Moose River at SW-2 (continued)

Date	Moose River Flow (m^3/s)	Filtered Baseflow (m^3/s)
2018-08-04	0.145	0.121
2018-08-05	0.141	0.119
2018-08-06	0.141	0.117
2018-08-07	0.137	0.116
2018-08-08	0.135	0.114
2018-08-09	0.13	0.112
2018-08-10	0.141	0.111
2018-08-11	0.127	0.11
2018-08-12	0.117	0.109
2018-08-13	0.112	0.108
2018-08-14	0.111	0.108
2018-08-15	0.118	0.107
2018-08-16	0.114	0.107
2018-08-17	0.107	0.107
2018-08-18	0.112	0.107
2018-08-19	0.143	0.107
2018-08-20	0.173	0.107
2018-08-21	0.226	0.107
2018-08-22	0.217	0.108
2018-08-23	0.228	0.107
2018-08-24	0.206	0.105
2018-08-25	0.182	0.102
2018-08-26	0.163	0.098
2018-08-27	0.146	0.0941
2018-08-28	0.134	0.0904
2018-08-29	0.125	0.0872
2018-08-30	0.12	0.0844
2018-08-31	0.113	0.0818
2018-09-01	0.107	0.0795
2018-09-02	0.102	0.0775
2018-09-03	0.096	0.0757
2018-09-04	0.093	0.0742
2018-09-05	0.092	0.0727
2018-09-06	0.088	0.0713
2018-09-07	0.087	0.07

Date	Moose River Flow (m^3/s)	Filtered Baseflow (m^3/s)
2018-09-08	0.082	0.0688
2018-09-09	0.072	0.0682
2018-09-10	0.068	0.068
2018-09-11	0.069	0.068
2018-09-12	0.115	0.0681
2018-09-13	0.116	0.0683
2018-09-14	0.12	0.0688
2018-09-15	0.124	0.0692
2018-09-16	0.119	0.0696
2018-09-17	0.112	0.0699
2018-09-18	0.109	0.0702
2018-09-19	0.111	0.0703
2018-09-20	0.096	0.0696
2018-09-21	0.083	0.0682
2018-09-22	0.083	0.067
2018-09-23	0.078	0.0659
2018-09-24	0.071	0.0652
2018-09-25	0.065	0.065
2018-09-26	0.079	0.065
2018-09-27	0.172	0.0652
2018-09-28	0.323	0.0661
2018-09-29	0.564	0.0684
2018-09-30	0.51	0.0727
2018-10-01	0.372	0.0788
2018-10-02	0.266	0.0857
2018-10-03	0.264	0.0927
2018-10-04	0.386	0.0999
2018-10-05	0.519	0.108
2018-10-06	0.438	0.116
2018-10-07	0.324	0.125
2018-10-08	0.262	0.134
1900-01-00	0	0
2019-05-10	0.441	0.143
2019-05-11	0.604	0.152
2019-05-12	0.79	0.163

Table CEAA-2-44-1: Streamflow and Recursively Filtered Baseflow Data for Moose River at SW-2 (continued)

Date	Moose River Flow (m^3/s)	Filtered Baseflow (m^3/s)
2019-05-13	0.725	0.175
2019-05-14	0.643	0.188
2019-05-15	0.929	0.203
2019-05-16	1.18	0.219
2019-05-17	1.07	0.238
2019-05-18	1.16	0.26
2019-05-19	1.38	0.283
2019-05-20	1.37	0.309
2019-05-21	2.31	0.338
2019-05-22	3.17	0.371
2019-05-23	2.78	0.404
2019-05-24	1.98	0.432
2019-05-25	1.68	0.456
2019-05-26	1.31	0.476
2019-05-27	1.12	0.491
2019-05-28	1.03	0.503
2019-05-29	0.887	0.511
2019-05-30	0.775	0.517
2019-05-31	0.672	0.521
2019-06-01	0.617	0.525
2019-06-02	0.562	0.528
2019-06-03	0.658	0.53
2019-06-04	0.865	0.534
2019-06-05	0.885	0.538
2019-06-06	1.16	0.544
2019-06-07	3.59	0.555
2019-06-08	3.47	0.568
2019-06-09	2.02	0.579
2019-06-10	1.3	0.587
2019-06-11	0.944	0.592
2019-06-12	1.03	0.594
2019-06-13	0.976	0.585
2019-06-14	0.971	0.555
2019-06-15	1.03	0.523
2019-06-16	0.866	0.491

Date	Moose River Flow (m^3/s)	Filtered Baseflow (m^3/s)
2019-06-17	0.773	0.465
2019-06-18	0.648	0.445
2019-06-19	0.522	0.433
2019-06-20	0.43	0.43
2019-06-21	0.543	0.43
2019-06-22	1.59	0.432
2019-06-23	2.39	0.435
2019-06-24	1.71	0.437
2019-06-25	1.11	0.433
2019-06-26	0.772	0.406
2019-06-27	0.619	0.383
2019-06-28	0.562	0.366
2019-06-29	0.546	0.351
2019-06-30	0.607	0.335
2019-07-01	0.713	0.317
2019-07-02	0.761	0.297
2019-07-03	0.696	0.274
2019-07-04	0.604	0.249
2019-07-05	0.51	0.225
2019-07-06	0.426	0.205
2019-07-07	0.38	0.189
2019-07-08	0.322	0.176
2019-07-09	0.28	0.166
2019-07-10	0.242	0.158
2019-07-11	0.203	0.153
2019-07-12	0.176	0.15
2019-07-13	0.18	0.148
2019-07-14	0.174	0.146
2019-07-15	0.184	0.144
2019-07-16	0.184	0.141
2019-07-17	0.162	0.139
2019-07-18	0.168	0.137
2019-07-19	0.163	0.135
2019-07-20	0.167	0.133
2019-07-21	0.162	0.13

