WATER RESOURCES VOL 3
ENVIRONMENTAL EFFECTS

TWIN METALS MINNESOTA PROJECT
Environmental Review Support Document

Prepared for Twin Metals Minnesota, LLC
Prepared by

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REVISION RECORD

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REVISION NARRATIVE

DISCLAIMER

This document is a working document. This document may change over time because of new information, or further analysis or deliberation.

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LIST OF ABBREVIATIONS, ACRONYMS, AND SYMBOLS

TMM	Twin Metals Minnesota, LLC

1.0 INTRODUCTION

The Twin Metals Minnesota, LLC (TMM) Project (Project) is focused on designing, permitting, constructing, and operating an underground copper, nickel, cobalt, platinum, palladium, gold, and silver mining project. Located approximately nine miles (14 kilometers [km]) southeast of Ely, Minnesota, and 11 miles (18 km) northeast of Babbitt, Minnesota, the Project targets valuable state, federal, and private minerals within the Maturi deposit, which is a part of the Duluth Complex geologic formation.

All potential Project infrastructure locations presented herein are considered preliminary and are undergoing further design and engineering evaluations which will dictate final design and locations. Further information about TMM and the Project is located at http://www.twin-metals.com/.

The purpose of this document is to provide necessary information for the environmental review and permitting process. TMM retained [insert Consultant name] (insert abbreviated Consultant name) to complete [insert text].

2.0 SUMMARY

This report will describe the impacts of the proposed action and alternatives on the water resources within the applicable areas of analysis.

The results presented in this volume are defined by overlaying the impacts from the proposed actions and alternatives conceptualized and simulated on the baseline conditions using as inputs the data and data quality verification procedures described in the other volumes of the *Water Resource Data Package.*

Reference relevant sections of the FSDD, SEAW, and / or federal documents to remind the reader there is a defined scope that is being followed.

3.0 ENVIRONMENTAL EFFECTS

Provide a high level summary of what is presented in the environmental effects. Section summarizes what environmental effects are and the effects of the proposed action and alternatives.

3.1 Impact Assessment Indicators and Methods

- Describe the baseline conditions at a high level using the other volumes of the *Water Resources Data Package*.
- Describe the impact assessment indicators and methods, assessment criteria and locations at a high level as follows:
    - Surface Water Quantity

  - Surface Water Quality
  - Groundwater Quantity
  - Groundwater Quantity
- Describe time for analysis:
  - Timeline for analysis for direct effects would be during the construction and operations, closure and post closure phases.
  - Timeline for analysis of the indirect effects would likely be the primarily during construction and operations, with lesser impacts during initial portions of the closure phase.

3.2 Discussion of Environmental Effects

Utilizing the impact assessment methods, areas of direct impacts, and areas of potential indirect impacts summarized in Section 3.1, an assessment of direct and indirect impacts will be conducted and described within this section. The following items will be assessed and described for the proposed action, alternatives to the proposed action, and the no action alternative:

Factors contributing to the impacts.

  - Underground mine dewatering
  - Underground mine flooding during closure
    - Groundwater flow changes
    - Mass loading to groundwater
  - Consumptive Water Usage
    - Water appropriation for makeup water
    - Process water demand
  - Storm water management
  - Wastewater discharge (none planned)
  - Watershed alterations, including changes in recharge to groundwater at:
    - DSF
    - NWDA
    - Plant Site
  - Leakage from ponds and DSF

Surface Water

Surface Water Quantity

- Net change in surface water volume to Birch Lake watershed
- Appropriation quantity from Birch Lake Reservoir
- Keely Creek flow
- Unnamed tributary to Keely Creek
- North Nokomis Creek flow
- South Nokomis Creek flow

- S. Kawishiwi River Flow
- Filson Creek flow
- Unnamed Stream tributary to Filson Creek flow

Surface Water Quality

- Birch Lake water quality
- Birch Lake fish tissue mercury
- White Iron Lake water quality
- White Iron Lake fish tissue mercury (only if modeling results estimate a measurable change in Birch Lake fish tissue)
- Keeley Creek water quality
- North Nokomis Creek water quality
- South Nokomis Creek water quality
- S. Kawishiwi River water quality?
- Filson Creek water quality
- Unnamed tributary to Filson Creek water quality

Groundwater

Groundwater Quantity

- Appropriation quantity from Quaternary Unconsolidated Materials
- Appropriation quantity from Shallow Bedrock
- Appropriation quantity from Deep Bedrock

Groundwater Quality

- Quaternary Unconsolidated Materials groundwater quality
- Shallow Bedrock groundwater quality
- Deep Bedrock groundwater quality
- USDW water quality (UIC)

3.2.1 Proposed Action

Impacts associated with the proposed action will be described in this section using the structure above.

Surface Water

Surface Water Quantity

Surface Water Quality

Groundwater

Groundwater Quantity

Groundwater Quality

3.2.2 Alternatives to the Proposed Action

Impacts associated with the alternatives will be discussed in this section. This discussion will focus on differences in impacts between the alternatives and proposed action. Impacts that are the same between the proposed action and alternatives will be noted but not discussed in detail. This would follow the same structure above.

Surface Water

Surface Water Quantity

Surface Water Quality

Groundwater

Groundwater Quantity

Groundwater Quality

3.2.3 No Action Alternative

Impacts associated with the no action alternative will be described in this section.

Surface Water

Surface Water Quantity

Surface Water Quality

Groundwater

Groundwater Quantity

Groundwater Quality

4.0 REFERENCES

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APPENDICES

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[APPENDIX TITLE]

APPENDIX [#A, B, C, D]

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