Preliminary Design Report
Iron Mountain Mine
Matheson Site Final Restoration

PREPARED FOR: Rick Sugarek/EPA
PREPARED BY: Dale Cannon/CH2M HILL
John Spitzley/CH2M HILL
Jack Woo/CH2M HILL

EPA WA: 056-RD-RD-0917
DATE: July 3, 2001

Project Description

This technical memorandum presents the preliminary design report for the removal of the pyritic waste material and restoration of the Matheson Site near the Iron Mountain Mine (IMM) Superfund Site northwest of Redding, California. The site is located adjacent to the Sacramento River at a location owned and managed by the U.S. Bureau of Reclamation (USBR) and designated by the U.S. Bureau of Land Management (BLM) for public access to the Sacramento River and a new river trail that will extend from Keswick Dam to Shasta Dam.

CH2M HILL completed this Work for the U.S. Environmental Protection Agency (EPA) under the EPA RAC VI contract, Work Assignment 056. The project includes excavation and removal of the pyritic waste, demolition of the existing concrete structures, collection and disposal of debris, final site grading, replacement of road and trail surfacing, and reseeding of the site.

Background

Between 1920 and 1923, Mountain Copper Company constructed facilities on the Matheson Site to store and transfer pyrite ore from IMM to Southern Pacific Railroad rail cars. An aerial tramway conveyed the ore a distance of approximately 4 miles from Iron Mountain to the Matheson Site. The Matheson Site included ore bunkers, a tram terminal, main-line railroad sidings, a stockpile area, and warehouses. Historical documents show that the site was used through the 1950s, except during construction of a new railroad line after operation of Keswick Dam flooded the original line. The rail line has since been replaced by BLM's river trail system.

Previous site investigations have been conducted by Morrison Knudsen Corporation (MK) for Stauffer Management Company (SMC) in 1994, and by USBR in 1995. These
investigations are described in detail in the Data Evaluation Report, Existing Conditions at Iron Mountain Mine Matheson Site, dated June 20, 2001.

Introduction

This report addresses the preliminary design components for pyritic waste removal and restoration of the Matheson Site:

1. Design Criteria
2. Project Delivery Strategy
3. Project Construction Scheduling
4. Specifications Outline
5. Preliminary Design Drawings
6. Basis of Design
7. Preliminary Cost Estimate
8. Compliance with ARARs
9. Land Acquisition/ Easement Requirements

1.0 Design Criteria

1.1 Waste Characterization

The types of material to be removed include pyritic waste, concrete, and miscellaneous debris.

1.1.1 Pyritic Waste

Pyritic material exists throughout the site, on the surface and with depth. Bedrock is the underlying boundary for the pyritic material. The thickness of the pyritic material in the northern half of the site is approximately 2 to 3 feet. Near the retaining walls and bunkers, the thickness of the pyritic material is the greatest, ranging from 5 to 7 feet from ground surface. The southwest corner of the site contains a 2-foot-thick lens of pyritic material at depths ranging from 3 to 9 feet below the surface. The southern portion of the site also has a rock veneer on the surface that requires cleanup. Pyritic material was observed on the surface near the remains of the scale/vault along the old railroad bed.

The Matheson Site is located between two drainage ditches. Investigation in the north gully did not reveal pyritic material, but pyritic material mixed with native material down to a depth of 6 feet was observed in a test pit immediately south of the gully, within the drainage path. A sample from this test pit exceeded state regulatory standards for arsenic, copper, and lead. MK’s investigation in the gully showed a seam of pyritic material between 3 and 4 feet below ground surface. The bunkers, vaults, and culverts all contain pyritic waste materials.

The presence of pyritic material in the south gully was observed to a depth of 2 feet. A sample collected at a depth of 4 feet exceeded the state regulatory standard for copper. Material will be removed to this depth. During MK’s investigation, pyritic material was observed to a depth of 4 feet. The oil seam noted in MK’s investigation was not observed in CH2M HILL’s test pit.
Pyritic material was also observed outside of the primary Matheson Site loading area at what appeared to be isolated locations:

- Approximately 300 feet west of the site along the western access road.
- In a berm on the east side of the river trail north of the center culvert.
- South of the intersection of the county access road and the river trail along the west side of the river trail. There were no test pits excavated in the path of the river trail because of safety issues. Pyritic material was observed mixed with the native soil on the surface of the river trail.
- Below the discharge end of the center culvert. The pyritic material appeared to form a delta from the end of the culvert out into Keswick Reservoir. The extent of the pyritic waste deposits in Keswick Reservoir was not determined. Because pyritic material was found in the south drainage gully immediately upstream from the culvert, it is assumed that pyritic material has also drained through that culvert and is deposited in the sediment accumulated in the culvert and below the culvert outlet into Keswick Reservoir. Silt deposits fill the south culvert and part of the center culvert. The north culvert was clean of sediment.

1.1.2 Concrete Structures

Abandoned concrete structures exist throughout the site. Examples are shown on the Preliminary Design Drawings, Sheets 5, 6, and 7. The Preliminary Design Drawings are included in Appendix A. The concrete structures include retaining walls, bunkers, vaults, foundations, equipment pads, supports, and other concrete structures of various sizes and shapes. The bunkers and vaults are partially buried. Several buildings and structures had been located within the immediately vicinity of the loading facilities, but these appear to have been removed as they were not found during recent site visits. Some of the retaining walls appear to have been poured against the cut slopes; the widths of these walls are probably not uniform. Reinforcing used in the retaining walls included old drill bits and rock bolts as well as standard reinforcing steel. The concrete walls are cracked in many locations, and they are covered with graffiti. Vault openings are approximately 3-feet-square. The vaults contain pyritic waste material that will be removed and hauled to the disposal cell. The tops of the vaults will probably be demolished to remove the waste material contained in the vaults.

1.1.3 Miscellaneous Debris

Trash and debris are scattered throughout and beyond the site. This includes wood products, tires, bed mattresses, steel cables, steel anchors, corrugated metal, cans, bottles, and miscellaneous items. Some debris is partially buried and it is likely that additional debris that is totally buried will be exposed during the removal of the pyritic waste material. Cables from the abandoned tramway extend up the slope beyond the boundaries of the cleanup and restoration remedial activities. Towers for the tramway remain upslope from the Matheson Site. Some cables are still draped over the towers. These are outside of the Matheson Site cleanup and restoration boundaries and will not be demolished as part of the Matheson Site restoration.
1.2 Quantity of Materials

1.2.1 Pyritic Waste Material

The locations of the test pits and thicknesses of the pyritic material were input into a digital terrain model (DTM) of the site using a software package called Inroads. The depth to pyrite was interpolated between each test pit and a surface generated. The resulting surface was used to calculate the approximate volume of pyritic material present at the site and the amount that would have to be excavated and hauled to the disposal cell. The volume of pyritic material within the boundaries of the test pits is approximately 13,000 cubic yards. An additional 1,000 cubic yards of material was estimated for three locations outside of the test pit boundaries. In addition, pyritic waste deposits were found below the discharge ends of the center and south culverts extending out into Keswick Reservoir. An estimated amount of 1,000 cubic yards of waste material was calculated assuming a delta with a bottom length of 100 feet, a depth of 10 feet, and a length along the center of the delta of 25 feet for each of the center and south culverts. A reassessment of the quantity of material within the reservoir will be made during the Matheson Site restoration. Material in excess of the 1,000 cubic yards will be included in the cleanup of the Spring Creek arm of Keswick Reservoir.

The volume of pyritic waste material is based on MK's field investigations, and recent CH2M HILL test pit excavations and site observations. Because of the highly variable depths of contaminated material deposits on the site, the estimate could be understated, and a 20 percent contingency was added to the estimate. The total estimated volume of pyritic waste material and sediment to be removed and hauled to the disposal cell including the 20 percent contingency is 18,000 cubic yards.

1.2.2 Concrete Structures

The concrete structures will be removed, demolished, and disposed of in a concrete disposal area. The amount of concrete estimated by MK in their site investigation was 640 cubic yards. Dimensions of aboveground structures were measured in the data evaluation study and MK's estimates were verified. However, MK did not include removal of a scale/vault located in the old railroad bed or a concrete slab that was once used for a water tank. CH2M HILL increased the quantity estimate to 845 cubic yards following preliminary analysis of the site restoration. This estimate included a 30 percent contingency factor because of the uncertainty in the dimensions of buried concrete and the possibility of other unknown underground concrete structures. The 845-cubic-yard estimate will be used in this report.

1.2.3 Miscellaneous Trash and Debris

Debris such as cables, metal beams, timbers, railroad ties, structural steel members, tires, bedsprings, and trash are spread throughout the site. Cleanup of this debris will be included in the restoration of the site. It is difficult to quantify this material. A site visit by the prospective bidders would be necessary for their understanding of the quantity and types of material and the effort of cleanup and disposal. Partially buried debris will be extracted or will be exposed to a depth of 3 feet below the final finished grade where it will be severed and removed. The excavation will then be backfilled to bury the residual debris. Cables will
be severed at the limits of the cleanup and restoration site and the cables inside the limits will be removed and those outside will remain in place.

1.3 Performance Standards

Once the site is graded and seeded, only minimal maintenance will be needed. Erosion will be minimized but the culverts may need to be cleaned occasionally. Monitoring will be conducted to ensure that no erosion is occurring and that the vegetation is growing. It is assumed that there will be minimal monitoring and maintenance of the site once the vegetation becomes established.

1.3.1 Long-term Performance Monitoring and Maintenance

Periodic inspection and cleaning of the culverts should be conducted, when necessary, as part of the Sacramento River Trail maintenance program to ensure full carrying capacity is maintained. It is assumed that the culverts will be turned over to BLM to maintain as part of the river trail system.

1.3.2 Compliance with Codes and Standards

The Work shall comply with USBR requirements. State and local regulations regarding environmental protection of land, air, and water resources will be followed. The construction contractor will be required to prepare plans and comply with those plans for the control of dust, sediment, and surface water runoff, and for the removal and hauling of waste materials. The construction contractor also will be required to obtain and comply with all permits.

1.3.3 Technical Factors

Site Access

The site can be accessed by vehicular traffic from Iron Mountain Road via a county road or via the Sacramento River Trail next to the Keswick Reservoir boat ramp. Iron Mountain Road is paved to the Minnesota Flats Treatment Plant. The county road from Iron Mountain Road to the Matheson Site is relatively steep and not well maintained. Parts of the road had been surfaced with oil mat or asphalt paving, but for the most part, the surfacing is gone. What remains is highly raveled and broken. The roadway has a mixed dirt/gravel layer and is rutted and potholed. No signs are posted along the road. It is assumed that the county road would be used to haul pyritic waste material to the disposal cell at IMM. The steep grades will limit the speed of loaded trucks. Sight distances are poor and the roadway is relatively narrow with few turnouts. Communications between trucks is suggested for safety.