Table CEAA-2-44-1: Streamflow and Recursively Filtered Baseflow Data for Moose River at SW-2 (continued)

Date	Moose River Flow (m^3/s)	Filtered Baseflow (m^3/s)
2019-07-22	0.152	0.128
2019-07-23	0.151	0.126
2019-07-24	0.169	0.124
2019-07-25	0.184	0.122
2019-07-26	0.191	0.119
2019-07-27	0.179	0.116
2019-07-28	0.166	0.113
2019-07-29	0.151	0.109
2019-07-30	0.148	0.106
2019-07-31	0.14	0.103
2019-08-01	0.137	0.0998
2019-08-02	0.134	0.0969
2019-08-03	0.124	0.0943
2019-08-04	0.117	0.0922
2019-08-05	0.112	0.0904
2019-08-06	0.107	0.0888
2019-08-07	0.096	0.0878
2019-08-08	0.091	0.0874
2019-08-09	0.111	0.087
2019-08-10	0.107	0.0866
2019-08-11	0.104	0.086
2019-08-12	0.105	0.0854
2019-08-13	0.104	0.0846
2019-08-14	0.105	0.0837
2019-08-15	0.101	0.0826
2019-08-16	0.097	0.0815
2019-08-17	0.095	0.0803
2019-08-18	0.092	0.0792
2019-08-19	0.089	0.0783
2019-08-20	0.095	0.0775
2019-08-21	0.092	0.0765
2019-08-22	0.091	0.0754
2019-08-23	0.088	0.0743
2019-08-24	0.08	0.0736
2019-08-25	0.077	0.0732

Date	Moose River Flow (m^3/s)	Filtered Baseflow (m^3/s)
2019-08-26	0.073	0.073
2019-08-27	0.076	0.073
2019-08-28	0.078	0.073
2019-08-29	0.076	0.0731
2019-08-30	0.095	0.0731
2019-08-31	0.089	0.0733
2019-09-01	0.087	0.0735
2019-09-02	0.087	0.0738
2019-09-03	0.11	0.0741
2019-09-04	0.122	0.0746
2019-09-05	0.135	0.0753
2019-09-06	0.142	0.0762
2019-09-07	0.195	0.0774
2019-09-08	0.846	0.0799
2019-09-09	1.52	0.0865
2019-09-10	1.02	0.0953
2019-09-11	0.627	0.103
2019-09-12	0.474	0.11
2019-09-13	0.396	0.115
2019-09-14	0.327	0.118
2019-09-15	0.278	0.121
2019-09-16	0.242	0.122
2019-09-17	0.207	0.123
2019-09-18	0.183	0.123
2019-09-19	0.171	0.118
2019-09-20	0.162	0.114
2019-09-21	0.148	0.111
2019-09-22	0.134	0.109
2019-09-23	0.131	0.107
2019-09-24	0.126	0.105
2019-09-25	0.133	0.103
2019-09-26	0.123	0.102
2019-09-27	0.121	0.0999
2019-09-28	0.117	0.0983
2019-09-29	0.113	0.097

Table CEAA-2-44-1: Streamflow and Recursively Filtered Baseflow Data for Moose River at SW-2 (continued)

Date	Moose River Flow (m^3/s)	Filtered Baseflow (m^3/s)
2019-09-30	0.101	0.0962
2019-10-01	0.096	0.096
2019-10-02	0.102	0.096
2019-10-03	0.102	0.096
2019-10-04	0.105	0.0961
2019-10-05	0.108	0.0962
2019-10-06	0.109	0.0964
2019-10-07	0.11	0.0966
2019-10-08	0.113	0.0968
2019-10-09	0.113	0.0971
2019-10-10	0.111	0.0975
2019-10-11	0.112	0.0978
2019-10-12	0.18	0.0983
2019-10-13	0.429	0.0995
2019-10-14	0.533	0.102
2019-10-15	0.455	0.107
2019-10-16	0.392	0.112
2019-10-17	0.939	0.12
2019-10-18	5.05	0.136
2019-10-19	4.73	0.17
2019-10-20	2.56	0.213
2019-10-21	1.5	0.251
2019-10-22	0.997	0.285
2019-10-23	0.802	0.315
2019-10-24	2.38	0.341
2019-10-25	3.52	0.364
2019-10-26	2.33	0.384
2019-10-27	1.48	0.398
2019-10-28	1.07	0.408
2019-10-29	0.845	0.414
2019-10-30	0.695	0.417
2019-10-31	0.599	0.419
2019-11-01	0.548	0.416
2019-11-02	0.489	0.408
2019-11-03	0.44	0.404

Date	Moose River Flow (m^3/s)	Filtered Baseflow (m^3/s)
2019-11-04	0.416	0.402
2019-11-05	0.401	0.401
2019-11-06	0.727	0.401
2019-11-07	1.46	0.404
2019-11-08	1.91	0.412
2019-11-09	2.75	0.428
2019-11-10	2.33	0.453
2019-11-11	1.62	0.484
2019-11-12	1.7	0.518
2019-11-13	9.63	0.565
2019-11-14	11.9	0.643
2019-11-15	5.63	0.733
2019-11-16	3.81	0.813
2019-11-17	2.61	0.882
2019-11-18	1.83	0.941
2019-11-19	1.97	0.994
2019-11-20	2.24	1.04
2019-11-21	1.98	1.09
2019-11-22	1.59	1.12
2019-11-23	2.29	1.16
2019-11-24	3.27	1.2
2019-11-25	4.19	1.24
2019-11-26	5.11	1.3
2019-11-27	3.49	1.35
2019-11-28	3.36	1.41
2019-11-29	13.5	1.46
2019-11-30	12.1	1.5
2019-12-01	4.92	1.53
2019-12-02	3.76	1.54
2020-03-30	1.73	1.55
2020-03-31	1.67	1.54
2020-04-01	1.54	1.54
2020-04-02	4.33	1.54
2020-04-03	39	1.57
2020-04-04	21.1	1.62

