



**Montana Department of
ENVIRONMENTAL QUALITY**

**Steve Bullock, Governor
Tracy Stone-Manning, Director**

P. O. Box 200901 • Helena, MT 59620-0901 • (406) 444-2544 • Website: www.deq.mt.gov

February 20, 2014

RE: Final EIS Released for Proposed Garnet Mine

Dear Sir/Madam

The Montana Department of Environmental Quality (DEQ) has completed the Final Environmental Impact Statement (EIS) for an application by Garnet USA to mine garnet ore at an open pit industrial mine at the Red Wash Hard Rock Site located in Madison County approximately 4.5 miles southeast of Alder, Montana. DEQ's final decision will be set forth in a record of decision to be released in early March.

You can review the entire Final EIS in the CD which is included as a part of this mailing, or on our website at <http://deq.mt.gov/eis.mcp.x>. The Final EIS describes the land, people, and resources potentially affected by the proposed mining activities, and it incorporates responses to public comments and any updated information on the alternatives under consideration.

The DEQ analyzed three alternative proposals, including a No-Action Alternative. DEQ chose the "Agency-Mitigated Alternative" because it adds more groundwater and surface water monitoring to provide better information about current and future water quality conditions. This Alternative also provides for an altered route for ore haul trucks to reduce potential traffic conflicts.

As a part of the EIS, DEQ will also require Garnet USA to include more groundwater sampling points at the mine site and the Alder Gulch processing plant. The company will also be required to analyze for additional parameters including nitrates in surface and groundwater.

This will allow a comparison of future water quality compared to current conditions, identification of potential leakage from the two lined process ponds, and evaluate if nitrogen compounds are present near the Alder Gulch processing plant site.

Please don't hesitate to contact me at the information below.

Sincerely,

Jeffrey Frank Herrick
Montana Environmental Policy Act Coordinator
406-444-3276
Jherrick@mt.gov

**Final Environmental Impact Statement for the
Proposed Amendment 003, Garnet USA, LLC,
Operating Permit 00157:**

Garnet USA Mine Project

Madison County, Montana

February 2014



Page intentionally left blank

Executive Summary

This Executive Summary provides an overview of the contents of the Final Environmental Impact Statement (EIS) for the Garnet USA, LLC (Garnet USA) Hard Rock Mine Operating Permit No. 00157, Amendment 003. The Final EIS describes the land, people, and resources potentially affected by the proposed mining activities, and it incorporates responses to public comments and any updated information on the alternatives under consideration. The proposed mine is located in Madison County, in southwestern Montana. This Executive Summary does not provide all of the information contained in the Final EIS. If more detailed information is desired, please refer to the Final EIS, its appendices, or referenced reports.

The Final EIS presents descriptions of the Proposed Action and alternatives, including the No Action Alternative and the Agency-Mitigated Alternative (Chapter 2); descriptions of the existing environment for all potentially affected resources (Chapter 3); an analysis of the environmental consequences of the alternatives (Chapter 4); and responses to comments received on the EIS (Chapter 5). A copy of all comments received on the EIS is included as an Appendix. The Final EIS also identifies the Department of Environmental Quality's (DEQ) preferred alternative.

ES-1: Introduction

Garnet USA holds Operating Permit No. 00157 which has been amended twice since it was issued in 1995. Garnet USA also holds Exploration License No. 00642, issued by the DEQ in 2013, which allows for exploration activities at the Red Wash Hard Rock (RWHR) Mine site. Throughout this document it is important to distinguish between activities that have already been authorized as part of the 1995 operating permit or the exploration license and those that are being considered under this EIS as part of the draft operating permit amendment. To clarify, the exploration license allows exploration activities only. This amendment to the 1995 operating permit, if approved, would allow mining to proceed at the RWHR Mine site.

ES-2: Purpose and Benefits of the Proposed Action

DEQ has received an application from Garnet USA to amend Operating Permit No. 00157. The purpose of the proposed amendment is to allow Garnet USA to mine garnet ore at a new site known as the RWHR Mine site. Hard Rock Operating Permit No. 00157 currently covers a processing plant at the Alder Gulch Mine site, located approximately one mile east of Alder, Montana and the Red Wash Alluvial site, which previously has been mined and since reclaimed. The proposed permit boundaries for the project are shown in Figure ES-1.

ES-3: Project Area Description

The geographic scope of this EIS includes areas near the town of Alder, Montana in Madison County. The areas potentially affected by the Proposed Action include existing

infrastructure related to the Garnet USA Alder Gulch processing plant, the proposed RWHR Mine, and the areas within the proposed mine permit boundaries (Figure ES-1), as well as an alternate access road connection to the processing plant (Figure ES-2).

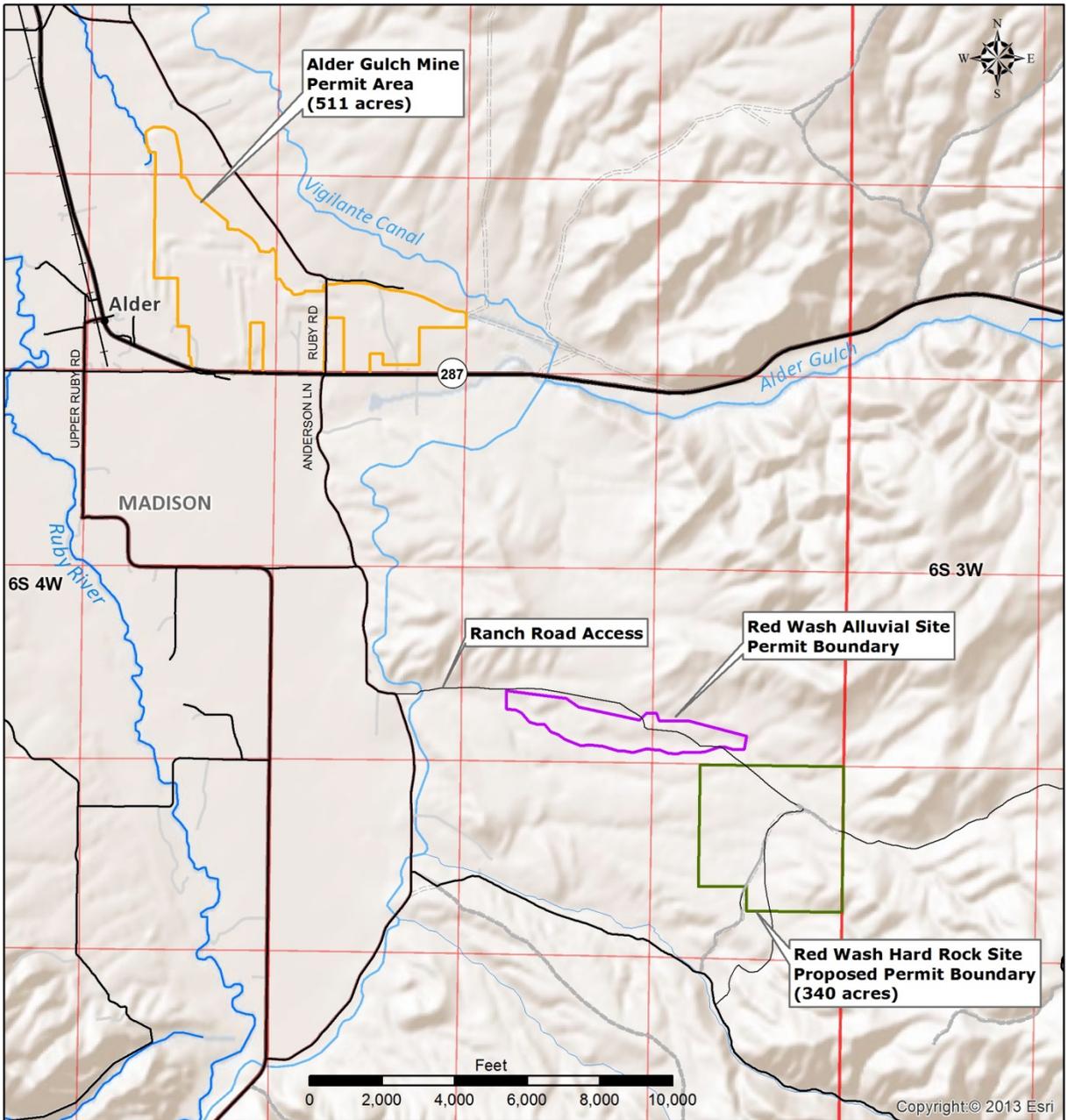


Figure ES-1. Permit Area Boundaries for the Alder Gulch Processing Plant, the Red Wash Alluvial Mine site (reclaimed), and the Red Wash Hard Rock Mine site, Madison County, Montana.



Figure ES-2. Proposed Alternative Processing Plant Access Road and Associated Infrastructure for the Garnet USA Project, Madison County, Montana.

Page intentionally left blank

ES-4: Scope of the Decision to be Made

This EIS will focus on the decision to be made by DEQ concerning a proposed amendment to Garnet USA's operating permit as submitted in February 2013 (Garnet USA, 2013a). DEQ must determine whether the operating permit amendment application satisfies the requirements of the Montana Metal Mine Reclamation Act (MMRA), Title 82, Chapter 4, Part 3, Montana Code Annotated (MCA). As part of DEQ's review of the operating permit amendment application, an environmental review of the Proposed Action is required under the Montana Environmental Policy Act (MEPA) Title 75, Chapter 1, Part 2, MCA. This EIS analyzes impacts of allowing the Garnet USA project to proceed as described in the Proposed Action.

The DEQ Director will use the EIS process to develop the information necessary to determine whether the Proposed Action meets the performance standards of the MMRA, including but not limited to:

- The removal of buildings and other structures at closure consistent with the post-mine land uses;
- Post-closure environmental monitoring programs and contingency plans;
- Compliance with state air and water quality standards.

The DEQ Director will issue a Record of Decision (ROD) documenting the decision on the operating permit amendment. The ROD is a public notice of what the decision is, the reasons for the decision, and any special conditions surrounding the decision or its implementation.

ES-5: Public Involvement

DEQ opened the scoping period for this EIS on March 26, 2013. On April 16, 2013 DEQ held a scoping meeting in Alder, Montana at the Alder Community Hall. Comments made at the meeting and those received via postal mail or e-mail were compiled by DEQ and entered into the administrative record. The scoping period ended on April 26, 2013. DEQ published notices of the scoping period and the scoping meeting in the Butte newspaper, the *Montana Standard*, on Sunday, March 24 and Sunday, March 31, 2013 and in the Ennis newspaper, the *Madisonian* on Thursday, March 28 and Wednesday, April 3, 2013. In addition, DEQ mailed scoping notices to over 150 agencies and individuals who had expressed interest in the project.

Issues were identified through the agency and public scoping process, through DEQ's review of the 2013 Operating Permit Amendment Application, and through interagency discussions on the development of alternatives. Issues were evaluated to determine whether the Proposed Action or an alternative would result in significant impacts. The Montana Environmental Policy Act (MEPA) provides direction on determining the significance of impacts (ARM 17.4.608(1), MCA 75.1.201).

The major issues identified include:

Water Management

- Groundwater quality
- Surface water quality
- Long-term monitoring of water quality

Transport of Ore Materials

- Use of county and state roads
- Alignment of haul route and access to the processing plant
- Potential impacts to safety at the processing plant access
- Potential for noise and dust from ore transport

DEQ made the Garnet USA Draft EIS (DEIS) available to the public on September 29, 2013. The DEIS was published on DEQ's website (<http://www.deq.mt.gov>) in PDF format to allow for broader distribution. This distribution opened the comment period for the DEIS. On October 16, 2013, DEQ held a public meeting in Alder, Montana at the Alder Community Hall. Several members of DEQ's hard rock program attended the meeting and Jeffrey Herrick, MEPA coordinator for DEQ, presided over the meeting. Instructions were provided to commenters as to format and procedures for presenting comments. Approximately 22 members of the public attended the meeting in Alder. Comments made at the meeting were collected by DEQ representatives and by Mr. Herrick. Comments received via fax, postal mail, or e-mail were forwarded to DEQ's consultant. The comment period on the DEIS closed on October 31, 2013. MEPA requires a minimum 30-day comment period on an EIS; this comment period lasted 32 days.

ES-6: Alternatives Description

Alternatives fully evaluated in this EIS are the No Action Alternative, the Proposed Action, and the Agency-Mitigated Alternative. Some additional alternatives were evaluated and eliminated from further consideration. Complete descriptions of each alternative are provided in Chapter 2 of the EIS.

No Action Alternative

Under the No Action Alternative, DEQ would not approve Garnet USA's operating permit amendment. Garnet USA currently holds Operating Permit No. 00157 and has developed or is using previously developed areas covering approximately 75 acres within the Alder Gulch processing plant permit area boundary. The No Action Alternative assumes that Garnet USA could continue any and all activities approved under its operating permit and exploration license; therefore, the No Action Alternative is a "status quo" approach.

Proposed Action

The Proposed Action would allow garnet mining at the RWHR Mine site, adding 340 acres to the mine operating permit area. About 213 acres of this permit area would be disturbed

over the life of the RWHR Mine. Approximately one-third of the total RWHR acreage proposed for amendment (127 acres) would remain undisturbed. The mining plan for the RWHR Mine site is to extract garnet-bearing rock using standard quarry mining methods. Garnet ore would be hauled to the Alder Gulch processing plant where it would be crushed, washed, sorted, and processed for sale and distribution. After mine closure, the area would be reclaimed in compliance with MMRA.

Agency-Mitigated Alternative

MEPA allows the decision-making agency to propose alternatives to the Proposed Action that would meet the purpose and benefits while reducing or mitigating potential impacts. The Agency-Mitigated Alternative may include changes to some aspects of the Proposed Action while other aspects remain unchanged. The aspects of the Proposed Action addressed under the Agency-Mitigated Alternative are the haul truck entrance to the Alder Gulch processing plant, surface and groundwater protection, and reclamation issues that were identified in the EIS scoping process. In summary, under the Agency-Mitigated Alternative, DEQ would include the following stipulations in the amendment to Garnet USA's operating permit.

- Garnet USA would design and develop a diagonal access road to facilitate haul trucks crossing State Route 287 and to direct truck traffic away from residential areas along Ruby Road.
- The visibility berm described under the Proposed Action would be extended south across the old East Road entrance as far as needed to block the entrance road and further shield the residents from the plant operations, employee traffic, haul truck traffic, and the associated noise, dust, and light.
- Garnet USA would expand the current groundwater monitoring plan at the Alder Gulch processing plant to include more sampling locations and to evaluate selected water quality parameters, including the potential for nitrogen compounds from blasting materials.
- Garnet USA would locate additional groundwater monitoring locations and install monitoring wells at the RWHR Mine site and conduct water quality monitoring periodically.
- At the RWHR Mine site, the south sediment control basin and the west sediment control basin would be sampled for water quality parameters twice per year.
- During reclamation, disturbed areas would be regraded as necessary before soil spreading. Compacted areas would be ripped with a dozer or grader to at least a depth of 12 inches prior to resoiling. Stockpiled soils or settling pond fines would be spread six inches deep.
- As a mitigation to ensure revegetation and reduce compaction, Garnet USA would take the following action: once the soil has been placed, any compacted areas would be ripped again with a dozer or grader to at least a depth of 12 inches prior to reseeding at the mine site and 6 inches at the plant site. Areas would be seeded with an approved seed mix.

Alternatives Considered and Eliminated

During scoping, the possibility of moving the processing plant from the Alder Gulch Mine site to the RWHR Mine site was put forward by members of the Alder community. Operation of the processing plant at the Alder Gulch Mine site, however, is currently permitted under Operating Permit No. 00157. Garnet USA did not include relocation of the processing plant in its application to amend the operating permit. Because relocation of the processing facility is neither requested by Garnet USA nor within DEQ's unilateral authority, relocation of the processing facility to the RWHR Mine site will not be considered in detail.

ES-7: Analysis of Alternatives

The following sections provide a summary of the effects of implementing each alternative. Information is focused on activities and effects where different levels of effects can be distinguished between alternatives. Detailed effects analyses for each alternative are found in Chapter 4 of the EIS.

Garnet USA's proposed activities were found to have minimal to no effect on several of the resource areas analyzed, and minimal differences exist between the potential effects of each alternative. These resource areas include hazardous materials, air quality, power supply, cultural resources, socioeconomics, land use, recreation, visual scenery, and wildlife. These resource areas are not discussed further in this summary and a more detailed description of potential effects is found in Chapter 4 of the EIS.

Resource areas where there could be potentially substantial impacts under one or more alternatives include geology, soils, vegetation and wetlands, surface water, groundwater, noise, transportation, and fisheries. The differences in potential effects between alternatives for these resource areas are described in the sections below. Potentially substantial impacts are summarized in Table ES-1.

Geology

Under the Proposed Action, the removal of 500,000 tons of waste rock and ore per year over a 37 year-period would have an impact on the surface geology at the RWHR Mine site. The geology within the mined area would be permanently altered with the removal of garnet-bearing bedrock for garnet-processing. The extent of mine excavation would exist beyond the life of the mine. The removal of ore and waste rock volume from the RWHR Mine site is an irreversible impact.

Soils

Under the Proposed Action, about 213 acres would be disturbed over the life of the project. Some soil would be irrevocably lost during soil removal, construction, and operation of the mine prior to the reestablishment of vegetation. Secondary impacts to soil resources could result from increased wind and water erosion if surface disturbance exposes soils. Stockpiling would destroy soil structure, reduce soil biological activity, increase compaction and bulk density, and decrease the soil organic matter content. These are unavoidable impacts of permitting disturbance of the site for mining. Even with reclamation, there would

be changes to the soil profile and make-up of the soils in the reclaimed areas that may limit vegetation reestablishment. The arid nature of the local climate would contribute to a slow recovery of the soil structure.

Under the Agency-Mitigated Alternative there would be approximately 0.5 additional acres of soil disturbance on leveled, naturally revegetated placer tailings resulting from the construction of a new haul truck access road that runs diagonally between the plant shop and office, and Ruby Road near the intersection with State Route 287.

Vegetation and Wetlands

There would be minimal impacts to vegetation, wetlands, or weeds under the No Action Alternative. No additional surface disturbance is included in this Alternative.

The Proposed Action would result in temporary impacts to vegetation from construction of roads and facilities at the Alder Gulch processing plant. There would be approximately nine acres of additional disturbance for new ponds, the visibility berm, boneyard relocation, and employee parking areas under the Proposed Action. Secondary impacts to vegetation at the RWHR Mine site would include the potential for noxious weeds to spread due to disturbed acreage and an overall decrease in vegetation community diversity after reclamation is completed.

The Agency-Mitigated Alternative would result in an additional 0.5 acres of surface disturbance within the Alder Gulch processing plant site from the proposed diagonal access road construction. In addition, approximately 0.06 acres of wetlands would be filled or disturbed to construct the access road. Increasing the area of disturbance would increase the potential for weed spread. Garnet USA has an approved weed control plan in place to minimize weed spread and colonization that would apply under any alternative.

Surface Water

Under the No Action Alternative, BMPs would limit the potential for impacts to surface water resources. Under the Proposed Action, impacts to surface water resources at both the Alder Gulch Mine site and the RWHR Mine site may occur. At the Alder Gulch Mine site, recirculation and reuse of water from the lined recycling ponds during garnet processing may allow nitrogen compounds originating from blasting residue to concentrate in the recycling pond waters. Recycled water could potentially be released to groundwater or surface water. A surface water and groundwater monitoring plan is in place to establish a baseline of water quality at the plant site. This plan includes a future sampling schedule.

Primary impacts to surface water resources at the RWHR Mine site would include irreversible alterations to the ephemeral drainages. Post-closure, drainage patterns would be identified and incorporated into reclamation to approximate pre-mine drainage patterns where possible. Potential secondary impacts under the Proposed Action include wind erosion and surface water runoff which would carry sediment and nitrogen compounds offsite and increase concentrations in groundwater and surface water resources.

Under the Agency-Mitigated Alternative, construction of the access route would increase surface disturbance near Alder Gulch and may introduce sediment or pollutants to the stream or wetlands. Additional surface water monitoring to include additional locations and parameters is proposed as part of the Agency-Mitigated Alternative at both the Alder Gulch processing plant and the RWHR Mine site.

Groundwater

Under the Proposed Action, some impact to groundwater resources at the Alder Gulch processing plant site may occur. The proposed additional processing ponds at the Alder Gulch processing plant do not intersect groundwater. These ponds would be lined to minimize the potential interaction of processing water with underlying groundwater. The concentration of nitrogen compounds in these ponds may be a concern if the liners leak. A surface water and groundwater monitoring plan is in place to establish a baseline of water quality at the plant site and includes a future sampling schedule.

Additional monitoring which includes new monitoring wells and water quality parameters is proposed as part of the Agency-Mitigated Alternative at both the Alder Gulch processing plant and the RWHR Mine site.

Noise

There would be minimal impacts to noise under the No Action Alternative as the current level of activity at the processing plant would be expected to remain the same.

Under the Proposed Action, processing plant operations between 7:00 a.m. and 5:00 p.m. would be barely to clearly audible above ambient, background noise. Noise levels are quantified using units of decibels (dB). Humans typically have reduced hearing sensitivity at low frequencies compared with their response at high frequencies. The “A-weighting” of noise levels, or A-weighted decibels (dBA), closely correlates to the frequency response of normal human hearing (250 to 4,000 hertz [Hz]). Decibels are logarithmic values, and therefore, the combined noise level of two 50 dBA noise sources is 53 dBA, not 100 dBA.

If the plant operates continuously for 24 hours per day, the +14 decibel (dBA) increase would be considered more than twice as loud as the L_{dn} 40 dBA ambient noise without the plant operating, which would be a significant noise impact at residences near the Alder Gulch processing plant. The day-night average noise level, L_{dn} , is a single number descriptor that represents the constantly varying sound level during a continuous 24-hour period. The L_{dn} can be determined using 24 consecutive one-hour L_{eq} noise levels, or estimated using measured L_{eq} noise levels during shorter time periods.

Noise levels of the diesel equipment and rock drill at the RWHR Mine site at the closest residence one mile west of the site would be similar to the noise levels during exploration, and would not constitute a noticeable impact. The increased haul truck traffic under the Proposed Action may create a moderate noise impact.

Socioeconomics

There would be minimal impacts to socioeconomics under the No Action Alternative as the current level of employment and economic activity would be expected to remain the same.

Under the Proposed Action, 30 to 60 jobs would be created at the Garnet USA facilities. These jobs would be expected to pay more than the average wage for Madison County and to persist for the life of the project. A total of 50 to 99 new employment opportunities would be generated indirectly in Madison County as a result of the Proposed Action (Cummins, 2013).

Transportation

All alternatives under consideration include hauling some garnet ore from the RWHR Mine site to the Alder Gulch processing plant. Under the No Action and Proposed Action, trucks would enter the plant using the existing East Road off of Ruby Road. Approximately 8 truck trips per day would occur under the No Action Alternative, and approximately 45 truck trips per day are anticipated under the Proposed Action. Primary impacts to transportation from these two alternatives could include increased traffic due to haul trucks using State Route 287, Ruby Road, and Anderson Lane. Impacts due to noise, light, and dust would increase under the Proposed Action as compared to the No Action Alternative.

Under the Agency-Mitigated Alternative, trucks would use a new angled road constructed near the southeastern corner of the Alder Gulch permit area. The new road would allow trucks to enter the plant without driving past residences on Ruby Road. Another component of the Agency-Mitigated Alternative would be to extend the proposed visibility berm across the East Road and abandon the use of that road. These components would reduce potential impacts by improving the truck access alignment as it crosses State Route 287 and eliminating trucks and other mine-related traffic from a portion of Ruby Road.

Fisheries

Impacts to fisheries would be linked to potential impacts to groundwater and surface water as described above. There is the potential for some increase in surface water level fluctuations at the Alder Gulch site due to each of the alternatives under consideration. Garnet USA would monitor surface and groundwater quality under all alternatives, and an increased level of surface and groundwater monitoring is proposed under the Agency-Mitigated Alternative. Monitoring would increase the likelihood that contaminants would be detected if they reach the groundwater or surface water where they would impact fisheries. The contaminants most likely to cause negative impacts are the nitrates originating from explosive residue in the ore and waste rock. However, it is unlikely that these contaminants would impact fisheries because the ponds where they would be deposited will not contain fish and will be lined to prevent contaminants from entering the groundwater.

Table ES-1. List of Potential Impacts by Resource Area for the Alternatives Under Consideration.

Resource	No Action Alternative	Proposed Action	Agency-Mitigated Alternative
Geology	Alternative would result in removal of 10,000 tons of rock and ore under the exploration license. No additional impacts at the permitted Alder Gulch processing plant.	Alternative would result in removal of 500,000 tons per year of waste rock and ore. Yields are estimated to be 50,000 tons per year of finished garnet product. Surface geology would be permanently disturbed.	The level and extent of impacts to geology and geochemistry under this Alternative would be the same as that expected under the Proposed Action.
Soils	Alternative would result in minimal impacts to soil resources. All previously permitted surface disturbances that affect soil resources have already occurred.	Some soil would be irrevocably lost during soil removal, construction, and operation of the mine prior to the reestablishment of vegetation. Even with reclamation, there would be changes to the soil profile, structure, and make-up of the soils in the reclaimed areas that may limit vegetation reestablishment. The arid nature of the climate would contribute to a slow recovery of the soil structure.	<p>The level and extent of impacts to soils at the RWHR Mine site under this Alternative would be the same as that expected under the Proposed Action.</p> <p>Approximately 0.5 acres of additional disturbance would be required for the development of the access route. This would not constitute substantial additional primary, secondary, or cumulative impacts to the soil resources at the Alder Gulch site.</p>

Resource	No Action Alternative	Proposed Action	Agency-Mitigated Alternative
<p>Vegetation and Wetlands</p>	<p>Alternative would result in minor impacts to vegetation resources. All other previously permitted surface disturbances that affect vegetation resources have already occurred.</p>	<p>Alternative would result in temporary impacts to vegetation from construction of roads and facilities. Longterm impacts would include changes in vegetation communities and a decrease in community diversity after reclamation.</p> <p>Noxious weeds have the potential to spread due to disturbed acreage.</p>	<p>Development of the alternative Alder Gulch site access road would increase impacts to vegetation and wetlands. Approximately 0.06 acres of wetlands are expected to be filled or disturbed during road construction.</p> <p>Increasing the area of disturbance may increase the potential for weed spread.</p>
<p>Surface Water</p>	<p>All previously permitted disturbances that affect surface water resources have already occurred.</p>	<p>Recirculation and reuse of water during processing separation may allow for a concentration of nitrogen compounds in the water that could potentially be released to groundwater or surface water. A surface water and groundwater monitoring plan is in-place to establish a baseline of water quality at the plant site. This plan includes a schedule for future sampling.</p> <p>Primary impacts to surface water resources at the RWHR Mine site would include irreversible alterations</p>	<p>Construction of the access route would increase surface disturbance near Alder Gulch and may introduce sediment or pollutants to the stream or wetlands. Appropriate use of BMPs would reduce impact below the level of significance.</p> <p>Additional water monitoring is proposed as part of this</p>

Resource	No Action Alternative	Proposed Action	Agency-Mitigated Alternative
		<p>to the ephemeral drainages. Potential secondary impacts include wind and surface water runoff which would carry sediments and nitrogen compounds offsite and increase concentrations in nearby surface water resources.</p>	<p>alternative including monitoring the two sediment control basins at the RWHR Mine site.</p>
Groundwater	<p>There would be limited potential for primary and secondary impacts to groundwater through implementation of the No Action Alternative. All previously permitted disturbances that affect groundwater resources have already occurred.</p>	<p>There would be no primary impacts to the groundwater from the newly constructed, lined ponds because they would not intersect the water table. The lined ponds could have secondary impacts to the groundwater if a liner leaked. A leak could allow recycled process water to reach groundwater.</p>	<p>The level and extent of impacts to groundwater under this Alternative would be the same as that expected under the Proposed Action.</p> <p>Additional groundwater monitoring is proposed as part of this alternative.</p>
Air Quality	<p>There would be no primary or secondary impacts to air quality through implementation of the No Action Alternative. All activities that affect air quality resources are previously permitted.</p>	<p>The level of impact to air quality would increase in duration, but not in intensity as the project is expected to continue for 37 years.</p>	<p>The level and extent of impacts to air quality under this Alternative would be the same as that expected under the Proposed Action.</p>

Resource	No Action Alternative	Proposed Action	Agency-Mitigated Alternative
Noise	<p>The noise levels of the equipment and activities for the No Action Alternative would be the same as the existing environment. There would be no primary or secondary noise impacts for the No Action Alternative.</p>	<p>Plant operations between 7:00 a.m. and 5:00 p.m. would be barely to clearly audible because the incremental increase above ambient noise levels would only be +3 to +6 dBA. If the plant operates continuously for 24 hours per day, the +14 dBA increase would be considered more than twice as loud as the L_{dn} 40 dBA ambient noise without the plant operating, which would be a significant noise impact at residences near the Alder Gulch site.</p> <p>Noise levels of the diesel equipment and rock drill at the RWHR Mine site at the closest residence one mile west of the site would be similar to the noise levels during exploration.</p> <p>The increased haul truck traffic may create a moderate noise impact.</p>	<p>All aspects of the Agency-Mitigated Alternative would be the same as the Proposed Action, except that the ore truck access to the Alder Gulch processing plant would be redirected from Ruby Road. The proposed access road would move the haul truck traffic farther from the Ruby Road residences and would reduce the truck noise at the residences.</p>
Socioeconomics	<p>Alternative would retain the existing workforce at the Alder Gulch processing plant.</p>	<p>Under the Proposed Action, Garnet would increase its employees to 30-60 individuals. These jobs are likely to pay wages higher than the average for Madison County, and would constitute a localized, long-term benefit to the community.</p>	<p>All aspects of the Agency-Mitigated Alternative would be the same as the Proposed Action. The access road construction may generate a small number of additional short-term jobs in the community.</p>

Resource	No Action Alternative	Proposed Action	Agency-Mitigated Alternative
<p>Transportation</p>	<p>Alternative would include highway-legal dump trucks hauling approximately four to eight truckloads per day using Anderson Lane and Ruby Road. Other potential primary impacts due to haul truck and other traffic would include increased noise, dust, and lights from truck traffic on Ruby Road in front of residences.</p>	<p>Alternative would increase the number of truck trips between the RWHR Mine site and the processing plant to 45 truck trips per operating day. The most likely times for the haul trucks to affect other traffic would be in the morning and evening commute hours, during school bus loading time, and seasonally in the summer when tourism increases traffic on State Route 287. Primary impacts to transportation could include increased traffic from the haul trucks using State Route 287, Ruby Road, and Anderson Lane. Impacts due to noise, light, and dust would increase as compared to the No Action Alternative. Increasing traffic on local roads may cause an increase in traffic accidents.</p>	<p>The alternative access road would not reduce the number of truck trips described under the Proposed Action, but it would provide a shorter and more direct haul route to the processing plant. The partial realignment of Anderson Lane and Ruby Road may allow trucks to cross State Route 287 more efficiently. This could also reduce the overall likelihood of conflict with other traffic and increase traffic safety along the route. The angled access route would reduce the potential for impacts due to noise, dust, and light along Ruby Road.</p>

Resource	No Action Alternative	Proposed Action	Agency-Mitigated Alternative
<p>Fisheries</p>	<p>Under the existing exploration license, processing operations may cause fluctuations in pond water levels, but impacts to fisheries would be minor. Impacts to fisheries would be linked to potential impacts to groundwater and surface water as described above. Nitrogen compounds could enter water bodies and affect aquatic systems.</p>	<p>The level of impact to fisheries at the Alder Gulch site would increase in duration, and may increase slightly in intensity as the rate of water use for processing increases and is expected to continue for 37 years. Impacts to fisheries would be linked to potential impacts to groundwater and surface water as described above. The lined, water recycling ponds will not contain fish.</p>	<p>Impacts to fisheries would be linked to potential impacts to groundwater and surface water as described above.</p>

Page intentionally left blank

Table of Contents

Executive Summary	ES-1
ES-1: Introduction	ES-1
ES-2: Purpose and Benefits of the Proposed Action.....	ES-1
ES-3: Project Area Description	ES-1
ES-4: Scope of the Decision to be Made	ES-5
ES-5: Public Involvement.....	ES-5
ES-6: Alternatives Description	ES-6
ES-7: Analysis of Alternatives	ES-8
List of Tables	viii
List of Figures	ix
Acronyms and Abbreviations	xi
Glossary and Useful Terminology	xiv
Chapter 1: Purpose and Benefits of the Proposed Action	1
1.1 Introduction	1
1.2 Garnet USA Mine Background.....	1
1.3 Montana’s Hard Rock Mining Permitting Process	2
1.4 DEQ’s Responsibilities and Decisions.....	2
1.5 Scope of the Analysis.....	4
1.6 Public Involvement Process	4
1.7 Issues Identified during Scoping	4
1.8 Issues Considered but Not Studied in Detail	6
1.9 Comments on the DEIS	6
Chapter 2: Description of Alternatives	9
2.1 Overview	9
2.1.1 Development of Reasonable Alternatives.....	9

Table of Contents

2.2	Project Area	10
2.3	Existing Approvals	11
2.4	No Action Alternative.....	12
2.4.1	Exploration and Operations.....	13
2.4.2	Project Facilities	13
2.4.3	Bulk Sample Handling and Processing.....	13
2.4.4	Exploration Water Management	13
2.4.5	Personnel and Utilities	19
2.4.6	Transportation.....	19
2.4.7	Reclamation	20
2.4.8	Post Mining Land Use	20
2.4.9	Site Facility Removal.....	20
2.4.10	Alder Gulch Processing Plant Site Reclamation	21
2.5	Proposed Action.....	21
2.5.1	Mine Operations.....	21
2.5.2	Project Facilities	25
2.5.3	Ore Handling and Processing.....	26
2.5.4	Mine Water Management	27
2.5.5	Personnel and Utilities	29
2.5.6	Transportation.....	29
2.5.7	Reclamation	30
2.6	Agency-Mitigated Alternative	35
2.6.1	Project Facilities	35
2.6.2	Ore Handling and Processing.....	36
2.6.3	Water Management.....	36
2.6.4	Personnel and Utilities	43
2.6.5	Transportation.....	44
2.6.6	Reclamation	44
2.6.7	Summary of Agency-Mitigated Alternative Stipulations.....	44
2.7	Reclamation-Common to All Alternatives	45
2.7.1	Post Mining Land-Use	45
2.7.2	Site Facility Removal.....	45

Table of Contents

2.7.3 RWHR Mine Area Reclamation46

2.7.4 Personnel.....47

2.8 Related Future Actions..... 47

2.9 Alternatives Considered But Dismissed 47

2.9.1 Relocation of Processing Facilities to RWHR Mine Site47

Chapter 3: Affected Environment 51

3.1 Introduction 51

3.2 Geology and Minerals 52

3.2.1 Overview and Analysis Area52

3.2.2 Methods52

3.2.3 Results.....52

3.3 Soil Resources 57

3.3.1 Overview and Study Area.....57

3.3.2 Methods57

3.3.3 Results.....57

3.4 Vegetation and Wetland Resources..... 58

3.4.1 Overview and Study Area.....58

3.4.2 Methods59

3.4.3 Results.....59

3.5 Surface Water Resources 68

3.5.1 Overview and Analysis Area68

3.5.2 Methods68

3.5.3 Results.....68

3.6 Groundwater Resources 75

3.6.1 Overview and Analysis Area76

3.6.2 Methods76

3.6.3 Results.....76

3.7 Hazardous Materials 83

3.7.1 Overview and Analysis Area83

3.7.2 Methods83

3.7.3 Regulatory Environment.....83

3.7.4 Results.....84

Table of Contents

3.8 Air Quality	86
3.8.1 Overview and Analysis Area	86
3.8.2 Methods	86
3.8.3 Results.....	86
3.9 Power Supply.....	91
3.9.1 Overview and Study Area.....	91
3.9.2 Methods	91
3.9.3 Results.....	91
3.10 Noise.....	92
3.10.1 Overview and Study Area.....	92
3.10.2 Methods	92
3.10.3 Existing Noise Levels	95
3.11 Cultural Resources	97
3.11.1 Overview and Study Area.....	97
3.11.2 Methods	97
3.11.3 Results.....	98
3.12 Socioeconomics.....	99
3.12.1 Overview and Study Area.....	99
3.12.2 Methods	99
3.12.3 Results.....	99
3.13 Transportation.....	106
3.13.1 Overview and Study Area.....	106
3.13.2 Methods	107
3.13.3 Results.....	107
3.14 Land Use and Recreation	108
3.14.1 Overview and Study Area.....	108
3.14.2 Methods	108
3.14.3 Results.....	109
3.15 Visual Resources and Aesthetics.....	110
3.15.1 Overview and Study Area.....	111
3.15.2 Methods	111
3.15.3 Results.....	111

3.16 Wildlife Resources	112
3.16.1 Overview and Study Area.....	112
3.16.2 Methods	112
3.16.3 Results.....	113
3.17 Fisheries and Aquatic Resources	117
3.17.1 Overview and Study Area.....	117
3.17.2 Methods	117
3.17.3 Results.....	118
Chapter 4: Alternatives Analysis	121
4.1 Introduction	121
4.1.1 Primary Impacts	122
4.1.2 Secondary Impacts	122
4.1.3 Cumulative Impacts.....	122
4.1.4 Mitigation	123
4.1.5 Residual Impacts.....	123
4.2 Geology and Minerals	123
4.2.1 No Action Alternative.....	123
4.2.2 Proposed Action.....	123
4.2.3 Agency-Mitigated Alternative.....	124
4.3 Soil Resources	125
4.3.1 No Action Alternative.....	125
4.3.2 Proposed Action.....	125
4.3.3 Agency-Mitigated Alternative.....	126
4.4 Vegetation and Wetland Resources.....	127
4.4.1 No Action Alternative.....	127
4.4.2 Proposed Action.....	128
4.4.3 Agency-Mitigated Alternative.....	129
4.5 Surface Water Resources	130
4.5.1 No Action Alternative.....	130
4.5.2 Proposed Action.....	131
4.5.3 Agency-Mitigated Alternative.....	132
4.6 Groundwater Resources	132

Table of Contents

4.6.1 No Action Alternative.....	132
4.6.2 Proposed Action.....	133
4.6.3 Agency-Mitigated Alternative.....	135
4.7 Hazardous Materials	137
4.7.1 No Action Alternative.....	137
4.7.2 Proposed Action.....	138
4.7.3 Agency-Mitigated Alternative.....	139
4.8 Air Quality	139
4.8.1 No Action Alternative.....	140
4.8.2 Proposed Action.....	141
4.8.3 Agency-Mitigated Alternative.....	142
4.8.4 Air Quality Permit Best Available Control Technology Requirements	142
4.9 Power Supply.....	143
4.9.1 No Action Alternative.....	143
4.9.2 Proposed Action.....	143
4.9.3 Agency-Mitigated Alternative.....	143
4.10 Noise.....	143
4.10.1 No Action Alternative.....	143
4.10.2 Proposed Action.....	143
4.10.3 Agency-Mitigated Alternative.....	146
4.11 Cultural Resources	147
4.12 Socioeconomics.....	147
4.12.1 No Action Alternative.....	147
4.12.2 Proposed Action.....	148
4.12.3 Agency-Mitigated Alternative.....	149
4.13 Transportation.....	149
4.13.1 No Action Alternative.....	149
4.13.2 Proposed Action.....	150
4.13.3 Agency-Mitigated Alternative.....	151
4.14 Land Use and Recreation	152
4.14.1 No Action Alternative.....	152
4.14.2 Proposed Action.....	153

Table of Contents

4.14.3 Agency-Mitigated Alternative.....	154
4.15 Visual Resources and Aesthetics.....	154
4.15.1 No Action Alternative.....	154
4.15.2 Proposed Action.....	154
4.15.3 Agency-Mitigated Alternative.....	155
4.16 Wildlife Resources	156
4.16.1 No Action Alternative.....	156
4.16.2 Proposed Action.....	157
4.16.3 Agency-Mitigated Alternative.....	158
4.17 Fisheries and Aquatic Resources	158
4.17.1 No Action Alternative.....	158
4.17.2 Proposed Action.....	159
4.17.3 Agency-Mitigated Alternative.....	160
4.18 Residual Impacts	161
Chapter 5: Response to Comments on the Draft EIS.....	163
5.1 Comments Received from Alder Gulch LLC.....	164
5.2 Comments Received from Montana Department of Transportation	209
5.3 Comments Received from Mrs. Doris Fischer.....	209
5.4 Comments Received from Annaliese Smail, Ryan Smail, Mary Jo Smail, Dale Smail	211
Chapter 6: Public Comments Received	213
Chapter 7: Consultation and Coordination	215
Chapter 8: List of Preparers.....	217
Chapter 9: References Cited	219
Appendix: Original Copies of Comments Submitted on the Garnet USA Draft EIS	225

List of Tables

Executive Summary

Table ES-1. List of Potential Impacts by Resource Area for the Alternatives Under Consideration.	ES-12
---	-------

Chapter 2

Table 2.4-1. List of Existing, Permitted Facilities at the Alder Gulch Processing Plant, the Acreage Covered by Each Component, and any Proposed Changes to These Facilities Covered Under the Alternatives Under Consideration.	14
Table 2.9-1. Comparison of Potential Impacts by Resource Area for the Alternatives Under Consideration.	49

Chapter 3

Table 3.2-1. Whole Rock Geochemistry Sample Results, RWHR Mine Site, Madison County, Montana.	56
Table 3.4-1. List of Wetland Plant Species Identified at the Alder Gulch Processing Plant and RWHR Mine Site, Madison County, Montana.	62
Table 3.4-2. List of Upland Plant Species Identified at the Alder Gulch Mine and RWHR Mine Sites, Madison County, Montana.	65
Table 3.4-3. List of Weed Species Identified at the Alder Gulch Mine and RWHR Mine Sites, Madison County, Montana.	67
Table 3.5-1. Current Surface and Groundwater Sample Locations and Associated Former Names at the Alder Gulch Mine and RWHR Mine Sites, Madison County, Montana.	69
Table 3.5-2. Surface Water and Groundwater Analytical Results for June and December 2013 Sampling Events at the Alder Gulch Mine and RWHR Mine Sites, Madison County, Montana.	71
Table 3.5-3. Garnet USA Surface Water Rights on Alder Gulch Creek.	74
Table 3.6-1. Monitoring Well Locations and Ground Water Elevations, Garnet USA Project Sites, Madison County, Montana.	78
Table 3.8-1. NOAA Stations Most Indicative of Garnet USA Permit Areas Climate	87
Table 3.12-1. Census and Demographic Data for Madison County, Montana	100
Table 3.13-2. District Information for Madison County Schools for the 2011-2012 School Year.	103
Table 3.12-3. 2009 and 2010 Average Wages per Job and Annual Employment, Madison County.	104
Table 3.12-4. Per capita Personal Income for the United States, Montana, and Madison County from 2009 to 2011.	104
Table 3.12-5. Employment by NAICS Industry (persons) for Madison County from 2009 to 2011.	105

Table 3.12-6. 2011 School District 2, Alder and Madison County Taxable Value and Revenues106

Table 3.13-1. Annual Average Daily Traffic Counts for MDT Traffic Monitoring Stations in the Vicinity of the Garnet USA Project, Madison County, Montana.108

Table 3.16-1. Bird Species Identified by Song or Observation at the Alder Gulch and RWHR Permit Areas, Madison County, Montana.114

Table 3.16-2. Wildlife Species Identified in the Vicinity of the Alder Gulch and RWHR Mine Permit Areas.....115

Chapter 4

Table 4.13-1. Comparison of the Transportation Specifics for Each Alternative Under Consideration, Garnet USA Project, Madison County, Montana.150

List of Figures

Executive Summary

Figure ES-1. Permit Area Boundaries for the Alder Gulch Processing Plant, the Red Wash Alluvial Mine site (reclaimed), and the Red Wash Hard Rock Mine site, Madison County, Montana.ES-2

Figure ES- 2. Proposed Alternative Processing Plant Access Road and Associated Infrastructure for the Garnet USA Project, Madison County, Montana.ES-3

Chapter 1

Figure 1.1-1. Project Area for the Proposed Garnet USA Operating Permit Amendment, Madison County, Montana. 3

Figure 1.1-2. Permit Area Boundaries for the Alder Gulch Processing Plant, the Red Wash Alluvial Mine site (reclaimed), and the Red Wash Hard Rock Mine site, Madison County, Montana. 5

Chapter 2

Figure 2.4-1. Existing Facilities at the Alder Gulch Processing Plant and Schematic for Proposed Facility Changes.17

Figure 2.5-1. Proposed Conceptual Mine Topography for the Red Wash Hard Rock Mine at the End of Year 37.23

Figure 2.5-2. Proposed Conceptual Mine Topography for the Red Wash Hard Rock Mine after Reclamation.33

Table of Contents

Figure 2.6-1. Proposed Alternative Processing Plant Access Road and Associated Infrastructure for the Garnet USA Project, Madison County, Montana.....39

Figure 2.6-2. Proposed Surface and Groundwater Monitoring Locations at the Alder Gulch Processing Plant for the Garnet USA Project, Madison County, Montana.41

Figure 2.6-3. Proposed Groundwater Monitoring Locations at the RWHR Mine site for the Garnet USA Project, Madison County, Montana.....43

Chapter 3

Figure 3.2-1. Geology Underlying the Garnet USA Permit Boundary Areas, Madison County, Montana.55

Figure 3.4-1. Wetlands Delineated within the Alder Gulch Permit Area, Madison County, Montana.61

Figure 3.4-2. Wetlands Delineated within the Red Wash Hard Rock Mine Permit Area, Madison County, Montana.64

Figure 3.6-1. Groundwater Elevation Contour Map for the Alder Gulch Mine Permit Area.....79

Figure 3.8-1. Precipitation Data (1981-1993) for the Ruby Dam NOAA station.....87

Figure 3.8-2. Annual and Monthly Precipitation Data (1957-2007) Alder 17S NOAA Station88

Figure 3.8-3. Monthly Mean Temperature Data (1957-2007) Alder 17S NOAA Station.89

Acronyms and Abbreviations

Acronym	Definition
AADTs	Annual Average Daily Traffic
ACOE	Army Corps of Engineers
amsl	above mean sea level
ARM	Administrative Rules of Montana
BACT	Best Available Control Technology
bgs	Below ground surface
CARB TM 435	A specialized method used for testing asbestos content in the serpentine aggregate storage piles, on conveyer belts, and on covered surfaces such as roads, play-yards, shoulders and parking lots.
CO	carbon monoxide
dB	decibels
dBp	unweighted peak decibels
DEQ	Department of Environmental Quality
DEQ-ARMB	Department of Environmental Quality Air Resources Management Bureau
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
gpd/ft²	gallons per day per square foot
gpm	gallons per minute
GWIC	Groundwater Information Center
HAPs	Hazardous Air Pollutants
Hz	hertz
IOS	International Organization for Standardization
IPaC	Information, Planning, and Conservation System
km	kilometers
KOA	Kampgrounds of America
L₉₀	90th percentile-exceeded noise level

Acronyms and Abbreviations

Acronym	Definition
LAD	Land Application Disposal
L_{dn}	A single number that represents the constantly varying sound level during a continuous 24-hour period.
L_{eq}	A-weighted equivalent noise levels
L_{pk}	Instantaneous peak noise level
MAAQS	Montana Ambient Air Quality Standards
MAQP	Montana Air Quality Permit
MBMG	Montana Bureau of Mines and Geology
MCA	Montana Code Annotated
MDT	Montana Department of Transportation
MEPA	Montana Environmental Policy Act
MFISH	Montana Fisheries Information System
MFWP	Montana Fish, Wildlife and Parks
mm	millimeter
MMRA	Montana Metal Mine Reclamation Act
MPDES	Montana Pollutant Discharge Elimination System
MSHA	Mine Safety and Health Administration
MSU	Montana State University
MTNHP	Montana Natural Heritage Program
NAAQS	National Ambient Air Quality Standards
NAICS	North American Industry Classification Systems
NOAA	National Oceanic And Atmospheric Administration
NOI MTR	Notice of Intent, Motion to Reopen
NO_x	nitrogen oxides
NRCS	Natural Resources and Conservation Service
NSR	New Source Review
NWS	National Weather Service

Acronyms and Abbreviations

Acronym	Definition
PM	particulate matter
Pb	lead
PSD	Prevention of Significant Deterioration
PTE	Potential to Emit
PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
RWA	Red Wash Alluvial Site
RWHR	Red Wash Hard Rock Site
SO₂	sulfur dioxides
SPCC	Spill Prevention, Control, and Countermeasures
SSL	Soil Screening Levels
SWPPP	Storm Water Pollution Prevention Plan
TDS	Total Dissolved Solids
TES	Threatened and Endangered Species
TMDL	Total Maximum Daily Load
TNM	Traffic Noise Model
TPY	tons per year
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VOC	volatile organic compounds

Glossary and Useful Terminology

Term	Definition
Acid rock drainage	Water from pits, underground workings, waste rock, and tailings containing free sulfuric acid. The formation of acid drainage is primarily due to the weathering of iron pyrite and other sulfur-containing minerals. Acid drainage can mobilize and transport heavy metals which are often characteristic of metal deposits.
Agency-Mitigated Alternative	An alternative to the Proposed Action developed in response to impacts or issues identified during scoping
Alluvium	Sand, silt, gravel, and similar materials transported and deposited by water
Amalgam	A substance formed by the reaction of mercury with another metal
Amphibole	Any of a group of complex silicate minerals that contain calcium, sodium, magnesium, aluminum, and iron ions or a combination of them
Amphibolite	A metamorphic rock composed chiefly of amphibole with minor plagioclase and little quartz
Arid	Excessively dry environment, with insufficient rainfall to support agriculture, less than 25 cm (10 inches) of annual rainfall
Arsenic	A metalloid element used to strengthen the alloys of copper and lead. It is poisonous to multicellular life including humans and aquatic organisms
Asbestos	A fibrous silicate material known for its resistance to fire, heat, electrical and chemical damage. It has been banned or restricted in many jurisdictions because it is harmful when inhaled.
Attainment area	An area where the air quality currently meets or exceeds NAAQS primary standards
Bedrock	Solid rock underlying the soil or other unconsolidated material
Biotite	A black to dark brown or dark green mineral in the mica group that forms in crystalline rocks.
Channery	An accumulation of thin, flat, coarse fragments of sandstone, limestone, or schist with diameters up to 6 inches
Chlorite	A mineral group of platy greenish mica minerals found in igneous rocks, often as a product of rock alteration
Chromium	A hard, corrosion resistant mineral that often occurs in contact zones between rock types
Coarse grained	A particle size measuring between 0.5 and 1 mm

Term	Definition
Colluvium	A term used to describe a loose mass of soil material and or rock fragments deposited by process of weathering
Competent rock	A volume of rock with a set of criteria that allow it to support tectonic force.
Crystalline bedrock	A term used to define an igneous or metamorphic rock rather than a sedimentary rock
Dredge	Excavation completed at least partly underwater, or the machine used to excavate underwater
Effluent	Outflow of water (or another liquid) from a natural body of water or from a manmade structure
Ephemeral	A stream that flows seasonally for a short period
Fleet ready line area	An area near the entrance of the pit to provide parking, maintenance, and storage of trucks and equipment
Fugitive emissions	Leaks of gases or vapors from pressurized equipment
Gaining stream	A stream that gains water from the saturated zone as it goes downstream
Garnet	A group of silicate minerals that form in igneous and metamorphic rocks. They are used as semiprecious stones and as abrasives.
General Mining Act of 1872	A US law that governs prospecting and mining for economic minerals on federal public lands
Groundwater gradient	The direction that water flows beneath the ground's surface
Hydraulic conductivity	Rate at which groundwater moves through porous media
Hydric soils	Soil formed under conditions of saturation, flooding, or ponding
Hydrophytic vegetation	Plant life that thrives in wet conditions
Igneous	A rock type formed through the cooling and solidification of magma or lava
Intrusion	Igneous rock injected into or between other rocks
Jigging	A process by which ore is separated by specific gravity
Late Cretaceous	A period of geologic time, from 96-74 million years ago
Lava	Molten rock expelled by a volcano during an eruption or the resulting rock after solidification and cooling
Loam	A mixture of clay, silt, and sand
Lode mining	Mining of a mineral deposit from veins within a rock

Term	Definition
Losing stream	A stream that loses water to the ground as it goes downstream
Magma	A mixture of molten or semi-molten rock, volatiles and solids that is found beneath the surface of the Earth
Manganese	An element often found in combination with iron. It is used to improve the strength, stiffness, hardness, wear resistance, and hardenability of steels and other industrial uses. It is an important trace element in nutrition, but it can be toxic to organisms in high quantities.
Metamorphosed	Rock altered by naturally occurring heat and pressure in the earth's crust
Migratory Bird Treaty Act	A treaty passed in 1916 between the US and Canada for the protection of migratory birds. Now includes the US, Mexico, Japan, and Russia.
Migmatite	A mixture of metamorphic and igneous rock found in medium to high grade metamorphic areas
Molybdenum	A transition metal element with a high melting point. It is used in forming steel alloys.
Montana Water Quality Act	This act asserts the primary basis for water quality in Montana and provides the authority to implement surface and groundwater standards.
National Historic Preservation Act	Signed into law in 1966 in an effort to preserve historical and archaeological sites in the U.S.
Noise Control Act of 1972	The federal program designed to regulate noise pollution in order to protect human health.
Nonattainment areas	Regions which the EPA has designated, by rule, as not consistently attaining National Ambient Air Quality Standards limits
Ore	A mineral or an aggregate of minerals from which a commodity can be profitably mined or extracted
Outcrop	A visible exposure of bedrock
Pegmatite	A coarse grained igneous rock usually found in dikes, lenses or veins
Pit highwall	Steep rock surfaces bordering a pit after removal of ore and waste, or the working face of the pit
Placer mining	Mining of alluvial (water deposited sediments) deposits for minerals
Point source	A single identifiable source of pollution
Precambrian	An era of geologic time, from approximately 3.8 billion years ago to

Term	Definition
	570 million years ago
Quaternary	Geologic time period from 1.5 million years ago to present
Quartzo-feldspathic gneiss	A rock formed by metamorphosis of either silica-rich igneous or sedimentary rocks, containing mainly quartz and feldspar
Redox	The tendency for transfer of electrons from one compound to another. The donor is oxidized, the acceptor reduced
Residuum weathered	The components left over by the weathering processes
Rhizosphere	The narrow region of soil that is directly influenced by root secretions and associated soil microorganisms
Rookery	A communal nesting ground for gregarious birds consisting of anywhere from just a few nests to hundreds of nesting pairs
Schist	Shale that has undergone metamorphosis. Recognizable by the foliation or laminated layers
Sedimentary	A rock formed by the deposition of material on the surface of the earth, primarily within bodies of water
Selenium	A grey non-metallic mineral that is toxic to aquatic organisms at elevated concentrations
Shrub-steppe	A type of low rainfall natural grassland characterized by dry-adapted shrubs and grasses
Silica	A chemical compound that is an oxide of silicon with the chemical formula SiO_2 and is the main constituent of most of the earth's rocks. Also known as silicon dioxide.
Spiral	In mining, a machine used for physical separation by centrifugal force
Strata	Multiple sheet like layers of sedimentary rock that are visibly separable from the layers above and below
Substrate	The substance, base, or nutrient, or other material on which an organism lives and grows
Sulfides	A mineral composed of sulfur combined with a metal or semi-metal, for example pyrite, iron sulfides
Sump	A space that collects any liquids and drainage water
Swales	A low-lying tract of land, especially one that is moist or marshy. Can be natural or human created
Tailings	Waste rock remaining after ore has been processed
Talc	A very soft mineral that is a basic silicate of magnesium

Glossary

Term	Definition
Total Maximum Daily Load	A Total Maximum Daily Load is a regulatory term in the U.S. Clean Water Act, describing a value of the maximum amount of a pollutant that a body of water can receive while still meeting water quality standards.
Upland montane sagebrush steppe	Occurs on deep-soiled to stony flats, ridges, nearly flat ridge tops, and mountain slopes and is dominated by sagebrush
Water Protection Bureau	A Bureau in DEQ's Permitting and Compliance Division charged with preventing surface and groundwater pollution by reviewing potential sources of pollution and issuing permits for pollutant discharges
Wet plant	Processing of garnet ore with the aid of water
Whole rock geochemical analysis	Analyzing all the different parts of the rock to determine what elements exist in the rock

Chapter 1: Purpose and Benefits of the Proposed Action

1.1 Introduction

Under the Montana Environmental Policy Act (MEPA), the intent of the Final Environmental Impact Statement (FEIS) is to summarize comments and participation from the public and interested agencies regarding the adequacy, direction, breadth, and extent of the analysis contained in a Draft Environmental Impact Statement (DEIS). Comments are evaluated based on their content, relevance, and jurisdiction of the Department of Environmental Quality (DEQ) and any other involved agencies. Public comments may redirect the analysis or require new analyses. MEPA requires agencies to include all comments in the FEIS or, if not practical, a representative sample of comments and the agency's response to all substantive comments. Copies of all comments received on the DEIS for the Proposed Amendment 003, Garnet USA, LLC, Operating Permit 00157 are included in an Appendix of this document. DEQ's responses to comments received are provided in Chapter 5. The DEIS is adopted as final with amendments made in response to public comments.

The FEIS also includes any data, information, and explanations obtained subsequent to circulation of the DEIS, and DEQ's recommendation, preferred alternative, or proposed decision together with an explanation of the reasons therefore (ARM 17.4.619).

DEQ has received an application from Garnet USA, LLC (Garnet USA) to amend Operating Permit No. 00157. The purpose of the proposed amendment is to allow Garnet USA to mine garnet ore at a new site known as the Red Wash Hard Rock (RWHR) Mine site. Hard Rock Operating Permit No. 00157 currently covers a mine and processing plant at the Alder Gulch Mine site, located approximately one mile east of Alder, Montana (Figure 1.1-1), and the Red Wash Alluvial site, which previously has been mined and reclaimed. The proposed permit area boundaries for the project are shown in Figure 1.1-2.

1.2 Garnet USA Mine Background

Operating Permit No. 00157 was initially issued to Cominco American Resources Incorporated (Cominco American) in 1995. The operating permit provided for mining and processing of garnet from the alluvial deposits within the 511 acre permit boundary surrounding the Alder Gulch Mine site. Historically, the site had been subject to placer mining for gold. Ownership of the Alder Gulch Mine site was transferred to the Montana-Oregon Investment Group (MOIG) in 2000. MOIG sold the operation to Ruby Valley Garnet in September 2004. In 2007, DEQ issued an amendment to Operating Permit No. 00157 allowing Ruby Valley Garnet to mine an alluvial deposit at the Red Wash Alluvial (RWA) site, approximately three miles from the Alder Gulch Mine site. Materials mined at the RWA site were transported to and processed at the Alder Gulch processing plant. The RWA site was mined from 2007 to 2010, when it was reclaimed.

Garnet USA purchased Ruby Valley Garnet in November 2011. In January 2012, Operating Permit No. 00157 was transferred to Garnet USA. Garnet USA amended Exploration License No. 00642 to continue exploration at the RWHR Mine site in early 2013. The exploration license

allows for Garnet USA to conduct drilling, trenching, and removal of a 10,000 ton bulk sample of ore from the RWHR Mine site for testing and evaluation. Materials removed under the exploration license would be processed at the Alder Gulch processing plant under the operating permit.

1.3 Montana's Hard Rock Mining Permitting Process

The DEQ Hard Rock Mining Program regulates the mining of all ore, rock, or substances except oil, gas, bentonite, clay, coal, sand, gravel, peat, soil materials, and uranium. It is the Hard Rock Mining Program's responsibility to issue timely permitting decisions under the Metal Mine Reclamation Act (MMRA). In addition, the permitting process ensures appropriate environmental analysis and public involvement through compliance with the Montana Environmental Policy Act (MEPA).

Once DEQ receives an operating permit application, the agency reviews it for completeness and compliance with the substantive requirements of the MMRA. DEQ may request additional information or modification of the permit application in order to deem it complete or to bring the permit application into compliance. If DEQ is able to determine that the permit application is complete and compliant with the substantive requirements of the MMRA, the agency issues a draft permit. Issuance of the draft permit as a final permit is the proposed state action that is the subject of this MEPA analysis. An application for a major amendment to an operating permit is processed in the same manner as an application for a new permit.

1.4 DEQ's Responsibilities and Decisions

DEQ administers the MMRA (82-4-301 *et seq.*, MCA), MEPA (75-1-101, *et seq.*, MCA), the Clean Air Act of Montana (75-2-101, *et seq.*, MCA), and the Montana Water Quality Act (75-5-101, *et seq.*, MCA). DEQ may approve a mining operating permit only if it contains a reclamation plan that accomplishes the requirements and standards set forth in Section 82-4-336, MCA. Subsection 10 of this statute requires reclamation plans to provide sufficient measures to ensure public safety and to prevent the pollution of air or water and the degradation of adjacent lands.

DEQ is preparing this environmental impact statement (EIS) in order to comply with MEPA. The EIS will disclose the potential impacts of the Proposed Action, the No Action Alternative, and reasonable alternatives to the Proposed Action. At the conclusion of the environmental review, DEQ will issue a concise public record of decision (ROD). The ROD is a public notice of what the decision is, the reasons for the decision, and any special conditions surrounding the decision or its implementation.

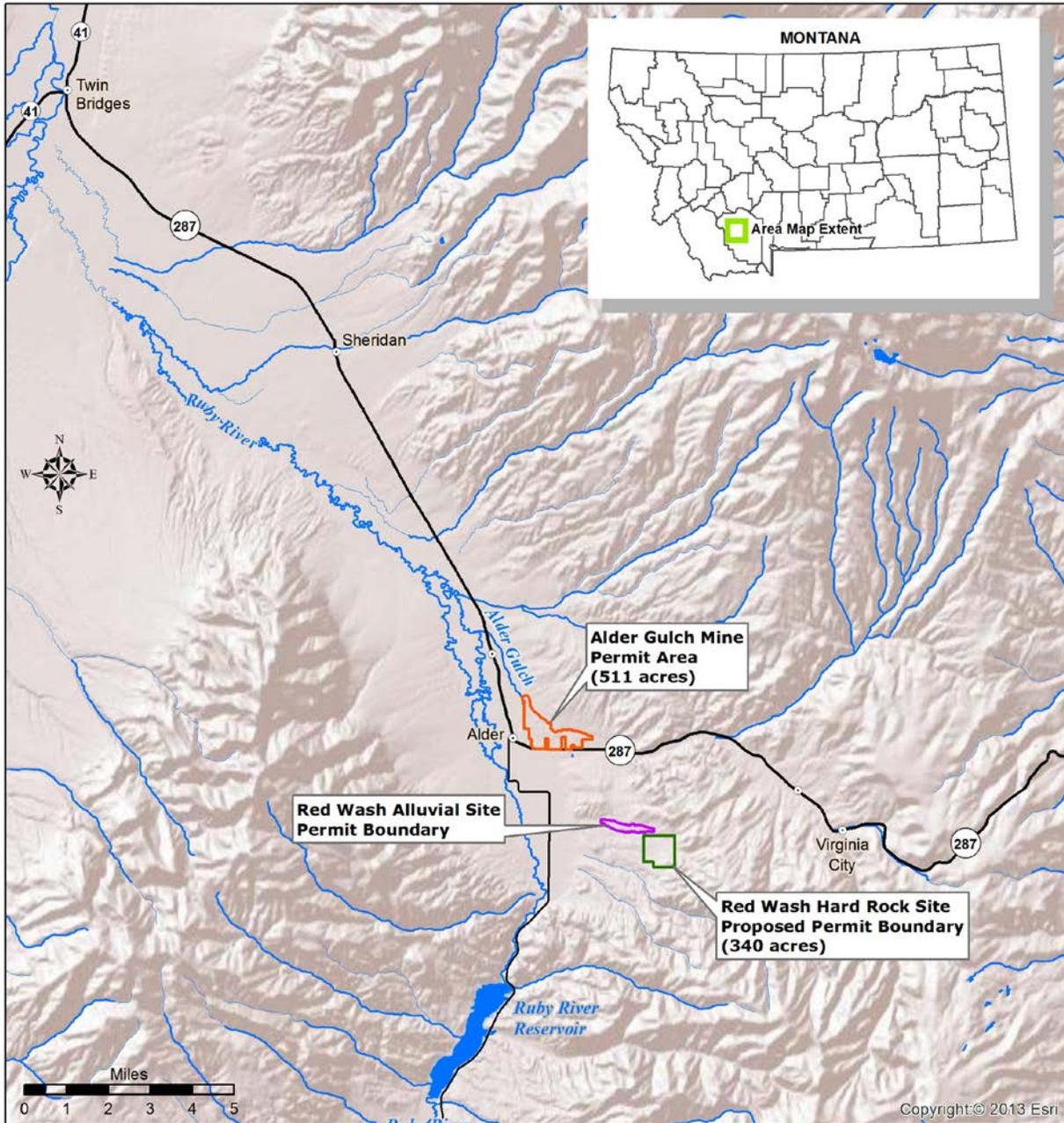


Figure 1.1-1. Project Area for the Proposed Garnet USA Operating Permit Amendment, Madison County, Montana.

DEQ will recommend in the ROD whether to issue the proposed amendment to Garnet USA's operating permit as written, or to issue a modified version of the proposed amendment (Stockwell, 2009). The MEPA Model Rules require the decision-making agency to inform the public about how it used the EIS (Stockwell, 2009). Throughout this entire process, DEQ has

complied with MEPA's requirements for scheduling, open disclosure, and reasonable provisions for involvement of the public in the EIS process as detailed in Section 1.6.

1.5 Scope of the Analysis

The geographic scope of this EIS includes the existing infrastructure related to Garnet USA's Alder Gulch processing plant, the areas within the Red Wash Alluvial Site and the proposed RWHR Mine permit boundaries, as well as an alternate road connection with the processing plant (Figure 1.1-2). The EIS presents descriptions of the Proposed Action and alternatives, including the No Action Alternative and the Agency-Mitigated Alternative (Chapter 2); descriptions of the affected environment for all potentially affected resources (Chapter 3); an analysis of the environmental consequences of the alternatives (Chapter 4); and DEQ's responses to comments received on the DEIS (Chapter 5).

1.6 Public Involvement Process

One of MEPA's objectives is to ensure that the public is informed of and participates in the review process. The MEPA Model Rules require an agency to invite the participation of government agencies and interested persons or groups in determining the scope of an EIS. A review period is provided to receive comments on the DEIS. A public scoping period was provided prior to development of the DEIS, and a public meeting on the DEIS was held during the review period.

1.7 Issues Identified during Scoping

DEQ opened the scoping period for this EIS on March 26, 2013. On April 16, 2013 DEQ held a scoping meeting in Alder, Montana at the Alder Community Hall. Comments made at the meeting and received via postal mail or e-mail were compiled by DEQ and entered into the administrative record. The scoping period ended on April 26, 2013. DEQ published notices of the scoping period and the scoping meeting in the Butte newspaper, the *Montana Standard*, on Sunday, March 24 and Sunday, March 31, 2013 and in the Ennis newspaper, the *Madisonian* on Thursday, March 28 and Wednesday, April 3, 2013. In addition, DEQ mailed scoping notices to over 150 agencies and individuals who had expressed interest in the project.

The intent of scoping is to solicit participation from the public and interested agencies regarding the direction, breadth, and extent of the analysis contained in an EIS. Comments are evaluated based on their content and relevance, and the jurisdiction of DEQ and associated agencies. Scoping comments may redirect the analysis or assist in development of alternatives.

Fifteen individuals or entities submitted written comments to DEQ during the public scoping period in addition to the comments recorded at the April 16 scoping meeting. The majority of comments were from individual citizens. No comments were received from State or Federal agencies. Several commenters addressed more than one topic or resource area in their submittals. The transcribed comments from the April 16 scoping meeting were collected anonymously, and it is impossible to determine how many individuals commented, or on which issues each person commented. Scoping comments focused on potential impacts related to

transporting the ore material from the mine site to the processing plant, the potential for water quality impacts to surface and groundwater, and concerns related to noise and dust produced by the processing plant.

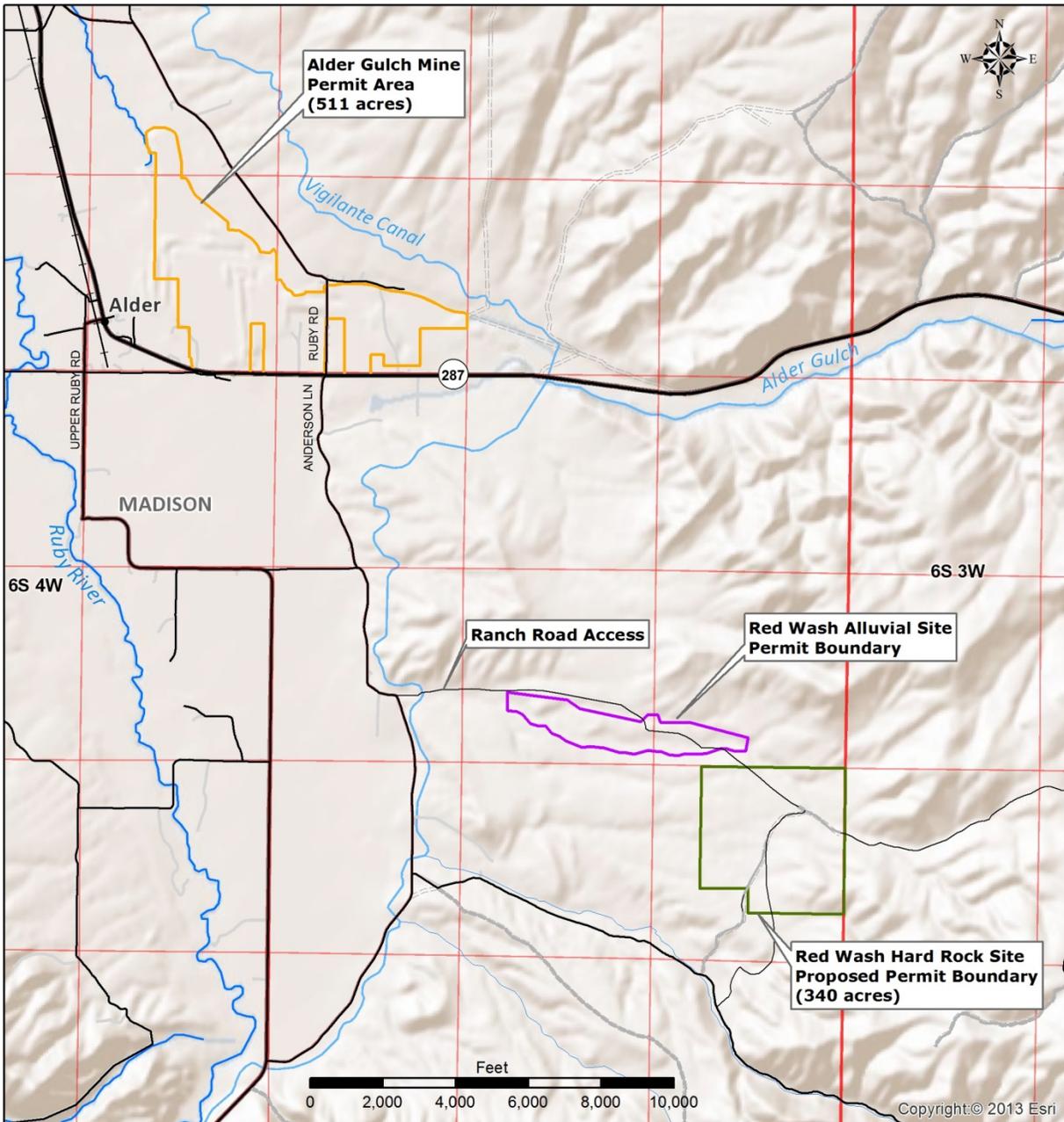


Figure 1.1-2. Permit Area Boundaries for the Alder Gulch Processing Plant, the Red Wash Alluvial Mine site (reclaimed), and the Red Wash Hard Rock Mine site, Madison County, Montana.

1.8 Issues Considered but Not Studied in Detail

During scoping, the possibility of moving the processing plant from the Alder Gulch Mine site to the RWHR Mine site was put forward by members of the Alder community. Operation of the processing plant at the Alder Gulch Mine site, however, is currently permitted under Operating Permit No. 00157. Garnet USA did not include relocation of the processing plant in its application to amend the operating permit.

DEQ has the authority to unilaterally modify the terms of an existing operating permit only for one of the following reasons:

1. To modify the requirements so that they will not conflict with existing law;
2. When the previously adopted reclamation plan is impossible or impracticable to implement and maintain;
3. When significant environmental problem situations not permitted under the terms of regulatory permits held by the permittee are revealed by field inspection and the department has the authority to address them under the provisions of the Metal Mine Reclamation Act.

None of these reasons exists in regard to operation of the processing plant at the Alder Gulch Mine site. Because relocation of the processing facility is neither requested by Garnet USA nor within DEQ's unilateral authority, relocation of the processing plant to the RWHR Mine site will not be considered in detail.

1.9 Comments on the DEIS

DEQ made the Garnet USA DEIS available to the public on September 29, 2013. The EIS was published on DEQ's website (<http://www.deq.mt.gov>) in PDF format to allow for broader distribution. This distribution opened the comment period for the DEIS. On October 16, 2013, DEQ held a public meeting in Alder, Montana at the Alder Community Hall. DEQ posted a legal notice of the meeting in the Butte newspaper, the *Montana Standard*, and in the Ennis newspaper, the *Madisonian*. Several members of DEQ's hard rock program attended the meeting and Jeffrey Herrick, MEPA coordinator for DEQ, presided over the meeting. There were also posters and informational handouts on the proposed mine and the materials in the DEIS provided at the meeting. Instructions were provided to commenters as to format and procedures for presenting comments. Approximately 22 members of the public attended the meeting in Alder. Comments made at the meeting were collected by DEQ representatives and by Mr. Herrick. Comments received via fax, postal mail, or e-mail were forwarded to DEQ's consultant. The comment period on the DEIS closed on October 31, 2013. MEPA requires a minimum 30-day comment period on an EIS; this comment period lasted 32 days.

This FEIS summarizes comments received by DEQ during the comment period for the Garnet USA DEIS. Each comment was classified by the resource area addressed, and then forwarded to the appropriate specialist for assessment. Resource specialists read each comment, and

responded with a brief analysis of how the DEIS addressed the comment, or when necessary, with additional analyses or data to answer the comment. Some comments requested analysis beyond the scope of the EIS, outside of the jurisdiction of DEQ, or inconsistent with the legal framework associated with the hard rock mining permitting process. These comments are catalogued in this report, but no further analysis was completed. All comments and responses are provided in Chapter 5.

Page intentionally left blank

Chapter 2: Description of Alternatives

2.1 Overview

This chapter describes the process of developing and selecting reasonable alternatives to the Proposed Action. To be considered for further analysis, each potential alternative had to meet the purpose and benefits of allowing Garnet USA to pursue extraction of mineral resources from its mining claims, as well as regulatory, environmental, and economic feasibility criteria. In addition, each alternative must be deemed to be reasonable. A reasonable alternative is one that is practical, technically possible, and economically feasible. In most instances, economic feasibility of a Proposed Action is determined solely by the economic viability for "similar projects having similar conditions and physical locations and determined without regard to the economic strength of the specific project sponsor" (75-1-201, MCA).