Drainage ditches have not been well maintained and many are full. The road will be graded, drainage improved, and culverts in poor conditions will be replaced once work has been completed. The construction contractor will be required to obtain a permit from the County to use the road. The road will be regraded and resurfaced with a ¾-inch minus aggregate base after completion of the work at the Matheson Site.

The river trail is an alternate route to access the Matheson Site, but this route should be considered only if the loaded trucks cannot climb the steep grades on the county road. The river trail can be accessed at the Keswick Reservoir boat launch located approximately
3.1 miles south of the site. The trail was recently converted to a hiking/equestrian trail and was resurfaced with a 10-foot-wide, 6-inch-thick layer of 3/8-inch minus crushed rock from the Keswick Reservoir boat launch to a gate just south of the Matheson Site. If the river trail is used for truck and equipment access to and from the site, then it would need to be regraded and resurfaced after the completion of the Matheson Site restoration.

Site Preparation
The limits for cleanup and restoration are shown on Sheet 3 of the Preliminary Design Drawings. Exposed trash and debris, such as cables, bedsprings, old tires, rubbish, and similar items scattered around the Matheson Site and within limits of the site cleanup and restoration, will be gathered up and hauled to a landfill. Debris that is buried or in thickly vegetated areas and not readily visible will not be removed unless it is uncovered during the removal of the waste material or the demolition of the concrete. Partially buried debris will be extracted or exposed to a depth of 3 feet below the estimated finished grade and then severed. The excavation will then be backfilled to bury the residual debris. Timbers and other wood products scattered around the site in the contaminated areas will be removed and hauled to a disposal location on the IMM property. Railroad ties in uncontaminated soils will be salvaged or disposed of by the contractor at an approved landfill.

Removal of Pyritic Waste Materials
Pyrite-contaminated materials will be hauled offsite to a new disposal cell on the IMM site. It is assumed that the disposal cell will be near the temporary treatment plant site near the junction of Iron Mountain Road with the Jeep Road. The cell will be prepared by the contractor for disposal of the estimated 18,000 cubic yards of pyritic waste materials and sediment. In concept, the disposal cell would include an 18-inch underdrain system for intercepting and collecting incidental groundwater, a bottom liner consisting of 24 inches of decomposed granite, a geosynthetic liner placed over the pyritic waste, a 40-ml membrane liner, and a 24-inch decomposed granite cap. The design drawings and specifications will be finalized after the specific site is identified.

The contractor will be required to prepare an excavation, haul, and disposal plan for the pyritic waste cleanup. At a minimum, the plan will contain procedures and methods for handling the hazardous material, including personal health and safety. The contractor will be required to have sediment and surface water controls in place prior to starting the excavation. Trucks used for hauling the material will not be permitted to drive over the waste material and the contractor will be required to remove material spilled on the trucks during loading and dumping before driving away from the loading or disposal site. Final cleanup will be by flat-bladed excavating or loading equipment supplemented by manual cleanup with flat-bladed shovels.

Demolition
Concrete retaining walls, vaults, and bunkers to a depth of 3 feet below the final surface, foundations, supports, equipment pads, and other concrete structures will be demolished and disposed of in a prepared fill located in the south gully. The disposal site will be stripped of vegetation and grubbed. The vegetation will be stockpiled and dried for later burning onsite. Uncontaminated dirt will be removed and stockpiled for future use in filling the voids and placing a cap over the concrete rubble. Concrete will be broken up into pieces no larger than 12 inches in the maximum dimension and mixed with dirt or imported decomposed granite and deposited in the disposal area. The concrete rubble will be placed
in 12-inch lifts and compacted by a minimum of four passes with a 10-ton sheepsfoot or vibratory roller. The concrete rubble will be covered with a minimum of 24 inches of decomposed granite. The decomposed granite will be hauled from a borrow source near the entrance gate to the IMM site. The construction specifications will require that all exposed reinforcing steel be removed flush with the concrete face to eliminate potential safety hazards. The removed reinforcing steel will be hauled offsite to a landfill. The disposal area will then be graded to drain surface water. It is anticipated that it will be used for a future parking lot as part of the facilities for the river trail.

Hydrology
The Matheson Site comprises an area of approximately 3 acres. The site drains to one of two drainages that drain larger basins. The north drainage basin contains approximately 19 acres and the south drainage basin contains approximately 44 acres. These watersheds drain to Keswick Reservoir. The reservoir has a normal water surface elevation of approximately 581 feet above mean sea level (msl). The elevation at the top of the watersheds is approximately 1,250 feet above msl. Drainage is generally from west to east. The watersheds drain in open channels except where they cross an access road on the west side of the site and where they cross beneath the railroad bed in culverts. The culvert conveying the drainage across the railroad bed on the north side of the site is 36 inches in diameter. The bottom of the north culvert at the upstream end was completely eroded. The ends of the culvert on the south side of the Matheson Site were covered with vegetation. This culvert appeared to be a concrete box culvert but both ends of the culvert were completely filled to the top with sediment so that the type and size could not be determined.

The amount of runoff was determined from an analysis of the basins and rainfall intensity duration curves for the area. The criteria previously used for the design of drainage systems on IMM were used to determine runoff and to size culverts. A summary of the criteria and the analysis is included in Appendix B. No changes will be made to the existing drainage channels upstream from the Matheson Site; however, the drainage ditches immediately upstream from the entrance to the culverts will be cleaned of silt and debris and waste material. Pyrite-contaminated materials will be hauled to the disposal cell. The south gully will be prepared and filled with a mixture of broken concrete from the site demolition and clean, excavated material from the site or from a borrow source on the IMM site. The concrete disposal area will be graded for a future parking lot.

The non-rocky areas in the loading area will be seeded with a grass seed mixture similar to that used at other locations on the IMM site, and the banks will be covered with straw mulch. Culverts crossing the railroad bed will be sized to convey the peak discharge from the 100-year design storm using Antecedent Moisture Condition (AMC) III. The peak discharge will be computed using the modified rational formula provided in the Shasta County design manual. The runoff coefficient used in the formula will be estimated according to the soil and surface cover conditions and the watershed slope. No new headwall or end wall is assumed; the existing head wall at the end of the center culvert will be reused.

New culverts are required because of inadequate size or condition of the existing culverts. New corrugated metal pipe culverts will be placed in the same general location as the culverts that now exist, but the south culvert will be extended beyond the concrete disposal
Decomposed granite will be specified for bedding and backfill around and over the culverts.

The discharge end of the existing south culvert is below the normal Keswick Reservoir water surface elevation. The invert of the upstream end of the existing culvert may also be lower than the normal water surface elevation. This will result in water backing up from the reservoir and could cause silt to settle either in the culvert or upstream from the head end of the culverts. Periodic cleaning will be necessary to maintain full capacity. Another alternative to minimize the amount of silting is to raise the level of the discharge end of the new culvert above the normal level of Keswick Reservoir.

Site Grading
After the contaminated material is removed from the site and the concrete demolished and removed to the disposal cell, the land will be finish-graded to drain and to blend into the surrounding terrain. Depressions will be filled and the ground behind the concrete retaining walls will be dressed up after the concrete is removed. The concrete disposal area will be compacted in lifts by four passes of a 10-ton sheepsfoot or vibratory roller. The disposal area will be capped with 24 inches of decomposed granite imported from the borrow source just inside the gate to IMM. The area, proposed for the future parking lot, will be graded at a 2 percent slope for drainage but it will not be surfaced. No fences, gates, or signs are included as part of this project.

Seeding
The graded areas will be seeded with a seed mixture used at other sites on IMM. Cut slopes and rock outcropping areas will not be seeded. The areas to be seeded will be prepared by loosening the top 1 to 3 inches of soil. Fertilizer and lime will be applied and mixed into the top 6 inches of soil. Straw mulch will be spread over the seeded areas.

2.0 Project Delivery Strategy

The project delivery strategy and schedule for completing the Matheson Site remediation work is limited to the disposal cell design and siting and project funding. It is anticipated that the proposed disposal cell location will not be available for development until early 2003. Once the disposal cell is constructed, the Matheson Site work can commence.

The preliminary design drawings and technical specifications are included with this Preliminary Design Report for EPA review. Comments will be solicited and CH2M HILL will respond to each comment indicating if a design change will result from the comment and the impact of the change to the selected remedy. In the final design stage, any recommended changes will be incorporated. The final technical specifications will conform to the “front-end” contract documents of the lead group taking charge of the remediation work.

3.0 Project Construction Scheduling

At this time, it is anticipated that a disposal cell location at IMM will not be available for development until 2003. Even though a time allowance is included for the preparation of the disposal cell, the schedule may need to be adjusted after the location of the cell and the
extent of work are known. The estimated number of workdays for each task is shown in Table 1.

<table>
<thead>
<tr>
<th>Task Description</th>
<th>Estimated Workdays</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobilization</td>
<td>15 workdays</td>
</tr>
<tr>
<td>Site Preparation (prepare access road, sediment and surface water controls – pick up and disposal of trash and debris)</td>
<td>10 workdays</td>
</tr>
<tr>
<td>Prepare Disposal Cell</td>
<td>20 workdays</td>
</tr>
<tr>
<td>Excavate and haul waste material</td>
<td>50 workdays</td>
</tr>
<tr>
<td>Demolish and dispose of concrete</td>
<td>40 workdays</td>
</tr>
<tr>
<td>Site grading, resurfacing, seeding</td>
<td>10 workdays</td>
</tr>
<tr>
<td>Final cleanup and demobilization</td>
<td>5 workdays</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>150 workdays</strong></td>
</tr>
</tbody>
</table>

Some of tasks will overlap so the total amount of time for the project will be less than the total time of the individual tasks. It is estimated that the entire project will take approximately 7 calendar months to complete.

### 4.0 Specifications Outline

The following outline of technical specifications will be used for the cleanup and restoration of the Matheson Site.

- 01010 – Summary of Work
- 01025 – Measurement and Payment
- 01300 - Submittals
- 01500 – Construction Facilities and Temporary Controls
- 01510 – Environmental Protection Plan
- 01780 – Contract Closeout
- 02100 – Site Preparation
  - This section describes the requirements for grubbing and clearing, and removal of the miscellaneous trash and debris scattered throughout the site.
- 02200 – Earthwork
  - This section describes the requirements for removal of the pyritic waste material and hauling offsite to a disposal cell. Placing and compacting concrete rubble and fill materials, furnishing and installing culverts, final grading, and safety issues are also included in this specification section.
02220 – Demolition

- This section describes the requirements for demolition of the concrete structures and removal of the reinforcing steel. It is assumed that the concrete can be scraped clean of any residual waste material and used as fill in the south gully.

02271 – Sediment and Surface Water Runoff Controls

02935 – Seeding

- This section describes the requirements for seeding disturbed areas on the site.