Table CEAA-2-44-1: Streamflow and Recursively Filtered Baseflow Data for Moose River at SW-2 (continued)

Date	Moose River Flow (m^3/s)	Filtered Baseflow (m^3/s)
2020-04-05	8.02	1.65
2020-04-06	4.14	1.62
2020-04-07	2.79	1.47
2020-04-08	2.01	1.4
2020-04-09	1.56	1.37
2020-04-10	1.55	1.35
2020-04-11	2.23	1.34
2020-04-12	1.98	1.32
2020-04-13	1.44	1.3
2020-04-14	5.06	1.28
2020-04-15	8.58	1.24
2020-04-16	4.96	1.17
2020-04-17	2.89	1.07
2020-04-18	1.89	0.982
2020-04-19	1.54	0.922
2020-04-20	1.17	0.887
2020-04-21	0.985	0.872
2020-04-22	0.961	0.864
2020-04-23	1.27	0.855
2020-04-24	1.1	0.845
2020-04-25	1.02	0.833
2020-04-26	0.827	0.827
2020-04-27	0.923	0.827
2020-04-28	2.06	0.829
2020-04-29	3.52	0.838
2020-04-30	3.35	0.859
2020-05-01	2.37	0.89
2020-05-02	4.22	0.923
2020-05-03	7.32	0.954
2020-05-04	4.1	0.98
2020-05-05	2.7	0.999
2020-05-06	1.97	1.01
2020-05-07	1.51	1.02
2020-05-08	1.61	1.02
2020-05-09	1.48	1.01

Date	Moose River Flow (m^3/s)	Filtered Baseflow (m^3/s)
2020-05-10	2.21	0.968
2020-05-11	2.26	0.923
2020-05-12	1.8	0.87
2020-05-13	1.8	0.811
2020-05-14	1.78	0.745
2020-05-15	1.43	0.682
2020-05-16	1.41	0.623
2020-05-17	1.96	0.558
2020-05-18	1.72	0.486
2020-05-19	1.3	0.413
2020-05-20	0.975	0.355
2020-05-21	0.781	0.312
2020-05-22	0.676	0.279
2020-05-23	0.579	0.25
2020-05-24	0.471	0.228
2020-05-25	0.4	0.211
2020-05-26	0.353	0.198
2020-05-27	0.327	0.186
2020-05-28	0.298	0.176
2020-05-29	0.256	0.168
2020-05-30	0.217	0.162
2020-05-31	0.207	0.158
2020-06-01	0.191	0.155
2020-06-02	0.161	0.153
2020-06-03	0.153	0.153
2020-06-04	0.184	0.153
2020-06-05	0.169	0.153
2020-06-06	0.161	0.153
2020-06-07	0.161	0.154
2020-06-08	0.194	0.154
2020-06-09	0.291	0.155
2020-06-10	0.357	0.155
2020-06-11	0.272	0.157
2020-06-12	0.228	0.157
2020-06-13	0.238	0.158

Table CEAA-2-44-1: Streamflow and Recursively Filtered Baseflow Data for Moose River at SW-2 (continued)

Date	Moose River Flow (m^3/s)	Filtered Baseflow (m^3/s)
2020-06-14	0.235	0.159
2020-06-15	0.228	0.159
2020-06-16	0.268	0.156
2020-06-17	0.277	0.152
2020-06-18	0.264	0.147
2020-06-19	0.245	0.142
2020-06-20	0.23	0.136
2020-06-21	0.183	0.13
2020-06-22	0.166	0.127
2020-06-23	0.163	0.124
2020-06-24	0.154	0.121
2020-06-25	0.146	0.119
2020-06-26	0.14	0.117
2020-06-27	0.133	0.115
2020-06-28	0.123	0.114
2020-06-29	0.13	0.113
2020-06-30	0.127	0.112
2020-07-01	0.124	0.112
2020-07-02	0.123	0.111
2020-07-03	0.128	0.11
2020-07-04	0.115	0.109
2020-07-05	0.113	0.108
2020-07-06	0.109	0.108
2020-07-07	0.111	0.108
2020-07-08	0.108	0.108
2020-07-09	0.263	0.108
2020-07-10	0.484	0.109
2020-07-11	0.432	0.112
2020-07-12	0.521	0.116
2020-07-13	0.784	0.122
2020-07-14	0.653	0.127
2020-07-15	0.44	0.132
2020-07-16	0.342	0.136
2020-07-17	0.276	0.138
2020-07-18	0.25	0.14

Date	Moose River Flow (m^3/s)	Filtered Baseflow (m^3/s)
2020-07-19	0.227	0.142
2020-07-20	0.2	0.143
2020-07-21	0.198	0.143
2020-07-22	0.17	0.143
2020-07-23	0.162	0.143
2020-07-24	0.382	0.141
2020-07-25	0.505	0.137
2020-07-26	0.388	0.132
2020-07-27	0.296	0.126
2020-07-28	0.256	0.118
2020-07-29	0.206	0.11
2020-07-30	0.173	0.103
2020-07-31	0.154	0.0986
2020-08-01	0.138	0.0947
2020-08-02	0.132	0.0915
2020-08-03	0.112	0.089
2020-08-04	0.121	0.0871
2020-08-05	0.113	0.0851
2020-08-06	0.111	0.0829
2020-08-07	0.108	0.0807
2020-08-08	0.097	0.079
2020-08-09	0.095	0.0776
2020-08-10	0.094	0.0762
2020-08-11	0.082	0.0753
2020-08-12	0.075	0.075
2020-08-13	0.083	0.075
2020-08-14	0.083	0.0751
2020-08-15	0.096	0.0752
2020-08-16	0.111	0.0754
2020-08-17	0.144	0.0758
2020-08-18	0.184	0.0765
2020-08-19	0.181	0.0777
2020-08-20	0.161	0.0792
2020-08-21	0.13	0.0807
2020-08-22	0.128	0.0821