Alternatives were evaluated and placed into the following categories:

- The No Action Alternative assumes that DEQ would not approve the amendment to Garnet USA's existing operating permit. Exploration actions already approved under Garnet USA's Exploration License and the 1995 Operating Permit and previous amendments would continue.
- The Proposed Action describes Garnet USA's mine plan and the reclamation plan as submitted in its draft Operating Permit amendment.
- The Agency-Mitigated Alternative identifies alternative components that are reasonable and that would support the purpose and benefits of the Proposed Action. The alternatives must also be feasible from a regulatory, technical, and economic standpoint.
- Alternatives considered and eliminated include alternatives or alternative components that were examined but eliminated from detailed study. Alternatives discussed include moving the processing plant to the RWHR Mine site.

To facilitate comparison of alternatives, background information is included on Montana's mining laws and existing regulations to provide context on how the State permits mining activities as well as other required permits and environmental standards with which Garnet USA must comply. This review is not exhaustive; rather it provides an overview of the most pertinent laws and regulations. The MMRA is contained in 82-4-300 *et seq.*, MCA; MEPA is contained in 75-1-100 *et seq.*, MCA; Montana Water Quality Act is contained in 75-5-101 *et seq.*, MCA; Montana's non-degradation policy is found in 75-5-303, MCA; and Clean Air Act of Montana is contained in 75-2-100 *et seq.*, MCA. Readers are encouraged to review the primary source material for more complete understanding of the laws and regulations that govern mining and resource policy in Montana.

2.1.1 Development of Reasonable Alternatives

The Proposed Action is a permitting action and would have potential implications for future land use. A comparison of the operations and facilities of the alternatives considered in detail is

provided in Table 2.4-1. A condensed description of the potential impacts is provided in Table 2-9-1, at the end of this chapter. The potential impacts relevant to each resource area are detailed in Chapter 4.

2.2 Project Area

The Garnet USA project has three distinct sites: the existing Alder Gulch Mine permit area and processing plant, the Red Wash Alluvial site, and the proposed RWHR Mine site. The existing and previously permitted Alder Gulch processing plant is located approximately one mile east of the community of Alder, Montana, in the Ruby Valley of southwestern Montana (Figure 1.1-1). Virginia City, Montana is the Madison County Seat and is located approximately nine miles east of the previously permitted site; Sheridan, Montana is located approximately eleven miles northwest. All access, surface facilities, and mining areas are located on privately-owned lands.

As previously approved, the permitted area for the Alder Gulch Mine contains mining sites and a processing facility. The Alder Gulch Mine and processing plant site is contained within Sections 4, 9, and 10, Township 6 South, Range 4 West, in Madison County, Montana on lands that have been disturbed by historic gold placer mining. The Alder Gulch processing plant covers approximately 75 acres and surrounds the Alder Water and Sewer District sewage lagoons and land application disposal (LAD) acreage. The entire Alder Gulch Mine permit area covers approximately 511 acres and includes a historic placer-mined area. A gravel pit operation is located just west of and adjacent to the processing plant lands. There are seven private homes east of the site along Ruby Road, and several private land parcels to the north.

Access to the processing facility is provided by Ruby Road, a gravel road that intersects State Route 287, and by a driveway (South Road) that connects directly with State Route 287. No further mining is proposed at the Alder Gulch Mine facility; it would be used as the processing site for garnet-bearing rock mined from the RWHR Mine site, but has the ability to process garnet feedstock from other alternate sources with DEQ approval. It should be noted that mining at the Alder Gulch processing plant is still permitted. Garnet USA may mine it at some future time.

The Red Wash Alluvial Mine site covers portions of Sections 23 and 24, Township 6 South, Range 4 West and has been reclaimed. Although this site remains permitted for mining, no further mining is planned or proposed for the site.

The RWHR Mine site is located approximately three miles southeast of the Alder Gulch processing plant. The RWHR Mine site permit boundary includes approximately 340 acres in Section 25, Township 6 South, and Range 4 West. The RWHR Mine site is less than one-half mile from the now reclaimed Red Wash Alluvial site. Access to the RWHR Mine site is via State Route 287 and Anderson Lane, a county-maintained road, to improved ranch access roads that intersect the mine area.

2.3 Existing Approvals

This EIS will focus on the decision to be made related to approving an amendment to Garnet USA's operating permit as submitted in February 2013 (Garnet USA, 2013a). Garnet USA holds Operating Permit No. 00157 which has been amended twice since it was issued in 1995.

Garnet USA also holds Exploration License No. 00642 that allows for exploration activities at the RWHR Mine site. Throughout this document it is important to distinguish between activities that have already been approved as part of the 1995 operating permit or the exploration license, and those that are being considered under this EIS as part of the draft operating permit amendment. To clarify, the exploration license allows exploration activities only. This amendment to the 1995 operating permit, if approved, would allow mining to proceed at the RWHR Mine site. The following sections explain some of the approvals that Garnet USA has obtained.

General Mining Act of 1872

The legal right to mine is granted by the General Mining Act of 1872 which authorizes Garnet USA to hold the mineral rights to land affected by the operating permit via patented and unpatented mineral lode and placer claims and to conduct mining on this land.

DEQ Operating Permit No. 00157

The proposed amendment to Operating Permit No. 00157 is a major amendment which must be processed under the MMRA. If approved, this would be the third amendment under Operating Permit No. 00157. The MMRA statute provides a two-step process for DEQ's review of an application. First, a completeness and compliance review must be performed to determine whether the application for amendment contains all the information required by law and satisfies the substantive requirements of the MMRA and its associated administrative rules. If an application is found to be complete and compliant, a draft permit amendment is issued. Second, an environmental review of the application under MEPA is performed. A final permit amendment is issued upon the determination that it meets the substantive requirements of the MMRA and its associated rules and after the submission of a reclamation bond by the applicant. Garnet USA's application was deemed complete and compliant and DEQ issued the draft permit in February 2013.

DEQ Exploration License No. 00642

Garnet USA received an exploration license modification for the RWHR Mine site in February of 2013. Under the exploration program, Garnet USA can construct trenches, drill, and remove a bulk sample of up to 10,000 tons of ore to gain a better understanding of the garnet resource. Exploration findings can assist in mine planning, and may suggest additional technical investigations.

DEQ Air Quality Permits 2888-03 and 4842-00

In accordance with DEQ regulations for operating the processing facility, Garnet USA submitted Air Quality Permit Applications to DEQ's Air Resources Management Bureau. DEQ issued DEQ-ARMB Permit # 2888-03 for the Alder Gulch processing plant in May 2012. A modification

application was made to the existing air quality permit to add the crushing circuit and equipment at the RWHR Mine site on November 29, 2012. This modification was revised to include operation initially at the plant as well as additional equipment and was issued a new permit number. The new permit was assigned #4842-00 and the preliminary determination and proposal to issue a permit was issued on February 13, 2013. DEQ issued DEQ-ARMB Permit #4842-00, which covers the mobile crushing unit to be used at the RWHR Mine site, in April 2013. Both permit #4842-00, covering the crusher and other mobile components, and permit #2888-03, covering the processing plant are in force until revoked (Garnet USA 2013a).

Montana Department of Environmental Quality – Montana Pollutant Discharge Elimination System (MPDES)

Montana Pollutant Discharge Elimination System (MPDES) Permit MT No. 0029971 was issued on November 1, 1997 for the Ruby Garnet Project. The project did not involve the discharge of any pollutants to the surface waters of the State of Montana. This permit was replaced by the Sand and Gravel General Permit, Authorization Number MTG490015 on June 19, 2007. The permit was transferred to Garnet USA, LLC on April 18, 2012. The authorization allowed for the discharge of wastewater under the July 1, 2007 MPDES Sand and Gravel General Permit, MTG490000. The discharge occurs through infiltration of wastewater from three silt ponds to groundwater which is hydrogeologically connected to Alder Creek. The combined discharge to groundwater from the three outfalls must be estimated and reported and cannot exceed 6,000 gallons per minute (gpm). In addition, the net turbidity must not exceed 5.0 Nephelometric Turbidity Units above the naturally occurring turbidity of the receiving water and the pH of the discharge must be within the range of 6.0 to 9.0 standard units. Authorization of the permit is issued pursuant to the MPDES program under the authority of 75-5-402, MCA, of the Montana Water Quality Act and Section 402 and 303 of the Federal Clean Water Act.

DEQ General Permit for Storm Water Discharges Associated with Construction Activity

In accordance with DEQ regulations for discharge of storm water from a construction site, Garnet USA submitted a Notice of Intent (NOI MTR) and a Storm Water Pollution Prevention Plan (SWPPP) to the DEQ for the Alder Gulch processing plant site. This authorizes the project to discharge storm water in accordance with the limitations, monitoring requirements, and other provisions set forth by the General Permit. Garnet USA also plans to obtain a SWPPP for the RWHR Mine site. The SWPPP would be updated as needed to address storm water discharges from any new disturbances proposed under the Operating Permit amendment.

2.4 No Action Alternative

Under the No Action Alternative, DEQ would not approve Garnet USA's operating permit amendment. Garnet USA currently holds Operating Permit No. 00157 and has developed or is using previously developed areas covering approximately 75 acres within the Alder Gulch processing plant permit area boundary. The No Action Alternative assumes that Garnet USA could continue any and all activities approved under its operating permit and exploration license; therefore, the No Action Alternative is a "status quo" approach. The following sections describe what kinds of activities and surface disturbance are currently part of its operating permit and exploration license.

2.4.1 Exploration and Operations

Under the MMRA, "Exploration" includes all activities that are conducted on or beneath the surface of lands and that result in material disturbance of the surface for the purpose of determining the presence, location, extent, depth, grade, and economic viability of mineralization in those lands, if any, other than mining for production and economic exploitation; and all roads made for the purpose of facilitating exploration (82-4-303, MCA). Garnet USA could remove up to 10,000 tons of ore as a bulk sample under their current exploration license. This would provide a project life of less than one year. Ore removed as part of exploration would be processed at the Alder Gulch Mine site under the current operating permit.

2.4.2 Project Facilities

Garnet USA can process any ore stockpiles, process the exploration bulk ore sample, or process ore brought to the plant from other sources with DEQ approval to its processing plant under its existing permit. Garnet USA can also reprocess dredge tailings under its current operating permit; however, there are no plans to conduct dredge mining at this time, nor is dredge mining being assessed as part of this EIS. The existing facilities at the Alder Gulch processing plant are described in Table 2.4-1 and are shown on Figure 2.4-1.

2.4.3 Bulk Sample Handling and Processing

The bulk sample removed under the exploration license would be transported to the Alder Gulch processing plant where it would be crushed. Wet processing of the bulk sample would include washing, grinding, physical concentration, screening, and separation at the wet plant. All concentration procedures would continue to involve physical separation (spirals, jigging, tabling, and/or magnetic) processes and would not involve any chemical processes. The drying and bagging processes would continue as previously approved.

2.4.4 Exploration Water Management

Water used for processing at the Alder Gulch processing plant would be obtained from existing ponds on site. Use of water during the exploration phase would be expected to be similar to water use under the Proposed Action and is described in detail in Section 2.5.4. The garnet sand preconcentration and final concentration process would require water for use in the separation of garnet sand from non-garnet bearing materials. Water used during the garnet sand concentration process would be obtained directly from the existing ponds. Water used during the garnet concentration process would be directed back to the existing ponds, allowed to settle out fine sediments, and pumped back for use in the processing plant. Water from freshwater ponds would be used to make up evaporation and operational losses.

Potable water would be obtained from a shallow groundwater well located adjacent to the processing facilities. Potable water from the facilities' washrooms would return to the groundwater system through the on-site septic system.

Table 2.4-1. List of Existing, Permitted Facilities at the Alder Gulch Processing Plant, the Acreage Covered by Each Component, and any Proposed Changes to These Facilities Covered Under the Alternatives Under Consideration.

Facility/ Component	No Action Alternative	Current Acreage	Proposed Action	Agency-Mitigated Alternative
Ore stockpiles	Three areas are used for stockpiles	5.8	No changes	Same as Proposed Action
Haul and access roads	Existing roads are on north, south, and east sides of facility to provide access	2.8	New road on west side for access to State Route 287	Realign entrance, construct angle road, retire East Road, extend visibility berm
Ponds	Existing north, west, and east ponds	6.1	No changes	Same as Proposed Action
Wet process pond	Pond used to collect washed non-ore fines from the ore in wet plant and other wet processing activities	1.0	No changes	Same as Proposed Action
Wet processing plant	Plant uses wet spirals, screens, slurry pumps and other processing methods to process garnet ore	1.4	Proposed upgrades would remain within current footprint	Same as Proposed Action
North and South Process Ponds	N/A	N/A	Lined recirculation ponds for process water-4.7 acres	Same as Proposed Action
Buildings	Office, lab, warehouse and packaging plant, dry plant, shop, and fuel facilities	8.2	Additional office building and lab facility in existing 8.2 acre footprint	Same as Proposed Action
Parking	Parking scattered across site at office, shop, and other locations		Creation of dedicated employee parking site to meet MSHA rules on approx. 1.2 acres	Parking accessed via South Road. Parking location and size is the same as under Proposed Action

Facility/ Component	No Action Alternative	Current Acreage	Proposed Action	Agency-Mitigated Alternative
Boneyards	Areas for miscellaneous parts, equipment, conveyors, and items that need repair or are being stored for future use or re-use in the facilities between office and shop area	2.7	Existing boneyards would be moved to the north side of Alder Gulch on 2.7 acres	Same as Proposed Action
Sand stockpile	Sand is separated as part of the wet processing process and is stockpiled on site. It is sold as a byproduct and also used for operational and reclamation applications on site	1.9	No changes	Same as Proposed Action
Crushing area	Portable unit to be operated at the site during exploration adjacent to fleet line ready area. No additional disturbance as a result	NA	Crusher included as part of Proposed Action at RWHR Mine site	Same as Proposed Action
Existing Reclaimed areas	Variety of areas used as visual and noise screens along the north, west, and east boundaries of the plant site have been reclaimed	9.7	Some previously reclaimed areas would be used for road expansion or pond development. A visibility berm will be extended along Ruby Road between the local residences and the processing plant. It will extend as far south as the East Entrance Road	DEQ recommended extension of visibility berm southward across the East Entrance Road

Page intentionally left blank

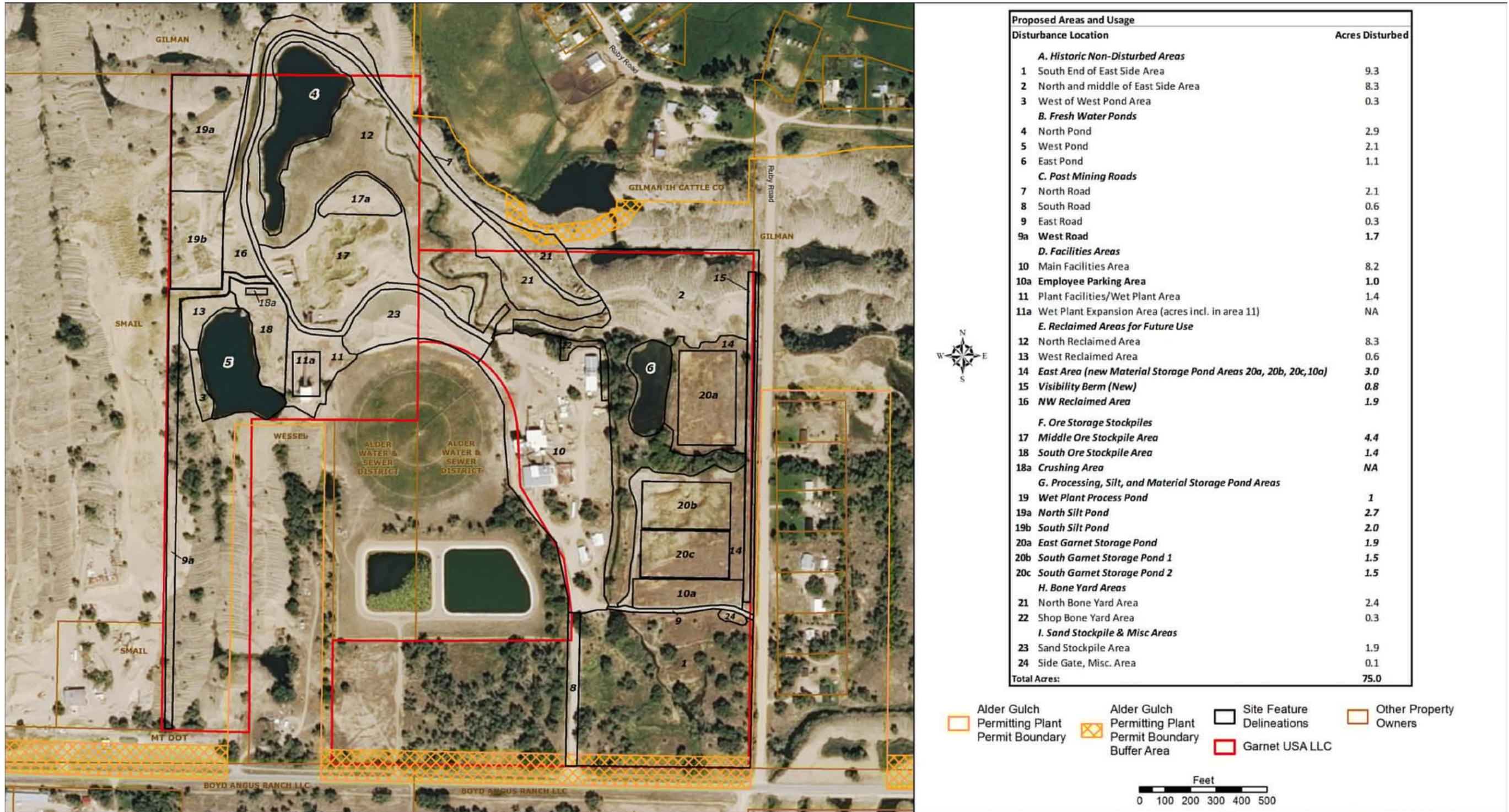


Figure 2.4-1. Existing Facilities at the Alder Gulch Processing Plant and Schematic for Proposed Facility Changes.

Page intentionally left blank

2.4.5 Personnel and Utilities

Employment

Garnet USA anticipates employing approximately 40 to 50 people to operate the facilities and perform the activities approved under the Exploration License.

Power

Overhead electric power is provided to the Alder Gulch processing plant from an existing 7,200 volt NorthWestern Energy overhead power line nearby. Propane is used for the process dryers and space heating. On-site storage of propane is approximately 18,000 gallons and located adjacent to the main processing building.

Telephone service is provided by the existing buried fiber optics line along Ruby Road.

Water and Sewer

Water is readily available from groundwater sources, and two on-site wells were constructed to meet processing and potable water needs. One well is capable of providing 15 gpm to the office and safety buildings. A second well is capable of providing 15 gpm to the change room area of the Wet Process building for bathrooms and showers. Domestic wastewater from washrooms is disposed of in an on-site septic tank and drain field system. The septic systems and drain fields were designed in compliance with Madison County and State of Montana sanitary regulations. A sanitary disposal permit was obtained from the Madison County Sanitarian and the disposal facilities were inspected prior to use.

The septic systems receive a maximum flow of 25 gpm through a 4-inch line to a 1,000-gallon septic tank. Drain-field discharge is from a 4-inch diameter perforated pipe. The septic drain field is immediately adjacent to the temporary settling pond used in the 1990 pilot plant operations, and is in the same flat tailings material excavated for the 1990 settling pond. Percolation and water table measurements from the 1990 settling pond showed that to accommodate 25 gpm of discharge, the drain field requires less than 400 linear feet of 4-inch perforated drainpipe (at 1.05 ft² per linear foot of pipe), and was installed out in an area approximately 100 feet by 40 feet.

2.4.6 Transportation

All roads are shown on Figure 2.4-1 and Figure 1.1-2. The existing Ruby Road runs northward from State Route 287 and is used for access and ore hauling to the main processing and support facilities. Ruby Road has a travel surface width of about 30 feet. The East Road to the processing plant turns off of Ruby Road and was used to haul ore from Red Wash Alluvial site. The East Road is 30 feet wide and was built on regraded tailings.

The original South Road which is still used for access and deliveries from the warehouse runs north off of State Route 287 directly to the office and warehouse area.

Employee parking is adjacent to the office building, at the shop, and other areas on site.

2.4.7 Reclamation

The original Alder Gulch Mine and processing plant sites are located on previous placer dredge-mined lands that are privately-owned. These lands were mined prior to the establishment of mining reclamation laws in Montana, and as a result, were not subject to reclamation activities. The current unreclaimed nature of the Alder Gulch permit area as well as surrounding properties in this region has significantly reduced the productivity and usefulness of the land. Past historic mining within the permit area has resulted in the disruption of the historic Alder Gulch Creek stream channel, and has left an area characterized by barren dredge tailings piles, sparse vegetation, and limited soil.

The reclamation associated with the operating permit activities at the Alder Gulch site beginning in the 1990's provided for the establishment of new surface contours and vegetation, including a reconstructed stream channel for a segment of Alder Gulch Creek. Backfilling, recontouring, top coating with soil fines, and seeding were concurrent with ongoing mining of the tailings piles.

Much of the reclamation plan for the Alder Gulch Mine site has been permitted and approved previously.

2.4.8 Post Mining Land Use

The main processing facilities and support facilities would remain post-mine for future industrial land uses. No soil replacement following disturbance is proposed. Garnet USA is the owner of lands affected by the main processing facilities and support facilities and will propose which structures will remain at the completion of the project.

In general, lands outside of any proposed industrial use would be graded and revegetated with the proposed upland vegetation species mix. A minimum of six inches of soil fines and silts will be laid down to provide a growth medium on any reclaimed lands. Specific reclamation practices for other lands and facilities within the Alder Gulch Mine permit area are described below. Areas along Alder Gulch would be reclaimed as riparian areas with an appropriate seed mix.

2.4.9 Site Facility Removal

The main processing facility and support facilities would remain functional through the life of the project. The office trailer and repair shop would remain after mine closure. Operation of the facilities would seek to minimize the area of disturbance. Disturbed areas are regraded and a minimum of six inches of fines and silts, sourced from the settling ponds at the Alder Gulch processing plant, will be used to provide a growth medium.

Fuel Storage Facilities

Fuel storage facilities would be salvaged and removed following completion of mining and reclamation activities or when no longer needed. Prior to regrading, soiling, and seeding with the approved seed mix, the area would be inspected for contamination associated with fuel or other petroleum product spills. Any soil with potential contamination would be removed to an appropriate off-site disposal area before reclamation.

Equipment Yard and Contents

All equipment previously stored or located within the equipment yard would be salvaged and removed from the project site. The site would be regraded and revegetated as described above.

The 50-ton storage bin and conveyor associated with the ore stockpile and main processing facility would be salvaged and removed from the project site at the completion of processing activities. Areas disturbed by the operation of these facilities would be reclaimed using the same grading, soiling, and revegetation procedures described above.

2.4.10 Alder Gulch Processing Plant Site Reclamation

Almost all of the reclamation for the Alder Gulch processing plant site has been permitted and approved previously. The following sections describe the reclamation planned for after garnet ore is no longer processed at the Alder Gulch facility.

Topography and Vegetation

Areas would be regraded as necessary before soil spreading. Compacted areas would be ripped with a dozer or grader to at least a depth of 12 inches prior to resoiling. Stockpiled soils or settling pond fines would be spread six inches deep. Once the soil has been placed, areas would be ripped with a dozer or grader to at least a depth of 12 inches prior to reseeding. Areas would be seeded with an approved seed mix.

Ponds and Stockpiles

Following completion of the project, and final removal and salvage of silts and clays (fines) from the settling ponds, the pond would be backfilled to the original contours. The backfilled ponds would be graded and revegetated with the proposed upland vegetation species mix. The area of the settling pond fines stockpile would be graded and revegetated.

Roads

All access roads to the Alder Gulch processing plant would remain for future industrial use. Other internal roads may be regraded and reclaimed after review by DEQ with the permittee.

2.5 Proposed Action

The Proposed Action would allow garnet mining at the RWHR Mine site, adding 340 acres to the mine operating permit area. About 213 acres would be disturbed over the life of the RWHR Mine. Approximately one-third of the total RWHR acreage proposed for amendment (127 acres) would remain undisturbed.

2.5.1 Mine Operations

The mining plan for the RWHR Mine site is to extract garnet-bearing rock using standard quarry mining methods. Soil would be stripped only in the places intended to be disturbed in specific areas at a time and stockpiled in separate piles south of the pit. The upper weathered zone of the deposit would be ripped using a dozer until competent rock is encountered. Figure 2.5-1 shows the mine facilities and arrangement.

Topsoil in the areas to be disturbed would be pushed downhill and used as erosion control berms or loaded and trucked to soil stockpiles. Overburden at the ore storage pile and crushing areas would be pushed from the eastern pit edge toward the west creating a flat working area at approximately the 5,675 feet elevation above mean sea level (amsl). This would create a bench near the pit entrance that would remain until the pit excavation reaches that elevation.

Actual mining would commence in and around the fleet ready line area, where trucks would be staged for loading, as well as the crushing and screening areas on the western portion to the extent necessary to create the needed flat working areas. The fleet ready line area would be excavated as far down as the pit floor of 5,650 feet amsl. Further excavation may take place as additional ore is found. This would require a revision to the operating permit. Other activities would focus on excavating access roads while mining the eastern portion of the RWHR Mine site by drilling and blasting until the northern line of Section 25 is encountered, or the rock does not contain ore-grade garnet. Mineable garnet resource is not anticipated in the crushing area; this area would not likely be excavated below the original 5,675 feet elevation amsl.

The mining plan includes the excavation of the southwest corner where the sump would be located as the pit extends to lower elevations. Mining benches would typically be 10 feet in height and would run in a winding south-north direction. The 10-foot benches would be mined stepwise from the top to the pit floor. Explosives would be used to break up the rock. Blasted material would be moved by front end loader and dozer, and then transported to the crushing area where it would be stockpiled and fed into a crushing circuit. An ore dump adjacent to the sump would facilitate the handling of ore directly onto a grizzly screen and would reduce use of a front end loader to feed the crushing circuit.

Actual mining depth has been estimated to extend approximately to elevation 5,650 feet amsl. This would result in a virtually flat pit bottom. However, a minor slope would be maintained to direct storm water to the sump. Drainage from the sump and the mine pit floor would leave the pit area and flow to the south sediment control basin and/or the long west sediment control basin at the lower slope of the mining and milling waste rock stockpile.

The 100-acre waste rock stockpile area would be located west of the area proposed to be mined. Stripped soil would be stockpiled separately and redistributed during reclamation. Figure 2.5-1 shows the proposed RWHR permit boundary, proposed permitted disturbance, access roads, soil and waste rock storage areas, and storm water control structures, as well as conceptual mine topography at the end of mine life. The waste rock would initially be deposited in the middle of the stockpile area in sections for each year of deposit. The waste rock would be packed in lifts typically running from the downhill west end working up to the east end along the road. The northern section would likely remain undisturbed for the first six years as shown, while the first lift of the stockpile would be leveled out at about 5,660-5,670 elevation. The North-South stockpile access road running the length of the eastern boundary of the mining and milling waste stockpile would be at the 5,660-5,650 feet amsl elevation during the life of the mine to allow drainage from the pit and facilitate construction of a sediment control basin for mine pit overflow if needed.

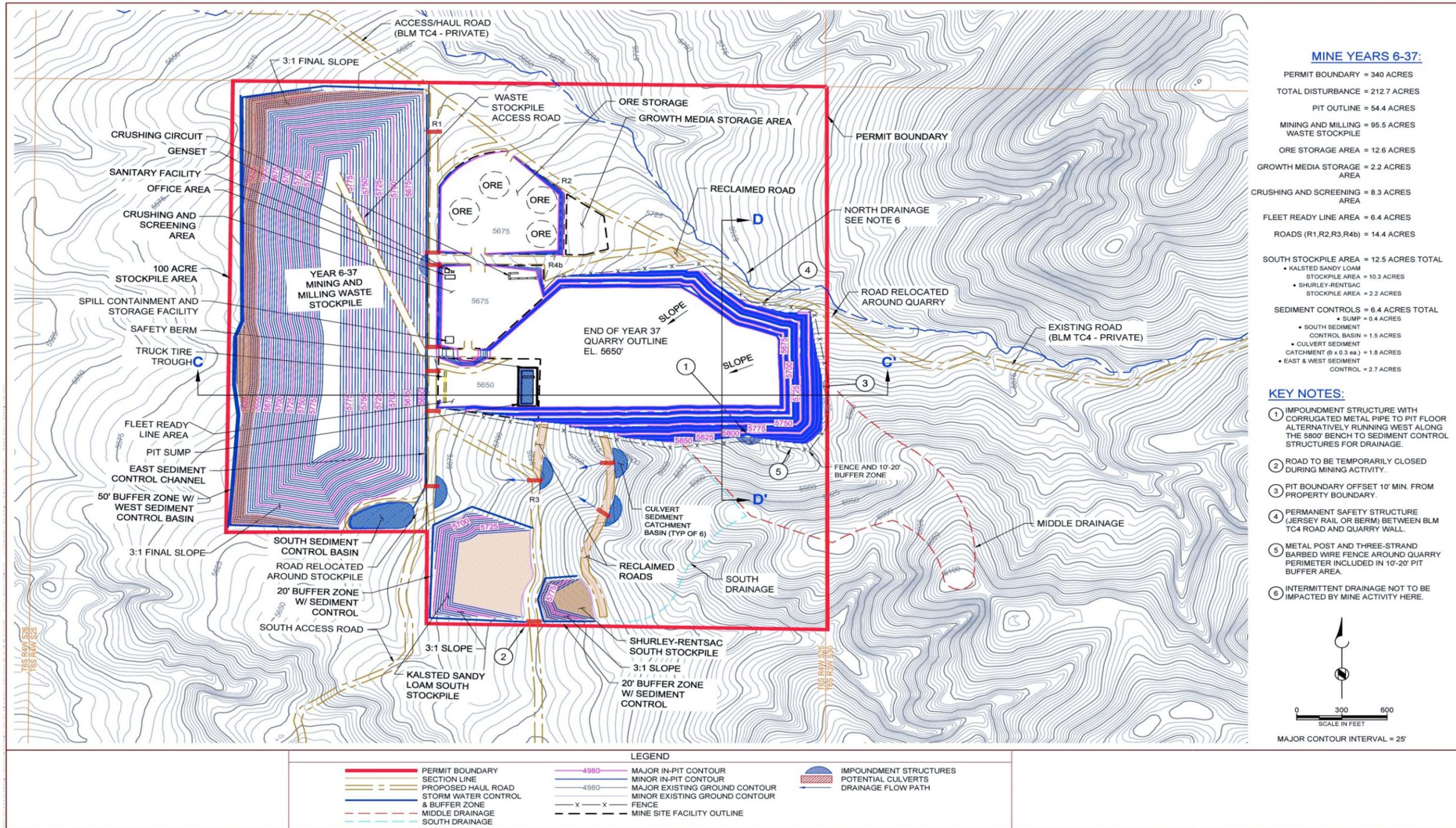


Figure 2.5-1. Proposed Conceptual Mine Topography for the Red Wash Hard Rock Mine at the End of Year 37.

Page intentionally left blank

The estimated mine life for RWHR would be approximately 37 years, based on a proposed production rate of about 500,000 tons of ore and waste per year. Mining would take place on a seasonal basis and material would be stockpiled for winter processing at the plant site. The mine is projected to produce 50,000 tons per year of finished garnet product. Surface mining operations may be suspended during adverse winter and spring weather conditions and possibly during extreme dry summer periods. It is possible that the mining operations would be continued year round at the mine site with redirecting workers during winter storm events as needed. The plant would run year-round.

Dozers, loaders, excavators, and track drills would be used to strip soil, rip weathered rock, and drill and blast waste rock and garnet-bearing material. A wheel loader or excavator would load a haul truck to transport garnet-bearing ore to the crushing circuit. Crushed product would then be trucked to the Alder Gulch processing facility.

2.5.2 Project Facilities

Approximately 213 acres of the proposed RWHR acreage would be disturbed, and would encompass a pit, waste rock stockpile, ore storage area, growth media storage area, crushing and screening area, roads, fleet ready line area, soil stockpile areas, and sediment control areas.

Garnet USA estimates that the disturbance that would result from mining at the end of pit life would be about 54 acres. The amendment provides that at the end of pit life, the pit would have reclaimed rock slopes on the southeast and northeast corners, raptor and bat habitat, and revegetated flat benches reclaimed with soil and seeded. A description of the estimated disturbance is provided below.

- Waste rock stockpile: The stockpile area would be located west of the mine pit and proceed north and south as the excavation proceeds. Garnet USA estimates that the total disturbed area at the end of mine life would be about 41.2 acres. The design calls for placing the first layer up to the 5,650 elevation even with the floor of the pit and protecting the perimeter with berms and sediment control features.
- Ore storage area: Garnet USA estimates that the ore storage area would be about 12.6 acres and located at 5,675 feet elevation amsl to facilitate easy access for ore haulage. During pit operation it would be graded flat with berms for safety and water runoff control. At the end of pit life, the area would be reclaimed.
- Crushing and Screening area: Garnet USA estimates that about 8.3 acres would be used for the crushing and screening area. This area would be located between the pit and the waste stockpile and excavated to the same elevation as the ore storage area. The crushing circuit equipment is compact, so the rest of the land would be available for staging and stockpiling as needed.
- Growth media storage area: Garnet USA estimates that the growth media storage area would be about 2.2 acres and other than temporarily holding some of the stripped vegetation and soil during the first excavation passes, would be undisturbed. The

stripped vegetation and soil stockpile would grow and shrink depending upon excavation and concurrent reclamation activities.

- Roads: Garnet USA estimates that about 14.4 acres would be used for roads related to the RWHR pit activities, such as moving materials to the soil stockpiles, crushing and screening area, and hauling ore to the Alder Gulch processing plant.
- Fleet ready line area: This area would be excavated flat at the 5,650 feet elevation amsl at the base of the pit and provide an area for trucks and equipment to be parked, maintained, or stored. Garnet USA estimates that the disturbed area would be about 12.5 acres.
- South soil stockpile areas: This area would store two soil types from the steeper and shallower slopes in separate stockpiles. Garnet USA estimates this stockpile area would cover about 12.5 acres. The stockpiles would change in size depending upon excavation and concurrent reclamation activities.
- Sediment control areas: Garnet USA estimates that depending upon pit excavation and road locations, about 6.4 acres would be disturbed for sediment and storm water control structures.

2.5.3 Ore Handling and Processing

The function and use of the processing plant at the Alder Gulch site would remain the same as under the existing permitted activities. However, in order to facilitate mining at RWHR Mine site and processing of the higher grade ore, the amendment would include upgrades to the Alder Gulch processing plant and facilities including:

- The reconfiguration of the North Road to eliminate 8,000 feet of travel through and around processing areas;
- Construction of the West Road to reduce amount of haul truck use on East Road, to allow grading and reclamation of historic placer piles and to create a berm along the western property line. The West Road will allow truck traffic to follow a loop road path to access State Route 287;
- Abandonment of wet plant processing pond below water table;
- Improvements in processing plant;
- Establishment of dedicated employee parking area at the east entrance;
- Establishment of visibility berm along the Ruby Road property line to shield view of storage ponds, parking and plant activity. The berm would extend to a point just north of the East Entrance off Ruby Road;
- Changes in screening and crushing equipment sizing/types;
- Relocation of the bone yard area; and
- Installation of two new lined processing ponds.

A new “Wet Plant Expansion” would be built along with a relocated process pond. The equipment would be installed adjacent to the existing wet plant facility. The Wet Plant Expansion would provide critical processing capacity that complements the current wet plant functionality and would increase processing capacity in a current production bottleneck.

Organizational improvements to processing and material handling as well as equipment upgrades would likely increase the plant efficiency and throughput.

2.5.4 Mine Water Management

Water management at the RWHR Mine site would include water used for operations and maintenance of the mine, and structures and practices related to control of runoff to reduce sedimentation and erosion. Water management at the Alder Gulch processing facility related to the activities under the Proposed Action would be modified using process ponds constructed with 80 mil thickness, high density polyethylene (HDPE) geomembrane liners. Water used for processing at the Alder Gulch processing plant would be obtained from existing ponds on site. Garnet USA has water rights to provide sufficient water for processing. The garnet sand preconcentration and final concentration process would require water for use in the separation of garnet sand from non-garnet bearing materials. Water used during the garnet sand concentration process would be obtained directly from the active mine pond (silty water), from nearby surface water (existing ponds), and from the plant site recycle pond. Water used during the garnet concentration process would be directed back to the lined North and South process ponds, allowed to settle out fine sediments, and pumped back for use in the processing plant. Water from freshwater ponds would be used to make up evaporation and operational losses.

Much of the process water will be recycled to minimize the use of fresh water during ore processing. The Deslime Process Circuit and the Wet Plant Processing main hydrosizer and classifiers will require water for operational purposes. Garnet USA estimates that 2,700 gpm of total inflow will be needed for the Deslime circuit processing. Of this 2,700 gpm, 2,430 gpm of water will be recycled. Approximately 81 gpm (3 percent) of Deslime circuit water will need to be added as makeup water.

Approximately 2,300 gpm will be pumped into the wet plant and feed the main hydrosizer and the two final product classifiers. Garnet USA expects to recover and recycle most of this 2,300 gpm. Approximately 3 percent of loss (69 gpm) is estimated at this time resulting from spillage or evaporation at the wet plant.

Water for the mine process operations will be obtained from two HDPE-lined ponds at the northwest corner of the permitted boundary. Make up water will be obtained from the fresh water pond located immediately south of the two lined ponds. Garnet USA estimates that approximately 2 million gallons per year will be lost to evaporation from the two lined ponds, the North Settling Pond and the South Process Water source pond. Any potential for cross-contamination of process water with groundwater or other surface water sources is minimized by lining of the surface water ponds and regular monitoring from surface water sites and groundwater monitoring wells.

The total amount of water estimated for use by Garnet USA in the garnet processing operation is summarized below:

Water Use	Percent of Total	Approximate Volume (gpm)
Total Process Source Flow	100%	5,000
Total Recycled	94.6%	4,730
Process Flow Makeup Water (10% losses of moisture in dryer)	5.4%	270
Process Makeup Losses (Deslime and Plant)		150
Estimated Process Pond Losses to Evaporation		3.8
Approximated Consumptive Rate for Processing		424

Water Supply

Drilling and dust control at the RWHR Mine site would require water. Water would be pumped from the downslope sediment pond or trucked in from the Alder Gulch processing facilities. A 40,000 gallon water tank would be used to store water at the RWHR Mine site with 15,000 gallons held in reserve for fire water resources. A water truck would be used to control dust. The RWHR crushing and screening circuit would not require water for operation.

Potable water would be transported daily as needed to the RWHR Mine site from the Alder Gulch processing facility.

Storm Water Management

Sediment control structures are planned to divert any possible surface runoff from above the proposed pit during mining activities. The downslope sump area surrounded by berms would be constructed before any mining disturbance occurs. An upstream water control structure with piping to the pit floor would be constructed to divert runoff past the pit highwall and direct any flows toward the sump. The pit floor would be maintained to slope toward the sump to prevent any ponding.

All of the working areas including the pit itself, the ore storage area, crushing area, fleet ready line and each road have been designed to incorporate substantial berms and buffer zones that include sediment control features. The soil storage stockpiles and the mining and milling waste stockpile have sediment control features as well as buffer zones to keep material or water runoff from leaving the proposed permit boundary. The roads that access the storage piles have culverts and catchment basins added to create places where water flows are controlled and overflows are directed to each of the next control features downhill. All storm water runoff would culminate in the south sediment control basin which covers 1.5 acres on a fairly flat slope below the disturbed mining areas.

The 1.5 acre west sediment control basin captures the flow off the slope of the waste rock pile as well as overflow from other sediment control structures. At an 8-foot average depth, the west basin would hold over half a million cubic feet of storm water, almost as much as the 1.5 acre south sediment control basin.

2.5.5 Personnel and Utilities

Employment

Garnet USA anticipates employing approximately 30 to 60 people to operate the facilities and perform the activities at the proposed RWHR Mine site. This workforce includes the 40 to 50 people employed during the operations under the exploration license (See Section 2.4.5). The potential for indirect or associated employment changes is addressed in Chapter 4.

Power

Power would be provided to the proposed RWHR Mine site by a diesel powered generator. No wired telephone communication is available at the RWHR Mine site. Communication at the RWHR Mine site would be through cellular service and two-way radios.

Water and Sewer

The proposed RWHR Mine site surface area is dry. Several small seasonal seeps occur in a drainage north of the mine permit boundary. A stockwater pipeline runs along the western edge of the mine area. The contractor may need to relocate the pipeline upon initiation of construction depending on construction and activity in that location. All potable water would be trucked to the RWHR Mine site as needed.

Sewage at the RWHR Mine site would initially be handled by the use of portable toilets which would be leased and serviced by an independent licensed contractor. Sewage would be removed and disposed of by the contractor in a manner consistent with state and federal regulations.

A temporary office trailer and/or a lunch room may be brought to the RWHR Mine site. If this occurred, then domestic wastewater and sewage would be disposed of in an on-site septic holding tank for periodic pump-outs. All domestic water and septic systems would be designed in compliance with Madison County and State of Montana sanitary regulations. A sanitary disposal permit would be obtained from Madison County's Sanitarian and the disposal facilities inspected prior to use.

2.5.6 Transportation

The proposed main access route to the RWHR Mine site would be along Anderson Lane to an improved and existing ranch access road (Figure 1.1-2). The contractor would maintain and grade the road as necessary to ensure safe travel of all personnel. Unimproved "interior" access roads would be constructed with on-site material to provide access between active mine areas and the crushing circuit. Soil would be stripped first and stockpiled before surfacing. The location and life of these roads would vary annually based on advancement of the mining operations. These roads would generally have a surface travel width of 35 feet to safely

accommodate mining-related traffic. Based on the proposed equipment, road grades would be held to 10 percent or less as a standard.

Garnet USA's employees would stage at a designated parking area within the Alder Gulch processing facility and carpool to the RWHR Mine site. The parking area would be surfaced with clean gravels obtained from the mining operation.

Employees and vendors would enter and exit the plant site along the South Road (located directly south of the office and shops). Under the Proposed Action, ore haul trucks travel from the RWHR Mine site to Anderson Lane, cross State Route 287 onto Ruby Road, then turn west into the plant on the East Road. The crossing from Anderson Lane to Ruby Road is not fully aligned and requires the haul trucks to deviate slightly to the east. The Proposed Action allows Garnet USA to construct and use a road along the far west plant boundary for the empty ore trucks to exit the plant. This West Road may or may not be built or used. The construction of that road would be contingent upon the needs of the plant and would depend upon permissions and permits to cross State of Montana right-of-way and access State Route 287.

Sediment and erosion control for the roads would be maintained under good engineering practices. It is likely that improvements would be made by the County or the mining company over the life of the mine to straighten sections and fill in some depressions. If any sections of the private road are proposed to be permanently rerouted, the older track would be reclaimed. First year mining activities would not require any major improvements to the road in order to start mining. Sediment control features would be maintained during any improvements.

Ore mined from the RWHR Mine site would be transported to the Alder Gulch Mine site for processing using highway-legal trucks.

2.5.7 Reclamation

Most components of reclamation of the RWHR Mine and of altered portions of the Alder Gulch processing facilities would be the same or similar to those required under any alternative under consideration. Therefore, a more complete description of mine site reclamation is provided in Section 2.7 Reclamation Common to All Alternatives.

RWHR Waste Rock Stockpile and Pit Reclamation

All facilities at RWHR Mine site, including the Mining and Milling Waste Rock Stockpile and pit, will be regraded and soiled as shown on Figure 2.5-2. The proposed grade for all facilities except the pit highwalls would be 3:1, horizontal to vertical, on average. The grade may be steepened in a natural regrade design, with agency review and approval, in some areas if materials testing indicate that steeper slopes can be incorporated without risk of excessive erosion. Variable slopes would enhance visual appeal and reduce the manmade appearance of the facilities.

Garnet USA intends to maximize the utility of the flat pit safety benches for habitat by seeding after application of 30 inches of soil. The benches would be concurrently reclaimed by placing soil on the flat benches before deepening the pit as excavation continues (Garnet USA, 2013a).

The reclamation would be done in a manner to smooth the transition between the steeper rock faces and flat benches to maximize the revegetated area.

The pit highwalls would be structurally competent and reclaimed to rock faces (MCA 82-4-336 (9)(b)). The rock faces in the pit would consist of layered metamorphic rock including garnet gneiss, amphibole gneiss, and quartzo-feldspathic gneiss. During the mine life, some portions of the pit highwalls would facilitate the creation of vertical wall habitat on the steeper slopes, shelves, flat benches, and partial backfilling. The majority of the highwalls would be reclaimed to rock faces for wildlife habitat and the benches would be soiled like the pit floor. In the upper pit rock faces, Garnet USA would excavate two cavities to produce wildlife habitat for bats or nesting areas for raptors. Garnet USA would provide a conceptual plan for bonding purposes now and develop a final design once the upper rock face is completed to final grade. Once the highwall is completed, Garnet USA can identify portions of the exposed geology that would provide suitable places for the cavities. Garnet USA would create some vertical portions of the highwall after mining activity is finished. The highwall reclamation would depend entirely on the structure, competence, and safety of the rock that is encountered during mining excavation.

About 10 percent of the pit highwalls would be reclaimed in a different manner than the stable rock face and bench method to reduce the visual contrast with adjacent lands, provided work can be accomplished safely. About five percent of the upper northeast corner highwall and five percent in the southeast corner area would be partially backfilled to create 2:1, horizontal to vertical slopes, covered with rocky soils to reduce erosion, and seeded. This partial backfilling would provide access for wildlife and livestock at the two pit corners as well as a visual break in the horizontal benches. As the vegetation on the benches and pit corners matures, the post-reclamation visual contrast would look like natural rock slopes with breaks which occur throughout the region. Storm water retention on the planted flat benches should dramatically increase the plant growth success and enhance the habitat as well as the visual benefit.

Maximizing the revegetated flat pit floor area, and only regrading some portions of the pit highwalls would enhance the utility of post-mine use of the area for the rancher's livestock by maximizing the vegetation produced.

Following backfilling and contouring activities, clean waste sand and recovered silts (fines) will be hauled from the Garnet USA processing plant and nearby settling ponds. The stockpiled soil and recovered silts and fines would be blended and spread over regraded spoil to the approximate premine soil depths. Resoiled areas would be ripped with a dozer or grader to at least a depth of 12 inches prior to seeding.

Page intentionally left blank

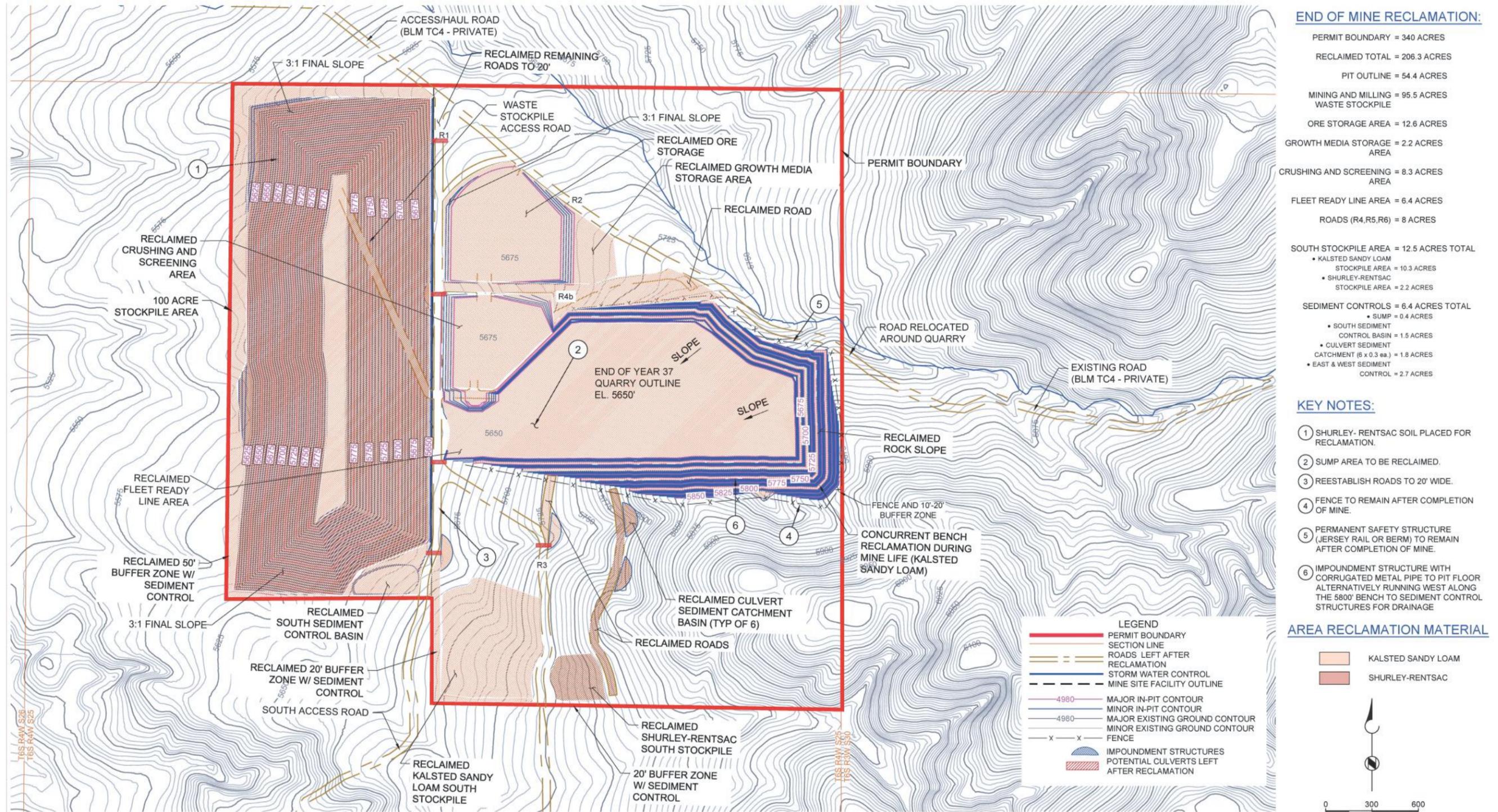


Figure 2.5-2. Proposed Conceptual Mine Topography for the Red Wash Hard Rock Mine after Reclamation.

Page intentionally left blank

RWHR Mine Roads

Upon final closure of the mining activities at RWHR Mine site, the ranch roads used for haulage and access would be regraded to a width of less than 20 feet or as directed by the landowner. Gravel used in surfacing parking areas during project operations would stay, as the landowner expects to have a commercial use for the facilities when the mine life is over. As a result, the main access road would not be included in proposed site reclamation. Many temporary interior mine access and haul roads would be used for only one year of mining, and would be sequentially reclaimed as part of annual mining reclamation activities.

Alder Gulch Plant Site Processing Ponds

Following completion of project processing activities, the HDPE geomembrane liners lining the plant site processing ponds would be removed. The ponds would be backfilled to near original contour with material excavated and stored in the settling ponds stockpile during the first year of operations. The area would be graded, soiled, and revegetated.

2.6 Agency-Mitigated Alternative

MEPA allows the decision-making agency to propose alternatives to the Proposed Action that would meet the purpose and benefits while reducing or mitigating potential impacts. The Agency-Mitigated Alternative may include changes to some aspects of the Proposed Action while other aspects remain unchanged. This section will focus on alterations to the Proposed Action that DEQ includes because the agency has determined that they have the potential to lessen potential impacts. A summary of the proposed alterations is provided in Section 2.6.7.

2.6.1 Project Facilities

In the Proposed Action, Garnet USA's haul trucks coming from the RWHR Mine site travel north along Anderson Lane. They then would cross State Route 287 from Anderson Lane to Ruby Road. These two roads are offset which increases the time the haul trucks spend crossing State Route 287. The trucks then travel north along Ruby Road (passing a row of residences) and turn west onto the East Road to the processing plant. The trucks will unload the ore and return to the RWHR Mine site by the same route. The time spent crossing the offset intersection across the highway (Ruby Road and Anderson Lane) and the time spent traveling on Ruby Road places these large trucks in close proximity with residential and highway traffic. The potential impacts due to conflict between ore haul trucks and local traffic may be reduced if Garnet USA chooses to modify the route of the haul trucks as they enter and leave the plant.

Garnet USA would work with the local landowners, Montana Department of Transportation (MDT), and Madison County to straighten the alignment of Anderson Lane with Ruby Road across State Route 287. This more direct crossing would help minimize the time that the trucks spend on the highway and increase the ability of the trucks to see oncoming traffic. Once across the highway and traveling along the south end of Ruby Road, the trucks would turn left and enter the plant site via a new northwest-trending access road that takes the trucks directly

toward the main plant area (Figure 2.6.1). Garnet USA would need to design and develop this diagonal entrance and egress road to accommodate the passage of trucks in two directions.

Ore trucks would enter the plant by this route, drop their loads at the ore stockpile area, and exit the plant along the same road to Ruby Road. Depending on the final design, the route of this diagonal ore truck entrance may be on the west or east side of the Alder Creek channel and the road may be built across some small isolated seasonal wetlands that have formed in excavated shallow depressions from previous placer mining activities. The new entrance and road into the plant would remove ore trucks from Ruby Road north of the entrance and isolate them from the residents located further north (Figure 2.6-1).

During scoping, local residents commented that the on-site plant operations' employee vehicles, haul trucks, lights, and noise were a nuisance. To help remove plant-related traffic from Ruby Road and reduce possible conflicts with local traffic, Garnet USA would remove the entrance to the plant on the East Road intersection with Ruby Road. Ore haul trucks would use the new diagonal road discussed above. Visitors, vendors, and employees to the plant would use the South Road. The portion of the East Road just east of the office and shop area would continue to be used to access the parking area and to work in the areas west of Ruby Road, but that road would not connect to Ruby Road.

A berm is proposed along the west side of Ruby Road that would be a visibility and noise barrier to shield the local residences from the plant operations. This berm, as proposed, extends as far south as the current East Road access to Ruby Road. When that plant entrance road is removed, the visibility berm would be extended south across the old East Road entrance as far as needed to block the entrance road and further shield the residents from the plant operations, employee traffic, haul truck traffic, and the associated noise, dust, and light. See the Transportation Section 2.6.5 below.

2.6.2 Ore Handling and Processing

There are no proposed changes to ore handling and processing as part of the Agency-Mitigated Alternative other than the changes to the haul route described in Section 2.6.1 and 2.6.5.

2.6.3 Water Management

Nitrogen compounds are common constituents of commercial explosives used in mining. The Proposed Action would include the use of explosives to break up the rock at the RWHR Mine site and the stockpiling of waste rock and high grade ore. Waste rock would be permanently stored and ore would be temporarily stockpiled at the RWHR Mine site. Ore would also be stockpiled at the plant prior to wet processing. Nitrogen compounds, if present, could be washed off the ore and waste rock at the RWHR Mine site and at the processing plant. The processing plant would use water to process the ore and garnet concentrate. This water would be sent to two HDPE-lined process ponds for later reuse. By design, process water is contained with a closed loop and would not interact with surface water or groundwater. Should the liner fail, there is a potential for groundwater and surface water to be impacted at the processing plant area.

Groundwater has the potential to be impacted at the RWHR Mine site in the event that water moving through waste rock encounters groundwater.

The Alder Water and Sewer District, which includes two sewage lagoons and a LAD area, is located within the permit boundary of Garnet USA. It is unclear what impact this facility has on local groundwater. Although outside the scope of this EIS, the location of this LAD will be considered in the proposed groundwater monitoring plan.

Local surface water and groundwater was sampled and analyzed from monitoring locations within the boundaries of the Alder Gulch processing plant before the bulk sample was hauled to the plant site for processing. Nitrogen compounds detected in the surface and groundwater did not exceed water quality standards.

Garnet USA would expand the current groundwater monitoring plan to include more sampling locations and to analyze for nitrogen compounds in surface water and groundwater. This expanded monitoring would allow for a broader characterization of baseline water quality conditions, allow a comparison of future water quality compared to current conditions, identify potential leakage from the two lined process ponds, and evaluate if nitrogen compounds are present beneath or migrating from the Alder Gulch site. Garnet USA would also locate groundwater monitoring locations and install monitoring wells at the RWHR Mine site. Groundwater and surface water monitoring locations at the processing plant are shown on Figure 2.6-2. New groundwater monitoring locations for the RWHR Mine site are shown on Figure 2.6-3. As mitigation at the RWHR site, the south sediment control basin and the west sediment control basin will be sampled twice per year. Adequate controls in the form of sumps or ponds will be in place to prevent discharge of storm water from the plant site or from the RWHR Mine site. Garnet USA plans to obtain a SWPPP for the RWHR Mine site operations.

Page intentionally left blank

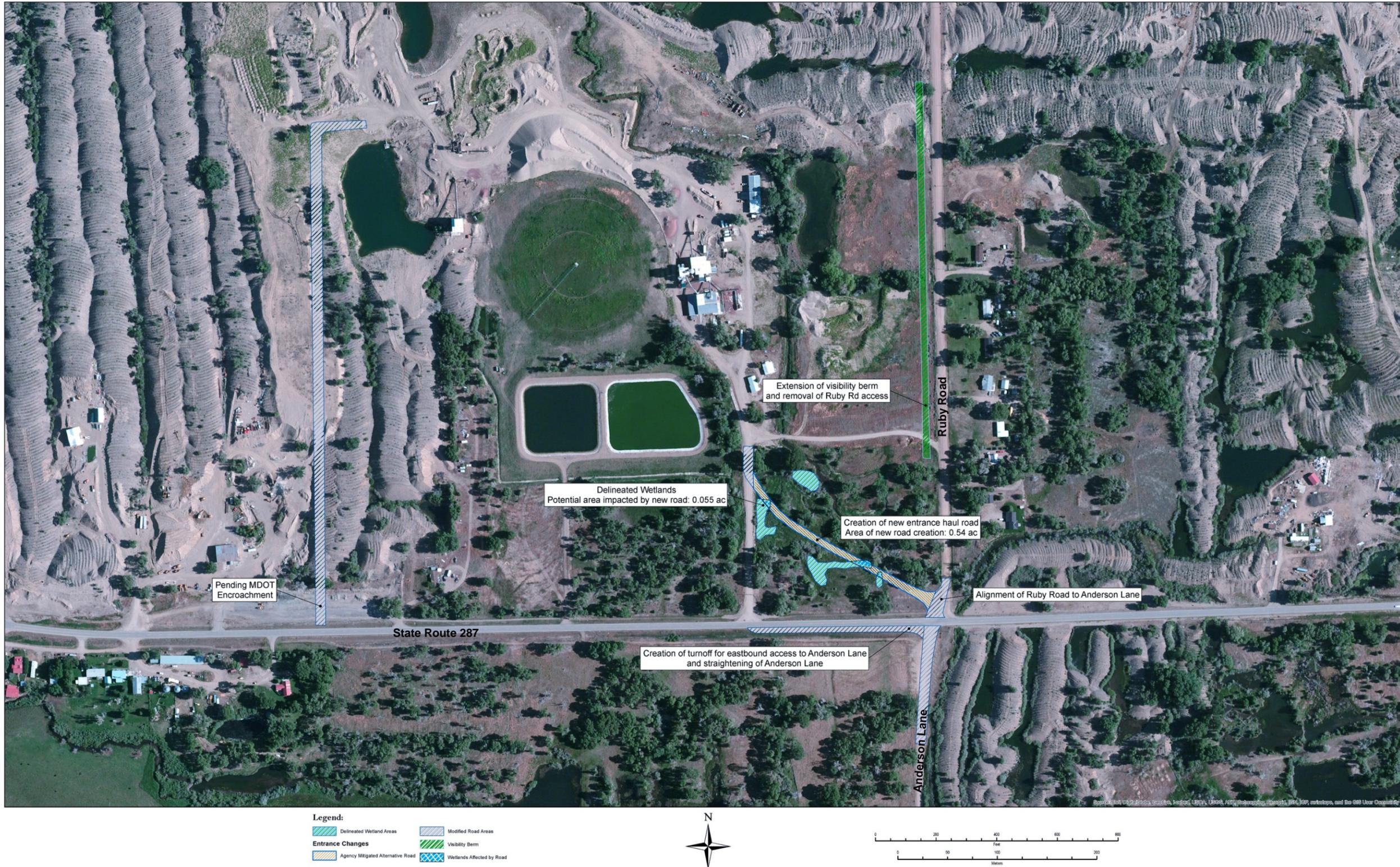


Figure 2.6-1. Proposed Alternative Processing Plant Access Road and Associated Infrastructure for the Garnet USA Project, Madison County, Montana.

Page intentionally left blank

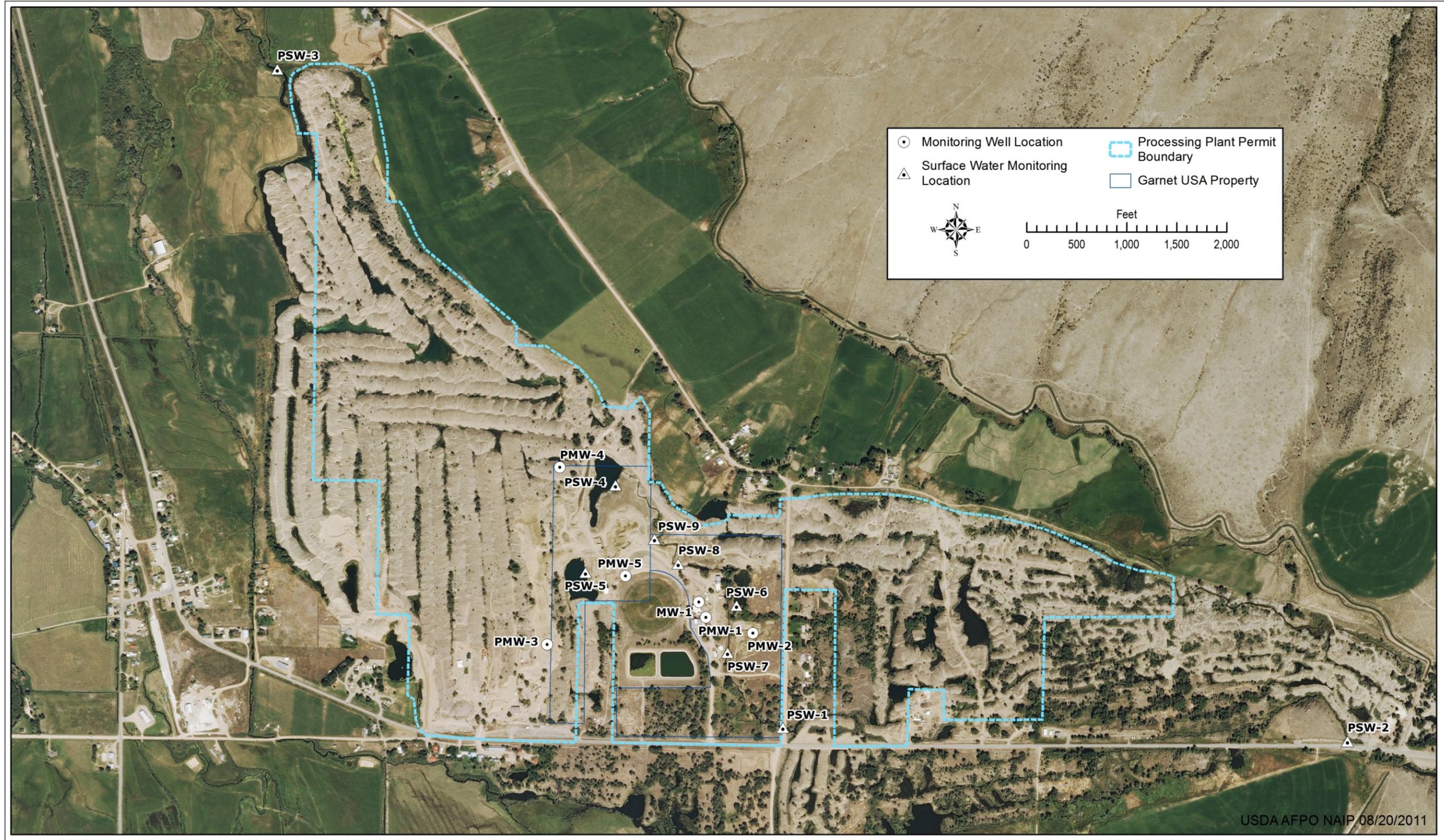


Figure 2.6-2. Proposed Surface and Groundwater Monitoring Locations at the Alder Gulch Processing Plant for the Garnet USA Project, Madison County, Montana.

Page intentionally left blank

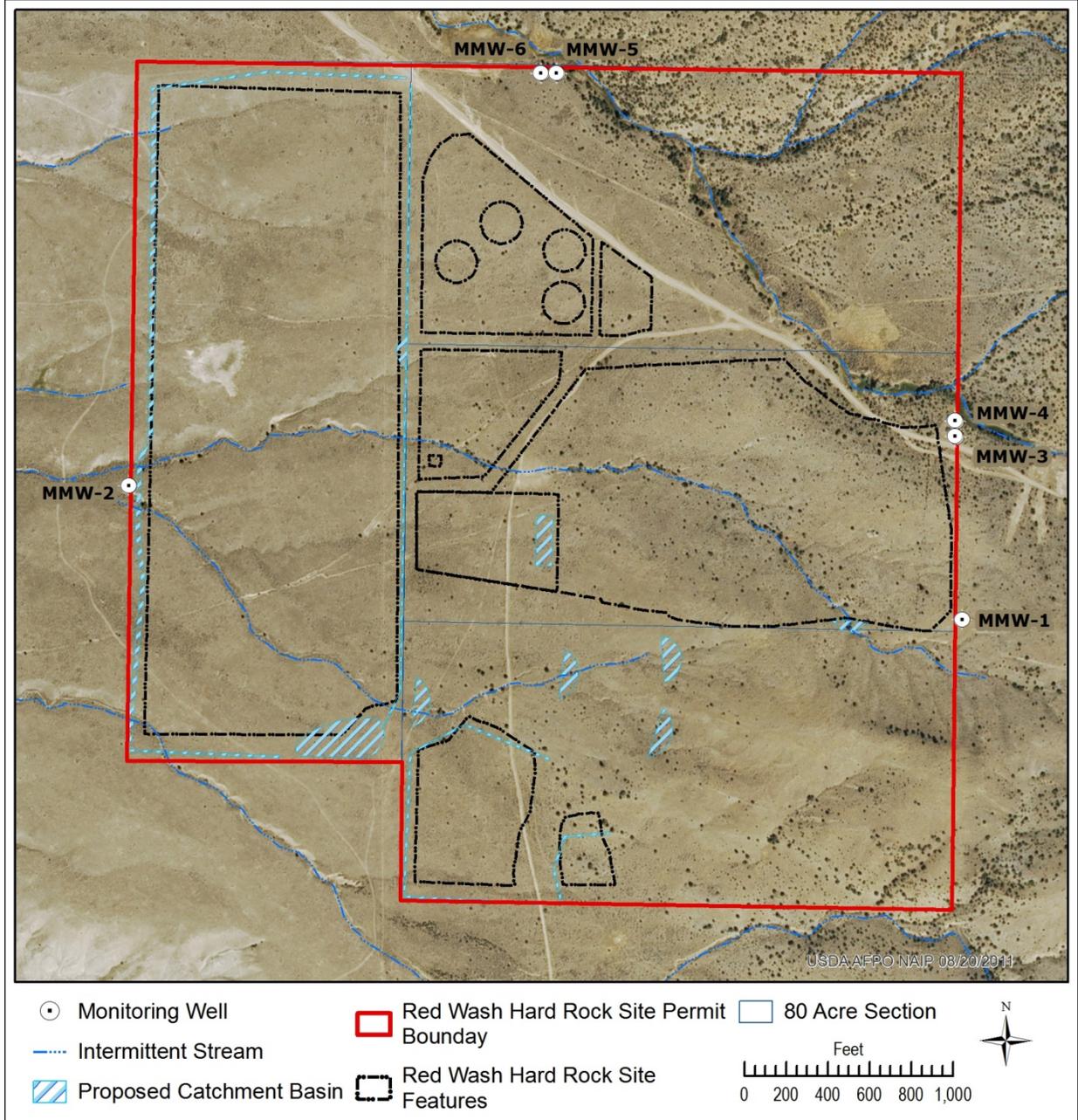


Figure 2.6-3. Proposed Groundwater Monitoring Locations at the RWHR Mine Site for the Garnet USA Project, Madison County, Montana.

2.6.4 Personnel and Utilities

There would be no changes to personnel or utilities necessary as part of the Agency-Mitigated Alternative.

2.6.5 Transportation

As part of the Proposed Action, employees would park and stage for carpooling to and from the RWHR Mine site in the designated parking area as previously described. Mitigation for traffic safety concerns along Ruby Road would be to retire the East Road access from the plant and extend the visibility berm southward to block the former entrance. Employees would enter and exit the processing plant using the South Road.

To reduce impacts due to potential conflict between ore haul trucks and local traffic, Garnet USA may modify the route of the haul trucks as they enter and leave the plant. A possible approach is described in Section 2.6.1 above. The mitigation would involve 1) straightening the alignment of Anderson Lane with Ruby Road across State Route 287 and 2) creating a new northwest-trending access road off the south end of Ruby Road that would direct truck traffic directly toward the main plant area. Ore trucks would enter and exit the plant by this route. The new entrance and road into the plant would remove these trucks from Ruby Road north of the entrance and separate them from the residents located further to the north (Figure 2.6-1).

2.6.6 Reclamation

Reclamation under the Agency-Mitigated Alternative would be the same as that described in Section 2.7 below, with the following exception: areas would be regraded as necessary before soil spreading. Compacted areas would be ripped with a dozer or grader to at least a depth of 12 inches prior to resoiling. Stockpiled soils or settling pond fines would be spread six inches deep. As a mitigation to ensure revegetation and reduce compaction, Garnet USA would take the following action: once the soil has been placed, any compacted areas would be ripped again with a dozer or grader to at least a depth of 12 inches prior to reseeding at the mine site and 6 inches at the plant site. Areas would be seeded with an approved seed mix.

2.6.7 Summary of Agency-Mitigated Alternative Stipulations

Under the Agency-Mitigated Alternative, DEQ would include the following stipulations in the amendment to Garnet USA's operating permit.

- Garnet USA would design and develop a diagonal access road to facilitate haul trucks crossing State Route 287 and to direct truck traffic away from residential areas along Ruby Road.
- The visibility berm described under the Proposed Action would be extended south across the old East Road entrance as far as needed to block the entrance road and further shield the residents from the plant operations, employee traffic, haul truck traffic, and the associated noise, dust, and light.
- Garnet USA would expand the current groundwater monitoring plan at the Alder Gulch processing plant to include more sampling locations and to evaluate selected water quality parameters, including the potential for nitrogen compounds from blasting materials
- Garnet USA would locate groundwater monitoring locations and install monitoring wells at the RWHR Mine site and conduct water quality monitoring periodically.

- At the RWHR Mine site, the south sediment control basin and the west sediment control basin would be sampled for water quality parameters twice per year.
- During reclamation, disturbed areas would be regraded as necessary before soil spreading. Compacted areas would be ripped with a dozer or grader to at least a depth of 12 inches prior to resoiling. Stockpiled soils or settling pond fines would be spread six inches deep.
- As a mitigation to ensure revegetation and reduce compaction, Garnet USA would take the following action: once the soil has been placed, any compacted areas would be ripped again with a dozer or grader to at least a depth of 12 inches prior to reseeding at the mine site and 6 inches at the plant site. Areas would be seeded with an approved seed mix.

2.7 Reclamation-Common to All Alternatives

The extent of reclamation at the RWHR Mine site and the Alder Gulch processing facilities would be limited to the existing disturbances under the No Action Alternative. Under the Proposed Action, the extent and duration of the reclamation activities would be greater, but the methods, actions, and criteria would be the same.

The objective of the reclamation plan would be to restore the proposed mining area at the RWHR Mine site to conditions compatible with present and future desired land uses and conditions compatible with state regulations. The reclamation plan would minimize areas affected, provide for stabilized post-mining slopes and soils, and protect air, surface water, and groundwater resources.

The reclamation plan would include reestablishment of wildlife habitat, restructuring of surface drainage patterns, and improved range productivity. Modifications to the plan would be made based on advancements in reclamation technology, operational changes, or results of on-site reclamation evaluations. Changes would be made only after consultation with and approval by appropriate regulatory agencies.

Mine site reclamation activities would provide concurrent contouring, soiling, and successful revegetation of any areas that would not be disturbed again throughout the life of the proposed mining operations. All other areas except those left for post-mine industrial use would be reclaimed at closure.

2.7.1 Post Mining Land-Use

The reclamation plan for the RWHR Mine site would allow the mined lands to be used for grazing after recontouring, soiling, and revegetation is complete.

2.7.2 Site Facility Removal

There would be limited facilities at the RWHR Mine site under the Proposed Action and Agency-Mitigated Alternative. Facilities would be removed upon mine closure.

Office Trailer and Facilities

At the completion of reclamation activities, the office trailer, lunch room, and service shop located at the RWHR Mine site would be dismantled, hauled off site, and the site reclaimed as described above. The owner of lands affected by the office trailer and other support facilities could request some structures to remain after mine closure.

Fuel Facilities

Mobile fuel vehicles are proposed at the RWHR Mine site, and all fuel for equipment would be brought in daily as needed. Prior to regrading, soiling, and seeding with the approved seed mix, the fleet ready line area would be inspected for contamination associated with fuel or other petroleum product spills. Any soil with potential contamination would be removed to an appropriate off-site disposal area before reclamation.

2.7.3 RWHR Mine Area Reclamation

Topography and Vegetation

The soil stockpiles would be revegetated for stabilization and control of erosion concurrently on an ongoing basis. The majority of the stockpiles would remain through the life of the operations, and as part of the final reclamation activities, would be reapplied to disturbed areas. Following their use in reclamation, the areas previously occupied by the soil stockpiles would be ripped and revegetated with the approved upland vegetation species mix.

The following fill procedure applies to the mining and milling waste rock stockpile as well as the areas north and south of the RWHR mine excavation. This does not apply to the mine pit excavation itself. The proposed grade for reclaimed slopes across the area is a minimum of 3:1, horizontal to vertical. During grading, small drainage features, such as swales, would be incorporated into slopes to break up the slopes and better approximate pre-mining topography which includes several shallow swales and small drainage features that traverse the permit area.

The operator would recontour the area to the extent possible to provide a concave, longitudinal profile from where the drainage enters the permit boundary to where it leaves the permit boundary. Bedrock may be used to transition from native to reclaimed areas.

Following contouring activities, the stockpiled soil would be spread over regraded areas to approximate premine depths. Soiling and seedbed preparation processes are discussed in detail in the operating permit, and would conform to DEQ guidelines.