The specifications are included in Appendix C.

5.0 Preliminary Design Drawings

The Preliminary Design Drawings are included in Appendix A of this document. They are listed below:

- Drawing G-1, Sheet 1. A general site map showing site access and the location of the Matheson Site in relation to IMM.
- Drawing C-1, Sheet 2. A topographic map showing the existing site plan.
- Drawing C-2, Sheet 3. A topographic map showing the site cleanup and restoration limits.
- Drawing C-3, Sheet 4. A topographic map that shows the approximate contour locations after excavation and demolition are completed.
- Drawing C-4, Sheet 5. An aerial photo showing the concrete structures, reference locations, and direction of surface photographs showing examples of concrete structures to be demolished.
- Drawings C-5 and C-6, Sheets 6 and 7. Two drawings showing photographic examples of concrete structures to be demolished.
- Drawing C-7, Sheet 8. A site grading plan showing new drainage ditches, new culverts, and the concrete rubble disposal cell.
- Drawing C-8, Sheet 9. A detail drawing showing bedding and backfill around the culverts, drainage ditch sections, and a cross section of the developed parking area.
- Drawing C-9, Sheet 10. A detail map showing the locations of the existing culverts along the county road from the Matheson Site boundary to Iron Mountain Road.

6.0 Basis of Design

This Basis of Design section details the evaluations conducted to select the design approach for the Matheson Site restoration.
For the data evaluation of existing conditions, the following activities were conducted:

- Site reconnaissance to determine site access, evaluate drainage conditions, determine the extent of debris and concrete structures, scope potential areas for a future parking lot, evaluate potential borrow sources, and conduct a culvert investigation.
- A subsurface investigation to determine the location and extent of pyritic materials at the site.

The data obtained during the existing data review and field exploration were compiled and analyzed. A summary of the results is presented below.

6.1 Problem Statement

Currently, the Matheson Site sits abandoned. The site has been used as a “hang-out” for vagrants, graffiti covers all of the concrete walls, and trash and debris are scattered throughout the site. The Sacramento River Trail is being developed from Keswick Dam to Shasta Dam and includes the portion passing through the Matheson Site. The land is owned by USBR, but BLM will manage the river trail.

6.2 Summary of Volumes of Materials

The following volumes of material will be included in the cleanup and restoration of the Matheson Site:

- Pyritic waste material: 18,000 cubic yards (approximate)
- Concrete: 845 cubic yards (approximate)
- Miscellaneous trash and debris: Variable
- Aggregate base material (3/4-inch minus crushed rock): 3,400 tons
- Crushed rock surfacing (3/8-inch minus crushed rock): 600 tons
- Imported decomposed granite for concrete disposal cell cap and backfill around culverts: 2,100 cubic yards

6.3 Removal and Disposal of Debris

6.3.1 Characterization

- The debris includes such items as cables, metal beams, anchors, timbers, tires, bedsprings, and trash.

6.3.2 Location

- Debris is scattered throughout the site and outside the boundaries of the cleanup and restoration area.
6.3.3 Method of Debris Removal

- Debris outside the limits of the cleanup and restoration boundaries will not be removed.
- Debris that is buried or in thick, vegetated areas and not readily visual will not be removed.
- Partially buried debris will be exposed to a depth of 3 feet, severed, and removed. The excavation will then be backfilled to cover the residual debris.
- Metal debris will be hauled to a recycling center or an approved landfill. The contractor will be required to conform to all regulations regarding the hauling and disposal of materials that could be contaminated by chemicals. The contractor will pay all disposal costs and will retain any recycling monies.
- Rails and railroad ties in the railroad bed will be removed. The rails and ties will be taken for recycling or disposed of at an approved landfill. The contractor will pay disposal costs and retain all recycling monies.
- Wood products in the contaminated areas will be hauled to an IMM site for disposal. Wood products that are not within contaminated area will be recycled, burned onsite, or disposed of at an approved landfill.
- All other debris will be hauled to an approved landfill.

6.4 Removal and Disposal of Pyrite-Contaminated Material

Please refer to the Data Evaluation Report for a detailed discussion of the pyritic waste investigation. A summary is presented here.

6.4.1 Characterization

- The pyritic waste material is similar to a loose sand and is gray in color. The depth of pyrite is highly variable throughout the site. In some areas it is visible in layers and in other areas it is mixed in with the native soil.

6.4.2 Location

- The pyritic material is spread over an area of approximately 3 acres. Pyrite had been dumped in one isolated location in a pile approximately 300 feet west of the site, and in two isolated areas along the river trail. Additional pyritic waste material is expected to be found in the concrete structures, and under and within the culverts. Pyritic waste material was also observed below the discharge end of two of the culverts. This material extends out into Keswick Reservoir. The pyritic waste material will be excavated and hauled to a disposal cell near the temporary treatment plant at IMM.

6.4.3 Method of Removal

- Preparation of a health and safety plan
  - A health and safety plan is required during the removal of the pyritic material to minimize exposure to contaminants, such as arsenic and lead, contained in the pyritic waste material. Because the river trail runs adjacent to the site, public safety must also be addressed to prohibit unauthorized entry during construction.
The site work will be covered by state or federal Hazardous Waste Operations and Emergency Response (Hazwoper) standards and therefore requires training and medical monitoring. Anticipated Hazwoper tasks might occur consecutively or concurrently with respect to non-Hazwoper tasks. Non-Hazwoper-trained personnel must also be trained in accordance with all other state and federal Occupational Safety and Health Administration (OSHA) requirements.

- Vegetation in the south gully will be cleared to remove pyritic waste material. The vegetation will be stockpiled and dried for burning onsite.

- Hauling trucks will use the county access road to haul the pyritic material up to a designated waste disposal cell near the temporary treatment plant. Alternatively, haul trucks could use the river trail.
  - The material in the trucks will be covered with a tarp to minimize dust and dirt during transport. The haul trucks will be cleaned after they are loaded with pyritic material and again after the material is dumped at the disposal cell.
  - On the return of the haul trucks to the Matheson Site, they could be loaded with decomposed granite from the borrow source. The decomposed granite could be stockpiled until it was needed for the concrete disposal or the bedding around the culverts.
  - The haul road will be graded and resurfaced with 3/4-inch minus imported aggregate base material after hauling is complete.

6.5 Removal and Disposal of Concrete Materials

6.5.1 Characterization

Concrete footings, retaining walls, bunkers, vaults, equipment pads, and other miscellaneous concrete structures are evident on the site.

6.5.2 Location

- The area of visible concrete is shown on Drawings C-4 through C-6, Sheets 5 through 7. It is probable that more concrete is buried underneath the surface and not visible.

6.5.3 Method of Removal

- The tops of concrete vaults will be opened and pyritic material contained in bunkers or vaults will be removed.

- Concrete surfaces will be scraped clean with flat-bladed shovels or with a flat-bladed bucket of a backhoe/excavator.

- The concrete will be broken into pieces no greater than 12 inches in one dimension. The reinforcing steel will be removed or cut flush with the face of each concrete piece.

- Concrete will be disposed of in the area of the south gully after the existing culvert has been removed and replaced with a new culvert.
• The concrete will be dusted with lime during placement in the south gully. Decomposed granite will also be added with the concrete to fill the voids.

• The concrete/decomposed granite fill will be capped with 2 feet of compacted decomposed granite.

• The decomposed granite will be hauled from a borrow source at the IMM site located just past the main gate.

• Temporary drainage erosion control will be installed during installation of the culverts. This will involve placement of sandbags and/or a liner on the downstream end of the culverts to isolate them from Keswick Reservoir.

### 6.6 Drainage

• All existing culverts will be removed. Three existing culverts convey drainage across the river trail from the site. These are in the north and south gullies and near the scale/vault. Also, an existing culvert conveys water across a dirt road on the western side of the Matheson Site. The existing culverts are full or partially full of sediments and in poor condition.

• The contractor will furnish and install new corrugated metal pipe (CMP) culverts in the approximate location of the existing culverts. The new culvert in the south gully will extend beyond the area proposed for concrete fill and the potential parking area. During installation, water will be temporarily diverted around the south gully. The discharge end of the south culvert may be raised to minimize the amount of water backing up from Keswick Reservoir causing silt to settle in the culvert.

• Pyritic material may be found underneath some of the culverts and will be excavated and removed to the waste disposal cell on IMM.

• Decomposed granite will be used for bedding and backfill around the culverts.

• Culverts on the county road that become damaged as a result of the hauling will be replaced. The locations of these culverts are shown on Drawing C-9, Sheet 10.

### 6.7 Final Grading and Seeding

• Any holes remaining at the site after excavation and demolition will be filled.

• Finish-grading will involve grading the site to blend in with the existing topography.

• Non-rock exposed areas will be seeded. The areas to be seeded will be determined after the removal of the waste and the concrete structures and the final grading. Payment for seeding will be at a unit price per square foot. The areas will be seeded with a seed mixture used at other sites on IMM. The seed mix will include:
  - Fescue “zorro” annual
  - Fescue “scaldis durar” or “covar”
  - Delar “small burnet”
  - Rose clover
Slopes will be covered with straw mulch.

Maintenance of the seeded areas will continue for one year or until the vegetation becomes established, whichever is sooner.

### 7.0 Preliminary Cost Estimate

The preliminary cost estimate is shown in Table 2. The estimate includes costs for preparation of a disposal cell but the details of the disposal cell are unknown. Quantities of pyritic waste material contain a contingency factor of 20 percent because of the variable depths of the material on the site and the unknown depths of material in the south gully.

### 8.0 Compliance with ARARs

The Matheson Site served as a loadout facility for pyrite ore from Iron Mountain Mine. The approximately 3-acre site contains scattered piles with highly variable metals concentrations. Surface runoff from the site enters Keswick Reservoir via several culverts and through overland flow across the former railroad bed. Testing performed on the pyrite piles indicates that it provides a threat to water quality in Keswick Reservoir and the Sacramento River. The railroad bed has also been opened to public access as a trail, which extends from the Keswick Reservoir boat ramp approximately 3.1 miles south of the Matheson Site to the base of Shasta Dam, approximately 4 miles north of the Matheson Site. Exposure of persons on the trail to dust and direct contact with the pyrite ore is also of concern.