Table CEAA-2-44-1: Streamflow and Recursively Filtered Baseflow Data for Moose River at SW-2 (continued)

Date	Moose River Flow (m^3/s)	Filtered Baseflow (m^3/s)
2020-08-23	0.111	0.0833
2020-08-24	0.105	0.0844
2020-08-25	0.103	0.0853
2020-08-26	0.121	0.0862
2020-08-27	0.11	0.0869
2020-08-28	0.101	0.0876
2020-08-29	0.095	0.0881
2020-08-30	0.145	0.0887
2020-08-31	0.164	0.0895
2020-09-01	0.168	0.0903
2020-09-02	0.145	0.0911
2020-09-03	0.133	0.0917
2020-09-04	0.142	0.0922
2020-09-05	0.136	0.0926
2020-09-06	0.118	0.0928
2020-09-07	0.108	0.0929
2020-09-08	0.105	0.0924
2020-09-09	0.103	0.0915
2020-09-10	0.091	0.091
2020-09-11	0.221	0.0912
2020-09-12	0.543	0.0923
2020-09-13	0.469	0.0945
2020-09-14	0.354	0.0968
2020-09-15	0.268	0.0987
2020-09-16	0.208	0.1
2020-09-17	0.172	0.101
2020-09-18	0.146	0.102
2020-09-19	0.134	0.102
2020-09-20	0.115	0.102
2020-09-21	0.103	0.101
2020-09-22	0.101	0.101
2020-09-23	1.05	0.102
2020-09-24	3.99	0.112
2020-09-25	2.77	0.132
2020-09-26	1.55	0.155

Date	Moose River Flow (m^3/s)	Filtered Baseflow (m^3/s)
2020-09-27	1.02	0.175
2020-09-28	0.758	0.191
2020-09-29	0.612	0.205
2020-09-30	0.567	0.216
2020-10-01	0.643	0.225
2020-10-02	0.614	0.232
2020-10-03	0.553	0.237
2020-10-04	0.441	0.24
2020-10-05	0.344	0.242
2020-10-06	0.288	0.243
2020-10-07	0.275	0.243
2020-10-08	0.362	0.244
2020-10-09	0.387	0.244
2020-10-10	0.337	0.243
2020-10-11	0.33	0.239
2020-10-12	0.272	0.235
2020-10-13	0.234	0.234
2020-10-14	0.69	0.235
2020-10-15	3.32	0.241
2020-10-16	3.32	0.26
2020-10-17	2.05	0.291
2020-10-18	1.51	0.328
2020-10-19	1.16	0.364
2020-10-20	0.956	0.396
2020-10-21	0.856	0.426
2020-10-22	0.838	0.453
2020-10-23	0.78	0.477

References

AMNS (Atlantic Mining NS Inc.). 2021. Updated Environmental Impact Statement. Beaver Dam Mine Project. Submitted to the Impact Assessment Agency of Canada and Nova Scotia Environment. May 2021. Middle Musquodoboit, NS.

Arnold, J G, P M Allen, R Muttiah, and G Bernhardt. 1995. "Automated Base Flow Separation and Recession Analysis Techniques." Ground Water 33 (6): 1010–18.

Round 2 Information Request Number:	CEAA-2-45
Regulatory Agency/Indigenous Community:	NRCan
Topic/Discipline:	Hydrogeochemistry
EIS Guideline Reference:	Section 6.1.4; 6.2.2
Revised EIS (February 28, 2019) Reference:	Appendix F.6 (Groundwater Flow and Solute Transport Modelling to Evaluate Disposal of Beaver Dam Tailings in Touquoy Open Pit)

Context and Rationale

Calibrated hydraulic conductivity values for streambed at Touquoy:

It is indicated that the hydraulic conductivity values for river streambeds (e.g., Moose River) were adjusted during the calibration. However, the calibrated values are not provided.

For conservative simulations, NRCan recommends also using streambed hydraulic conductivity values higher or equal than the hosting material. Indeed, using lower K values will disconnect the rivers from the aquifer and thus diminishing the impact of dewatering activities.

The Proponent is Required to …

Provide adjusted calibrated hydraulic conductivity streambed values for river streambeds at the Touquoy project site.

Indicate how values compare with the hosting material.

Response

The calibrated hydraulic conductivity values as well as the hosting material comparison is provided in the Groundwater Flow and Solute Transport Modelling to Evaluate Disposal of Beaver Dam Tailings in Touquoy Open Pit has been updated and is provided as Appendix F.6 of the Updated 2021 EIS (AMNS 2021). The calibrated hydraulic conductivity of the streambed was assigned as 6.7×10^{-6} m/s, which is slightly lower than the average hydraulic conductivity of the overburden materials (i.e., 1×10^{-4} m/s). A sensitivity analysis of the streambed rates is provided in Appendix F.6, Section 4.4.6, PDF page 41 of the updated Touquoy groundwater modelling report (Appendix F.6). As presented in this section, the groundwater baseflow rates to Moose River and pit inflow rates do not change substantively from the calibrated rates by increasing the conductance rate by up to a factor of 10, or by decreasing the conductance by a factor of 0.1. Moose River baseflows are observed to decrease when the conductance is decreased by factors below 0.01.