Once the soil has been placed, compacted areas would be ripped with a dozer or grader to at least a depth of 12 inches prior to reseeding. Areas would be seeded with a seed mix approved by DEQ. Detail on the RWHR Mine site and pit reclamation is provided in Section 2.5.7.

Roads

After closure of the RWHR Mine site, the expanded ranch road which heads eastward from the county road to the site would be regraded to 20 feet in width or less and all excess fill material

would be removed or regraded. Disturbed portions of the expanded width would be ripped, regraded, and covered with previously stockpiled soil and seeded using the approved seed mix.

2.7.4 Personnel

Garnet USA anticipates scaling back the full production work force to approximately 15 to 20 employees during final reclamation after mine closure. Reclamation would occur concurrently with mining when possible for much of the mine project life, but a majority of reclamation work would occur at closure.

2.8 Related Future Actions

There are no actions currently under consideration or in the permitting process that are related to the proposed Garnet USA mine operation. Garnet USA is consulting with MDT on possible changes to State Route 287 resulting from the proposed alternative entrance to the Alder Gulch processing facility, but these discussions have not progressed to the point where details would be available beyond those described under the Agency-Mitigated Alternative. Garnet USA has not requested to mill garnet from off-site sources, nor is DEQ aware of potential off-site sources for garnet that could be processed at the Alder Gulch processing plant.

2.9 Alternatives Considered But Dismissed

Under MEPA, a reasonable alternative is one that is practical, technically possible, and economically feasible. In addition, any alternative under consideration must be able to meet the purpose and need of the Proposed Action. During scoping, alternatives to the Proposed Action were suggested and have been discussed by agency representatives with Garnet USA. Alternatives covered in this section include alternatives or alternative components that were considered and eliminated from detailed study. For each alternative discussed, a synopsis of the changes proposed and a brief discussion of why the alternative or component was dismissed is included.

2.9.1 Relocation of Processing Facilities to RWHR Mine Site

During the scoping process moving the processing facility to the RWHR Mine site was proposed as a way to reduce the impacts due to noise, light, traffic, and dust at the Alder Gulch processing site. Eventually the crushing machinery would be moved from the Alder Gulch site to the RWHR Mine site as part of the Proposed Action (Garnet USA, 2013a). Operation of the processing plant at the Alder Gulch Mine site, however, is currently permitted under Operating Permit No. 00157. Garnet USA did not include relocation of the processing plant in its application to amend the operating permit. Because relocation of the processing facility is neither requested by Garnet USA nor within DEQ's unilateral authority, relocation of the processing facility to the RWHR Mine site will not be considered in detail.

Page intentionally left blank

Table 2.9-1. Comparison of Potential Impacts by Resource Area for the Alternatives Under Consideration.

Resource	No Action Alternative	Proposed Action	Agency-Mitigated Alternative
Geology	Alternative would result in removal of 10,000 tons of rock and ore under the exploration license. No additional impacts at the permitted Alder Gulch processing plant.	Alternative would result in removal of 500,000 tons per year of waste rock and ore. Yields are estimated to be 50,000 tons per year of finished garnet product. Surface geology would be permanently disturbed.	The level and extent of impacts to geology and geochemistry under this Alternative would be the same as that expected under the Proposed Action.
Soils	Alternative would result in minimal impacts to soil resources. All previously permitted surface disturbances that affect soil resources have already occurred.	Some soil would be irrevocably lost during soil removal, construction, and operation of the mine prior to the reestablishment of vegetation. Even with reclamation, there would be changes to the soil profile, structure, and make-up of the soils in the reclaimed areas that may limit vegetation reestablishment. The arid nature of the climate would contribute to a slow recovery of the soil structure.	<p>The level and extent of impacts to soils at the RWHR Mine site under this Alternative would be the same as that expected under the Proposed Action.</p> <p>Approximately 0.5 acres of additional disturbance would be required for the development of the access route. This would not constitute substantial additional primary, secondary, or cumulative impacts to the soil resources at the Alder Gulch site.</p>
Vegetation and Wetlands	Alternative would result in minor impacts to vegetation resources. All other previously permitted surface disturbances that affect vegetation resources have already occurred.	<p>Alternative would result in temporary impacts to vegetation and soil from construction of roads and facilities. Long-term impacts would include changes in vegetation communities and a decrease in community diversity after reclamation.</p> <p>Noxious weeds have the potential to spread due to disturbed acreage.</p>	<p>Development of the alternative Alder Gulch site access road would increase impacts to vegetation and wetlands. Approximately 0.06 acres of wetlands are expected to be filled or disturbed during road construction.</p> <p>Increasing the area of disturbance may increase the potential for weed spread.</p>
Surface Water	All previously permitted disturbances that affect surface water resources have already occurred.	<p>Recirculation and reuse of water during processing separation may allow for a concentration of nitrogen compounds in the water that could potentially be released to groundwater or surface water. A surface water and groundwater monitoring plan is in-place to establish a baseline of water quality at the plant site. This plan includes future sampling as needed.</p> <p>Primary impacts to surface water resources at the RWHR Mine site would include irreversible alterations to the ephemeral drainages. Potential secondary impacts include wind and surface water runoff which would carry sediments and nitrogen compounds offsite and increase concentrations in nearby surface water resources.</p>	Construction of the access route would increase surface disturbance near Alder Gulch and may introduce sediment or pollutants to the stream or wetlands. Appropriate use of BMPs would reduce impact below the level of significance.
Groundwater	There would be limited potential for primary and secondary impacts to groundwater through implementation of the No Action Alternative. All previously permitted disturbances that affect groundwater resources have already occurred.	There would be no primary impacts to the groundwater from the newly constructed, lined ponds at the Alder Gulch processing plant because they would not intersect the water table. The lined ponds could have secondary impacts to the groundwater if a liner leaked. A leak could allow recycled process water with nitrogen compounds to reach groundwater.	<p>The level and extent of impacts to groundwater under this Alternative would be the same as that expected under the Proposed Action.</p> <p>Additional groundwater monitoring is proposed as part of this alternative.</p>

Resource	No Action Alternative	Proposed Action	Agency-Mitigated Alternative
Air Quality	There would be no primary or secondary impacts to air quality through implementation of the No Action Alternative. All activities that affect air quality resources are previously permitted.	The level of impact to air quality would increase in duration, but not in intensity as the project is expected to continue for 37 years.	The level and extent of impacts to air quality under this Alternative would be the same as that expected under the Proposed Action.
Noise	The noise levels of the equipment and activities for the No Action Alternative would be the same as the existing environment. There would be no primary or secondary noise impacts for the No Action Alternative.	<p>Plant operations between 7:00 a.m. and 5:00 p.m. would be barely to clearly audible because the incremental increase above ambient noise levels would only be +3 to +6 dBA. If the plant operates continuously for 24 hours per day, the +14 dBA increase would be considered more than twice as loud as the L_{dn} 40 dBA ambient noise without the plant operating, which would be a significant noise impact at residences near the Alder Gulch site.</p> <p>Noise levels of the diesel equipment and rock drill at the RWHR Mine site at the closest residence one mile west of the site would be similar to the noise levels during exploration.</p> <p>The increased haul truck traffic may create a moderate noise impact.</p>	All aspects of the Agency-Mitigated Alternative would be the same as the Proposed Action, except that the ore truck access to the Alder Gulch processing plant would be redirected from Ruby Road. The proposed access road would move the haul truck traffic farther from the Ruby Road residences and would reduce the truck noise at the residences.
Socioeconomics	Alternative would retain the existing workforce at the Alder Gulch processing plant.	Under the Proposed Action, Garnet would increase its employees to 30-60 individuals. These jobs are likely to pay wages higher than the average for Madison County, and would constitute a localized, long-term benefit to the community.	All aspects of the Agency-Mitigated Alternative would be the same as the Proposed Action. The access road construction may generate a small number of additional short-term jobs in the community.
Transportation	Alternative would include highway-legal dump trucks hauling approximately four to eight truckloads per day using Anderson Lane and Ruby Road (ISR Capital, 2013). Other potential primary impacts due to haul truck and other traffic would include increased noise, dust, and lights from truck traffic on Ruby Road in front of residences.	Alternative would increase the number of truck trips between the RWHR Mine site and the processing plant to 45 truck trips per operating day. The most likely times for the haul trucks to affect other traffic would be in the morning and evening commute hours, during school bus loading time, and seasonally in the summer when tourism increases traffic on State Route 287. Primary impacts to transportation could include delays to traffic as the haul trucks cross State Route 287 to Ruby Road from Anderson Lane. Impacts due to noise, light, and dust would increase as compared to the No Action Alternative. Increasing traffic on local roads may cause an increase in traffic accidents.	The alternative access road would not reduce the number of truck trips described under the Proposed Action, but it would provide a shorter and more direct haul route to the processing plant. The partial realignment of Anderson Lane and Ruby Road may allow trucks to cross State Route 287 more efficiently. This could also reduce the overall likelihood of conflict with other traffic and increase traffic safety along the route. The angled access route would reduce the potential for impacts due to noise, dust, and light along Ruby Road.
Fisheries	Under the existing exploration license, processing operations may cause fluctuations in pond water levels, but impacts to fisheries would be minor. Impacts to fisheries would be linked to potential impacts to groundwater and surface water as described above.	The level of impact to fisheries at the Alder Gulch site would increase in duration, and may increase slightly in intensity as the rate of water use for processing increases and is expected to continue for 37 years. Impacts to fisheries would be linked to potential impacts to groundwater and surface water as described above. The lined, water recycling ponds will not contain fish.	Impacts to fisheries would be linked to potential impacts to groundwater and surface water as described above.

Chapter 3: Affected Environment

3.1 Introduction

Chapter 3 describes components of the existing environment that could be affected by the Proposed Action or alternatives to the Proposed Action. The Proposed Action is described in detail in Section 2.5 of Chapter 2.

Chapter 3 serves three purposes: 1) it provides a baseline from which to analyze and compare alternatives and their impact; 2) it ensures that DEQ has a clear understanding of the environment potentially affected by the Proposed Action; and 3) it provides the public information to evaluate the agency's alternatives, including the Proposed Action. The environmental components described in this chapter include air, water, geology, soils, vegetation, fish and wildlife, cultural, visual, land use, transportation, and socioeconomics. In general, the affected environment is defined by the extent to which the implementation of the Proposed Action would affect each resource.

The study areas are defined in the methods sections for each resource, as they may vary in location and extent. Discussions are limited to resources within areas where issuance of the operating permit amendment would create new disturbance or where proposed activities would change from those permitted under the current operating permit. There are two distinct sites with the potential to be affected by the alternatives under consideration: 1) the processing plant area within the Alder Gulch Mine permit area and 2) the proposed RWHR Mine permit area where the proposed open pit excavation would occur on private lands. Because the two sites are separated by several miles and one site is relatively undisturbed while the other is an operating processing plant, their environments and resources differ substantially in many respects. Several sections of this Chapter describe the two areas separately for clarity.

The Alder Gulch processing plant and the Red Wash Alluvial site are permitted under MMRA Operating Permit No. 00157. Activities described in the mine permit or the environmental effects of those activities at these two sites have already been approved and are not considered in this analysis.

Each section below summarizes the current conditions by resource. Activities approved or completed under the existing permit are part of the existing environment and will be included in this chapter. Much of the information in this chapter was collected as part of the operating permit amendment application (Garnet USA, 2013a). Data collected from electronic databases and other online resources were also important in the evaluation of the existing environment. Data queries were rerun and updated as appropriate. Chapter 3 does not contain all of the information from the operating permit amendment application or its appendices. Rather, this chapter attempts to distill the key aspects of the environment that are most likely to be affected by any alternative under consideration. Sections will refer the

reader to pertinent references where original study results can be reviewed. A compilation of all references used in the EIS is provided in Chapter 9.

3.2 Geology and Minerals

This section provides a description of the general and site-specific geologic setting, alteration, and ore mineralization in the vicinity of the Alder Gulch processing plant and the proposed RWHR Mine.

3.2.1 Overview and Analysis Area

The existing conditions of geologic and mineral resources were evaluated for two permit areas, the Alder Gulch site and the proposed RWHR Mine site. Except for a general discussion of historical mining activities, the analysis area was limited to within the permit boundary at each location since operations that may affect geology and mineral resources would be restricted to these areas under the alternatives under consideration.

3.2.2 Methods

Existing geologic conditions were compiled primarily from information contained within Garnet USA, LLC's operating permit amendment application (Garnet USA, 2013a). The geologic and stratigraphic descriptions were derived from mapping and reporting from the United States Geological Survey (USGS) (Ruppel et al., 1993) and the Montana Bureau of Mines and Geology (MBMG) (McDonald et al., 2012). The mineral resources and geochemistry were reviewed in studies completed by Evans and Moyle, (2006); Frishman et al., (1993); Burger et al., (1996); and Pearson et al., (1990).

3.2.3 Results

Geologic and Historic Mining Context

The Alder Gulch permit area is located in the Alder Gulch drainage in southwestern Montana (Figure 1.1-2). The RWHR Mine site is located about 4.5 miles to the southeast on uplands above the valley bottoms. The sites are flanked by the Tobacco Root Mountains to the north, the Gravelly and Greenhorn Ranges to the east, and the Ruby Range to the west (Garnet USA, 2013a). The mountain ranges are predominately uplifted Precambrian metamorphic rocks of igneous and sedimentary origin with Late Cretaceous granitic intrusions (Burger et al., 1996). Locally, unconsolidated Quaternary alluvial sediments consisting of sand, gravel, and boulders are present in stream and river valleys (Ruppel et al., 1993; Garnet USA, 2013a).

Alder and surrounding areas have a long gold mining history dating to the latter half of the nineteenth century. The present tailings near Alder are the result of gold dredging that is reported to have begun in 1889 and extended into the twentieth century. In recent decades, attention has turned from gold mining to garnet mining (Evans & Moyle, 2006; Garnet USA, 2013a).

Garnet in mineable concentrations has been identified in three types of deposits: (1) tailings from historic dredge mining along Alder Gulch, (2) alluvial deposits in the Red Wash area, and (3) metamorphic bedrock, which is thought to be the source of the garnet in the alluvial deposits (Evans & Moyle, 2006; Garnet USA, 2013a). Beginning in the 1990's, garnet deposits in the historic tailings near Alder were mined by a series of entities at what is herein referred to as the Alder Gulch site. Subsequently, in the 2000's, mining was initiated in an alluvial garnet deposit located southeast of Alder in the Red Wash drainage (Evans and Moyle, 2006).

Mining at the Red Wash Alluvial site and Alder Gulch sites is currently permitted under Montana Metal Mine Reclamation Act Operating Permit No. 00157, and is thus considered part of the existing environment for the purposes of evaluating the Proposed Action. Mining has not previously occurred at the proposed RWHR Mine site, although Garnet USA has conducted test drilling, trenching, and test pit construction at the site under DEQ Hard Rock Exploration License No. 00642 (Garnet USA, 2013a; Garnet USA, 2013b).

Alder Gulch Site

The Alder Gulch site sits atop Quaternary alluvium near the mouth of the Ruby Valley. A general geologic map of the area is shown in Figure 3.2-1. These alluvial sediments primarily comprise sand, gravel, and boulders derived from nearby Precambrian bedrock. The alluvial sediments are underlain by Tertiary lake bed deposits consisting of ash-derived clay strata, volcanic ash beds, and sandstone. These lake bed deposits are informally known as the "false bedrock" horizon at the Alder Gulch site, and have been identified during drilling as a clay stratum typically 20 to 30 feet thick beneath the tailings within the Alder Gulch permit area. Previously, garnet mining has occurred at the Alder Gulch site by reprocessing historic dredge tailings (Garnet USA, 2013a; Garnet USA, 2013b).

RWHR Site

Garnet at the proposed RWHR Mine site occurs in structurally deformed, metamorphosed crystalline bedrock. Mineable concentrations of garnet at the RWHR site are reportedly found in rock types including biotite schist, migmatite, and amphibolite, as well as in garnet-bearing granitic and pegmatite dikes that have intruded these metamorphic rocks. These granitic intrusions have locally altered garnet and other minerals to talc and chlorite (Evans and Moyle, 2006; Garnet USA, 2013a).

Detailed geologic mapping conducted at the RWHR Mine site by Garnet USA resulted in further delineation of three garnet-bearing rock units and an igneous intrusive unit, all of which would be mined at times during the life of the proposed mine. Garnet USA has named these units the 1) garnet gneiss, 2) upper felsic gneiss, 3) lower felsic gneiss, and 4) igneous intrusive (granite and pegmatite dikes). The subsurface extent and structure of these garnet-bearing units is not well understood, but additional diamond drilling is planned under the Proposed Action in order to further delineate their nature and extent (Garnet USA, 2013a).

Waste Rock Geochemistry

Garnet USA conducted a sampling investigation during March 2012, which involved the collection of composite whole rock samples from the garnet gneiss, the upper felsic gneiss, the lower felsic gneiss, and the igneous intrusive units. Samples were collected from outcrops, trenches, and test pits and were submitted to laboratories for asbestiform mineral and whole rock geochemical analyses (Garnet USA, 2013a).

As part of the whole rock geochemical analyses conducted by Garnet USA, static tests were conducted to assess the acid generating potential of the rock units that would be mined under the Proposed Action. These static tests, called neutralization potential and acid generating potential tests, are used to calculate a predictive parameter called acid-base accounting (EPA, 1994). The results from static testing suggest that there is a low risk for acid generation by the rocks that would be mined (Garnet USA, 2013a). Additionally, Garnet USA's analytical results indicate that sulfur was not detected in any form in any of the samples collected. Sulfide mineralization is the primary contributing factor to the development of acid rock drainage, and its absence is consistent with a low acid generating potential. Asbestiform minerals are present in the parent materials, but testing for fibers in four samples did not identify fibers at detectable levels. The analytical results for whole rock geochemical analysis are provided in Table 3.2-1 below.

In June 2013, a toxicity characteristics leaching procedure (TCLP) test was conducted on a garnet ore sample. TCLP is an acceptable method to evaluate leachate from wastes in an environment that does not have the potential to produce acid mine drainage due to sulfide oxidation (lack of sulfides). The sample was analyzed for leachable mercury, arsenic, barium, cadmium, chromium, lead, selenium, and silver. TCLP analytical results were all reported below detection limits. Whole rock geochemical analysis, static tests, and TCLP results confirm that the host rock and garnet ore are inert and that impacts to the surface and groundwater are unlikely.

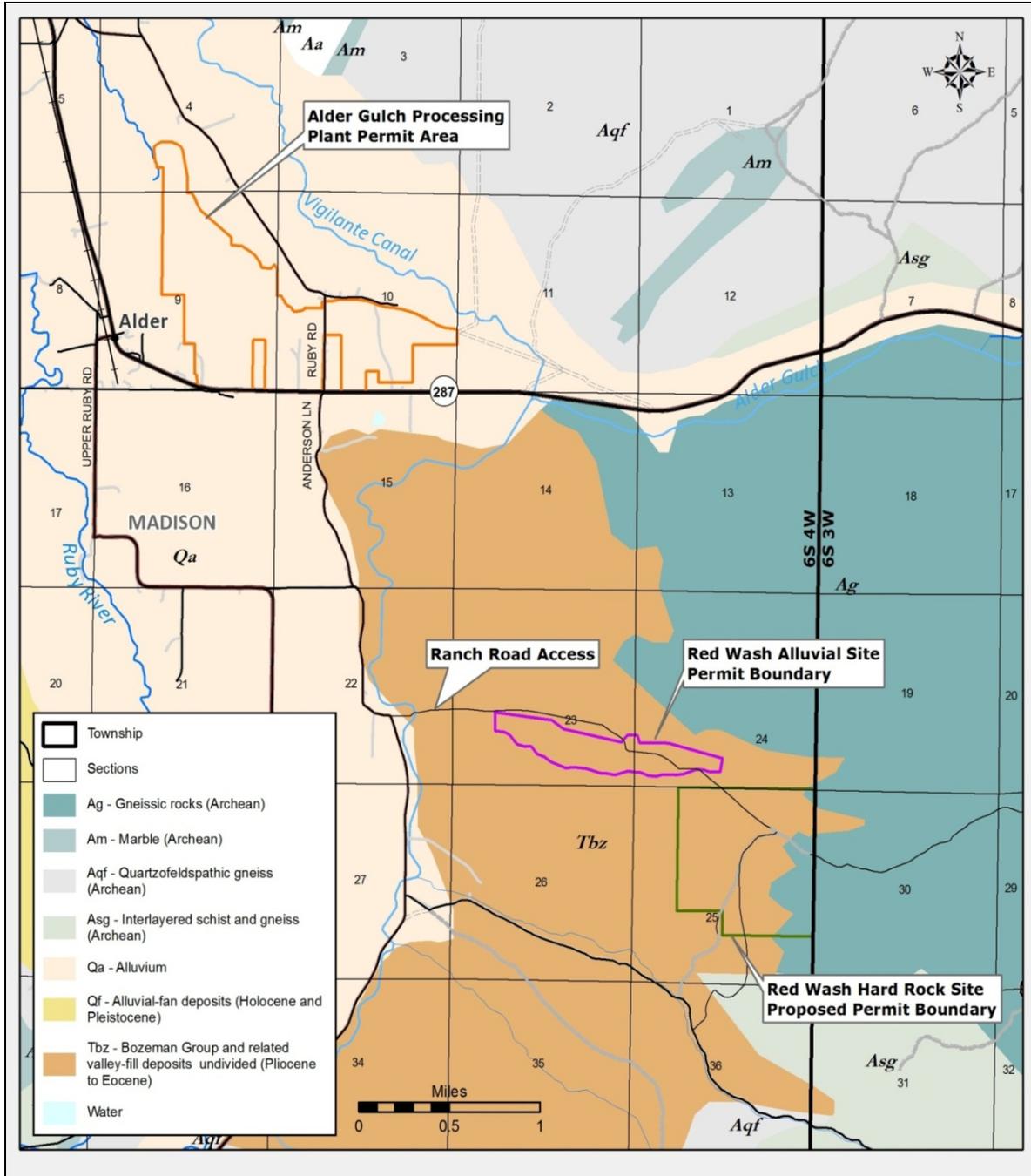


Figure 3.2-1. Geology Underlying the Garnet USA Permit Boundary Areas, Madison County, Montana.

Table 3.2-1. Whole Rock Geochemistry Sample Results, RWHR Mine Site, Madison County, Montana.

Analyte	RWHR-WRG-12-UFG	RWHR-WRG-12-GG	RWHR-WRG-12-LFG	RWHR-WRG-12-IGI
Arsenic (mg/kg)	1.23	0.753	1.26	1.12
Beryllium (mg/kg)	<0.100	<0.100	<0.100	.110
Cadmium (mg/kg)	<0.100	<0.100	<0.100	<0.100
Molybdenum (mg/kg)	5.07	4.82	4.87	3.14
Selenium (mg/kg)	0.527	1.63	2.01	1.6
Thallium (mg/kg)	<0.100	<0.100	<0.100	<0.100
Uranium (mg/kg)	.382	0.586	0.345	0.754
Aluminum (mg/kg)	806	8970	5970	12800
Antimony (mg/kg)	<2.0	<2.0	<2.0	<2.0
Barium (mg/kg)	19.3	32.7	55.6	38.8
Bismuth (mg/kg)	<6.0	<6.0	<6.0	8.5
Boron (mg/kg)	<4.0	<4.0	<4.0	4.9
Calcium (mg/kg)	322	5300	833	1750
Chromium (mg/kg)	65.7	96.3	95.3	75.3
Cobalt (mg/kg)	<0.60	10.5	5.21	10.2
Copper (mg/kg)	2.26	165	46.5	23.3
Iron (mg/kg)	920	13900	13600	23700
Lead (mg/kg)	1.69	1.19	2.32	6.29
Lithium (mg/kg)	<2.0	5.3	7.9	12.5
Magnesium (mg/kg)	54.6	7820	2250	12000
Manganese (mg/kg)	29.4	119	61.8	192
Nickel (mg/kg)	11.3	50.2	41.7	27.0
Silver (mg/kg)	<0.50	<0.50	<0.50	<0.50
Strontium (mg/kg)	1.53	7.11	2.45	10.4
Tin (mg/kg)	<5.0	<5.0	<5.0	<5.0
Vanadium (mg/kg)	0.77	64.8	67.1	46.0
Zinc (mg/kg)	1.73	19.0	29.9	27.6
Mercury (mg/kg)	<0.033	<0.033	<0.033	<0.033
ABA (TCaCO3/kT)	1.0	12.6	4.0	8.1
AGP (TCaCO3/kT)	<0.3	<0.3	<0.3	<0.3
ANP (TCaCO3/kT)	1.0	12.6	4.0	8.1
Non-extractable Sulfur (%)	<0.01	<0.01	<0.01	<0.01
Non-sulfate Sulfur (%)	<0.01	<0.01	<0.01	<0.01
Pyritic Sulfur (%)	<0.01	<0.01	<0.01	<0.01
Sulfate Sulfur (%)	<0.01	<0.01	<0.01	<0.01
Total Sulfur (%)	<0.01	<0.01	<0.01	<0.01

3.3 Soil Resources

3.3.1 Overview and Study Area

Soil type and characteristics were evaluated in the proposed permitted boundary for the Alder Gulch processing plant area and the RWHR Mine site.

3.3.2 Methods

Baseline investigation of soils in the Alder Gulch permit area was conducted during the summer of 1991 to (1) delineate, classify, and map the location and extent of soil types, (2) estimate average depth of soil for potential salvage use, (3) assess soil characteristics, and (4) provide information for use in reclamation plans (Hydrometrics Inc., 1992). Additional soils information for the sites was obtained from the Madison County Soil Survey (NRCS, 2011).

3.3.3 Results

Soils identified in the Alder Gulch permit area were classified as Entisols. They formed in mixed stream alluvium composed predominantly of quartz, feldspar, silicates, magnetite, and garnet, and were disturbed by placer mining activities occurring between 1899 and 1922. Some portions of the permit area were placer mined as late as the 1930s and 1940s. The Entisols lacked diagnostic horizons, and well developed genetic horizons were absent in many of the soils.

Most of the Alder Gulch permit area is dredge tailings or piles consisting of gravels, cobbles, and boulders. In some areas, these dredge tailings consist of fine-grained material (less than two mm) that filled interstices between coarse-grained fragments. In most locations, however, tailings piles are devoid of fines as a result of early placer mining techniques that placed coarse-grained cobble waste over fine-grained wastes. The soils in the Alder Gulch permit area are Entisols. The Entisols have been further defined as Ustic Torriorthents. These soils are found in flood plains and stream terrace deposits, and develop from sandy and gravelly alluvium parent material. Most of the permit area soils have been disrupted by dredge mining and are now covered with dredge tailings, consisting of gravels, cobbles, and boulders.

Soils at the proposed RWHR Mine permit area are composed of a mixture of Kalsted Sandy Loam, 2 percent to 8 percent slopes, Shurley-Rentsac-Rock outcrop complex, 8 to 35 percent slopes and Shurley-Rock outcrop complex, 25 to 60 percent slopes. Kalsted Sandy Loam is a deep, well-drained soil on terraces and hills, mainly in intermountain valleys and formed in calcareous alluvium at elevations ranging from 4,500 to 6,500 feet amsl. Average annual precipitation is about 12 inches, average annual air temperature is about 40 degrees Fahrenheit, and average frost free period is about 100 days. Typically, the surface layer of this Kalsted soil is pale brown sandy loam 7 inches thick. From 7 to 11 inches from the soil surface, the underlying material is very pale brown sandy loam. From 11 to 30 inches in depth, the subsoil is white sandy loam and from 30 to 60 inches or more is pale brown, gravelly sandy loam with strata of loamy sand.

Permeability is moderately rapid. Available water holding capacity is about 7 inches in the top 60 inches. Effective rooting depth is 60 inches or more. Where this soil is under native vegetation, the average annual wetting depth is about 20 inches. Runoff is medium and hazard of water erosion is moderate while the hazard of wind erosion is high. This soil is calcareous throughout. This soil unit is used primarily for irrigated crops (mainly alfalfa for hay and grasses and legumes for pasture) and secondarily for non-irrigated crops (small grains) and as rangeland.

The major components of Shurley-Rentsac-Rock outcrop complex 8 to 35 percent slopes are Shurley (35%) and Rentsac (35%) soils. Other components are rock outcrops (20%) and 10% minor soil components (Nuley (5%) and Yetull (5%) soils). The major component of Shurley-Rentsac-Rock outcrop complex 25 to 60 percent slopes is Shurley (40%) soils. Other components are rock outcrop (40%) and minor component soils (Rentsac (7%), Yetull (7%), and Nuley (6%)).

Shurley soils are deep well-drained soils found on hill foot-slopes. Shurley soils form in sandy and gravelly colluvium derived from granite and gneiss at elevations between 1,900 and 6,500 feet amsl. Average annual precipitation is 10 to 15 inches and mean annual air temperature ranges between 37 and 45 degrees Fahrenheit with frost-free periods of 90 to 135 days. Typical profiles contain very coarse-grained sandy loam to 10 inches and loamy coarse-grained sand from 10 to 60 inches with depth to restrictive feature and water table more than 80 inches.

Rentsac soils are shallow well-drained soils found on shoulders and backslopes of hills and ridges. Rentsac soils are residuum weathered from calcareous sandstone found at elevations between 1,900 and 6,500 feet amsl. Typical profile of Rentsac soils are channery sandy loam from 0 to 4 inches, very channery loam from 4 to 16 inches, and unweathered bedrock 16 to 60 inches. Depth to the water table is more than 80 inches.

3.4 Vegetation and Wetland Resources

Vegetation resources evaluated include vegetation communities, special status plants, wetlands, and noxious weed species.

3.4.1 Overview and Study Area

The existing conditions of vegetation and wetland resources were evaluated for the two permit areas, the Alder Gulch site and the proposed RWHR Mine site. Except for a general discussion of surrounding vegetation communities, the analysis area was limited to within the permit boundary at each location since operations that may affect vegetation or wetlands resources would be restricted to these areas under the alternatives under consideration. 2013 Wetland delineations at the Alder Gulch permit area were limited to areas with potential to be affected by proposed activities, and did not cover the entire permit area.

3.4.2 Methods

Materials provided from a 1991 vegetation survey were reviewed and compared to field surveys conducted in May and June 2013 (Babcock, 2013). Plant communities were summarized in species tables.

Wetlands

Existing background information from the National Wetlands Inventory (2013), Madison County soil survey, and previous wetland delineations for the potentially affected areas were reviewed. During June 2013, wetland specialists conducted field determinations for wetlands at the Alder Gulch processing plant and RWHR Mine site (VanFossen, 2013). These determinations involved the initial identification of representative plant community types in the subject area and then characterization of vegetation, soils, and hydrology. Three criteria were evaluated to determine wetland status including the presence of 1) hydrophytic vegetation, 2) hydric soils, and 3) supporting hydrology. These three technical criteria must all be met for an area to be identified as a wetland using the US Army Corps of Engineers (USACE) wetland determination method (USACE, 1987). Prior wetland delineations were conducted at the Alder Gulch processing plant in 1991. Results from prior surveys were compared to the 2013 delineations. Wetlands (hydrophytic) vegetation communities, along with hydric soils and wetlands hydrology, were used to identify "jurisdictional" wetlands for the purpose of potential compliance with Section 404 of the Clean Water Act.

Throughout this document, common names are used in the text, and the corresponding scientific names are provided in tables for clarity and to increase the readability of the text.

3.4.3 Results

Upland and wetlands vegetation communities occur within the permit areas. Hydrophytic (wetlands) vegetation communities occupy sites where water remains at or close to the land surface for a substantial portion of the growing season. Forested upland communities with an overstory of black cottonwood predominated where groundwater saturates the tailings at a depth of about two to 12 feet beneath the surface. Sparse shrub upland communities dominated by rubber rabbitbrush and big sagebrush occurred on the arid, rocky, high tailings piles over the greatest portion of the permit area. The permit area at the proposed RWHR Mine site is predominately upland communities of montane sagebrush steppe and Rocky Mountain lower montane, foothill, and valley grassland communities. An unnamed intermittent stream passes through the RWHR Mine site and provides a limited riparian shrub community.

Wetlands Vegetation Communities

Alder Gulch Permit Area

Wetlands vegetation communities occur along the shorelines of ponds within the permitted area, along the short segment of Alder Gulch in the tailings area, and within depressions (valleys) of the tailings where groundwater saturates the substrate to the surface for a

portion of the growing season. Wetlands within the Alder Gulch permit area are identified on Figure 3.4-1.

Wetlands vegetation communities along the short section of Alder Gulch in the flat tailings areas were dominated by cattail, emergent grasses, and sedge species. A list of wetland plant species identified during the wetlands survey is shown in Table 3.4-1. Wetlands vegetation communities growing in linear depressions of the tailings had an overstory of black cottonwood (10 to 20 percent canopy cover) and an irregular shrub canopy dominated by sandbar willow, Pacific willow, prickly gooseberry, and prickly rose. At the Alder Gulch processing plant approximately 0.51 acres of wetlands polygons and 4,363 feet of linear wetlands were mapped (VanFossen, 2013). The overstory consists of narrowleaf cottonwood with sandbar willow, reed canarygrass, and timothy in the understory. Hydric soils were classified as redox dark surface and hydrology indicators included water stained leaves, oxidized rhizospheres, and the presence of reduced iron.

RWHR Mine Site

At the proposed RWHR Mine site, the ephemeral washes within and surrounding this site lack any evidence of wetlands vegetation. An intermittent stream channel intersects the proposed RWHR Mine site in the northeast corner that contains pockets of riparian and wetlands vegetation within the channel (Figure 3.4-2). This stream is north of the proposed access road and outside of the area directly impacted by mining activities. The drainage consists of minor ponding areas and has been historically manipulated to provide watering areas for stock use.

The intermittent drainage in the northeast corner of the section contains approximately 1.07 acres of wetlands. The overstory consists of narrowleaf cottonwood with Nebraska sedge, few-flower spikerush, Wood's rose, mountain rush, field horsetail, Kentucky bluegrass, and beaked sedge (Table 3.4-1). The hydric soils include sandy mucky mineral and sandy redox. Surface water and a high water table are the hydrological indicators at the site. The USACE visited the proposed RWHR Mine site in June 2012 to evaluate wetland or riparian areas and made a jurisdictional determination that there was no visual evidence of wetland or riparian areas within the area of proposed mining disturbance (Garnet USA, 2013a). A similar inspection of the southeastern corner of the Alder Gulch permit area may be necessary to determine if the access route proposed under the Agency-Mitigated Alternative would impact wetlands.

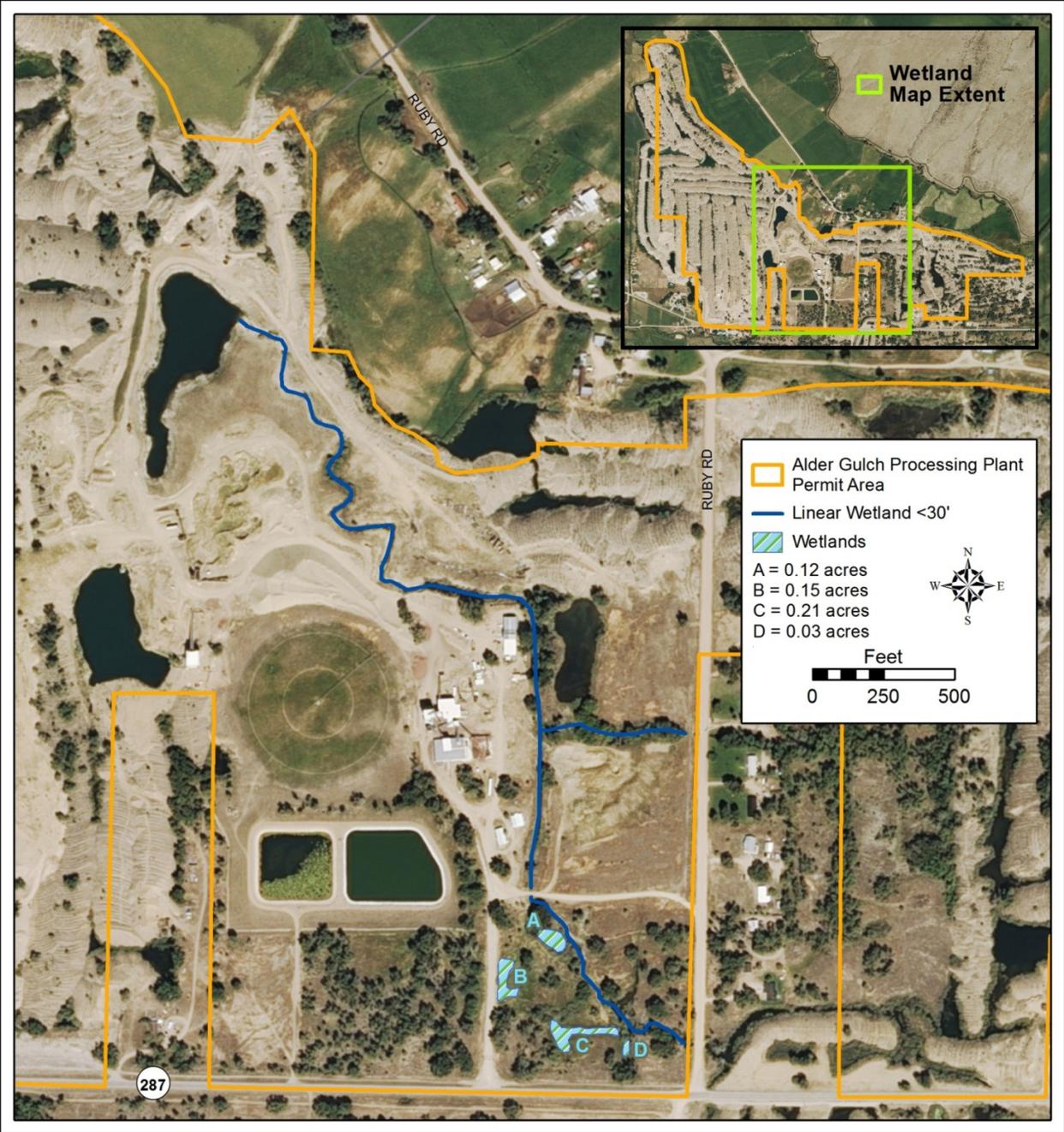


Figure 3.4-1. Wetlands Delineated within the Alder Gulch Permit Area, Madison County, Montana.

Table 3.4-1. List of Wetland Plant Species Identified at the Alder Gulch Processing Plant and RWHR Mine Site, Madison County, Montana.

Common Name	Scientific Name ^a	Alder Gulch Processing Plant	RWHR Site
Redtop	<i>Agrostis stolonifera</i>	x	
Sloughgrass	<i>Beckmannia syzigachne</i>	x	
Columbia sedge	<i>Carex aperta</i>	x	
Wooly sedge	<i>Carex pellita</i>	x	
Nebraska sedge	<i>Carex nebrascensis</i>		x
Beaked sedge	<i>Carex rostrata</i>		x
Few-flower spikerush	<i>Eleocharis pauciflora</i>	x	x
Field horsetail	<i>Equisetum arvense</i>	x	x
Reed mannagrass	<i>Glyceria grandis</i>	x	
Foxtail barley	<i>Hordeum jubatum</i>	x	
Taper-tip rush	<i>Juncus acuminatus</i>	x	
Mountain rush	<i>Juncus balticus</i>		x
Threadrush	<i>Juncus filiformis</i>	x	
Duckweed	<i>Lemna minor</i>	x	
Reed canarygrass	<i>Phalaris arundinacea</i>	x	x
Timothy	<i>Phleum pratense</i>		
Purple dragon-head	<i>Physotegia parviflora</i>	x	
Kentucky bluegrass	<i>Poa pratensis</i>	x	x
Narrowleaf cottonwood	<i>Populus angustifolia</i>	x	x
Black cottonwood	<i>Populus balsamifera</i>	x	
Aquatic buttercup	<i>Ranunculus aquatilis</i>	x	
Prickly gooseberry	<i>Ribes setosum</i>	x	
Woods' rose	<i>Rosa woodsii</i>	x	x
Sandbar willow	<i>Salix exigua</i>	x	x
Pacific willow	<i>Salix lasiandra</i>	x	
Cattail	<i>Typha latifolia</i>	x	

^a (Lesica, 2012)

Upland Vegetation Communities

A vegetation survey was conducted in 1991 covering the Alder Gulch permit area (Garnet USA, 2013a). The Red Wash Alluvial site, which comprises similar vegetation, soils, and exposure to the RWHR Mine site was given a cursory vegetation review when it was permitted (Ruby Valley Garnet, 2006). The two Red Wash sites are less than one-half mile apart.

Alder Gulch Permit Area

There is a forested vegetation community dominated by black cottonwood (55 percent canopy cover), Rocky Mountain juniper (15 to 20 percent canopy cover), and a sparse shrub and herbaceous understory that occurs on the flat tailings areas. Shrubs include big sagebrush, rubber rabbitbrush, prickly pear cactus, broom snakeweed, and prickly gooseberry. Herbaceous species include grasses such as cheatgrass brome, Kentucky bluegrass, and foxtail barley; common opportunistic plants include dandelion, alfalfa, aster,

alyssum, black medic, mullein, red clover and white clover. Canada thistle, black henbane, musk thistle and spotted knapweed are noxious weeds that are also present.

A sparse shrub/herbaceous vegetation community occurred on most of the high tailings piles. Rubber rabbitbrush was the dominant species on most vegetated areas; however, big sagebrush, prickly currant, prickly rose, and matrimony vine were present on some sites (Garnet USA, 2013a). Representative herbaceous species included cudweed sagewort, goldenrod, wildrye, annual willow-herb, and lambsquarters, Russian thistle, needle-and-thread, plantain, fumitory, mullein, verbena, and crested wheatgrass. A more complete list of vegetation species observed is provided in Table 3.4-2.

The RWHR Mine site comprises a mixture of grassland and sagebrush steppe communities with scattered populations of Rocky Mountain juniper. The sagebrush component was generally dominated by mountain big sagebrush with an understory of Idaho fescue, spike fescue, and oatgrass. Other shrub species included three-tip sagebrush, antelope bitterbrush, and rubber rabbitbrush. Grassland species included cool-season perennial bunchgrasses such as Idaho fescue, rough fescue, and bluebunch wheatgrass.

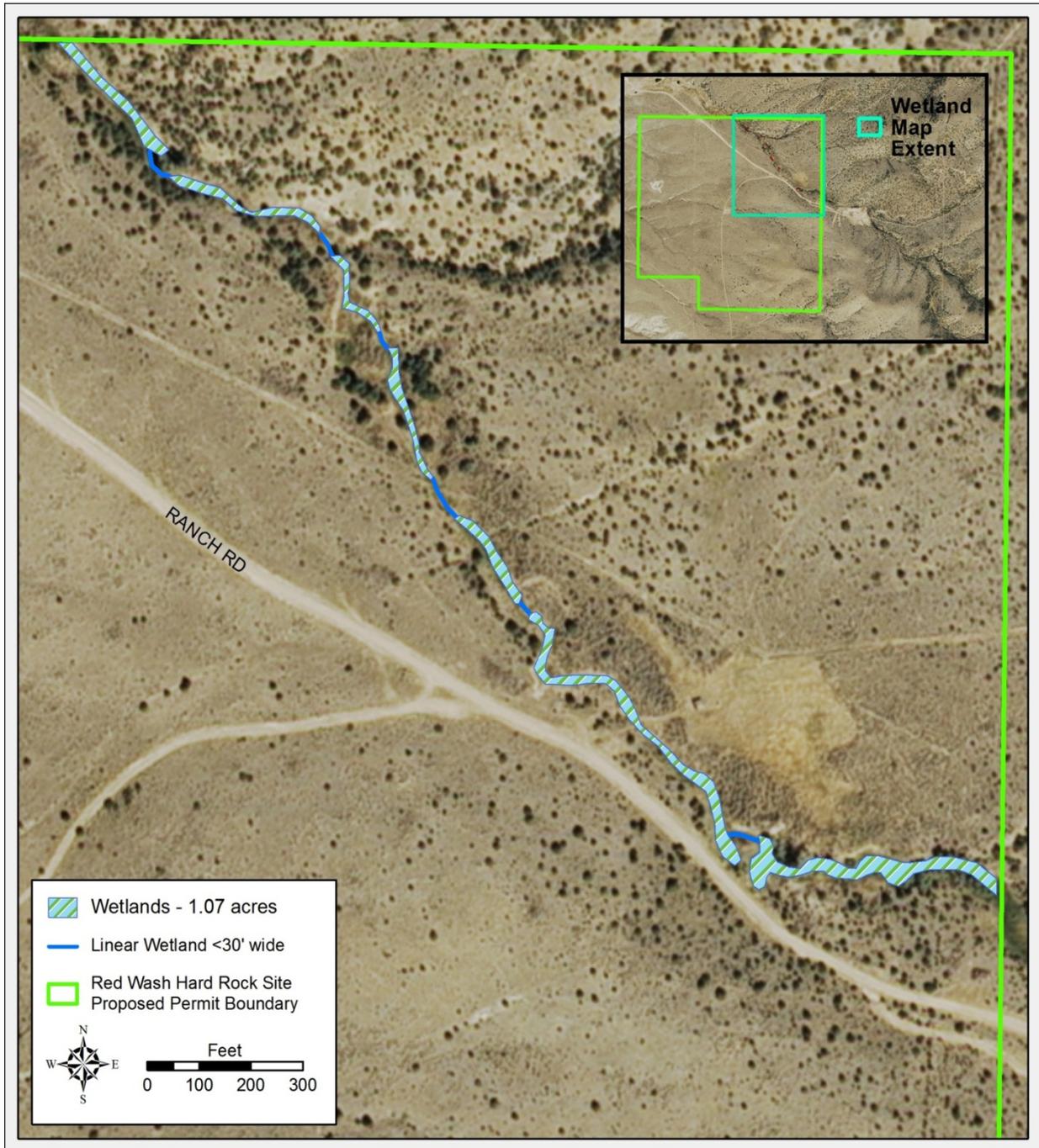


Figure 3.4-2. Wetlands Delineated within the Red Wash Hard Rock Mine Permit Area, Madison County, Montana.

Table 3.4-2. List of Upland Plant Species Identified at the Alder Gulch Mine and RWHR Mine Sites, Madison County, Montana.

Common Name	Scientific Name ¹	Alder Gulch Mine Site	RWHR Site
Yarrow	<i>Achillea millefolium</i>		X
Crested wheatgrass	<i>Agropyron cristatum</i>	X	
Alyssum	<i>Alyssum alyssoides</i>	X	
Green amaranth	<i>Amaranthus retroflexus</i>	X	
Pussytoes	<i>Antennaria</i> spp.		X
Holboell's rockcress	<i>Boechera retrofracta</i>	X	
Fringed sagewort	<i>Artemisia frigida</i>	X	
Big sagebrush	<i>Artemisia tridentata</i>	X	X
Three tip sagebrush	<i>Artemisia tripartita</i>		X
Cudweed sagewort	<i>Artemisia ludoviciana</i>	X	
Aster	<i>Symphotrichium ericoides</i>	X	
Vetch	<i>Astragalus</i> spp.		X
Hoary allysum	<i>Berteroia incana</i>		X
Downy brome	<i>Bromus tectorum</i>	X	X
Shepherd's purse	<i>Capsella bursa-pastoris</i>	X	
Musk thistle	<i>Carduus nutans</i>		X
Spotted knapweed	<i>Centaurea maculosa</i>	X	X
Lambsquarters	<i>Chenopodium album</i>	X	
Jerusalem oak	<i>Chenopodium botrys</i>	X	
Conyza	<i>Conyza canadensis</i>	X	
Prickly currant	<i>Ribes lacustre</i>	X	
Canada thistle	<i>Cirsium arvense</i>	X	
Houndstongue	<i>Cynoglossum officinale</i>	X	X
Oatgrass	<i>Danthonia intermedia</i>		X
One spike danthonia	<i>Danthonia unispicata</i>		X
Annual willow-herb	<i>Epilobium brachycarpum</i>	X	
Rubber rabbitbrush	<i>Ericameria nauseosa</i>		
Wildrye	<i>Elymus canadensis</i>	X	
Filago	<i>Filago arvensis</i>	X	
Rough fescue	<i>Festuca campestris</i>		X
Idaho fescue	<i>Festuca idahoensis</i>		X
Fumitory	<i>Fumaria officinalis</i>	X	
Prairie smoke	<i>Geum triflorum</i>		X
Curly cup gumweed	<i>Grindelia squarrosa</i>	X	
Broom snakeweed	<i>Gutierrezia sarothrae</i>	X	
Foxtail barley	<i>Hordeum jubatum</i>	X	
Black henbane	<i>Hyoscyamus niger</i>	X	
Poverty weed	<i>Iva axillaris</i>	X	
Rocky Mountain juniper	<i>Juniperus scopulorum</i>	X	X
Kochia	<i>Kochia scoparia</i>	X	
Prairie junegrass	<i>Koeleria macrantha</i>		X
Prickly lettuce	<i>Lactuca serriola</i>	X	
Lappula	<i>Lappula redowskii</i>	X	
Spike fescue	<i>Leucopoa kingii</i>		X
Matrimony vine	<i>Lycium barbarum</i>	X	
Black medic	<i>Medicago lupulina</i>	X	

Common Name	Scientific Name ¹	Alder Gulch Mine Site	RWHR Site
Alfalfa	<i>Medicago sativa</i>	x	
White sweetclover	<i>Melilotus alba</i>	x	
Yellow sweetclover	<i>Melilotus officinalis</i>	x	
Evening star	<i>Mentzelia decapetala</i>	x	
Small-flowered mentzelia	<i>Mentzelia dispersa</i>	x	
Leafy wildparsley	<i>Musineon divaricatum</i>		x
Prickly pear cactus	<i>Opuntia polyacantha</i>	x	x
Indian ricegrass	<i>Oryzopsis hynenoides</i>	x	
Western wheatgrass	<i>Agropyron smithii</i>		x
Reed canarygrass	<i>Phalaris arundinacea</i> L.	x	
Timothy	<i>Phleum pratense</i> L.	x	
Phlox	<i>Phlox</i> spp.		x
Plantain	<i>Plantago major</i>	x	
Kentucky bluegrass	<i>Poa pratensis</i>	x	
Narrowleaf cottonwood	<i>Populus angustifolia</i>	x	
Bluebunch wheatgrass	<i>Agropyron spicatum</i>		x
Antelope bitterbrush	<i>Purshia tridentata</i>		x
Prickly gooseberry	<i>Ribes setosum</i>	x	
Prickly rose	<i>Rosa acicularis</i>	x	
Sandbar willow	<i>Salix exigua</i>	x	
Russian thistle	<i>Salsola tragus</i>	x	
Goldenrod	<i>Solidago gigantea</i>	x	
Needle and thread grass	<i>Stipa comata</i>	x	
Dandelion	<i>Taraxacum officinale</i>	x	x
Thermopsis	<i>Thermopsis montana</i>	x	
Red clover	<i>Trifolium pratense</i>	x	
White clover	<i>Trifolium repens</i>	x	
Common mullein	<i>Verbascum thapsus</i>	x	
Verbena	<i>Verbena bracteata</i>	x	
Death camas	<i>Zigadenus</i> sp.		x

¹ (Lesica, 2012)

Noxious Weeds

Noxious weeds are species brought from other countries that aggressively colonize disturbed sites and interfere with agriculture and reduce habitat values for wildlife. Weeds are assigned state priority levels or categories by County Weed Boards (Madison County , 2008; MSU Extension Service, 2010). Field studies conducted during the summer of 1991 and spring 2013 indicated several plants designated as "noxious weeds" under the County Noxious Weed Control Act (7-22-2101(5), MCA) occurred within the permitted areas. In 1991, noxious weeds observed on the Alder Gulch processing plant permit area were: spotted knapweed, Canada thistle, and whitetop. Spotted knapweed occurred throughout the permit area and was a dominant plant on some sites. Whitetop and Canada thistle occurred predominantly on the flat tailings area. In 2013, noxious weeds at the Alder Gulch processing plant location were spotted knapweed, common mullein, houndstongue, and Canada thistle. The 1991 field study did not include the RWHR Mine site. In 2013, noxious

weeds observed in the RWHR area included spotted knapweed, hoary alyssum, houndstongue, and musk thistle (Babcock, 2013).

Garnet USA has filed a Noxious Weed Control Management Plan with the Madison County Weed Board.

Table 3.4-3. List of Weed Species Identified at the Alder Gulch Mine and RWHR Mine Sites, Madison County, Montana.

Common Name	Scientific Name	Priority Level/ Category	Alder Gulch Mine Site	RWHR Site
Houndstongue	<i>Cynoglossum officinale</i>	2B/ I	x	x
Hoary alyssum	<i>Berteroa incana</i>	2A/ I		x
Whitetop	<i>Cardaria draba</i>	2B/ I	x	
Musk thistle	<i>Carduus nutans</i>	MC	x	
Spotted knapweed	<i>Centaurea maculosa</i>	2B/ I		x
Canada thistle	<i>Cirsium arvense</i>	2B/ I	x	
Black henbane	<i>Hyocyamus niger</i>			x
Common mullein	<i>Verbascum thapsus</i>	MC	x	

Priority 2A: Common in isolated areas of Montana. Management criteria will require containment and suppression where common; and eradication, prevention, and education where less abundant. Management shall be prioritized by local weed districts (MSU Extension Service, 2010).

Priority 2B: Abundant in Montana and widespread in many counties. Management criteria will require containment and suppression where abundant and widespread; and eradication, prevention and education where less abundant. Management shall be prioritized by local weed districts.

Category I: Noxious weeds are weeds that are currently established and generally widespread in many counties of the state. Management criteria include awareness and education, containment and suppression of existing infestations and prevention of new infestations. These weeds are capable of rapid spread and render land unfit or greatly limit beneficial uses (Madison County , 2008).

MC: Identified as a weed by Madison County (Madison County , 2008).

Special Status Species

To determine the presence of Threatened or Endangered Plant Species (TES) the U.S. Fish and Wildlife Service’s (USFWS) Information, Planning, and Conservation System (IPaC) was queried in February of 2012 and again in June of 2013 for a current list of TES species within Madison County, Montana (USFWS, 2013). In addition a request was sent to the Montana Natural Heritage Program (MTNHP) for a list of Species of Concern and elemental occurrence map for the areas surrounding the two permit boundaries. Ute ladies-tresses (*Spiranthes diluvialis*), Listed-Threatened, and whitebark pine (*Pinus albicaulis*), a Candidate species, were identified as having potential to occur in Madison County. However, suitable habitat for these species is absent from the two permit areas. Ute ladies-tresses require moist meadows or riparian habitat at elevations between 4,300 and 6,850 feet amsl. Populations of Ute ladies-tresses have been documented as recently as 2011 along State Route 287 approximately 2.5 miles northwest of the Alder Gulch permit area in

riparian wetlands (MTNHP, 2013). However, the disturbed tailings areas within the permit area are unlikely to provide habitat. Whitebark pine is found at high elevations (above 5,900 feet amsl) and does not occur on the Garnet USA property.

3.5 Surface Water Resources

3.5.1 Overview and Analysis Area

The existing condition of surface water resources was evaluated for the Alder Gulch permit area and the proposed RWHR Mine site. Surface water bodies at and near the Alder Gulch site consist of Alder Gulch Creek, groundwater-fed ponds that have formed in the placer tailings, and an unnamed stream channel fragment along the northeast boundary of the permit area. The RWHR area is generally dry, with the exception of several ephemeral washes, and an intermittent stream that crosses the northeast corner of the permit area (Garnet USA, 2013a).

The analysis area for the Alder Gulch permit area site and the proposed RWHR Mine site was limited to the permit boundary and immediate vicinity. The local surface water hydrology of the Alder Gulch site has been modified by historic placer mining activities.

3.5.2 Methods

Existing surface water conditions were obtained from Garnet USA's 2013 operating permit amendment application and review of maps and aerial photographs. Information from Garnet USA's operating permit amendment application included results of recent field work conducted by Garnet USA at the proposed RWHR Mine site, and results of water resources data collected for the Alder Gulch permit area during previous permit applications. In addition, recent water level measurements, surface water, and groundwater sampling provide baseline data for inclusion in this EIS.

In late 2013, Garnet USA renamed selected surface water and groundwater sample locations at the Alder Gulch permit area to better identify sample sites that will be monitored as part of this operation. Current sample locations and associated former names for surface water and groundwater sites are shown in Table 3.5-1.

3.5.3 Results

Alder Gulch Permit Area

A water resources investigation conducted in 1990 and 1991 was provided in Garnet USA's current amendment application. Following the baseline data collection phase, quarterly water monitoring continued at the Alder Gulch permit site for the duration of the placer mining project (through 2001). No impacts to water quality from the operation were identified. Monitoring near the plant site resumed in accordance with MPDES permit requirements in 2005 during the processing of garnet from the Red Wash Alluvial site. New surface water resource studies were conducted in spring 2013 for this operating permit amendment application. Baseline conditions evaluated in this EIS are representative of conditions at the Alder Gulch site during 1990-1991 and 2013.

Table 3.5-1. Current Surface and Groundwater Sample Locations and Associated Former Names at the Alder Gulch Mine and RWHR Mine Sites, Madison County, Montana.

CURRENT NAME	FORMER NAME
Alder Gulch Plant Site	
Surface Water Sample Locations	
PSW-1	104, SW-4
PSW-2	SW-2
PSW-3	SW-11
PSW-4	109
PSW-5	121
PSW-6	123, SW-7
PSW-7	105
PSW-8	106
PSW-9	111
Groundwater Sample Locations	
MW-1	(none)
PMW-1	113, MW-1A
PMW-2	112, MW-2
PMW-3	116, MW-3
PMW-4	120, MW-B
PMW-5	117, MW-A
Red Wash Hard Rock Mine Site	
MMW-1	RWHR-MW-2, MMW-2, MW-B
MMW-2	RWHR-MW-1, MMW-1, MW-A
MMW-3	RWHR-MW-4B, MW-D
MMW-4	RWHR-MW-4A, MW-D
MMW-5	RWHR-MW-3A, MW-C
MMW-6	RWHR-MW-3B, MW-C

The Alder Gulch processing plant permit area is located on tailings from historic dredge mining of Alder Gulch Creek. These mining activities have modified Alder Gulch Creek’s natural channel such that Alder Gulch Creek infiltrates into the tailings inside the permit boundary and re-emerges as discharge from the tailings near the northwest corner of the permit boundary. In addition to discontinuous remnants of Alder Gulch Creek, ponds that intercept the water table are common within the permit area. In addition, an unnamed creek flows along the northeastern permit boundary. Studies completed during 1990–1991 suggested that Alder Gulch Creek is a gaining stream east of the permit area and a losing

stream in the southern portion of the permit area. The unnamed stream is likely a losing stream for its entire course through the permit area (Garnet USA, 2013a).

Flow measurements conducted during 1990 and 1991 suggest that the highest flows on both streams occur during spring and early summer in response to snowmelt and precipitation events. However, Garnet USA's operating permit amendment application indicates that no historic flood frequency information exists for Alder Gulch Creek (Garnet USA, 2013a). Flood magnitude events have not been calculated.

Chemical quality of surface water was monitored twice during 1990 and 1991, before and after small-scale test mining operations were carried out at the site, and then continued on a quarterly basis for the duration of active mining at the site. Monitoring resumed again in June 2013. The 1990 and 1991 data were provided in the operating permit amendment application. The more recent sampling occurred after submittal of the operating permit amendment application to provide recent water quality results.

Eleven sites located across the Alder Gulch permit area were monitored during 1991 and 1992 and three sites in 2013 for a suite of parameters including: common ions, selected metals, nitrogen, turbidity, total dissolved solids, pH, specific conductivity, and other parameters (Figure 2.6.2). The 2013 sampling included analysis for volatile and semi-volatile organics. The 1991 and 1992 monitoring sites were located on the unnamed stream along the northeastern boundary of the permitted area, along Alder Gulch Creek, and in ponds in the historic tailings (Figure 2.6-2). The 2013 samples were collected from SW-4, (southern location), SW-2, (east of the permitted boundary), and SW-11 (northwestern location). These monitoring sites have since been re-named PSW-1, PSW-2, and PSW-3, respectively (Table 3.5-1).

Results of the 1991 and 1992 monitoring events were provided as attachments to the operating permit amendment application. Total dissolved solids (TDS) concentrations ranged from 180 milligrams per liter (mg/l) to 361 mg/l, and as noted in the operating permit amendment application appear to increase somewhat from east to west along Alder Gulch Creek. The highest concentration of TDS in Alder Gulch Creek was 361 mg/l at site SW-11, located at the northwest end of the permit boundary where Alder Gulch Creek emerges as surface flow from the historic tailings. To the east, TDS concentrations in Alder Gulch Creek were lower and ranged from 180 mg/l to 200 mg/l at sites SW-2 and SW-4. TDS concentrations in ponds fell within the range reported for the streams.

Nitrate concentrations were generally low, but also exhibited a modest increase from east to west along Alder Gulch Creek, ranging from around 0.05 mg/l to 0.17 mg/l, in both cases well below the EPA drinking water maximum contaminant level of 10 mg/l (EPA, 2013a). One sample from a pond had the highest reported nitrate concentration of 0.26 mg/l. Metals were typically not detected at concentrations above the laboratory reporting limits.

Results of 2013 surface water samples collected in June and December are shown in Table 3.5-2 and summarized below (Garnet USA, 2013d; Garnet USA, 2013e).

Table 3.5-2. Surface Water and Groundwater Analytical Results for June and December 2013 Sampling Events at the Alder Gulch Mine and RWHR Mine Sites, Madison County, Montana.

Current Name	Former Name	Sample Date	Total Dissolved Solids (mg/L)	pH (Standard Units)	Specific Conductivity (µmhos/cm)	Nitrate+ Nitrite as N (mg/L)	Nitrite as N (mg/L)	Nitrate as N (mg/L)
Surface Water Sample Sites								
Alder Gulch Plant Site								
PSW-1	104, SW-4	12/18/2013	223	7.60	338	0.038	NA	NA
PSW-2	SW-2	6/5/2013	140	8.20	229	NA	<0.30	<0.18
		12/18/2013	45.3	7.50	300	0.27	NA	NA
PSW-3	SW-11	6/5/2013	280	7.88	465	NA	<0.30	<0.18
		12/18/2013	277	7.30	453	0.49	NA	NA
PSW-4	109	6/5/2013	160	8.05	268	NA	<0.30	<0.18
PSW-5	121	No samples in 2013	NS	NS	NS	NS	NS	NS
PSW-6	123, SW-7	No samples in 2013	NS	NS	NS	NS	NS	NS
PSW-7	105	No samples in 2013	NS	NS	NS	NS	NS	NS
PSW-8	106	No samples in 2013	NS	NS	NS	NS	NS	NS
PSW-9	111	No samples in 2013	NS	NS	NS	NS	NS	NS

Chapter 3: Affected Environment

Current Name	Former Name	Sample Date	Total Dissolved Solids (mg/L)	pH (Standard Units)	Specific Conductivity (µmhos/cm)	Nitrate+ Nitrite as N (mg/L)	Nitrite as N (mg/L)	Nitrate as N (mg/L)
Groundwater Sample Sites								
Alder Gulch Plant Site								
MW-1	(none)	6/5/2013	160	8.36	269	NA	<0.30	0.191
PMW-1	113, MW-1A	No samples in 2013	NS	NS	NS	NS	NS	NS
PMW-2	112, MW-2	6/5/2013	200	7.17	332	NA	<0.30	<0.18
		12/18/2013	233	6.90	338	0.093	NA	NA
PMW-3	116, MW-3	6/5/2013	220	7.60	383	NA	<0.30	<0.18
PMW-4	120, MW-B	No samples in 2013	NS	NS	NS	NS	NS	NS
PMW-5	117, MW-A	No samples in 2013	NS	NS	NS	NS	NS	NS
Red Wash Hard Rock Mine Site								
MMW-1	RWHR-MW-2, MMW-2, MW-B	12/17/2013	NS	NS	NS	NS	NS	NS
MMW-2	RWHR-MW-1, MMW-1, MW-A	12/17/2013	425	7.50	711	0.51	NA	NA
MMW-3	RWHR-MW-4B, MW-D	12/17/2013	443	7.60	622	0.57	NA	NA
MMW-4	RWHR-MW-4A, MW-D	12/17/2013	525	7.60	826	0.016	NA	NA
MMW-5	RWHR-MW-3A, MW-C	12/17/2013	NS	NS	NS	NS	NS	NS
MMW-6	RWHR-MW-3B, MW-C	12/17/2013	NS	NS	NS	NS	NS	NS

mg/L Milligram per liter NS No Sample
µmhos/cm Micromhos per centimeter NA Not Analyzed

MMW-1 not sampled due to sampling equipment failure MMW-5 and MMW-6 not sampled - dry wells
MW-1 abandoned

Samples were collected on June 5, 2013 from three surface water sample locations (current names shown in parentheses) (Garnet USA, 2013d). TDS concentrations ranged from 140 mg/L at sample location SW-2 (PSW-2) to 280 mg/l at sample location SW-11-, (PSW-3), showing similar trends of increasing concentrations from east to west as found in the 1991 and 1992 sampling results. Conductivity and pH also show similar trends. Maximum conductivity was 464 microSiemens/centimeter (uS/cm) at SW-11 (PSW-3) and minimum conductivity of 229 uS/cm was measured at SW-2 (PSW-2). The pH decreased from east to west with readings of 8.20 at SW-2 (PSW-2) and 7.88 at SW-11 (PSW-3). Nitrites and nitrates were non-detectable at all three surface water locations (Garnet USA, 2013d). Metal analytical results were typically non-detectable or just above laboratory detection limits. No volatile or semi-volatile organic detections were reported. All results were compared to DEQ Circular 7 for aquatic and human health standards (DEQ, 2012). No exceedances were reported.

Samples were collected on December 18, 2013 from three surface water sample locations and are comparable to June sample results (Garnet USA, 2013e). TDS concentrations ranged from 45.3 mg/L at sample location PSW-2 to 277 mg/l at sample location PSW-3. A maximum conductivity of 453 uS/cm at sample location PSW-3 and a minimum conductivity of 300 uS/cm at PSW-2 were reported. The pH ranged from 7.30 at PSW-3 to 7.60 at PSW-1. Nitrate plus nitrites as N reported very low concentrations ranging from 0.038 mg/L at PSW-1 to 0.49 mg/L at PSW-3 (Garnet USA, 2013e).

The Alder Gulch processing plant site was issued a Montana Pollutant Discharge Elimination System (MPDES) permit (No. MT-0029971) on November 1, 1997 (Garnet USA, 2013a). The MPDES program is designed to control point-source discharges of wastewater in order to maintain water quality in Montana, and does so primarily by requiring adherence to effluent limits and treatment standards through a mandatory permit program. The Garnet USA operating permit amendment application states that the current project does not involve the discharge of any pollutants to surface waters. When the Individual MPDES Permit expired, the Alder Gulch site, operated by Ruby Valley Garnet at the time, was issued an MPDES Sand and Gravel General Permit (No. MTG490015). That permit was transferred to Garnet USA in 2012.

There are three existing ponds, the North Pond, the West Pond, and the East Pond, within the Alder Gulch permit area (Figure 2.4-2). Historically, the North Pond (2.9 acres) was a major source of processing water. Currently, the West Pond (2.1 acres) is the primary source of water for the processing plant needs as the makeup balance for the operations. The East Pond (1.1 acres) is silted with fine material and at most holds a few feet of water

Alder Gulch TMDL

The Total Maximum Daily Load (TMDL) study was completed for the Ruby River watershed in 2006 and included Alder Gulch and Alder Gulch Creek. Although no data were collected for the TMDL along the reach of Alder Gulch between the confluence with Brown's Gulch and the town of Alder, some of the findings and targets provide information on potential sources and pollutants in Alder Gulch (DEQ, 2006).

Brown’s Gulch is a tributary to Alder Gulch located approximately 1.5 miles downstream from Virginia City. Alder Gulch is listed on Montana’s 303(d) list as impaired for total nitrogen, mercury, manganese, lead, and sediment. The TMDL states that the probable source for mercury and lead was the abandoned mine on Brown’s Gulch and that no other samples collected supported the earlier metals impairments listing (DEQ, 2006). The TMDL also found that the sediment impairment rating was not supported by the limited data available, but that major sources of current sediment loading, in order of probable size of contribution, include grazing, past placer mining, roads, and vegetation clearing related to agriculture (DEQ, 2006). The final sediment allocations call for reductions in these potential sources of 60, 25, 51, and 50 percent, respectively. The final monitoring strategy recommended for Alder Gulch and its tributaries includes lead, sediment, water column, and biomonitoring above and below priority abandoned mine sites on Mill Gulch and Brown’s Gulch (DEQ, 2006). No monitoring was recommended for the stretch nearest the Alder Gulch processing plant.

Water Rights

Garnet USA has three surface water rights on Alder Gulch Creek which are listed in Table 3.5-3. These rights are included in the operating permit.

Table 3.5-3. Garnet USA Surface Water Rights on Alder Gulch Creek.

Water Right Number	Owner Name	Priority Date	Source	Purpose of Use	Max Flow Rate (gpm)
41C 77973 00	GARNET USA LLC	19910722	Alder Gulch Creek	Mining	2050
41C 92601 00	GARNET USA LLC	19950221	Groundwater	Commercial	15
41C 97880 00	GARNET USA LLC	19960415	Groundwater	Lawn and Garden	30
41C 193858 00	GARNET USA LLC	18991231	Alder Gulch Creek	Mining	1500
41C 196461 00	Gilman I H Cattle Co	18991231	Alder Gulch Creek	Mining	12000

gpm: gallons per minute

Water rights 41C 77973 00 and 41C 193858 00, along with 41C 196461 00, will be used specifically for mining activities within the permit boundary. They will be used for ore processing water applications throughout the plant. The two existing wells with water right numbers 41C 92601 00 and 41C 97880 00 will be used for commercial and irrigation uses at the Alder Gulch processing plant site. Garnet USA is completing an application to DEQ for a new public water supply well for domestic use.

RWHR Mine Site

The operating permit amendment application identifies three drainages that partially traverse the proposed RWHR Mine site, including 1) an intermittent stream channel crossing the northeast corner of the permit boundary, 2) the middle drainage, an ephemeral channel that

traverses southeast to northwest across the middle of the permit area, and 3) a south drainage, an ephemeral channel in the southwest quadrant of the proposed permit boundary (Figure 2.5-1). The presence of a large southern ephemeral drainage, about one-quarter mile southwest of the proposed permit boundary, was also noted in the operating permit amendment application (Garnet USA, 2013a).

The Garnet USA operating permit amendment application states that “the RWHR Site is in a dry area with no perennial flowing water” (Garnet USA, 2013a). Due to the lack of observed surface water flow at the proposed RWHR Mine site, Garnet USA did not collect any flow or surface water quality data at the site. Garnet USA indicated in their operating permit amendment application that stream flow monitoring could be conducted if flows were observed and monitoring was considered necessary by DEQ.

The intermittent channel has some stock water developments upstream of the permit area and is the same channel that is actively mined to the northwest at the previously permitted Red Wash Alluvial site. A segment of this intermittent channel (1,000 feet or less) within the proposed permit area exhibits a “concentration of growth” characterized as “enhanced habitat” in the operating permit amendment application.

In addition to the information provided by Garnet USA, aerial photographs obtained from Google Earth were reviewed for evidence of surface water and shallow groundwater. Examination of these aerial photographs suggests that springs discharge into intermittent drainage tributaries upstream of the proposed RWHR Mine site. Reaches of these tributary channels, particularly to the southeast of the proposed RWHR Mine site, exhibit notable areas of vegetation compared to the surrounding terrain, further suggesting that surface water and/or shallow groundwater is consistently present in these channels. Williams Creek, a tributary of the Ruby River, flows across the southwestern corner of Section 25 and is approximately one-half mile from the mine permit boundary.

Additionally, aerial photographs indicate that after crossing the western proposed permit boundary, the middle drainage flows into a reservoir approximately one mile to the west-southwest. Review of DNRC water rights data did not identify a water right associated with this reservoir, although Ruby Dell Ranch owns several water rights in the immediate area (e.g. 41C 132600 00).

3.6 Groundwater Resources

Groundwater resources are described as subsurface water flowing through the porous spaces in sediments or bedrock. Groundwater may discharge to the surface as springs, seeps, wetlands, or surface water bodies. The following section discusses existing groundwater resources in the vicinity of the Alder Gulch and RWHR Mine permit areas. An analysis of groundwater resources requires understanding the physical movement, the volume, and the chemical characteristics of groundwater, as well as the characteristics of the aquifer(s) that contain groundwater.

3.6.1 Overview and Analysis Area

As discussed in Section 3.2, the Alder Gulch permit area is located near Alder Gulch in the Ruby River valley. The proposed RWHR Mine site is located over 600 feet higher in elevation and about 4.5 miles to the southeast of the Alder Gulch site on bedrock-dominated uplands above the valley bottoms. These two types of environments are typically associated with different groundwater systems. The Alder Gulch system is dominated by the alluvial aquifer underlying the Ruby River valley. Groundwater near the proposed RWHR Mine site is dominated by a bedrock aquifer system of varying depth and extent and possibly localized shallow groundwater systems accompanying intermittent or ephemeral drainage channels.

The groundwater resource analysis area for the Alder Gulch permit area includes the active permit area and extends approximately 3,000 feet beyond the east and west sides of the permit area. This analysis area encompasses the current permitted area, the majority of the historically disturbed placer tailings area, most of the village of Alder, and extends over one mile hydrologically down gradient from the location of the Alder Gulch processing plant site. This area was selected because it coincides with the extent of groundwater monitoring data collected during the 1990 and 1991 baseline studies.

The groundwater resource analysis area for the proposed RWHR Mine site includes the proposed RWHR permit area as well as approximately one mile around the proposed permit area. This area was selected because 1) groundwater resources do not appear to be heavily utilized in the vicinity of the proposed RWHR Mine site, 2) shallow groundwater likely exists in localized systems associated with drainages and fractured bedrock aquifers, and 3) the Ruby River valley is located 1.5 miles to the west and represents a different hydrogeologic regime from the one in which the Proposed Action would occur.

3.6.2 Methods

Existing groundwater resources were evaluated primarily from information contained within Garnet USA's operating permit amendment application (Garnet USA, 2013a). For the Alder Gulch site, the operating permit amendment application document provided baseline water resource study completed during 1990 and 1991 (Garnet USA, 2013a). A groundwater resource study was completed in spring 2013 and provided additional groundwater quality and water level data in support of the operating permit amendment application (Garnet USA, 2013f). The MBMG Groundwater Information Center (GWIC) was consulted for additional information on local groundwater wells (GWIC, 2013). Monitoring sites are shown on Figures 2.6-2 and 2.6-3. Monitoring well locations, well completion information, and groundwater elevations are provided in Table 3.6-1.

3.6.3 Results

Alder Gulch Permit Area

The Alder Gulch processing plant site overlies an alluvial aquifer that has been dredged during historic placer mining activities. Prior to mining, Alder Gulch Creek alluvium consisted of a mixture of clay, silt, sand, gravel, cobbles, and boulders. The tailings consist of mounds

of coarse-grained alluvium underlain by moderately- to well-sorted finer-grained sand and gravel. Locally, the lowermost sand and gravel consists of up to 15 percent fine-grained sand and silt-sized material. These sediments are underlain by a hard clay layer locally referred to as “false bedrock”, which marks the base of the alluvial aquifer, and the base of historic mining operations. Drilling in the area suggests that the false bedrock horizon ranges from 20 to 55 feet thick and possibly greater thicknesses at the Alder Gulch site (Garnet USA, 2013a).