Applicable Relevant and Appropriate Requirements (ARARs) specific to the Matheson Site have not been developed; however, the ARARs developed for IMM are considered valid in application to the Matheson Site with the addition of exposure to people on the river trail. The remedial action includes the following:

- Removal of the contaminated soil and rock
- Removal of sediments from onsite depressions
- Replacement of culverts
- Onsite disposal of concrete rubble and offsite disposal of the pyrite ore at a secure disposal cell on the IMM site
- Upon completion of the work, the site will be contoured and the trail covered with imported gravel

Reference is made to ARARs developed for the Waste Management Feasibility Study, June 1994, and the Record of Decision for Boulder Creek Operable Unit, September 30, 1992. By removing the pyrite ore and other contaminated materials, the Matheson remedial action will comply with current ARARs for the site.
**TABLE 2**  
Cost Estimate  
*Matheson Site Cleanup and Restoration*

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Quantity</th>
<th>Units</th>
<th>Unit Price</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mobilization, Demobilization, Bonds, Insurance</td>
<td>1</td>
<td>LS</td>
<td>$20,000</td>
<td>$20,000</td>
</tr>
<tr>
<td>2</td>
<td>Rubbish and Cable removal from site</td>
<td>1</td>
<td>LS</td>
<td>$10,000</td>
<td>$10,000</td>
</tr>
<tr>
<td>3</td>
<td>Clear and Grub pyrite disposal Cell Footprint</td>
<td>1.25</td>
<td>acre</td>
<td>$10,000</td>
<td>$12,500</td>
</tr>
<tr>
<td>4</td>
<td>Clear and Grub Concrete fill Footprint</td>
<td>0.15</td>
<td>acre</td>
<td>$10,000</td>
<td>$1,500</td>
</tr>
<tr>
<td>5</td>
<td>Construct roadway access</td>
<td>500</td>
<td>feet</td>
<td>$50</td>
<td>$25,000</td>
</tr>
<tr>
<td>6</td>
<td>Prepare waste cell footprint</td>
<td>3227</td>
<td>cu yd</td>
<td>$7</td>
<td>$22,589</td>
</tr>
<tr>
<td>7</td>
<td>Place gravel underdrain</td>
<td>2420</td>
<td>cu yd</td>
<td>$35</td>
<td>$84,700</td>
</tr>
<tr>
<td>8</td>
<td>Place 24-inch decomposed granite liner</td>
<td>3227</td>
<td>cu yd</td>
<td>$16</td>
<td>$51,632</td>
</tr>
<tr>
<td>9</td>
<td>Place 40 ml HDPE liner</td>
<td>43560</td>
<td>sq - feet</td>
<td>$0.75</td>
<td>$32,670</td>
</tr>
<tr>
<td>10</td>
<td>Excavate, haul, and place pyritic waste in waste cell</td>
<td>17,000</td>
<td>cu yd</td>
<td>$16</td>
<td>$272,000</td>
</tr>
<tr>
<td>11</td>
<td>Excavate, haul, and place concrete waste</td>
<td>845</td>
<td>cu yd</td>
<td>$40</td>
<td>$33,800</td>
</tr>
<tr>
<td>12</td>
<td>Excavate, haul, and dispose of oil waste</td>
<td>100</td>
<td>cu yd</td>
<td>$100</td>
<td>$10,000</td>
</tr>
<tr>
<td>13</td>
<td>Place geotextile cover over pyritic waste cell</td>
<td>43560</td>
<td>sq - feet</td>
<td>$0.65</td>
<td>$28,314</td>
</tr>
<tr>
<td>14</td>
<td>Place 24-inch decomposed granite cap on waste cell</td>
<td>3227</td>
<td>cu yd</td>
<td>$16</td>
<td>$51,632</td>
</tr>
<tr>
<td>15</td>
<td>Cut rebar, remove steel offsite</td>
<td>1</td>
<td>LS</td>
<td>$10,000</td>
<td>$10,000</td>
</tr>
<tr>
<td>16</td>
<td>Place 24- inch decomposed granite cap on concrete fill</td>
<td>2100</td>
<td>cu yd</td>
<td>$16</td>
<td>$33,600</td>
</tr>
<tr>
<td>17</td>
<td>Excavate, haul sediment from edge of Keswick Reservoir</td>
<td>1000</td>
<td>cu yd</td>
<td>$25</td>
<td>$25,000</td>
</tr>
<tr>
<td>18</td>
<td>Construct drainage ditch and culverts.</td>
<td>1</td>
<td>LS</td>
<td>$40,000</td>
<td>$40,000</td>
</tr>
<tr>
<td>19</td>
<td>Construct drainage ditch and culverts on County Road.</td>
<td>1</td>
<td>LS</td>
<td>$50,000</td>
<td>$50,000</td>
</tr>
<tr>
<td>20</td>
<td>Place erosion control riprap on waste cap</td>
<td>807</td>
<td>cu yd</td>
<td>$20</td>
<td>$16,140</td>
</tr>
<tr>
<td>21</td>
<td>Finish grading</td>
<td>3</td>
<td>acre</td>
<td>$5,000</td>
<td>$15,000</td>
</tr>
<tr>
<td>22</td>
<td>Seeding</td>
<td>2.5</td>
<td>acre</td>
<td>$3,500</td>
<td>$8,750</td>
</tr>
<tr>
<td>23</td>
<td>Crushed Rock Surfacing (3/8 inch minus)</td>
<td>600</td>
<td>tons</td>
<td>$20</td>
<td>$12,000</td>
</tr>
<tr>
<td>24</td>
<td>Aggregate Base (3/4 inch minus crushed rock)</td>
<td>3400</td>
<td>tons</td>
<td>$20</td>
<td>$68,000</td>
</tr>
</tbody>
</table>

Subtotal: $934,827  
Engineering @ 15 percent: $140,224  
Construction Management @ 10 percent: $93,483  
Subtotal: $1,168,534  
Contingency @ 15 percent: $175,280  
Total: $1,343,814
9.0 Land Acquisition/Easement Requirements

If the county road is used as the haul road, then a permit may be required from the county.

A Memorandum of Understanding (MOU) between USBR and BLM will probably be required for the cleanup and restoration work on the USBR-administered property and BLM-operated and maintained river trail.
Appendix A

Preliminary Design Drawings
UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
IRON MOUNTAIN MINE
MATHESON FINAL RESTORATION
IRON MOUNTAIN MINE
REDDING, CALIFORNIA

INDEX TO DRAWINGS

<table>
<thead>
<tr>
<th>SHEET NO.</th>
<th>DWG. NO.</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>G-1</td>
<td>COVER SHEET, VICINITY, AREA &amp; LOCATION</td>
</tr>
<tr>
<td>2.</td>
<td>C-1</td>
<td>EXISTING SITE PLAN</td>
</tr>
<tr>
<td>3.</td>
<td>C-2</td>
<td>SITE SITE CLEANUP AND RESTORATION LIMITS</td>
</tr>
<tr>
<td>4.</td>
<td>C-3</td>
<td>APPROXIMATE CONTOUR LOCATIONS AFTER EXCAVATION AND DEMOLITION</td>
</tr>
<tr>
<td>5.</td>
<td>C-4</td>
<td>SITE DEMOLITION</td>
</tr>
<tr>
<td>6.</td>
<td>C-5</td>
<td>SITE DEMOLITION PHOTOS</td>
</tr>
<tr>
<td>7.</td>
<td>C-6</td>
<td>SITE DEMOLITION PHOTOS</td>
</tr>
<tr>
<td>8.</td>
<td>C-7</td>
<td>SITE GRADING PLAN</td>
</tr>
<tr>
<td>9.</td>
<td>C-8</td>
<td>SITE DETAILS</td>
</tr>
<tr>
<td>10.</td>
<td>C-9</td>
<td>COUNTY ROAD DETAILS</td>
</tr>
</tbody>
</table>

CH2MILL
JUNE 2001
The drawing shows the approximate location of contours after the removal of pyritic waste material and demolition of structures. The depth of pyritic waste material varies from the surface layer to approximately 15 feet deep. The depth of excavation and final contour falls are adjusted by the engineer during the site restoration.
Photo Location and Direction
See Drawings C-5 and C-6
NOTE: PHOTOS SHOW EXAMPLES OF CONCRETE STRUCTURES AND DEBRIS TO BE DEMOLISHED. DEMOLISH CONCRETE STRUCTURES WITHIN THE LIMITS OF THE MATHESON SITE. CLEAN UP AND RESTORATION. SEE SHEET C-4 FOR LOCATION OF PHOTOS.
NOTE:
PHOTOS SHOW EXAMPLES OF CONCRETE STRUCTURES TO BE DEMOLISHED. DEMO PHOTO AND CONCRETE STRUCTURES WITHIN THE LIMITS OF THE MATHESON SITE CLEAN UP AND RESTORATION. SEE DWG C-4 FOR LOCATION OF PHOTOS.
CONSTRUCT DITCH PRIOR TO REMOVING PYRITIC IMMINENT TO ADEQUATELY DRAIN OFFSITE. REMOVE LOOSE MATERIAL ON CUT SLOPES AND FINISH PAVING EXPOSED AREAS.

NOTE:
AFTER REMOVAL OF PYRITIC WASTE MATERIAL, AND CONCRETE, RAIL AND ROUND ALL EdGES TO EXACTLY CLEAN INTERPENTS, REMOVER LOOSER MATERIAL AND BLEND INTO EXISTING TERRAIN. CLEAN ALL OPEN CUTTERIES AND CULVERTS.
Appendix B
Matheson Site Hydrology/Drainage and Preliminary Culvert Sizing
Introduction and Background

The abandoned Matheson Site ore handling and loading facility is located between Keswick Dam and Shasta Dam on the west side of the Sacramento River. The watershed extends from along the riverbank road at about Elevation 595 to about Elevation 1250, as shown on Figure 1. The drainage area of the local watershed surrounding the Matheson Site was divided into two subbasins for collection and conveyance of storm runoff under the abandoned railroad roadbed. The roadbed will ultimately be converted into a segment of the Sacramento River Trail. A combined total of about 63 acres drains through the Matheson Site and into the Sacramento River (Keswick Reservoir).

The purpose of this study was to estimate the runoff from the two subbasins and evaluate the culvert size/capacity required to carry the storm flow past the new trail extension without overtopping. It is anticipated that the two existing culverts will be replaced as part of the site remediation because of their poor condition.

Subbasin Drainage Area A has an existing 36-inch-diameter corrugated metal pipe (CMP) culvert under the roadbed. Portions of the culvert are missing because of corrosion and the culvert will need to be replaced. Subbasin Drainage Area B has an existing 60-inch-diameter CMP culvert under an auxiliary road above the site and another existing culvert downstream towards the river. The size of the downstream culvert was not determined because of siltation and heavy vegetative overgrowth at both ends.

The bottom of the 60-inch CMP has corroded to the extent that there were holes in the pipe. A smaller pipe could be inserted into the culvert if it was necessary to maintain the road, or the culvert could be removed and the drainage ditch restored.