Reference

AMNS (Atlantic Mining NS Inc.). 2021. Updated Environmental Impact Statement. Beaver Dam Mine Project. Submitted to the Impact Assessment Agency of Canada and Nova Scotia Environment. May 2021. Middle Musquodoboit, NS.

Round 2 Information Request Number:	CEAA-2-46
Regulatory Agency/Indigenous Community:	CEAA, KMKNO
Topic/Discipline:	Hydrogeochemistry
EIS Guideline Reference:	Section 6.1.4; 6.2.2
Revised EIS (February 28, 2019) Reference:	Section 6.6.6.3 Appendix F.6

Context and Rationale

The proponent's solute transport model presented in Appendix F.6 indicates that contaminant concentrations would decrease by a factor of 1,000 over the 100 m distance between the tailings pit and the Moose River. However, even when the low permeability of the rock is considered, this rate of transport is unusually low.

Kwilmu'kw Maw-klusuaqn Negotiation Office's consultant (CBCL Limited) completed scoping calculations using data from the report, and the results are not consistent with the presented model results.

The Proponent is Required to …

Discuss the low rate of transport presented in Appendix F.6 and justify the results presented in the model.

Response

The Groundwater Flow and Solute Transport Modelling to Evaluate Disposal of Beaver Dam Tailings in Touquoy Open Pit has been updated and is provided in Appendix F.6 of the Updated 2021 EIS (AMNS 2021). This report provides an assessment of the transport rates assumed in the modelling that support the conclusion as stated in Section 6.6.7.3, page 6-200 (AMNS 2021), that the total groundwater seepage rate is simulated to contribute approximately 0.6% of the flow in Moose River, therefore the mass loading of the primary compounds of concern are predicted to be low and are not anticipated to adversely affect the water quality in Moose River.

The rate of transport is predicted in the groundwater flow model, and accounts for the hydraulic conductivity of the overburden and bedrock, and the relatively deeper source of the solutes (i.e., within the bedrock layers) whereas Moose River is located within the overburden, and the mixing of clean groundwater recharge. As discussed in Appendix F.6, Section 5.4.1.2, PDF page 52 and Section 5.4.2.2, PDF page 62 of the Updated 2021 EIS (AMNS 2021), the timing of the solute transport from the pit to Moose River is sensitive to the bedrock porosity. However, the magnitude of the final concentrations in Moose River are not substantively different between the scenarios, with slightly lower relative concentrations predicted in the lower porosity scenarios presented in Appendix F.6, Section 5.4.1.1, PDF page 51 and Section 5.4.2.2, PDF page 62 (AMNS 2021).

Reference

AMNS (Atlantic Mining NS Inc.). 2021. Updated Environmental Impact Statement. Beaver Dam Mine Project. Submitted to the Impact Assessment Agency of Canada and Nova Scotia Environment. May 2021. Middle Musquodoboit, NS.

Round 2 Information Request Number:	CEAA-2-47
Regulatory Agency/Indigenous Community:	CEAA, ECCC, KMKNO, ESFW
Topic/Discipline:	Accidents and Malfunctions
EIS Guideline Reference:	Section 6.7.1
Revised EIS (February 28, 2019) Reference:	Section 6.18

Context and Rationale

In accordance with the Operation Policy Statement: Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under the Canadian Environmental Assessment Act, 2012 and Technical Guidance: Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under the Canadian Environmental Assessment Act, 2012, the Agency requires that mitigation and contingency planning are clearly outlined in the event of accidents and malfunctions.

Comments received from Indigenous people expressed concern regarding the potential for fuel and other spills (e.g. cyanide) to affect land and resources in the project area, and to detract from Indigenous use of the area or lead to avoidance.

In the revised EIS, Table 6.18-6 Fuel and/or Other Spills Interactions with VCs states that "fuel and/or spills could potentially adversely affect Indigenous peoples", either directly in relation to ground and surface water quality and/or indirectly due to potential adverse effects to fish, fish habitat, wetlands and terrestrial habitats and species, and that this potential for adverse effects is high. No analysis of potential fuel/spills on current use is provided in the revised EIS.

Furthermore, the Risk Rating Matrix (i.e. Figure 6.18-1), utilized on page 861 of the revised EIS, is not a commonly used ranking system. The selected values for likelihood of occurrence and level of magnitude are unsupported. The resulting risk ratings appear to be unrealistic for the selected scenarios.

The Proponent is Required to …

Provide an analysis of the effects of potential fuel or other spill events on current use of land and resources by Indigenous people, including the potential for a worst-case scenario event.

Provide mitigation and contingency planning, with priority given to areas of high importance by Indigenous people and how these would be protected in the event of a spill.

Justify or revise the Risk Rating Matrix to provide a more comprehensive assessment that utilizes a more up-to-date ranking method of the likelihood and magnitude of all plausible accidents and malfunctions.

Response

Accidents and Malfunctions (Section 6.18, page 6-934) of the Updated 2021 EIS (AMNS 2021) has been updated to include an assessment of a potential worst-case scenario fuel spill which is outlined in Section 6.18.7.1.1, page 6-954. Mitigation and emergency response for potential fuel and other spills are discussed in Section 6.18.7.1.6, page 6-960 of the Updated 2021 EIS (AMNS 2021).