Several monitoring wells were installed at the Alder Gulch site in 1991, and aquifer tests were conducted on select wells. The alluvial aquifer had a calculated hydraulic conductivity between 1,400 gallons per day per square foot (gpd/ft²) and 3,000 gpd/ft², which indicates a permeable aquifer capable of rapidly transmitting large volumes of groundwater.

Groundwater measurements collected in June 2013 indicate the depth to groundwater below ground surface (bgs) ranges from 9.6 to 16.8 feet in the plant area to 45.7 feet bgs along the far western boundary. (Garnet USA, 2013f). A partial hydrograph (water level record) from well MW-1 (recording data from May 1990 to October 1991) was provided in the operating permit amendment application. This hydrograph indicates that seasonal high groundwater levels occurred during spring and early summer.

The timing of seasonal low groundwater levels is less clear due to an interruption in the hydrograph record. However, 1990 and 1991 records appear to indicate that seasonal low water levels occurred in August and September. Garnet USA stated in the operating permit amendment application that annual water table fluctuation in the Alder Gulch area is less than 3.5 feet, which is consistent with the data included in the partial MW-1 record.

A groundwater elevation contour map, which graphically displays the elevation of the water table at a specific time of measurement was prepared from data collected on June 5, 2013 and is presented in Figure 3.6-1. These data indicates that groundwater flows generally from the southeast to the northwest and joins the Ruby Valley alluvial system near the western portion of the site.

The average groundwater gradient (change in groundwater table elevation per unit of horizontal distance) was reported to be approximately 0.013 feet per foot (Garnet USA, 2013a). Based on the hydraulic conductivity and gradient data, and an estimated aquifer porosity of 0.35, the average groundwater velocity in the alluvial aquifer beneath the Alder Gulch site is approximately 7.5 feet per day.

Table 3.6-1. Monitoring Well Locations and Ground Water Elevations, Garnet USA Project Sites, Madison County, Montana.

Monitoring Well	Latitude ¹	Longitude	Total Depth of Well (feet)	Top of Measuring Point Elevation ² (feet)	Depth to Ground Water from Measuring Point ³ (feet)	Ground Water Elevation ² (feet)
Alder Gulch Processing Plant Site						
PMW-1	45.323486	-112.0866	25	5159.95	10.00	5149.95
PMW-2	45.323078	-112.08476	38.5	5173.24	18.00	5155.24
PMW-3	45.322694	-112.09275	39.5	5177.55	47.00	5130.55
PMW-4	45.327543	-112.09235	70	5161.96	30.00	5131.96
PMW-5	45.324593	-112.08975	30	5159.94	18.00	5141.94
Red Wash Hard Rock Mine Site						
MMW-1	45.283668	-112.02726	200	5879.50	65.80	5813.70
MMW-2	45.285289	-112.04282	150	5572.98	19.60	5553.38
MMW-3	45.286172	-112.02742	40	5793.10	15.40	5777.70
MMW-4	45.286183	-112.02744	170	5792.75	5.50	5787.25
MMW-5	45.290788	-112.03508	100	5643.59	95.00	5548.59
MMW-6	45.290794	-112.0351	40	5644.22	Dry	NM

¹Latitude and Longitude based on NAD83

²All elevations are feet amsl

Measuring Point = Top of Steel Casing

³Depth to Ground Water Measured December 17, 2013

NM No measurement

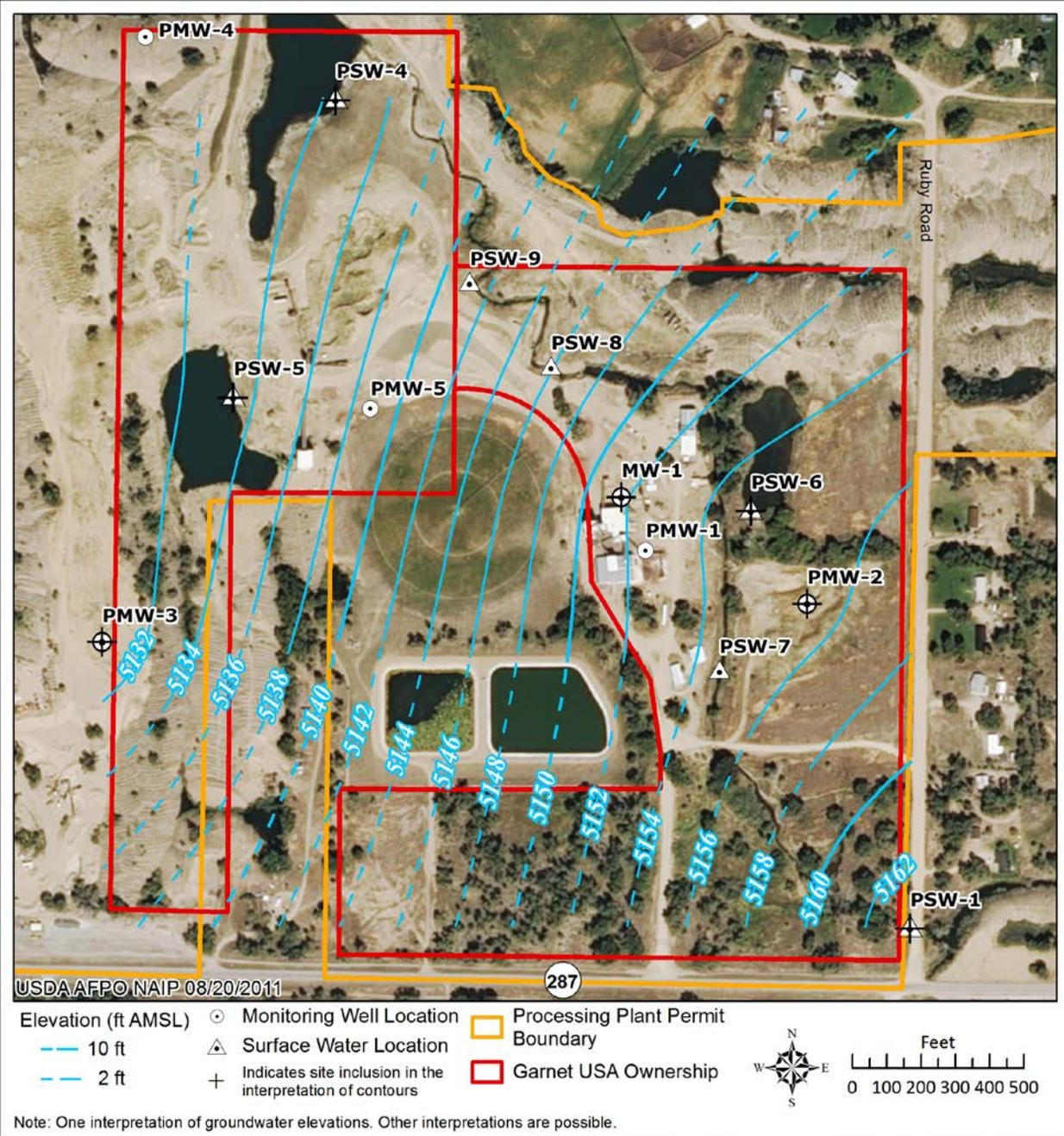


Figure 3.6-1. Groundwater Elevation Contour Map for the Alder Gulch Mine Permit Area.

Groundwater quality data was provided by Garnet USA in the HROP from samples collected from nine wells during 1991 and 1992. Additional data were provided for samples collected in June and December 2013. The more recent sampling occurred after submittal of the operating permit amendment application to provide recent water quality results. The operating permit amendment application provided the 1991 and 1992 groundwater water quality results, and states the following:

- The chemical composition of groundwater is similar to that of surface water,
- Groundwater is hard (contains relatively high concentrations of calcium and magnesium compounds),
- Total dissolved solids range from 300 milligrams per liter (mg/l) to 550 mg/l,
- Dissolved metals concentrations were less than or slightly above laboratory detection limits, and
- Turbidity levels (a measure of water clarity) ranged from 2 nephelometric turbidity units (NTUs) to 16 NTUs in domestic wells.

Results of the June 2013 monitoring event are summarized below (Garnet USA, 2013f). Monitoring wells at the Alder Gulch processing plant Site have been renamed with a “P” to reflect the well locations and to avoid confusion with RWHR Mine site wells. Monitoring well MW-1 was abandoned in October 2013 when a replacement well PMW-1 was drilled. A table showing current and former monitoring names is provided in Table 3.5.1. TDS concentrations ranged from 160 mg/L (monitoring well MW-1) to 220 mg/L (monitoring well PMW-3) with concentrations similar to surface water. The total hardness for the groundwater ranged from 130 to 170 mg/L and is classified as hard water. A maximum conductivity of 383 uS/cm was measured at monitoring well PMW-3 and a minimum conductivity of 269 uS/cm was measured at monitoring well MW-1. The pH ranged from 7.17 (monitoring well PMW-2) to 8.36 at monitoring well MW-1. Nitrites and nitrates were non-detect at monitoring wells PMW-2 and PMW-3. At monitoring well MW-1, nitrites were non-detect but nitrate was detected at 0.191 mg/L, just above the laboratory detection limit of 0.18 mg/L.

Samples were also collected from monitoring well PMW-2 in December 2013 (Garnet USA, 2013e). TDS concentration of 233 mg/L, pH of 6.90, and a conductivity of 338 uS/cm were reported. Nitrates plus nitrites as N was reported at a low concentration of 0.093 mg/L.

Metal analytical results were typically non-detect or just above laboratory detection limits. No volatile or semi-volatile organic detections were reported from monitoring well PMW-2. There were several detections of organics reported in monitoring wells MW-1 and PMW-3 slightly above detection limits. Monitoring well MW-1 reported tetrachloroethylene (PCE) concentrations of 0.57 micrograms/Liter (ug/L) and a reporting limit of 0.5 ug/L. Monitoring well PMW-3 reported concentrations of Bis(2-ethylhexyl)phthalate at 3.7 ug/L (detection limit of 2 ug/L) and Iodomethane concentrations of 1 ug/L (detection limit of 1 ug/L). All results were compared to DEQ Circular 7 for surface water and groundwater human health standards. There were no exceedances of these standards.

RWHR Permit Area

Prior to the installation of monitoring wells at the proposed RWHR Mine site in late 2013, limited data were available for characterizing groundwater conditions in the vicinity. One privately-owned domestic groundwater well (GWIC 211478) appears to be located less than one mile from the proposed site boundary (GWIC, 2013; Garnet USA, 2013a). Records indicate that this well is 39 feet deep and has a static water level of 7 feet (GWIC, 2013). Garnet USA's operating permit amendment application states that the well was inaccessible during site reconnaissance; therefore, no field data for this well are available.

Garnet USA drilled two groundwater exploration test holes at the proposed RWHR Mine site using a blast hole drill rig and submitted this information in the operating permit amendment application. The test holes were identified as TH-1 and TH-2, and each was drilled to a total depth of 72 feet below ground surface, and both holes were reported to be dry. Using a map provided in Garnet USA's operating permit amendment application, the surface elevations of TH-1 and TH-2 were estimated to be 5,740 and 5,700 feet amsl, respectively (Garnet USA, 2013a). The elevation at the bottom of each test hole was estimated to be 5,668 feet amsl for TH-1 and 5,628 feet amsl for TH-2. Based on these estimated elevations, TH-2 appears to have been drilled to a depth below that of the proposed quarry floor elevation of 5,650 feet amsl, whereas TH-1 was terminated approximately 18 feet above this level.

On the basis of these dry test hole results, Garnet USA stated that "the mining operation will be dry and completely above the groundwater table and will have negligible impacts on groundwater levels and quality" (Garnet USA, 2013a). For this reason, no wells were completed at the proposed RWHR Mine site (Garnet USA, 2013a).

Early in 2013, after submittal of the operating permit amendment application, Garnet USA drilled 14 additional exploration boreholes at the RWHR site. These drill holes were completed within the proposed quarry area with none of the holes reported to produce water. The deepest hole was drilled to 185 feet. The average exploration drill depth is 150 feet. Based upon the lack of groundwater reported during the exploration drilling program, Garnet USA assumed the proposed quarry would not intercept groundwater. However, boreholes drilled into saturated bedrock having sufficiently low permeability can appear to be dry during drilling yet can fill with groundwater over time. Exploration boreholes are often reclaimed immediately after rock samples are extracted. If the boreholes were not kept open for follow-up examinations for groundwater inflow for several weeks after they were drilled, then the observed absence of groundwater during drilling may not be adequate to confirm that quarry development would not intercept groundwater.

Due to the uncertainty associated with groundwater observations in exploration boreholes, DEQ required in the Agency-Mitigated Alternative that six monitoring wells be installed at the RWHR site to provide further information on the shallow and deep groundwater systems. Garnet USA proceeded to drill these wells in November 2013 and initiated a water quality sampling program in December 2013.

Six new monitoring wells were drilled (MMW-1 through MMW-6) outside the perimeter of the proposed RWHR Mine site. The locations of these monitoring wells are shown on Figure 2.6-3. Monitoring well MMW-1 is located near the southeast corner of the proposed quarry, above the highest point of the proposed highwall. Monitoring well MMW-1 was drilled to a depth of 200 feet on November 12, 2013, and was screened from 50 to 200 feet bgs. Monitoring well locations and groundwater elevations are provided in Table 3.6-1. The 200 foot depth is similar to the maximum proposed depth of the quarry after 37 years of mining. Monitoring well MMW-1 encountered groundwater at a depth of 68 feet and produced 6 gpm during a one hour air-lift test with the drill stem set at 190 feet bgs. On December 17, 2013, static water level (SWL) in monitoring well MMW-1 was measured at 65.8 feet below top of

casing (TOC), or an approximate elevation of 5,815 feet amsl. The proposed quarry floor is projected to reach an elevation of 5,780 feet amsl within 5 years of operation, with an ultimate quarry floor elevation of 5,650 feet amsl after 37 years. Therefore, based on the measured static water level in monitoring well MMW-1, there is some potential for groundwater seepage into the quarry through the southeast highwall within the first 5 years of operations.

Monitoring wells MMW-3 and MMW-4 are paired wells located northeast of the proposed quarry area adjacent to the ephemeral "Red Wash" drainage which cuts northwest through the RWHR permit area. Monitoring well MMW-3 was drilled to a depth of 40 feet through sand and gravel into weathered bedrock, and was screened from 15 to 40 feet below ground surface (bgs). The well was reported to be dry when drilled on November 13, 2013, but had a static water level of 15.4 feet below TOC when sampled on December 17, 2013. Monitoring well MMW-4 was drilled to a depth of 170 feet and encountered groundwater at a depth of 5.5 feet bgs. The monitoring well MMW-4 was air tested with the drill stem set at 165 feet for 1 hour, and produced 42 gpm. The well was screened from 50 to 170 feet bgs. Observations from monitoring wells MMW-3 and MMW-4 indicate that shallow groundwater is present in the bedrock beneath the Red Wash drainage, and likely discharges into the alluvial sand and gravel within the drainage where it provides subsurface flow within the alluvium. These data from monitoring wells MMW-3 and MMW-4 are consistent with the previous observations of groundwater inflow into a small exploration test pit located adjacent to the Red Wash drainage a few hundred feet upgradient of the mine area, as well as the presence of a small developed stock spring in Red Wash located about 0.5 miles east of the RWHR Mine site.

In addition to the monitoring wells near the proposed quarry area, paired monitoring wells MMW-5 and MMW-6 were drilled at the northern edge of the RWHR permit area, where Red Wash exits the RWHR Mine site boundary (Figure 2.6-3). Monitoring well MMW-5 was drilled to a depth of 100 feet, and was screened from 50 to 100 feet bgs in greenish gray clay, which is probably indicative of deeply weathered bedrock. The well was reported to be dry at the time of drilling on November 20, 2013, but contained water at a depth of 95 feet below TOC when measured on December 17, 2013. Well MMW-6 was drilled to a depth of 40 feet, and was screened from 15 to 40 feet bgs in tan and brown clay. The well was reported to be dry when drilled on November 20, 2013, and was still dry when observed on December 17, 2013. Water levels in these wells suggest that the shallow groundwater conditions present near wells MMW-3 and MMW-4 where the ephemeral Red Wash drainage enters the RWHR permit area may not continue along the drainage to the northern edge of the permit boundary. This may be a consequence of the alluvium filling the Red Wash drainage becoming thicker and more extensive as the drainage exits the rocky mountainous area to the east and enters alluvial fan deposits to the west.

Monitoring well MMW-2 was drilled at the western edge of the RWHR permit area and west (down gradient) of the proposed waste rock stockpile. This monitoring well was drilled to a depth of 150 feet, and was screened from 50 to 100 feet bgs. The monitoring well was

reported to be dry when it was completed on November 22, 2013, but had a SWL of 19.6 feet below TOC when measured on December 17, 2013.

Analytical results from the first monitoring event in December 2013 show that no groundwater quality standards are exceeded at the RWHR Mine site (Table 3.5-2). Selected analytical results from three of the six wells sampled are shown in Table 3.5.2. Two wells were not sampled because they were dry, and one well could not be sampled due to equipment failure. TDS concentrations ranged from 425 mg/L to 525 mg/L, conductivity ranged from 622 uS/cm to 826 uS/cm, and pH ranged from 7.50 to 7.60. Nitrate plus nitrite as N concentrations ranged from 0.016 mg/L up to 0.57 mg/L.

3.7 Hazardous Materials

Hazardous materials at the Alder Gulch processing plant would be mainly associated with operation and maintenance of equipment and may exert a hazardous characteristic as a result of its composition.

3.7.1 Overview and Analysis Area

The current Alder Gulch processing plant uses various fluids for use as fuel, lubricants, coolants, and other maintenance activities which may have hazardous characteristics. These materials have the potential to impact storm water, surface water, and local air quality. These materials are located at the Alder Gulch processing plant and would be located at the proposed RWHR Mine site in the fuel and lubricant storage areas and septic systems.

3.7.2 Methods

Garnet USA's operating permit, Spill Prevention, Control, and Containment (SPCC) plan, Storm Water Pollution Prevention Plan (SWPPP) discussion for the proposed RWHR Mine site, Present Permit and Proposed Amendment, and its current Air Quality Permit (#4842-00 Approved April 3, 2013) outline potential sources of storm water and surface water pollution as a result of current processing and proposed mining activities and are described below.

3.7.3 Regulatory Environment

Some hazardous materials must be handled under the Resource Conservation and Recovery Act (RCRA). This act regulates the hazardous waste from "cradle to grave." However, specific wastes associated with mining, albeit exhibiting hazardous characteristics may be exempted from RCRA regulation. These materials are addressed in Section 3.2 Geology and Waste Rock Geochemistry and Sections 3.5 and 3.6, Surface Water and Groundwater.

In October, 1980, RCRA was amended with the Bevill exclusion, to exclude "solid waste from the extraction, beneficiation, and processing of ores and minerals" from regulation as hazardous waste under Subtitle C of RCRA. Specific requirements for waste materials for exclusion apply to wastes which are generated by operations downstream of beneficiation

and originate from a mineral processing operation, and are solid waste as defined by EPA, uniquely associated with mineral industry operations (EPA, 2012).

Fuels, motor oils, lubricants, and other hazardous materials hauled by truck must be transported to and from the site via public roads under the Department of Transportation requirements which include driver training and registration, inspections, manifesting (shipping papers), approved containers, with labeling and placarding requirements primarily under Title 49 CFR (MDT, 2011).

If storm water is allowed to leave the site, an industrial storm water discharge permit may be necessary; however, if all storm water is to remain onsite, DEQ may require department approval of the Industrial No Exposure Certification Form for exclusion from MPDES Storm Water Discharge Permitting for specified industrial activities. Waste or materials which may impact storm water or surface water are addressed in the SWPPP as part of the Notice of Intent to be covered under the Statewide General Storm Water Permit as required by ARM Title 17.30.1101 – Storm Water. Petroleum, oils, and greases which may impact surface waters are covered under the SPCC plan if required by 40 CFR Part 112.2.

The SWPPP outlines measures to be implemented to reduce impacts to water quality as a result of construction or industrial activities. It is associated with the Storm Water Permit as required under ARM Title 17.30.1101. The SPCC plan requires implementation of measures for oil spill prevention, preparedness, and response to prevent oil discharge to navigable waters. An SPCC plan is required for sites storing petroleum volumes greater than 1,350 gallons in containers holding 55 gallons or more in areas with the potential to reach navigable waters of the United States as required by 40 CFR Part 112.2. There are no plans to exceed these storage levels at the RWHR Mine site, but an SPCC plan has been prepared by Garnet USA to comply with 40 CFR Part 112.2 for the Alder Gulch processing plant (Garnet, 2013a; Garnet 2013c).

Septic systems must be permitted through Madison County to ensure that there is no transmission of diseases. A permit ensures safe treatment and disposal of all wastewater to protect public health and the environment, and that the septic system will not be in violation of other laws or regulations governing water pollution or wastewater disposal (Madison County Board of Health, 2006).

3.7.4 Results

Hazardous materials which have the potential to be present at the site are identified. Two types of waste which have the potential to be hazardous and could be generated at the facility would include potential RCRA wastes and septic wastes. These materials are discussed below.

Potential RCRA Wastes

Some materials may be hazardous as products, but as wastes, these materials may be regulated under RCRA as hazardous waste. Based on review of the documents referenced

above regarding current materials located at the two sites, the following materials were noted:

- Lubricating Oils/Waste Oils (Motor Oil – 1,100 gallons stored in 55-gallon storage drums, Used Motor Oil – 1,000 gallons)
- Antifreeze
- Diesel Fuel two-6,000 gallon tanks

Diesel fuel, lubricating oils, and antifreeze are stored onsite at the processing plant. Fueling and servicing of equipment are completed using leak proof fueling hoses and servicing procedures. Fueling and major servicing of vehicles and equipment only occur at designated areas using a five-ton truck containing fuels and lubricants. Fuel is obtained from the pumping station equipped with overhead piping to a concrete self-contained pumping station for equipment fueling.

Fuel storage facilities are constructed of non-permeable, leak proof concrete containment of at least twice the total storage capacity. The bulk lubricant storage facilities at the shop site have a concrete, leak proof containment of double the storage capacity which functions in conjunction with the waste oil containment facility associated with the shop operation. The garnet sand concentration process does not involve the use of process chemical agents.

The storage of these materials is regulated under 40 CFR Part 112.2 through the implementation of an SPCC plan. All petroleum products stored in 55-gallon containers or greater at the facility are covered under an SPCC plan. The facility has implemented this plan, which requires implementation of measures for oil spill prevention, preparedness, and response to prevent oil discharge to navigable waters. These measures include sized secondary containment of the material, inspections, procedures, and response to any release.

RWHR Site

There is no fuel storage proposed at the proposed RWHR Mine site. All fuel for equipment would be brought in daily as needed. There is no process chemical storage or waste at the proposed site at this time.

Septic Waste

Septic waste can have hazardous characteristics, but disposal is not regulated under RCRA. Septic systems are designed with potential demand requirements and are required to have approval from the county. The Alder Gulch processing plant site has a septic system that was approved by the Madison County Sanitarian as part of the initial permit (Garnet USA, 2013a). Permitting assures that the septic design has met county requirements for the disposal of septic wastes.

3.8 Air Quality

The air quality of a region is primarily controlled by the type, magnitude, and distribution of pollutants and may be affected by regional climate. Transport of pollutants from their source areas is affected by topography and meteorology.

3.8.1 Overview and Analysis Area

The Proposed Action would occur under the current Montana Air Quality Permit (MAQP) # 4842-00 issued April 3, 2013 by the DEQ Air Resources Management Bureau. Sources of potential air quality impacts exist at the proposed RWHR Mine site where a majority of the activities would occur. The permit allows portable operation of crushing/screening equipment, diesel generators, and material handling; however, the air quality analysis area for this evaluation is focused on the initial proposed project area under the current air quality permit located in Section 10, Township 6 South, Range 4 West, Madison County, Montana. In addition, whole rock chemistry analysis was completed to evaluate the potential for asbestiform minerals.

3.8.2 Methods

Air quality for the project area was described as part of the MAQP #4842-00 issued April 3, 2013, and the Garnet USA operating permit application which incorporates regional climate and areas of concern, emission sources, types (fugitive or point source) quantities, and a projected ambient air quality evaluation.

3.8.3 Results

The existing air quality and climatic conditions in the vicinity of the Proposed Action are detailed below in a discussion of conditions which may affect regional air quality and the existing air quality in the affected area.

Topography

The Alder Gulch processing plant and the proposed RWHR Mine site lie between the Tobacco Root Mountains to the north, Gravelly and Greenhorn Ranges to the east, and the Ruby Range to the west (Garnet USA, 2013a). The premining topography in the proposed RWHR Mine site is generally moderately steep in the east and falls in elevation sloping downward somewhat to the northwest (Garnet USA, 2013a).

Climate and Meteorology

The area surrounding the Alder Gulch processing plant and the proposed RWHR Mine is characterized by a dry, mild continental climate. Generally, average daily temperatures are moderate, rarely falling below 0 degrees Fahrenheit (°F) or rising above 90°F.

Typically, fall and winter seasons are dry and the late spring and early summer produce the greatest percentage of the precipitation. Snow pack normally peaks in early April and is absent by late May. Rain falling on snow causes runoff events that are typical in late winter and early spring. Figures 3.8-1, 3.8-2 and 3.8-3 show the temperature and precipitation data that most closely match the Alder Gulch and the RWHR Mine sites.

Historical climate data specific for the Alder Gulch permit area and the RWHR Mine were not available through the National Oceanographic and Atmospheric Administration’s (NOAA) National Weather Service (NWS). Below is a table of the NOAA stations closest in elevation and proximity to the permit areas.

Table 3.8-1. NOAA Stations Most Indicative of Garnet USA Permit Areas Climate

NOAA Station	Proximity	Elevation (ft amsl)	Years of Operation	Average Annual Precipitation
Alder Ruby Dam	8 Miles south	5611	1981-1993	13.76
Alder 17S	17 Miles south	6204	1956-2007	13.10
Alder 19S	15.3 Miles south	6098	2009-current	11.23*

*Average annual precipitation calculated on the only two years of complete data, 2009 and 2012.

The precipitation data for the Ruby Dam area were collected from January 1981 through March 1993. Figure 3.8-1 displays the annual precipitation totals in red, on the left axis, and monthly precipitation totals in blue, on the right axis. Elevation of the Ruby Dam Station is similar to that of the project area, but the Ruby Dam station site is shielded to the west by the Ruby Range in contrast to the open range typical of the project area. Monitoring ceased at this station in 1993.

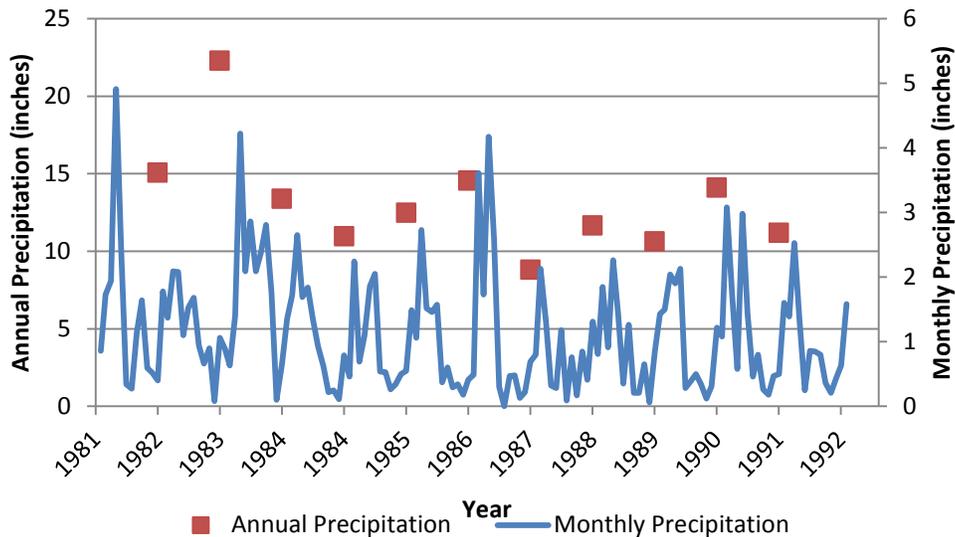


Figure 3.8-1. Precipitation Data (1981-1993) for the Ruby Dam NOAA station

The precipitation data for the Alder 17S station were collected from October 1956 through January 2008 (Figure 3.8-2). The period graphed has been truncated to make it more comparable to the data for the Ruby Dam station shown in Figure 3.8-1. The monthly precipitation totals are shown in blue, on the left axis, and annual precipitation totals are shown in red, on the right axis.

Statistical projections of precipitation from the Alder 17S station database indicated that two years in ten received less than 9.42 inches and another two years received more than 15.90 inches of annual precipitation. The average number of days that were likely to receive more than 0.10 inches of precipitation during the year was 34, or less than ten percent of days in a year. The highest projected number of days receiving more than 0.10 inches of precipitation within a particular month was six for both May and June.

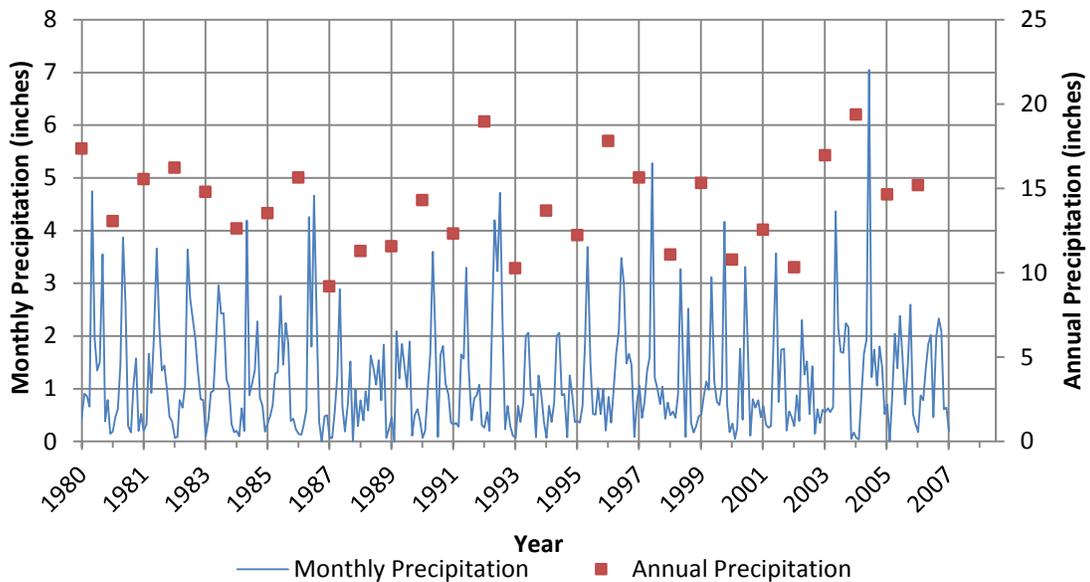


Figure 3.8-2. Annual and Monthly Precipitation Data (1957-2007) Alder 17S NOAA Station

Statistical projections of temperatures from the Alder17S station showed two years in ten had maximum temperatures greater than 92 degrees Fahrenheit (°F) and another two years in ten saw minimum temperatures less than - 27°F (Figure 3.8-3). During the period from November to March, average minimum temperatures during any of these months fell below 0°F two years out of 10.

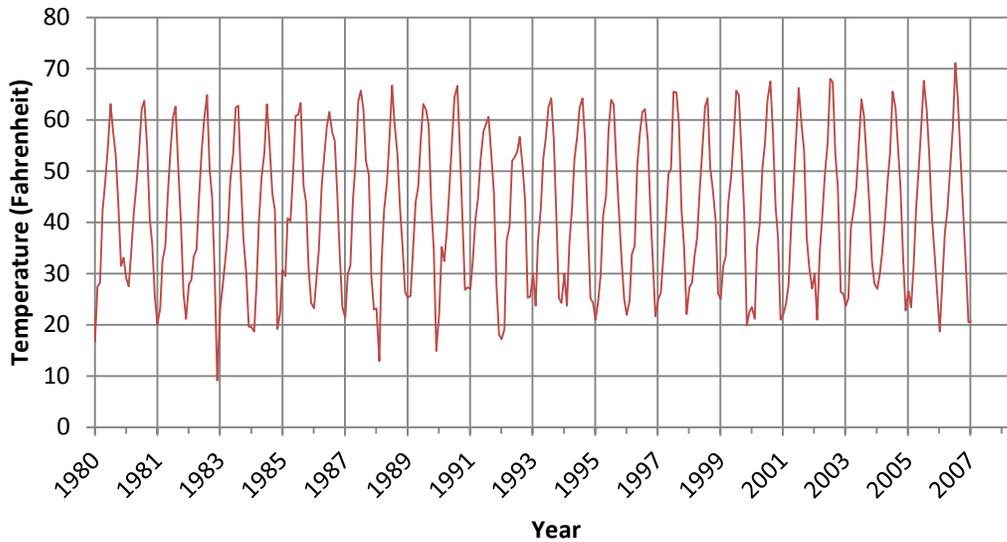


Figure 3.8-3. Monthly Mean Temperature Data (1957-2007) Alder 17S NOAA Station.

Regulatory Environment

The Clean Air Act, which was last amended in 1990, requires EPA to set National Ambient Air Quality Standards (NAAQS) (40 CFR part 50) for pollutants considered harmful to public health and the environment. The Clean Air Act established two types of national air quality standards. The standards or limits based on human health are called primary standards. The limits intended to prevent environmental and property damage are called secondary standards. A geographic area with air quality that is cleaner than the primary standard is called an "attainment" area; areas that do not meet the primary standard are called "nonattainment" areas. Designation of a nonattainment area is a formal rulemaking process under the EPA only after air quality standards have been exceeded for several consecutive years (DEQ, 2011).

Asbestiform minerals, in their fibrous, airborne form, have potential to be hazardous to human health through inhalation and can be found in certain geologic materials. Although there is no general ban on the use of asbestos, EPA primarily regulates the material with the National Emission Standards for Hazardous Air Pollutants (NESHAP) and DEQ under the Asbestos Control Act. Some of its many uses have been banned by the Toxic Substances Control Act (EPA, 2013b; DEQ, 2013).

The EPA Office of Air Quality Planning and Standards has set NAAQS for six principal pollutants, which are called "criteria" pollutants. These are particle pollution (often referred to as particulate matter (PM)), ground-level ozone as measured by volatile organic compounds (VOCs), which are necessary in the formation of ozone, carbon monoxide (CO), sulfur dioxides (SO₂), nitrogen oxides (NO_x), and lead (Pb) (EPA, 2010). The NAAQS set the absolute limit for criteria air quality pollutants. Montana has adopted additional state air quality standards known as the Montana Ambient Air Quality Standards (MAAQS). The

Proposed Action must demonstrate continued compliance with all applicable state and federal air quality standards.

The 1990 Clean Air Act amendments require large stationary sources of air pollution to obtain air quality permits. There are two different permitting programs for these sources which include the Title V Operating Permit program and the New Source Review (NSR) program. All major sources (those that have a potential to emit (PTE) greater than 100 tons per year (TPY) of any air pollutant, greater than 10 TPY for any hazardous air pollutants as listed in EPA's Section 112(b)1 Hazardous Air Pollutants (HAPS) or greater than 25 TPY for any combination of HAPS) have requirements under the EPA's Title V and NSR programs (EPA, 2007). The Title V program requires major sources to obtain a permit that consolidates all Clean Air Act requirements for the facility into one document and provides for public participation. The NSR program requires that major sources install the most stringent pollution control technology. All major sources within an attainment area would be required to have a Prevention of Significant Deterioration (PSD) increment evaluation under the federal NSR regulations (DEQ, 2011).

Projects subject to PSD must also demonstrate the use of Best Available Control Technology (BACT) and show that combined impacts from all PSD sources would not exceed allowable increments in air quality for NO₂, SO₂ and particulate matter – 10 micron (PM₁₀) which includes particles with a diameter of 10 micrometers or less (such as dust) (EPA, 2011). BACT is based on the maximum degree of control that can be achieved. It is a case-by-case decision that considers energy, environmental, and economic impact. BACT can be add-on control equipment or modification of the production processes or methods. BACT may be a design, equipment, work practice, or operational standard if imposition of an emissions standard is infeasible.

Existing Air Quality

Baseline air quality measurements were not made in the vicinity of the Alder Gulch, Red Wash Alluvial, or RWHR Mine sites. The nearest known air quality measurements were made at two talc mines south of Ennis, Montana. These measurements, however, were not representative of the Alder, Montana area. There were no significant air pollution sources in the Alder Gulch, Red Wash Alluvial, or Proposed RWHR Mine sites.

The Alder Gulch area was considered as attaining or being unclassified for all criteria air pollutants. The nearest non-attainment area is the Butte area, located approximately 50 miles northwest of the project area. The project area was also designated as a Class II area under the PSD regulations. The nearest Class I area is Yellowstone National Park, located approximately 50 miles southeast of the project areas.

On March 7, 2012, materials were sampled from surface outcrops, test pits, and exploration trenches from each lithology proposed to be encountered. No obvious asbestiform minerals were observed during the collection of the samples. Each sample was analyzed for asbestiform fibers using EPA Method 600/R/93/116 with CARB TM 435. All analytical results were reported as non-detected (Garnet USA, 2013a).

The air quality permit #2888-03 for the processing plant was transferred to Garnet USA on March 25, 2012 and an updated revision was approved May 12, 2012 (Garnet USA, 2013a). A modification application was made to the existing air quality permit to add the crushing circuit and equipment at the mine site on November 29, 2012. The permit for the crushing circuit is air quality permit #4842-00. The modifications were designed to include initial and future operation at the plant. Permit #4842-00 was issued on February 13, 2013 and finalized on April 3, 2013 (DEQ, 2013a).

The permit (#4842-00) for the crusher circuit covers fugitive emissions, those which could not reasonably pass through a stack, chimney vent, or other functionally-equivalent opening (40 CFR Sections 70.2 & 71.2), and point source emissions, those that are released from a single point. Fugitive emissions evaluated for the current air quality permit included the following: crushing, screening, material transfer including pile forming, loading and unloading, and haul roads. Point source emissions include exhaust stack emissions from diesel-fired engine generators.

Garnet USA has accepted federally enforceable permit operating limits to be considered a minor source for emissions. The location of the proposed activities has been designated as unclassified/attainment with all ambient air quality standards, meaning there is not an immediate concern with respect to the area's ambient air quality, and there are no major air pollution sources in the surrounding areas. The permit covers the plant while operating at any location in Montana with several exceptions where those areas have a DEQ approved permitting program, are considered tribal land, or are in or within 10 kilometers (km) (6.2 miles) of designated particulate matter PM₁₀ nonattainment areas.

The current air quality permit contains an air quality analysis of the proposed Garnet USA Mine Project. DEQ has determined that impacts from the current permitting action would be minor and not expected to cause or contribute to a violation of any NAAQS or MAAQS or opacity requirements and would have minimal effect on the air quality of the project area. (DEQ, 2013a).

3.9 Power Supply

3.9.1 Overview and Study Area

Both the Alder Gulch processing plant and the proposed RWHR Mine site would require electrical power to run equipment and lighting. The Alder Gulch processing plant is not proposing to add substantially to its current power usage.

3.9.2 Methods

Materials and background information were researched using the Garnet USA operating permit and amendment application (Garnet USA, 2013a).

3.9.3 Results

A 3-phase, 4-wire configuration distribution line capable of supplying 7,200 volts (to ground) and 12,470 volts (phase to phase) is located along Ruby Road within approximately 1,000

feet of the main Alder Gulch processing facility that serves customers along the county road (Garnet USA, 2013a). NorthWestern Energy has distribution power lines running west from Ruby Road to the adjacent processing plant facilities and another distribution power line running north from Highway 287 to the plant facilities west of the Alder waste water treatment plant. These power lines serve customers and landowners on both sides of the plant.

The proposed RWHR Mine site is isolated from any conventional power and gas and would derive energy from a diesel powered generator on the site. If the power cables for the generator are run above ground they would be protected by required Mine Safety and Health Administration (MSHA) safety features from damage (Garnet USA, 2013a). If the power cables are run underground, they would be removed with a backhoe or excavator at the end of the mine life.

3.10 Noise

3.10.1 Overview and Study Area

At the Alder Gulch processing plant, previously permitted noise sources include haul trucks, offloading, diesel-powered heavy equipment, wet processing (i.e., jigs, spirals, tables, etc.), drying, and bagging equipment. Other intermittent existing noise sources include wind, aircraft flying overhead, birds, insects, vehicles traveling on nearby roads, including Ruby Road (eastern and northern boundary of the site) and Highway 287 (southern boundary), the City of Alder wastewater facility operations (mid site), and Smail's Gravel Pit with crusher and conveyor operations (southwest of the site). Noise-sensitive receptors include residences to the east along Ruby Road, residences located northeast of the site, residences, and the Kampground of America (KOA) Campground along Highway 287 southwest of the site. The processing plant was last operational in 2010 until process plant testing began again in 2013. Since the spring of 2012, there have been daily operations moving gravel and dirt on the site (Garnet USA, 2013b).

The RWHR Mine site is located in open rangeland, approximately 4.5 miles southeast of the Alder Gulch site. Exploration activities are intermittent at the site, and noise sources include diesel-powered heavy equipment, blasting, and traffic on ranch roads and Anderson Lane. Other existing noise sources include aircraft flyovers, wind, wildlife, birds, insects, etc. The closest residence to the RWHR Mine site is located approximately 1.2 miles west and downslope of the site. Several rural residences are also located along the haul route along Anderson Lane between the RWHR Mine site and Highway 287.

3.10.2 Methods

The noise assessment relied on published noise levels for noise sources and ambient conditions (Harris, 1998; Fidel, 1983; FTA, 2006; BSA, 2005; BSA, 2008). Existing noise levels at the Alder Gulch and RWHR Mine sites have not been measured (McCullough, 2013).

Noise levels predictions at receptor locations due to equipment and operations, except haul truck traffic, were estimated according to the calculations of the International Organization for Standardization (ISO) Standard 9613-2, Attenuation of Sound During Propagation Outdoors, Part 2: General Method of Calculation (ISO, 1996). These calculations conservatively assume that atmospheric conditions are favorable for noise propagation, but atmospheric conditions can vary dramatically at large distances between a noise source and a receptor. Therefore, the predicted noise levels should be assumed to be average noise levels, and temporary significant positive and negative deviations from the averages can occur (Harris, 1998).

Haul truck noise level predictions were made using the Federal Highway Administration (FHWA) approved Traffic Noise Model (TNM), Version 2.5 software program.

Background

Noise is generally defined as unwanted sound, and can be intermittent or continuous, steady or impulsive, stationary or transient. Noise levels heard by humans and animals are dependent on several variables, including distance and ground cover between the source and receiver and atmospheric conditions. Perception of noise is affected by intensity, frequency, pitch and duration, and a person's attitude toward the noise source.

Noise levels are quantified using units of decibels (dB). Humans typically have reduced hearing sensitivity at low frequencies compared with their response at high frequencies. The "A-weighting" of noise levels, or A-weighted decibels (dBA), closely correlates to the frequency response of normal human hearing (250 to 4,000 hertz [Hz]). Decibels are logarithmic values, and therefore, the combined noise level of two 50 dBA noise sources is 53 dBA, not 100 dBA.

Noise levels typically decrease by approximately 6 dBA every time the distance between the source and receptor is doubled, depending on the characteristics of the source and the conditions over the path that the noise travels. The reduction in noise levels can be increased if a solid barrier or natural topography is located between the source and receptor.

For environmental noise studies, noise levels are typically described using A-weighted equivalent noise levels, L_{eq} , during a certain time period. The L_{eq} metric is useful because it uses a single number, similar to an average, to describe the constantly fluctuating instantaneous noise levels at a receptor location during a period of time, and accounts for all of the noises and quiet periods that occur during that time period.

The ambient noise at a receptor location in a given environment is the all-encompassing sound associated with that environment, and is due to the combination of noise sources from many directions, near and far, including the noise source of interest. The 90th percentile-exceeded noise level, L_{90} , is a metric that indicates the single noise level that is exceeded during 90 percent of a measurement period although the actual instantaneous noise levels fluctuate continuously. The L_{90} noise level is typically considered the ambient

noise level, and is often near the low end of the instantaneous noise levels during a measurement period. It typically does not include the influence of discrete noises of short duration, such as bird chirps, dog barks, car horns, a single blast, etc. If a continuous noise is audible at a measurement location, typically it is that noise that determines the L_{90} of a measurement period even though other noise sources may be briefly audible and occasionally louder than the equipment during the same measurement period.

The day-night average noise level, L_{dn} , is a single number descriptor that represents the constantly varying sound level during a continuous 24-hour period. The L_{dn} can be determined using 24 consecutive one-hour L_{eq} noise levels, or estimated using measured L_{eq} noise levels during shorter time periods. The L_{dn} includes a 10 decibel penalty that is added to noises that occur during the nighttime hours between 10:00 p.m. and 7:00 a.m., to account for people's higher sensitivity to noise at night when the background noise level is typically low. Because it represents a weighted average noise level during a 24-hour period, the L_{dn} is not effective for describing individual or intermittent noise events, such as a single blast.

Large amplitude impulsive sounds, such as blasting, are commonly defined using the unweighted instantaneous peak noise level, L_{pk} . L_{pk} represents the highest instantaneous noise level during a certain time period, and the units of L_{pk} are unweighted peak decibels (dBP). L_{pk} is used to assess blast noise because A-weighting underestimates the human annoyance caused by these low frequency impulsive sounds (USACHPPM, 2005).

Regulatory Environment

Madison County and the State of Montana do not have noise ordinances or regulations to limit the noise levels of mine or processing operations. However, excessive noise can be considered a public nuisance according to Montana Code, if the noise "endangers safety or health, is offensive to the senses, or obstructs the free use of property so as to interfere with comfortable enjoyment of life or property by an entire community or neighborhood or by any considerable number of persons" (45-8-1(11), MCA).

As a result of the Noise Control Act of 1972, the EPA developed acceptable noise levels under various conditions that would protect public health and welfare with an adequate margin of safety. The EPA identified outdoor L_{dn} noise levels less than or equal to 55 dBA are sufficient to protect public health and welfare in residential areas and other places where quiet is a basis for use (EPA, 1979). Although the EPA guideline is not an enforceable regulation, it is a commonly accepted target noise level for environmental noise studies.

No regulations limit the blasting noise produced by the Proposed Action, but the U.S. Army has determined an approximate level associated with human annoyance to blast noise. In general, L_{pk} 115 dBP at a listener location represents the threshold of annoyance for people, and below this level, there is a low risk of noise complaints (USACHPPM, 2005).

The Montana Department of Transportation (MDT) determines traffic noise impacts based on the noise levels generated by peak-hour traffic. The MDT criteria state that traffic noise

impacts occur if predicted one-hour $L_{eq}(h)$ traffic noise levels are 66 dBA or greater at a residential property during the peak traffic hour, or if the projected traffic noise levels exceed the existing peak hour $L_{eq}(h)$ by 13 dBA or more (MDT, 2011a).

In addition to the absolute impact limits defined by EPA, MDT, and the U.S. Army, changes in noise levels are used to determine noise impacts and gauge community response (Egan, 1988). A change of 0 dBA is typically imperceptible and a 3 dBA is typically barely audible, which would result in no noise impact. A change of 5 dBA is clearly noticeable, and would be a moderate impact. A 10 dBA change is typically considered to be twice as loud as the existing conditions, and considered a significant impact.

3.10.3 Existing Noise Levels

Alder Gulch Processing Plant

When the Alder Gulch processing plant was last operational full time in 2010, the noise levels at the nearby residences were influenced by the onsite equipment and operations. Noise from an enclosed processing plant is typically about L_{eq} 63 dBA at 450 feet away, which includes diesel equipment and trucks coming and going from the building (BSA, 2005), and the residences located to the east and northeast of the site are approximately 1,300 to 2,400 feet from the plant. Therefore, the noise of the processing plant was approximately L_{eq} 42 to 48 dBA at the residences, and continuous processing activities between 7:00 a.m. and 5:00 p.m. would have been approximately L_{dn} 43 to 46 dBA at the residences, which is less than the EPA guideline of L_{dn} 55 dBA (EPA, 1979).

The noise of the diesel equipment working on the site since spring 2012 is difficult to quantify. Although typical diesel-powered equipment is L_{eq} 85 dBA at 50 feet away (FTA, 2006), the equipment is mobile over a large area, and operates intermittently. Therefore, the equipment noise levels at the residences vary widely from day to day.

When there are no processing activities and the diesel equipment is operating far from a residence, the ambient noise levels surrounding the Alder Gulch site are estimated to be approximately L_{90} 35 dBA and L_{dn} 40 dBA, which is typical for sparsely-populated, rural locations (Harris, 1998).

RWHR Mine Site

Exploration activities at the RWHR Mine site are intermittent, and include diesel-powered equipment, a rock drill, blasting, and hauling the bulk sample to the Alder Gulch processing plant along Anderson Lane. Typical diesel-powered equipment is L_{eq} 85 dBA at 50 feet away, and a rock drill is L_{eq} 98 dBA at 50 feet (FTA, 2006). Therefore, when exploration activities occur, the diesel equipment noise is predicted to be approximately L_{eq} 30 dBA, and the rock drill noise approximately L_{eq} 43 dBA at the closest residence located 1.2 miles west. Therefore, the existing L_{dn} at the residence is predicted to be approximately L_{dn} 41 to 43 dBA if the diesel equipment and rock drill operate continuously for all 10 hours between 7:00 a.m. and 5:00 p.m. on weekdays (Garnet USA, 2013a), which is less than the EPA guideline of L_{dn} 55 dBA (EPA, 1979).

Blast noise is calculated based on the weight of explosive used for each delay (Fidel, 1983). For the exploration activities, the maximum charge per delay is approximately 44 pounds (Garnet USA 2013a), and therefore, the predicted blast noise level is approximately L_{pk} 103 dBP, which is less than the U.S. Army L_{pk} 115 dBP threshold for annoyance (USACHPPM, 2005).

Near the RWHR Mine site and along Anderson Lane, the existing ambient noise levels are estimated to be approximately L_{90} 35 dBA and L_{dn} 40 dBA, when exploration activities are not occurring, which is typical for sparsely-populated, rural locations (Harris, 1998).

Back-Up Alarms

Because of their intermittent, high-pitched, impulsive sound, back-up alarms can cause high levels of annoyance and numerous complaints even at noise levels equal to or less than the ambient noise levels at a listener location. However, back-up alarm noise has little influence on L_{eq} or L_{dn} values. Federal regulations indicate that backup alarms shall be audible above the surrounding background noise level near the equipment, but does not specify a particular noise level (MSHA, 2011).

Manufacturer published back-up alarm sound levels can vary between a maximum noise level of 90 and 110 dBA at 4 feet away, depending on the volume setting, model, working environment, etc. Although the back-up alarm noise varies widely at the residences near the Alder Gulch site as equipment moves around the site, the noise is expected to exceed and be clearly audible compared to the existing ambient noise levels. At the residence closest to the RWHR Mine site, the back-up alarm noise may be equal to or less than the existing ambient levels, but may be still audible.

Haul Trucks

Hauling for the exploration work typically involves four to eight truckloads per day between 7:00 a.m. and 5:00 p.m. (Garnet USA, 2013b). The residences located along Anderson Lane are approximately 160 to 200 feet from the road, and traffic travels at approximately 30 mph. Therefore, the predicted haul truck traffic noise during exploration work is approximately $L_{eq}(h)$ 38 to 40 dBA, which is less than the MDT $L_{eq}(h)$ 66 dBA traffic noise impact criterion (MDT, 2011).

During exploration, haul trucks are entering the Alder Gulch site by moving north from Anderson Lane and across Highway 287 to Ruby Road, travel approximately 900 feet north on Ruby Road, and turn onto the East Road into the site. Residences along Ruby Road between Highway 287 and the East Road are approximately 200 feet from the road. Therefore, the predicted haul truck traffic noise on Ruby Road during exploration work is approximately $L_{eq}(h)$ 38 dBA, which is less than the MDT $L_{eq}(h)$ 66 dBA traffic noise impact criterion (MDT, 2011a).

3.11 Cultural Resources

Alder Gulch, in the vicinity of Virginia City, was one of the early placer gold mining camps in Montana where an estimated \$30,000,000 worth of gold was recovered during the initial gold rush of the 1860's. An additional \$9,000,000 in gold was recovered from the gulch in the vicinity of Alder, including the processing plant site, by a succession of dredges operated by the Conrey Placer Mining Company during the first two decades of the twentieth century.

The Alder dredge piles have been previously recorded and their significance assessed in terms of the National Register of Historic Places (GCM Services, 1989). The permit area is outside of the Virginia City Historic Landmark District, but has important historical, economic, and geological connections with Virginia City, Montana.

3.11.1 Overview and Study Area

The area of potential effect for the alternatives under consideration includes the areas within the permit boundaries for the proposed RWHR Mine site and the Alder Gulch processing plant.

3.11.2 Methods

Since this project is not a Federal undertaking, the federal laws relating to the protection of cultural resources (Section 106 or Section 110 of the National Historic Preservation Act) do not apply. Also since the project is located entirely on private land, the Montana Antiquities Act does not apply, as it is restricted to State owned lands. MEPA requires the identification of known cultural resources within a project area, and a disclosure on what the potential impacts might be to those resources. This generally entails a file search conducted with the Montana State Historic Preservation Office (SHPO), with a disclosure of those findings. This was done as part of the MEPA process and in addition, on their own accord, Garnet USA voluntarily conducted a Class III cultural resource inventory of the area (Sears, 2012), and a report was submitted to and approved by SHPO. The inventory was conducted under the same "standards" required by federal law.

A historical inventory and assessment of the Alder Gulch permit area was conducted by the permit holder as a portion of the project's baseline environmental investigations in 1990. The objective of the inventory and assessment was to document historic activity which may have taken place on the permit area, to document the existing cultural environment prior to the proposed mining disturbance, and to assess the proposed disturbance in the context of historic placer and dredge mining. This assessment covered much of the permit boundary, and extended beyond the boundaries of the processing facility.

In June 2012, DEQ conducted a Class III cultural resources inventory at the proposed RWHR Mine site.

3.11.3 Results

Alder Gulch Processing Plant

Historic features and artifacts were found at three locations at or near the Alder Gulch permit area. Two of the features were felt to be of historic significance, either individually or in terms of the historic mining district. The remains of the No. 4 Conrey Dredge were located adjacent to the Alder KOA Campground, outside of, but immediately adjacent to the permit boundary. The permit activities provided maintenance of the setting and associations of this feature within the mining plan by avoiding the feature and leaving an unmined buffer zone of high tailings around the eastern periphery of the dredge pond.

The remains of the No. 2 Conrey Dredge, built in 1901, are in a pond on the permit area's northern border in the eastern edge of Section 10, Township 6 South, Range 4 West. This feature is near the old Virginia City Road, and is inside the permit area. The previously submitted permit provided for maintenance of the setting and associations of this feature in the mine plan by avoiding the feature and leaving an unmined buffer zone immediately adjacent to the feature.

The former Alder headquarters for the Conrey Placer Mining Company was located at the former town site of Ruby, immediately adjacent to the north boundary of the central portion of the permit area. The complex was last used by the Conrey Company in 1915, and has remained in an excellent state of preservation. While intimately associated with the Alder dredges and their resulting dredge piles, the site was separated in its purpose, which was administration, maintenance, and reporting of the amalgam from the dredges. The current owner was aware of the historic resource, and was largely responsible for the site's unusually high degree of integrity. The site; however, was not disturbed by the permitted activities, and the current owner does not wish to have the property listed on the National Register of Historic Places.

RWHR Mine Site

No historic properties were found, nor was there any evidence of cultural properties within the area of potential effect during the July 2012 pedestrian survey conducted by DEQ (Sears, 2012). The area has been used for cattle grazing and there was no evidence of structures or artifacts on the ground surface.

The cultural resource examinations were completed in a manner to satisfy federal and state regulations requiring cultural resources inventory in compliance with Section 106 of the National Historic Preservation Act (Public Law 89-665, as amended); Executive Order 11593 (Protection and Enhancement of the Cultural Environment); the National and Montana Environmental Policy Acts, and other state and federal legislation.

3.12 Socioeconomics

3.12.1 Overview and Study Area

The discovery of gold in Virginia City in the 1850's resulted in a rapid migration of miners and associated tradesmen into the area. Although the rich placer gold deposits upstream from Virginia City were depleted during the following decade, placer and lode mining continued on a relatively large scale until 1922. Since then, intermittent mining activities in the general area have continued to the present on a much smaller scale.

From 1899 to 1922, approximately two square miles of the Alder Creek drainage within the immediate vicinity of Alder were mined by large scale dredging operations to recover placer gold from alluvial sands and gravels. The original Cominco American Mining Project proposed to placer mine and reprocess these dredge tailings left from this historic mining. Following the end of the major mining activity in the Alder area near the beginning of this century, farming and ranching became the primary and basic industries characterizing the area. The construction of the Ruby Reservoir Dam south of Alder resulted in a large expansion of irrigation systems which provide water for ranch lands in the Ruby River Valley. Today, cattle and alfalfa hay are the principal agricultural products of the area.

Tourism and recreational opportunities have become a major factor in the socioeconomic structure of the Alder and Ruby River Valley area. Hunting and fishing, along with nearby Yellowstone National Park, the historic reconstruction of Nevada City, and preservation of Virginia City, all contribute to these opportunities.

Limited local goods and services are provided in Alder, Montana. Other nearby communities of Sheridan, Virginia City, Twin Bridges, and Ennis offer additional goods and services. Major regional retail centers nearest the Alder area include Butte (approximately 65 miles), Dillon (approximately 48 miles), and Bozeman (approximately 78 miles). Socioeconomic analyses are focused on the area surrounding Alder, but some statistics are available only for larger communities in Madison County.

3.12.2 Methods

Statistical information used in the following sections to document and describe the socioeconomics and human environment of the Madison County, Montana area was obtained from the US Census and other governmental databases available on-line (US Census Bureau, 2012; IES, 2012; US Dept. of Commerce, 2013). The low population density in Madison County and Alder limits the amount of community-specific statistics available.

3.12.3 Results

Population and Demographics

The 2010 National Census recorded a Madison County population of 7,691 persons. In 2012 the population estimate increased by 82 persons or approximately one percent (US Census, 2013). Madison County was one of the top ten fastest-growing counties in the state

from 2000 to 2010, with a population increase of 12.3 percent (MT DLI, 2012). Table 3.12-1 provides available population statistics for communities in Madison County and demographic data for the county as a whole.

Table 3.12-1. Census and Demographic Data for Madison County, Montana

Population (count)		
	2010	2012
Madison County	7,691	7,733
Alder	103	105
Ennis	838	853
Virginia City	285	196
Sheridan Town (CCD) ¹	642 (1,718)	651
Twin Bridges Town (CCD)	375 (1,514)	382
Gender – Madison County		
	2010	2012
Male (%)	52	52
Female (%)	48	48
Percent Race – Madison County		
	2010	2012
White	96.8	98.1
Native American	0.5	0.5
Hispanic	2.4	1.4
Other	0.3	0.0
Age Groups (count) – Madison County		
	2010	2012
Under 18	1,364	1,491
18-44	2,508	1,848
45-64	2,207	2,775
65 or older	1,612	1,612
Sources: (US Census Bureau, 2012; US Census, 2013)		
¹ CCD: Census County Division- Areas designated by the Census Bureau for presenting decennial census statistics in areas with lower population density.		
Note: Column sums for groups reflect questions answered and may not match County totals due to individual census completion.		

Housing: Quantity and Distribution

The 2010 housing census reported 807 occupied housing units in Sheridan, of which 588 are owner occupied and 219 are renter-occupied. 257 vacant housing units were identified in Sheridan. Across Madison County, there are approximately 6,580 housing units of which 3,672 are occupied. The overall 2010 Madison County rental vacancy rate was estimated at 12.3 percent (US Census Bureau, 2012). Specific housing data are not available for Alder.

Social and Governmental Services

Hospitals or medical centers near Alder, Montana include:

- Ruby Valley Hospital- provides emergency services 9 miles away in Sheridan
- Barrett Memorial Hospital- provides emergency services 35 miles away in Dillon
- St. James Healthcare- provides emergency services 51 miles away in Butte, MT

Emergency response and services are dispatched out of the Madison County Communication Center in Virginia City, Montana. Madison County Communication Center supplies local communication and dispatch services for local police, fire emergency medical, and search and rescue agencies. Madison is a rural county, but social services such as community centers, counseling, child care, and elder care are available at the larger population centers such as Dillon and Sheridan.

School System

An elementary school system at Alder provides education for children in kindergarten through eighth grade. The school has three classrooms and a small gymnasium which also serves as a town meeting hall and school auditorium. The school was designed to serve a capacity enrollment of 60 students and 3 teachers. Enrollment in 2011 was 24 students served by 2 teachers (IES, 2012).

Madison County has an "open" enrollment policy whereby students may choose their schools. About 12 students of elementary age from Alder attended schools in the Sheridan School District during the 2011 school year. Madison County provides bus service for these students.

Sheridan schools include a kindergarten through eighth grade elementary school and a high school in adjoining buildings. The elementary school has a capacity of about 206 students, and registered an enrollment of 106 in 2011. The high school has a capacity of 130 students, and had a 2011 enrollment of 76 students (IES, 2012). Alder, Montana, is included in the Sheridan High School District. For comparison, the Ennis School District served approximately 328 students at three schools in grades kindergarten through 12th grade in the 2011-2012 school year (Table 3.12-2).

Law Enforcement and Fire Protection

Law enforcement services within Madison County are provided by the Madison County Sheriff's Department. The Sheriff's Department consists of a sheriff, an undersheriff, and five deputies and radio operators. Two law enforcement personnel are on duty, with one officer patrolling the area west of Virginia City, and one officer patrolling the area east of Virginia City.

The Alder Volunteer Fire Department had 17 local volunteer members. Mobile response units are located at Alder, Montana, and include one pumper truck with a 500 gallon tank and a 300 gallon per minute (gpm) pump, a water tender with a 1,000 gallon tank and a 100

gpm pump, and a Montana Department of Natural Resources and Conservation fire truck with a 250 gallon tank and a 100 gpm pump.

The Sheridan Volunteer Fire Department consisted of 28 local volunteers and six mobile response units, including a service truck, two wildfire pumpers, one fire truck with a 1,000 gallon tank and a 1,000 gpm pump, and two fire trucks with 500 gallon tanks and 500 gpm pumps. Although the local fire control district extends to the community of Laurin about two miles north of Alder, the Sheridan Fire Department is available by request to assist in responding to local fire protection needs. The Alder and Sheridan fire control areas maintain a Mutual Fire Aid Agreement.

Sanitation

Alder has a municipal wastewater system. Individual wells provide domestic water to the businesses and residents. Individual homes and businesses are responsible for providing their own water via domestic wells.

Madison County owns and operates solid waste landfill sites near Ennis and Twin Bridges. A solid waste collection facility (green boxes) for the Alder area is located in the southwest portion of the existing dredge tailings about one-half mile east of Alder. The Madison County Sanitarian reports no current problem with capacity at the county's landfill sites. Special arrangements, including payment of additional fees, would have to be made with the County Sanitarian if large quantities of solid waste were proposed for disposal at the Alder collection site.

Employment and Income

Employment across Madison County is diverse and the top ten private industry employers in the county include three resorts, a mine, local hospitals, a grocery, and a fly-rod manufacturer (MT DLI, 2012). Average wage per worker and annual employment data for representative industry categories Madison County, Montana for 2009 and 2010 are provided in Table 3.12-3.

Table 3.13-2. District Information for Madison County Schools for the 2011-2012 School Year.

School Name	Full-time classroom teachers	Total Enrollment	Student teacher ratio	Title 1 (School Wide Program) ¹
Alder Elementary District				
Alder Elementary (kindergarten-8th grade)	1.9	24	12.63	Yes
Sheridan District				
Sheridan Elementary School (kindergarten-8th grade)	11.87	106	8.93	Yes
Sheridan High School (9th-12th grade)	9.73	76	8.06	Yes
Ennis Elementary and High School Districts				
Ennis Elementary (pre-K-6 th)	13	181	13.92	No
Ennis 7-8	3.14	47	14.97	No
Ennis High School (9th-12th grade)	8.79	100	11.4	No

Source: National Center for Education Statistics. Data for the 2011-2012 school year. <http://nces.ed.gov/ccd/districtsearch/>

¹Title I schoolwide programs serve schools where 40% or more of the enrolled population come from families living in poverty. Schoolwide programs serve all students within Title I schools regardless of individual income status.

Table 3.12-3. 2009 and 2010 Average Wages per Job and Annual Employment, Madison County

Industry	2009		2010	
	Wage	Employees	Wage	Employees
All Industries	\$27,220	3,584	\$29,022	3,322
Mining	\$58,718	74	\$60,930	51
Construction	\$33,690	351	\$30,592	341
Manufacturing	\$25,273	77	\$24,378	87
Transportation/ Warehousing	\$32,696	85	\$34,227	84
Wholesale Trade	\$35,493	32	\$39,870	27
Retail Trade	\$21,230	217	\$21,823	212
Finance /Insurance/Real Estate	\$36,781	155	\$35,450	154
Government	\$30,453	521	\$30,701	528
Health Services	\$34,517	154	\$34,543	152
Accommodations and Food Service	\$19,373	949	\$20,517	885
Source: Montana Department of Labor and Industry				

The median family income in Madison County in 2011 was \$45,242 (US Census, 2013). Per capita income in 2011 was \$35,281 (Table 3.12-4). The total civilian labor force for Madison County in 2009 was estimated to be 4,171, of which 94.2 percent were employed. In 2010, the labor force decreased to 3,910 and unemployment increased to 7.5 percent (MT DLI, 2012). This trend is similar to overall nationwide trends in unemployment.

Table 3.12-4. Per capita Personal Income for the United States, Montana, and Madison County from 2009 to 2011.

Year	United States	Montana		Madison County	
	Dollars	Dollars	% of US Avg	Dollars	% of Montana Avg
2009	\$ 39,635	\$ 34,828	87.8	\$ 33,196	99.5
2010	\$39,791	\$ 34,363	86.6	\$ 33,401	97.2
2011	\$41,560	\$ 36,016	87.0	\$ 35,281	99.5
2012	\$42,693	\$ 37,370	88.2	---	---

Source: US Department of Commerce, Bureau of Economic Analysis, CA1-3 - Per capita personal income 2/ <http://www.bea.gov/regional/reis/drill.cfm>

Industrial and Commercial Activities

Intermittent lode and placer gold mining operations have contributed to industrial activities in the Ruby Valley. Family ranching and farming activities predominated in the Ruby Valley area. In addition, seasonal tourism (Virginia City and nearby historic features) and recreational opportunities (hunting and fishing, sightseeing) contributed to local commercial activities. The *Madisonian* in Virginia City, Montana, publishes a weekly newspaper which

provides coverage for the Ruby Valley Area. The US Department of Labor classifies jobs using the North American Industry Classification System (NAICS). Major industries use a two-digit code, and mining, quarrying, and oil and gas is classified as NAICS 21. Examples of other major industries include health services, transportation, construction, government, accommodations, and manufacturing.

The industrial and commercial activities for Madison County also pertain to the proposed RWHR Mine site. Agriculture, forestry, fishing and hunting, and mining are the main industrial employers but only account for four percent of industry in Madison County. Other major industries are construction (7%), educational, health and social services (5%) and arts, entertainment, recreation, accommodation and food services (31%) (US Dept. of Commerce, 2013). Employment in Madison County has shifted over the past few years. Sectors such as construction have lost jobs while service industry jobs such as accommodations and food service have increased (Table 3.12-5).

Table 3.12-5. Employment by NAICS Industry (persons) for Madison County from 2009 to 2011.

Description	2009	2010	2011
Employment by place of work (number of jobs)			
Total employment	5,976	5,643	5,790
By type			
Wage and salary employment	3,813	3,565	3,700
Proprietors employment	2,163	2,078	2,090
Farm proprietors employment	471	466	464
Nonfarm proprietors employment	1,692	1,612	1,626
By industry			
Farm employment	615	615	631
Nonfarm employment	5,361	5,028	5,159
Private nonfarm employment	4,796	4,457	4,585
Forestry, fishing, and related activities	142	152	154
Mining	114	91	86
Utilities	13	13	13
Construction	652	616	413
Manufacturing	134	132	139
Wholesale trade	50	44	39
Retail trade	420	402	406
Transportation and warehousing	142	140	155
Information	18	18	18
Finance and insurance	149	153	151
Real estate and rental and leasing	321	302	303
Professional, scientific, and technical services	(D)	(D)	(D)
Management of companies and enterprises	(D)	(D)	(D)
Administrative and waste management services	197	180	186
Educational services	28	29	31
Health care and social assistance	211	209	204

Description	2009	2010	2011
Arts, entertainment, and recreation	618	499	547
Accommodation and food services	1,070	987	1,239
Other services, except public administration	303	299	311
Government and government enterprises	565	571	574
Federal, civilian	70	70	68
Military	38	38	39
State and local	457	463	467
State government	13	13	12
Local government	444	450	455

(D) Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.

Source: Regional Economic Information System, Bureau of Economic Analysis, US Department of Commerce, <http://www.bea.gov/regional/docs/footnotes.cfm?tablename=CA05N>

Local and State Tax Revenues

Madison County, Montana and School District 2 valuations and revenues are shown in Table 3.13.-6. School District 2 serves the immediate Alder, Montana area and teaches students in kindergarten through 6th grade. The elementary school receives most of the available tax revenues. The amounts shown in Table 3.12-6 are approximate. The 2011 tax levy in the Alder tax district of Madison County was 443 mills.

Table 3.12-6. 2011 School District 2, Alder and Madison County Taxable Value and Revenues

Tax Entity	Taxable Value	Revenues
Madison County	\$74,186,637	\$24,106,387*
Alder Elementary School District	\$1,484,796	\$1,323,000
*Estimated		

3.13 Transportation

3.13.1 Overview and Study Area

The main roadway servicing the Alder Gulch processing plant is State Route 287 which connects Alder on the west with Virginia City to the east. The roadway passes through Alder, and turns north toward Sheridan. Other roadways that would be driven on by employees and contractors include Ruby Road, Anderson Lane, and private ranching roads. Of these, only State Route 287 is a paved road. Truck traffic related to the project would potentially affect other traffic on State Route 287 on the section between Alder and the entrance to the Alder Gulch processing plant. The study area for transportation includes this section of State Route 287 and the potential access roads for the Alder Gulch processing plant and the proposed RWHR Mine site.

3.13.2 Methods

Statewide traffic data from MDT annual counts for State Route 287 from Ennis to Alder were reviewed (MDT, 2012). Information on county and private roads was provided by Garnet USA in its operating permit (Garnet USA, 2013a).

3.13.3 Results

All transportation of materials and personnel would occur on public and private roads. There are no plans to use rail transport to move ore or other project-related materials. All employee transportation associated with the mining project is by personal vehicle. Employees park near the processing facility and would carpool to the mine site using personal vehicles.

Construction and Operational Materials

All materials necessary for operation of the Alder Gulch processing plant access the project site from State Route 287. A main access road, the South Road, had been completed with appropriate right-of-way permits obtained from MDT. All materials necessary for operation of the proposed RWHR Mine site would access the project site from State Route 287 to Anderson Lane, to a private ranch road for final access. A main access road for the RWHR Mine site has been completed with appropriate right-of-way permits obtained from MDT.

Access Roads

The main existing access road to the Alder Gulch processing facilities, the South Road, originates from State Route 287. The main access to the proposed RWHR Mine site is along Anderson Lane to an improved existing ranch access road.

All trucks and employee traffic would use State Route 287 in some capacity to reach one or both permit areas. Traffic data are summarized annually by MDT for several monitoring sites along State Route 287. These data are provided as Annual Average Daily Traffic or AADTs. Although traffic data are not available by month, it is generally accepted that the summer months have higher traffic counts due to heavy tourist traffic traveling between Ennis, Virginia City, Alder, and Sheridan, Montana. MDT Traffic Count Site 29-3-1 is less than one mile east of the Alder Gulch processing plant entrance on State Route 287 (MDT, 2012). Table 3.13-1 summarizes the AADTs for several traffic count sites along State Route 287 from just north of Alder (29-3-2) to where it intersects with US Highway 287 at Ennis (29-4-13). Traffic has declined on State Route 287 at all traffic count sites in the area from 2007 to 2011 by an average of 28 percent. MDT counted approximately 60 commercial trucks daily during their traffic counts for 2011 along State Route 287 at sites from Ennis to Alder.

Table 3.13-1. Annual Average Daily Traffic Counts for MDT Traffic Monitoring Stations in the Vicinity of the Garnet USA Project, Madison County, Montana.

MDT Site ID	Description	2007	2008	2009	2010	2011
29-3-6	Upper Ruby Road, West of Alder	540*	400	400	400	270
29-3-2	State Route 287 Northwest of Alder	1,610*	1,520*	1,480	1,360	1,260
29-3-1	State Route 287 East of Alder-Station closest to processing plant	1,230*	1,160*	1,110	1,080	960
29-4-6	State Route 287 W of Virginia City	1,470*	1,380	1,370*	1,380*	910
29-4-8	State Route 287 E of Virginia City	1,440*	1,360*	2,110	2,120*	820
29-4-4	State Route 287 West of Ennis	1,780*	1,840	1,900	1,900	1,520
29-4-13	US Hwy 287 just N of Ennis	6,580	6,040*	6,320*	4,660	3,500

*estimated from previous year's data

Source: (MDT, 2012)

The section of the main RWHR Mine access, Anderson Lane, that is on the County Road is a wide gravel road and is well maintained. The private road has been maintained for hauling semi-trailers and stock equipment. The road has had many layers of gravel applied over the past several years and is in excellent condition. Garnet USA has widened and improved the road to accommodate the haul truck traffic with county approval.

3.14 Land Use and Recreation

Land use includes all types of commercial, municipal, and recreational activities and how they affect the character of an area as well as its ability to sustain these uses.

3.14.1 Overview and Study Area

The study areas include the established Alder Gulch processing plant, the proposed RWHR Mine site, their respective permit areas, and adjacent lands.

3.14.2 Methods

Materials provided in the operating permit were reviewed, aerial photos of the sites were examined, and land use data bases were consulted to determine the types and arrangements of land uses in the study area.

3.14.3 Results

Alder Gulch Permit Area

The Alder Water and Sewer District operates a wastewater facility on 18.54 acres adjacent to the Alder Gulch processing plant. The facility includes two lined holding ponds and a center pivot LAD area. Approximately 20 percent of the northwestern corner of the LAD is located on Garnet USA property. Wastewater from Alder is delivered to the treatment facility via a lift system and pipeline. The facility is in compliance with plans and specifications and recently passed a state compliance inspection (Bill Bahr, DEQ, pers. comm., July 2, 2013). The facility is estimated to be running at half capacity. Last year water in the ponds completely evaporated and land application was not necessary. A discharge permit is not required by DEQ. No yearly monitoring of water or soil quality is required or completed.