The downstream culvert in Subbasin Drainage Area B needs to be cleaned to determine its condition, but based on the status of the other culverts, it is also expected to be in poor condition.
FIGURE 1
SUB-BASIN AND DRAINAGE PLAN
MATHERON SITE HYDROLOGY/DRAINAGE AND PRELIMINARY CULVERT SIZING

SUB-BASIN 'A': 19 ACRES

SUB-BASIN 'B': 43.5 ACRES

1"=120'

18-JUN-2001
matheron04.dlv
Approach

The Shasta County Drainage Manual was used as the basis for estimating the peak runoff for the 100-year frequency, 24-hour duration storm event. This procedure uses a modified Rational formula method that includes the basin characteristics incorporated in the Soil Conservation Service (now Natural Resource Conservation Service [NRCS]) curve number (CN) approach.

Detailed topographic mapping was developed for the Matheson Site with 1-foot contour intervals. The mapping was combined with the local U.S. Geological Survey (USGS) quad-sheet to provide detailed topographic information for estimating the storm runoff from the two subbasins.

The site hydrology assumed a previous saturated condition in the watershed for an Antecedent Moisture Condition (AMC) III classification. Precipitation data from both Shasta Dam and Redding were used to define the rainfall depth for the 100-year, 24-hour storm. Because the watershed lies between Redding and Shasta Dam with similar elevation ranges, the rainfall data from the two sites were averaged for the Matheson Site watershed. Data for the 6-hour storm and the 24-hour storm are required in the application of the runoff calculations.

Table 1 shows the rainfall data used in the analysis for the Matheson Site hydrology.

### Table 1

<table>
<thead>
<tr>
<th>Event</th>
<th>Redding (Elv. 577 feet)</th>
<th>Shasta Dam (Elv. 1076 feet)</th>
<th>Matheson Mine (Elv. 595 to 1250 feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-yr, 24-hr</td>
<td>6.69</td>
<td>10.63</td>
<td>8.66</td>
</tr>
<tr>
<td>100-yr, 6-hr</td>
<td>3.49</td>
<td>5.17</td>
<td>4.33</td>
</tr>
</tbody>
</table>

Watershed characteristics of the Matheson Site were extracted from onsite field visits, Shasta County soils survey, site mapping, and watershed photographs. Subbasin Drainage Area A was computed as 19.1 acres or about 0.030 mi², and Subbasin Drainage Area B was computed as 43.5 acres or about 0.068 mi². The vegetative cover over both of the drainage basins was defined as manzanita, field grasses, and occasional pine trees. The soil type was GeF2 (Goulding) with a hydrologic soil group of D that translates to poor infiltration capacity and high runoff potential.

A preliminary culvert sizing and capacity evaluation was completed with information estimated from the site mapping. Approximate slopes of the culverts and assumed inlet conditions were used to determine the capacity of the existing culverts and the necessary size of new culverts. A maximum 1 percent slope was used for the culvert design with the Hazen-Williams coefficient of 100 for CMP-type material.
Results

The runoff hydrology (AMC III) of the two Matheson Site drainage basins for the 100-yr, 24-hr storm showed peak flows as follows:

- Subbasin Drainage Area A – 34 cubic feet per second (cfs)
- Subbasin Drainage Area B – 76 cfs

The existing 36-inch CMP culvert in Subbasin Drainage Area A, assuming a minimum 1 percent slope with inlet control, should be capable of carrying about 65 cfs. The existing 60-inch CMP culvert in the subbasin upper Drainage Area B, assuming a minimum 1.5 percent slope with inlet control, should be capable of carrying about 305 cfs.

Each of these existing culverts appears to have adequate capacity to convey the storm runoff estimated for the 100-yr, 24-hr event. A new culvert under the railroad roadbed near the river should be sized according to the site plan and drainage options in Subbasin Drainage Area B. If a minimum slope of 1 percent is used with CMP-type material, the required size to convey 76 cfs is slightly greater than 36 inches. Depending on the final design of the new culvert crossing, a culvert diameter of at least 42 inches will likely be required.
### Basis of Design Flows

- Use Shasta Co. Drainage Manual (Modified Rational formula w/SCS CN Methods)
- Use Soil Survey to define soil types & hydrological soil groups
- Use rainfall statistics for Redding & Shasta Dam
- Develop rainfall peaks & volume for 100 yr. storm assuming AMO III conditions
- Use photographs and local knowledge to describe cover type & understory w/USB ref.

### Rainfall (100 yr. 24 hr.)

<table>
<thead>
<tr>
<th>Period</th>
<th>Rainfall (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Redd (1898 to 1999)</td>
<td>8.66</td>
</tr>
<tr>
<td>Shasta Dam (1944 to 1999)</td>
<td>10.63</td>
</tr>
</tbody>
</table>

### Soil Types

- Shasta Co. Soil Survey, 1:2000 scale 1" = 1666'
- Sheet 47 (at Mattheson Mine) = Geo F2 (Goulding, gravelly loam, bedrock 1-2 feet)

#### Hydrologic Soil Group (Table 6)

#### Drainage Areas

- $1 \text{ mi}^2 = 640 \text{ acres} \times 43,560 \text{ ft}^2 / \text{acre} = 27,878,400 \text{ ft}^2 / \text{mi}^2$

- $A = 831,795 \text{ ft}^2 \Rightarrow 0.030 \text{ mi}^2$, Elev. 1000 to 595', stream $L = 15'$ at $1' = 50'$
- $B = 1,893,244 \text{ ft}^2 \Rightarrow 0.068 \text{ mi}^2$, Elev. 1250 to 594', stream $L = 24.2'$ at $1' = 50'$

#### Drainage Area Calculation

- Thick Manzanita w/scattered pine trees, $K = 1.1$
- Soil Type = Geo F2
- Hydrological Soil Group = D
- Cover = 80%

#### Hydrologic Char.

- Use AMO III for saturated conditions
**Culvert Hydraulics & Sizing:**

1. **D.A. A (Q = 34 cfs)**
   - Assume culvert length = 40'
   - slope = 1%
   - C = 100
   - Full pipe flow req'd φ for 34 cfs @ 1% slope (inlet control assumed) = 28" < 36" OK

2. **D.A. B (Q = 76 cfs)**
   - Assume culvert length 60'
   - slope = 1.5%
   - C = 100
   - Full pipe flow req'd φ for 76 cfs @ 1.5% slope (inlet control assumed) = 36" < 60" OK

3. **D.A. B at 1/5 Road Crossing (Q = 76 cfs)**
   - Assume culvert length 70'
   - slope = 1%
   - C = 100
   - Full pipe flow req'd φ for 76 cfs @ 1% slope (inlet control assumed) = 38"
COUNTY OF SHASTA
DEPARTMENT OF PUBLIC WORKS AND WATER AGENCY

HYDROLOGY ANALYSIS
FOR
SMALL WATERSHEDS

PROJECT NAME Matheson Mine

DRAINAGE AREA NO. A

SCALE 1" = 50' CALC. BY Kent G. DATE 6/14/81

SOURCE Site Mapping

ATTACH COPY

STEP I WATERSHED DATA

(a) TOTAL DRAINAGE AREA (A) = 19.10 ac. = 0.030 mi²

(b) LENGTH OF WATERSHED (L) = 750 ft. = 0.14 mi.

(c) ELEV. OF HIGHEST POINT IN WATERSHED (Eh) = 1000 ft.

(d) ELEV. OF LOWEST POINT IN WATERSHED (El) = 595 ft.

(e) HEIGHT OF WATERSHED (H) = Eh - El = 405 ft.

STEP II. SELECT DESIGN FREQUENCY

(a) CHECK APPROPRIATE BOXES

1.  \( A < 10 \text{ ac.} \)

2.  \( 10 \text{ ac.} \leq A \leq 1 \text{ mi}² \)

3.  \( A > 1 \text{ mi}² \)

4.  Streets with curb and gutter

5.  Roadway fills exceed 10 feet

6.  Sumps or retention ponds

(b) BOXES CHECKED

(1) only 10 year design

(2) only or (1 and 6) 25 year design

(3) or (5) or (2 and 5) 100 year design

STEP III. FIND \( T_c \)

(a) FOR NATURAL DRAINAGE BASINS WHERE \( A > 1 \text{ mi}² \)

\[
T_c = \left( \frac{11.75}{N} \right)^{0.395}
\]

(b) ALL OTHER BASINS

\[
T_c = \left( \frac{0.75}{N} \right)^{0.20}
\]

\[ T_c = 0.29 \text{ hrs.} \]

○ \( K \) = Land use constant (see attachment no. 1)

○ Use 5 minute minimum

1.  (continued)
COUNTY OF SHASTA
DEPARTMENT OF PUBLIC WORKS AND WATER AGENCY

HYDROLOGY ANALYSIS
FOR
SMALL WATERSHEDS

PROJECT NAME   Matheson Mine

DRAINAGE AREA NO.  B

SCALE 1" = 50'  CALC. BY Kent G. DATE 6/4/81

SOURCE  Site Mapping
(attach copy)

STEP I  WATERSHED DATA

(a) TOTAL DRAINAGE AREA (A)  43.5 ac.  =  A  = 0.068 mi²
(b) LENGTH OF WATERSHED (L)  1210 ft.  =  L  = 0.23 mi.
(c) ELEV. OF HIGHEST POINT IN WATERSHED (Zh)  1250 ft.
(d) ELEV. OF LOWEST POINT IN WATERSHED (Zl)  594 ft.
(e) HEIGHT OF WATERSHED (H)  Zh - Zl  =  656 ft.