Assessment of Large Fuel Release

All phases of the Project have the potential for fuel and/or other spills to occur. As requested, modeling was completed to support this IR response to assess a worst-case scenario fuel spill and assess the effects on current use of land and resources by the MI'kmaq of Nova Scotia. To select the worst-case scenario for the modeling, there are ultimately three potential locations a large fuel spill could take place. The first occurrence could occur during the delivery of fuels to the Beaver Dam facility. The second could occur from a spill from the on-site storage tanks and the third potential location would be along the Haul Road from the trucks transporting ore from the Beaver Dam Mine to the Touquoy processing facility.

The delivery of hydrocarbons to the Beaver Dam Mine will be completed by a third party using licenced and trained drivers along a regional road network. Any potential spill and containment/remediation would fall under the third party's responsibility, therefore the following assessment does not cover this type of spill.

A spill occurring from a holding tank on-site has a potential to reach the receiving environment (aquatic and terrestrial) and would be the responsibility of AMNS to contain and remediate. Therefore, this type of spill has been investigated further. Within the design of the storage tanks a secondary containment berm is included to capture any unforeseen spill from entering the receiving environment. Furthermore, should a spill breach the secondary containment berm, the hydrocarbons would be captured in the surface water collection ditches. The surface water collection ditches in the area of the tanks all drain north through the east side PAG ditches to a sump pit (~500 m in length) where the water gets pumped west to a collection ditch that ultimately discharges to the North Pond (~1,125 m in length). The North Pond has a 24-hour detention time and been designed to include an emergency shutoff valve. If a spill event were to occur from the storage tanks on-site and breach the secondary containment berms, the fuel can be captured in the sump pit located in the northeast corner of the PAG pile collection ditch as well as the ultimate discharge location of the North Pond. Through this multi-tiered containment system (secondary containment berms, PAG ditch sump pit, and North Collection Pond with shutoff valve) there is negligible risk of a spill entering the receiving environment.

The highest potential risk of a fuel spill entering the receiving environment would occur along the Haul Road between Beaver Dam and Touquoy. Therefore, the following detailed assessment was focused on the Haul Road, which would represent a worst-case scenario. The most likely cause of a spill event would result from a collision of two "C" train transport trucks carrying ore, assuming all saddle tanks are full of diesel holding an approximate maximum volume of 1,100 litres per truck.

This assessment was completed in multiple steps. The first step consisted of identifying the locations along the Haul Road that have the highest risk potential for broad impact should a spill occur. It was determined by the project team that the broadest impact would happen if a spill was to occur near an aquatic waterbody. A terrestrial fuel spill is more easily contained and doesn't have the same potential to migrate. The second step, required the planning distance calculation, which was used to simulate a spill and determine the potential downstream travel distance in the aquatic receiving environment before a spill response team can be deployed and have the spill containment equipment put in place. The last step was to determine, based on the extent of the spill in the aquatic receiving environment, what the potential impacts could be to fish and fish habitat and by extension, the current use of land and resources by the Mi'kmaq of Nova Scotia. A qualitative discussion of fuel oil impacts in a terrestrial environment and the impact of this to current use of land and resources by the Mi'kmaq of Nova Scotia is also included.

High risk areas along the Haul Road were determined based on proximity to water crossings. A total of 38 water crossings were identified along the entire length of the Haul Road. The majority of the water crossings are pipe culverts, total of 35, with the remaining three water crossings being bridges. A total of 27 of the culverts crossings and all three bridges are currently part of the Haul Road improvement works and will be new culverts and bridges designed by WSP. The design velocities calculated by WSP for each of the water crossings was used for planning distance calculation in step 2 of this analysis. The remaining culvert crossings are all along public roads that are not slated for redesign and therefore outside of WSP's scope of work. For these culvert crossings an alternative method, drainage-area ratio method, was used to estimate these flow velocities. The formula used to perform the planning distance calculation was for diesel transport on moving navigable water based on the velocity of the water body and the time interval to reach final storage (large water body) or ability for a spill response team to contain the spill during adverse weather conditions (worst-case scenario). The travel distance/planning distance of a spill is then equal to the velocity multiplied by the deployment time of a spill containment team from either Beaver Dam or Touquoy site.

The planning distance calculation included the calculation of both the potential downstream travel distance and the response time of the spill containment crew. As mentioned above, the velocities for the majority of the culvert crossings and all bridge crossings were provided by WSP. The velocities for remaining culvert crossings (8) were calculated based on a drainage-area ratio method. The response times were calculated based on the combination of three response criteria:

1. an initial 30 min activation time from the moment the spill occurred until the spill containment crew were mobilized from either Touquoy or Beaver Dam Site (depending on location of the spill)
2. the time to travel from Touquoy or Beaver Dam to the spill location (assuming an average speed of 70 km/hr), and
3. an average time of 30 min deployment time of spill containment equipment.

Calculation results have been plotted on Figure CEAA-2-47-1 and the potential area covered by a spill event at each of the 38 water crossings is highlighted. It must be noted that if a water crossing enters a large body of water (>2,000 m^2) a default five-kilometer buffer is created following the waterbody shoreline. This is a conservative approach based on the anticipated reduction in velocities in a waterbody and dispersion of spill throughout the waterbody; and it resulted in inclusion of Scraggy Lake, Grassy/Ferry Lake and Lake Alma in the modelled potential affected area for a fuel release. These results are further used to identify potential impacts to fish and fish habitat and current use of land and resources by the Mi'kmaq of Nova Scotia. The selection of a 5 km buffer was used for spills entering a large waterbody as this size represents a conservative estimate on the time for a spill response team to deploy a containment kit at the downstream end of the waterbody. They could then work their way back upstream to identify the true extent of the spill and deploy further containment/remediation equipment.