Public recreational opportunities within the permit area and immediately adjacent areas are limited as these lands are privately owned with access only by permission of the landowners.

The permitted area is located entirely on privately-owned land either owned or leased by Garnet USA, LLC. Mineral rights are owned, leased, or available for lease by Garnet USA. Property boundaries and surface ownership are identified in Figure 2.4-1.

A small subdivision with several homes is located along the east side of the Ruby Road adjacent to the central portion of the permit area. The original site of the headquarters for the Conrey Mining Company was located a short distance north of the north-central portion of the permit boundary, and was historically referred to as Ruby Village. This area also contained several homes, including those of two of the permit area landowners. Several homes are located immediately south of State Route 287 in the vicinity of the southwestern boundary of the permit area.

A gravel operation is maintained on the lands to the west of the Alder Gulch processing plant within the permit boundary. Gravel is mined from the tailings piles, sorted, washed, and loaded onto trucks for distribution. MDT also maintains a shop and gravel source area just west of the permit boundary within the historic tailings piles.

A KOA camping facility is located adjacent to the southwestern-most portion of the permitted area boundary. A small area of the dredge tailings piles adjacent to State Route 287 along the southern boundary of the permit area had been used by local individuals (with landowner permission) for obtaining small amounts of gravel and sand. The community of Alder, Montana, is located a short distance west of the KOA facility along State Route 287.

The area immediately south of State Route 287 and the permitted area boundary is characterized by flat tailings, and is used by a private landowner for livestock wintering and feeding. Other areas beyond the permit area boundary are used by private landowners for agricultural purposes, primarily hay production and livestock grazing. Landowner homes are widely dispersed in these areas. These areas are also interspersed with several irrigation canals. The Vigilante Canal, a major local irrigation canal providing water from the Ruby

Reservoir, originates well south of the permitted area, flows north in an area east of the permit area and then northwestward along the bench land north of the permit area.

RWHR Permit Area

The RWHR is solely on privately owned lands and has restricted access for public recreation. The rangeland has historically been used for livestock grazing. The area also contains a previously permitted alluvial site (Red Wash) northwest of the proposed RWHR Mine site. There are no private residences or buildings within one mile of the proposed RWHR Mine site. Williams Creek-St-287-Adobetown Road is the only maintained dirt road within one-mile radius of the proposed RWHR Mine site. The road forks east off of Anderson Lane and travels through private and USDA Forest Service land to the northeast and ends at State Route 287 just northwest of Nevada City, Montana. Several unmaintained ranch roads are present within and surrounding the proposed RWHR Mine site.

Regional Land Uses

Madison County and the Ruby Valley, along with adjoining counties of Gallatin, Beaverhead, Silver Bow, and Jefferson offer a wide variety of seasonal public recreational opportunities. Major recreational opportunities within a one-hour drive of the permit area near Alder, Montana, include the following:

- Virginia City and Nevada City, along State Route 287 approximately nine miles west of the mine project area, recreate the historic era of the area with wooden sidewalks and authentic period shops, restaurants, and hotels. The Virginia City Player's Community Theater offers popular nightly melodrama and other theatrical productions during the summer season. A children's fishing pond is located among the placer tailings and a historic train travels between Nevada City and Virginia City.
- The Ruby River near Alder, south of the project area, offers public recreational opportunities (primarily sport fishing), but public access is limited as a result of private land ownership. Ruby Reservoir, about 10 miles south of Alder, offers public access for boating and fishing activities, as well as rock-hounding for gem quality garnets and other minerals.
- The Madison River, east of Alder, and the Big Hole, Beaverhead, and Jefferson Rivers, west of Alder, offer excellent recreational activities, such as white-water rafting, kayaking, and sport fishing.
- Good roads and trails lead from the Ruby Valley area to adjacent national forest lands in the Tobacco Root, Ruby, and Gravelly Mountain Ranges. These areas offer opportunities for mountain biking, OHV's, gold panning, hiking and backpacking, fishing, hunting, horseback riding, and general sightseeing.

3.15 Visual Resources and Aesthetics

Visual resources are the visible physical features on a landscape (e.g., land, water, vegetation, animals, structures, and other features). The USDA Forest Service views landscape components of landform, vegetation types, and cultural modifications as the basis

for the definition of visual resources. Existing or introduced visual resources may add or detract from the overall scenic quality or the visual appeal of a landscape.

3.15.1 Overview and Study Area

The areas studied for visual resources include the Alder Gulch processing plant, an established industrial site, and the proposed RWHR Mine site, which is surrounded by rangelands in the foothills of the Ruby Mountains.

3.15.2 Methods

A visual resources assessment was conducted using the Spatial Analyst extension in ArcGIS to perform a viewshed analysis of the proposed RWHR Mine site from several vantage points (Blocker, 2013). A viewshed is an area of land, water, or other environmental element that is visible to the human eye from a fixed vantage point. Google Earth, along with project information such as pit location and the mining and milling waste rock stockpile, were used to complete the visual analysis. Based on the initial Spatial Analyst results, five vantage points were selected where the proposed RWHR Mine site was likely to be visible to the public.

3.15.3 Results

The Alder Gulch processing plant is in southwestern Montana in the eastern portion of the Ruby Valley, a large northwest to southeast trending valley bisected by the meandering Ruby River. The Ruby Valley is bounded on the north by the Tobacco Root Mountains and on the south by the Ruby Range.

The visual resources of the existing dredge tailings piles, characterizing much of the permit area, offer stark contrast to the adjacent irrigated valley farmland, and benches and foothills of the Tobacco Root and Ruby Ranges. For travelers on State Route 287 traveling eastward toward Nevada City and Virginia City, the high tailings piles in the western portion of the permit area provide the first indication of the major placer dredge mining activities that historically occurred in Alder Gulch. From State Route 287, the permit area provides a foreground visual resource. The dredge piles extend eastward through the permit area and along State Route 287 to Virginia City, a distance of approximately nine miles.

In the vicinity of the permit area, views of the full extent of the high dredge tailings piles to the north from State Route 287 are generally limited, as a result of the height of the tailings piles and the position of the highway (Blocker 2013). The greater amount of vegetation found on the flat tailings area (primarily large cottonwood trees) along the central portion of the permit area, and the more "jumbled" orientation of the tailings piles in the eastern portion of the permit area, do not provide the traveler along State Route 287 as great a visual contrast as found in the area of high tailings. The plant facilities are approximately 1,000 feet north of State Route 287. This distance, when coupled with the cottonwoods along State Route 287 near the entrance to the Alder Gulch processing plant, shields much of the plant buildings and machinery from the public view.

The lights at the Alder Gulch processing plant have been redirected to minimize or eliminate impacts to neighbors. Only lights required for safe operation and security would be used during operation.

Garnet USA has stated in their operating permit that operating hours would be adjusted to reduce the need for night-time operations and light plants (Garnet, USA 2013). The MMRA does not allow DEQ to regulate noise or light associated with permitted activities. Dust would be controlled using BACT such as road surfacing with washed gravel, by the routine use of a water truck, or by the use of a binder.

RWHR Permit Area

The RWHR permit area is located within an open rangeland setting with dispersed juniper and sagebrush vegetation. The predominant vegetation is shrub-steppe habitat type with a short segment of riparian in the northeast corner of the project area. The area appears mostly natural-looking to people traveling along Highway 287 and the Ruby Reservoir Road; however, much of the native vegetation has been modified due to extensive grazing. The open valley bottom and long sight distances allow travelers to see several miles across the rangeland, but the rolling hills also shield some areas from view. In the summer, green, irrigated fields stand out to the viewer in contrast to the grazed or open range non-irrigated areas which appear lighter in color.

Only lights required for safe operation and security will be used during operation at the RWHR Mine site. The viewshed assessment found that the RWHR site is not directly visible from any nearby residence, and although the lights may be discernible to people passing the site, it is unlikely that they will impact resident activities. Dust abatement would occur as needed using water trucks and other BACT as described in the Air Quality Permit.

3.16 Wildlife Resources

3.16.1 Overview and Study Area

Wildlife habitat in the vicinity of the permit area at the proposed RWHR Mine site is predominately arid, upland, montane sagebrush steppe and Rocky Mountain lower montane, foothill and valley grasslands. An unnamed intermittent stream passes through the northeast corner of the site and provides limited riparian habitat.

The Alder Gulch permit area consists of cleared industrial land with extensive historic tailings to the west. There are several open water ponds and isolated treed and shrubby areas interspersed with the industrial use activity. Within the 511-acre Alder Gulch Mine Permit Area, wildlife habitat was assessed for the 75 acres encompassing the area previously disturbed or proposed for disturbance within the Alder Gulch processing plant only.

3.16.2 Methods

Biologists with Montana Fish, Wildlife and Parks (MFWP) were contacted for information on wildlife issues related to the Proposed Action. Montana Natural Heritage Program

information requests were submitted to determine known sensitive species presence within two miles of the proposed RWHR Mine site and the Alder Gulch processing plant. Surveys and other materials prepared as part of the operating permit amendment submittal were also reviewed and are summarized in this section. Surveys included an avian point count conducted in June 2013 and wildlife field observation study conducted in May 2013 (Glas and Jourdonnais, 2013).

3.16.3 Results

Avian Surveys

Avian surveys were conducted in June 2013, at the proposed RWHR Mine site from midmorning to early afternoon and at the Alder Gulch processing plant in the midafternoon. Approximately 25 bird species were identified either by sight or by call. Identified bird species are listed in Table 3.16-1 (Glas and Jourdonnais, 2013). No rare or special status species were observed during the 2013 avian counts. Nesting status for all species was not determined, although several species have the potential to nest in similar habitats. The RWHR Mine site is less than one-half mile from the reclaimed Red Wash Alluvial site and is expected to supply similar resources for birds found in the 2000 study. Juniper trees and sagebrush may provide nesting sites for several bird species within the RWHR Mine site (Garnet USA, 2013a).

Birds observed in the existing Alder Gulch permit area included great blue heron, bald eagle, sandhill crane, blue-winged teal, wood duck, mallard duck, Canada goose, great horned owl, red-shafted flicker, hairy woodpecker, American robin, goldfinch, and black-billed magpie. Mallard, sandhill crane, black-billed magpie, hairy woodpecker, and great horned owl breed in the Alder Gulch permit area. One pair of sandhill cranes nested in cattails along the margin of a pond in the eastern portion of the permit area in 1991. According to local residents, at least six pairs of sandhill cranes established breeding territories around the periphery and in portions of the permit area.

A great blue heron rookery and several magpie nests were identified during the 2000 survey (Garnet USA, 2013a). The rookery is located in the extreme northern part of the permit boundary on the eastern edge on the property within a number of cottonwoods. Several other stick nests were also located near the eastern edge of the property. Most of these nests were identified as magpie nests although there was a possibility of use by raptors in one location. All nests were protected with a minimum of a 200-foot no mine zone. No mining occurs within 500 feet of the nests or rookery during nesting season if the nests are found to be active.

Most species of birds, including eagles and other raptors, including owls, are protected under the Migratory Bird Treaty Act (16 U.S.C. 703). Bald eagles and golden eagles receive additional protection under the Bald and Golden Eagle Protection Act (16 U.S.C. 668).

Table 3.16-1. Bird Species Identified by Song or Observation at the Alder Gulch and RWHR Permit Areas, Madison County, Montana.

Common Name	Scientific Name ¹	Migratory Species?	Status
American goldfinch	<i>Spinus tristis</i>	Y	
American kestrel+	<i>Falco sparverius</i>	Y	
American redstart	<i>Setophaga ruticilla</i>	Y	
American robin	<i>Turdus migratorius</i>	Y	
Bank swallow	<i>Riparia riparia</i>	Y	
Black-billed magpie	<i>Pica hudsonia</i>	Y	
Brewer's blackbird	<i>Euphagus cyanocephalus</i>	Y	
Chipping sparrow*	<i>Spizella passerina</i>	Y	
Common nighthawk	<i>Chordeiles minor</i>	Y	
Dark-eyed junco	<i>Junco hyemalis</i>	Y	
European starling	<i>Sturnus vulgaris</i>	N	
Killdeer	<i>Charadrius vociferus</i>	Y	
Lark sparrow	<i>Chondestes grammacus</i>	Y	
Mountain bluebird	<i>Sialia currucoides</i>	Y	
Mountain chickadee	<i>Poecile gambeli</i>	Y	
Mourning dove	<i>Zenaida macroura</i>	Y	
Red-tailed hawk	<i>Buteo jamaicensis</i>	Y	
Red-winged blackbird	<i>Agelaius phoeniceus</i>	Y	
Sandhill crane (1 mile from riparian site)	<i>Grus canadensis</i>	Y	
Song sparrow	<i>Melospiza melodia</i>	Y	
Vesper sparrow	<i>Pooecetes gramineus</i>	Y	
Western bluebird*	<i>Sialia mexicana</i>	Y	
Yellow warbler+	<i>Dendroica petechia</i>	Y	
Yellow-rumped warbler	<i>Dendroica coronata</i>	Y	
Great blue heron	<i>Ardea herodias</i>	Y	SOC
Bald eagle	<i>Haliaeetus leucocephalus</i>	Y	
Blue-winged teal	<i>Anas discors</i>	Y	
Wood duck	<i>Aix sponsa</i>	Y	
Mallard duck	<i>Anas platyrhynchos</i>	Y	
Canada goose	<i>Branta canadensis</i>	Y	
Great horned owl	<i>Bubo virginianus</i>	Y	
Red-shafted flicker	<i>Colaptes auratus cafer</i>	Y	
Hairy woodpecker	<i>Picoides villosus</i>	Y	

+Species identified based on field notes, accuracy not guaranteed

*Species actively nesting on the site ¹ Nomenclature verified using (ITIS, 2013)

Big Game

The Alder Gulch permit area is within Hunting District 320 of Region 3 in southwestern Montana. The most numerous big game animals in this hunting district are white-tailed deer, mule deer, and elk. However, the industrial nature of the habitat available in the permit area and associated placer dredge tailings is not typical of either Hunting District 320 or Region 3.

Big game occurring within the existing 511-acre permitted area include resident populations of white-tailed deer, mule deer, and transient moose which occasionally move through the area. The topographic relief of the permit area tailings piles and dense shrub growth occurring in depressions between the tailings piles provides secure resting and feeding cover for deer. Deer rest and feed in the tailings area and forage in adjacent agricultural and riparian areas outside the existing permitted area. White-tailed deer periodically use portions of the permit area and adjacent lands year-round. Neither pronghorn antelope, nor black bear (*Ursus americana*) has been observed in the Alder Gulch area. An occasional elk and pronghorn antelope have been observed around the proposed RWHR Mine site.

Hollow cottonwood trees and snags in proximity to surface water and riparian communities within the Alder Gulch permit area provide habitat for raccoon and cavity-nesting birds and mammals. Furbearers present in the permit area include beaver, muskrat, bobcat, raccoon, mink, skunk, and red fox. Beaver reside throughout the permit area and have colonized ponds in the tailings, constructing dams where surface water occurred along linear depressions in the tailings. Small mammals include deer mouse, meadow vole, and cottontail rabbit. In the 2000 survey, several other small mammals were identified including the least chipmunk, yellow-bellied marmot, snowshoe hare, red squirrel, pocket gopher, and an unidentified weasel.

Table 3.16-2. Wildlife Species Identified in the Vicinity of the Alder Gulch and RWHR Mine Permit Areas.

Common Name	Scientific Name ¹	Alder Gulch site	RWHR Mine Site
Raccoon	<i>Procyon lotor</i>	X	
Beaver	<i>Castor canadensis</i>	X	
Muskrat	<i>Ondatra zibethicus</i>	X	
Bobcat	<i>Lynx rufus</i>	X	
Mink	<i>Mustela vison</i>	X	
Skunk	<i>Mephitis mephitis</i>	X	
Red fox	<i>Vulpes vulpes</i>	X	
Deer mouse	<i>Peromyscus maniculatus</i>	X	
Meadow vole	<i>Microtis pennsylvanicus</i>	X	
Least chipmunk	<i>Tamias minimus</i>	X	
Yellow-bellied marmot	<i>Marmota flaviventris</i>	X	
Snowshoe hare	<i>Lepus americanus</i>	X	
Cottontail rabbit	<i>Sylvilagus nuttalli</i>	X	
Red squirrel	<i>Tamiasciurus hudsonicus</i>	X	
Pocket gopher	<i>Thomomys talpoides</i>	X	
Weasel	<i>Mustela spp.</i>	X	
Pronghorn antelope	<i>Antilocapra americana</i>		X
White-tailed deer	<i>Odocoileus virginianus</i>	X	X
Mule deer	<i>Odocoileus hemionus</i>	X	X
Elk	<i>Cervus elaphus</i>	X	X
Moose	<i>Alces alces</i>	X	

¹ Nomenclature verified using ITIS (2013)

RWHR Permit Area

The RWHR permit area is within Hunting District 330 of Region 3. Although the wildlife and big game species are similar to those occurring in the Alder Gulch permit area, District 330 has much lower population numbers than District 320.

The RWHR permit area lacks readily available water sources which several of the species found in the Alder Gulch permit area depend upon. Beaver, muskrat, and mink in particular are not likely to use the sagebrush steppe habitat at the proposed RWHR Mine site. Other furbearers or small mammals could pass through the proposed RWHR Mine site, but presence of ample, higher-quality habitat in and around the valley agricultural areas two miles away imply that wildlife density is likely to be lower at the RWHR permit area. Field observations at the RWHR permit area suggest this area serves as winter and seasonal range for pronghorn, mule deer, and elk (Glas & Jourdonnais, 2013). Mule deer and pronghorn were observed on this site during the 2013 field visit. Numerous elk pellet groups were observed during a short hike through the area during the 2013 field visit.

Special Status Wildlife Species

The USFWS identified four Candidate wildlife species, the greater sage-grouse (*Centrocercus urophasianus*), Sprague's Pipit (*Anthus spragueii*), Arctic grayling (*Thymallus arcticus*), and North American wolverine (*Gulo gulo*) and two Threatened species, Canada lynx (*Lynx canadensis*) and grizzly bear (*Ursus arctos*), protected under the Federal Endangered Species Act, which could be present within or near the two permit areas. There is no suitable habitat present in either permit area for Arctic grayling, Canada lynx, or North American wolverine. Grizzly bear may pass through the proposed RWHR Mine site or the Alder Gulch area, but neither site has habitat suitable for long-term use by this species. However, mine workers should be made aware of the potential presence of grizzly bear and take reasonable precautions such as maintaining a clean site to prevent attracting bears.

RWHR Permit Area and Alder Gulch Processing Plant

A database query for sensitive wildlife species was requested from the Montana Natural Heritage Program for the RWHR permit area (Township 6S, Range 4W, Section 25, with a one mile buffer) and the Alder Gulch processing plant (Township 6S, Range 4W, Section 10, with a one mile buffer (MTNHP, 2013). No sensitive wildlife species were found within the permit boundaries. However, two Montana Species of Concern in addition to the previously identified federally-listed species were identified as occurring in the vicinity of the project area: bobolink and great blue heron. Great blue heron have been known to nest near the Alder Gulch processing plant, and the wet areas along the northern margin of the RWHR Mine site may be potential habitat for bobolink (MTNHP, 2013a).

The area surrounding the RWHR permit area supports habitat for sage-grouse, especially along the lower reaches of the site. Sage-grouse occupy sagebrush habitat throughout Madison County in relatively low numbers. In 2010, the USFWS determined that sage-grouse listing on the endangered species list was warranted but precluded by other species with greater threats. A litigation settlement requires the USFWS to make a decision by September 2015.

Catherine Wightman, MFWP sagebrush, wetland, and Farm Bill coordinator, was contacted for the most recent data regarding sage-grouse core areas (Glas & Jourdonnais, 2013). Core areas, as defined by MFWP are the primary or most critical strongholds for sage-grouse in Montana. The RWHR Mine site is 10 miles from a core area that extends into west-central Madison County from Beaverhead County (Glas & Jourdonnais, 2013).

MFWP Dillon area wildlife biologist Craig Fager was also contacted about any known locations of sage-grouse leks in the project area. Fager checked the internal records of sage-grouse leks within the Alder area and found two leks. These leks were the Water Gulch and Quaking Aspen leks both of which are over four miles from the project area and had not had a positive sage-grouse observation during the previous three surveys, between 1988 and 2003 (Glas & Jourdonnais, 2013).

The RWHR Mine site contains habitat characteristics used by the two listed bird species. The Sprague's Pipit is typically found in grassland habitats which occur within the project area. The RWHR Mine site is on the western boundary of the Sprague's Pipit's breeding range and the bird is unlikely to occur within the permit boundaries due to habitat condition and proximity to human activities. Surveys of Sprague's Pipit distribution in the vicinity of other surface disturbing activities such as oil fields demonstrated that these birds are likely to avoid unimproved roads and cleared gravel pads (Linnen, 2008). In Linnen's study, the decrease in abundance for Sprague's Pipits extended for up to 984 feet (300 m) from the disturbed areas. In addition, the MTNHP did not identify the area as being within the known range of Sprague's Pipit (MTNHP, 2013).

3.17 Fisheries and Aquatic Resources

3.17.1 Overview and Study Area

The study area for fisheries and aquatic resources is limited to the nearby sections of Alder Gulch, which has been disturbed by placer mining over the last century, and the excavated ponds at the Alder Gulch processing plant. There is a small, intermittent drainage at the northern edge of the proposed RWHR Mine site permit boundary, but it does not have sustained flow for a long enough period to support a fishery.

3.17.2 Methods

The Montana Fisheries Information System (MFISH) was queried for Alder Gulch and materials presented in the Garnet USA operating permit were reviewed to determine the potential for fisheries habitat and populations for the two permit areas. Historic stream channel configuration was compared to current channel locations using the 1965 Madison County water resources survey (Montana State Engineers Office, 1954). The Total Maximum Daily Load (TMDL) completed for the Ruby River watershed was reviewed for information on Alder Gulch related to support of aquatic life (DEQ, 2006). MFWP fisheries biologist, Matt Jaeger, was consulted regarding fisheries habitat values and fisheries projects in the local area (Jaeger, 2014). The Ruby Valley Watershed Group was also consulted regarding other restoration projects in the watershed (Ramsay, 2014).

3.17.3 Results

Alder Gulch is classified as a Class B-1 stream based on the most recent TMDL review (DEQ, 2012a). Waters classified B-1 are suitable for drinking, culinary and food processing purposes after conventional treatment; bathing, swimming and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply. Alder Gulch is classified as “not supporting” for aquatic life. A sediment TMDL has been completed for Alder Gulch related to this impairment (DEQ, 2006).

Fish populations in the existing Alder Gulch permitted area are restricted to ponds in depressions between tailings piles, and a short section of a spur of Alder Gulch that flows through the flat tailings area and into the ponds. This short section of stream is connected to the channel of Alder Gulch and a pond complex associated with the tailings area immediately south of State Route 287 outside the permitted area, and flows about 2,300 feet on the surface before flowing into the North Pond at the northwestern corner of the permit area (Figures 1.1-2 and 2.4-1). Portions of the channel have been straightened and other portions appear relatively unmodified. It is difficult to determine if this short section has a perennial connection with Alder Gulch, and much of its water likely comes from subsurface flow. Alder Gulch is a small stream measuring approximately 18 miles with its headwaters near Garrison Mine on Mount Baldy (MFISH, 2013). The main channel of Alder Gulch flows south of State Route 287, becomes discontinuous as it passes through the tailings areas near Virginia City, Nevada City, and Alder, and joins the Ruby River north of Alder. The lack of continuous flow reduces the current fisheries habitat value of Alder Gulch (Jaeger 2014). The Ruby Valley Watershed Group is pursuing projects to increase connectivity among the discontinuous sections of Alder Gulch. Currently their projects are focused on upstream reaches near Virginia City (Ramsay, 2014).

The stream section within the Alder Gulch permit area contains emergent and submerged aquatic vegetation that could provide cover for fish and production of aquatic insects. There are no continuous surface flow connections between the permitted area's surface water and the unmined portion of Alder Gulch downstream of the permit area.

Ponds within the permitted tailings area vary in depth, and most have limited potential to provide suitable year-round habitat for game fish. Water levels within these ponds fluctuate throughout the year in response to seasonal changes in subsurface groundwater levels. During the summer months, the ponds typically develop dense floating mats of algae and duckweed. These mats settle to the bottom over winter, and through decomposition, utilize much of the dissolved oxygen in the water. This oxygen depletion limits the ability of many of the ponds to overwinter game fish populations. The ponds may support amphibians and other water-dependent wildlife and provide a perennial source of water for a variety of organisms.

Fish stocking data from the MFWP show that no stocking has occurred in Alder Gulch over the period of record (MFISH, 2013). Rainbow trout (*Oncorhynchus mykiss*) are thought to

occur in Alder Gulch, but their distribution is listed as limited to reaches of the Gulch upstream of the mining activity. There have been no population surveys of fisheries in Alder Gulch (MFISH, 2013). Fish may move into Alder Gulch from the Ruby River, but it is unlikely that they would migrate into the short spur section within the permit boundary. Fish have been stocked in several ponds within the Alder Gulch permit area in the past; however, there is no record of stocking dates, specific locations, and numbers of fish. Typically, fish reared at the Ennis National Fish Hatchery were given to local residents to place in those tailings ponds open to public fishing (Garnet USA, 2013a).

Field observations of ponds in the permitted area during 1990 and 1991 and interviews with private landowners identified existing ponds that supported game fish populations. Local residents reported that bullheads (*Ictalurus* spp.) and suckers (*Catostomus* spp.) were the most common fish found in ponds within the permit area, although some of the adjacent larger ponds were reported to possibly contain rainbow and brown trout (*Salmo trutta*) exceeding 10 pounds. From discussions with local landowners, rainbow trout were considered to be uncommon and the presence of other trout species is suspected, but has not been verified (Garnet USA, 2013a).

RWHR Permit Area

There are no streams or waterways present within the proposed RWHR Mine site capable of sustaining populations of fish or other aquatic organisms. There is one intermittent draw at the northeastern corner of the permit boundary, but it is uphill from and outside of the area proposed for disturbance. Ephemeral drainages exist within the permit boundary (See Section 3.5), but none contains water for sufficient duration to support riparian vegetation or create aquatic habitat. Williams Creek, a tributary of the Ruby River flows from east to west approximately one-half mile south of the RWHR permit boundary. There is no surface water connection to Williams Creek within the RWHR Mine permit area.

Page intentionally left blank

Chapter 4: Alternatives Analysis

4.1 Introduction

Chapter 4 describes potential impacts to the existing environment that could occur due to the Proposed Action, the No Action Alternative, and Agency-Mitigated Alternative (i.e., the alternatives carried forward for detailed analysis). The No Action Alternative analyzes potential impacts stemming from activities currently approved under the exploration license and the existing operating permit. DEQ completed an environmental assessment prior to issuing Exploration License No. 00642 (DEQ, 2009). The Proposed Action analyzes potential impacts stemming from the additional disturbance and activities included in Garnet USA's operating permit amendment application. The Agency-Mitigated Alternative includes components that may alleviate impacts identified for the Proposed Action. The Agency-Mitigated Alternative includes the following components:

- Garnet USA would design and develop a diagonal access road to facilitate haul trucks crossing State Route 287 and to direct truck traffic away from residential areas along Ruby Road.
- The visibility berm described under the Proposed Action would be extended south across the old East Road entrance as far as needed to block the entrance road and further shield the residents from the plant operations, employee traffic, haul truck traffic, and the associated noise, dust, and light.
- Garnet USA would expand the current groundwater monitoring plan at the Alder Gulch processing plant to include more sampling locations and to evaluate selected water quality parameters, including the potential for nitrogen compounds from blasting materials.
- Garnet USA would locate groundwater monitoring locations and install monitoring wells at the RWHR Mine site and conduct water quality monitoring periodically.
- At the RWHR Mine site, the south sediment control basin and the west sediment control basin will be sampled for water quality parameters twice per year.
- During reclamation, disturbed areas would be regraded as necessary before soil spreading. Compacted areas would be ripped with a dozer or grader to at least a depth of 12 inches prior to resoiling. Stockpiled soils or settling pond fines would be spread six inches deep.
- As a mitigation to ensure revegetation and reduce compaction, Garnet USA would take the following action: once the soil has been placed, any compacted areas would be ripped again with a dozer or grader to at least a depth of 12 inches prior to reseeding at the mine site and 6 inches at the plant site. Areas would be seeded with an approved seed mix.

All other aspects of the Proposed Action would be retained as part of the Agency-Mitigated Alternative. Each alternative is described in Chapter 2. Chapter 4 serves three purposes: 1)

it provides an analysis and comparison of alternatives and their impacts; 2) it ensures that the DEQ has a clear understanding of the potential impacts, both positive and negative, of all alternatives under consideration; and 3) it provides the public with information to evaluate DEQ's alternatives, including the Proposed Action. Impacts are assessed for the same environmental components discussed in Chapter 3.

MEPA defines three levels of potential impacts: primary, secondary, and cumulative. In some instances, impacts can be minimized or avoided altogether by making changes to an alternative. These changes are called "mitigation." Mitigations may be selected in the final agency decision if DEQ has the statutory authority to impose the mitigation or with the consent of the applicant. The three levels of impacts and potential mitigation are examined for each resource area as described below. Some impacts may persist even with mitigation; these are called "residual impacts" under MEPA and are discussed at the end of this chapter.

4.1.1 Primary Impacts

Primary impacts are defined by MEPA as those impacts that have a direct cause and effect relationship with a specific action, i.e., they occur at the same time and place as the action that causes the impact. One result of implementing the Proposed Action would be the excavation of the pit at the proposed RWHR Mine site. As described in Chapter 2, there would be some additional surface disturbance associated with the Proposed Action.

4.1.2 Secondary Impacts

Secondary impacts to the human environment are indirectly related to the agency action, i.e., they are induced by primary impacts and occur at a later time or distance from the triggering action. For example, an acknowledged secondary impact of excavating the mine pit would be a change in the topography after reclamation is completed.

4.1.3 Cumulative Impacts

Cumulative impacts are the collective impacts on the human environment within the borders of Montana of the No Action Alternative, Proposed Action, or Agency-Mitigated Alternative when considered in conjunction with other past, present, and future actions related to the alternative under consideration by location or generic type (75-1-220(4), MCA). Cumulative impacts can result from individual actions that are minor, but, when combined over time with other actions, become significant. Related future actions may only be considered when these actions are under concurrent consideration by any agency through pre-impact statement studies, separate impact statement evaluations, or permit processing procedures (75-1-208(11), MCA). Cumulative impacts are assessed using resource-specific spatial boundaries and often attempt to characterize trends over a timescale appropriate to the alternatives under consideration. Cumulative impacts can only be assessed for resources that are likely to experience primary or secondary impacts due to an alternative under consideration.

4.1.4 Mitigation

Mitigation includes any and all actions that could be taken to reduce adverse impacts of the alternatives being considered, such as:

- a) avoiding an impact by not taking a certain action or parts of an action;
- b) minimizing impacts by limiting the degree or magnitude of an action and its implementation;
- c) rectifying an impact by repairing, rehabilitating, or restoring the impaired resource; or
- a) reducing or eliminating an impact over time by preservation and maintenance operations during the life of an action or the time period thereafter that an impact continues (MEPA Model Rules II(14)).

To be considered, mitigations must functionally reduce impacts related to an alternative under consideration; therefore, studies, monitoring plans, and further consultation do not satisfy the requirements of mitigation under MEPA. Mitigations may be selected in the final agency decision if DEQ has the statutory authority to impose the mitigation or with the consent of the applicant.

4.1.5 Residual Impacts

Residual impacts are those that cannot be avoided, even with mitigation. These are summarized for all resource areas at the end of this chapter.

4.2 Geology and Minerals

4.2.1 No Action Alternative

There would be minimal primary and secondary impacts to the geologic resources through implementation of the No Action Alternative at the Alder Gulch site. All previously permitted surface disturbances for facilities that affect geology have already occurred at the processing plant. During reclamation most of the disturbed areas would be regraded and covered with fines or soil and revegetated. Some buildings and other disturbance areas would be left for industrial use after mining. Mining at the Red Wash Alluvial site was concluded under a prior amendment to the operating permit, and reclamation has been completed.

At the RWHR Mine site, Garnet USA could remove up to 10,000 tons of ore as a bulk sample under the exploration license as part of the No Action Alternative. This would provide a project life of less than one year. The geology within the mined area would be permanently altered. This impact has been evaluated and approved in a prior EA (DEQ, 2009).

4.2.2 Proposed Action

Under the Proposed Action, the primary impact to the geologic resources would be the removal of approximately 500,000 tons of garnet-bearing material per year from 54.4 acres of the pit over a 37 year-period from the RWHR Mine site. At present calculations, the mine

is projected to produce 50,000 tons per year of finished garnet product. The geology within the mined area would be permanently altered with the removal of garnet-bearing bedrock for garnet-processing. The extent of mine excavation would exist for the life of the mine under the Proposed Action.

The pit highwalls that remain after reclamation is completed would be structurally competent. The rock faces in the pit consist of layered metamorphic rock including garnet gneiss, amphibole gneiss, and quartzo-feldspathic gneiss.

There is very low potential for secondary impacts from acid rock drainage and metal mobility from exposed geologic material. The result of Garnet USA's geochemical testing suggests that there is a low risk for acid generation by the rocks that would be mined (Garnet USA, 2013a). Sulfides were not identified in laboratory analysis of any whole rock samples. Asbestiform mineral fibers were not reported in any of the geologic samples analyzed.

There is very low potential for increased metal mobility offsite due to blasting and crushing of the ore followed by wind or water erosion affecting waste rock and garnet-bearing stockpiles. The potential impact would be from blowing dust off the ore while being hauled to the plant and from wind erosion off stockpiles at the plant site. The impacts would be minimal as long as Garnet USA implements best available control technology (BACT) to control dust during operations. Wind and water erosion at the mine site would have minimal effects as long as Garnet USA implements its BACT program.

Cumulative impacts to geology and minerals stemming from the Proposed Action would include a continued reduction in the amount of garnet ore in the area. Past garnet mining, such as the development of the Red Wash Alluvial Mine, has contributed to this reduction in available ore in Madison County. At the time of the EIS, there were no other garnet ore operations under consideration by or applying for permits with DEQ, and the cumulative impact of the removal proposed by Garnet USA has been assessed in the context of past mining in the valley. Removal of garnet is the purpose of the Proposed Action, and as such is an unavoidable impact of this alternative.

4.2.3 Agency-Mitigated Alternative

There would be minimal additional primary, secondary, or cumulative impacts to the geology under the Agency-Mitigated Alternative. The Agency-Mitigated Alternative would minimally alter the geologic resources at the Alder Gulch site by building a diagonal road and a visibility berm extension. These impacts would be inconsequential in the context of the industrial site location, and would primarily consist of re-allocation of gravels rather than consumption of geologic resources. The mining plan at the RWHR Mine site would not be modified by the Agency-Mitigated Alternative.

4.3 Soil Resources

4.3.1 No Action Alternative

There would be no negative primary or secondary impacts to soil resources through implementation of the No Action Alternative at the processing plant. All previously permitted surface disturbances that would affect undisturbed soil resources have already occurred. There would be some beneficial impacts during reclamation as most of the current disturbances would be reclaimed by regrading and covering with fines recovered from the processing ponds. This would speed soil redevelopment in the area by hundreds of years.

The reclamation plan would reclaim any disturbed areas resulting from the exploration activities at the RWHR Mine site with stockpiled soils. Reclamation would speed redevelopment of soil resources in the disturbed areas.

The cumulative impacts to soils from the No Action Alternative would be beneficial as other industrial operations in the area are likely to continue. Garnet USA's reclamation plan would promote soil redevelopment within the boundaries of the processing plant.

4.3.2 Proposed Action

The primary impact to soil resources under the Proposed Action would be disturbance and removal of soils at the proposed RWHR Mine site. In the first five years the estimated volume of Shurley-Rentsac soil to be disturbed is about 46.7 thousand cubic yards. The estimated volume of Kalsted Sandy Loam soil to be disturbed is about 478 thousand cubic yards. This is more than half of the total expected volume of soils for the life of the mine in the first five years, but the operations could ultimately lead to going deeper in some places rather than going wider in the excavation which would disturb substantially less area, and thus less soil, than anticipated in some of the earlier years.

The soils would be separated into two discreet piles. Soils coming off slopes of less than eight percent would be stockpiled in one pile. Soils coming off steeper slopes would be stockpiled separately. Soil salvaged and stockpiled would lose the hundreds of years of profile development that has occurred on the site. Stockpiling would destroy soil structure, reduce soil biological activity, increase compaction and bulk density, and decrease the soil organic matter content. These are unavoidable impacts of permitting disturbance of the site for mining.

The soil stockpiles would be marked in the field and the slopes would be graded at a 3:1 horizontal to vertical slope and revegetated to limit erosion. Soil stockpile locations are shown on Figure 2.5.1. Silt fences, straw wattles, and other applicable BMPs would be implemented where appropriate to limit erosion and minimize sediment leaving disturbed sites including access and haul roads before and during construction. Some soil would be irrevocably lost during soil removal, construction, and operation of the mine. Additional soil would be lost during soil replacement prior to the reestablishment of vegetation. Secondary impacts to soil resources could result from increased wind and water erosion until the disturbed soil placed in stockpiles is revegetated.

During reclamation, stockpiled soils would be replaced. The soil from slopes less than eight percent slopes would be placed on slopes less than eight percent, such as the pit floor. Soil from slopes greater than eight percent would be replaced on slopes over eight percent such as the waste rock stockpile slopes. Stockpiling and replacement of the upper horizons of soil after mining would speed up soil redevelopment. Soil would be ripped to relieve compaction from equipment traffic. It would take decades for soil horizons to redevelop. The arid nature of the climate would contribute to a slow recovery of the soil structure. Soil organic matter contents would take decades to redevelop. Seeding the reclaimed areas would speed revegetation of the site. Typically it takes up to five years for native species on reclaimed areas to develop and limit soil erosion. The loss of soil, soil development, and the time needed for redevelopment of soils in an area are unavoidable impacts of disturbance.

With the Proposed Action, there would be larger amounts of exposed soil that could erode until successful revegetation occurs. Revegetation is dependent upon precipitation received after seeding and success of weed control. Garnet USA would be required to ensure the successful revegetation and weed control as part of the operating permit application reclamation plan.

Cumulative impacts to soils in the Alder Gulch Mine permit area due to selection of the Proposed Action would be minimally beneficial as the footprint of the processing plant would be reclaimed and seeded. The processing plant is surrounded by historic dredge tailings and active industrial gravel mine operations. The reclamation of the processing plant area would constitute a minor reduction of the overall exposed tailings in the area.

Cumulative impacts to soils in the proposed RWHR Mine site would include removal and replacement of stockpiled soils. The limited overall area affected by these actions and DEQ's reclamation requirements would reduce the cumulative impact of these actions on soils. DEQ is not aware of other future surface disturbing activities in the area that might contribute to the cumulative changes in surface soils.

4.3.3 Agency-Mitigated Alternative

There would be approximately 0.54 acres of additional soil disturbance on leveled naturally revegetated placer tailings resulting from the construction of a new haul truck access road that runs diagonally between the plant shop and office, and Ruby Road near the intersection with the State Route 287 (Figure 2.6.1). These young soils would be salvaged and stockpiled. The visibility berm on the east side of the permit area would be extended south across the East Road redisturbing some dredge tailings and covering them with soil or settling pond fines. These actions would minimally impact soils in the processing plant area, but would not contribute to cumulative impacts to soils as the areas being affected are already disturbed and being used industrially.

The East Road plant access entrance located off of Ruby Road (across from the residences) would be eliminated and reclaimed. Access to the employee parking and the nearby silt ponds would be from the South Road through the office area and across the current bridge. The East Road entrance removal and the extended visibility berm would be

revegetated and maintained consistent with the current Alder Gulch operating permit. The Agency-Mitigated Alternative would not alter the soil resources at the Alder Gulch or the RWHR Mine site beyond the impacts described under the Proposed Action.

Additionally, DEQ would require the above areas to be regraded as necessary before soil spreading. Compacted areas would be ripped with a dozer or grader to at least a depth of 12 inches prior to resoiling. Stockpiled soils or settling pond fines would be spread six inches deep. As a mitigation to ensure revegetation and reduce compaction, Garnet USA would take the following action: once the soil has been placed, any compacted areas would be ripped again with a dozer or grader to at least a depth of 12 inches prior to reseeding at the mine site and 6 inches at the plant site. Areas would be seeded with an approved seed mix. These stipulations would reduce the overall impacts to soils and improve the likelihood of revegetation success.

Cumulative impacts to soil resources under the Agency-Mitigated Alternative would not differ substantially from those anticipated under the Proposed Action.

4.4 Vegetation and Wetland Resources

4.4.1 No Action Alternative

There would be primary or secondary impacts to vegetation resources (vegetation communities, wetlands, or noxious weeds) through implementation of the No Action Alternative at the Alder Gulch processing plant. Reclamation would enhance development of vegetation communities after mining and create more productive vegetation for the post-mine land uses.

There would be no acres of additional disturbance in the processing plant area under the No Action Alternative. There would be some beneficial impacts during reclamation as most of the facility disturbances would be reclaimed by regrading and covering with fines recovered from the processing ponds. This would promote revegetation and increase productivity over the dredge tailings.

All previously permitted surface disturbances that affect vegetation resources have already occurred at the RWHR Mine site. The reclamation plan would resoil and revegetate the disturbed areas at the RWHR Mine site disturbed under the exploration license.

Noxious weeds would increase on all disturbed areas over the life of the operation. Weed control would limit the expansion. The diversity of vegetation in the reclaimed communities would be less than the natural revegetated communities in the area because of noxious weed and other aggressive invasive species like cheatgrass and indirect impacts of noxious weed control programs that inadvertently or directly kill native species. The reduction in diversity in reclaimed communities and an increase in invasive species is an unavoidable impact of permitting disturbance for mining.

Cumulative impacts to vegetation due to activity at the RWHR Mine site and the nearby disturbance and reclamation of the Red Wash Alluvial site would reduce plant community

diversity in reclaimed areas. However, reclamation requirements would reduce the cumulative impact of these actions on the sage-steppe vegetative community. DEQ is not aware of other planned future surface disturbing activities in the area that might contribute to the cumulative changes in vegetation.

4.4.2 Proposed Action

The potential for impacts to vegetation resources at the Alder Gulch processing site would be similar under the Proposed Action as under the No Action Alternative. There would be approximately nine acres of additional disturbance for new ponds, the visibility berm, boneyard relocation, and employee parking areas under the Proposed Action (Table 2.4-1). These disturbances would largely occur on disturbed tailings minimizing additional impacts to vegetation resources. This section will focus on the potential impacts at the RWHR Mine site due to the Proposed Action.

Primary Impacts

Primary impacts due to the Proposed Action would include removal of diverse native vegetation communities and potential spread of invasive species carried to the site by trucks or spread by wind over the 37-year mine life. The 213 acres of disturbance would provide conditions for opportunistic weeds to grow until revegetation is successful. In addition, revegetation could struggle if periods of extended dry weather occur following seeding. Weeds, such as black henbane, cheatgrass, and mullein, and noxious weeds would establish during mine life and be a part of reclaimed communities.

Noxious weeds would increase on all disturbed areas over the life of the operation. Weed control would limit the expansion. The diversity of vegetation in the reclaimed communities would be less than the native communities in the area because of noxious weed and other aggressive invasive species and indirect impacts of noxious weed control programs that inadvertently or directly kill native species. The lack of diversity in reclaimed communities and increase in invasive species is an unavoidable impact of permitting disturbance for mining.

Secondary Impacts

Secondary impacts would include the spread of noxious weeds to adjacent lands. Garnet USA has developed a noxious weed control plan in cooperation with the Madison County Weed Board to minimize the potential for weed spread. If soil stockpiles are aggressively revegetated, then the potential for weed establishment and seed dispersal would be minimized. Garnet USA would also reduce the potential for secondary impacts to vegetation by concurrently reclaiming disturbed areas as they are no longer needed for mine operations.

The reclamation plan developed by Garnet USA has shown success at the nearby Red Wash Alluvial site which supports some vegetation species similar to those occurring at the RWHR Mine site. Vegetation canopy cover and productivity can be restored within three to five years on reclaimed sites. It is likely that reclamation at the RWHR Mine site would function as proposed, and that once reclamation is completed there would be negligible

changes to the vegetation community in the area in terms of productivity and canopy cover. Plant communities at the Alder Gulch processing plant and at the Red Wash Alluvial site contain limited number of species compared to undisturbed plant communities in the area.

Cumulative Impacts

The Proposed Action would have cumulative impacts on vegetation communities at the RWHR Mine site because the acreage of this site would be added to the acreage of the previously reclaimed Red Wash Alluvial site and both sites would experience reduced diversity of species. This is an unavoidable consequence of disturbing the site. In addition the long duration of the proposed mining, 37 years, would increase the potential for weed seed spread because the edges of the site are likely to be sporadically disturbed by machinery which may contribute to the success of invasive weed species adapted to disturbed sites and create a larger seed source than what is currently present in the area.

4.4.3 Agency-Mitigated Alternative

In general, the primary, secondary, and cumulative impacts to the vegetation and wetlands under the Agency-Mitigated Alternative would be the same as those described under the No Action Alternative and Proposed Action at the Alder Gulch processing area. The construction of the diagonal access road and extended visibility berm under the Agency-Mitigated Alternative would create minimal additional potential impacts.

The Agency-Mitigated Alternative does not include any changes to the Proposed Action at the Red Wash Hard Rock Mine site.

Primary Impacts

The Agency-Mitigated Alternative would require approximately 0.54 acres of additional surface disturbance in a naturally revegetated treed area on level tailings along the small stream that crosses the Alder Gulch permit area (Figure 2.6-1). This proposed haul truck access road would cross mixed riparian, wetland, and upland vegetation. The surface disturbance and potential for tree and other naturally revegetated plant community removal would constitute primary impacts to vegetation. The extension of the visibility berm that runs along Ruby Road would cross and block the current East Road entrance to the plant. The removal of the East Road entrance road and the extension of the berm would have a small impact on local vegetation. The area would be revegetated per the current operating permit for the Alder Gulch Mine site. Removing traffic from this route may reduce the potential for weed seed dispersal. Establishing vegetation along the visibility berm would also potentially reduce the area open to weed colonization.

Secondary Impacts

Secondary impacts from the new access road would include possible changes to vegetation bordering areas of disturbance due to tree removal and changes in sun exposure. Weed establishment would increase in the area along the new diagonal access road. BMPs to prevent weed spread would include those described in the Weed Management Plan developed by Garnet USA. The stream that bisects the area of disturbance provides an additional vector for weed seed spread, and erosion-control measures such as straw wattles

or fabric barriers would be used to minimize sediment input to the stream. If the roadway infringes on the stream, a 310 permit would be required prior to construction.

Potential secondary impacts to wetlands would occur if the hydrology that supports the wetlands is changed. As an example, roadway construction often compacts soils under the roadway and the road design may incorporate drainage ditches on the sides of the road. Compaction decreases soil permeability and can change the rate that groundwater passes through the soil. This can lead to a buildup of groundwater or increased soil saturation on the upgradient side of the compression and a decrease in soil saturation on the down gradient side. In this way roads can cause expansion or contraction of wetland areas.

Under the Agency-Mitigated Alternative, the proposed Alder Gulch diagonal access haul route would bisect an area that contains wetlands, and some of the wetlands would be filled in (Figure 2.6.1). Filling in a wetland would constitute a primary impact and would also have the potential to cause secondary impacts to the wetlands nearby or the vegetation supported by the wetland hydrology. The preliminary design and alignment of the proposed roadway indicates that the potential acreage of fill would be 0.06 acres (Figure 2.6.1). Garnet USA would consult with the USACE to determine if the wetland impacts would require mitigation under Section 404 of the Clean Water Act before the road could be constructed.

Cumulative Impacts

Although the Agency-Mitigated Alternative would add to the overall surface disturbance, the amount of new disturbance would not be enough to constitute a cumulative impact to vegetation or wetlands in the context of other land uses in the area within and surrounding the Alder Gulch processing plant.

There would be no additional primary, secondary, or cumulative impacts to vegetation resources due to the Agency-Mitigated Alternative at the RWHR Mine site.

4.5 Surface Water Resources

4.5.1 No Action Alternative

There would be no primary or secondary impacts to surface water through implementation of the No Action Alternative at the processing plant.

There would be no additional disturbance in the processing plant area, but some increase in sediment delivery to surface waters is possible even with BMPs in place. The existing interrupted nature of the stream channel through the Alder Gulch Mine permit area would limit the potential for sediments or pollutants to travel downstream. Therefore, it is unlikely that activities under the No Action Alternative would contribute to cumulative impacts to surface water resources such as Alder Gulch Creek.

4.5.2 Proposed Action

Primary impacts to the surface water resources at the Alder Gulch site would differ from the No Action Alternative for the Alder Gulch processing plant site. Garnet USA proposes to continue to monitor surface water locations on a quarterly basis at the Alder Gulch site. Baseline monitoring showed low concentrations for nitrogen compounds; thus, there is a low potential for secondary impacts such as wind erosion and surface water runoff to carry nitrogen compounds, increasing concentrations directly into surface water resources or indirectly into groundwater and then to surface water resources down gradient.

Nitrogen compounds would originate from blasting at the RWHR Mine site. Although garnet ore would be exposed to precipitation and leaching while stockpiled in the RWHR Mine site ore stock pile, there is a potential for nitrogen compounds to be retained in garnet-bearing rock transported to the Alder Gulch site for processing. Recirculation and reuse of water during processing separation may allow for a concentration of nitrogen compounds in the water in the new lined ponds that could potentially be released to groundwater or surface water. A surface water and groundwater monitoring plan is in place to establish a baseline of water quality at the plant site. This plan includes a future sampling schedule.

Primary impacts to surface water resources at the RWHR Mine site would include irreversible alterations to the ephemeral drainages. The middle drainage of the RWHR Mine site is an ephemeral channel that traverses southeast to northwest across the middle of the permit area and would be partially excavated within the permit boundary during mining operations. The “south drainage” is an ephemeral channel in the southwest quadrant of the proposed boundary that would be altered by site activities. Flow from the middle and south drainages would be diverted or allowed to flow naturally to sediment and storm water control structures (Garnet USA, 2013a). Post-closure, drainage patterns would be identified and incorporated into reclamation to approximate pre-mine drainage patterns where possible. The mine excavation floor would drain to a sump and post-closure drainage would be structured to slope off the site without ponding. Erosion control features would be left in place.

The RWHR Mine site does not have any perennial surface water features within the footprint of the mine layout that would require monitoring during the life of the mine. Potential secondary impacts include wind erosion and surface water runoff which would carry nitrogen compounds offsite and increase concentrations in nearby surface water resources. There is little likelihood that nitrogen would be carried to surface water.

Cumulative impacts to surface water resources at the RWHR Mine site would be minimal because of the limited potential for materials to reach surface waters, the lack of perennial waterways that intersect the permit area, and the overall low level of past or planned human disturbance in the area surrounding the proposed mine site.

4.5.3 Agency-Mitigated Alternative

In general, the primary, secondary, and cumulative impacts to surface water resources under the Agency-Mitigated Alternative would be the same as those described under the Proposed Action. The construction of the diagonal access road under the Agency-Mitigated Alternative would create additional potential impacts as described below.

A new road may be constructed that cuts diagonally northwest from Ruby Road to redirect truck traffic into and out of the plant. Potential primary impacts to the surface water resources from the ore haulage road would be minimal. Potential secondary impacts to surface water resources from the ore haulage road would be an increase in runoff and sediment into the surface water drainage. Runoff can increase the volume of water delivered to the stream channel, but any increase in flow would be minimal due to the level terrain.

Garnet USA would install BMPs along the stream channel to minimize road runoff from directly impacting the stream channel. The stream that traverses the Alder Gulch processing plant site flows seasonally. When flowing, the stream enters the site at the southeast corner as groundwater discharging into the channel from the shallow alluvium. The stream then crosses the plant site and drains back into the shallow alluvium and mine tailings, but never exits the site as surface flow.

Surface water quality would be monitored by Garnet USA concurrent with future plant operations. At the RWHR Mine site, sediment control basins would be sampled twice per year to assess surface water quality. A limited monitoring plan was submitted with the amendment application. Additional surface water monitoring locations would be identified by Garnet USA and DEQ and a revised monitoring plan submitted to DEQ for approval. Samples would be collected for initial baseline data and analyzed for selected nutrients, and other lab and field parameters. A sampling schedule would be approved by DEQ.

4.6 Groundwater Resources

4.6.1 No Action Alternative

There would be minimal primary or secondary impacts to groundwater through implementation of the No Action Alternative at the processing plant. Reclamation would potentially change the amount and type of groundwater interaction with surface water for the post-mine land uses. If the dredge piles and ponds are leveled, the interaction with surface water would be reduced since the small expressions of water between dredge piles would be eliminated. This would reduce groundwater loss through evaporation and reduce opportunities for groundwater contamination via surface water exposure. There would be no additional acres of disturbance in the processing plant area under the No Action Alternative.

No groundwater resources would likely be impacted at the RWHR Mine site under the exploration license.

4.6.2 Proposed Action

Alder Gulch Site

Most potential impacts to groundwater quality and quantity at the Alder Gulch processing plant would result from the construction and use of the process ponds as part of the Proposed Action. Two new processing ponds located in the northwest corner of the Alder Gulch processing plant site, the north and south silt ponds, would be constructed with HDPE geosynthetic liners. The ponds would be lined and completed entirely above the water table. Garnet USA may construct a wet plant process pond directly to the east of the proposed silt ponds. The proposed east garnet storage pond would be reserved for material storage and would be unlined. The unlined south garnet storage ponds 1 and 2 are proposed in the southeastern portion of the Alder Gulch site and would be used for material storage (Figure 2.4-1).

There would be no primary impacts to the groundwater from the newly constructed ponds. The ponds, as designed, would not intersect the water table. The lined ponds would have secondary impacts to the groundwater if a leak occurred in a liner. A leak has the potential to allow recycled process water with nitrogen compounds to reach groundwater. The unlined garnet storage ponds 1 and 2 would be used for material storage and have no primary effect on the groundwater unless some residual nitrogen compounds are contained in the silts. Secondary effects from the lined ponds could be similar, where water draining from the material storage could move downward into groundwater. Although the material stored in this area would be generally dry, precipitation may leach compounds from the sediments.

Nitrogen compounds (nitrate and ammonia) associated with the project would primarily be derived from explosives used to break up the bedrock at the quarry site. Nitrogen concentrations at the Alder Gulch processing plant site are expected to be low, at least initially, because ore would be crushed, screened, and stockpiled at the RWHR site prior to being transported to the plant site. Precipitation falling on these stockpiles at the RWHR site would likely rinse the majority of nitrogen compounds from the ore before it is transported to the plant site.

Recycling of the process water may result in an increase of nitrogen concentrations within the processing circuit over time; however, it is unlikely that nitrogen levels in the process water would reach concentrations that would result in exceedance of the non-degradation limit for groundwater if the water were discharged to groundwater. Because this water would be contained within lined ponds, discharge to groundwater would only occur if the liners are not properly maintained and develop substantial leaks.

Garnet USA has an approved surface water and groundwater monitoring plan for the Alder Gulch processing plant site. After mining stopped at the Alder Gulch processing plant site, permittees collected water samples and analyzed the samples for pH, specific conductance (SC), total dissolved solids (TDS), turbidity, and mercury (Hg) at monitoring sites GW-8, MW-1, SW-2, SW-4, and SW-11 through 2006. Since 2006, permittees have measured the

rate of discharge from the processing plant into infiltration ponds and have collected water samples and analyzed the samples for pH, total suspended solids (TSS) and oil and grease under a MPDES General Permit for sand and gravel operations. Recent samples have been analyzed for a full suite of parameters including nitrogen compounds.

RWHR Mine Site

At the end of mine life (37 years), the bottom of the quarry would be about 130 feet below the existing surface elevation, with a maximum highwall height of 230 feet at the southeast corner of the quarry. Garnet USA initially anticipated that the RWHR site would be mined as a dry operation that would not encounter measurable groundwater through the 37-year life of the mine. However, recent drilling has identified groundwater at locations closer to the surface than anticipated and extended monitoring will be required by DEQ.

The quarry floor is planned to maintain a slope toward the west and intercepted water would drain across the quarry floor, possibly evaporating or re-infiltrating into the bedrock as it flows through the quarry. If this water flows out of the quarry, it would drain into a storm water collection sump and/or into a storm water infiltration basin. Possible groundwater impacts would include a lowering of the groundwater table within the bedrock immediately adjacent to the quarry highwall, and mounding of the groundwater table where the water is re-infiltrated. Concentrations of nitrogen compounds in the water may increase as it contacts blasting residues within the quarry area.

The potential for impacts from acid rock drainage and metal mobility from exposed geologic material is low due to the inert nature of the material to be mined. Acid rock drainage and metal mobility were described in Section 3.2.3, Waste Rock Geochemistry. Based on the non-acid and non-toxic nature of the ore to be mined, impacts to groundwater are not expected. Garnet USA will be required to monitor groundwater quality to confirm that impacts to groundwater do not occur. Nitrogen compounds (nitrate and ammonia) derived from explosives used to break up the bedrock in the quarry would enter groundwater at the RWHR site. This may occur due to infiltration of storm water through the quarry floor into bedrock beneath the quarry, seepage from the waste rock storage area, and infiltration of storm water runoff derived from the quarry or rock storage areas into groundwater.

While the resultant concentrations of nitrogen compounds in groundwater cannot be predicted accurately, proper management of explosive use in the quarry should limit nitrogen concentrations to non-significant levels. Proper explosive management would result in the nitrogen compounds being consumed in the explosive event rather than being left as a residue in the environment. The amount of nitrogen left as a residue if proper explosive management is used is not expected to cause the level of nitrogen in groundwater to rise from the baseline concentration (0.16 mg/L to 0.57 mg/L) to the non-degradation threshold for nitrate in groundwater of 7.5 mg/L.

All storm water from the mine site would drain to sediment control basins to prevent discharge of storm water off site. The storm water would either evaporate or infiltrate into the

soils and overburden. The storm water could contain nitrogen compounds and petroleum products from mine equipment. Although monitoring and sampling is not proposed for the sediment control basins, monitoring well MMW-2 is located downgradient from the sediment control basins and will be sampled and analyzed for selected parameters to evaluate if contaminants from the mine site or ponds are reaching groundwater. In addition, Garnet USA plans to complete a voluntary SWPPP for the RWHR Mine site operations.

4.6.3 Agency-Mitigated Alternative

The Agency-Mitigated Alternative does not contain components that have the potential to substantially change impacts to groundwater from those anticipated under the Proposed Action. There would be limited primary, secondary, or cumulative impacts to groundwater under the Agency-Mitigated Alternative. Additional groundwater monitoring would be conducted to characterize current and ongoing future groundwater quality at the RWHR Mine site and the Alder Gulch processing plant site processing facilities.

Analytical results will be compared to water quality standards listed in Circular DEQ-7 and with non-degradation criteria described in ARM 17.30.715. In the event that analytical results approach non-degradation limits, then a required action or mitigation would be initiated. The non-degradation threshold for nitrate in groundwater is 7.5 mg/L, and is not dependent upon baseline nitrate concentrations. Data from existing monitoring wells at the RWHR site indicate that baseline nitrate concentrations range from 0.016 mg/L to 0.57 mg/L. Groundwater monitoring data from the Alder Gulch processing plant site collected during June 2013 show nitrate concentrations below 0.2 mg/L (Garnet USA, 2013e). The groundwater (human health) standard for nitrate is 10.0 mg/L, and nitrate concentrations in groundwater, outside of any approved mixing zone, can be increased to 7.5 mg/L without requiring an authorization to degrade.

There is very low potential for secondary impacts from acid rock drainage and metal mobility from exposed geologic material (See Section 3.2.3, Waste Rock Geochemistry). Based on the non-acid and non-toxic nature of the ore to be mined, impacts to groundwater other than increases in nitrogen concentrations are not expected. As an extra measure of caution, Garnet USA will be required to sample the six monitoring wells at the RWHR site to confirm that impacts do not occur, or to respond with appropriate mitigations if monitoring indicates the potential to exceed non-degradation criteria.

In the event that water quality monitoring identifies impacts to groundwater quality resulting from the project, mitigation measures appropriate to the nature and extent of the impact would be implemented. These may include interception and treatment of contaminated water, changes in mining and material handling practices to reduce the release of nitrogen or other potential contaminants into groundwater, and/or reclamation, lining, or capping of source areas that are identified as contributing to groundwater quality impacts.

Alder Gulch Processing Plant Site

The water monitoring plan for the Alder Gulch processing plant site submitted with the application for an amendment to the operating permit would be expanded. Three new monitoring wells (PMW-1, PMW-4, and PMW-5) have been installed. The locations of monitoring sites for the Alder Gulch processing plant site are shown on Figure 2.6-2. Monitoring would include monthly sampling of nitrogen compounds, turbidity, mercury, common ions, temperature, pH, petroleum products, and phosphorus.

As discussed in the previous section, nitrogen compounds are unlikely to be present at the Plant site in concentrations that would result in groundwater degradation if discharged from the processing ponds due to liner leakage. However, if nitrogen compounds from groundwater samples collected from monitoring wells exceed 7.0 mg/l, Garnet USA would be required to submit a plan to control nitrogen compounds released from the processing operations within 30 days. This plan may include the installation of pumpback wells and possibly lining of other process areas where nitrogen compounds are escaping to groundwater.

RWHR Mine Site

As noted above, six new monitoring locations have been installed at the RWHR Mine site. The locations of monitoring sites at the RWHR Mine site are shown on Figure 2.6-3. A monitoring and sampling schedule would include quarterly sampling at all six monitoring wells for nitrogen compounds, pH, common ions, SC, and TDS. The monitoring schedule for the RWHR Mine site would be added to the monitoring plan submitted with the application for an amendment to the operating permit. This monitoring plan will be expanded to include recommended additional monitoring locations.

Primary sources of nitrogen compounds generated from explosives would be found on the pit floor and waste rock stockpile. As noted in the previous section, nitrogen levels in groundwater should not exceed the non-degradation limit provided that proper blasting procedures are followed. In the event that water quality monitoring identifies impacts to groundwater quality resulting from the project, mitigation measures appropriate to the nature and extent of the impact would be implemented. If nitrogen compounds from groundwater samples collected from monitoring wells exceed 7.0 mg/l, Garnet USA would have to submit a plan to control nitrogen compound release from the mining operations within 30 days. Mitigation measures may include interception and treatment of contaminated water, changes in mining and material handling practices to reduce the release of nitrogen or other potential contaminants into groundwater, and reclamation, lining, or capping of source areas that are identified as contributing to groundwater quality impacts.

At the end of 5 years of mining, the depth of the pit would be at an elevation of 5,780 feet amsl or 130 feet above the final elevation of the proposed pit bottom after 37 years of mining. This progressive deepening of the quarry floor would allow Garnet USA to collect site specific information on groundwater occurrence in bedrock as mining progresses.

Bedrock monitoring wells installed upgradient (east) of the pit showed water table elevations between 5,784 feet amsl (at monitoring well MMW-4) and 5,812 feet amsl (at monitoring well MMW-1) in December 2013 (Garnet USA, 2013d). This indicates that the pit excavation may begin to intercept groundwater after four to five years of mining. If the rate of groundwater inflow becomes sufficient to interfere with blasting or mining operations, Garnet USA would need to modify the water management plan to manage groundwater appropriately at the RWHR Mine site. Modifications may include dewatering of the pit via a pit sump or upgradient dewatering wells, and re-infiltration of this water to either bedrock or alluvium via percolation ponds, drainfields, or injection wells. Such modifications would require an amendment to the operating permit.

4.7 Hazardous Materials

4.7.1 No Action Alternative

Primary Impacts

Materials which may be hazardous are currently present on the Alder Gulch site and include motor oil/lubricants, diesel fuel, and septic waste. Fuel storage facilities are constructed of non-permeable, leak proof concrete containment of at least twice the total storage capacity. The bulk lubricant storage facilities at the shop site have a concrete, leak proof containment of double the storage capacity which functions in conjunction with the waste oil containment facility associated with the shop operation.

Each material if released could be potentially hazardous and might impact soils, surface water, and groundwater in the immediate area. Garnet USA would work in conjunction with the DEQ Water Protection Bureau to determine if a SWPPP is necessary for the processing facility.

The RWHR Mine site would not need a SWPPP for the limited exploration disturbance at the site. Storm water can easily be contained on site with BMPs. Based on the low likelihood that contaminants would leave the site, the primary impacts of the No Action Alternative due to hazardous materials would be minor.

All petroleum products stored in 55-gallon containers or greater at the facility are covered under the Alder Gulch SPCC plan. The plan requires implementation of measures for oil spill prevention, preparedness, and response to prevent oil discharge to navigable waters. These measures include sized secondary containment of the material, inspections, procedures, and response to any release. This plan will minimize potential for release of petroleum products to navigable waters.

Septic effluent may also exhibit hazardous characteristics and is disposed through a septic system permitted by Madison County at the Alder Gulch processing plant site. Permitting assures that the septic design has met county requirements for the disposal of septic wastes. Based on the county requirements and permit approval, primary impacts from the septic system from the No Action Alternative would be minor.

Portable toilets are used at the RWHR Mine site during the exploration phase.

Secondary Impacts

Deposition of pollutants on water, soil, vegetation, and impacts to unique, endangered, fragile, or limited environmental resources, terrestrial and aquatic life are expected to be minor as a result of current activities at the Alder Gulch processing plant site. There is a possibility that contaminants could leave the site and impact water quality downstream which may affect vegetation or aquatic life. The secondary impacts from the No Action Alternative on the physical and biological environment in the immediate Alder Gulch processing plant site and RWHR exploration area would be minor.

Cumulative Impacts

There are no other large sources of potentially hazardous materials in the area. The cumulative impacts from the No Action Alternative on the physical and biological environment in the immediate area appear to be minor.

4.7.2 Proposed Action

Primary Impacts

The Proposed Action may result in a slight increase in materials on the processing site due to the increased site activity and production. These materials may potentially be hazardous and include motor oil/lubricants, diesel fuel, and septic waste.

Each material, if released, could be potentially hazardous and may impact soils, surface water, and groundwater in the immediate area. Garnet USA would work in conjunction with the Water Protection Bureau to determine if a SWPPP and Storm Water Discharge permit are necessary for both the Alder Gulch processing facility and the RWHR Mine site. No storm water would be allowed to leave the site. Garnet USA understands that runoff from storms cannot be allowed to leave the property without a SWPPP. The containment facilities would be designed and maintained to contain at least the 10-year, 24-hour storm event. Based on this, the primary impacts from the Proposed Action would be minor.

All petroleum products stored in 55-gallon containers or greater at the facility are covered under the Alder Gulch SPCC plan. The plan requires implementation of measures for oil spill prevention, preparedness, and response to prevent oil discharge to navigable waters. These measures include sized secondary containment of the materials, inspections, procedures, and response to any release. This plan will minimize potential for release of petroleum products to navigable waters.

There may be a slight increase in septic effluent due to an increase in employees at the site. This waste would be handled by a septic system permitted through the Madison County Sanitarian. Septic systems are designed with potential demand requirements and are required to have approval from the county. The mine site has a septic system that was approved by the Madison County Sanitarian as part of the initial operating permit. Permitting assures that the septic design has met county requirements for the disposal of septic

wastes. Based on the county requirements and permit approval, primary impacts from the septic system from the Proposed Action would be minor.

Sewage at the RWHR Mine site shall initially be handled by the use of portable toilets which will be leased and serviced by an independent licensed contractor. Sewage shall be removed and disposed of by the contractor in a manner consistent with state and federal regulations (Garnet USA, 2013a).

If a temporary office trailer or a lunch room is brought on-site, domestic wastewater and sewage shall be disposed of in an on-site septic holding tank for periodic pump-outs. All domestic water and septic systems shall be designed in compliance with Madison County and State of Montana sanitary regulations. A sanitary disposal permit shall be obtained from Madison County's Sanitarian and the disposal facilities inspected prior to use (Garnet 2013a). Based on the county requirements and permit approval, primary impacts from the septic system from the Proposed Action would be minor.

Secondary Impacts

Deposition of pollutants on water, soil, vegetation, and impacts to unique, endangered, fragile, or limited environmental resources, terrestrial and aquatic life would be minor as a result of proposed activities at the Alder Gulch processing plant site and the RWHR Mine site. There is a possibility of impacts to water quality from nitrogen compounds downstream which may affect vegetation or aquatic life. The secondary impacts from the Proposed Action on the physical and biological environment in the immediate area would be minor.

Cumulative Impacts

There are no other significant sources of potentially hazardous materials in the area. The cumulative impacts from the No Action Alternative on the physical and biological environment in the immediate area would be minor.

4.7.3 Agency-Mitigated Alternative

The Agency-Mitigated Alternative does not contain components that have the potential to substantially change impacts due to hazardous materials from those anticipated under the Proposed Action. Under the Agency-Mitigated Alternative an access road would be constructed across naturally revegetated tailings in the vicinity of a tributary channel to the Alder Gulch stream channel. Garnet USA would need to secure appropriate permits or permissions from the USACE and develop a SWPPP for the road construction.

4.8 Air Quality

The Air Resources Management Bureau reviews permit applications and prescribes Best Available Control Technology (BACT) to address potential impacts as part of the permits they issue. There are two air quality permits that cover activities under the alternatives being considered, MAQP # 2888-03 covers activities and equipment present at the Alder Gulch processing plant, and MAQP # 4842-00 was issued for the crusher and supporting equipment including the generator as a mobile permit (Merkel, pers. comm., 2013).

Air quality permit MAQP #4842-00 covers equipment needed for the No Action Alternative as well as for the Proposed Action. This air quality permit covers the diesel engine associated with the on-site generator. All mobile equipment such as passenger vehicles, mobile construction equipment (e.g. loaders), and haul trucks with engine emissions are covered under multiple tiers of emission standards adopted by a comprehensive national program through the engine manufacturers (EPA, 2013c).

4.8.1 No Action Alternative

Under the No Action Alternative, the Alder Gulch processing plant is expected to continue operation under its existing mine permit. It would process a 10,000 ton exploration bulk sample from the RWHR Mine site and could process garnet materials from other alternate offsite locations if DEQ approves the offsite materials. The truck and other vehicle traffic involved with refurbishing the plant site or bringing garnet ore to the site may be a source of ongoing dust. The RWHR Mine site exploration disturbances would be limited.

Primary Impacts

The air quality permit MAQP #4842-00 contains an air quality analysis of the Garnet USA processing plant site and RWHR exploration disturbances. The analysis determined that the air quality impacts from the project would likely be minor because the facility would not be enlarged and operate only on an intermittent and temporary basis. This would cover emissions from plant operations and dust from haul truck traffic. The impacts from the current permitting action are not expected to cause or contribute to a violation of any National Ambient Air Quality Standard (NAAQS) or Montana Ambient Air Quality Standard (MAAQS) or opacity requirements and would have minimal effect on the air quality of the project area.

This facility could be expected to operate in compliance with all applicable rules and regulations as outlined in the Montana Air Quality Permits (MAQP) #2888-003 and #4842-00 (DEQ, 2013a).

Pollutant deposition from the facility would be expected to be minimal because the pollutants are widely dispersed (from factors such as wind speed and wind direction) and exhibit minimal deposition on the surrounding areas. Therefore, air quality impacts in this area as a result of the No Action Alternative would be minor.

Secondary Impacts

Secondary impacts to the physical and biological aspects of the human environment as a result of the No Action Alternative would be minor if Garnet USA controls blowing dust from the operations area using the prescribed BACT as described in their air quality permits.

Deposition of pollutants on water, soil, vegetation, and impacts to unique, endangered, fragile, or limited environmental resources, terrestrial and aquatic life as a result of the No Action Alternative would be minor (DEQ, 2013a).

Cumulative Impacts

Cumulative impacts to the physical and biological aspects of the human environment as a result of the No Action Alternative appear to be minor.

There are no major sources of air pollutants within a 50 mile radius of the proposed project (Section 3.8.3). Cumulative impacts to physical and biological aspects on the physical and biological environment in the immediate area as a result of the No Action Alternative appear to be minor (DEQ, 2013a).

4.8.2 Proposed Action

Under the Proposed Action, the processing plant would continue operation under its current operating permit. Garnet USA would increase garnet production at the processing plant with ore from the RWHR Mine site, possibly producing up to 50,000 tons of garnet per year (Garnet USA, 2013a). Garnet USA's operating permit amendment application estimates that ore from the RWHR Mine would generate approximately 45 truckloads per day, Monday through Friday, for 34 weeks each year.

Primary Impacts

Garnet USA would use prescribed BACT to control dust such as watering of haul roads. The most recent air quality permit (MAQP #4842-00) includes new equipment needed for the Proposed Action. Based on this, the air quality permit contains an air quality analysis of the proposed Garnet USA RWHR Mine Project. In the analysis, DEQ indicated that the air quality impacts from the current permit covering the proposed project would likely be minor. The impacts from the current permitting action, which would include the Proposed Action, are not expected to cause or contribute to a violation of any National Ambient Air Quality Standard (NAAQS) or Montana Ambient Air Quality Standard (MAAQS) or opacity requirements and would have minimal effect on the air quality of the project area. (DEQ, 2013a).

This facility is expected to operate in compliance with all applicable rules and regulations as outlined in MAQP #2888-03 and #4842-00.

Pollutant deposition from the facility would be expected to be minimal because the pollutants are widely dispersed (from factors such as wind speed and wind direction) and exhibit minimal deposition on the surrounding areas. Air quality impacts in this area as a result of the Proposed Action would be minor if Garnet USA diligently follows its dust control program (DEQ, 2013a).

Secondary Impacts

Secondary impacts to the physical and biological aspects of the human environment as a result of the Proposed Action would be minor if dust is controlled using BACTs.

Deposition of pollutants on water, soil, vegetation, and impacts to unique, endangered, fragile, or limited environmental resources, terrestrial and aquatic life as a result of the Proposed Action would be minor (DEQ, 2013a).

Cumulative Impacts

Overall, any cumulative impacts to the physical and biological aspects of the human environment as a result of the Proposed Action would be minor.

There are no other major sources of air pollutants within a 50 mile radius of the proposed project (Section 3.8.3). Cumulative impacts to physical and biological aspects on the physical and biological environment in the immediate area as a result of the Proposed Action would be minor (DEQ, 2013a).

4.8.3 Agency-Mitigated Alternative

No aspect of the Agency-Mitigated Alternative is likely to contribute to primary, secondary, or cumulative impacts to air quality.

4.8.4 Air Quality Permit Best Available Control Technology Requirements

The following are required control technologies outlined in the air quality permit for the each referenced emission type. They were selected by DEQ based on feasibility and cost.

A best available control technology (BACT) analysis was completed as part of air quality permit. MAQP #4842-00. The analysis looks at control options for emissions based on technical and environmental feasibility, and economics of each option to select the option which would be considered the best available control technology.

Due to the limited amount of emissions produced by the diesel engines associated with the stationary generator, the lack of cost effective add-on controls, and the likelihood that the engines would be required to comply with federal engine emission limitations, compliance with applicable federal standards and operation and maintenance of the engines with no add-on controls would constitute BACT for these engines.