STEP II  SELECT DESIGN FREQUENCY

(a) CHECK APPROPRIATE BOXES

1.  A < 10ac.  (1) only  10 year design
2.  10ac. ≤ A ≤ 1 mi².  (2) only or (1 and 4)  25 year design
3.  A > 1 mi².  (3) or (6) or (2 and 5) 100 year design
4.  Streets with curb and gutter
5.  Roadway fills exceed 10 feet
6.  Sumps or retention ponds

STEP III  FIND (Tc)

(a) FOR NATURAL DRAINAGE BASINS WHERE A > 1 mi²

\[ T_c = \left(11.92 \frac{1}{H} \right) 0.385 \]

(b) ALL OTHER BASINS

\[ T_c = \left( \frac{0.32}{60} \right) 0.35 \]

\[ T_c = 0.35 \text{ hrs.} \]

\( \Phi \) X = Land use constant (see attachment no. 1)

\( \circ \) Use 5 minute minimum

1.  (continued)
# Matheson Mine, Drainage area A (34 cfs)

**Worksheet for Circular Channel**

## Project Description
- **Project File**: c:\software\flowmstr\matheson.fm2
- **Worksheet**: Matheson Mine - Drainage Area A
- **Flow Element**: Circular Channel
- **Method**: Hazen-Williams Formula
- **Solve For**: Full Flow Diameter

## Input Data
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>C Coefficient</td>
<td>100.0</td>
</tr>
<tr>
<td>Channel Slope</td>
<td>0.014000 ft/ft</td>
</tr>
<tr>
<td>Discharge</td>
<td>34.00 ft³/s</td>
</tr>
</tbody>
</table>

## Results
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth</td>
<td>2.19 ft</td>
</tr>
<tr>
<td>Diameter</td>
<td>2.19 ft</td>
</tr>
<tr>
<td>Flow Area</td>
<td>3.78 ft²</td>
</tr>
<tr>
<td>Wetted Perimeter</td>
<td>6.89 ft</td>
</tr>
<tr>
<td>Top Width</td>
<td>0.00 ft</td>
</tr>
<tr>
<td>Critical Depth</td>
<td>1.98 ft</td>
</tr>
<tr>
<td>Percent Full</td>
<td>100.00 %</td>
</tr>
<tr>
<td>Critical Slope</td>
<td>0.012546 ft/ft</td>
</tr>
<tr>
<td>Velocity</td>
<td>9.00 ft/s</td>
</tr>
<tr>
<td>Velocity Head</td>
<td>1.26 ft</td>
</tr>
<tr>
<td>Specific Energy</td>
<td>FULL ft</td>
</tr>
<tr>
<td>Froude Number</td>
<td>FULL</td>
</tr>
<tr>
<td>Maximum Discharge</td>
<td>36.38 ft³/s</td>
</tr>
<tr>
<td>Full Flow Capacity</td>
<td>34.00 ft³/s</td>
</tr>
<tr>
<td>Full Flow Slope</td>
<td>0.014000 ft/ft</td>
</tr>
</tbody>
</table>

*Jun 12, 2001 08 39 29*
Matheson Mine, Drainage area A (36")
Worksheet for Circular Channel

**Project Description**
- Project File: c:\software\flowmstr\matheson.fm2
- Worksheet: Matheson Mine - Drainage Area A
- Flow Element: Circular Channel
- Method: Hazen-Williams Formula
- Solve For: Full Flow Capacity

**Input Data**
- C Coefficient: 100.0
- Channel Slope: 0.010000 ft/ft
- Diameter: 3.00 ft (36")

**Results**
- Depth: 3.00 ft
- Discharge: 64.65 ft³/s
- Flow Area: 7.07 ft²
- Wetted Perimeter: 9.42 ft
- Top Width: 0.00 ft
- Critical Depth: 2.58 ft
- Percent Full: 100.00 %
- Critical Slope: 0.009436 ft/ft
- Velocity: 9.15 ft/s
- Velocity Head: 1.30 ft
- Specific Energy: FULL ft
- Froude Number: FULL
- Maximum Discharge: 69.16 ft³/s
- Full Flow Capacity: 64.65 ft³/s
- Full Flow Slope: 0.010000 ft/ft
# Matheson Mine, Drainage area A (34 cfs)

## Worksheet for Circular Channel

### Project Description
- **Project File**: c:\software\flowmstr\matheson.fm2
- **Worksheet**: Matheson Mine - Drainage Area A
- **Flow Element**: Circular Channel
- **Method**: Hazen-Williams Formula
- **Solve For**: Full Flow Diameter

### Input Data
- **C Coefficient**: 100.0
- **Channel Slope**: 0.010000 ft/ft
- **Discharge**: 34.00 ft³/s

### Results
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth</td>
<td>2.35 ft</td>
</tr>
<tr>
<td>Diameter</td>
<td>2.35 ft</td>
</tr>
<tr>
<td>Flow Area</td>
<td>4.34 ft²</td>
</tr>
<tr>
<td>Wetted Perimeter</td>
<td>7.38 ft</td>
</tr>
<tr>
<td>Top Width</td>
<td>0.00 ft</td>
</tr>
<tr>
<td>Critical Depth</td>
<td>1.99 ft</td>
</tr>
<tr>
<td>Percent Full</td>
<td>100.00 %</td>
</tr>
<tr>
<td>Critical Slope</td>
<td>0.009600 ft/ft</td>
</tr>
<tr>
<td>Velocity</td>
<td>7.84 ft/s</td>
</tr>
<tr>
<td>Velocity Head</td>
<td>0.96 ft</td>
</tr>
<tr>
<td>Specific Energy</td>
<td>FULL ft</td>
</tr>
<tr>
<td>Froude Number</td>
<td>FULL</td>
</tr>
<tr>
<td>Maximum Discharge</td>
<td>36.38 ft³/s</td>
</tr>
<tr>
<td>Full Flow Capacity</td>
<td>34.00 ft³/s</td>
</tr>
<tr>
<td>Full Flow Slope</td>
<td>0.010000 ft/ft</td>
</tr>
</tbody>
</table>

---

*Jun 8, 2001 07 47 22*

*Haestad Methods, Inc* 37 Brookside Road Waterbury, CT 06708 (203) 755-1666

*FlowMaster v4 1c*

*Page 1 of 1*
Matheson Mine, Drainage Area B (60")
Worksheet for Circular Channel

<table>
<thead>
<tr>
<th>Project Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project File</td>
</tr>
<tr>
<td>Worksheet</td>
</tr>
<tr>
<td>Flow Element</td>
</tr>
<tr>
<td>Method</td>
</tr>
<tr>
<td>Solve For</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Input Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>C Coefficient</td>
</tr>
<tr>
<td>Channel Slope</td>
</tr>
<tr>
<td>Diameter</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth</td>
</tr>
<tr>
<td>Discharge</td>
</tr>
<tr>
<td>Flow Area</td>
</tr>
<tr>
<td>Wetted Perimeter</td>
</tr>
<tr>
<td>Top Width</td>
</tr>
<tr>
<td>Critical Depth</td>
</tr>
<tr>
<td>Percent Full</td>
</tr>
<tr>
<td>Critical Slope</td>
</tr>
<tr>
<td>Velocity</td>
</tr>
<tr>
<td>Velocity Head</td>
</tr>
<tr>
<td>Specific Energy</td>
</tr>
<tr>
<td>Froude Number</td>
</tr>
<tr>
<td>Maximum Discharge</td>
</tr>
<tr>
<td>Full Flow Capacity</td>
</tr>
<tr>
<td>Full Flow Slope</td>
</tr>
</tbody>
</table>
### Project Description

- **Project File:** c:\software\flowmstr\matheson.fm2
- **Worksheet:** Matheson Mine - Drainage Area B
- **Flow Element:** Circular Channel
- **Method:** Hazen-Williams Formula
- **Solve For:** Full Flow Diameter

### Input Data

- **C Coefficient:** 100.0
- **Channel Slope:** 0.015000 ft/ft (1.5\%)
- **Discharge:** 76.00 ft³/s

### Results

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth</td>
<td>2.94 ft</td>
</tr>
<tr>
<td>Diameter</td>
<td>2.94 ft</td>
</tr>
<tr>
<td>Flow Area</td>
<td>6.77 ft²</td>
</tr>
<tr>
<td>Wetted Perimeter</td>
<td>9.22 ft</td>
</tr>
<tr>
<td>Top Width</td>
<td>0.00 ft</td>
</tr>
<tr>
<td>Critical Depth</td>
<td>2.71 ft</td>
</tr>
<tr>
<td>Percent Full</td>
<td>100.00 %</td>
</tr>
<tr>
<td>Critical Slope</td>
<td>0.013281 ft/ft</td>
</tr>
<tr>
<td>Velocity</td>
<td>11.23 ft/s</td>
</tr>
<tr>
<td>Velocity Head</td>
<td>1.96 ft</td>
</tr>
<tr>
<td>Specific Energy</td>
<td>FULL ft</td>
</tr>
<tr>
<td>Froude Number</td>
<td>FULL</td>
</tr>
<tr>
<td>Maximum Discharge</td>
<td>81.31 ft³/s</td>
</tr>
<tr>
<td>Full Flow Capacity</td>
<td>76.00 ft³/s</td>
</tr>
<tr>
<td>Full Flow Slope</td>
<td>0.015000 ft/ft</td>
</tr>
</tbody>
</table>

*Jun 8, 2001 07:47:37*
Appendix C
Specifications
IMM – MATHESON SITE RESTORATION

SECTION 01010
SUMMARY OF WORK

PART 1 GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

A. The completed Work will provide EPA and the property owner with a cleaned and restored site. In general, Work includes:

1. Site cleanup including gathering and disposal of miscellaneous metal, rebar, trash, and other debris.
2. Excavation and hauling pyritic waste material to a designate disposal cell located at Iron Mountain Mine site.
3. Demolition and disposal of concrete retaining walls, structures, foundations, and other miscellaneous concrete above and below ground.
4. Removing and disposal of existing culverts and installing new culverts.
5. Finish grading, including hauling and placing decomposed granite for capping the concrete disposal site.
7. Placing gravel surfacing on trail and access road.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION
IMM - MATHESON SITE RESTORATION

SECTION 01025
MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 ADMINISTRATIVE SUBMITTALS

A. Schedule of Values: Submit schedule on CONTRACTOR's standard form.

B. Schedule of Estimated Progress Payments:
   1. Submit with initially acceptable schedule of values.
   2. Submit adjustments thereto with Application for Payment.

C. Application for Payment.

D. Final Application for Payment.

1.2 SCHEDULE OF VALUES

A. Unit Price Work: Reflect unit price quantity and price breakdown from conformed Bid Form.

B. Lump Sum Work:
   1. Reflect schedule of values format included in conformed Bid Form, specified allowances, alternates, and equipment selected by OWNER, as applicable.
   2. List Bonds and insurance premiums, mobilization, demobilization, facility startup, and contract closeout separately.

C. An unbalanced or front-end loaded schedule will not be acceptable.

D. Summation of the complete schedule of values representing all Work shall equal the Contract Price.

1.3 SCHEDULE OF ESTIMATED PROGRESS PAYMENTS

A. Show estimated payment requests throughout Contract Times aggregating initial Contract Price.

B. Base estimated progress payments on initially acceptable progress schedule. Adjust to reflect subsequent adjustments in progress schedule and Contract Price as reflected by modifications to the Contract Documents.
1.4 APPLICATION FOR PAYMENT

A. Transmittal Summary Form: Attach one Summary Form with each detailed Application for Payment for each schedule and include Request for Payment of Materials and Equipment on Hand as applicable. Execute certification by authorized officer of CONTRACTOR.

B. Use detailed Application for Payment Form suitable to ENGINEER.

C. Include accepted schedule of values for each portion of Work, the unit price breakdown for Work to be paid on unit price basis.

D. Preparation:
   
   1. Round values to nearest dollar.
   2. List each Change Order and Written Amendment executed prior to date of submission as separate line item. Totals to equal those shown on the Transmittal Summary Form for each schedule as applicable.
   3. Submit Application for Payment, including a Transmittal Summary Form and detailed Application for Payment Form(s) for each schedule as applicable, a listing of materials on hand for each schedule as applicable, and such supporting data as may be requested by ENGINEER.