As shown on Figure CEAA-2-47-1, if a spill were to occur at the intersection of the Haul Road with the West River Sheet Harbour, the greatest spatial extent predicted to be impacted is a maximum of approximately 3km downstream (using design criteria listed in the previous paragraph). The spatial extent of each additional water crossing does not extend farther than the 3km predicted for the West River Sheet Harbour crossing, as shown in Figure CEAA-2-47-1.

Potential Environmental Concerns

If a fuel spill were to occur within close proximity to fish habitat (at each water crossing identified, especially the West River Sheet Harbour, there would be an adverse impact to fish and fish habitat. A fuel spill could result in a degradation to the water quality, resulting in adverse effects to the spawning, rearing, foraging and overwintering habitat functions as well as several biological effects including increased mortality, early-life stage developmental defects, reduced reproductive capacity, genetic damage, impaired immune function and disease resistance, and changes in behavior (DFO, 2015). Acutely toxic conditions for fish can occur in any area covered with an oil slick, and can last 24-48 hours, or until oil weathered significantly or is removed, unless fresh inputs of oil continue. The size and impacts of a fish kill are difficult to predict however significant fish kills are typically observed following spills of lighter petroleum products which have a higher proportion of acutely toxic LMW compounds (e.g. gasoline, diesel fuel) (Logan et al, 2015). Depending on the location and volume of a release, this could result in a high magnitude of effect to fish and fish habitat (Logan et al, 2015). The geographical extent is expected to be discrete to local in nature (maximum of 5km downstream of the Haul Road), with short term duration and sporadic frequency. Given the implementation of appropriate containment and recovery (clean-up) measures, the effects to fish habitat are expected to be acute in nature and partially reversible (Logan et al, 2015). As described in Section 6.18.9, Table 6.18-13, page 6-979 of the Updated 2021 EIS (AMNS 2021) Accidents and Malfunctions section, the likelihood of a fuel release in an aquatic environment is considered very low.

Potential impacts to fish and fish habitat which could occur as a result of an accident or malfunction such as a large fuel spill are addressed in the Accidents and Malfunctions (Section 6.18.7.1 (page 6-953) of the Updated 2021 EIS), as a large fuel spill is not expected as part of normal mine operations. Potential direct and indirect impacts to fish and fish habitat are not specifically quantified within the effects assessment to Fish and Fish Habitat (Section 6.9, page 6-431) or the Cumulative Effects Assessment (Section 8, page 8-1) of the Updated 2021 EIS.

Impact To Current Use Of Land And Resources By The Mi'kmaq Of Nova Scotia (Aquatic)

The results of the modelling exercise provide a conservative estimate of extent of aquatic impact from a diesel fuel oil spill. The results predict potential aquatic impact within Scraggy Lake, Grassy/Ferry Lake and Lake Alma, West River Sheet Harbour, Morgan River and other smaller linear watercourses along the Haul Road. The Mi'kmaq of Nova Scotia and specifically, the Millbrook First Nation, have documented traditional practices within aquatic receiving environments, specifically fishing. As described within CEAA 2-17 and summarized within this IR response, the impact to fish and fish habitat from a spill of this nature (worse case) would be of high magnitude; however, the likelihood of an event is low. By extension, the impact to the Mi'kmaq of Nova Scotia would also be of high magnitude. Considering the very low likelihood and high consequence together, a fuel spill along the haul road has been assigned a risk ranking of 6, which represents an overall moderate risk. Accidents or malfunctions with a low to moderate overall risk are determined to be not significant.

Impact To Current Use Of Land And Resources By The Mi'kmaq Of Nova Scotia (Terrestrial)

If an accident was to occur and result in impacts only within the terrestrial environment, emergency response would allow for containment and remedial activities to limit impacts to the Mi'kmaq of Nova Scotia current use of the land and resources. Millbrook First Nation have documented traditional use in terrestrial habitats along the entire length of the Haul Road. Short term impact of a spill would be high, but the geographical extent of a terrestrial spill is expected to be discrete, and the impact is reversible with appropriate remedial action and removal of impacted soils, resulting in a low to moderate overall risk.

Within the Accidents and Malfunctions section, Section 6.18.7.1.5, Table 6.18-7, page 6-958, outlines that a fuel release during truck transport has a high potential adverse effect to fish and fish habitat. As described in Section 6.18.9, Table 6.18-13, page 6-979, the likelihood of this event is determined to be very low due to competent, licensed and trained delivers and usage of inspected vehicles. Due to the sensitivity of the receiving aquatic environment, the consequence of a fuel spill is determined to be high. Considering the very low likelihood and high consequence together, a fuel spill along the haul road has been assigned a risk ranking of 6, which represents an overall moderate risk. Accidents or malfunctions with a low to moderate overall risk are determined to be not significant (Section 6.18.9, page 6-978).

AMNS intents to address the potential impact of fuel spills through project design and operation performance to ensure a safe and environmentally sound operation. Therefore, in part and described below, is focused on the environmental designs and protections that will be in place to address potential fuel spills before there is an impact on current use of land and resources by the MI'kmaq of Nova Scotia.

This section outlines the avoidance and mitigation measures to be employed in the event of a fuel release during transport, which will reduce the likelihood of impact to the lands and resources used by the Mi'kmaq of Nova Scotia.

Design and Operations Environmental Protections

Regular maintenance of fuel trucks can significantly reduce the chance of an equipment failure caused accident. The need for compliance with the Transportation of Dangerous Goods Act and associated Regulations will be reinforced in all applicable contracts and vendor agreements.