Water or chemical dust suppressant was determined by the DEQ to be BACT for fugitive emissions which would include Particulate Matter (PM) from activities outlined in the current permit to include haul road traffic, increases in aggregate throughput, and additional crushing and screening.

The current air quality permit includes conditions and limitations to ensure the facility will operate in compliance with all rules and regulations. Annual garnet throughput might be restricted by other governmental agencies, which would limit ore production to a level less than that described in the current permit (DEQ, 2013a).

MAQP #4842-00 includes conditions limiting the facility's opacity and requiring water and spray bars to be available on the site to ensure compliance with opacity standards. These conditions would limit fugitive emissions. Further, Garnet USA is required to meet federally-enforceable air quality limits to remain a minor source of emissions with respect to Title V permitting.

4.9 Power Supply

4.9.1 No Action Alternative

There would be no primary, secondary, or cumulative impacts to the power supply under the No Action Alternative. The power usage is unlikely to change substantially given that the equipment currently in use would remain in use under this alternative, nor would the cumulative impact of this usage appreciably change overall power usage in the Alder area. The RWHR Mine would not be constructed and disturbances would be limited to exploration work.

4.9.2 Proposed Action

There would be no primary, secondary, or cumulative impacts to the power supply under the Proposed Action. Power demand at the Alder Gulch processing plant is unlikely to change substantially given that the equipment currently in use would remain in use under this alternative. Although the production would increase, it is unlikely that this increase would cause the overall power demand on the system to exceed its current capacity. Nor would the impact of this usage, when viewed in the context of past and potential future usage, contribute to a cumulative increase in overall power usage in the Alder area. Power at the RWHR Mine site would be provided by generators. There would be no additional demands on the power supply.

4.9.3 Agency-Mitigated Alternative

There would be no primary, secondary, or cumulative impacts to the power supply under the Agency-Mitigated Alternative. The Agency-Mitigated Alternative would not alter power usage at the Alder Gulch processing plant or the RWHR Mine site.

4.10 Noise

4.10.1 No Action Alternative

Garnet USA is currently approved for operating the Alder Gulch processing plant 24 hours per day.

The noise levels of the processing equipment and haul truck activities for the No Action Alternative would be the same as the levels while Ruby Valley Garnet was mining the Red Wash Alluvial site. These levels would be the same as described in Section 3.10. The only primary or secondary noise impacts for the No Action Alternative would result from operation of the processing equipment while the bulk sample was processed.

4.10.2 Proposed Action

Alder Gulch Site

Garnet USA will attempt to reduce noise by limiting certain operations during evening and night hours (Garnet USA 2103b). Hours worked in the plant, wet process, screening, drying and bagging operations are dependent on sales and marketing efforts. In the past, the wet processing operations operated two shifts per day, five days per week between the hours of

6:00 a.m. and 2:00 a.m. (Garnet USA, 2013a). The screening and bagging operations would at times operate 24 hours per day, six days per week.

Noise associated with the previously approved Alder Gulch Mine Project primarily originated from the mining activities. Initially the mining operations were anticipated to involve one 10-hour shift daily between 7:00 a.m. and 7:00 p.m. with some overtime and weekend operation as necessary. Operations did not exceed 16 hours of operation in any given day. Operation of the mining activities typically did not occur during winter months.

Garnet USA has proposed that mobile equipment at the plant site used outdoors during daylight hours would be equipped with backup alarms and strobe lights to reduce noise impacts (Garnet USA, 2013a). After daylight hours, only the MSHA approved strobe lights would be used, eliminating backup alarm noise. The only anticipated processing and mining equipment operating after 5:00 p.m. would be two front end loaders, two haul trucks, and one generator. Equipment would be inspected regularly and all noise preventing equipment would be maintained in good working order (i.e. mufflers, engine covers, generator sheds, etc.)

Garnet USA proposes to increase the production at the site over what was produced in the past. Although the Alder Gulch site is permitted to operate the processing plant for 24 hours per day, Garnet USA has indicated the plant's proposed hours of operation will initially be 7:00 a.m. to 5:00 p.m. every weekday (Garnet USA, 2013b). If the processing plant equipment and operations at the Alder Gulch site of the Proposed Action are similar to the equipment and operations of the plant when it last operated in 2010, then the processing plant noise levels at nearby residences should be similar to what they were in 2010. If the plant operates continuously 24 hours per day, the noise levels are predicted to be L_{dn} 51 to 54 dBA, and if the plant operates between 7:00 a.m. and 5:00 p.m., the noise levels are predicted to be L_{dn} 43 to 46 dBA (Section 3.10.3). These levels are less than the EPA guideline of L_{dn} 55 dBA. If the plant operates between 7:00 a.m. and 5:00 p.m., the +3 to +6 increase compared to the L_{dn} 40 dBA ambient noise without the processing plant activities would be barely to clearly audible (Section 3.10.2). If the plant operates continuously for 24 hours per day, the +14 increase would be considered more than twice as loud than the L_{dn} 40 dBA ambient noise without the plant operating, which would be a significant noise impact at residences near the Alder Gulch site.

Although there has been diesel-powered equipment, such as loaders and dozers, working on the site since spring 2012, the noise they create is intermittent and varies as the equipment moves around the site, and these operations would continue in a similar manner (Garnet USA, 2013b). The noise of the processing plant would be more of a constant, steady drone due to large process and ventilation fans which exhaust through the roof of buildings and the noise of operations inside the buildings.

Since the exhaust stacks of the plant are above the roof of the buildings, the existing visibility berm along Ruby Road does not block the line of sight between the stacks and the residences along Ruby Road, and the existing stockpiles do not block the line of sight

between the plant buildings and the residences northeast of the site. Therefore, the berms and stockpiles would not mitigate the noise of the processing plant.

RWHR Site

The mine operating hours at the RWHR Mine site could reach 24 hours a day 7 days per week during the operating season. Garnet USA would stockpile ore and not operate the mine during the winter months. Some operations and equipment would be similar to those during the recent exploration work, and some new operations and equipment would be used. The use of diesel-powered equipment and a rock drill would be similar. Therefore, the noise levels of the diesel equipment and rock drill for the Proposed Action at the closest residence 1.2 miles west of the site would be similar to the noise levels during exploration. The estimated L_{dn} 41 to 43 dBA if the diesel equipment and rock drill operate continuously for all 10 hours between 7:00 a.m. and 5:00 p.m. on weekdays are less than the EPA guideline L_{dn} 55 dBA, and +1 to +3 dBA compared to the estimated L_{dn} 40 ambient noise levels. Although the diesel equipment and rock drill may be audible at the closest residence, noise impacts are not predicted for the diesel equipment and rock drill operations.

As mining progresses, the weight of explosive used per delay may change, but the necessary weight is unknown (Garnet USA, 2013a). If blasting continues to use approximately 44 pounds per delay as used during exploration activities, the blast noise at the closest residence due to the Proposed Action would be similar. If the weight of explosive used during mining is increased to approximately 100 pounds per delay, the predicted blast noise is predicted to be L_{pk} 105 dBP, which is still less than the L_{pk} 115 dBP threshold for annoyance (USACHPPM, 2005). Although blasting noise would be audible at the closest residence, noise impacts would be minimal due to blasting.

A new crushing circuit would be added to the RWHR Mine site. The noise level of a crushing circuit, which includes jaw and cone crushers, vibrating screens, and conveyor systems, is L_{eq} 66 dBA at 1,050 feet (BSA 2008). The crushing circuit noise level at the closest residence is predicted to be approximately L_{eq} 38 dBA, and L_{dn} 42 dBA if the circuit operates continuously for all 10 hours between 7:00 a.m. and 5:00 p.m. when the crusher is operating seasonally. The predicted L_{dn} 42 dBA is less than the EPA guideline L_{dn} 55 dBA (EPA 1979), and +2 dBA compared to the estimated L_{dn} 40 ambient noise levels. Although the crusher noise may be audible at the closest residence, noise impacts would be minimal for the crushing circuit.

If the same back-up alarms with the same settings currently in use at the Alder Gulch site and the RWHR Mine site are used for the Proposed Action, then the back-up alarm noise would be similar to the existing environment (Section 3.10).

Haul truck traffic would increase for the Proposed Action to approximately 45 trips per day between 7:00 a.m. and 5:00 p.m. (Garnet USA, 2013b). The haul truck traffic noise for the Proposed Action is predicted to be $L_{eq}(h)$ 45 to 47 dBA, which is less than the MDT $L_{eq}(h)$ 66 dBA traffic noise impact criterion, and +7 dBA compared to the $L_{eq}(h)$ 38 to 40 dBA haul truck noise during exploration (Section 3.11.3). The +7 dBA increase is less than the MDT

+13 dBA increase noise impact criterion (MDT, 2011a). However, the +7 dBA increase would be perceived as between a clearly noticeable increase to being twice as loud as the existing haul truck noise, which may be a moderate noise impact for residences along Ruby Road (Egan, 1988).

For the Proposed Action, haul trucks would continue to enter the Alder Gulch site by using Ruby Road and the East Road, but a new West Road may be constructed so the haul trucks would follow a one-way loop path to Highway 287. Construction and use of the west road is contingent upon approval by MDT. Use of the West Road would reduce the number of haul trucks passing by residences along Ruby Road by half. The predicted haul truck traffic noise at residences on Ruby Road for the Proposed Action is approximately $L_{eq}(h)$ 42 dBA, which is less than the MDT $L_{eq}(h)$ 66 dBA traffic noise impact criterion, and +4 dBA compared to the $L_{eq}(h)$ 38 dBA haul truck noise during exploration (Section 3.11.3). The +4 dBA increase is less than the MDT +13 dBA increase noise impact criterion (MDT, 2011a). The +4 dBA increase would be perceived as between a barely noticeable and clearly noticeable increase for residences along Ruby Road (Egan 1998). Although the increase in truck traffic noise may be noticeable, noise impacts would be minimal for the haul truck traffic along Ruby Road.

4.10.3 Agency-Mitigated Alternative

All aspects of the Agency-Mitigated Alternative would be the same as the Proposed Action, except that the haul truck access to the Alder Gulch processing plant would be redirected from Ruby Road to a new diagonal road that would be constructed in the southeast corner of the Alder Gulch site (Figure 2.6-1). The new road would allow haul trucks to cross Highway 287 directly from Anderson Lane and access the site after briefly driving on Ruby Road to reach Garnet USA property. The new diagonal road would move the haul truck traffic farther from the Ruby Road residences and would reduce the truck noise at the residences. The proposed visibility berm that runs along Ruby Road would be extended southward preventing access on the East Road to the plant from Ruby Road near the residences. That berm would in effect cut off and eliminate the East Road entrance to the plant. The removal of traffic off of Ruby Road should help reduce the truck noise noted by the residents (Figure 2.6-1).

Noise associated with haul truck traffic to and from the processing plant was mentioned by residents living along Ruby Road. DEQ does not have the authority under the MMRA to require mitigation to reduce the noise levels. Garnet USA can implement the following measures to reduce noise impacts to the neighborhood around the processing plant:

- Limit the operation of outdoor equipment and operations at the Alder Gulch processing plant and the RWHR Mine site to the proposed 7:00 to 5:00 p.m. on weekdays.
- Install high-grade mufflers on all diesel-powered equipment.

- Replace traditional “beep-beep-beep” back-up alarms on all mobile equipment at the Alder Gulch site and RWHR Mine site with manually adjustable, self-adjusting, or broadband sound alarms. Any new equipment would have to be MSHA approved.

4.11 Cultural Resources

Alder Gulch Permit Area

A cultural resource survey and report was conducted in compliance with the provisions of the National Historic Preservation Act (Public Law 89-665 as amended), and Executive Order 1593 (Protection and Enhancement of the Cultural Environment) for land within the proposed permit boundary at the Alder Gulch processing plant. As a result of the survey, mitigation by avoidance of identified historic resources has been included in the proposed project’s Plan of Operations. The proposed project would be conducted entirely on privately owned lands. The processing plant has been permitted and no further action is required to protect cultural resources.

RWHR Mine Permit Area

In July 2012 DEQ conducted a Class III field inspection of the proposed RWHR Mine site. No historic properties were found, nor was there any evidence of cultural properties within the area of potential effect (Sears, 2012). Therefore, it is unlikely that there would be any potential for primary, secondary, or cumulative impacts to cultural resources due to activities under any alternative under consideration. DEQ’s operating permit does not require Garnet USA to adhere to all state and federal regulations on private land if qualified prehistoric or historic articles are encountered during operations.

DEQ has no authority to require any additional cultural resource inventory or investigations under MEPA. If Historic Properties are encountered during operation, DEQ would ask the proponent to cease operations and consult with DEQ and SHPO.

4.12 Socioeconomics

Socioeconomic impacts relate to the changes experienced by a community due to the alternatives under consideration. These can relate to changes in population, demographics, income, taxes, and demands on community and governmental services.

4.12.1 No Action Alternative

Garnet USA does not anticipate increasing its employees under the No Action Alternative. The number of people employed by Garnet USA to refurbish the plant and complete exploration and the current level of use of community and government services would remain the same. If the plant could find alternate sources of garnet ore or feedstock and get approval from DEQ to process at the Alder Gulch processing plant site, the plant could continue operation, but at an unknown level or duration. There would be minimal primary impacts to socioeconomic conditions anticipated due to the No Action Alternative. Individuals employed by Garnet USA are likely to remain in the community for the duration

of their employment and then most of them would leave looking for alternate employment. Their use of governmental and social services would decrease unless they applied for unemployment.

The overall cumulative effect of the No Action Alternative would be difficult to quantify as the number of employees, 40 to 50, is not likely to be large enough to generate a measurable change to the socioeconomic statistics collected for Madison County (BLS, 2012).

4.12.2 Proposed Action

Primary Impacts

In general, the Proposed Action would provide beneficial economic impacts for the town of Alder and the 50-99 individual jobs directly and indirectly generated as a result of the mine operation, and would not result in adverse social or economic impacts. Garnet USA anticipates employing 30 to 60 people directly, and generating from 50-99 total new employment opportunities in Madison County (Cummins, 2013). Because Garnet USA is not expected to directly employ more than 75 persons, the Hard Rock Impact Act (90-6-301, *et seq.*, MCA) is not expected to be triggered.

In addition, the population demographic characteristics of Madison County or Alder are not likely to be significantly affected. Processing and marketing of garnet materials would represent an increase in economic activity within the Alder area. Subsequently, the overall tax income realized by the county from the adoption of the Proposed Action would be greater than it would be in the absence of that economic activity. Social and economic impacts associated with development of the proposed mine may include additional demands on governmental services, impacts on community and county facilities, and minor relocation or population increases.

The highest annual employment level reported for Madison County occurred in 2008 at 4,000 (BLS, 2012). The highest level of employment in Natural Resources and Mining in the same year was 216, which was 5.4 percent of total employment. Table 3.12-3 details total employment in several major NAICS industries for Madison County from 2009 through 2010. Employment in Mining, Quarrying, and Oil and Gas (NAICS 21) over the past decade in Madison County was low in the early 2000s, experienced a high in 2008, and has since declined slightly, but has remained well above levels seen in 2002 (Cummins, 2013). Garnet USA's Plan of Operation would substantially increase the employment in the Mining, Quarrying, and Oil and Gas industry in Madison County.

By increasing employment within this industry by 30 to 60 employees, Garnet USA's operations would also increase demand for other services in the county, such as truck driving to transport product, and creating more household income which would create induced demand for services in the county, such as groceries, health services, and retail goods. The potential increase in total employment would be the equivalent of 50 to 99 new full-time jobs per year in Madison County (Cummins, 2013).

Secondary Impacts

The relatively long-term aspect of the life of the mine as proposed would retain these jobs within the community for as long as 37 years. This consistent economic stimulus has the potential to have a long-term positive effect on socioeconomic conditions within Madison County. Jobs in the mining industry are likely to pay at a level higher than the current average per capita income in Madison County (Table 3.12-3).

Employment in mining, quarrying, and oil and gas in Madison County has decreased each year since 2008, and as of 2011 was below 50 (Cummins, 2013). An additional 30 to 60 jobs in this industry would create a total of 50 to 99 jobs in Madison County, when indirect and induced jobs are taken into consideration (Cummins, 2013). The direct jobs added by Garnet USA would be higher paying than average and would produce more output than average.

Cumulative Impacts

Cumulative impacts due to the Proposed Action on the socioeconomic conditions of Madison County are likely to be localized and beneficial. The increase in available, higher paying jobs would contribute to economic growth in the area which may be reflected in economic statistics for the county. The high rental vacancy rate in the county may allow potential Garnet USA employees to find housing without difficulty, and the fact that schools are currently below capacity should allow families to join the communities without stretching available services.

4.12.3 Agency-Mitigated Alternative

The proposed addition of a road segment may create some short-term jobs in construction, but it would not result in significant primary, secondary, or cumulative impacts to the socioeconomic conditions in Madison County beyond those identified for the Proposed Action.

4.13 Transportation

The main roadways with potential to be impacted by any alternative under consideration are Ruby Road and State Route 287. State Route 287 is maintained and regulated by MDT. DEQ does not have regulatory authority over the use of publicly maintained roads. Table 4.13-1 compares the transportation specifics for each alternative under consideration.

4.13.1 No Action Alternative

Primary Impacts

Under its exploration license, Garnet USA can remove a 10,000 ton ore bulk sample from the RWHR Mine site and transport it to the Alder Gulch processing plant. The hauling activities for the exploration work have typically involved four to eight truckloads per day for approximately 34 weeks per year to haul down to the stockpiles at the processing plant (ISR Capital, 2013). The current operating permit for the Alder Gulch processing plant allows ongoing processing of garnet ore regardless of the source of that material if approved by DEQ. Truck traffic related to bringing garnet ore to the plant may affect other travelers on

the private ranch roads, Ruby Road, Anderson Lane, or State Route 287. Haul trucks crossing State Route 287 from the south and entering the processing plant via Ruby Road and the East Road would create dust and produce noise that may affect local residents. These activities are permitted under the exploration license.

Table 4.13-1. Comparison of the Transportation Specifics for Each Alternative Under Consideration, Garnet USA Project, Madison County, Montana.

Alternative	Estimated Haul Truck Round Trips per day	Estimated Other Mine-related Traffic, Round trips per day ¹	Entrance Route	Exit Route
No Action	4 to 8	15-20	Ruby Road	Ruby Road
Proposed Action	45	20-34	Ruby Road	West Road ²
Agency-Mitigated Alternative	45	20-34	Diagonal access route ²	Diagonal access route ²

¹ To include average daily employee traffic to and from the RWHR site, water trucks, etc.

²to be constructed

Secondary Impacts

It is unlikely that actions under the No Action Alternative would cause secondary impacts to transportation in the Alder area. The permitted level of truck traffic would continue during exploration. Garnet USA has performed some upgrades on the ranch roads and county sections of unpaved roads to accommodate the haul trucks.

Cumulative Impacts

The No Action Alternative would not contribute to cumulative impacts to transportation in the Alder area. DEQ is not aware of related future actions that have the potential to increase or change traffic or transportation corridors in or near Alder.

4.13.2 Proposed Action

Primary Impacts

Under the Proposed Action, Garnet USA would begin full scale mining at the RWHR mine and would increase the number of truck trips between the RWHR Mine site and the processing plant to 45 truck trips per operating day (ISR Capital, 2013)(Table 4.13-1). The anticipated startup schedule is to haul ore in up to 10-hour shifts, 5 days per week from the mine site. Hauling would be managed between the hours of 7:00 a.m. to 5:00 p.m. The most likely times for the haul trucks to affect other traffic would be in the morning and evening commute hours, during school bus loading time, and seasonally in the summer when tourism increases traffic on State Route 287.

Primary impacts to transportation could include increased traffic from the haul trucks crossing State Route 287 to Ruby Road from Anderson Lane. There is a slight misalignment

of these two roads as trucks cross from Anderson Lane onto Ruby Road which requires haul trucks to drive on a short section of State Route 287 as they make the crossing. Other potential impacts due to haul truck and other traffic related to the Proposed Action would include increased noise, dust, and lights from truck traffic on Ruby Road in front of residences (See Sections 4.8 and 4.15).

Secondary Impacts

Accidents due to increased truck traffic are another potential secondary impact of the Proposed Action. Higher traffic volume in the summer and visiting drivers less familiar with the truck presence may increase the likelihood of accidents occurring between haul trucks and passenger vehicles.

A western one-way haul truck route, West Road, for the haul trucks to exit the plant is included in the Proposed Action. Trucks would enter State Route 287 west of the Alder Water and Sewer District facility, turn left (east) and drive slightly less than one-half mile toward Anderson Lane. They would then turn right (south) onto Anderson Lane. The construction of the proposed West Road may increase the risk of truck accidents while these trucks are slowly accelerating on State Route 287 before they turn onto Anderson Lane. This is especially true during the high traffic volume summer months. Variations of this route that keep the haul trucks off the highway until they rejoin the proposed angled entrance road (southeast of the office) have been discussed, but not proposed to DEQ. The proposed West Road would need to be permitted by MDT.

It is unlikely that Garnet USA's use of State Route 287 or other parts of the haul route between the RWHR Mine site and the processing plant would impact transportation beyond the extent of the haul route. If an accident were to occur on State Route 287 involving a Garnet USA haul truck, other travelers could experience delays, but the delays would be similar to those created by any traffic accident. Garnet USA would consult with MDT related to any maintenance requirements or signage necessary to preserve safety conditions on State Route 287 for public use.

Cumulative Impacts

It is unlikely that Garnet USA's proposed use of State Route 287 would contribute to cumulative impacts to transportation in the Alder area. There are no related future actions that have the potential to increase or change traffic or transportation corridors in or near Alder.

4.13.3 Agency-Mitigated Alternative

Primary Impacts

As part of the Agency-Mitigated Alternative, Garnet USA would create a new access road to the processing plant for ore haul trucks. This road would have the trucks turn north onto Ruby Road, then immediately deviate west onto an entrance road that would run diagonally northwest toward the office and processing plant facilities. Primary impacts from adoption of the Agency-Mitigated Alternative would include the elimination of Garnet USA haul truck and

employee traffic on the majority of Ruby Road. By retiring the East Road entrance, Garnet USA would no longer use that portion of Ruby Road near the residences to access the processing plant.

Along with the removal of the East Road entrance, the visibility berm that is part of the Proposed Action would be extended south across the old East Road as far south as feasible. This southern extension of the visibility berm would prevent use of the East Road entrance and isolate the Ruby Road residences from truck and auto traffic related to the processing plant. Eliminating haul truck and employee traffic on Ruby Road would reduce noise, dust, and light experienced by residents, and it would reduce the chance of collisions between the haul trucks and local traffic. The alignment of Ruby Road and Anderson Lane would contribute to safety at this intersection. The specifics of the angled access to the processing plant would be determined by consultation between landowners, Madison County, MDT, and Garnet USA. The angled access road would provide a shorter and more direct haul route to the processing plant. The partial realignment of Anderson Lane and Ruby Road may allow trucks to cross State Route 287 more efficiently. This could also reduce the overall likelihood of conflict with other traffic and increase traffic safety along the route. The new diagonal road would be designed for two way haul truck traffic.

Secondary Impacts

It is unlikely that Garnet USA's altered crossing of State Route 287 would impact transportation beyond the extent of the new processing plant entrance. If the angled entrance to the processing plant does increase crossing efficiency for the haul trucks, there could be fewer traffic impacts due to slow moving trucks at the crossing intersection.

Cumulative Impacts

It is unlikely that Garnet USA's retiring use of the East Road and creating an alternate access road to the processing plant would contribute to cumulative impacts to transportation in the Alder area. There are no related future actions that have the potential to increase or change traffic or transportation corridors in or near Alder.

4.14 Land Use and Recreation

4.14.1 No Action Alternative

Land use at the Alder Gulch processing plant during operations is unlikely to change substantially given that the equipment and areas of the plant currently in use would remain in use under this alternative. At closure, the site would be reclaimed and revegetated except for some of the buildings and parking areas which would be left for alternate industrial land uses.

The activity at the plant would not contribute to cumulative impacts to land use in the Alder area. The lands within the Alder Gulch permit area are private and not available for public recreational activities.

There would be limited primary impacts to the RWHR Mine site from the ongoing exploration license activities. These would include some drilling, blasting, soil stockpiling, and reclamation activities. There would be no primary, secondary, or cumulative impacts to existing land use at the RWHR Mine site under the No Action Alternative. There is no grazing occurring at the RWHR Mine site proper, but some still occurs on lands surrounding the exploration site. After the exploration is completed the site would be reclaimed and grazing would resume.

4.14.2 Proposed Action

Primary Impacts

The mining and processing facility land use at the Alder Gulch processing plant site would continue as permitted. Mining is not being proposed at the site at this time, but has been previously approved. The post-operations land use would be as described for the No Action Alternative.

Under the Proposed Action, land use in the RWHR permit area would be converted from exploration blasting, trenching, and ore removal to include full scale mining. The footprint of the proposed mine would cover approximately 213 acres of the 340 acre permit area over a 37-year mine life. The topography of the land would be changed as the garnet ore is removed and the area would become an industrial mining site. At closure, the disturbances would be reclaimed within the two-year timeline and other requirements specified in Section 82-4-336(3), MCA.

Secondary and Cumulative Impacts

There would be no secondary or cumulative impacts to land use under the Proposed Action. Land use in the areas surrounding the Alder Gulch processing plant and the RWHR Mine site is unlikely to change substantially given that the existing land uses are well established and consistent with the types of use proposed under this alternative. The areas surrounding, but outside the permit boundary of, the RWHR Mine site could continue to be grazed or used by the landowner for agricultural purposes. Exploration work has identified a large garnet resource in the area on surrounding lands (Garnet USA, 2013a). Approval and operation of the mine may stimulate secondary exploration on neighboring properties around the mine area. There are no other mining or exploration activities contiguous to Garnet USA's proposed mining operation that are under concurrent consideration by DEQ, nor is DEQ aware of any relevant actions being reviewed by another state or federal agency.

The conversion of the RWHR Mine site from exploration activities to full scale mining is unlikely to contribute to cumulative impacts to land use in the Alder area. After reclamation, the RWHR Mine site would likely revert back to grazing use unless the mining is expanded. The lands within the two permit areas are private and not available for public recreational activities.

4.14.3 Agency-Mitigated Alternative

Under the Agency-Mitigated Alternative, a small section of land within the Alder Gulch permit area would be disturbed to create an access road. Since the land to be used is part of the processing plant, this change would not constitute a primary or secondary impact to overall land use. Adding the access road would not contribute to cumulative impacts to land use in the Alder area.

The Agency-Mitigated Alternative does not contain any other components that have the potential to substantially change impacts to land use from those anticipated under the Proposed Action.

4.15 Visual Resources and Aesthetics

Impacts to visual resources and aesthetics can include changes to the character of a landscape or the visibility of a landmark or scenic view. The rural nature and open range characteristic of the area near Alder contributes to longer sight distances, which can make changes more obvious to the observer.

4.15.1 No Action Alternative

The continued use of the Alder Gulch processing plant would not alter the industrial character of the site or the facilities visible to the public. There would be negligible primary, secondary, and potentially cumulative impact to visual resources or aesthetics during operations due to the selection of this alternative. Any reclamation of the dredge tailings could improve the overall aesthetics of the Alder Gulch processing plant.

4.15.2 Proposed Action

The visibility berm proposed along Ruby Road would help minimize the visibility of some of the operations at the plant site including lights, truck traffic, and dust. The East Road would remain in use creating light, traffic, and dust impacts to local residents along Ruby Road. The land use changes during operations and closure would be similar to those discussed under the No Action Alternative.

Garnet USA conducted a viewshed analysis to determine if the proposed surface disturbance at the RWHR Mine site would be visible from publicly accessible areas. The viewshed analysis selected five vantage points based on initial spatial assessment of the most likely areas where the RWHR Mine site would be visible (Blocker, 2013). All five sites were on publicly accessible roads. Due to its remote location on private property, the RWHR Mine site has limited visibility to the public. Visibility of the site is limited from State Route 287 and the town of Alder due to the rolling hills, trees, and existing placer piles. The site is partially visible from some private residential and agricultural properties on Upper Ruby Road and Anderson Lane, but the viewshed analysis found locating the site from Anderson Lane to be challenging. The point where the proposed RWHR Mine site is most easily visible is near the Ruby Reservoir Road, but only one to three percent of the site is likely to be visible from this location (Blocker, 2013).

When the 100 acre mining and milling waste stockpile was added to the digital analysis, the RWHR Mine site became difficult to distinguish from the undisturbed hillsides at all visibility assessment points (Blocker, 2013). The slopes of the mining and milling waste stockpile would be maintained at a final 3:1 horizontal to vertical slope during the mining activities and be concurrently reclaimed during mine life. This concurrently reclaimed slope minimizes the need for rework in reclamation activities and helps minimize the visual impact as it is similar in slope to the range behind it. The slopes of the soil stockpiles would be maintained at a 3:1 horizontal to vertical ratio and would be seeded to minimize visual contrast with the surrounding terrain during operations.

Post-closure, Garnet USA would regrade the upper lifts of the mining and milling waste stockpile to an average 3:1 horizontal to vertical slope. The grade may be steepened in a natural regrade design, with agency review and approval, in some areas if materials testing indicate that steeper slopes can be incorporated without risk. Variable slopes would enhance visuals and reduce the manmade appearance of the facilities. The regraded waste rock stockpile would then be seeded with an approved seed mix.

Garnet USA also would grade, soil, and revegetate the pit floor, which comprises a majority of the pit. Garnet USA would also apply 30 inches of soil to flat safety benches in the pit highwall and seed with an approved seed mix. The reclamation would be done in a manner to smooth the transition between the steeper rock faces and flat benches to maximize the revegetated area. Revegetation of the pit floor and flat safety benches would reduce visual contrasts with adjacent lands. About 10 percent of the pit highwalls would be reclaimed in a different manner than the stable rock slope and bench method to further reduce the visual contrast with adjacent lands, provided work can be accomplished safely. About five percent of the upper northeast corner highwall and five percent in the southeast corner highwall would be partially backfilled to create 2:1 horizontal to vertical slopes, covered with rocky soils to reduce erosion, and seeded.

The increase in haul truck traffic under the Proposed Action will be noticeable to local residents, but will not be visible beyond the area bordering the ranch road. The RWHR Mine site is approximately 1.2 miles from the nearest resident which will reduce the potential for visual impacts from dust and any lights used to illuminate the site.

Due to the remote location of the proposed RWHR Mine site and the topography of the local terrain, there would be negligible primary or secondary impacts to visual resources due to the Proposed Action. After mining and reclamation at the RWHR Mine site, the visual appearance would be enhanced by the revegetated grassland, and no secondary or cumulative impacts are anticipated.

4.15.3 Agency-Mitigated Alternative

The Agency-Mitigated Alternative would minimize visual impacts to the residents along Ruby Road by rerouting the access to the plant site along a diagonal road (Figure 2.6-1). In addition, the proposed visibility berm would be extended south to remove the East Road access to the plant site from Ruby Road. These two measures would reduce visual impacts

of lights, truck traffic, and dust to the residents along Ruby Road. If Garnet USA develops an alternative entrance to its Alder Gulch processing plant, primary or secondary impacts to the overall character of the area are likely to be minimal.

The plant facilities are offset from the existing access road and the proposed diagonal access road and are more than 1,000 feet from the southern permit boundary along State Route 287. Because of the distance between the road and the industrial facilities, passing vehicles would be unlikely to notice a change in the visual character of the roadside bordering the processing plant if minimal tree removal was necessary to accommodate the diagonal access road. Given the industrial nature of the area along State Route 287 in the vicinity of the project, the new entrance would not contribute to cumulative impacts to the visual character of this stretch of highway.

The Agency-Mitigated Alternative does not contain any other components that have the potential to substantially change impacts to visual resources from those anticipated under the Proposed Action.

4.16 Wildlife Resources

4.16.1 No Action Alternative

The continued use of the Alder Gulch processing plant would not alter the industrial character of the site or the likelihood of wildlife occurrences therein. Garnet USA has mitigations included in its operating permit to accommodate nesting and migratory birds and to prevent impacts to these protected species. In the past, all nests in a great blue heron rookery in the permit area were protected with a minimum of a 200 foot “no mine zone”. Currently no mining occurs within 500 feet of the nests or rookery during nesting season if the nests are found to be active (Garnet USA, 2013a). Activities and ongoing work at the processing plant would be conducted so that it does not harass nearby nesting birds at the facility.

Most species of birds, including eagles and other raptors, including owls, are protected under the Migratory Bird Treaty Act (16 U.S.C. 703). Bald eagles and golden eagles receive additional protection under the Bald and Golden Eagle Protection Act (16 U.S.C. 668).

If these bird species are present onsite, there would be minimal potential for primary, secondary, or cumulative impact to wildlife resources due to the selection of this alternative.

At closure, the majority of the site would be reclaimed and revegetated. Some of the buildings, roads, and parking areas would be left for alternate industrial land uses after mining and processing are completed.

Reclamation of the exploration disturbances at the RWHR Mine site would limit the wildlife impacts created during exploration.

4.16.2 Proposed Action

Primary Impacts

The impacts to the Alder Gulch processing plant area would essentially be the same as the No Action Alternative although there would be up to 37 years of additional ore processing from the RWHR Mine site.

Under the Proposed Action, land use in the RWHR permit area would be converted from exploration to mining. The change in land use has the potential to affect wildlife by destroying ground-nesting bird and small mammal habitat. Ungulates, birds, and mammals would be likely to avoid the area because of the increased human presence and noise from equipment at the site. The primary alteration of wildlife use of this 213 acre area would be avoidance by wildlife that pass near the area and potential displacement of wildlife that currently use the area. The surrounding area is a mosaic of public and private lands with large acreages held by the Bureau of Land Management and the USDA Forest Service. The RWHR site is located within a very large area of homogeneous, contiguous, arid, montane, sagebrush steppe. Wildlife densities are low in this habitat primarily due to water availability and the quality of browse. An individual animal or a group of wildlife traveling through the area could avoid the RWHR Mine site with little or no impact to their movements or energy expenditure.

Spring nesting surveys would be conducted each year prior to soil removal and stockpiling, as well as mining, to comply with the Migratory Bird Treaty Act of 1918. Per the proposed mine operating plan, any active nest would be protected from mining activities until the nest has been abandoned.

Although use of the RWHR Mine area by grizzly bears is unlikely, bears have been expanding their distribution in the Gravelly Range (FWP, 2002). If bears are sighted or evidence of bears is detected by Garnet USA, consultation with the USFWS would be advisable. Garnet USA can provide information to workers and follow basic practices to avoid conflict with bears such as keeping the mine area clean of food and trash that may act as attractants (FWP, 2002).

While much of the pit at the RWHR is being reclaimed for grazing, the majority of the highwalls would be reclaimed to rock faces for wildlife habitat. In the upper pit rock faces, Garnet USA would excavate two cavities to produce wildlife habitat for bats or nesting areas for raptors. Garnet USA is also revegetating flat safety benches in the pit after application of 30 inches of soil. In addition, Garnet USA is partially backfilling approximately five percent of the upper northeast corner highwall and five percent of the southeast corner highwalls to create 2:1 horizontal to vertical slopes, then covering them with rocky soils and seeding with an approved seed mix. These areas would also provide wildlife habitat.

Secondary Impacts

The footprint of the proposed mine covers approximately 213 acres of the 340 acre permit area within a large undeveloped area between isolated mountain ranges. Although wildlife

use of this area may be altered, this alteration is not likely to impact wildlife populations or the survival of individuals. Individuals may change their movements or use of the area surrounding the RWHR Mine site in response to the increased human presence. Again, the scale of these movements would not constitute a substantial impact to the wildlife populations in the vicinity. It will be important to control invasive weeds on the site to prevent these species from becoming established in the sage-steppe vegetation community which could affect food supplies for small mammals and grazing species.

The areas surrounding the RWHR Mine site could continue to be grazed or used by the landowner for agricultural purposes.

Cumulative Impacts

The conversion of the RWHR Mine site from exploration trenching, blasting, removal of a bulk sample, and stockpiling of soils to full-scale mining is unlikely to contribute to cumulative impacts to wildlife in the Alder area. In addition, after reclamation is completed the character of the site will be restored to rangeland. Although the vegetation diversity will be reduced, as noted under Section 4.4.2, the approved seed mix should provide browse of similar quality and help control invasive weed spread. There are no other related future actions that have the potential to impact wildlife resources.

4.16.3 Agency-Mitigated Alternative

Under the Agency-Mitigated Alternative, a small section of land within the Alder Gulch permit area would be disturbed to create a diagonal access road. The land to be used consists of naturally revegetated tailings. This less than one acre change near State Route 287 would not constitute a primary or secondary impact to overall land use. Adding the access road would not contribute to cumulative impacts to wildlife in the Alder area. All other aspects of the Proposed Action related to wildlife resources including any mitigations in the operating permit amendment application would remain the same.

4.17 Fisheries and Aquatic Resources

Impacts to fisheries would be closely linked to potential impacts to groundwater and surface water as described in Sections 4.5 and 4.6, respectively. Both water quantity and water quality have the potential to affect fisheries, amphibians, and other aquatic organisms because of their dependence on the aquatic environment. Impacts previously described are not repeated here except to explain how changes would potentially affect fisheries or aquatic resources.

4.17.1 No Action Alternative

Primary Impacts

Under the No Action Alternative, a 10,000 ton bulk sample from the RWHR Mine site would be processed at the plant site. Ore processing activities under the No Action Alternative may have the potential to affect the water levels in the ponds at the Alder Gulch processing plant. However, the ponds' seasonal fluctuations have been documented in the past, and the level

of dewatering proposed should not result in noticeable changes in the character of the pond habitat. There are no records of fish populations using the spur of Alder Gulch contained within the Alder Gulch permit area, and its habitat value to the overall fishery of Alder Gulch is low. This coupled with the lack of a direct surface water connection to Alder Gulch or Alder Gulch Creek make the potential for any primary impacts to fisheries resources due to the No Action Alternative negligible. Alder Gulch Creek is seasonally dry in the reach as it traverses the Alder Gulch mine site and processing plant permit area.

The bulk sample processing would produce minimal impacts to water levels at the plant site or increased nitrogen compounds in surface or ground water from blasting residues. No nitrogen compound monitoring is included in the current water monitoring program at the Alder Gulch Mine site.

Secondary Impacts

Garnet USA has developed a surface water and groundwater quality monitoring plan at the Alder Gulch processing plant site. Monitoring would allow detection of contaminants listed in the monitoring plan entering the ponds. In the absence of a liner, the ponds are connected to the groundwater in the Alder Gulch processing plant area. Secondary impacts could occur if contaminants from materials originating from the site pass through the unlined ponds and move down gradient via groundwater or enter surface water bodies.

There would be the potential for impacts from nitrogen compounds from the bulk sample getting into the ponds and regional groundwater. Nitrogen compounds would increase the potential for aquatic resource impacts due to reduction in oxygen in the water from excessive algal production and decomposition. However, the probability of this type of impact is low given the likely concentrations of nitrates, potential for uptake by existing vegetation, and the numbers of fish present in the unlined ponds (Allan, 2001).

Cumulative Impacts

The minimal primary or secondary impacts to aquatic habitats or fisheries suggest that there would be no cumulative impacts to these resources from the selection of the No Action Alternative.

4.17.2 Proposed Action

Primary Impacts

Under the Proposed Action, processing activities would continue at the Alder Gulch site for up to 37 years, production would increase, and process water would be recycled from two lined ponds. The impacts due to additional processing are not likely to substantially change the water level fluctuations in the ponds because of this water reuse. The increased duration does suggest a greater potential for impacts to surface waters, but the lack of quality fisheries habitat in the active processing area and the recycled water system would reduce the probability that fish would be directly affected by the activities under the Proposed Action.

Secondary Impacts

Nitrogen compounds would be delivered to the processing plant area from the RWHR Mine site as explosive residues in the ore. Runoff from the stockpile sites and wet processing the ore could wash nitrogen compounds into ponds and groundwater. The lined ponds would receive the bulk of the process water and nitrogen compounds. Nitrogen compounds would increase the potential for aquatic resource impacts from excess algal production and decomposition. However, no fish are present in the recycle ponds, and the levels of nitrate would be expected to be low enough to be taken up biologically without causing excess algal production. If algal blooms occur in the lined ponds, oxygenation would reduce the potential for negative impacts.

There are no perennial aquatic resources at the RWHR Mine site; therefore, there would be minimal potential for primary, secondary, or cumulative impacts to fisheries or aquatic resources from the activities under the Proposed Action. The small intermittent stream in the northeast corner of the permit area is removed from any proposed surface disturbance and uphill from the mine site. It is unlikely that this intermittent stream would be impacted by the Proposed Action. The storm water BMPs proposed should be sufficient to prevent any substantial runoff or sediment from leaving the mine site. Garnet USA has not proposed any groundwater monitoring at the RWHR Mine site as part of the Proposed Action.

Cumulative Impacts

There are no long-term or cumulative impacts to aquatic resources or fisheries that are anticipated at the Alder Gulch site.

4.17.3 Agency-Mitigated Alternative

The Agency-Mitigated Alternative would develop a diagonal access road for the haul trucks at the Alder Gulch processing plant. Development of the access road would slightly alter the riparian vegetation along the tributary channel of Alder Gulch that crosses the permit area. The level of impact from the potential disturbance associated with building the road would be minimal. To further minimize impacts from this alternative, the road alignment would avoid the stream channel and if culverts are required, they would be sized to accommodate seasonal high flows. Standard sediment control BMPs would be used to prevent sediment and road materials from entering the stream channel during construction and use of the road.

The monitoring plan for the Alder Gulch processing plant and mine permit boundary and the RWHR Mine site would be augmented to include sufficient groundwater and surface water quality monitoring to evaluate if there are any impacts of the mining or processing activities on surface water or groundwater from nitrogen compounds. The increased monitoring is intended to ensure that these resources are not being impacted by mining activities (nitrogen compounds originating from explosives) used at the RWHR Mine site.

The Agency-Mitigated Alternative does not contain other components that have the potential to substantially change impacts to fisheries or aquatics from those anticipated under the Proposed Action.

4.18 Residual Impacts

Residual impacts include changes that either cannot be mitigated or persist even with mitigations.

No Action Alternative

The residual impacts due to the No Action Alternative would include the changes in topography after removal of the 10,000 ton bulk sample at the RWHR Mine site under the exploration license. Regrading and other reclamation actions would minimize the impacts. Other residual impacts include the reduction in diversity in reclaimed vegetation communities and an increase in invasive species, both unavoidable impacts of permitting disturbance for mining.

Proposed Action

The character of residual impacts under the Proposed Action would be similar to that under the No Action Alternative, but the extent and duration of the impacts would be larger because the amount of material removed would be approximately 500,000 tons of garnet-bearing material per year over a 37-year period from the RWHR Mine site, which would leave a pit. Stockpiling soils would destroy soil structure, reduce soil biological activity, increase compaction and bulk density, and decrease the soil organic matter content.

These changes to the landscape are related to the purpose of the project, to remove garnet-bearing ore. There are no plans to backfill or reconstruct the excavated lands to their original elevations and that is not required in Montana law. The lands would be recontoured, but the topography would not be similar to the surrounding area after the site is reclaimed. The final reclaimed surface would partially blend into the existing contours of the lands. Man-made mine highwalls would be evident forever in the pit.

Agency-Mitigated Alternative

Residual impacts under the Agency-Mitigated Alternative would be the same as those described under the Proposed Action.

Page intentionally left blank

Chapter 5: Response to Comments on the Draft EIS

DEQ made the Garnet USA DEIS available to the public on September 29, 2013. The EIS was published on DEQ's website (<http://www.deq.mt.gov>) in PDF format to allow for broader distribution. This distribution opened the comment period for the DEIS. On October 16, 2013, DEQ held a public meeting in Alder, Montana at the Alder Community Hall. DEQ posted a legal notice of the meeting in the in the Butte newspaper, the *Montana Standard*, and in the Ennis newspaper, the *Madisonian*. Several members of DEQ's hard rock program attended the meeting and Jeffrey Herrick, MEPA coordinator for DEQ, presided over the meeting. There were also posters and informational handouts on the proposed mine and the materials in the DEIS provided at the meeting. Instructions were provided to commenters as to format and procedures for presenting comments. Approximately 22 members of the public attended the meeting in Alder.

Seven individuals or entities submitted comments to DEQ during the public comment period on the DEIS. Of these seven, two commented at the October 16, 2013 public meeting. The majority of comments came from individual citizens. Two comments were received from agencies and business interests. Most commenters addressed more than one topical resource area in their submittals. All comment letters contained at least one substantive issue that is addressed in this FEIS. In order to ensure that the FEIS addresses every comment made, the text of each comment was transcribed in this chapter and assigned an alphanumeric designation. Similarly designated responses are provided beneath each comment. To avoid duplication, the reader is directed to an appropriate response if the comment has already been addressed or to the pertinent section of the EIS if the material requested is contained within the EIS. Comments were received regarding each resource area covered in the DEIS.

Where appropriate, section numbers, page numbers, or figure and table numbers from the EIS as published by DEQ are included to assist the reader. These page numbers refer to the locations of any relevant text, figures or tables in this EIS, or direct the reader to places in the DEIS where the comment was addressed originally. New tables and analyses are accompanied by reference to an approximate insertion point in the FEIS. Introductory material has been included to make this FEIS a replacement of the DEIS and includes all the analyses used by the decision-maker to evaluate the alternatives.

5.1 Comments Received from Alder Gulch LLC

A. "I. Hard Rock Mining v. Alluvial Mining/Exploration Activities v. Hard Rock Mining"

A.1 Comment Summary

A.1.1. No analysis is made of the considerable distinctions, and varying impacts, between hard rock mining and the processing of hard rock minerals and alluvia/mining and the processing of alluvia/minerals.

Response A.1.1: Alluvial mining is covered under Garnet USA's current operating permit for the Alder Gulch tailings and the alluvial deposits in the Red Wash Alluvial Site. Analysis of mining these deposits was covered by environmental assessments completed when Operating Permit 00157 was issued in 1992 and when Amendment 001 was approved in 2007 (Ruby Valley Garnet, 2006). The proposed amendment would not authorize alluvial mining.

Hard rock quarry mining methods are discussed in Section 2.5.1 on page 20 of the DEIS. Blasting, crushing, and other aspects of hard rock mining and the effects on the environment are discussed in various sections of the DEIS.

A.1.2. An apparent theme of the DEIS is that mining has been done in the past, and the proposed amendment to the operating permit simply expands the mining's scope.³

3 See e.g. DEIS 9 (noting "[t]his amendment to the 1995 operating permit, if approved, would allow mining to proceed at the RWHR Mine site"); DEIS 20 (noting "[t]he Proposed Action would allow garnet mining at the RWHR site, adding 340 acres to the mine operating permit area").

Response A.1.2: DEQ has evaluated the potential impacts of the proposed activities described in Garnet USA's application to amend its current operating permit. The DEIS examined how the change from the limited activity at the Red Wash Hard Rock (RWHR) site conducted by Garnet USA under its exploration license to full-scale mining may affect the environment in the context of the existing environment.

A.1.3. This ignores a fundamental change in the type of mining proposed, and the concomitant changes to the processing of the mined materials. Not all garnet mining is the same, nor are the impacts of varying types of garnet mining the same. What was done in the past is not what is proposed to be done in the future. What was done in the past was alluvial garnet mining. What is proposed to be done in the future is hardrock garnet mining. It is a distinction of kind, and not just of extent. The distinction between the two types of mining and the related processing, and a description of the varying impacts of the types of mining and processing, is critical to an informed decision. It is, however, an analysis not done in the DEIS.

Response A.1.3: See Response A.1.1. There is no discussion of past alluvial mining in terms of potential impacts in the DEIS beyond disclosing the state of the existing environment, which has been altered by past alluvial mining. The DEIS evaluates impacts from the hardrock mining and associated processing described in Garnet USA's

application to amend its operating permit. Therefore, a comparison of the impacts from the two processes is not relevant.

A.1.4. Similarly, the DEIS notes that "[t]he function and use of the processing plant at the Alder Gulch site would remain the same as under the existing permitted activities." DEIS 24. Despite noting that the function and use would remain the same, the DEIS then goes on to describe upgrades to the Alder Gulch processing plant and facilities, including those that would increase processing capacity, plant efficiency, and throughput. DEIS 24-25. These changes are not described in detail nor, more importantly, are the impacts arising from these changes described. The changes proposed have the potential to add to or modify existing impacts, and should be analyzed and disclosed.

Response A.1.4: The upgrades to the Alder Gulch processing plant are listed in Section 2.5.3 of the EIS. These upgrades are components of the Proposed Action and are discussed in the sections of the EIS addressing potential impacts to water, air, noise, traffic and other resources.

A.1.5. To understand the impacts arising from these changes, moreover, the environmental impacts of the existing facilities as already approved need to be analyzed. See DEIS 47 (noting "[a]ctivities described in the mine permit or the environmental effects of those activities at these two sites have already been approved and are not considered in this analysis"). The changes in impacts cannot be assessed unless the current impacts are understood.

Response A.1.5: The environmental impacts of the existing facilities were analyzed in the environmental reviews conducted in 1992 and 2006. This EIS does not reanalyze environmental impacts of currently permitted activity. Rather, the purpose of this EIS is to analyze the potential environmental impacts associated with the changes in the operating permit that are proposed in Garnet USA's application to amend the operating permit.

A.1.6. *No analysis is made of the distinction, and varying impacts, between exploration activities and full-scale mining at the Red Wash Hard Rock Site.*

Response A.1.6: See Response A.1.1. As discussed in the previous response, Garnet USA's current operations, including the exploration activities at the RWHR site, were subject to previous environmental review. This EIS does not reanalyze environmental impacts of activities conducted by Garnet USA under its exploration license. The purpose of this EIS is to analyze the potential environmental impacts associated with the changes in the operating permit that are proposed in Garnet USA's application to amend the operating permit.

A.1.7. Under the exploration program, Garnet USA can construct trenches, drill, and remove a bulk sample of up to 10,000 tons of ore to gain a better understanding of the garnet resource. DEIS 9. By contrast, if a permit is issued, the estimated mine life for the Red Wash Hard Rock ("RWHR") Site would be approximately 37 years, based on a proposed production rate of about 500,000 tons of ore and waste per

year, including the production of approximately 50,000 tons per year of finished garnet product. DEIS 23, 111; see also DEIS 84, 127, 135.

Response A.1.7: The statement is correct. This is why DEQ has completed an EIS on the project which includes hard rock mining for 37 years and disturbing up to 213 new acres at the RWHR site.

A.1.8. The DEIS sometimes implies that the mining activities at the RWHR Site will differ negligibly from the exploration activities already permitted.⁴ This is not the case, as the scale of mining is considerably more intensive in scope, duration, and equipment used. The distinctions, and varying impacts, between exploration activities and full-scale mining need to be addressed.

4 See e.g. DEIS ES-8 (noting "[n]oise levels of the diesel equipment and rock drill at the RWHR site at the closest residence one mile west of the site would be similar to the noise levels during exploration, and would not constitute a noticeable impact to noise levels").

Response A.1.8: See Response A.1.6 The statement that the EIS implies that impacts from full scale mining "differ negligibly" from exploration activities is incorrect. The only example cited by the commenter is noise impacts. While the EIS indicates that the noise levels of the diesel equipment and rock drill will be similar to noise levels during exploration, the EIS recognizes additional noise impacts at the RWHR site that may result from Garnet USA's mining activity. See Section 4.10.2 of the EIS for further information.

A.1.9. Additionally, the No Action Alternative needs to describe what actions have taken place under Garnet USA's Operating Permit No. 00157 and Exploration License No. 00642 to provide context for the assumptions of future mining of alluvial material at the plant site, and drilling, trenching and bulk sampling under the exploration license. See e.g. DEIS 10.

Response A.1.9: See responses to comments A.1.1, A.1.5 and A.1.6.

B. "II. Geographic Scope"

B.1. Comment Summary

B.1.1. *The geographic scope of analysis, and particularly the areas potentially impacted or affected, is too restricted.*

Response B.1.1: See response to comment B.1.3.

B.1.2. The DEIS describes the areas potentially affected by the Proposed Action to include existing infrastructure related to the Garnet USA Alder Gulch processing plant, the Red Wash Alluvial Site, the proposed RWHR Mine, and the areas within the proposed mine permit boundaries, as well as an alternate access road connection to the processing plant. DEIS ES-1,3,.5 see also DEIS48,53,54,64,⁶ 67,⁷ 74-75,97,⁸ 100,⁹ and 105.

5 Please note also Figure ES-1-2 does not appear to be included in the DEIS. See DEIS ES-1.

6 With respect to surface water resources, the DEIS states that the analysis area "was limited to the permit boundary and immediate vicinity," but this "immediate vicinity" is not described. See DEIS 64.

7 With respect to groundwater resources, the DEIS notes that the groundwater resource analysis area was selected because it coincides with the extent of groundwater monitoring data collected during the 1990 and 1991 studies.

DEIS 67-68. There is no explanation in the DEIS why restricting the analysis area to coincide with the extent of groundwater monitoring data is appropriate.

8 With respect to land use and recreation, it is not clear what "adjacent lands" are or why they were chosen.

9 Wildlife habitat "was assessed for the Alder Gulch processing plant area only." DEIS 100.

Response B.1.2: Figure ES-1-2 is the same as Figure 1.1-2. DEQ regrets this omission in the Executive Summary, and directs the reader to the figure in Chapter 1. See Response B.1.3 below regarding the geographic extent of analyses.

B.1.3. This is too restricted. Project impacts, including potential, primary, secondary, and cumulative impacts, are not limited to the existing or proposed mine permit boundaries. MEPA requires "a detailed statement on ... the environmental impact of the proposed action." Mont. Code Ann. § 75-1-201 (1)(b)(iv)(A). If any restrictions exist on the geographical scope of impacts, it is to within Montana's borders. See e.g. § 75-1-201(2); 75-1-220(4). It is not to within the mine permit's boundaries. Moreover, the Metal Mine Reclamation Act requires the mitigation or prevention of "undesirable offsite environmental impacts." Mont. Code Ann. § 82-4-302(1)(g) (emphasis added).

Response B.1.3: DEQ did not restrict its environmental impacts analysis to the existing or proposed mine permit boundaries. Where the resource was not expected to be impacted beyond the proposed permit boundaries, the study area was limited to within the proposed permit boundaries. See, for example, the discussion of geology and minerals resources, soil resources, vegetation and wetland resources, hazardous materials, air quality and cultural resources. However, the study area went beyond the proposed permit boundaries for impacts where those resources may be expected outside the proposed permit boundaries. See, for example, surface water resources, groundwater resources, socioeconomics, transportation, land use and recreation, visual resources, wildlife resources, and fisheries and aquatic resources.

B.1.4. The DEIS is generally silent¹⁰ on impacts or affects occurring outside the proposed mine permit area boundaries. The scope of impact analysis must be expanded.

¹⁰ Socioeconomics is an exception.

Response B.1.4: See Response B.1.3.

C. "III. Mitigation"

C.1. Comment Summary

C.1.1. It is not clear what is discretionary mitigation and what is required mitigation.

Response C.1.1: DEQ has added mitigation measures to the Agency-Mitigated Alternative. These are described in Section 2.6.7 of the FEIS.

If DEQ approves the proposed amendment and selects mitigations measures included in the Agency-Mitigated Alternative, they would become stipulations to Garnet USA's operating permit that are enforceable under the MMRA. Pursuant to Section 82-4-

337(2), MCA, the stipulations can be imposed either with the consent of the applicant or upon DEQ's providing the applicant in writing the reasons for the stipulation, a citation to the statute or rule that gives DEQ the authority to impose the stipulation, and the reason the stipulation was not contained in the draft permit.

C.1.2. The DEIS describes in numerous places the Agency-Mitigated Alternative, and various other proposed mitigation measures. See e.g. DEIS 29, ES-5. The DEIS, however, never discusses the requirements of Montana Code Annotated § 84-4-337(2), nor is it clear what mitigation measures are intended to be discretionary, and what mitigation measures are required, nor does it ever discuss any stipulations to the draft or any final operating permit. This analysis of discretionary versus required mitigation, and of stipulations to any final permit, must be undertaken, as well as a discussion of the provisions of § 84-4-337(2).

Response C.1.2: See Response C.1.1. There is no Section 84 in the Montana Code Annotated (MCA). DEQ assumes that the commenter meant Section 82-4-337, MCA. Assuming the permit amendment is approved, the stipulations to the final permit amendment will be identified in the Record of Decision.

C.1.3. The DEIS should also disclose the results of the consultation with the applicant on potential stipulations required by § 84-4-337(2)(b).

Response C.1.3: There is no Section 84 in the MCA. DEQ assumes that the commenter meant Section 82-4-337, MCA. DEQ's consultation with an applicant regarding inclusion of stipulations in either a draft or final permit is conducted under the MMRA, not MEPA. Assuming the permit amendment is approved, the basis for any stipulations included in the final permit amendment will be set forth in DEQ's approval document.

C.1.4. What conditions has DEQ placed on the permit to ensure compliance with the Metal Mine Reclamation Act, and what mitigation measures have been mutually developed by DEQ and the applicant? See Mont. Admin. R. § 17.24.117(1)(a)(ii),(iv).

Response C.1.4: See response to comment C.1.3.

D. "IV. Related Future Actions: Secondary or Cumulative Impacts"

D.1. Comment Summary

D.1.1. *The impacts of exploring, mining, and processing contiguous or reasonably proximate garnet resources must be analyzed.*

D.1.2. The DEIS notes that "[e]xploration work has identified a large garnet resource in the area on surrounding lands," and that "[a]pproval and operation of the mine may stimulate secondary exploration on neighboring properties around the mine area." DEIS 135.

Response D.1.1 and D.1.2: Under MEPA, DEQ is required to evaluate cumulative impacts of a proposed project. However, related future actions may only be considered when those actions are under concurrent consideration by any agency through pre-impact statement studies, separate impact statement evaluations, or permit processing

procedures. Section 75-1-208(11), MCA; ARM 17.4.603(7). There are no other mining or exploration activities contiguous to Garnet USA's proposed mining operation that are under concurrent consideration by DEQ, nor is DEQ aware of any relevant actions being reviewed by another state or federal agency.

D.1.3. The impacts arising from this reasonably foreseeable increase in exploration, and, potentially, mining and processing, of contiguous or reasonably proximate garnet resources, however, is not analyzed. It is a secondary or cumulative impact requiring analysis.

Response D.1.3: See response to comments D.1.1 and D.1.2.

D.1.4. *The impacts of mining at the Alder Gulch processing plant Site or at the Red Wash Alluvial Site should be considered.*

Response D.1.4: See Response A.1.1. Impacts of mining those two areas were analyzed in the environmental reviews conducted in 1992 and 2006 specific to those projects. See Section 2.2, paragraph 4 of the EIS. As indicated in the EIS, the Red Wash Alluvial Site has been reclaimed. While it remains permitted for mining, no further mining is proposed for either site.

D.1.5. The DEIS recognizes that mining (mineral processing) at the Alder Gulch processing plant site is still permitted, and that Garnet USA may mine it at some future time. DEIS 8. An analysis in the DEIS of the impacts of mining at the Alder Gulch site, however, is not undertaken. It is a secondary or cumulative impact requiring analysis.

Response D.1.5: The DEIS does not state that mining is still permitted at the Alder Gulch processing plant site. Rather, it states that no further mining is proposed at the site, but that it would be used as the processing site for ore mined from the RWHR Mine site. If future mining is proposed for the dredge tailing at the Alder Gulch site, DEQ will conduct an environmental review at that time. See Responses to D.1.1 and D.1.2.

D.1.6. Similarly, the DEIS recognizes that the RWA Site remains permitted for mining. DEIS 8. An analysis in the DEIS of the impacts of mining at the RWA Site must be undertaken, as it is a secondary or cumulative impact requiring analysis.

Response D.1.6: See Response D.1.1 and D.1.2. The commenter does not place the statement that the "RWA Site remains permitted for mining" in context. The complete sentence in which the statement is contained is as follows: "*The Red Wash Alluvial Mine site covers portions of Sections 23 and 24, Township 6 South, Range 4 West and has been reclaimed. Although this site remains permitted for mining, no further mining is planned or proposed for the site.*"

Because no further mining is proposed for the RWA site, it is not a secondary or cumulative impact requiring analysis in the DEIS.

D.1.7. *The DEIS is largely silent on the status of, activities at, and impacts arising from the Red Wash Alluvial Site*

D.1.8. The DEIS indicates that the Red Wash Alluvial ("RWA") Site was mined and reclaimed. DEIS 1. The No Action Alternative generally describes the Alder Gulch Processing plant site, but is generally silent on the RWA Site. See e.g. DEIS Section 2.4. Please include information on the status of activities at the RWA Site, the status of the RWA Site permit, the potential future actions at the RWA Site, the potential for future reserves, impacts arising from potential actions at the RWA Site, and the status of reclamation. The DEIS notes that "[t]he reclamation plan ... has shown success at the nearby Red Wash Alluvial site," DEIS 115, but the DEIS provides no explanation or details, nor supporting documentation or studies.

Response D.1.7 and D.1.8: See Response A.1.1. The FEIS does not address the Red Wash Alluvial Site in detail because the amendment application submitted by Garnet USA does not propose additional activity at the Red Wash Alluvial Site beyond the activity currently permitted.

Garnet USA is in the process of reclaiming the Red Wash Alluvial Site. It has completed final grading and seeding of the site. Henbane (*Hyocyamus niger*) has been problematic on the reclaimed site which is typical in this area of Madison County. Garnet USA has sprayed to control weeds at the site as required under its current operating permit. Garnet USA has not requested DEQ to release any bond and, therefore, Garnet USA's reclamation obligations for the Red Wash Alluvial Site remain fully bonded. In regard to the current status and future mining at the Red Wash Alluvial Site, see Response D.1.2. and D.1.6.

D.1.9. *The impacts of processing ore at the Alder Gulch processing plant from other sources must be analyzed.*

Response D.1.9: Garnet USA has not requested to mill garnet ore from an off-site source. Therefore, DEQ cannot analyze impacts from custom milling. In the future, if Garnet USA wanted to custom mill, they could apply for an amendment to the operating permit to allow custom milling. At that time, DEQ would review the application. References to milling garnet ore from off-site sources have been deleted from the FEIS.

D.1.10. The DEIS notes that "the plant can receive and process an unspecified amount of garnet ore from other off-site sources." DEIS 140. The characteristics of this ore, as well as the impacts of processing this ore from off-site sources, needs to be analyzed. Additionally, it needs to be analyzed what impact the possible approval and operation of the mine will have on the mining of off-site ore sources, and transportation related to those off-site ore sources.

Response D.1.10: See Response D.1.9.

D.1.11. *Cumulative impact analysis needs to be clarified.*

D.1.12. The DEIS generally segregates out analysis of primary and secondary impacts, but is not consistent in locating cumulative impact analysis. The EIS should segregate out cumulative impacts and assess them in self-contained, independent sections for all alternatives and issues. Where cumulative impacts are not identified, that should be done, even if it is to note that no cumulative impacts will occur and to explain the basis, including the factual basis, for that determination. Where cumulative impacts are identified, they should be described in detail, including the facts that form the basis for the analysis. See e.g. DEIS 111-112, 113,

115, 116, 117-118, 119-120, 123, 124-125, 126-129, 129-130, 132-133, 135-136, 136-137, 138-139, 141.

Response D.1.11 and D.1.12: Additional language and headers have been added to the FEIS to allow cumulative impacts analysis to be assessed more readily by the reader.

Discussion of cumulative impacts analyses has been added to those sections where these impacts were not explicitly described in the DEIS. In many cases, the lack of primary or secondary impacts to a resource area precluded the potential for cumulative impacts; therefore, these were not mentioned. In those cases, explanatory text has been added.

D.1.13. Additionally, the cumulative impacts analysis should be reassessed given the impacts of exploring, mining, and processing contiguous or reasonably proximate garnet resources.

Response D.1.13. Please see Responses D.1.1. and D.1.9.

E. "V. Groundwater"

E.1. Comment Summary

E.1.1. No groundwater monitoring has occurred at the RWHR Site-groundwater monitoring, and an assessment of impacts to groundwater, must be performed and included in an EIS.

E.1.2. No groundwater monitoring has occurred at the RWHR Site.¹¹ See e.g. DEIS 35, 39. As recognized by DEQ, "few data are available for characterizing groundwater conditions in the vicinity of the proposed RWHR Mine site." DEIS 71. According to DEQ, groundwater near the proposed RWHR Site is dominated by a bedrock aquifer system of unknown depth and extent, and possibly localized shallow groundwater systems accompanying intermittent or ephemeral drainage channels. DEIS 67. Some evidence "suggest[s] that the proposed RWHR permit area is not entirely devoid of groundwater." DEIS 71. DEQ recognizes, moreover, that water reporting to the groundwater could contain nitrogen compounds, metals in sediment from the mineralized zone, and petroleum products from mine equipment leaks. DEIS 119.

¹¹ Garnet USA drilled two groundwater exploration test holes that were reported to be dry. DEIS 71. These test holes appear to have only provided a "snapshot of subsurface conditions," and apparently "may not indicate a groundwater system in low permeability or fractured rock." DEIS 72.

Response E.1.1 and E.1.2: Information from wells constructed during Garnet USA's exploration drilling wells suggests that the RWHR Site would be developed above the water table and is contained in Garnet USA's operating permit amendment application. Garnet USA drilled two 72 foot test holes to evaluate the presence or absence of groundwater in March of 2012. Test hole TH-1 was drilled to a total depth of 18 feet above the proposed pit floor. Test hole TH-2 was drilled to a total depth of 28 feet below the proposed pit floor. No groundwater was reported in either test hole. Early in 2013, after submittal of the operating permit amendment application, Garnet USA drilled 14 additional exploration boreholes at the RWHR Mine site. These exploration holes, drilled to an average depth of 150 feet, were also reported to be dry.

Based upon the lack of groundwater reported during the exploration drilling program, Garnet USA assumed the proposed quarry would not intercept groundwater. However, boreholes drilled into saturated bedrock having sufficiently low permeability can appear to be dry during drilling yet can fill with groundwater over time. Exploration boreholes are often reclaimed immediately after rock samples are extracted. If the boreholes were not kept open for follow-up examinations for groundwater inflow for several weeks after they were drilled, then the observed absence of groundwater during drilling may not be adequate to confirm that quarry development would not intercept groundwater. Due to the uncertainty associated with groundwater observations in exploration boreholes, at the time the DEIS was issued the Agency-Mitigated Alternative required Garnet USA to install six monitoring wells at the RWHR site to provide further information on the shallow and deep groundwater systems. Garnet USA drilled these wells in November 2013, and initiated a water quality sampling program in December of 2013. Analytical results from the first monitoring event show that no groundwater quality standards are exceeded at the RWHR site. Nitrate concentrations ranged from 0.016 mg/L up to 0.57 mg/L.

These six newly installed monitoring wells extended to the maximum proposed mining depth and groundwater was observed within the bedrock near the eastern margin of the proposed pit. DEQ will require Garnet USA to include these wells in a revised water monitoring plan.

There is very low potential for secondary impacts from acid rock drainage and metal mobility from exposed geologic material. See Section 3.2.3, Waste Rock Geochemistry. Based on the non-acid and non-toxic nature of the ore to be mined, impacts to groundwater, other than the addition of nitrogen compounds derived from blasting, are not expected. Garnet USA will be required to routinely sample the six monitoring wells to document compliance with water quality criteria.

Sediment transported by storm water on the RWHR site would be contained within sediment control basins. This storm water would have the potential to transport nitrogen compounds and small quantities of petroleum products derived from equipment leaks. Any metals contained in the sediment would be expected to be low in concentration and immobile, based upon geochemical testing conducted on rock samples from the RWHR site and the fact that the garnet deposit is not associated with metal mineralization.

At the end of five years of mining, the elevation of the pit floor will be 5,780 feet amsl. At the end of the 37 year mine life, the pit floor elevation will be 5,650 feet amsl. This graduated mining will allow Garnet USA to collect site specific information on groundwater occurrence as mining progresses. Bedrock monitoring wells installed upgradient (east) of the pit showed water table elevations between 5,784 feet amsl at monitoring well MMW-4 and 5,812 feet amsl at monitoring well MMW-1 in December 2013. The pit excavation will likely intercept groundwater during the first four to five years of mining. If the rate of groundwater inflow becomes sufficient to interfere with blasting or mining operations, Garnet USA would need to modify the water management plan to

manage groundwater inflow into the pit. Modifications may include dewatering of the pit via a pit sump or upgradient dewatering wells, and re-infiltration of this water to either bedrock or alluvium via percolation ponds and/or drainfields or injection wells. Such modifications would require an amendment to the operating permit, including an environmental review under MEPA. Section 4.6.2 of the final EIS has been updated to reflect this new information.

E.1.3. Groundwater monitoring must be performed. The absence of groundwater monitoring precludes determination of a baseline. It precludes, *inter alia*, an analysis of the chemical, physical, and temporal characteristics of the groundwater. See DEIS 72. It precludes an assessment of any impacts to groundwater, as well as an assessment of waters hydrologically connected to the groundwater system. It precludes a review of a sufficient number of sources, and over a sufficient length of time, to characterize the hydrologic regime. It precludes any determination that the RWHR Site would be expected to be mined as a dry operation and would not likely encounter measurable groundwater through the 37-year life of the mine.

Response E.1.3: See response to comments E.1.1 and E.1.2 above. Baseline groundwater monitoring at the Alder Gulch processing plant site was initiated during 1990 and groundwater monitoring has continued during periods of active operations at the site. The Agency-Mitigated Alternative includes expanded groundwater monitoring requirements. Three new monitoring wells were installed in 2013. New groundwater and surface water locations will be monitored at the plant site.

Monitoring wells were drilled at the RWHR site near the proposed pit perimeter in November of 2013, and baseline water quality sampling at these wells was initiated in December of 2013. The resulting baseline data are set forth in Chapter 3 of the EIS. These wells extended to the maximum proposed mining depth and intercepted groundwater, indicating that groundwater may flow into the pit when mining progresses deeper. These wells will continue to be monitored to document seasonal trends in groundwater elevations and to verify continued compliance with water quality criteria.

There is very low potential for secondary impacts from acid rock drainage and metal mobility from exposed geologic material. See Section 3.2.3, Waste Rock Geochemistry for further information.

E.1.4. How can the proposed action be determined to be in compliance with Montana's Water Quality Act, including non-degradation requirements, without any groundwater water quality or water level data?

Response E.1.4: See response to comments E.1.1, E.1.2, and E.1.3. The project would be required to comply with Montana's Water Quality Act. Geochemical testing of rock from the proposed pit area at the RWHR site was conducted and indicated no potential for acid generation. Concentrations of metals in the rock samples were low, and the potential for metal leaching from the rock to be mined is considered to be unlikely based upon this

testing. Therefore, no potential for the rock to be mined to result in degradation of groundwater has been identified. The non-degradation threshold for nitrate in groundwater is 7.5 mg/L, and is not dependent upon baseline nitrate concentrations.

Baseline groundwater monitoring at the Alder Gulch processing plant site was initiated during 1990 and groundwater monitoring has continued during periods of active operations at the site. Collection of baseline groundwater quality data at the RWHR site began in December of 2013. These data document that the water complies with all human health standards. Groundwater quality standards are fixed numbers (see Circular DEQ-7) and are not dependent on the baseline water chemistry.

E.1.5. *Post-proposed action approval groundwater monitoring is not mitigation.*

E.1.6. The DEIS states that "[i]n order to mitigate the potential for nitrogen or other compounds to impact groundwater, groundwater monitoring would be conducted to better characterize current and ongoing future groundwater quality at the RWHR Site and the Alder Gulch processing facilities." DEIS 120.

Response E.1.5 and E.1.6: This language has been removed from the EIS. DEQ is not relying on monitoring to mitigate impacts to groundwater.

Geochemical testing of rock from the proposed pit area at the RWHR site was conducted and indicated no potential for acid generation. Concentrations of metals in the rock samples were low, and the potential for metal leaching from the rock to be mined is considered to be unlikely based upon this testing. While there is a potential that nitrate compound concentrations in groundwater may increase, proper management of explosive use in the quarry should limit nitrogen concentrations to non-significant levels. Proper explosive management would result in the nitrogen compounds being consumed in the explosive event rather than being left as a residue in the environment. The amount of nitrogen left as a residue if proper explosive management is used is not expected to cause the level of nitrogen in groundwater to raise from the baseline concentration (0.16 mg/L to 0.57 mg/L) to the non-degradation threshold for nitrate in groundwater of 7.5 mg/L. The non-degradation threshold for nitrate in groundwater is 7.5 mg/L, and is not dependent upon baseline nitrate concentrations. Therefore, significant impacts to groundwater at the RWHR site is not expected

Likewise, significant impacts to groundwater are not expected at the Alder Gulch processing plant site. The new process ponds would not intersect the water table and would be constructed with geosynthetic liners. The unlined material storage ponds would have no primary effect on the groundwater unless some residual nitrogen compounds are retained in the silts. Groundwater monitoring data from the Alder Gulch processing plant site collected during June 2013 show nitrate concentrations below 0.2 mg/L. The groundwater (human health) standard for nitrate is 10.0 mg/L, and nitrate concentrations in groundwater, outside of any approved mixing zone, can be increased to 7.5 mg/L without requiring an authorization to degrade.

Garnet USA would be required to conduct groundwater monitoring at the RWHR site and the Alder Gulch processing plant site to ensure that unexpected impacts do not occur. The Agency-Mitigated Alternative adds additional monitoring at the RWHR site to that contained in Garnet USA's operating permit amendment application.

Analytical results will be compared to water quality standards listed in Circular DEQ-7 and with non-degradation criteria described in ARM 17.30.715. In the event that water quality monitoring identifies impacts to groundwater quality resulting from the project, mitigation measures appropriate to the nature and extent of the impact would be implemented. These may include interception and treatment of contaminated water, changes in mining and material handling practices to reduce the release of nitrogen or other potential contaminants into groundwater, and/or reclamation, lining, or capping of source areas that are identified as contributing to groundwater quality impacts.

E.1.7. Monitoring does not mitigate potential impacts. See DEIS 110. It merely identifies them. And here, it would only identify impacts after they are permitted to occur. "The Legislature enacted MEPA to prevent or eliminate environmental damage" Pompey's Pillar Historical Ass'n v. Montana Dept. of Environmental Quality, 2002 MT 352, ~ 17, 313 Mont. 401,61 P.3d 148. Monitoring must be done pre-approval so that impacts can be assessed preapproval, and so that potential mitigation measures can be assessed, and required, pre-approval.

Response E.1.7: See response to comment E.1.6. DEQ is not permitting any degradation of existing groundwater quality. DEQ is requiring groundwater monitoring to ensure that unexpected impacts to groundwater do not occur.

No groundwater quality impacts, other than the potential release of nitrogen compounds from mined material, are expected to occur at the Alder Gulch processing plant site. Groundwater monitoring would be used to assess whether or not nitrogen released from mined material occurs at a rate which would remain in compliance with non-degradation criteria. In the event that nitrogen loading occurs at rates which would lead to groundwater quality degradation, Garnet USA will be required to implement effective mitigations to reduce nitrogen loading to acceptable levels under the Montana Water Quality Act.