1.5 MEASUREMENT—GENERAL

A. Weighing, measuring, and metering devices used to measure quantity of materials for Work shall be suitable for purpose intended and conform to tolerances and specifications as specified in National Institute of Standards and Technology, Handbook 44.

B. Whenever pay quantities of material are determined by weight, the material shall be weighed on scales furnished by CONTRACTOR and certified accurate by the state agency responsible. A weight or load slip shall be obtained from the weigher and delivered to the OWNER'S representative at the point of delivery of the material. No payment will be made for materials used in the Project for which there is not a standard weight load slip.

C. Vehicles used to haul material being paid for by weight shall be weighed empty daily and at such additional times as required by ENGINEER. Each vehicle shall bear a plainly legible identification mark.

D. All materials which are specified for measurement by the cubic yard measured in the vehicle shall be hauled in vehicles of such type and size that the actual contents may be readily and accurately determined. Unless all vehicles are of uniform capacity, each vehicle must bear a plainly legible identification mark indicating its water level capacity. All vehicles shall be loaded to at least their water level capacity. Loads hauled in vehicles not meeting the above...
requirements or loads of a quantity less than the capacity of the vehicle, measured after being leveled off as above provided, will be subject to rejection, and no compensation will be allowed for such material.

E. Units of measure shown on the Bid Form shall be as follows unless specified otherwise.

<table>
<thead>
<tr>
<th>Item</th>
<th>Method of Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC</td>
<td>Acre—Field Measure by ENGINEER to nearest 0.1 acre</td>
</tr>
<tr>
<td>CY-VM</td>
<td>Cubic Yard—Measured in the Vehicle by Volume</td>
</tr>
<tr>
<td>FT</td>
<td>Feet—Slope Distance Field Measure by ENGINEER</td>
</tr>
<tr>
<td>LS</td>
<td>Lump Sum—Unit is one; no measurement will be made</td>
</tr>
<tr>
<td>SF</td>
<td>Square Foot—Slope Distance Field Measure by ENGINEER</td>
</tr>
<tr>
<td>TON</td>
<td>Ton—Weight Measure by Scale (2,000 pounds)</td>
</tr>
</tbody>
</table>

1.6 PAYMENT

A. General:

1. Progress payments will be made monthly.
2. The date for CONTRACTOR’s submission of monthly Application for Payment shall be established at the Preconstruction Conference.

B. Payment for Lump Sum Work covers all Work specified or shown within the limits or Specification sections as follows:

1. All Work shown on the Drawings and in Specification section(s).

C. Payment for unit price items covers all Work necessary to furnish and install the following items:

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear and grub pyritic disposal cell footprint</td>
<td>Acre</td>
<td>Clear site per Specification. No field measurement will be made. The plan area shown on the Drawings is approximately 1.25 acres and no additional payment will be made for clearing other areas.</td>
</tr>
<tr>
<td>Clear and grub concrete fill footprint</td>
<td>Acre</td>
<td>Perform Work per Specification. No field measurement will be made. The plan area shown on the Drawings is approximately 0.15 acres and no additional payment will be made for clearing other areas.</td>
</tr>
<tr>
<td>Item</td>
<td>Unit</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
<td>------</td>
<td>-------------</td>
</tr>
<tr>
<td>Construct roadway access at matheson</td>
<td>FT</td>
<td>To gain access to the waste areas will require making a path suitable for equipment. A total of 500 linear feet of access pathway will be paid for under this item. No additional payment will be made for creation of other access paths.</td>
</tr>
<tr>
<td>Prepare waste disposal cell footprint</td>
<td>CY</td>
<td>This Work includes excavation of the material and all grading required to prepare the waste cell footprint. Measurement of the cubic yards excavated will be made by either field cross-sections after the excavation is complete or by using the Drawings and calculating the excavated volume.</td>
</tr>
<tr>
<td>Place gravel underdrain</td>
<td>CY</td>
<td>Drainage layer in pyritic waste cell measured by the plan dimensions. No additional payment will be made for increases in dimensions beyond that shown on the Drawings.</td>
</tr>
<tr>
<td>Place 24-inch decomposed granite liner in pyritic disposal cell</td>
<td>CY</td>
<td>Low permeability barrier layer in pyritic waste cell measured by the dimensions and distances measured on the Drawings. No additional payment will be made for increases in dimensions beyond that shown on the Drawings.</td>
</tr>
<tr>
<td>Place 40-mil HDPE liner in disposal cell</td>
<td>SF</td>
<td>Plastic sheeting to provide barrier layer in pyritic waste cell measured by the dimensions and distances measured on the Drawings. No additional payment will be made for increases in dimensions beyond that shown on the Drawings.</td>
</tr>
<tr>
<td>Excavate, haul, and place pyritic waste in disposal cell</td>
<td>CY</td>
<td>Measurement will be made at the disposal cell. No measurements will be made of truck volumes or excavated areas. This item will include all work required to remove, load, haul, and place material in the disposal cell, backfill excavated areas and perform all grading of the excavated areas.</td>
</tr>
<tr>
<td>Excavate, haul, and place concrete waste</td>
<td>CY</td>
<td>Measurement will be made of the concrete walls, lids, and footings after removal of waste materials and exposure of the wall and structures and prior to commencement of demolition.</td>
</tr>
<tr>
<td>Excavate, haul, and dispose of oil waste</td>
<td>CY</td>
<td>Measurement will be made of each truck volume of material excavated as directed by the ENGINEER.</td>
</tr>
<tr>
<td>Place geotextile cover over pyritic waste well</td>
<td>SF</td>
<td>Measurement will be to the dimensions shown on the Drawings. No measurement will be made for overlap at seams, or for anchor trench quantities.</td>
</tr>
<tr>
<td>Place 24-inch decomposed granite cap on waste cell</td>
<td>CY</td>
<td>Low permeability barrier layer over top of pyritic waste cell measured by the dimensions and distances measured on the drawings. No additional payment will be made for increases in dimensions beyond that shown on the Drawings.</td>
</tr>
<tr>
<td>Place 24-inch decomposed granite cap on concrete fill</td>
<td>CY</td>
<td>Field measurements will be made when all concrete is in place of the area occupied by concrete. The area will be staked and covered with 2 feet of decomposed granite. No truck measurements of decomposed granite will be made.</td>
</tr>
</tbody>
</table>
IMM – MATHESON SITE RESTORATION

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excavate, haul sediment from edge of Keswick Reservoir</td>
<td>CY</td>
<td>Field measurements will be made before the sediment is removed and after the sediment is removed. No truck measurements of sediment will be made.</td>
</tr>
<tr>
<td>Place erosion control riprap on waste cap</td>
<td>CY</td>
<td></td>
</tr>
<tr>
<td>Finish grading</td>
<td>AC</td>
<td>Measurement will be made based on the dimensions shown on the Drawings. No field measurements will be made.</td>
</tr>
<tr>
<td>Seeding</td>
<td>AC</td>
<td>Measurement will be made based on the dimensions shown on the Drawings. No field measurements will be made.</td>
</tr>
<tr>
<td>Resurfacing Sacramento River Trail</td>
<td>Ton</td>
<td>Trip tickets will be collected for the amount of material placed to the dimensions shown. Material placed to thicknesses or widths greater than shown will be deducted from the total amount measured.</td>
</tr>
<tr>
<td>Resurfacing County Access Road</td>
<td>Ton</td>
<td>Trip tickets will be collected for the amount of material placed to the dimensions shown. Material placed to thicknesses or widths greater than shown will be deducted from the total amount measured.</td>
</tr>
</tbody>
</table>

**1.7 NONPAYMENT FOR REJECTED OR UNUSED PRODUCTS**

A. Payment will not be made for following:

1. Loading, hauling, and disposing of uncontaminated material not specified or shown for removal.
2. Quantities of material wasted or disposed of in manner not called for under Contract Documents.
3. Rejected loads of material, including material rejected after it has been placed by reason of failure of CONTRACTOR to conform to provisions of Contract Documents.
4. Material not unloaded from transporting vehicle.
5. Defective Work not accepted by OWNER.
6. Material remaining on hand after completion of Work.

**1.8 PARTIAL PAYMENT FOR STORED MATERIALS AND EQUIPMENT**

A. Partial Payment: No partial payments will be made for materials and equipment delivered or stored.

B. Final Payment: Will be made only for products incorporated in Work; remaining products, for which partial payments have been made, shall revert to CONTRACTOR unless otherwise agreed, and partial payments made for those items will be deducted from final payment.
PART 2   PRODUCTS (NOT USED)
PART 3   EXECUTION (NOT USED)

END OF SECTION
PART 1 GENERAL

1.1 GENERAL

A. Inquiries: Direct to ENGINEER regarding procedure, purpose, or extent of Submittal.

B. Timeliness: Schedule and make submissions in accordance with the Schedule of Submittal Submissions and the requirements of individual Specification sections, sequenced such as to cause no delay in Work or in work of other contractors.

C. Identification of Submittals:

1. Complete, sign, and transmit with each Submittal package, one Transmittal of CONTRACTOR'S Submittal Form attached at end of this section.
2. Identify each Submittal with the following numbering and tracking system:
   a. Sequentially number each Submittal.
   b. Resubmission of a Submittal will have original number with sequential alphabetic suffix.
3. Format: Orderly, indexed with labeled tab dividers.
4. Show date of submission.
5. Show Project title and OWNER'S contract identification and contract number.
6. Show names of CONTRACTOR, Subcontractor or Supplier, and manufacturer as appropriate.
7. Identify, as applicable, Contract Document section and paragraph to which Submittal applies.
8. Identify and indicate each deviation or variation from Contract Documents.

D. Resubmissions: Clearly identify each correction or change made.

E. Incomplete Submittal Submissions:

1. ENGINEER will return entire Submittal for CONTRACTOR'S revision/correction and resubmission.
2. Submittals which do not clearly bear CONTRACTOR's specific written indication of CONTRACTOR review and approval of Submittal or which are transmitted with an unsigned or uncertified submission form
or as may otherwise be required will be returned to CONTRACTOR unreviewed.

F. Nonspecified Submissions: Submissions not required under these Contract Documents and not shown on submissions will not be reviewed and will be returned to CONTRACTOR.

G. ENGINEER’s Review: ENGINEER will act upon CONTRACTOR’s Submittal and transmit response to CONTRACTOR not later than 30 days after receipt, unless otherwise specified. Resubmittals will be subject to same review time.