The potential for environmental impacts associated with malfunction and accidents on the trucking route will be minimized by the following operational procedures which will be incorporated into the environmental management system as possible and into trucking / supply contracts as reasonable:

- Speed limits are to be strictly adhered to;
- Strict adherence to national trucking hour limits and other applicable requirements;
- Drivers will be required to meet all applicable regulatory training requirements, be trained in spill response procedures for the materials they transport, and carry the appropriate Material Safety Data Sheets;
- All vehicles transporting materials to site will be required to maintain a supply of basic emergency response equipment, including communication equipment, first aid materials and a fire extinguisher; and
- Penalties for operational violations.

An Emergency Response Plan, including a Spill Contingency Plan, forms part of the environmental management system that will address the primary hazardous materials on site including procedures for spill response on the trucking route to the site. Materials to be maintained in vehicles will be identified in the draft Emergency Response Plan (Appendix P.1) and Attachment CEAA 2-47-A to this response includes a Spill Abatement Equipment List that will be available on-site for AMNS responders to complete initial containment and confinement of spills.

At the Beaver Dam Mine Site, the following additional controls will be in place to reduce the potential for or the severity of accidents involving hazardous materials:

- Speed limits, to be posted and enforced by security personnel;

- Right of way procedures will be defined and haul trucks and loaded vehicles will be given preference;
- Traffic will be required to yield to wildlife as observed; and
- Where possible, heavy traffic will be limited to site haul roads and other traffic limited to site access roads.

Emergency Response Procedure and Contingency

Emergency response procedures will be established as part of the environmental management system and include the following: medical response, notification, containment of spill, removal of spill, treatment of affected environment, monitoring of environment and learning from the accident.

The primary goal in any collision resulting in a fuel spill, will be to ensure public and worker health and safety. Potential ignition sources will be removed in the event of a spill of flammable or combustible materials, if safely possible, and the spill will be stopped or slowed using available equipment. Appropriate corporate and external personnel will be notified, and an assessment will be conducted to determine the best means to prevent immediate environmental impacts. Spill countermeasures may include the use of absorbent materials, establishment of a collection trench and setting containment booms on water. When fuel is contained by booms, berms or other means, it may be pumped, skimmed or mopped with absorbent matting, and disposed of in an approved facility designed to manage such wastes. If a spill were to directly enter a fast-moving watercourse, it may not be possible to completely contain and remediate the spill.

Clean-up and potentially remediation will ensure long term environmental impacts are reduced to the extent practical. After any major spill, a review will be conducted to ensure that the required design changes, procedures and appropriate monitoring measures are in place to ensure that incident will not be repeated.

Accidents and Malfunctions Risk Assessment

The effects of a large fuel spill event would vary depending on the location and proximity to sensitive environments potentially impacting soils (or snow in winter) and/or entering a waterbody if the collision occurred on or near a water crossing.

AMNS intents to address the potential impact of fuel spills through project design and operation performance to ensure a safe and environmentally sound operation. The potential for environmental impacts associated with malfunction and accidents on the trucking route will be minimized by the following operational procedures which will be incorporated into the environmental management system

Despite all reasonable safeguards, there is a small potential for spills from tanker/transport trucks due to collisions, accidents related to poor weather conditions, or other mishaps.

Emergency response procedures will be established as part of the environmental management system and include the following: medical response, notification, containment of spill, removal of spill, treatment of affected environment, monitoring of environment and learning from the accident.

Clean-up and potentially remediation will ensure long term environmental impacts are reduced to the extent practical. After any major spill, a review will be conducted to ensure that the required design changes, procedures, and appropriate monitoring measures are in place to ensure that incident will not be repeated.

Based on this information, the likelihood of fuel release during transport is considered very low.

The Mi'kmaq of Nova Scotia and specifically, the Millbrook First Nation, have documented traditional practices within aquatic receiving environments, specifically fishing. If a fuel spill were to occur within, or in close proximity to fish habitat, there would be an adverse effect to fish and fish habitat. A fuel spill could result in acute lethality to fish, and a degradation to the water quality, resulting in adverse effects to the spawning, rearing, foraging and overwintering habitat functions. Depending on the location and volume of a release, this could result in a high magnitude of effect to fish and fish habitat. The geographical extent is expected to be discrete to local in nature, with short term duration and sporadic frequency. Given the implementation of appropriate containment and recovery (clean-up) measures, the effects to fish habitat are expected to be partially reversible.

Millbrook First Nation have documented traditional use in terrestrial habitats along the entire length of the Haul Road. Short term impact of a spill would be high, but the geographical extent of a terrestrial spill is expected to be discrete, and the impact is reversible with appropriate remedial action and removal of impacted soils, resulting in a low to moderate overall risk.

Due to the potential consequences on the environment and the effects on current use of land and resources by the MI'kmaq of Nova Scotia, the magnitude of fuel release during transport is considered high.

With a very low likelihood and a high level of magnitude/consequence the risk rating is determined to be a 6 (e.g., 1 (highest risk rating) to 9 (lowest risk rating) (Section 6.18.4, Figure 6.18-1, page 6-938 [AMNS 2021]).

The risk hazard matrix as outlined in Section 6.18.4, page 6-936 and discussed further in CEAA-2-18 is based on Best Management Practice for the mining industry and has been applied to multiple environmental assessment across Canada that have undergone the Environmental Assessment process. These Projects include, but not limited to the following:

- Greenstone Mining Project – Ontario, Canada;
- Victor Mine Project – Ontario, Canada;
- Rainy River Mine – Ontario, Canada;
- Sisson Mine – New Brunswick, Canada; and
- Gahcho Kué Mine – Northwest Territories, Canada.

Reference

AMNS (Atlantic Mining NS Inc.). 2021. Updated Environmental Impact Statement. Beaver Dam Mine Project. Submitted to the Impact Assessment Agency of Canada and Nova Scotia Environment. May 2021. Middle Musquodoboit, NS.