As described in Section 3.2.3, geochemical testing of rock from the proposed pit area at the RWHR site was conducted and indicated no potential for acid generation. Concentrations of metals in the rock samples were low, and the potential for metal leaching from the rock to be mined is considered to be unlikely based upon this testing. Therefore, no potential for the rock to be mined to result in degradation of groundwater has been identified, other than nitrogen loading. Proper management of explosive use in the quarry should limit nitrogen concentrations to non-significant levels.

E.1.8. *An adequate groundwater impact analysis is contingent upon sufficient groundwater monitoring.*

E.1.9. Until groundwater's characteristics are monitored and understood, there can be no adequate assessment of the proposed action's impacts on groundwater or the related hydrologic regime, or an analysis of potential mitigation measures.

Response E.1.8 and E.1.9: Please see Sections 3.6, 3.7, 4.6, and 4.7, and responses to comments E.1.1 through E.1.7 above. Groundwater monitoring wells have been installed and sampled at the Alder Gulch processing plant site and the RWHR Mine site. DEQ believes that Garnet USA has provided sufficient hydrologic and hydrogeologic data to adequately characterize the affected environment and to conduct impacts analysis for water resources at the proposed mine site. As noted in responses to previous comments on groundwater monitoring, geochemical analyses of the rock proposed for mining have been conducted. There is no indication the potential exists for the rock to generate leachate and cause impacts to groundwater.

E.1.10. Miscellaneous groundwater matters require clarification or analysis.

E.1.11. It is unclear what "laboratory detection limits" are referred to for nitrate. DEIS 70. DEQ has conducted an analysis of laboratory detection limits for nitrogen compounds and presented in draft DEQ-12 a reporting limit of 20)µg/L. It is inconsistent for this DEIS to imply that the levels reported are essentially at the detection limit.

Response E.1.10 and E.1.11: Please see Section 3.6.3. Laboratory analytical results reported detection limits for nitrate as 0.18 mg/L and nitrite as 0.30 mg/L. Detection limits may vary depending upon the laboratory and the analytical method used. The Montana non-degradation limit for nitrate plus nitrite in groundwater is 7.5 mg/L. Detection limits used for monitoring at the project site in the past were below non-degradation limit concentrations. DEQ Circular DEQ-7 requires that laboratories achieve a detection limit of 0.02 mg/L for compliance monitoring for nitrate plus nitrite. This low-level detection limit is appropriate for monitoring of surface water, because relatively low concentrations of nutrients may cause nuisance algal growth in surface water. These detection limits were used for baseline groundwater sampling at the RWHR site beginning in December 2013. For future compliance monitoring at both the RWHR and Alder Gulch processing plant sites, DEQ will require that Garnet USA use a laboratory that achieves the required reporting values specified in Circular DEQ-7.

E.1.12. There is no analysis of the potential for the proposed action, including the open pit, to impact the existing springs that discharge to Red Wash adjacent to the mine site, or for the pit to intercept intermittent surface water flows in Red Wash channel. See DEIS 117.

Response E.1.12: No springs have been identified within or near the RWHR permit boundary. An exploration test pit located 500 to 1,000 feet east of the proposed permit boundary was excavated through the alluvium into bedrock during 2009- 2010. This pit exposed subsurface alluvial flow. The bedrock test pit also filled with water, though it is not certain whether this water was the result of inflow from bedrock or from the alluvial source. No spring was present at this location prior to the excavation of the test pit, but the

observation of shallow alluvial water is consistent with the presence of vegetation indicative of shallow groundwater along the Red Wash channel downgradient of this test pit. As the proposed RWHR Mine site quarry nears its maximum depth, drawdown of groundwater surrounding the quarry could extend as far as this test pit location. Intermittent surface water flows in the Red Wash channel, and subsurface flow within the Red Wash alluvium, is not likely to be intercepted by inflow into the RWHR Mine site quarry. Groundwater preferentially flows along the path of least resistance; therefore, water flowing through highly permeable alluvium is unlikely to drain into underlying low permeability bedrock in significant quantities. Monitoring wells MMW-3 and MMW-4, located between the northeast corner of the proposed quarry and Red Wash, showed a higher water level in the bedrock than in the alluvium in December 2013, indicating that bedrock groundwater likely discharges into the alluvium during low flow conditions.

There is an existing developed stock spring located approximately 0.5 mile upstream of the RWHR Mine site near the headwaters of Red Wash. This spring is of sufficient distance from the proposed quarry that no impacts to the flow of this spring are predicted.

E.1.13. What is the basis for the conclusion that the pit would not encounter groundwater? See DEIS 118.

Response E.1.13: Please see Section 3.6.3, and response to comment E.1.1. During March of 2012, Garnet USA drilled two 72 foot test holes to evaluate the presence or absence of groundwater at the RWHR site. Test hole TH-1 was drilled to a total depth (TD) of 18 feet above the proposed pit floor. Test hole TH-2 was drilled to a TD of 28 feet below the proposed pit floor. No groundwater was reported in either test hole. During early 2013, Garnet USA drilled an additional 14 exploration holes at the RWHR site which averaged 150 feet deep. The drillers did not report any inflow of groundwater into these test holes.

In November 2013, GUSA drilled six monitoring wells (MMW 1 through MMW-6) near the perimeter of the proposed RWHR Mine site. Monitoring wells MMW-2, MMW-5 and MMW-6 are too remote to be indicative of the depth to bedrock groundwater where mining will occur. Monitoring wells MMW-3 and MMW-4 are paired wells. Monitoring well MMW-3 encountered groundwater at a depth of 15 feet. Monitoring well MMW-4 encountered groundwater at a depth of 5 feet. MMW-1 is located near the southeast corner of the pit. It encountered groundwater at a depth of 68 feet. The three exploration drill holes closest to MMW-1 were dry to a depth of 142-185 feet.

Based upon review of data collected from the recently installed monitoring wells, DEQ believes that excavation of the pit probably will likely encounter groundwater within the first four to five years of mining. This new information has been added to Section 3.6 and 4.6.2 in the EIS.

E.1.14. Despite recognizing that water reporting to the groundwater could contain nitrogen compounds, metals in sediment from the mineralized zone, and petroleum

products from mine equipment leaks, why is no monitoring proposed for the storm water ponds? DEIS 119.

Response E.1.14: Please see Section 3.6 and 4.6. The monitoring plan will include sampling of both surface and groundwater. Garnet USA does not propose any discharge of water from the RWHR site. Garnet USA has submitted a SWPPP for the Alder Gulch processing plant site. Although a SWPPP is not required by DEQ for the RWHR Mine site, Garnet USA intends to submit a SWPPP for the site.

DEQ has included the requirement in the Agency-Mitigated Alternative in the FEIS that Garnet USA sample the south sediment control basin and the west sediment control basin at the RWHR site twice per year. Adequate controls in the form of sumps or ponds are proposed to prevent discharge of storm water from the plant site or from the RWHR site.

E.1.15. There is no discussion or analysis of the potential impacts of leachate from ore storage or stockpiles at the processing plant site or at the RWHR Site on groundwater. See DEIS 119.

Response E.1.15: Please see Section 3.2.3. Whole rock geochemical analysis and static tests on RWHR Mine site bedrock and toxicity characteristic testing (TCLP) on garnet ore were conducted. The geochemical results confirm that the host rock and garnet ore are inert and that impacts to the surface and groundwater are unlikely. No further leachate analysis is warranted.

E.1.16. Why is reliance on an "incomplete hydrograph record" adequate, and are conclusions based on that record defensible? See DEIS 69.

Response E.1.16: No activities are proposed at the Alder Gulch processing plant site that would result in measureable changes in groundwater elevations; therefore, collection of long-term detailed hydrograph information from monitoring wells is not required for baseline characterization. The hydrograph data collected from monitoring well MW-1 during 1990-1991 were not collected to fulfill baseline groundwater data collection requirements, but rather were collected to document groundwater level response to test mining and processing activities adjacent to monitoring well MW-1, and were only collected during these tests rather than for a full year. The data collected from monitoring well MW-1 during 1990-1991 confirm that seasonal high groundwater elevations at the Alder Gulch processing plant site occur during late spring to early summer. Therefore the recent June 2013 sampling event was scheduled at the appropriate time to document water quality and water level conditions during the seasonal high water level. Groundwater levels at the Alder Gulch processing plant site have not been measured on a regular basis since the project was initially permitted in 1992 because the project has not been continuously active. All available data were used in the evaluation. Additional monitoring will be completed on a regular schedule outlined in the expanded monitoring plan.

Baseline data are included in the Amendment application, Sections 3.3.1 through 3.3.3. A water resource investigation of the previously submitted Alder Gulch Mine project area began during 1990 and continued in 1991 to document existing surface water and groundwater conditions in the project area. The results of the investigation provided a baseline for the future observation and documentation of any changes to surface water and groundwater regimes. Therefore, baseline data were obtained and can be used to determine impacts from the proposed amendment.

E.1.17. Is a Montana Ground Water Pollution Control System permit required?

Response E.1.17: Garnet USA has an MPDES permit (MTG490000) for the Alder Gulch processing plant site. See Section 2.3. No discharges to surface water are proposed at the RWHR site and a Montana Ground Water Pollution Control System (MGWPCS) permit is not needed for the RWHR Mine site. The Montana Water Quality Act (75-5-401(5)(J), MCA) allows groundwater discharges from projects permitted under the MMRA without an MGWPCS permit.

F. “VI. Surface Water”

F.1. Comment Summary

F.1.1. *An assessment of the impacts to Alder Gulch must be performed.*

F.1.2. *An analysis of the water quality of Alder Gulch, and sources impacting the water quality of Alder Gulch, must be provided. Alder Gulch is listed as impaired on the Montana 303(d) list for total nitrogen, mercury, manganese, lead, and sediment. Nitrogen levels along Alder Gulch exceed the proposed numeric standards. Nowhere in the DEIS is there an analysis of Alder Gulch's impairments, or an analysis of the impacts to Alder Gulch's impairments as a result of the proposed action. The EIS must include this analysis.*

Response F.1.1 and F.1.2: Because of the distance between the Alder Gulch processing plant site and Alder Gulch and the limited potential for discharges to groundwater from the plant site that could reach Alder Gulch, no impacts to Alder Gulch are expected. Therefore, the current condition of Alder Gulch does not need to be analyzed in depth

It should be noted that no data for the 2006 Ruby River Watershed TMDL were collected along the reach of Alder Gulch between the confluence with Brown's Gulch and the town of Alder (DEQ, 2006). The TMDL states that the probable source for mercury and lead was the abandoned mine on Brown's Gulch and that no other samples collected supported the earlier metals impairments listing (DEQ, 2006). Brown's Gulch is a tributary to Alder Gulch located approximately 1.5 miles downstream from Virginia City. The TMDL also found that the sediment impairment rating was not supported by the limited data available, but that major sources of current sediment loading, in order of probable size of contribution, include grazing, past placer mining, roads, and vegetation clearing related to agriculture (DEQ, 2006). The final sediment allocations call for reductions in these potential sources of 60, 25, 51, and 50 percent, respectively. The final monitoring strategy

recommended for Alder Gulch and its tributaries includes lead, sediment, water column, and biomonitoring above and below priority abandoned mine sites on Mill Gulch and Browns Gulch (DEQ, 2006). This text has been added to Section 3.5.3 of the FEIS.

Surface water quality data were also submitted to DEQ by Garnet USA in Section 3.2.2 of its operating permit amendment application. Water samples were collected from 11 surface water sites between spring and autumn of 1990 which established baseline data on surface water quality in and around Alder Gulch. The analytical parameters are listed in Table 4 in the amendment application. The parameter list was reduced in 1997 due to lack of any samples reporting concentrations of concern. The results of water quality sampling are provided in Appendix C of the amendment application and indicate good water quality at the site.

F.1.3. *An assessment of the impacts to Ruby River must be performed.*

F.1.4. *The DEIS is silent on the water quality of the Ruby River, sources impacting the water quality of the Ruby River, and the proposed action's impact on the Ruby River.*

Response F.1.3 and F.1.4: No direct impacts to the Ruby River are predicted. The Ruby River is 1.45 miles southwest of the processing plant at its closest point, and groundwater at the Alder Gulch processing plant site flows toward the northwest, parallel to Alder Gulch.

Furthermore, no direct impacts to the Ruby River via Alder Gulch are predicted. There is no continuous surface flow in Alder Gulch through the Alder Gulch processing plant site permit area due to the presence of historic dredge tailings. Surface flow in Alder Gulch resumes northwest of the dredge tailings, approximately one mile northwest of the Alder Gulch processing plant site. Alder Gulch flows into the Ruby River approximately three miles northwest of the Alder Gulch processing plant site. As indicated in the EIS, impacts to groundwater at the Alder Gulch processing plant site permit area are not predicted. Because no impacts to groundwater beneath the Alder Gulch processing plant site are predicted, no impacts to water quality in Alder Gulch are expected. Thus, no impacts to the Ruby River are expected below its confluence with Alder Gulch.

F.1.5. *Hydrological connections need to be provided.*

F.1.6. *The DEIS is generally silent on the hydrological connections between groundwater and surface waters, and between surface waters, within the area of potential impact or affects. These hydrological connections must be analyzed.*

Response F.1.5 and F.1.6: Surface water resources are described in Sections 3.5 and 4.5. Groundwater resources are described in Sections 3.6 and 4.6. Water management and monitoring proposed as part of the Proposed Action are described in Section 2.6.3. A complete description of the groundwater and surface water hydrology is provided in these sections. The appropriate sections in the EIS have been updated with current information described below.

DEQ agrees that shallow groundwater and surface water near the Alder Gulch processing plant site are most likely connected, as is typical in shallow hydrological systems. Water in Alder Gulch infiltrates into the historic dredge tailings piles upgradient (east) of the Alder Gulch processing plant site and flows as groundwater beneath the site before re-surfacing approximately one mile downgradient (northwest) of the plant site at the lower end of the historic dredging area. Groundwater flowing through the dredge piles maintains numerous ponds and wetlands that occur in depressions located between the dredge piles.

Groundwater and surface water interaction near the Alder Gulch processing plant site is described in Section 3.2.1 of the operating permit amendment application. Water levels in the tailings ponds were observed in 1991 to be approximately two to four feet higher than water levels measured in an unnamed stream near the Vigilante Canal and in Alder Gulch Creek, respectively. This suggests that both streams were gaining flow from groundwater. Groundwater in the area upgradient (north) of the permit boundary was observed to be flowing into Alder Gulch Creek through the tailings deposits and entering the drainage approximately two feet above the streambed.

Groundwater observed in shallow test pits dug in 1991 suggested that the unnamed stream could be gaining some flow from groundwater in the area south and east of the plant site. The hydrologic connection between groundwater and surface water in the unnamed stream flowing along the northern boundary of the permit is uncertain but could be gaining over a portion of its reach.

Existing ponds in the placer tailings are surface expressions of groundwater and there are numerous ponds within low areas between tailings mounds. Surface flows may occur within the valleys between the mounds and from pond to pond, but such flows are often discontinuous and ephemeral depending on the seasonal level of the water table.

At the RWHR Mine site, there are no perennial surface water features. Red Wash is classified as an intermittent stream, and likely has localized surface flow in response to snow melt or large rain events. Shallow groundwater is present within the Red Wash alluvium upstream of the proposed quarry site (see response to comment E.1.12). This shallow alluvial groundwater is recharged by storm events resulting in flow within the Red Wash channel, and also by discharge from the bedrock aquifer upstream of the project area (as evidenced by higher water levels measured in bedrock monitoring well MMW-4 than in alluvial monitoring well MMW-3). Downstream of the proposed RWHR Mine site, the alluvial monitoring well MMW-6 measured groundwater at a depth of 40 feet, and bedrock monitoring well MMW-5 has measurable groundwater at a depth of 95 feet. These water level measurements suggest that Red Wash within the project area is a losing stream, with groundwater levels dropping from near surface upstream of the project area to considerable depth downstream of the site. DEQ will require Garnet USA to submit an updated groundwater and surface water monitoring plan which includes monitoring locations for the RWHR Mine site

F.1.7. Surface water monitoring and analysis must be conducted at, and near, the RWHR Site.

F.1.8. The DEIS suggests that "surface water and/or shallow groundwater is consistently present in some of these nearby channels." DEIS 67.¹² This recognition indicates the need to quantify, and qualitatively analyze, surface waters within the RWHR Site and area of potential impacts or affects. The DEIS must document existing environmental conditions. The proposed action's impact on these surface waters must be analyzed.

¹² Garnet USA did not collect any flow or surface water quality data at the site. DEIS 66.

Response F.1.7 and F.1.8: Surface water conditions at the RWHR Mine site are described in Section 3.5.3. Surface waters are not present at the RWHR Mine site

The commenter takes the quote from page 67 of the DEIS out of context. As indicated in the DEIS, the referenced nearby channels are outside of the proposed RWHR Mine site. The referenced channels are located to the southeast of the project area and are associated with Williams Creek. Williams Creek is completely outside of the RWHR Mine site permit boundary.

F.1.9. Why is comparing nitrate concentrations to drinking water standards, see DEIS 65, appropriate when DEQ has proposed numeric nutrient standards?

Response F.1.9: DEQ is developing numeric nutrient standards for surface water, but they have not been adopted at this time. The nitrate concentration results were compared to human health standards simply for comparison. Currently, the 10 mg/L human health standard is the only approved numeric surface water quality standard for nitrate. As stated in Section 3.5.3, all results were compared to Circular DEQ-7.

F.1.10. How will the Vigilante Canal, a major local irrigation canal providing water from the Ruby Reservoir, be impacted by the proposed action? DEIS 98.

Response F.1.10: Vigilante Canal is 1.6 miles from the RWHR site and flows under State Route 287 approximately 1.3 miles upgradient of the Alder Gulch processing plant. There are no surface water connections between the Vigilante Canal and the RWHR site or the Alder Gulch processing plant. It is highly unlikely that any aspect of the Proposed Action or the other alternatives under consideration would have any impact on Vigilante Canal.

F.1.11. Why is a Sand and Gravel General Permit used to permit discharge? See DEIS 10. Should an individual Montana Pollutant Discharge Elimination System Permit be required?

Response F.1.11: A General Permit applies to facilities that are engaged in the business of mineral mining and processing, as defined in 40 CFR 436 Subparts B and C, and propose to discharge mine dewatering or process generated wastewater to state surface waters. Subpart B applies to facilities that mine or quarry and process crushed and broken stone and riprap which includes all types of rock and stone. Subpart C applies to facilities that mine and process sand and gravel for construction and fill use. Garnet

USA's facility would quarry and process crushed stone and is appropriately covered by the Sand and Gravel General Permit.

F.1.12. The design, operation, and monitoring criteria for storm water controls do not appear to be indicated. Those should be provided.

Response F.1.12: Please see Section 4.7.2. Storm water control features at the RWHR site are shown on Figure 2.5-1 on page 21 of the DEIS. No storm water would be allowed to leave the site, unless authorized by a Storm Water Discharge permit. If Garnet USA applies for such a permit, additional information on storm water controls would be described in the Storm Water Pollution Prevention Plan (SWPPP). Under the Agency-Mitigated Alternative, DEQ would also require storm water in sediment control basins at the RWHR site to be monitored for any contaminants that may be present on the mine site, such as nitrogen compounds and petroleum compounds. Garnet USA will be required to submit an updated water monitoring plan to DEQ for review and approval prior to development of the mine site. Note that Garnet USA has indicated that the company will apply for a storm water permit from DEQ.

F.1.13. DEQ should determine if a storm water permit is needed for the existing site. See DEIS 73, 121. The status and conclusions should be stated in this EIS.

Response F.1.13: See Response F.1.12. No SWPPP is required at this time.

A storm water permit is not required because no discharges from the site are proposed. The plant site and the proposed RWHR site have adequate sediment ponds to contain runoff. However, Garnet USA intends to apply for a storm water discharge permit from DEQ.

F.1.14. What impacts to surface and groundwater will occur if mining (mineral processing) occurs at the Alder Gulch processing plant site or at the RWA Site?

Response F.1.14: See response to A.1.1

F.1.15. Based on the DEIS determination that "[i]mpacts to fisheries would be closely linked to potential impacts to groundwater and surface water," DEIS 139, a reexamination of the impacts to fisheries should be included in the EIS after examining impacts to groundwater and surface water.

Response F.1.15: Given the information presented in the DEIS, and the additional material presented in these responses to comments (Sections E and F), no further analysis of potential impacts to fisheries is warranted.

G. "VII. Air Quality"

G.1. Comment Summary

G.1.1. *The EIS must include an analysis of air quality impacts.*

G.1.2. *The DEIS must analyze impacts to air quality. It is not sufficient to simply state that impacts would be, or appear to be, minor. See DEIS 123-124. The EIS should, at minimum, reference and tier from the Air Quality permit MEPA analyses, and*

should, at minimum, summarize the projected impacts quantitatively and qualitatively.

Response G.1.2: The DEIS references the air quality permits currently held by Garnet USA. Air Quality Permit No. 2888-00 was issued to Cominco American in 1995 and covers operation of the processing plant. It has subsequently been transferred to Garnet USA and is currently denominated Air Quality Permit No. 2888-03. Air Quality Permit No. 4842-00 was issued to Garnet USA in April of 2013. It covers a portable crushing and screening facility. DEQ conducted environmental reviews under MEPA prior to issuing the air quality permits. Air Quality Permit No. 2888-00 is referenced on page 123 and Air Quality Permit No. 4842-00 is referenced on page 124.

Copies of the air quality permits are set forth in Appendix B-3 and Appendix B-4 of Garnet USA's Operating Permit application, available on-line at:

<http://www.deq.mt.gov/hardrock/default.mcp.x>. The air quality permits may also be viewed online at http://www.deq.mt.gov/airquality/ARMpermits/awm_final_permit.mcp.x

G.1.3. Will there be fugitive dust from the RWHR pit, crusher, waste dump, or other operations at the RWHR Site? What will the control measures be, what will the monitoring be, what will trigger additional mitigation if, for example, blowing dust is a problem?

Response G.1.3: Please see Section 4.8.4. The Air Quality permit requires the use of Best Available Control Technology (BACT) for fugitive dust using water. Fugitive dust was analyzed in the Air Quality permit.

G.1.4. Diesel generators and engines impact air quality. The DEIS contains no analysis of the amount of diesel fuel expected to be used, or the quality of the generators and engines of the equipment to be used, including whether or not they are expected to be Tier 4 compliant.

Response G.1.4: The equipment covered by Air Quality Permit No. 4842-00 includes a maximum of two diesel-fired generator sets. The combined maximum rated design capacity of the diesel-fired generator engines cannot exceed 850 horsepower. The total combined hours for the diesel-fired engine generator sets cannot exceed 6,000 hours of operation during any rolling 12-month period. The BACT (Best Available Control Technology) determination is set forth on pages 9 and 10 of the permit and the associated emissions are set forth on page 12 and of the permit.

In issuing Air Quality Permit No. 4842-00, DEQ determined that the impact from operating the equipment covered by the permit, including the diesel generators and engines, will be minor and is not expected to cause or contribute to a violation of any ambient air quality standards.

G.1.5. What impact will increased traffic have on air quality?

Response G.1.4: Please see Section 4.8.2 and 4.8.4. Air Quality Permit No. 4842-00 prohibits Garnet USA from using any street, road or parking lot without taking reasonable

precautions to control emissions of airborne particulate matter. In addition, the permit requires Garnet USA to treat all unpaved portions of the haul roads, access roads, parking lots, or the general plant area with water and/or chemical dust suppressant, as necessary, to maintain compliance with the reasonable precaution limitation. An emissions inventory associated with the unloading of trucks and the use of haul roads is set forth on pages 14 and 15 of Air Quality Permit No. 4842-00. In issuing Air Quality Permit No. 4842-00, DEQ determined that the impact will be minor and is not expected to cause or contribute to a violation of any ambient air quality standards.

G.1.6. Upon what basis is it concluded that the proposed action is not expected to cause or contribute to a violation of any NAAQS or MAAQS or opacity requirements and would have minimal effect on the air quality of the project area? DEIS 80, 124. What is the project area?

Response G.1.6: Both Air Quality Permit Nos. 2888-00 and 4842-00 contain emissions limitations, including limitations on opacity. See the specific provisions of the air quality permits for detailed information on the emission limitations.

Air Quality Permit No. 2888-00 contains an impact analysis in which DEQ determined that the impact to ambient air quality should be minimal. Air Quality Permit No. 4842-00 contains an impact analysis in which DEQ determined that the impact to ambient air quality will be minor and will not cause or contribute to a violation of any ambient air quality standard. The referenced air quality standards are those set forth in the National Ambient Air Quality Standards (NAAQS) and the Montana Ambient Air Quality Standards (MAAQS).

The project area is defined in Section ES-3 and Figure ES-1-1.

G.1.7. What measures are taken to ensure dust is controlled?

Response G.1.7: The Air Quality permit requires the use of Best Available Control Technology (BACT) for fugitive dust using water. Please see Section 4.8.2 and 4.8.4 of the EIS for a description of the BACT prescribed for this project. Fugitive dust was analyzed in the Air Quality permit.

G.1.8. *Baseline air quality measurements must be made.*

G.1.9. The DEIS indicates that baseline air quality measurements were not made in the vicinity of the Alder Gulch processing plant, RWA Site, or the RWHR Site. See DEIS 79. Nearest known samples were not considered representative. See DEIS 79. Baseline air quality measurements must be made, and an analysis of those measurements incorporated into the EIS.

Response G.1.8 and G.1.9: Because Garnet USA will not produce more than 250 tons of any one pollutant annually, DEQ's issuance of the air quality permits may be based on either a qualitative or quantitative demonstration that Garnet USA's operation will not cause or contribute to an ambient air quality standard. Thus, baseline air quality measurements were not required.

G.1.10. Who will be responsible for compliance with air quality laws and regulations?

G.1.11. Garnet USA's Application for an Amendment to the Current Operating Permit notes that "[i]f a contractor is chosen for crushing, then they will be expected to operate under their own air quality permit, not the one for the plant." Application 14. Has Garnet USA secured all air quality permits necessary for the proposed action? Will Garnet USA be responsible for compliance with air quality laws, regulations, and permits related to its proposed action, including if those permits are obtained by contractors?

Response to G.1.10 and G.1.11: The entity in whose name the air quality permit is issued would be responsible for compliance with the Air Quality Act. Thus, if the crushing contractor operates under its own air quality permit, Garnet USA would not be responsible for compliance with air quality laws in regard to operation of the crusher. The contractor would be responsible.

H. "VIII. Wildlife"

H.1. Comment Summary

H.1.1. Wildlife habitat should be assessed within the proposed permit boundary, and in the area of potential impact. The DEIS states that "[w]ildlife habitat was assessed for the Alder Gulch processing plant area only." DEIS 100 (emphasis added). This excludes assessment of, *inter alia*, the proposed RWHR Site, whose proposed permit boundary encompasses approximately 340 acres, of which the footprint of the proposed mine would cover approximately 213 acres. DEIS 135.

Response H.1.1: The section referred to in the comment relates to the Alder Gulch processing plant. The sentence in context means that areas within the Alder Gulch Mine Permit area, but outside of the processing plant, were not assessed for this EIS. The processing plant permit boundary encompasses approximately 511 acres, but the processing plant and its associated infrastructure cover only 75 acres. The EIS included information from wildlife assessments made within the area of potential impact for the Proposed Action. Other portions of the Alder Gulch Mine permit area are owned by various business operations and are conducted by entities other than Garnet USA. This EIS is not an evaluation of those land uses or the potential for wildlife habitat in those areas.

The sentence in question from Section 3.16.1 has been clarified to read, "*Within the 511 acre Alder Gulch Mine Permit Area, wildlife habitat was assessed for the 75 acres encompassing the area previously disturbed or proposed for disturbance within the Alder Gulch processing plant only.*"

Baseline information describing wildlife occurring within and adjacent to the Alder Gulch Mine Project was provided in the operating permit amendment application and analyzed as part of the EIS. Results from more recent field work and more recent MTNHP queries are included in Section 3.16 of the Final EIS.

H.1.2. Absent an assessment of the wildlife habitat within the proposed permit boundary and in the area of potential impact, impacts to wildlife cannot be adequately assessed. DEIS conclusions regarding habitat, moreover, are questionable given the absence of a habitat study. See e.g. DEIS 102 (habitat typical of Hunting District 320 or Region 3); 104, 105 (habitat for special status wildlife species).

Response H.1.2: Wildlife habitat was assessed at a level commensurate with the potential for impacts based on consultation with Montana Department of Fish, Wildlife, and Parks (MFWP) and the Montana Natural Heritage Program (MT NHP). Please see Section 3.16.

H.1.3. Analysis of wildlife impacts should be done.

H.1.4. The analysis of impacts to wildlife resources is conclusory and necessitates expanded analysis.

Response H.1.3 and H.1.4: DEQ consulted with MFWP on potential wildlife habitat and values. This consultation was used to develop the analysis of impacts in Section 4.16 of the DEIS. The level of analysis reflects the results of DEQ's consultation with MFWP that wildlife habitat was not likely to be affected in the long-term by the Proposed Action given the current undeveloped nature of the surrounding lands and the reclamation plan contained within the Proposed Action.

H.1.5. The DEIS notes that "[u]ngulates, birds, and mammals would be likely to avoid the area because of the increased human presence and noise from equipment at the site." DEIS 138. What ungulates, birds, and mammals? How do they presently use the area (permanent residents, migratory, etc.)? What impact would arise from avoidance of the area? Could impacts be mitigated?

Response H.1.5: Please see Tables 3.16-1 and 3.16-2 for a list of species likely to use the Alder Gulch and RWHR sites. These tables are based on field observations as well as consultation and habitat research. Section 3.16 provides information on what wildlife uses the area and the seasonal aspects of this use. Section 4.16.2 describes the potential impacts to wildlife from development of the Proposed Action.

H.1.6. The DEIS notes that, "[a]lthough wildlife use of this area may be altered, this alteration is not likely to impact wildlife populations or the survival of individuals." DEIS 139. What wildlife uses the area? How is the area used? How will use be altered? Why is it not likely to impact wildlife populations or the survival of individuals?

Response H.1.6: See Response H.1.5. The primary alteration of wildlife use of this 213 acre area would be avoidance by wildlife that pass near the area and potential displacement of wildlife that currently use the area. The area is a mosaic of public and private lands with large areas held by the Bureau of Land Management and the USDA Forest Service. The RWHR site is located within a very large area of homogeneous, contiguous, arid, montane, sagebrush steppe. Wildlife densities are low in this habitat primarily due to water availability and the quality of browse. An individual animal or a group of wildlife traveling through the area could avoid the RWHR Mine site with little or no impact to their

movements or energy expenditure. Section 3.16 provides information on what wildlife use the area and the seasonal aspects of this use.

H.1.7. The DEIS notes that the conversion of the RWHR Site from exploration to full-scale mining "is unlikely to contribute to cumulative impacts to wildlife in the Alder area." DEIS 139. Why? How is this conclusion reached? Upon what is it based? What are the potential cumulative impacts, even if unlikely? What is the Alder area?

Response H.1.7: See Response H.1.3. The study areas for wildlife included the Alder Gulch and RWHR permit areas and adjacent lands within a one mile radius centered on each permit area.

The RWHR site lacks available water sources upon which several of the species found in Alder Gulch depend. Furbearers or other small mammals could pass through the RWHR site, but the lack of habitat in and surrounding the RWHR site and the presence of ample habitat in other places in the valley agricultural areas suggests that there will be minimal effects to wildlife at the RWHR site.

A database search for sensitive wildlife species found that no sensitive species are present within the proposed and existing RWHR permit boundary. However, three species were listed as occurring in the vicinity of the project area, including the North American wolverine, grizzly bear, and great blue heron. It is unlikely that any of these species would use the RWHR site due to the lack of habitat characteristics preferred by each of these species.

H.1.8. What impacts to wildlife will occur if approval and operation of the mine stimulates secondary exploration and mining on contiguous or reasonably proximate properties? See DEIS 135.

Response H.1.8: See response to D.1.2. Related future actions may only be considered when these actions are under concurrent consideration by any agency through pre-impact studies, separate impact statement evaluations, or permit processing procedures. (Section 75-1-208(11), MCA)

H.1.9. No explanation is given for why nesting status for all avian species was not determined, despite several species having the potential to nest in similar habitats. DEIS 101.

Response H.1.9: The nesting survey conducted by Garnet USA is intended to prevent impacts to migratory birds that may be actively nesting in the area of disturbance. Garnet USA implemented this annual nest survey as part of a previous permit decision (Garnet USA, 2013a). The level of effort is intended to identify active nests, not to assess nesting status of all birds observed.

H.1.10. What human activities proximal to the RWHR Site suggest an unlikelihood of occurrence of the Sprague's Pipit within the permit boundary? DEIS 105.

Response H.1.10: Surveys of Sprague's Pipit distribution in the vicinity of other surface disturbing activities demonstrated that these birds are likely to avoid unimproved roads and cleared gravel pads (Linnen, 2008). The decrease in abundance for Sprague's Pipits extended for up to 984 feet (300 m) from the disturbed areas. In addition, the Montana Natural Heritage Program did not identify the area as being within the known range of Sprague's Pipit (MTNHP, 2013).

H.1.11. The DEIS notes that "[a]ctivities and ongoing work at the processing plant would be conducted so that it does not harass nearby nesting birds at the facility." DEIS 138. How would activities and ongoing work be conducted so as not to cause any harassment of nearby nesting birds at the facility?

Response H.1.11: As stated in the DEIS, Section 3.16.1, "Currently, no mining occurs 500 feet of the nests or rookery during nesting season if nests are found to be active."

I. "IX. Noise"

I.1. Comment Summary

I.1.1. Existing noise levels at the Alder Gulch processing plant and RWHR Site have not been measured. DEIS 82. Noise levels need to be analyzed to determine the impacts caused by the proposed action.

Response I.1.1: Although existing noise levels were not measured, noise levels at receptors near the Alder Gulch processing plant and the RWHR site were estimated based on similar equipment, conditions and environments. Please see Section 3.10.3.

I.1.2. DEQ states that the haul road realignment would "reduce the truck noise at the residences." DEIS 129. The amount of reduction needs to be quantified, and compared to the proposed action and no action alternatives.

Response I.1.2: The traffic on the new diagonal road shown on Figure 2.6-1 would reduce traffic noise by approximately 6 to 10 dBA at residences on Ruby Road between State Route 287 and the existing plant entrance. The reduction would appear to be clearly noticeable to half as loud as the existing conditions.

I.1.3. Stating that the L_{dn} of 54 is less than EPA's guideline of 55 does not provide an analysis and comparison of alternatives and their impacts. The EIS must describe what the impacts will be to adjacent residences, or to others potentially affected. DEIS 127.

Response I.1.3: Section 3.10 states the EPA identified outdoor L_{dn} levels less than or equal to 55 dBA are sufficient to protect public health and welfare in residential areas and other places where quiet is a basis for use. Therefore, the comparison of the predicted L_{dn} 54 dBA to the EPA guideline is a part of the noise analysis and assessment of the potential noise impacts of the project.

I.1.4. Does the+ 14 L_{dn} impact that is described as "significant noise impact at residences" constitute a violation of Montana Code Annotated § 45-8-101? DEIS

127. If not, why not, and, if so, how can DEQ issue a permit? How can this impact be mitigated?

Response I.1.4: Pursuant to Section 27-30-101(2), MCA, nothing that is done or maintained under the express authority of a statute may be deemed a public or private nuisance. The MMRA authorizes the permitting of hard rock mining and ore processing. The term “disturbed land” is defined, in part, to include the area where minerals have been removed, conveyor systems and load out facilities. “Ore processing” is defined to include, in part, milling and other standard hard rock mineral concentration processes. Unless these activities are conducted negligently, noise emitted from these activities cannot constitute a private or public nuisance under Section 27-30-101(2), MCA. In addition, DEQ does not have regulatory authority over noise impacts under the MMRA.

I.1.5. What noise impacts will arise from the use of the crusher at the RWHR Site? What noise impacts will arise from backup alarms on equipment? What noise impacts will arise given the increased traffic between the RWHR Site and the Alder Gulch processing facility?

Response I.1.5: The predicted noise levels of equipment and operations associated with the RWHR site, including diesel equipment, the crusher, explosives, back-up alarms and haul truck traffic, are quantified and compared to relevant impact criteria in Section 4.10.2.

J. “X. Socioeconomics and Contractor Responsibility”

J.1. Comment Summary

J.1.1. The socioeconomic analysis needs clarification and expansion.

J.1.2. It is not clear in the DEIS what impact to employment will result from the proposed action. The DEIS, under the no action alternative, notes that the current number of employees is 40-50. DEIS 130. The DEIS, under the proposed action alternative, notes that Garnet USA anticipates employing 30 to 60 people directly. DEIS 130. What is the current number of employees? How is it expected to change? What impacts will result? Does the proposed number of employees have the potential to trigger the Hard Rock Impact Act? Mont. Code Ann. § 90-6-301, *et seq.*

Response J.1.2: The current number of employees is 40 to 50. Garnet USA anticipates employing 30-60 people if the proposed amendment is approved. Because Garnet USA is not expected to directly employ more than 75 persons, the Hard Rock Impact Act is not expected to be triggered.

J.1.3. Garnet USA's Application for an Amendment to the Current Operating Permit notes that employees and contractors will perform various services. What will be the socioeconomic impact of relying on contractors and contract employees? What benefits are provided to Garnet USA employees? What benefits are provided to contract employees? What demands on governmental or social services will arise from the provision, or lack thereof, of benefits? How will Garnet USA's demand for

employees and contract employees impact other employers in the region? The DEIS does not address these issues.

Response J.1.3: An analysis of the benefits provided to Garnet USA employees and contractors is beyond the scope of the environmental review. DEQ does not regulate Garnet USA's contracts with its workers, nor does it have the ability to assess how Garnet USA's business plan may affect other specific employers in the region. The level of socioeconomic analysis presented in Section 4.12 is commensurate with the potential impact of adding up to 60 individual jobs within the economic context of Madison County which supports approximately 5,800 jobs (US Dept. of Commerce, 2013).

J.1.4. The socioeconomic analysis notes that the processing and marketing of garnet materials would result in an increase in both Alder community and county tax income. DEIS 131. Why would an increase result and in what amount? Is that increase offset by additional demands on governmental services?

Response J.1.4: The statement is meant to reflect the idea that adding economic activity to the Alder area is likely to increase tax revenue received by the Alder community and Madison County from individual and business income. DEQ cannot predict what the total income would be for Garnet USA or how the employees would be distributed in terms of tax liability. However, it is reasonable to assume that if Garnet USA operates the mine and employ the predicted number of people, that the overall tax income realized by the county from the adoption of the Proposed Action would be greater than it would be in the absence of that economic activity. See also Response J.1.5, below.

J.1.5. The socioeconomic analysis notes that the social and economic impacts associated with the development of the proposed mine may include additional demands on governmental services and impacts on community and county facilities. DEIS 131. What are those additional demands and impacts?

Response J.1.5: Adding individuals to a community is likely to increase the need for services in that community such as emergency response capacity (police and fire) and social services such as schools and health care services. The analysis of exactly how those individuals may use resources is dependent upon factors beyond Garnet USA's control, such as family size and make-up, and attempting to quantify these factors goes beyond the scope of this EIS. For example, a family with four school-age children would be likely to make use of the public school system, while a single individual employee with no children would not use that public resource. The EIS notes that by creating jobs, Garnet USA's action has the potential to add individuals to the area. It is impossible to quantify how many of the jobs would be filled by current residents versus people moving to the area for a job.

J.1.6. The socioeconomic analysis notes that the garnet products from the proposed mine are expected to increase in value due to potential market niche shortfalls and increasing demand. DEIS 131. How was this conclusion reached? Was a market analysis performed? There is no analysis, moreover, of the potentiality that this

"market niche" might decline, or what impacts might arise from any declining market.

Response J.1.6: The statement reflects Garnet USA's opinion of the potential market for garnet given their experience in the industry. The sentence has been removed from the FEIS.

J.1.7. *What responsibility does Garnet USA retain for ensuring the safety of contractors, supervising contractors' work, and ensuring contractors perform work in compliance with law.*

Response J.1.7: The safety of mine contractors is regulated by the MSHA, not DEQ. In regard to the work performed by contractors, DEQ would take an enforcement action against Garnet USA for any violations of the MMRA, regardless of whether the activity resulting in the violation was conducted by an employee of Garnet USA or a contractor hired by Garnet USA.

J.1.8. *Garnet USA's Application for an Amendment to the Current Operating Permit notes that contractors will be responsible for performing various services, including sewage handling, haul road mitigation, and facility construction. See e.g. Application 128, 136, 137. Will Garnet USA be responsible for the safety of contractors and the supervision and control of contractors?*

Response J.1.8: See Response J.1.7.

J.1.9. *Garnet USA's Application for an Amendment to the Current Operating Permit notes that contractors will be responsible for developing certain environmental aspects of the project, including topsoil storage, storm water control and sediment control, and dust and erosion reduction. See e.g. Application 91-92, 97, 137. Will Garnet USA be responsible for supervising and controlling the performance of work done by contractors, and, particularly, will Garnet USA be responsible for contractors performing work in compliance with all laws and regulations, including environmental laws and regulations?*

Response J.1.9: See Response J.1.7.

J.1.10. *Garnet USA's Application for an Amendment to the Current Operating Permit notes that contractors will be responsible for obtaining certain permits. See e.g. Application 14, 122. Will Garnet USA ensure that contractors obtain all requisite permits, and that contractors comply will all permit requirements?*

Response J.1.10: See Response J.1.7.

K. "XI. Reclamation"

K.1. Comment Summary

K.1.1. *Does Garnet USA's proposed mine plan maximize the potential success of reclamation, and do alternatives exist to the mine plan that would facilitate more successful reclamation?*

Response K.1.1: Lands disturbed by hard rock mining must be reclaimed consistent with the requirements and standards set forth in Section 82-4-336, MCA. A reclamation plan must be approved by DEQ if it adequately provides for the accomplishment of these requirements and standards. Prior to initiating this environmental review, DEQ determined that the proposed operating permit amendment complied with these requirements and standards. Aside from the mitigation measures included in the Agency-Mitigated Alternative, this environmental review has not changed that determination.

The success of the reclamation will be assured by Garnet USA's posting of a reclamation bond under Section 82-4-338, MCA.

K.1.2. The DEIS is generally silent on reclamation activities. What reclamation will be performed? Why is reclamation at the RWHR Site likely to function as proposed? DEIS 15. Are there alternative means of reclamation that might lessen future impacts?

Response K.1.2: The DEIS includes the substantive aspects of the reclamation plan. Please see Sections 2.5.7(Reclamation under the Proposed Action), 2.6.6 (Reclamation under the Agency-Mitigated Alternative), and 2.7 (Reclamation- Common to all Alternatives) for reclamation specifics such as slope grade, methods, and plans for the pit. See Response K.1.1.

K.1.3. The DEIS notes that, "[a]t closure, the disturbances would be reclaimed and the site would be restored to grazing use and wildlife habitat." DEIS 135. The DEIS further notes that "[a]fter reclamation, the RWHR Mine site would likely revert back to grazing use unless the mining is expanded." DEIS 135. There is no analysis in the DEIS of the likelihood for reclamation's success in restoring the land to grazing use. There is no ability to determine if the land is restored to wildlife habitat because a wildlife habitat study on the RWHR Site was not performed. There is no analysis in the DEIS of the time until closure, or the time it will take for reclamation to achieve success. There is no explanation in the DEIS of the potential, or scope, of expanded mining.

Response K.1.3: Pursuant to Section 82-4-336(3), MCA, reclamation activities must be completed not more than 2 years after completion of the operation. DEQ will retain bond associated with revegetation until it is demonstrated that the vegetation has been successfully established, which takes at least several growing seasons. The "potential" or "scope" of expanded mining is beyond the scope of this EIS. See responses in regard to cumulative impacts. Any expanded mining would require Garnet USA to apply for an amendment of its operating permit. Another environmental review would be completed before DEQ took action on that application.

K.1.4. *Could the waste-rock stockpile be reclaimed to better contour with the natural landscape.*

Response K.1.4: A reclamation plan must be approved by DEQ if it satisfies the standards set forth in Section 82-4-336, MCA. Under subsection (9)(a), disturbed land must be reclaimed to comparable utility and stability as that of adjacent lands. Under subsection

(12), the reclamation plan must provide for permanent landscaping and contouring to minimize the amount of precipitation that infiltrates into disturbed areas that are to be graded, covered, or vegetated, including but not limited to tailings impoundments and waste rock dumps. Subsection (11) requires DEQ to approve a reclamation plan if it complies with the standards set forth in Section 82-4-336, MCA. DEQ has determined that the reclamation plan submitted by Garnet USA complies with these standards.

K.1.5. Garnet USA has proposed to create a 100 acre waste-rock stockpile in the west half of section 25, which will be approximately 175 feet above ground surface. During the reclamation process, the waste-rock stockpile and pit must be reclaimed or capped with soil. The final landscape appears to be a pit, and a hill that is different from the surrounding landscape. To lessen the impact to visual aesthetics of the Ruby Valley, could the construction of the waste-rock stockpile be contoured similar to the natural landscape?

Response K.1.5: See Response K.1.4.

L. “XII. Transportation, Fluids, and Water Usage”

L.1. Comment Summary

L.1.1. *Traffic impacts must be addressed.*

L.1.2. What amount of project-related traffic, including employee vehicles, employee carpool vehicles, water trucks, fuel trucks, haul trucks, road maintenance vehicles, etc. will travel to and from the RWHR Site per day, and what roads will be used? How will this traffic, including an assessment of the weight of the vehicles, impact the roads, local residents, and wildlife? How will the roads be maintained? What is the current condition of the roads? What is the current volume of traffic on the roads? How will road maintenance be funded, and who will perform road maintenance?

Response L.1.1 and L.1.2: Please see Section 4.13 of the EIS. State Route 287 is maintained and regulated by MDT. DEQ does not have regulatory authority over the use of publicly maintained roads. The following table has been added to Section 4.13 to facilitate comparison of the alternatives under consideration.

Alternative	Estimated Haul Truck Round Trips per day	Estimated Other Mine-related Traffic, Round trips per day¹	Entrance Route	Exit Route
No Action	4 to 8	15-20	Ruby Road	Ruby Road
Proposed Action	45	20-34	Ruby Road	West Road ²
Agency-Mitigated Alternative	45	20-34	Diagonal access route ²	Diagonal access route ²

¹ To include average daily employee traffic to and from the RWHR site, water trucks, etc.

² to be constructed

L.1.3. Road improvements or realignments need clarification, and wetland impacts appear avoidable.

Response L.1.3: DEQ has put forward an alternative to change the haul truck entrance to the Alder Gulch processing plant to alleviate some of the potential for impacts due to the use of Ruby Road. The Agency-Mitigated Alternative is not a request for a specific route or alignment of the entrance road. The figure provided presents a schematic to show approximately where the haul road entrance could be located, and it shows current wetland locations. Garnet USA would consult with appropriate agencies such as the USACE and the Montana Department of Transportation (MDT) on the final alignment. DEQ would support an alignment that meets the regulatory requirements of these agencies, but does not have the authority to prescribe a specific alignment.

L.1.4. The DEIS suggests that "likely" actions include road improvements or realignments. See e.g. DEIS 27. Please provide details concerning these actions, and an analysis of potential impacts.

Response L.1.4: See Response L.1.3

L.1.5. The Agency-Mitigated Alternative entrance haul road impacts wetlands. These impacts appear avoidable with minor, practicable changes to the alignment. See e.g. DEIS 33, Figure 2.6-1. In keeping with United States Army Corps of Engineers 404(B)(1) guidance or requirements of United States Army Corp of Engineers Nationwide Permits, DEQ should consider revising the proposed road alignment to avoid wetland impacts.

Response L.1.5: See Response L.1.3.

L.1.6. *Analysis of fuels, lubricants, coolants, and similar fluids, and demands on the power supply, needs to be done or expanded.*

L.1.7. The DEIS indicates that fuels, lubricants, and coolants would be located at the RWHR Site fuel and lubricant storage area. DEIS 72. Elsewhere in the DEIS it appears to indicate that there would be no fuel storage at the RWHR Site. This requires clarification, as well as an assessment of the impacts of the storage of fluids, lubricants, or coolants at the RWHR Site, which appears to be at least a potential occurrence.

Response L.1.6 and L.1.7: Please see Section 3.7.4. Fuel, lubricants, and coolants will be stored at the Alder Gulch processing plant. There will be no fuel storage or process chemical storage or wastes at the RWHR Mine site.

L.1.8. The DEIS indicates that there are no plans to exceed the 1,350 gallon storage volume that triggers a Spill Prevention, Control, and Containment ("SPCC") plan. DEIS 73. However, the DEIS lists two 10,000 gallon diesel/fuel gasoline tanks. DEIS 74. The DEIS needs to clarify the applicability of an SPCC plan, as well as the provisions of the SPCC plan.

Response L.1.8: Please see Section 3.7.4. The fuel tanks are located at the Alder Gulch processing plant. There will be no fuel storage at the RWHR Mine site. Garnet USA has submitted an SPCC plan to DEQ.

L.1.9. What accident plans will be in place for vehicles, including haul trucks and fuel trucks, and what mitigation measures will be implemented for spills at the RWHR Site, the processing plant, or on haul roads?

Response L.1.9: Please see Section 3.7.2. Department of Transportation (DOT) primarily regulates hazardous materials while they are in transit over public right-of-way. Section 3.7.4 states that no fuel will be stored at the RWHR Mine site.

An SPCC plan requires implementation of measures for oil spill prevention, preparedness, and response to prevent oil discharge to navigable waters. The SPCC is not required at the RWHR Mine site. Please see Section 3.7.3. There is no fuel storage proposed for the RWHR site. All fuel for equipment and generators is proposed to be hauled to the site by a fuel service truck as needed. Fueling of equipment is described in Section 15.2.5 of the operating permit amendment application. All fueling of vehicles will occur within the boundaries of the containment area. All appropriate State and local storage permits will be obtained by the contractor prior to delivery to the site.

An SPCC will be required for the Alder Gulch processing plant, and has been submitted to DEQ.

L.1.10. What amount of diesel, or other fuel, usage will arise from the proposed action?

Response L.1.9: Please see Section 3.7.4. DEQ does not have regulatory authority over fuel usage.

L.1.11. It is not clear how much fuel will be stored at the RWHR Site. Is it reasonable to conclude that all trucks, generators, and other fuel dependent vehicles or machinery will be fueled only by a service truck? What size fuel tanks will the generators require, and what is their fuel usage?

Response L.1.9: Please see Section 3.7.4. There will be no fuel storage at the RWHR Mine site. Fueling and major servicing of vehicles and equipment only occur at designated areas using a five-ton truck containing fuels and lubricants. DEQ does not have regulatory authority of fuel requirements.

L.1.12. The DEIS does not analyze the power demand at the RWHR Site, other than indicating it will be met with generators. See DEIS 126. What is the power demand? What are the sizes of the generators?

Response L.1.9: DEQ does not have regulatory authority to evaluate power demands from onsite generators.

L.1.13. What items at the RWHR Site will require power, and what will be the power demand of those items? For example, what will be the power demand of the portable crushing and screening systems, and how will it be supplied?

Response L.1.9: Power demands will be met with onsite generators. DEQ does not have regulatory authority to evaluate power demands from onsite generators.

L.1.14. Analysis of water source and use needs to be done or expanded.

L.1.15. The EIS should be able to present a project water balance, and confirm the availability of water rights. Upgrades to the processing plant and the changed characteristics of mining and processing hard rock garnet suggest a significant increase in volume of water used.

Response L.1.14 and L.1.15: The use of water for processing garnet is described in Response L.1.17.

Garnet USA has the following water rights filed with the Department of Natural Resources and Conservation:

Water Right Number	Owner Name	Priority Date	Source	Purpose of Use	Max Flow Rate (gpm)
41C 77973 00	GARNET USA LLC	19910722	ALDER GULCH CREEK	Mining	2,050
41C 92601 00	GARNET USA LLC	19950221	GROUNDWATER	Commercial	15
41C 97880 00	GARNET USA LLC	19960415	GROUNDWATER	Lawn and Garden	30
41C 193858 00	GARNET USA LLC	18991231	ALDER GULCH CREEK	Mining	1,500
41C 196461 00	Gilman I H Cattle Co	18991231	ALDER GULCH CREEK	Mining	12,000

While these water rights are administered by the Department of Natural Resources and Conservation rather than DEQ, DEQ believes that Garnet USA has water rights to provide sufficient water for processing. Water use requirements are described in Response L.1.17.

The purpose of the EIS is to analyze potential environmental impacts associated with the Proposed Action, including impacts to surface and groundwater resources. Compliance with water rights is not an environmental impact and is outside the scope of the EIS.

L.1.16. The amount of water used at the RWHR Site must be analyzed. How much water will be required during operations at the RWHR Site? What operations at the RWHR Site will require water, and in what amount? Is the use of water a potential source for cross-contamination?

Response L.1.16: Drilling and dust control at the RWHR site will require water. Water will be trucked in from the Alder Gulch processing plant site. A 40,000 gallon water tank will be used to store water at the RWRH site. A water truck will be used to control dust. The RWHR crushing and screening circuit does not require water for operation except for dust control purposes.

L.1.17. The amount of water used at the Alder Gulch processing plant site must be analyzed. How much water will be required during operations at the processing plant? What operations at the processing plant will require water, and in what amount? Is the use of water a potential source for cross-contamination?

Response L.1.17: Section 2.5.4 of the DEIS describes water use, plant operations, and management of water for the Proposed Action at the Alder Gulch processing plant. Section 2.5.4 will be updated to include current water use information obtained from Garnet USA as a result of decisions made on actual process equipment used. The following information will be added to the FEIS.

Much of the process water will be recycled to minimize the use of fresh water during ore processing. The deslime process circuit and the wet plant processing main hydrosizer and classifiers will require water for operational purposes. Approximately 2,700 gpm of total inflow will be needed for the deslime process circuit. Of this 2,700 gpm, 2,430 gpm of water will be recycled. Approximately 81 gpm (3 percent) of deslime circuit water will need to be added as makeup water.

Approximately 2,300 gpm will be pumped into the wet plant and feed the main hydrosizer and the two final product classifiers. Most of this 2,300 gpm will be recovered and recycled. Approximately 3 percent of loss (69 gpm) is estimated at this time resulting from spillage or evaporation at the wet plant.

Water for the mine process operations will be obtained from two lined ponds at the northwest corner of the permitted boundary. Make up water will be obtained from the fresh water pond located immediately south of the two lined ponds. Approximately 2 million gallons per year will be lost to evaporation from the two lined ponds, the North Settling Pond and the South Process Water source pond. Any potential for cross-contamination of process water with groundwater or other surface water sources is minimized by lining of the surface water ponds and regular monitoring from surface water sites and groundwater monitoring wells.

The total amount of water estimated for use in the garnet processing operation is summarized below:

Water Use	Percent of Total	Approximate Volume (gpm)
Total Process Source Flow	100%	5,000
Total Recycled	94.6%	4,730
Process Flow Makeup Water (10% losses of moisture in dryer)	5.4%	270

Water Use	Percent of Total	Approximate Volume (gpm)
Process Makeup Losses (Deslime and Plant)		150
Estimated Process Pond Losses to Evaporation		3.8
Approximated Consumptive Rate for Processing		424

L.1.18. Complete well data must be provided, including from geotechnical drill core holes. For example, to what depth were wells drilled? Why were those depths selected? When was water sampled? Why were those sampling times selected? How did sampling times coincide with expected groundwater levels? What was shown regarding the water table? What results were obtained for contamination (e.g. arsenic, asbestos, acid mine drainage potential). What mineralization was encountered? Was there test of the rock for acid generation? See e.g. Application 81, 35 (identifying drilling operations).

Response L.1.18: Geological exploration borehole information is not required for analysis of the affected resources. Information regarding drilling sampling and analysis, well completion and construction information, water quality sampling and results, depth to water measurements, and acid generating potential results, are described in the EIS. Please see Sections 3.6, 3.7, 4.6, and 4.7.

L.1.19. What is the level of the water table at the RWHR Site? What impact will excavation have on the water table?

Response L.1.19: Please see Sections 3.6 and 4.6, and response to comment E.1.1. Garnet USA initially determined that groundwater would not be intercepted by the proposed quarry, based upon driller’s observations during exploration drilling at the RWHR site. Monitoring wells were installed during November of 2013, and indicated that groundwater is present at varying depths beneath the surface across the RWHR site. The depth to water ranges from 5 feet below the top of casing at bedrock well MMW-4 located near the Red Wash drainage northeast of the proposed quarry site to 95 feet below top of casing at bedrock well MMW-5 located near the Red Wash drainage northwest of the quarry site. The groundwater flow direction is generally east to west, and roughly parallel to the Red Wash drainage.

Groundwater elevations in the three wells located near the eastern edge of the proposed quarry range from 5,774 feet to 5,812 feet amsl. The proposed quarry floor is projected to have a final elevation of 5,650 feet amsl after 37 years of mining. Mining below the water table would draw the water table down to the quarry floor elevation. Drawdown of the water table would likely be measureable within several hundred feet of the quarry area. No springs, perennial surface waters, or groundwater appropriations exist within the area

of potential drawdown, so no impacts to beneficial uses of groundwater in this area are predicted.

L.1.20. For the proposed employment, the water system would likely be considered a public water supply. Please confirm that this water system is approved for public water supply purposes. DEIS 18.

Response L.1.20: If the existing well or any new well constructed by Garnet USA is a “public water supply system” under the Public Water Supply Act, Garnet USA will be required to comply with the Public Water Supply Act and the administrative rules promulgated under the Public Water Supply Act. Garnet USA is working with DEQ on developing a public water supply system at the Plant site

M. “XIII. Visual Resources, Aesthetics, and Cultural Resources”

M.1. Comment Summary

M.1.1. Cottonwoods along State Route 287 near the entrance to the Alder Gulch processing plant shield much of the plant buildings and machinery from the public view. DEIS 100. The Agency-Mitigated Alternative contemplates tree removal. DEIS 116. How would the Agency-Mitigated Alternative impact visual resources and aesthetics, particularly if trees are removed that previously shielded the plant buildings and machinery from public view?

Response M.1.1: See Response to L.1.3. The final plan for the diagonal access road, if it is selected as part of the preferred alternative, would potentially be subject to consultation between Garnet USA and MDT. DEQ would not be part of these consultations. The plant facilities are offset from the existing access road and the proposed diagonal access road and are more than 1,000 feet from the southern permit boundary along State Route 287. Because of the distance between the road and the industrial facilities, passing vehicles would be unlikely to notice a change in the visual character of the roadside bordering the processing plant if minimal tree removal was necessary to accommodate the diagonal access road.

M.1.2. The visual resources and aesthetics analysis appears to omit consideration of two important aspects of potential visual impacts, lights at night and fugitive dust. The EIS needs to address these impacts. DEIS 136.

Response M.1.2: The lights at the Alder Gulch processing plant have been redirected to minimize or eliminate impacts to neighbors. Only lights required for safe operation and security would be used during operation.

Only lights required for safe operation and security will be used during operation at the RWHR Mine site. The RWHR site is not directly visible from any nearby residence (See Section 4.15.2: Visual Resources for analysis). Garnet USA has stated in their operating permit that operating hours would be adjusted to reduce the need for night-time operations and light plants (Garnet, USA 2013). The MMRA does not authorize DEQ to regulate noise or light levels or operating hours associated with permitted activities

Garnet USA will adhere to all regulations governed by the Air Quality Permits. Mining operations will use BACT to limit fugitive dust emissions, taking into consideration seasonal and climatic conditions in using dust control measures. Dust emissions associated with travel to and from the site on access roads and site roads will be regularly addressed with water suppression.

M.1.3. Given traffic, diesel usage, and dust arising from the proposed actions, and recognizing its increased intensity over past activity in the area, what impacts will occur to visual resources and aesthetics in the Ruby Valley, including in the vicinity of the RWHR Site?

Response M.1.3: See Section 4.15.2. A visual resources impacts analysis was conducted and its results are summarized in the EIS. The RWHR Mine site was found to be difficult to see from publicly accessible areas because of its isolated location and the surrounding topography. The presence of haul trucks on the ranch road will be noticeable to local residents, but will not be visible beyond the area bordering the ranch road. Dust, traffic and fuel have been addressed in previous responses (See Response to L.1.9, L.1.10; G.1.7) and in the EIS (Sections 4.7, 4.8, and 4.13).

M.1.4. There is no explanation how cultural resource examinations were completed in a manner to satisfy federal and state regulations. See DEIS 87. Can DEQ's operating permit not require Garnet USA to adhere to all state and federal regulations on private land if qualified prehistoric or historic articles are encountered during operations. DEIS 130.

Response M.1.4: The following has been added to Section 3.11.2 for clarification: Since this project is not a Federal undertaking, the federal laws relating to the protection of cultural resources (Section 106 or Section 110 of the National Historic Preservation Act) do not apply. Also since the project is located entirely on private land, the Montana Antiquities Act does not apply, as it is restricted to State owned lands. MEPA requires the identification of known cultural resources within a project area, and a disclosure on what the potential impacts might be to those resources. This generally entails a file search conducted with the Montana State Historic Preservation Office (SHPO), with a disclosure of those findings. This was done as part of the MEPA process and in addition, on their own accord, Garnet USA voluntarily conducted a Class III cultural resource inventory of the area (DEIS 87: Sears 2012), and a report was submitted to and approved by SHPO. The inventory was conducted under the same "standards" required by federal law.

However, DEQ has no authority to require any additional cultural resource inventory or investigations under MEPA. If Historic Properties are encountered during operation, DEQ would ask the proponent to cease operations and consult with DEQ and SHPO.

N. "XIV. Buffer Zone"

N.1. Comment Summary

N.1.1. Garnet USA 's proposed mine permit boundary does not extend east into T6S, R3 W, Section 30, and any amendment to Garnet USA's Operating Permit would not preclude a third-party from mining adjacent sections, including Section 30.

N.1.2. Garnet USA's proposed mine permit boundary does not extend east into T6S, R3W, Section 30. Any excavation of ore in Section 30, ignoring whether Garnet USA could show ownership of or a legal right to mine that ore, would require, inter alia, a revision to the Operating Permit. See DEIS 20. Garnet USA's proposed Amendment to the Current Operating Permit does not preclude any exploration or mining activities by third parties outside the permit boundary, including in adjacent Section 30. Similarly, the only mineral resource affected by the proposed action is that "within the permit boundary." DEIS 48.

Response N.1.1 and N.1.2: The commenter is correct that the proposed amendment to Garnet USA's operating permit would not authorize mining in Section 30. If Garnet USA wished to do so, it would be required to obtain another amendment to its operating permit allowing a mine expansion into Section 30. The proposed amendment does not preclude exploration or mining activities by third parties outside the permit boundary, including Section 30. The third party would first need to obtain either an exploration license or an operating permit prior to doing so.

DEQ is aware that there may be a property dispute regarding Section 30. Section 82-4-335, MCA, requires an operating permit applicant to identify relevant surface and mineral ownership and to identify the applicant's legal right to mine the mineral on the land to be affected under the permit. Section 82-4-335, MCA, expressly indicates that DEQ is not required to verify this information. DEQ does not have the authority to adjudicate property disputes.

N.1.3. The DEIS should note, in addition to the "northern line of Section 25," that mining activities by Garnet USA could continue only until the *eastern* line of Section 25 is encountered. See DEIS 20. Similarly, the DEIS should not imply that Garnet USA should cease mining if "the rock does not contain ore-grade garnet." DEIS 20. Garnet USA must cease mining if it encounters ore, e.g. in Section 30, that it does not own or have the legal right to mine.

Response N.1.3: As previously indicated, the proposed amendment to Garnet USA's operating permit would not authorize Garnet USA to conduct any mining activity in Section 30. See Response N.1.2.

N.1.4. The DEIS states that all proposed activities within the permitted area are located entirely on private land owned by Garnet USA, and that mineral rights are owned, leased, or available for lease by Garnet USA. DEIS 97. It should be explained what is meant by mineral rights "available for lease by Garnet USA." To understand any impact to, e.g., geology or land use, the extent of the mineral resource Garnet USA has the legal right to mine should be demonstrated.

Response N.1.4: The extent of the mineral resource that Garnet USA is authorized to mine under the proposed amendment is shown on Figure 2.5-1. The extent of the proposed mine operation shown on Figure 2.5-1 was used to determine potential impacts to geology and land use.

N.1.5. Similarly, the DEIS states that "[p]roperty boundaries and surface and mineral rights holders are identified in Figure 2.4-1." DEIS 97. Figure 2.4-1 does not identify property boundaries and surface and mineral rights holders.¹³ A figure identifying property boundaries and surface and mineral rights must be provided to demonstrate the extent, and boundary, of potential mining.

13 Figure 2.4-1 depicts existing facilities at the Alder Gulch processing plant and schematic for proposed facility changes. DEIS 15.

Response N.1.5: While Figure 2.4-1 depicts existing facilities and proposed facility changes at the Alder Gulch Processing Plant, it also depicts some property ownership information. The reference on page 97 of the DEIS erroneously indicating Figure 2.4-1 identifies mineral right holders will be deleted. More extensive information regarding surface and mineral ownership is contained in Garnet USA's application for an operating permit amendment (Garnet USA, 2013a).

N.1.6. Garnet USA's Application for an Amendment to the Current Operating Permit identifies a "project buffer" and "buffer zones." See e.g. Application Exhibit B, Overview Map of Three Project Sites (identifying "project buffer"); 81 (noting "buffer zones" have been included along the proposed permit boundary). This project buffer or buffer zone has no legal significance, nor does it impact at all a third-parties right to explore or mine within the project buffer or buffer zone. Not only does this project buffer or buffer zone have no legal significance, it should not be confused with, e.g., buffer zones used to keep material or water runoff from leaving the proposed permit boundary, nor should it be confused with the mine permit boundary. See DEIS ES-2, 26.

Response N.1.6: The "buffer zones" mentioned in Garnet USA's application are not relevant to DEQ's regulation of the proposed mining operation. The proposed amendment would authorize Garnet USA to conduct mining within the identified mine permit boundary.

O. "XV. Miscellaneous"

O.1. Comment Summary

O.1.1. The statement that "[n]itrogen compounds are common constituents of most commercial explosives used in mining" needs clarification. DEIS 35. If DEQ is aware of commercial explosives used in mining that do not contain nitrogen compounds, that should be disclosed. It should also be analyzed as a potential mitigation measure.

O.1.2. How much explosives will be used? See DEIS 128.

Response O.1.1 and O.1.2: DEQ does not regulate the type of explosives used at mines and cannot estimate the amount of explosives that would be used under the Proposed

Action. The amount of explosives needed would likely vary throughout the life of the project. Please see Section 3.7.2.

The EIS will be revised as follows in Section 2.6.3 (Water Management): "nitrogen compounds are common constituents of commercial explosives used in mining"

O.1.3. The DEIS should clarify the United States Army Corps of Engineers' (USACE) authority to make wetlands jurisdictional determinations, and that the "jurisdictional" wetlands are potentially jurisdictional. DEIS 55.

Response O.1.3: The section of the DEIS cited (3.4.2) describes the standard methodology used to assess and delineate potential wetland areas (USACE 1987). The USACE administers Section 404 of the Clean Water Act and would review any wetland delineation reports prior to assessing wetland acreage impacts, if any. It should be noted that jurisdictional status is not the only criterion evaluated in a field review by the USACE when the potential for required mitigation is being assessed. The USACE did visit the RWHR site in March 2012 and did verbally confirm that there was no visual evidence of wetland or riparian areas within the area of proposed mining disturbance (Garnet, 2013).

O.1.4. What are the potential secondary impacts to the wetlands nearby or the vegetation supported by the wetland hydrology. DEIS 116.

Response O.1.4: Potential secondary impacts to wetlands would occur if the hydrology that supports the wetlands is changed. As an example, roadway construction often compacts soils under the roadway and the road design may incorporate drainage ditches on the sides of the road. Compaction decreases soil permeability and can change the rate that groundwater passes through the soil. This can lead to a buildup of groundwater or increased soil saturation on the upgradient side of the compression and a decrease in soil saturation on the down gradient side. In this way roads can cause expansion or contraction of wetland areas. However, the alignment for the roadway has not been finalized, and any attempt to quantify the potential for these types of secondary impacts is premature.

O.1.5. Consideration should be given to methods to mitigate the potential spread of invasive species carried to the RWHR Site by trucks or other vehicles. DEIS 115.

Response O.1.5: See Section 3.4.3 of the DEIS. Garnet USA has filed a Noxious Weed Control Management Plan with the Madison County Weed Board. The Weed Board would be the regulatory agency that would prescribe specific mitigation measures.

DEQ will inspect the mine under the enforcement provisions of the Metal Mine Reclamation Act and administrative rules adopted under the Metal Mine Reclamation Act. DEQ inspectors are trained in noxious weed identification and note the establishment of noxious weeds at a mine site and the operator's control efforts or lack of control efforts in inspection reports.

O.1.6. What cumulative impacts will occur to vegetation communities at the RWHR Site because of the reduced diversity of species? DEIS 115.

Response O.1.6: Noxious weeds will have a greater opportunity for invasion throughout vegetative establishment during the mining and post-mining phases. The DEQ-approved seed mix will reflect the species that are present in the undisturbed areas. However, environmental conditions post-seeding will determine if all those species get established. If sagebrush and trees establish in a lower density than the undisturbed areas, grass and forb production will be greater than in the undisturbed areas. The RWHR Site will be used for grazing post-mining so less sage and trees will improve its use. Fewer sagebrush and trees could result in less cover for certain wildlife but more forage for other species.

O.1.7. What impacts will occur to the Alder Water and Sewer District wastewater facility located adjacent to the Alder Gulch processing plant? DEIS 97. Additionally, what is the current impact to surface and groundwater resulting from the wastewater facility? Future monitoring does not address adequately the potential for current and future impacts to surface and groundwater standards.

Response O.1.7: The proposed amendment to Garnet USA's operating permit is not expected to impact the Alder Water and Sewer District wastewater facility. This EIS analyzes the impact to surface and ground water resulting from operation of the processing plant, not the adjacent wastewater facility.

Groundwater monitoring has occurred at the Alder Gulch processing plant site since 1990 for purposes of baseline documentation and during periods when mining and/or processing were occurring near the plant site. Previous groundwater monitoring did not include analysis for nitrogen compounds because no blasting or other processes that would result in nitrogen loading were associated with previously permitted mining activities at the site. Baseline data for nitrate in groundwater were collected from existing wells at the Alder Gulch processing plant site during a sampling event on June 5, 2013. Nitrate concentrations at the three existing wells, including monitoring well MMW-3 which is down-gradient of the wastewater facility, were all below 0.2 mg/L. Under the Agency-Mitigated Alternative, DEQ would require that additional wells be installed at the Alder Gulch processing plant site, in part to more fully characterize groundwater quality down-gradient of the land application disposal facility.

Under the Agency-Mitigated Alternative, DEQ would require Garnet USA to increase groundwater and surface water monitoring. Garnet USA has initiated additional monitoring, which includes nitrate and nitrite analyses. Garnet USA will be required to submit an expanded monitoring plan to DEQ.

O.1.8. What is the likelihood of a leak occurring in the lined ponds? DEIS 119.

Response O.1.8: Based on the engineering design specifications and testing, a leak occurring from the geosynthetic-lined ponds is unlikely if the lined ponds are properly

constructed. Both ponds have GSE Environmental, LLC 80 mil thickness, High Density Polyethylene (HDPE) Geo-Membranes. The HDPE Geo-Membranes were installed by Clean Air and Water Systems, LLC in accordance with International Association of GeoSynthetic Installers (IAGI) guidelines. Clean Air and Water Systems, LLC conducted both destructive and non-destructive testing to verify field seams meet project strength requirements. All tests passed requirements.

In addition, the Agency-Mitigated Alternative will require Garnet USA to install a monitoring well at the northwest (downgradient) area of the lined ponds in order to monitor groundwater quality and identify any elevated nitrates and other constituents in groundwater. See responses in Section E: Groundwater.

O.1.9. What methods will be used to monitor for the accidental discharge of objectionable materials, and what remedial action plans will be used to control and mitigate discharges, to surface or ground water?

Response O.1.9: Please see Section 4.7.2. Garnet USA would construct retention ponds to prevent storm water from leaving the RWHR site. Because Garnet USA does not intend to discharge storm water into surface water, a storm water discharge permit is not required. Notwithstanding Garnet USA's intent not to discharge storm water, DEQ understands that Garnet USA intends to apply for a storm water discharge permit as an extra measure of precaution. Garnet USA does not need to obtain a Spill Prevention Control and Containment Plan for the RWHR site because no fuel will be stored there.

Garnet USA has a Storm Water Discharge Permit and a Spill Prevention Control and Containment Plan for the Alder Gulch processing facility site.

O.1.10. What are the impacts of use of the jig plant contemplated on page 98 of Garnet USA's Application for an Amendment to the Current Operating Permit?

Response O.1.10: Use of a jig plant is already permitted, and no additional noise impacts are expected as a result of the proposed amendment. The noise impacts are mitigated to some extent as the jig plant is enclosed in an existing building and by the distance to the nearest residence.

O.1.11. The DEIS notes that "[i]nitially the mining operations were anticipated to involve " What is meant by "[i]nitially mining operations were anticipated to involve ... ?" See DEIS 126. Did the operation hours change? What are the operation hours of the proposed action at the Alder Gulch processing plant, at the RWHR Site, and at the RWA Site? Are the operation hours expected to change? What will cause a change in operation hours? What are the impacts of any night time operations?

Response O.1.11: The statement cited in the comment refers to the period of time from 1992 to 2006 when both mining and processing occurred at the Alder Gulch site. At that time, the operations were anticipated to involve one 10-hour shift between 7 a.m. and 7 p.m. with some overtime and weekend operations as necessary. Operations did not exceed 16 hours of operation in any given day.

Garnet USA is permitted to operate the Alder Gulch processing plant 24 hours per day (Garnet USA, 2013a; Ruby Valley Garnet, 2006) DEQ does not have regulatory authority over Garnet USA's hours of operation under the Metal Mine Reclamation Act. Compare, for example, Section 82-4-434, MCA, which requires reclamation plans under the Opencut Mining Reclamation Act to minimize noise and visual impacts on residential areas to the degree practicable "through berms, vegetation screens, and reasonable limits on hours of operation." The Opencut Mining Reclamation Act generally applies to gravel pit operations, not quarry or hardrock mining operations.

O.1.12. Who performed, and what constituted, the extensive analysis identified on page 8 of Garnet USA's Application for an Amendment to the Current Operating Permit?

Response O.1.12: This is a comment on the application that Garnet USA submitted to DEQ to amend its operating permit, rather than a substantive comment on the DEIS. The phrase "after extensive analysis" refers to the analysis Garnet USA conducted prior to submitting its amendment application.

O.1.13 What is the "previously permitted quarry site" referenced on page 59 of Garnet USA's Application for an Amendment to the Current Operating Permit? Will those facilities, including water resources, be used in the proposed action?

Response O.1.13: This is a comment on the application that Garnet USA submitted to DEQ to amend its operating permit, rather than a substantive comment on the DEIS.

O.1.14. Page 92 of Garnet USA's Application for an Amendment to the Current Operating Permit refers to a crushing cycle, but does not define the size to be hauled to the processing plant or sorted and stockpiled. Depending on the fineness of the loads or stockpiles, what measures will be implemented to reduce dispersion?

Response O.1.14: Please see Sections 4.8.2 and 4.8.4. The Air Quality permit requires the use of BACT for dust control.

O.1.15. What purpose will the Citizen Advisory Group identified on page 13 8 of Garnet USA's Application for an Amendment to the Current Operating Permit serve in the future, including, for example, in minimizing public nuisance problems? What public nuisance problems, mine problems, concerns, good practices, or other mine related items have been identified by the Citizen Advisory Group, and how has Garnet USA responded to those items? What public nuisance problems are anticipated impacts of the proposed action?

Response O.1.15: Garnet USA initiated creation of a Citizen Advisory Group (CAG). The purpose of the CAG was to review mine operations to identify mine problems, concerns, good practices, or other mine related items and create workable solutions to problems or expand practices that are deemed good practice (Garnet USA, 2013a). The CAG was also used to keep the local public informed of future mine needs, and requirements. One DEQ staff member is a member of the advisory group.

The creation and function of the CAG lies outside the permitting requirements of the MMRA and procedural requirements of MEPA. A discussion of the actions of the CAG is outside the scope of this environmental review.

O.1.16. The DEIS does not analyze the data presented that indicates the possibility of historic releases of hazardous materials from the plant site. See DEIS 70, 72-74. The analysis must be done.

Response O.1.16: The presence of any historic releases of hazardous materials was not analyzed in this EIS. Analysis of such historic releases, if any, goes beyond the scope of the EIS.

O.1.17. Although the TCLP test has been used historically to evaluate leachate from wastes, the EIS should disclose and discuss the current EPA methods for leachate evaluation. DEIS 50.

Response O.1.17: Please see section 3.2.3. TCLP is an acceptable method to evaluate leachate from wastes in an environment that does not have the potential to produce acid mine drainage due to sulfide oxidation (lack of sulfides).

O.1.18. Why is there a low risk for acid generation by the rocks that would be mined? DEIS 50. What mineral, or other, analysis has been done of drilled core holes and what does that analysis show?

Response O.1.18: See Response O.1.17. Please see Section 3.2.3. Acid generating potential analysis of host rock and ore from the RWHR Mine site was performed. Analytical results indicate a low potential of acid generation.

O.1.19. Page 143 of Garnet USA's Application for an Amendment to the Current Operating Permit notes that mining activity began in the fall of 2012. What mining activity commenced in 2012?

Response O.1.19: The application notes that mining would begin in 2012. This activity has not yet begun. The language in the application was simply noting when the applicant anticipated mining would begin.

O.1.20. The DEIS should incorporate into its text the material results of all relevant studies and investigations rather than referencing studies and investigations contained elsewhere.

Response O.1.20: The MEPA Model Rules and DEQ's Procedural Rules are instructive on this point that an EIS shall be "analytic rather than encyclopedic" and "shall discuss the impacts of a proposed action in a level of detail that is proportionate to their significance". Model Rule VIII(1); ARM17.4.616. Incorporating all associated studies and investigations would dramatically increase the size and decrease the accessibility of the DEIS.

The referenced studies and investigations are included in the administrative files for Garnet USA's amendment application maintained by DEQ.

O.1.21. The EIS should avoid implications that a decision on the application is predetermined.

Response O.1.21: Please see Section 1.4 of the DEIS. A decision on Garnet USA's amendment application has not been predetermined. The purpose of the EIS is to provide DEQ with relevant information so that it can make an informed decision on Garnet USA's amendment application. This FEIS identifies a preferred alternative as required by ARM 17.4.619(5). DEQ's final decision will be set forth in a Record of Decision.

5.2 Comments Received from Montana Department of Transportation

P.1. Comment Summary

P.1.1. MDT has determined the proposed delays to traffic on US 287 requiring the motoring public to wait until mine vehicles cross, clear, or enter US 287 will not be allowed. If it has been determined through this study that the mine vehicles cannot operate safely on US 287 the developer must mitigate its impacts. Any work proposed in MDT right of way requires approvals and/ or proper permitting from MDT.

Response P.1.1: Garnet USA has been consulting with MDT throughout the planning process. The Agency-Mitigated Alternative would facilitate trucks crossing State Route 287 efficiently. The level of truck traffic under the No Action or the Proposed Action would not create delays for other travelers. Garnet USA will consult with MDT and secure any necessary permits before any work with the potential to occur in the MDT right-of-way begins.

5.3 Comments Received from Mrs. Doris Fischer

Q.1. Comment Summary

Q.1.1. My interest is in seeing mining occur in the Alder area in a way that will not degrade neighborhood quality of life or the irreplaceable natural resources of water quality, fisheries, wildlife habitats and wildlife populations. I'm sure that is your interest, and believe that is Garnet USA's interest as well.

Q.1.2. It appears that the Garnet USA and MT DEQ have been responsive to the transportation concerns of neighborhood residents, as well as water quality concerns. I applaud the decision to add more water quality monitoring wells, both at the mining site and processing plant.

Response Q.1.1 and Q.1.2: Thank you for your comment. No response required.

Q.1.3. I suggest MT DEQ and mining companies it deals with for exploration or mineral extraction anywhere in Montana use MT FWP's electronic mapping service known as the Crucial Areas Planning System, or CAPS, as a science-based reference supporting the earliest stages of development planning and environmental review: <http://fwp.mt.gov/fishAndWildlife/conservationInAction/crucialAreas.html>. CAPS is

intended to help provide landowners, developers, and permitting agencies with preliminary information re: the fish and wildlife resources in areas where land use changes are contemplated. Use of CAPS should then always be followed up by direct contact with the FWP area fisheries and wildlife biologists.

Response Q.1.3: DEQ reviewed the material available on the CAPS map and found it to be consistent with characterizations of the habitat in that area provided by MT NHP and reviews of aerial imagery. CAPS data are displayed at broad scale resolution of approximately one- square mile units analogous to sections in the Public Land Survey System (PLSS). The sites in the Garnet EIS were evaluated using on-the-ground visual surveys to confirm habitat information provided by MT NHP, which is also broad scale, but provides individual sighting information when available.

Q.1.4. In the case of the proposed Red Wash Hard Rock mining site (Sec 25 of T6S R4S), CAPS suggests – as does the draft EIS – that there is no high-value fisheries habitat in the project area. A communication to FWP area fisheries biologist Matt Jaeger might verify and possibly strengthen the EIS conclusion. His email address is mattjaeger@mt.gov.

Response Q.1.4: Matt Jaeger was contacted, and he concurred that the Alder Gulch processing plant site did not contain high value fisheries habitat. He suggested that DEQ work with the Ruby Valley Watershed Group to determine if there might be any potential opportunities for improving stream condition or aquatic habitat in the small segment of Alder Gulch that flows through the site. The head of the watershed group was contacted and she confirmed that the watershed group is pursuing restoration projects along Alder Gulch, but that their focus is on the upper portion of the gulch near Virginia City. This material has been added to the EIS in Section 3.17.

Q.1.5. I appreciate your diligence in checking with Craig Fager and Catherine Wightman of FWP re: presence of sage-grouse in the area. FWP’s nongame biologist for Region 3 is Claire Gower, and she may be helpful in affirming the draft EIS conclusions regarding the presence of other avian species and how they might be affected by the proposed new mining activity in Section 25. Her email address is cgower@mt.gov.

Response Q.1.5: Ms. Gower was contacted and DEQ discussed the project with her (Gower, 2014). At the time she did not have any additional comments on the project or on specific species present in the area.

Q.1.6. I was pleased to hear about the existence of a community action committee to help promote information exchange and good relations between the company and local residents. To my knowledge, a CAC is not a permittee requirement but I commend Garnet USA for being proactive in this regard.

Response Q.1.6: Thank you for your comment.

Q.1.7. I was puzzled by the lack of agency or public comments in the draft EIS document. If in fact there were comments submitted during scoping and leading up to the draft EIS release, I suggest those comments should have been included.

Response Q.1.7: Please see Section 1.7 of the DEIS. DEQ held a scoping meeting in Alder on April 16, 2013 and accepted public comments from March 26 to April 25, 2013. No comments were received from state or federal agencies during the scoping period. While the comments DEQ received during the scoping period assisted DEQ in determining the possible environmental impacts and the alternatives that were considered in the DEIS, the Montana Environmental Policy act does not provide for a direct response to the comments DEQ received during scoping.

All comments received on the DEIS and DEQ's responses to those comments are included in this chapter of the FEIS as required by the Montana Environmental Policy Act.

5.4 Comments Received from Annaliese Smail, Ryan Smail, Mary Jo Smail, Dale Smail

R.1. Comment Summary

R.1.1. I live approximately 3/4 of a mile to the west of the mine in the dredge piles and I would like to inform you that the noise is horrendous during the day while they are 'crushing/processing'.

Response R.1.1: Although Garnet USA did not operate the processing plant in 2013, it did conduct some limited testing of processing and handling equipment in anticipation of full scale operations. DEQ believes that there is an existing gravel crushing operation adjacent to the Garnet USA facility and a sand and gravel staging area maintained by the Montana Department of Transportation area along the highway near the site. DEQ cannot confirm the source of the noise the commenter heard. DEQ acknowledges that there may be noise impacts to residents that live near a crushing/processing facility such as Garnet USA's proposed activity.

R.1.2. Also, please note approximately 3 weeks ago when the wind was blowing East to West our property was completely under a cloud of dust resulting from activity from the mine.

Response R.1.1: Fugitive dust from Garnet USA's proposed mining and processing activities would be regulated by DEQ under the air quality permits issued to Garnet USA. If you believe that excessive dust is being generated by Garnet USA's operation, please contact DEQ.

R.1.3. I appreciate the fact they are providing jobs for the community, but when it's the local community that is also suffering environmentally because of the mine activities, how is that a positive thing?

Response R.1.3: The creation of jobs is not a factor that DEQ considers in its permitting decisions under the MMRA. DEQ may issue or amend an operating permit if it determines that the substantive requirements of the MMRA and administrative rules adopted under the MMRA are satisfied.

R.1.4. I cannot see any logical reason why they haul the materials down to the main plant to crush when they could move the crushing activity up to the pit they are pulling the materials are out of. This would reduce a number of the NEGATIVE environmental effects that are occurring.

Response R.1.4: Moving the processing facilities, which are permitted for operation at the Alder Gulch site under Operating Permit No. 00157, to the mine site is not something that DEQ can require Garnet USA to do. Please see Section 1.8 of the DEIS.

R.1.5. Our family and legal support are watching this process closely as we feel if things don't change it may require an action by the community to move things in a more positive direction environmentally.

Response R.1.5: Thank you for your comment.

Chapter 6: Public Comments Received

As required under ARM 17.4.619, the sources of all written and oral comments on the DEIS, including those obtained public hearings, must be included in the FEIS. The following is a list of people, and any affiliations they provided, who commented during the public comment period for the DEIS on the Proposed Amendment 003 to Garnet USA's Operating Permit 00157. Comments are separated below as to whether they were written or oral; some individuals commented both orally and in writing. The written comments (including those e-mailed or faxed) were electronically scanned and are found in Appendix A.

Table 6-1. Sources of comments on the DEIS received by DEQ during the public comment period from September 29 to October 31, 2013. Affiliations and representation are listed as provided by the commenter.

Name	Affiliation	Representing
Charles R. Barton	Alder Gulch, LLC	
Doris Fischer		
Mike Tierney	Montana Department of Transportation	
Smail: Annaliese, Ryan, Mary Jo, Dale		

Page intentionally left blank

Chapter 7: Consultation and Coordination

Agency	
Montana Department of Environmental Quality	
B. Bahr	Environmental Science Specialist
W. McCullough	Bureau Chief, Environmental Management Bureau
J. Strait	Cultural Resources Officer
Madison County	
D. Happel	Commissioner, District 2
D. Schulz	Commissioner, District 1
Montana Fish, Wildlife, and Parks	
C. Fager	Wildlife Biologist
C. Wightman	Sagebrush, Wetland, and Farm Bill coordinator
M. Jaeger	Fisheries Biologist, Region 3
C. Gower	Non-game Wildlife Biologist, Region 3
Montana Natural Heritage Program	
M. Miller	Data Assistant
USDA Forest Service	
Steve Kelley	Minerals Administrator, Beaverhead Deerlodge National Forests
US Fish and Wildlife Service	
Katrina Dixon	Section 7 Coordinator, Wildlife

Page intentionally left blank

Chapter 8: List of Preparers

Department of Environmental Quality		
James Castro	Geochemistry	B.S. Chemistry M.S. Physical Chemistry Ph D. Geochemistry
Jeffrey Frank Herrick	EIS Project Coordinator	B.S. Soil Science M.S. Environmental Systems, Applied Geology
Wayne Jepson	Hydrogeology	B.S. Earth Sciences M.S. Geology
Warren McCullough	EIS Reviewer, Editor	B.A. Anthropology M.S. Geology
Patrick Plantenberg	Soils, Vegetation, Wildlife, Recreation, Aesthetics, EIS Reviewer	B.S. Agricultural Science/Recreation Area Management M.S. Range Science/Reclamation Research
Herb Rolfes	Operating Permit Section Supervisor	A.S. Chemical Engineering B.A. Earth Space Science M.S. Land Rehabilitation
Charles Freshman P. E	Mining Engineer	B.A. Geology B.S. Civil/Environmental Engineering M.S. Geological Engineering
John Brown	Hydrologist	B.S. Natural Science A.S. Electronics
Betsy Hovda	Hydrogeologist	B.A. Geology
HydroSolutions Inc		
Shane Bofto	Hazardous Materials, Air Quality	B.S. Chemical Engineering M.B.A. Management
Stephanie Chamberlain	GIS, Mapping	B.S Mathematics B.A Environmental Studies Post-baccalaureate Certificate GIS
Melissa Schaar	Geology, Geochemistry	B.S. Earth Science M.S. Hydrogeological/Geological Engineering
David Donohue	Geology, Hydrology, Water quality, Technical Editing	B. S. Geology M.S. Hydrogeology
Korrin Kenck	Word Processing	B.S. Geology
Mike Meredith	Water Quality	B. S. Geology M.S. Geology

Chapter 8: List of Preparers

HydroSolutions Inc		
Luke Osborne	Hydrology	B.S. Civil Engineering M.S. Civil Engineering
Leanne Roulson	Project Manager, MEPA, Fisheries, Wildlife, Wetlands	B.S. Biology M.S. Fish and Wildlife Management

Big Sky Acoustics		
Sean Connolly	Noise	B.S. Mechanical Engineering M.S. Mechanical Engineering

Fehringer Agronomists		
Neal Fehringer	Range Science, Reclamation	B.S. Agronomy

Chapter 9: References Cited

- Allan, J. D. 2001. *Stream Ecology*. Norwell, Massachusetts: Kluwer Academic Publications.
- Babcock, S. (2013). *Vegetation Update- Garnet USA Project Area*. Missoula, Montana: Ecosystem Research Group.
- Bahr, B. (2013, July 2). DEQ, personal communication.
- Blocker, L. (2013). *Viewshed Analysis- Red Wash Hard Rock Site*. Missoula, Montana: Ecosystem Research Group.
- BLS. (2012). *US Department of Labor: Bureau of Labor Statistics*. Retrieved July 17, 2013, from Quarterly Census of Employment and Wages : <http://www.bls.gov/cew/>
- BSA. (2005). *Montana Tunnels EIS Project. Memo to Tetra Tech EMI: Noise Level Measurements Conducted on April 4, 2005*. Helena: Big Sky Acoustics, LLC.
- BSA. (2008). *Helena Sand and Gravel, Lake Helena Drive Gravel Pit Environmental Noise Study*. Helena: Big Sky Acoustics, LLC.
- Burger, H. R., Brady, J. B., Cheney, J. T., Harms, T. A., & Johnson, K. E. (1996). *Geochemistry, petrology, and structure of Archean rocks, Tobacco Root Mountains, southwestern Montana*. Retrieved May 14, 2013, from Keck Geology Consortium: <http://keckgeology.org/9thsymposiumvolume>
- Cummins, T. (2013). *Madison County Economic Impacts Analysis*. Missoula: Ecosystem Research Group.
- DEQ. (2006). *Ruby River Watershed Total Maximum Daily Loads and Framework for a Water Quality Restoration Plan*. Helena: Montana Department of Environmental Quality- Water Protection Bureau.
- DEQ. (2009). *Checklist Environmental Assessment: Timberline Decline Exploration Ammendment 00680*. Helena, Montana: MT DEQ.
- DEQ. (2011, February 18). *Citizens' Guide to Air Quality in Montana*. Retrieved March 18, 2013, from Department of Environmental Quality: <http://www.deq.mt.gov/airmonitoring/citguide/understanding.mcp>
- DEQ. (2012). *DEQ-7 Montana Numeric Water Quality Standards*. Helena: Planning Prevention and Assistance Division, Water Quality Planning.
- DEQ. (2012a). *Clean Water Act Information Center (CWAIC)*. Retrieved from Query for Alder Gulch, Madison County: http://cwaic.mt.gov/det_rep.aspx?segId=MT41C002_040&qryId=103003

- DEQ. (2013). *Montana Department of Environmental Quality Asbestos Control Program*. Retrieved July 8, 2013, from <http://deq.mt.gov/asbestos/default.mcpX>
- DEQ. (2013a). *Montana Air Quality Permit, Garnet USA Permit 4842-00*. Helena: Montana Department of Environmental Quality.
- Egan, M. (1988). *Architectural Acoustics*. New York, New York: McGraw-Hill, Inc.
- EPA. (1979). *Protective Noise Levels, Condensed Version of EPA Levels Document 550/9-79-100 (N-96-01-II-A-86)*. Washington, D.C.: US Environmental Protection Agency.
- EPA. (1994). Technical Document: Acid Mine Drainage Prediction, EPA530-R-94-036. Washington, D.C.: Environmental Protection Agency.
- EPA. (2007, July 24). *Modifications to the 112(b)1 Hazardous Air Pollutants*. Retrieved January 11, 2011, from Technology Transfer Network Air Toxics Web Site: <http://www.epa.gov/ttn/atw/pollutants/atwsmod.html>
- EPA. (2010, June 3). *Environmental Protection Agency: National Ambient Air Quality Standards*. Retrieved March 8, 2011, from US EPA; air quality: <http://www.epa.gov/air/criteria.html>
- EPA. (2011). *Discharge Monitoring Report (DMR) Pollutant Loading Tool*. Retrieved May 16, 2013, from United States Environmental Protection Agency: <http://cfpub.epa.gov/dmr/index.cfm>
- EPA. (2011, January 14). *Region 8 Air Permitting*. Retrieved January 17, 2011, from Air Permitting, Region 8, US EPA: <http://www.epa.gov/region8/air/permitting/index.html>
- EPA. (2012, June 13). *Compliance Assistance*. Retrieved March 18, 2013, from Mineral Processing Assistance: <http://www.epa.gov/compliance/assistance/sectors/minerals/processing/bevillquestions.html#bevillxclusion>
- EPA. (2013a). *Drinking Water Contaminants*. Retrieved June 5, 2013, from U.S. EPA: <http://water.epa.gov/drink/contaminants/index.cfm>
- EPA. (2013b, April 16). *Environmental Protection Agency: Asbestos Laws and Regulations*. Retrieved July 8, 2013, from <http://www2.epa.gov/asbestos/asbestos-laws-and-regulations>
- EPA. (2013c, August 29). *Nonroad Engines, Equipment and Vehicles - Nonroad Diesel Engines*. Retrieved from Environmental Protection Agency: Transportation and Air Quality: <http://www.epa.gov/otaq/nonroad-diesel.htm>
- Evans, J. G., & Moyle, P. R. (2006). U.S. Industrial Garnet, Chapter L. In J. D. Bliss, P. R. Moyle, & K. R. Long, *Contributions to Industrial-Minerals Research, U.S. Geological Survey Professional Paper 2209-L*.

- Fidel, S. (1983). Community Response to Blasting. *Journal of the Acoustical Society of America* 74(3).
- Frishman, D., Elliott, J. E., Foord, E. E., Pearson, R. C., & Raymond, W. H. (1993). *Map Showing the Location of Productive Lode and Placer Gold Mines in Montana*. Helena: USGS.
- FTA. (1995). *Transit Noise and Vibration Impact Assessment, Final Report, April 1995*. Federal Transportation Administration.
- FTA. (2006). *Transit Noise and Vibration Impact Assessment, FTA-VA-90-1003-06*. Washington, D.C.: Federal Transportation Administration.
- FWP. (2002). *Grizzly Bear Management Plan for Southwestern Montana 2002-2012*. Bozeman: Montana Department of Fish, Wildlife, and Parks.
- Garnet USA. (2013a). *Application for an Amendment to the Current Operating Permit and Proposed Plan of Operations Garnet USA Mine Project Madison County, Montana. Permit Amendment Application submitted to Montana Department of Environmental Quality by Garnet USA, LLC*. Garnet USA, LLC.
- Garnet USA. (2013b). *GUSA Summary 5/15/13, Unpublished Summary of Garnet USA Operations Provided to Montana Department of Environmental Quality*.
- Garnet USA. (2013c). Memorandum: SPCC, SWPPP Discussion for Red Wash Hard Rock Site. June 27, 2013. Garnet USA, LLC.
- Garnet USA. (2013d). Laboratory analytical Results; Idaho Bureau of Laboratories, Boise, Idaho. Work order Number E130600037 060613. Samples collected on June 5, 2013.
- Garnet USA. (2013e). Laboratory analytical results; Pace Analytical Services, Inc. Billings, Montana. Pace Project Numbers 10252870. Samples collected on December 17 and 18, 2013.
- Garnet USA. (2013f). *Groundwater Monitoring Data Collected June 2013*. Garnet USA.
- Glas, Z., & Jourdonnais, C. (2013). *Avian Point Counts, Nesting Survey, And Wildlife Assessment- Garnet USA*. Helena: ERG.
- Gower, C. (2014, February 3). Personal Communication Regarding Non-game Wildlife Issues at the Alder Gulch and RWHR Mine Sites. Montana Department of Fish, Wildlife and Parks, Region 3 (L. Roulson, Interviewer).
- GWIC. (2013). *Montana Well Log Report*. Retrieved May 22, 2013, from Montana Groundwater Information Center: <http://mbmgwic.mtech.edu/>

- Harris, C. E. (1998). *Handbook of Acoustical Measurements and Noise Control*. Woodbury, New York: Acoustical Society of America.
- Hydrometrics Inc. (1992, January). *Baseline Soils Investigation, Alder Gulch Project Area, Madison County, Montana*. Prepared for Cominco American Resources Inc., Spokane, Washington.
- IES. (2012, August). *Search for Public School District Data: Madison County, Montana*. Retrieved July 15, 2013, from US Department of Education, Institute of Education Sciences: <http://nces.ed.gov/ccd/districtsearch/>
- ISO. (1996). *Attenuation of Sound During Propagation Outdoors, Part 2: General Method of Calculation. Designation: 9613-2*. International Organization for Standardization.
- ISR Capital. (2013). *Memorandum: Operating Hours, Hauling, Blasting- Noise Issues*. Garnet USA.
- ITIS. (2013, August 15). *Integrated Taxonomic Information System*. Retrieved from ITIS Advanced Search and Report: <http://www.itis.gov/>
- Jackson, B. (2013, August 27). Community Action Committee Summary and Contacts, e-mail to Jeffrey Herrick. Alder, Montana.
- Jaeger, M. (2014, January 3). Personal Communication Regarding Fisheries and Aquatic Habitat Issues at the Alder Gulch and RWHR Mine Sites. Montana Department of Fish, Wildlife and Parks, Region 3 (L. Roulson, Interviewer).
- Lesica, P. (2012). *Manual of Montana Vascular Plants*. Fort Worth, Texas: Botanical Research Inst. of Texas.
- Linnen, C. (2008). *Effects of oil and gas development on grassland birds*. Calgary, Alberta: prepared for: Petroleum Technology Alliance Canada.
- Madison County . (2008). *Declared Noxious Weeds 2008*. Retrieved July 16, 2013, from http://www.madison.mt.gov/departments/weed/noxious_weeds/noxious_weeds.asp
- Madison County Board of Health. (2006, July). *Madison County Wastewater System Regulations*. Retrieved July 12, 2013, from madison.mt.gov: http://madison.mt.gov/departments/sanitarian/septic/MC_Septic_System_Regs.pdf
- McCullough, W. (2013, March 21). Personal Communication Regarding Noise Levels at the Alder Gulch Site. (S. Connolly, Interviewer).
- McDonald, C., Elliott, C. G., Vuke, S. M., Lonn, J. D., & Berg, R. B. (2012). Geologic map of the Butte South 30' x 60' quadrangle, southwestern Montana. *Open-File Report 622; 1:100,000*. Montana Bureau of Mines and Geology.

- MDT. (2011, April). *Getting Started*. Retrieved July 9, 2013, from [www.mdt.mt:
http://www.mdt.mt.gov/publications/docs/manuals/mcs_getting_started.pdf](http://www.mdt.mt.gov/publications/docs/manuals/mcs_getting_started.pdf)
- MDT. (2011a). *Traffic Noise Analysis and Abatement*. Helena: Montana Department of Transportation.
- MDT. (2012). *Traffic Data Collection and Analysis 2007 to 2011*. Retrieved July 15, 2013, from http://www.mdt.mt.gov/publications/datastats/traffic_maps.shtml
- Menge, C. (2005). *Assessment of Community Reaction to Proposed Club Racetrack. Proceedings of the Institute of Noise Control Engineering (INCE) , Noise-Con 2005*. Mineapolis, Minnesota.
- Merkel, J. 2013. Air Permitting Section, DEQ Air Resources Management Bureau. Personal Communication. September 19, 2013.
- MFISH. (2013). *Montana Fisheries Informaiton System: Query for Alder Gulch, Madison County*. Retrieved July 15, 2013, from <http://fwp.mt.gov/fishing/mFish/>
- Montana State Engineers Office. (1954). *Water Resources Survey, Madison County, Montana. July*. Helena: Montana Department of Natural Resources and Conservaiton: Water Resources Division.
- MSHA. (2011). *Horns, Back-up Alrms, and Automatic Warning Devices*. Retrieved from US Mine Safety and Health Administraiton: <http://www.msha.gov/stats/top20viols/tips/14132/htm>
- MSU Extension Service. (2010). *Montana Noxious Weed Information*. Montana State University Extension. Retrieved July 16, 2013, from <http://www.msuxextension.org/invasiveplantsMangold/noxioussub.html>
- MT DLI. (2012). *Montana County Fliers: Madison County, September 2012*. Helena: Montana Department of Labor and Industry.
- MTNHP. (2013). *Montana Species of Concern: Alder Gulch Site: Query 14deq0003*. Helena: Montana Natural Heritage Program.
- MTNHP. (2013, July 8). *Montana Species of Concern Report: Red Wash Hard Rock Site 14deq0002*. Helena, Montana.
- MTNHP. (2013a). *Montana Field Guide: Bobolink- Dolichonyx oryzivorous*. Retrieved July 16, 2013, from http://fieldguide.mt.gov/detail_ABPBXA9010.aspx
- NRCS. (2011). *Web Soil Survey: Natural Resources Conservation Service*. Retrieved July 16, 2013, from Madison County Soil Survey: <http://websoilsurvey.nrcs.usda.gov/>

- NWI. (2013). *National Wetlands Inventory*. Retrieved from USFWS National Wetlands Inventory: <http://www.fws.gov/wetlands/>
- Pearson, R., Hannah, W. F., James, H. L., Loen, J. S., Moll, S. H., Ruppel, E. T., & Trautwein, C. M. (1990). *Map Showing Mineral Resource Assessment for Sulfur, Cobalt and Base Metals in Proterozoic Sedimentary Rocks and for Iron, Chromium, Nickel, Talc, Chlorite, Gold, and Graphite in Archean Crystalline Rocks. Dillon 1x2 Degree Quadrangle, Idaho and Montana*. Helena: USGS.
- Ruby Valley Garnet. (2006). *Ruby Valley Garnet Red Wash Amendment Draft Checklist Environmental Assessment*. Helena: Montana Department of Environmental Quality, Hard Rock Mining Division.
- Ruppel, E. T., O'Neill, J. M., & Lopez, D. A. (1993). *Geologic Map of the Dillon 1 x 2 degree Quadrangle, Montana and Idaho, Miscellaneous Geologic Investigation 1803H*. United States Geological Survey.
- Sears, K. (2012). *Class III Inventory Concurrence Report; Garnet USA LLC, Madison County, Montana*. Helena: Montana State Historic Preservation Office.
- US Census. (2013). *State and County Quick Facts; Madison County, Montana*. Retrieved July 2013, from <http://quickfacts.census.gov/qfd/states/30/30057.html>
- US Census Bureau. (2012). *American Factfinder*. Retrieved April 2013, from 2010 census: <http://factfinder2.census.gov>
- US Dept. of Commerce. (2013). *Regional Economic Information System, Bureau of Economic Analysis*. Retrieved July 2013, from <http://www.bea.gov>
- USACE. (1987). *Corps of Engineers Wetlands Delineation Manual*.
- USACHPPM. (2005). *Operational Noise Manual, An Orientation for Department of Defense Facilities*. Washington, D.C.: U.S. Army Center for Health Promotion and Preventative Medicine..
- USFWS. (2013). *Endangered, Threatened, Proposed, and Candidate Species, Montana Counties. Revised July 2013*. Montana Field Office, Helena: United States Fish and Wildlife Service, Ecological Services.
- VanFossen, S. (2013). *Wetland Certification and Delineation for Garnet USA, LCC Project, Alder, Montana*. Missoula, Montana: Ecosystem Research Group.

**Appendix: Original Copies of Comments Submitted on the Garnet
USA Draft EIS**

Appendix: Original Copies of Comments Submitted on the Garnet USA Draft EIS

Original Comments:

**Charles R. Barton
Alder Gulch LLC**

Alder Gulch LLC
1011 Centre Road, Suite 320
Wilmington, DE 19805

October 31, 2013

Mr. Jeffrey Herrick
Department of Environmental Quality
P.O. Box 200901
Helena, MT 59601

RE: Public Comment on the Draft Environmental Impact Statement for the Proposed Amendment 0003, Garnet USA, LLC, Operating Permit 00157

Dear Mr. Herrick:

The following constitutes Alder Gulch, LLC's substantive comments¹ on the Draft Environmental Impact Statement for the Proposed Amendment 0003, Garnet USA, LLC, Operating Permit 00157. Alder Gulch is submitting these comments both as a member of the public, and as a person whose interests may be adversely affected as a result of any action taken respecting the Draft Environmental Impact Statement ("DEIS") or Garnet USA's related Application for an Amendment to the Current Operating Permit. Alder Gulch is submitting these comments pursuant to law and in response to the Montana Department of Environmental Quality's ("DEQ") request for comments.

The Montana Environmental Policy Act ("MEPA") provides for the review of state actions to ensure that "environmental attributes are fully considered," and that the public and public officials are informed of the anticipated or potential impacts of state actions. Mont. Code Ann. § 75-1-102(1), (3). To ensure the full consideration of environmental attributes, MEPA facilitates public participation in the environmental review process, including the submission of comments by interested persons on draft environmental impact statements. See e.g. Mont. Admin. R. §§ 17.4.619(2); 17.4.620(3). A central premise of MEPA is informed decision making, and public participation, epitomized by public comment, is integral to informed decision making. It is also an embodiment of the fundamental right to participate in governmental deliberations and the fundamental right to know. See Mont. Const. art. II, §§ 8, 9.

DEQ has requested comments on the DEIS relating to Garnet USA's proposed amendment to its operating permit. Ltr. from Tracy Stone-Manning, Director DEQ, to Interested Party (Sept. 30, 2013).² The Final Environmental Impact Statement must, *inter alia*, provide the DEQ's response to Alder Gulch's substantive comments, including an evaluation of the comments received and a disposition of the issues involved. Mont. Admin. R. § 17.4.619(3).

¹ Please note that the headings in Alder Gulch's comments are for organizational convenience, and are not intended to correspond to particular sections of the DEIS. Simply because a DEIS issue or topic does not have a heading in these comments does not mean that a comment does not address that issue or topic.

² See also DEIS 3.

I. Hard Rock Mining v. Alluvial Mining / Exploration Activities v. Hard Rock Mining

· No analysis is made of the considerable distinctions, and varying impacts, between hard rock mining and the processing of hard rock minerals and alluvial mining and the processing of alluvial minerals.

An apparent theme of the DEIS is that mining has been done in the past, and the proposed amendment to the operating permit simply expands the mining's scope.³ This ignores a *fundamental change* in the type of mining proposed, and the concomitant changes to the processing of the mined materials. Not all garnet mining is the same, nor are the impacts of varying types of garnet mining the same. What was done in the past is not what is proposed to be done in the future. What was done in the past was alluvial garnet mining. What is proposed to be done in the future is hardrock garnet mining. It is a distinction of kind, and not just of extent. The distinction between the two types of mining and the related processing, and a description of the varying impacts of the types of mining and processing, is critical to an informed decision. It is, however, an analysis not done in the DEIS.

Similarly, the DEIS notes that “[t]he function and use of the processing plant at the Alder Gulch site would remain the same as under the existing permitted activities.” DEIS 24. Despite noting that the function and use would remain the same, the DEIS then goes on to describe upgrades to the Alder Gulch processing plant and facilities, including those that would increase processing capacity, plant efficiency, and throughput. DEIS 24-25. These changes are not described in detail nor, more importantly, are the impacts arising from these changes described. The changes proposed have the potential to add to or modify existing impacts, and should be analyzed and disclosed.

To understand the impacts arising from these changes, moreover, the environmental impacts of the existing facilities as already approved need to be analyzed. See DEIS 47 (noting “[a]ctivities described in the mine permit or the environmental effects of those activities at these two sites have already been approved and are not considered in this analysis”). The changes in impacts cannot be assessed unless the current impacts are understood.

· No analysis is made of the distinction, and varying impacts, between exploration activities and full-scale mining at the Red Wash Hard Rock Site.

Under the exploration program, Garnet USA can construct trenches, drill, and remove a bulk sample of up to 10,000 tons of ore to gain a better understanding of the garnet resource. DEIS 9. By contrast, if a permit is issued, the estimated mine life for the Red Wash Hard Rock (“RWHR”) Site would be approximately 37 years, based on a proposed production rate of about 500,000 tons of ore and waste per year, including the production of approximately 50,000 tons per year of finished garnet product. DEIS 23, 111; see also DEIS 84, 127, 135.

³ See e.g. DEIS 9 (noting “[t]his amendment to the 1995 operating permit, if approved, would allow mining to proceed at the RWHR Mine site”); DEIS 20 (noting “[t]he Proposed Action would allow garnet mining at the RWHR site, adding 340 acres to the mine operating permit area”).

The DEIS sometimes implies that the mining activities at the RWHR Site will differ negligibly from the exploration activities already permitted.⁴ This is not the case, as the scale of mining is considerably more intensive in scope, duration, and equipment used. The distinctions, and varying impacts, between exploration activities and full-scale mining need to be addressed.

Additionally, the No Action Alternative needs to describe what actions have taken place under Garnet USA's Operating Permit No. 00157 and Exploration License No. 00642 to provide context for the assumptions of future mining of alluvial material at the plant site, and drilling, trenching and bulk sampling under the exploration license. See e.g. DEIS 10.

II. Geographic Scope

· The geographic scope of analysis, and particularly the areas potentially impacted or affected, is too restricted.

The DEIS describes the areas potentially affected by the Proposed Action to include existing infrastructure related to the Garnet USA Alder Gulch processing plant, the Red Wash Alluvial Site, the proposed RWHR Mine, and the areas within the proposed mine permit boundaries, as well as an alternate access road connection to the processing plant. DEIS ES-1, 3;⁵ see also DEIS 48, 53, 54, 64,⁶ 67,⁷ 74-75, 97,⁸ 100,⁹ and 105.

This is too restricted. Project impacts, including potential, primary, secondary, and cumulative impacts, are not limited to the existing or proposed mine permit boundaries. MEPA requires “a detailed statement on...the environmental impact of the proposed action.” Mont. Code Ann. § 75-1-201(1)(b)(iv)(A). If any restrictions exist on the geographical scope of impacts, it is to *within Montana's borders*. See e.g. § 75-1-201(2); 75-1-220(4). It is not to within the mine permit's boundaries. Moreover, the Metal Mine Reclamation Act requires the mitigation or prevention of “undesirable *offsite* environmental impacts.” Mont. Code Ann. § 82-4-302(1)(g) (emphasis added).

The DEIS is generally silent¹⁰ on impacts or affects occurring outside the proposed mine permit area boundaries. The scope of impact analysis must be expanded.

⁴ See e.g. DEIS ES-8 (noting “[n]oise levels of the diesel equipment and rock drill at the RWHR site at the closest residence one mile west of the site would be similar to the noise levels during exploration, and would not constitute a noticeable impact to noise levels”).

⁵ Please note also Figure ES-1-2 does not appear to be included in the DEIS. See DEIS ES-1.

⁶ With respect to surface water resources, the DEIS states that the analysis area “was limited to the permit boundary and immediate vicinity,” but this “immediate vicinity” is not described. See DEIS 64.

⁷ With respect to groundwater resources, the DEIS notes that the groundwater resource analysis area was selected because it coincides with the extent of groundwater monitoring data collected during the 1990 and 1991 studies. DEIS 67-68. There is no explanation in the DEIS why restricting the analysis area to coincide with the extent of groundwater monitoring data is appropriate.

⁸ With respect to land use and recreation, it is not clear what “adjacent lands” are or why they were chosen.

⁹ Wildlife habitat “was assessed for the Alder Gulch processing plant area only.” DEIS 100.

¹⁰ Socioeconomics is an exception.

III. Mitigation

- *It is not clear what is discretionary mitigation and what is required mitigation.*

The DEIS describes in numerous places the Agency-Mitigated Alternative, and various other proposed mitigation measures. *See e.g.* DEIS 29, ES-5. The DEIS, however, never discusses the requirements of Montana Code Annotated § 84-4-337(2), nor is it clear what mitigation measures are intended to be discretionary, and what mitigation measures are required, nor does it ever discuss any stipulations to the draft or any final operating permit. This analysis of discretionary versus required mitigation, and of stipulations to any final permit, must be undertaken, as well as a discussion of the provisions of § 84-4-337(2).

The DEIS should also disclose the results of the consultation with the applicant on potential stipulations required by § 84-4-337(2)(b).

What conditions has DEQ placed on the permit to ensure compliance with the Metal Mine Reclamation Act, and what mitigation measures have been mutually developed by DEQ and the applicant? *See* Mont. Admin. R. § 17.24.117(1)(a)(ii), (iv).

IV. Related Future Actions / Secondary or Cumulative Impacts

- *The impacts of exploring, mining, and processing contiguous or reasonably proximate garnet resources must be analyzed.*

The DEIS notes that “[e]xploration work has identified a large garnet resource in the area on surrounding lands,” and that “[a]pproval and operation of the mine may stimulate secondary exploration on neighboring properties around the mine area.” DEIS 135.

The impacts arising from this reasonably foreseeable increase in exploration, and, potentially, mining and processing, of contiguous or reasonably proximate garnet resources, however, is not analyzed. It is a secondary or cumulative impact requiring analysis.

- *The impacts of mining at the Alder Gulch Processing Plant Site or at the Red Wash Alluvial Site should be considered.*

The DEIS recognizes that mining (mineral processing) at the Alder Gulch processing plant site is still permitted, and that Garnet USA may mine it at some future time. DEIS 8. An analysis in the DEIS of the impacts of mining at the Alder Gulch site, however, is not undertaken. It is a secondary or cumulative impact requiring analysis.

Similarly, the DEIS recognizes that the RWA Site remains permitted for mining. DEIS 8. An analysis in the DEIS of the impacts of mining at the RWA Site must be undertaken, as it is a secondary or cumulative impact requiring analysis.

4

- *The DEIS is largely silent on the status of, activities at, and impacts arising from the Red Wash Alluvial Site.*

The DEIS indicates that the Red Wash Alluvial (“RWA”) Site was mined and reclaimed. DEIS 1. The No Action Alternative generally describes the Alder Gulch Processing plant site, but is generally silent on the RWA Site. *See e.g.* DEIS Section 2.4. Please include information on the status of activities at the RWA Site, the status of the RWA Site permit, the potential future actions at the RWA Site, the potential for future reserves, impacts arising from potential actions at the RWA Site, and the status of reclamation. The DEIS notes that “[t]he reclamation plan...has shown success at the nearby Red Wash Alluvial site,” DEIS 115, but the DEIS provides no explanation or details, nor supporting documentation or studies.

- *The impacts of processing ore at the Alder Gulch processing plant from other sources must be analyzed.*

The DEIS notes that “the plant can receive and process an unspecified amount of garnet ore from other off-site sources.” DEIS 140. The characteristics of this ore, as well as the impacts of processing this ore from off-site sources, needs to be analyzed. Additionally, it needs to be analyzed what impact the possible approval and operation of the mine will have on the mining of off-site ore sources, and transportation related to those off-site ore sources.

- *Cumulative impact analysis needs to be clarified.*

The DEIS generally segregates out analysis of primary and secondary impacts, but is not consistent in locating cumulative impact analysis. The EIS should segregate out cumulative impacts and assess them in self-contained, independent sections for all alternatives and issues. Where cumulative impacts are not identified, that should be done, even if it is to note that no cumulative impacts will occur and to explain the basis, including the factual basis, for that determination. Where cumulative impacts are identified, they should be described in detail, including the facts that form the basis for the analysis. *See e.g.* DEIS 111-112, 113, 115, 116, 117-118, 119-120, 123, 124-125, 126-129, 129-130, 132-133, 135-136, 136-137, 138-139, 141.

Additionally, the cumulative impacts analysis should be reassessed given the impacts of exploring, mining, and processing contiguous or reasonably proximate garnet resources.

V. Groundwater

- *No groundwater monitoring has occurred at the RWHR Site—groundwater monitoring, and an assessment of impacts to groundwater, must be performed and included in an EIS.*

No groundwater monitoring has occurred at the RWHR Site.¹¹ *See e.g.* DEIS 35, 39. As recognized by DEQ, “few data are available for characterizing groundwater conditions in the

¹¹ Garnet USA drilled two groundwater exploration test holes that were reported to be dry. DEIS 71. These test holes appear to have only provided a “snapshot of subsurface conditions,” and apparently “may not indicate a groundwater system in low permeability or fractured rock.” DEIS 72.

5

vicinity of the proposed RWHR Mine site." DEIS 71. According to DEQ, groundwater near the proposed RWHR Site is dominated by a bedrock aquifer system of unknown depth and extent, and possibly localized shallow groundwater systems accompanying intermittent or ephemeral drainage channels. DEIS 67. Some evidence "suggest[s] that the proposed RWHR permit area is not entirely devoid of groundwater." DEIS 71. DEQ recognizes, moreover, that water reporting to the groundwater could contain nitrogen compounds, metals in sediment from the mineralized zone, and petroleum products from mine equipment leaks. DEIS 119.

Groundwater monitoring must be performed. The absence of groundwater monitoring precludes determination of a baseline. It precludes, *inter alia*, an analysis of the chemical, physical, and temporal characteristics of the groundwater. See DEIS 72. It precludes an assessment of any impacts to groundwater, as well as an assessment of waters hydrologically connected to the groundwater system. It precludes a review of a sufficient number of sources, and over a sufficient length of time, to characterize the hydrologic regime. It precludes any determination that the RWHR Site would be expected to be mined as a dry operation and would not likely encounter measurable groundwater through the 37-year life of the mine.

How can the proposed action be determined to be in compliance with Montana's Water Quality Act, including non-degradation requirements, without any groundwater water quality or water level data?

• Post-proposed action approval groundwater monitoring is not mitigation.

The DEIS states that "[i]n order to mitigate the potential for nitrogen or other compounds to impact groundwater, groundwater monitoring would be conducted to better characterize current and ongoing future groundwater quality at the RWHR Site and the Alder Gulch processing facilities." DEIS 120.

Monitoring does not mitigate potential impacts. See DEIS 110. It merely identifies them. And here, it would only identify impacts *after* they are permitted to occur. "The Legislature enacted MEPA to prevent or eliminate environmental damage..." *Pompeys Pillar Historical Ass'n v. Montana Dept. of Environmental Quality*, 2002 MT 352, ¶ 17, 313 Mont. 401, 61 P.3d 148. Monitoring must be done pre-approval so that impacts can be assessed pre-approval, and so that potential mitigation measures can be assessed, and required, pre-approval.

• An adequate groundwater impact analysis is contingent upon sufficient groundwater monitoring.

Until groundwater's characteristics are monitored and understood, there can be no adequate assessment of the proposed action's impacts on groundwater or the related hydrologic regime, or an analysis of potential mitigation measures.

• Miscellaneous groundwater matters require clarification or analysis.

It is unclear what "laboratory detection limits" are referred to for nitrate. DEIS 70. DEQ has conducted an analysis of laboratory detection limits for nitrogen compounds and presented in

6

draft DEQ-12 a reporting limit of 20µg/L. It is inconsistent for this DEIS to imply that the levels reported are essentially at the detection limit.

There is no analysis of the potential for the proposed action, including the open pit, to impact the existing springs that discharge to Red Wash adjacent to the mine site, or for the pit to intercept intermittent surface water flows in Red Wash channel. See DEIS 117.

What is the basis for the conclusion that the pit would not encounter groundwater? See DEIS 118.

Despite recognizing that water reporting to the groundwater could contain nitrogen compounds, metals in sediment from the mineralized zone, and petroleum products from mine equipment leaks, why is no monitoring proposed for the storm water ponds? DEIS 119.

There is no discussion or analysis of the potential impacts of leachate from ore storage or stockpiles at the processing plant site or at the RWHR Site on groundwater. See DEIS 119.

Why is reliance on an "incomplete hydrograph record" adequate, and are conclusions based on that record defensible? See DEIS 69.

Is a Montana Ground Water Pollution Control System permit required?

VI. Surface Water

• An assessment of the impacts to Alder Gulch must be performed.

An analysis of the water quality of Alder Gulch, and sources impacting the water quality of Alder Gulch, must be provided. Alder Gulch is listed as impaired on the Montana 303(d) list for total nitrogen, mercury, manganese, lead, and sediment. Nitrogen levels along Alder Gulch exceed the proposed numeric standards. Nowhere in the DEIS is there an analysis of Alder Gulch's impairments, or an analysis of the impacts to Alder Gulch's impairments as a result of the proposed action. The EIS must include this analysis.

• An assessment of the impacts to Ruby River must be performed.

The DEIS is silent on the water quality of the Ruby River, sources impacting the water quality of the Ruby River, and the proposed action's impact on the Ruby River.

• Hydrological connections need to be provided.

The DEIS is generally silent on the hydrological connections between groundwater and surface waters, and between surface waters, within the area of potential impact or affects. These hydrological connections must be analyzed.

7

• *Surface water monitoring and analysis must be conducted at, and near, the RWHR Site.*

The DEIS suggests that "surface water and/or shallow groundwater is consistently present in some of these nearby channels." DEIS 67.¹² This recognition indicates the need to quantify, and qualitatively analyze, surface waters within the RWHR Site and area of potential impacts or affects. The DEIS must document existing environmental conditions. The proposed action's impact on these surface waters must be analyzed.

• *Absent an applicable Total Maximum Daily Load on Alder Gulch, how can a permit be issued that will allow a discharge that may cause or contribute to a violation of water quality standards.*

The DEIS recognizes that, as a result of the proposed action, nitrogen may be introduced to surface and ground water. For example, the DEIS notes that "[p]otential secondary impacts include wind erosion and surface water runoff which could carry metals and nitrogen compounds offsite and increase concentrations in nearby surface water resources." DEIS 118; *see also* DEIS 112, 35, 140, 141. As recognized by DEQ, "[a]t the Alder Gulch Mine site, recirculation and reuse of water from the lined recycling ponds during garnet processing may allow nitrogen compounds originating from blasting residue to concentrate in the recycling pond waters and these could potentially be released to groundwater or surface water." DEIS ES-7. "The contaminants most likely to cause negative impacts [to fisheries] are the nitrates originating from explosive residue in the ore and waste rock." DEIS ES-8. Impacts, unidentified, could also occur to vegetation or aquatic life. DEIS 122. Presumably Alder Gulch is a surface water impacted, although the DEIS is unclear and must specifically identify the surface waters impacted. For impaired streams, how can additional load be allowed? Absent an applicable TMDL, how can discharge be permitted?

A TMDL has been done for sediment. *See* DEIS 105. How will the proposed action comply with the sediment TMDL?

• *Miscellaneous surface water matters require clarification or analysis.*

Surface water monitoring, including for constituents for which Alder Gulch and the Ruby River are impaired, needs to occur at the RWHR Site and the Alder Gulch processing plant site. *See* DEIS 140, Application 144. Impacts to these surface waters need to be analyzed.

Does the monitoring done in 1990 and 1991, and then again in June 2013, *see* DEIS 65, constitute a sufficient number of sources and length of time to characterize the hydrologic regime? Data from monitoring continued after the initial 1990 and 1991 monitoring, *see* DEIS 65, should be analyzed.

How is the "unnamed stream," *see* DEIS 64, likely a "losing stream" in the RWHR Site area given that there appears to be springs discharging to the channel through this reach?

¹² Garnet USA did not collect any flow or surface water quality data at the site. DEIS 66.

Why is comparing nitrate concentrations to drinking water standards, *see* DEIS 65, appropriate when DEQ has proposed numeric nutrient standards?

How will the Vigilante Canal, a major local irrigation canal providing water from the Ruby Reservoir, be impacted by the proposed action? DEIS 98.

Why is a Sand and Gravel General Permit used to permit discharge? *See* DEIS 10. Should an individual Montana Pollutant Discharge Elimination System Permit be required?

The design, operation, and monitoring criteria for storm water controls do not appear to be indicated. Those should be provided.

DEQ should determine if a stormwater permit is needed for the existing site. *See* DEIS 73, 121. The status and conclusions should be stated in this EIS.

What impacts to surface and groundwater will occur if mining (mineral processing) occurs at the Alder Gulch processing plant site or at the RWA Site?

Based on the DEIS determination that "[i]mpacts to fisheries would be closely linked to potential impacts to groundwater and surface water," DEIS 139, a reexamination of the impacts to fisheries should be included in the EIS after examining impacts to groundwater and surface water.

VII. Air Quality

• *The EIS must include an analysis of air quality impacts.*

The DEIS must analyze impacts to air quality. It is not sufficient to simply state that impacts would be, or appear to be, minor. *See* DEIS 123-124. The EIS should, at minimum, reference and tier from the Air Quality permit MEPA analyses, and should, at minimum, summarize the projected impacts quantitatively and qualitatively.

Will there be fugitive dust from the RWHR pit, crusher, waste dump, or other operations at the RWHR Site? What will the control measures be, what will the monitoring be, what will trigger additional mitigation if, for example, blowing dust is a problem?

Diesel generators and engines impact air quality. The DEIS contains no analysis of the amount of diesel fuel expected to be used, or the quality of the generators and engines of the equipment to be used, including whether or not they are expected to be Tier 4 compliant.

What impact will increased traffic have on air quality?

Upon what basis is it concluded that the proposed action is not expected to cause or contribute to a violation of any NAAQS or MAAQS or opacity requirements and would have minimal effect on the air quality of the project area? DEIS 80, 124. What is the project area?

What measures are taken to ensure dust is controlled?

· *Baseline air quality measurements must be made.*

The DEIS indicates that baseline air quality measurements were not made in the vicinity of the Alder Gulch processing plant, RWA Site, or the RWHR Site. See DEIS 79. Nearest known samples were not considered representative. See DEIS 79. Baseline air quality measurements must be made, and an analysis of those measurements incorporated into the EIS.

· *Who will be responsible for compliance with air quality laws and regulations.*

Garnet USA's Application for an Amendment to the Current Operating Permit notes that "[i]f a contractor is chosen for crushing, then they will be expected to operate under their own air quality permit, not the one for the plant." Application 14. Has Garnet USA secured all air quality permits necessary for the proposed action? Will Garnet USA be responsible for compliance with air quality laws, regulations, and permits related to its proposed action, including if those permits are obtained by contractors?

VIII. Wildlife

· *Wildlife habitat should be assessed within the proposed permit boundary, and in the area of potential impact.*

The DEIS states that "[w]ildlife habitat was assessed for the Alder Gulch processing plant area only." DEIS 100 (emphasis added). This excludes assessment of, *inter alia*, the proposed RWHR Site, whose proposed permit boundary encompasses approximately 340 acres, of which the footprint of the proposed mine would cover approximately 213 acres. DEIS 135.

Absent an assessment of the wildlife habitat within the proposed permit boundary and in the area of potential impact, impacts to wildlife cannot be adequately assessed. DEIS conclusions regarding habitat, moreover, are questionable given the absence of a habitat study. See e.g. DEIS 102 (habitat typical of Hunting District 320 or Region 3); 104, 105 (habitat for special status wildlife species).

· *Analysis of wildlife impacts should be done.*

The analysis of impacts to wildlife resources is conclusory and necessitates expanded analysis.

The DEIS notes that "[u]ngulates, birds, and mammals would be likely to avoid the area because of the increased human presence and noise from equipment at the site." DEIS 138. What ungulates, birds, and mammals? How do they presently use the area (permanent residents, migratory, etc.)? What impact would arise from avoidance of the area? Could impacts be mitigated?

10

The DEIS notes that, "[a]lthough wildlife use of this area may be altered, this alteration is not likely to impact wildlife populations or the survival of individuals." DEIS 139. What wildlife uses the area? How is the area used? How will use be altered? Why is it not likely to impact wildlife populations or the survival of individuals?

The DEIS notes that the conversion of the RWHR Site from exploration to full-scale mining "is unlikely to contribute to cumulative impacts to wildlife in the Alder area." DEIS 139. Why? How is this conclusion reached? Upon what is it based? What are the potential cumulative impacts, even if unlikely? What is the Alder area?

What impacts to wildlife will occur if approval and operation of the mine stimulates secondary exploration and mining on contiguous or reasonably proximate properties? See DEIS 135.

No explanation is given for why nesting status for all avian species was not determined, despite several species having the potential to nest in similar habitats. DEIS 101.

What human activities proximal to the RWHR Site suggest an unlikelihood of occurrence of the Sprague's Pipit within the permit boundary? DEIS 105.

The DEIS notes that "[a]ctivities and ongoing work at the processing plant would be conducted so that it does not harass nearby nesting birds at the facility." DEIS 138. How would activities and ongoing work be conducted so as not to cause any harassment of nearby nesting birds at the facility?

IX. Noise

Existing noise levels at the Alder Gulch processing plant and RWHR Site have not been measured. DEIS 82. Noise levels need to be analyzed to determine the impacts caused by the proposed action.

DEQ states that the haul road realignment would "reduce the truck noise at the residences." DEIS 129. The amount of reduction needs to be quantified, and compared to the proposed action and no action alternatives.

Stating that the L_{dn} of 54 is less than EPA's guideline of 55 does not provide an analysis and comparison of alternatives and their impacts. The EIS must describe what the impacts will be to adjacent residences, or to others potentially affected. DEIS 127.

Does the +14 L_{dn} impact that is described as "significant noise impact at residences" constitute a violation of Montana Code Annotated § 45-8-101? DEIS 127. If not, why not, and, if so, how can DEQ issue a permit? How can this impact be mitigated?

What noise impacts will arise from the use of the crusher at the RWHR Site? What noise impacts will arise from backup alarms on equipment? What noise impacts will arise given the increased traffic between the RWHR Site and the Alder Gulch processing facility?

11

X. Socioeconomics and Contractor Responsibility

· The socioeconomic analysis needs clarification and expansion.

It is not clear in the DEIS what impact to employment will result from the proposed action. The DEIS, under the no action alternative, notes that the current number of employees is 40-50. DEIS 130. The DEIS, under the proposed action alternative, notes that Garnet USA anticipates employing 30 to 60 people directly. DEIS 130. What is the current number of employees? How is it expected to change? What impacts will result? Does the proposed number of employees have the potential to trigger the Hard Rock Impact Act? Mont. Code Ann. § 90-6-301, *et seq.*

Garnet USA's Application for an Amendment to the Current Operating Permit notes that employees and contractors will perform various services. What will be the socioeconomic impact of relying on contractors and contract employees? What benefits are provided to Garnet USA employees? What benefits are provided to contract employees? What demands on governmental or social services will arise from the provision, or lack thereof, of benefits? How will Garnet USA's demand for employees and contract employees impact other employers in the region? The DEIS does not address these issues.

The socioeconomic analysis notes that the processing and marketing of garnet materials would result in an increase in both Alder community and county tax income. DEIS 131. Why would an increase result and in what amount? Is that increase offset by additional demands on governmental services?

The socioeconomic analysis notes that the social and economic impacts associated with the development of the proposed mine may include additional demands on governmental services and impacts on community and county facilities. DEIS 131. What are those additional demands and impacts?

The socioeconomic analysis notes that the garnet products from the proposed mine are expected to increase in value due to potential market niche shortfalls and increasing demand. DEIS 131. How was this conclusion reached? Was a market analysis performed? There is no analysis, moreover, of the potentiality that this "market niche" might decline, or what impacts might arise from any declining market.

· What responsibility does Garnet USA retain for ensuring the safety of contractors, supervising contractors' work, and ensuring contractors perform work in compliance with law.

Garnet USA's Application for an Amendment to the Current Operating Permit notes that contractors will be responsible for performing various services, including sewage handling, haul road mitigation, and facility construction. *See e.g.* Application 128, 136, 137. Will Garnet USA be responsible for the safety of contractors and the supervision and control of contractors?

12

Garnet USA's Application for an Amendment to the Current Operating Permit notes that contractors will be responsible for developing certain environmental aspects of the project, including topsoil storage, storm water control and sediment control, and dust and erosion reduction. *See e.g.* Application 91-92, 97, 137. Will Garnet USA be responsible for supervising and controlling the performance of work done by contractors, and, particularly, will Garnet USA be responsible for contractors performing work in compliance with all laws and regulations, including environmental laws and regulations?

Garnet USA's Application for an Amendment to the Current Operating Permit notes that contractors will be responsible for obtaining certain permits. *See e.g.* Application 14, 122. Will Garnet USA ensure that contractors obtain all requisite permits, and that contractors comply with all permit requirements?

XI. Reclamation

· Does Garnet USA's proposed mine plan maximize the potential success of reclamation, and do alternatives exist to the mine plan that would facilitate more successful reclamation?

The DEIS is generally silent on reclamation activities. What reclamation will be performed? Why is reclamation at the RWHR Site likely to function as proposed? DEIS 115. Are there alternative means of reclamation that might lessen future impacts?

The DEIS notes that, "[a]t closure, the disturbances would be reclaimed and the site would be restored to grazing use and wildlife habitat." DEIS 135. The DEIS further notes that "[a]fter reclamation, the RWHR Mine site would likely revert back to grazing use unless the mining is expanded." DEIS 135. There is no analysis in the DEIS of the likelihood for reclamation's success in restoring the land to grazing use. There is no ability to determine if the land is restored to wildlife habitat because a wildlife habitat study on the RWHR Site was not performed. There is no analysis in the DEIS of the time until closure, or the time it will take for reclamation to achieve success. There is no explanation in the DEIS of the potential, or scope, of expanded mining.

· Could the waste-rock stockpile be reclaimed to better contour with the natural landscape.

Garnet USA has proposed to create a 100 acre waste-rock stockpile in the west half of section 25, which will be approximately 175 feet above ground surface. During the reclamation process, the waste-rock stockpile and pit must be reclaimed or capped with soil. The final landscape appears to be a pit, and a hill that is different from the surrounding landscape. To lessen the impact to visual aesthetics of the Ruby Valley, could the construction of the waste-rock stockpile be contoured similar to the natural landscape?

13

XII. Transportation, Fluids, and Water Usage

· Traffic impacts must be addressed.

What amount of project-related traffic, including employee vehicles, employee carpool vehicles, water trucks, fuel trucks, haul trucks, road maintenance vehicles, *etc.* will travel to and from the RWHR Site per day, and what roads will be used? How will this traffic, including an assessment of the weight of the vehicles, impact the roads, local residents, and wildlife? How will the roads be maintained? What is the current condition of the roads? What is the current volume of traffic on the roads? How will road maintenance be funded, and who will perform road maintenance?

· Road improvements or realignments need clarification, and wetland impacts appear avoidable.

The DEIS suggests that “likely” actions include road improvements or realignments. *See e.g.* DEIS 27. Please provide details concerning these actions, and an analysis of potential impacts.

The Agency-Mitigated Alternative entrance haul road impacts wetlands. These impacts appear avoidable with minor, practicable changes to the alignment. *See e.g.* DEIS 33, Figure 2.6-1. In keeping with United States Army Corps of Engineers 404(B)(1) guidance or requirements of United States Army Corp of Engineers Nationwide Permits, DEQ should consider revising the proposed road alignment to avoid wetland impacts.

· Analysis of fuels, lubricants, coolants, and similar fluids, and demands on the power supply, needs to be done or expanded.

The DEIS indicates that fuels, lubricants, and coolants would be located at the RWHR Site fuel and lubricant storage area. DEIS 72. Elsewhere in the DEIS it appears to indicate that there would be no fuel storage at the RWHR Site. This requires clarification, as well as an assessment of the impacts of the storage of fluids, lubricants, or coolants at the RWHR Site, which appears to be at least a potential occurrence.

The DEIS indicates that there are no plans to exceed the 1,350 gallon storage volume that triggers a Spill Prevention, Control, and Containment (“SPCC”) plan. DEIS 73. However, the DEIS lists two 10,000 gallon diesel/fuel gasoline tanks. DEIS 74. The DEIS needs to clarify the applicability of an SPCC plan, as well as the provisions of the SPCC plan.

What accident plans will be in place for vehicles, including haul trucks and fuel trucks, and what mitigation measures will be implemented for spills at the RWHR Site, the processing plant, or on haul roads?

What amount of diesel, or other fuel, usage will arise from the proposed action?

14

It is not clear how much fuel will be stored at the RWHR Site. Is it reasonable to conclude that all trucks, generators, and other fuel dependent vehicles or machinery will be fueled only by a service truck? What size fuel tanks will the generators require, and what is their fuel usage?

The DEIS does not analyze the power demand at the RWHR Site, other than indicating it will be met with generators. *See* DEIS 126. What is the power demand? What are the sizes of the generators?

What items at the RWHR Site will require power, and what will be the power demand of those items? For example, what will be the power demand of the portable crushing and screening systems, and how will it be supplied?

· Analysis of water source and use needs to be done or expanded.

The EIS should be able to present a project water balance, and confirm the availability of water rights. Upgrades to the processing plant and the changed characteristics of mining and processing hard rock garnet suggest a significant increase in volume of water used.

The amount of water used at the RWHR Site must be analyzed. How much water will be required during operations at the RWHR Site? What operations at the RWHR Site will require water, and in what amount? Is the use of water a potential source for cross-contamination?

The amount of water used at the Alder Gulch processing plant site must be analyzed. How much water will be required during operations at the processing plant? What operations at the processing plant will require water, and in what amount? Is the use of water a potential source for cross-contamination?

Complete well data must be provided, including from geotechnical drill core holes. For example, to what depth were wells drilled? Why were those depths selected? When was water sampled? Why were those sampling times selected? How did sampling times coincide with expected groundwater levels? What was shown regarding the water table? What results were obtained for contamination (*e.g.* arsenic, asbestos, acid mine drainage potential). What mineralization was encountered? Was there test of the rock for acid generation? *See e.g.* Application 81, 35 (identifying drilling operations).

What is the level of the water table at the RWHR Site? What impact will excavation have on the water table?

For the proposed employment, the water system would likely be considered a public water supply. Please confirm that this water system is approved for public water supply purposes. DEIS 18.

15

XIII. Visual Resources, Aesthetics, and Cultural Resources

Cottonwoods along State Route 287 near the entrance to the Alder Gulch processing plant shield much of the plant buildings and machinery from the public view. DEIS 100. The Agency-Mitigated Alternative contemplates tree removal. DEIS 116. How would the Agency-Mitigated Alternative impact visual resources and aesthetics, particularly if trees are removed that previously shielded the plant buildings and machinery from public view?

The visual resources and aesthetics analysis appears to omit consideration of two important aspects of potential visual impacts, lights at night and fugitive dust. The EIS needs to address these impacts. DEIS 136.

Given traffic, diesel usage, and dust arising from the proposed actions, and recognizing its increased intensity over past activity in the area, what impacts will occur to visual resources and aesthetics in the Ruby Valley, including in the vicinity of the RWHR Site?

There is no explanation how cultural resource examinations were completed in a manner to satisfy federal and state regulations. See DEIS 87. Can DEQ's operating permit not require Garnet USA to adhere to all state and federal regulations on private land if qualified prehistoric or historic articles are encountered during operations. DEIS 130.

XIV. Buffer Zone

Garnet USA's proposed mine permit boundary does not extend east into T6S, R3W, Section 30, and any amendment to Garnet USA's Operating Permit would not preclude a third-party from mining adjacent sections, including Section 30.

Garnet USA's proposed mine permit boundary *does not* extend east into T6S, R3W, Section 30. Any excavation of ore in Section 30, ignoring whether Garnet USA could show ownership of or a legal right to mine that ore, would require, *inter alia*, a revision to the Operating Permit. See DEIS 20. Garnet USA's proposed Amendment to the Current Operating Permit does not preclude any exploration or mining activities by third parties outside the permit boundary, including in adjacent Section 30. Similarly, the only mineral resource affected by the proposed action is that "within the permit boundary." DEIS 48.

The DEIS should note, in addition to the "northern line of Section 25," that mining activities by Garnet USA could continue only until the *eastern* line of Section 25 is encountered. See DEIS 20. Similarly, the DEIS should not imply that Garnet USA should cease mining if "the rock does not contain ore-grade garnet." DEIS 20. Garnet USA must cease mining if it encounters ore, *e.g.* in Section 30, that it does not own or have the legal right to mine.

The DEIS states that all proposed activities within the permitted area are located entirely on private land owned by Garnet USA, and that mineral rights are owned, leased, or available for lease by Garnet USA. DEIS 97. It should be explained what is meant by mineral rights "available for lease by Garnet USA." To understand any impact to, *e.g.*, geology or land use, the extent of the mineral resource Garnet USA has the legal right to mine should be demonstrated.

16

Similarly, the DEIS states that "[p]roperty boundaries and surface and mineral rights holders are identified in Figure 2.4-1." DEIS 97. Figure 2.4-1 *does not* identify property boundaries and surface and mineral rights holders.¹³ A figure identifying property boundaries and surface and mineral rights must be provided to demonstrate the extent, and boundary, of potential mining.

Garnet USA's Application for an Amendment to the Current Operating Permit identifies a "project buffer" and "buffer zones." See *e.g.* Application Exhibit B, Overview Map of Three Project Sites (identifying "project buffer"); 81 (noting "buffer zones" have been included along the proposed permit boundary). This project buffer or buffer zone has no legal significance, nor does it impact at all a third-party's right to explore or mine within the project buffer or buffer zone. Not only does this project buffer or buffer zone have no legal significance, it should not be confused with, *e.g.*, buffer zones used to keep material or water runoff from leaving the proposed permit boundary, nor should it be confused with the mine permit boundary. See DEIS ES-2, 26.

XV. Miscellaneous

- The statement that "[n]itrogen compounds are common constituents of most commercial explosives used in mining" needs clarification. DEIS 35. If DEQ is aware of commercial explosives used in mining that do not contain nitrogen compounds, that should be disclosed. It should also be analyzed as a potential mitigation measure.
- How much explosives will be used? See DEIS 128.
- The DEIS should clarify the United States Army Corps of Engineers' authority to make wetlands jurisdictional determinations, and that the "jurisdictional" wetlands are potentially jurisdictional. DEIS 55.
- What are the potential secondary impacts to the wetlands nearby or the vegetation supported by the wetland hydrology. DEIS 116.
- Consideration should be given to methods to mitigate the potential spread of invasive species carried to the RWHR Site by trucks or other vehicles. DEIS 115.
- What cumulative impacts will occur to vegetation communities at the RWHR Site because of the reduced diversity of species? DEIS 115.
- What impacts will occur to the Alder Water and Sewer District wastewater facility located adjacent to the Alder Gulch processing plant? DEIS 97. Additionally, what is the current impact to surface and groundwater resulting from the wastewater facility? Future monitoring does not address adequately the potential for current and future impacts to surface and groundwater standards.
- What is the likelihood of a leak occurring in the lined ponds? DEIS 119.

¹³ Figure 2.4-1 depicts existing facilities at the Alder Gulch Processing Plant and schematic for proposed facility changes. DEIS 15.

17

· What methods will be used to monitor for the accidental discharge of objectionable materials, and what remedial action plans will be used to control and mitigate discharges, to surface or ground water?

· What are the impacts of use of the jig plant contemplated on page 98 of Garnet USA's Application for an Amendment to the Current Operating Permit?

· The DEIS notes that "[i]nitially the mining operations were anticipated to involve..." What is meant by "[i]nitially mining operations were anticipated to involve...?" See DEIS 126. Did the operation hours change? What are the operation hours of the proposed action at the Alder Gulch processing plant, at the RWHR Site, and at the RWA Site? Are the operation hours expected to change? What will cause a change in operation hours? What are the impacts of any night time operations?

· Who performed, and what constituted, the extensive analysis identified on page 8 of Garnet USA's Application for an Amendment to the Current Operating Permit?

· What is the "previously permitted quarry site" referenced on page 59 of Garnet USA's Application for an Amendment to the Current Operating Permit? Will those facilities, including water resources, be used in the proposed action?

· Page 92 of Garnet USA's Application for an Amendment to the Current Operating Permit refers to a crushing cycle, but does not define the size to be hauled to the processing plant or sorted and stockpiled. Depending on the fineness of the loads or stockpiles, what measures will be implemented to reduce dispersion?

· What purpose will the Citizen Advisory Group identified on page 138 of Garnet USA's Application for an Amendment to the Current Operating Permit serve in the future, including, for example, in minimizing public nuisance problems? What public nuisance problems, mine problems, concerns, good practices, or other mine related items have been identified by the Citizen Advisory Group, and how has Garnet USA responded to those items? What public nuisance problems are anticipated impacts of the proposed action?

· The DEIS does not analyze the data presented that indicates the possibility of historic releases of hazardous materials from the plant site. See DEIS 70, 72-74. The analysis must be done.

· Although the TCLP test has been used historically to evaluate leachate from wastes, the EIS should disclose and discuss the current EPA methods for leachate evaluation. DEIS 50.

· Why is there a low risk for acid generation by the rocks that would be mined? DEIS 50. What mineral, or other, analysis has been done of drilled core holes and what does that analysis show?

18

· Page 143 of Garnet USA's Application for an Amendment to the Current Operating Permit notes that mining activity began in the fall of 2012. What mining activity commenced in 2012?

· The DEIS should incorporate into its text the material results of all relevant studies and investigations rather than referencing studies and investigations contained elsewhere.

· The EIS should avoid implications that a decision on the application is predetermined.

Sincerely,


Charles R. Barton
Alder Gulch, LLC, Member

19

**Original Comments:
Annaliese Smail, Ryan Smail,
Mary Jo Smail, Dale Smail**

From: annaliese@gsa
To: CEO.GarnetUSA
Subject: Garnet USA comments for Record
Date: Wednesday, October 02, 2013 9:18:16 AM

Good morning, I just received a letter in the mail regarding the environmental impact by the Garnet USA mine. I live approximately 3/4 of a mile to the west of the mine in the dredge piles and I would like to inform you that the noise is horrendous during the day while they are 'crushing/processing'. Also, please note approximately 3 weeks ago when the wind was blowing East to West our property was completely under a cloud of dust resulting from activity from the mine.

I appreciate the fact they are providing jobs for the community, but when its the local community that is also suffering environmentally because of the mine activities, how is that a positive thing?

I cannot see any logical reason why they haul the materials down to the main plant to crush when they could move the crushing activity up to the pit they are pulling the materials are out of. This would reduce a number of the NEGATIVE environmental effects that are occurring.

Our family and legal support are watching this process closely as we feel if things don't change it may require an action by the community to move things in a more positive direction environmentally.

Thank-you for your time

Annaliese Smail
Ryan Smail
Mary Jo Smail
Dale Smail

Original Comments: Doris Fischer

From: [Dora Fischer](#)
To: [GEO.GarnetUSA](#)
CC: [Dora Fischer](#); [Dora Fischer](#)
Subject: Draft EIS
Date: Monday, October 21, 2013 9:30:34 AM

To Jeffrey Hensick and others at DEQ involved in the Garnet USA project review:

I appreciate the information provided at the recent public meeting in Alder.

My interest is in seeing mining occur in the Alder area in a way that will not degrade neighborhood quality of life or the irreplaceable natural resources of water quality, fisheries, wildlife habitats and wildlife populations. I'm sure that is your interest, and believe that is Garnet USA's interest as well.

It appears that the Garnet USA and MT DEQ have been responsive to the transportation concerns of neighborhood residents, as well as water quality concerns. I applauded the decision to add more water quality monitoring wells, both at the mining site and processing plant.

I suggest MT DEQ and mining companies it deals with for exploration or mineral extraction anywhere in Montana use MT FWP's electronic mapping service known as the Critical Areas Planning System, or CAPS, as a science-based reference supporting the earliest stages of development planning and environmental review: <http://ftp.mt.gov/mt/fwp/fish/wildlife/conservation/ActionCriticalAreas.html>. CAPS is intended to help private landowners, developers, and permitting agencies with preliminary information re: the fish and wildlife resources in areas where land use changes are contemplated. Use of CAPS should then always be followed up by direct contact with the FWP area fisheries and wildlife biologist.

In the case of the proposed Red Wash Hard Rock mining site (piv 25 of T65-R46), CAPS suggests - as does the draft EIS - that there is no high-value fisheries habitat in the project area. A communication to FWP area fisheries biologist Matt Jaeger might verify and possibly strengthen the EIS conclusion. His email address is mjaeger@mt.gov.

CAPS also suggests there may be high-value elk and mule deer winter range in Section 25. Dean Walter is the new FWP wildlife biologist for this part of Madison County, and you may want to check with him for further information about potential impacts of the mining operation on big game and public hunting. Oh, since Dean is new to the Ruby Valley (and a very busy hunting season is about to begin), you might contact Howard Bhatt who is the FWP Region 3 regional wildlife manager based in Bozeman. Their contact information is: dwalter@mt.gov and hbhatt@mt.gov.

I appreciate your diligence in checking with Craig Fager and Catherine Wightman of FWP re: presence of sage-grouse in the area. FWP's nongame biologist for Region 3 is Claire Goveer, and she may be helpful in affirming the draft EIS conclusions regarding the presence of other avian species and how they might be affected by the proposed new mining activity in Section 25. Her email address is cgoveer@mt.gov.

I was pleased to hear about the existence of a community action committee to help promote information exchange and good relations between the company and local residents. To my knowledge, a CAC is not a permittee requirement but I commend Garnet USA for being proactive in this regard.

I was puzzled by the lack of agency or public comments in the draft EIS document. If in fact there were comments submitted during scoping and leading up to the draft EIS release, I suggest those comments should have been included.

Thanks for the opportunity to comment.

Doris Fischer
P.O. Box 584
Sheridan, MT 59749
(406) 842-7161

Original Comments:

**Mike Tierney
Montana Department of
Transportation,
Program and Performance
Analysis Bureau**