H. Schedule Delays:

1. No adjustment of Contract Times or Price will be allowed due to ENGINEER’s review of Submittals, unless all of the following criteria are met:
   a. CONTRACTOR has notified ENGINEER in writing that timely review of Submittal in question is critical to progress of Work, and has received ENGINEER’s written acceptance to reflect such on current accepted submissions and progress schedule. Written agreement by ENGINEER to reduce Submittal review time will be made only for unusual and CONTRACTOR-justified reasons. Acceptance of a progress schedule containing Submittal review times less than specified or less than agreed to in writing by ENGINEER will not constitute ENGINEER’s acceptance of review times.
   b. ENGINEER has failed to review and return first submission of a Submittal within agreed time indicated on current accepted schedule of submissions or, if no time is indicated thereon, within 30 days after receipt.
   c. CONTRACTOR demonstrates that delay in progress of Work is directly attributable to ENGINEER’s failure to return Submittal within time indicated and accepted by ENGINEER.

2. No adjustment of Contract Times or Price will be allowed due to delays in progress of Work caused by rejection and subsequent resubmission of Submittals, including multiple resubmissions.

1.2 SHOP DRAWINGS AND SAMPLES

A. Copies:

1. Shop Drawings and Product Data: Six.
2. Samples: Two, unless otherwise specified in individual Specification sections.
B. General: Submit to ENGINEER as required by individual Specification sections.

C. Identify and Indicate:
   1. Critical field dimensions and relationships to other critical features of Work.
   2. Samples: Source, location, date taken, and by whom.
   3. Each deviation or variation from Contract Documents.

D. Design Data: When specified, provide Project-specific information as required and as necessary to clearly show calculations, dimensions, logic and assumptions, and referenced standards and codes upon which design is based.

E. Shop Drawing Disposition: ENGINEER will review, mark, and stamp as appropriate and distribute marked-up copies as noted:
   1. Approved as Submitted (for incorporation in Work):
      a. One copy furnished OWNER.
      b. One copy furnished Resident Project Representative.
      c. One copy retained in ENGINEER's file.
      d. Remaining copies returned to CONTRACTOR appropriately annotated.
      e. CONTRACTOR may begin to implement activities to incorporate specific product(s) or Work covered by Submittal.
   2. Approved as Noted (for incorporation in Work):
      a. One copy furnished OWNER.
      b. One copy furnished Resident Project Representative.
      c. One copy retained in ENGINEER's file.
      d. Remaining copies returned to CONTRACTOR appropriately annotated.
      e. CONTRACTOR may begin to implement activities to incorporate product(s) or Work covered by Submittal, in accordance with ENGINEER's notations.
   3. Disapproved:
      a. One copy furnished Resident Project Representative.
      b. One copy retained in ENGINEER's file.
      c. Remaining copies returned to CONTRACTOR appropriately annotated.
      d. CONTRACTOR shall make corrections or develop replacement and resubmit (in same manner and quantity as specified for original submission).
      e. Submittal is not approved.
   4. Incomplete:
      a. One copy furnished Resident Project Representative.
      b. One copy retained in ENGINEER's file.
c. Remaining copies returned to CONTRACTOR appropriately annotated.
d. CONTRACTOR shall complete and resubmit or submit missing portions.
e. Submittal is not approved.

F. Sample Disposition: Same as Shop Drawing disposition; samples will not be returned.

1.3 ADMINISTRATIVE SUBMITTALS

A. Copies: Submit four.

B. Description: Submittals that are not Shop Drawings or Samples, or that do not reflect quality of product or method of construction. May include, but not limited to those Submittals identified below.

C. Applications for Payment (and Cash Allowance Data and Values): Meet requirements of Section 01025, MEASUREMENT AND PAYMENT.

D. Progress Reports and Quantity Charts: As may be required in Section 01310, PROGRESS SCHEDULES.

E. Schedules:

1. Progress Schedule(s): Meet the requirements of Section 01310, PROGRESS SCHEDULES.
2. Schedule of Values: Meet requirements of Section 01025, MEASUREMENT AND PAYMENT.

F. Submittals Required by Laws, Regulations, and Governing Agencies:

1. Submit promptly notifications, reports, certifications, payrolls, and otherwise as may be required, directly to the applicable federal, state, or local governing agency or their representative.
2. Transmit to ENGINEER for OWNER's records one copy of correspondence and transmittals (to include enclosures and attachments) between CONTRACTOR and governing agency.

G. Disposition: ENGINEER will review, stamp, and indicate requirements for resubmission or acceptance on Submittal as follows:

1. Accepted:
   a. Acceptance will indicate that Submittal conforms to intent of Contract Documents as to form and substance.
   b. CONTRACTOR may proceed to perform Submittal related Work.
   c. One copy furnished OWNER.
1.4 QUALITY CONTROL SUBMITTALS

A. Field Samples: Provide as required by individual Specifications and as may be required by ENGINEER during progress of Work.

B. Written Test Reports of Each Test and Inspection: As a minimum, include the following:

1. Date of test and date issued, Project title and number, testing laboratory name, address, and telephone number, and name and signature of laboratory inspector.
2. Date and time of sampling or inspection and record of temperature and weather conditions.
3. Identification of product and Specification section, location of Sample, test or inspection in the Project, type of inspection or test with referenced standard or code, certified results of test.
4. Compliance with Contract Documents, and identifying corrective action necessary to bring materials and equipment into compliance.
5. Provide an interpretation of test results, when requested by ENGINEER.

C. Disposition: ENGINEER will review, stamp, and indicate requirements for resubmission or acceptance on Submittal as follows:

1. Accepted:
   a. Acceptance will indicate that Submittal conforms to intent of Contract Documents as to form and substance.
   b. CONTRACTOR may proceed to perform Submittal related Work.
   c. One copy furnished OWNER.
   d. One copy furnished Resident Project Representative.
   e. One copy retained in ENGINEER's file.
   f. Remaining copies returned to CONTRACTOR appropriately annotated.

2. Rejected as Noted:
   a. One copy retained in ENGINEER's file.
b. Remaining copies returned to CONTRACTOR appropriately annotated.
c. CONTRACTOR shall revise/correct or develop replacement and resubmit.

1.5 CONTRACT CLOSEOUT SUBMITTALS

A. General: In accordance with Section 01780, CONTRACT CLOSEOUT.

B. Disposition: ENGINEER will review, stamp, and indicate requirements for resubmission or acceptance on Submittal as follows:

1. Accepted:
   a. Acceptance will indicate that Submittal conforms to intent of Contract Documents as to form and substance.
   b. CONTRACTOR may proceed to perform Submittal related Work.
   c. One copy furnished OWNER.
   d. One copy furnished Resident Project Representative.
   e. One copy retained in ENGINEER's file.
   f. Remaining copies returned to CONTRACTOR appropriately annotated.

2. Rejected as Noted:
   a. One copy retained in ENGINEER's file.
   b. Remaining copies returned to CONTRACTOR appropriately annotated.
   c. CONTRACTOR shall revise/correct or develop replacement and resubmit.

1.6 SUPPLEMENTS

A. The supplements listed below, following "END OF SECTION", are part of this Specification.

1. Forms: Transmittal of CONTRACTOR's Submittal

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION
CH2M HILL

TRANSMITTAL OF CONTRACTOR'S SUBMITTAL

(ATTACH TO EACH SUBMITTAL) DATE: __________________________

TO: ___________________________________________________________

Submittal No.: ________________________________________________

☐ New Submittal  ☐ Resubmittal

Previous Submittal No.: _________________________________________

Project: _______________________________________________________

Project No.: __________________________________________________

Specification Section No.: _______________________________________

(Cover only one section with each transmittal)

Schedule Date of Submittal: ______________________________________

FROM: ________________________________________________________

Contractor

SUBMITTAL TYPE: ☐ Shop Drawing  ☐ Administrative  ☐ Sample

☐ Quality Control  ☐ Contract Closeout  ☐ "Or-Equal"/Substitute

The following items are hereby submitted:

<table>
<thead>
<tr>
<th>Number of Copies</th>
<th>Description of Item Submitted (Type, Size, Model Number, Etc.)</th>
<th>Spec. Para. No.</th>
<th>Drawing or Brochure Number</th>
<th>Contains Variation to Contract</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No</td>
</tr>
</tbody>
</table>

CONTRACTOR hereby certifies that (i) CONTRACTOR has complied with the requirements of Contract Documents in preparation, review, and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws and regulations and governing agencies.

By: __________________________

CONTRACTOR (Authorized Signature)
IMM – MATHESON SITE RESTORATION

SECTION 01500
CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.1 REFERENCES

A. The following is a list of standards which may be referenced in this section:


1.2 SUBMITTALS

A. Administrative Submittals: Copies of permits and approvals for construction as required by Laws and Regulations and governing agencies.

B. Shop Drawings:

1. Temporary Construction Submittals:
   a. Site Security Plan including: Fencing and protective barrier locations and details.

2. Temporary Control Submittals:
   a. Environmental Protection Plan including: Plan for excavating, hauling, and disposal of pyritic waste materials and intended haul routes and controlling air and water pollution. See Section 01510, ENVIRONMENTAL PROTECTION PLAN, for requirements.

1.3 MOBILIZATION

A. Mobilization shall include, but not be limited to, these principal items:

1. Obtaining required permits.
2. Moving CONTRACTOR's field office and equipment required for first month operations onto site.
3. Installing temporary construction power, wiring, and lighting facilities.
4. Providing onsite communication facilities, including telephones.
5. Providing onsite sanitary facilities and potable water facilities as specified and as required by Laws and Regulations, and governing agencies.
6. Arranging for and erection of CONTRACTOR's work and storage yard.
7. Posting OSHA required notices and establishing safety programs and procedures.
8. Having CONTRACTOR's superintendent at site full time.
1.4 PROTECTION OF WORK AND PROPERTY

A. Comply with OWNER's safety rules while on OWNER's property.
B. Keep OWNER informed of serious onsite accidents and related claims.
C. Use of Explosives: No blasting or use of explosives will be allowed onsite.

1.5 SITE ACCESS

A. Access the Matheson site for equipment, materials, workmen, and hauling materials will be limited to the existing county road from Iron Mountain Road. Vehicle traffic and construction equipment shall not use the Sacramento River Trail to access the site.

PART 2 PRODUCTS

2.1 ENGINEER'S FIELD OFFICES

A. Provide minimum 6-foot by 8-foot space or space in CONTRACTOR's field office or provide separate field office. Provide with double desk and chair.

PART 3 EXECUTION

3.1 TEMPORARY UTILITIES

A. Power: No electric power is available at the site. Make arrangements to obtain and pay for electrical power used as required for CONTRACTOR's operations.
B. Water: No construction or potable water is available at site. Make arrangements for and bear costs of providing water required for construction purposes and for drinking by construction personnel during construction.
C. Sanitary and Personnel Facilities: Provide and maintain facilities for CONTRACTOR's employees, Subcontractors, ENGINEER, and OWNER and all other onsite employer's employees. Service, clean, and maintain facilities and enclosures.
D. Communications:

1. CONTRACTOR: Arrange and provides onsite communication (radio or telephone) service for use during construction. The Matheson site is a canyon. Use communications equipment that provide strong and clear communications from the site.

3.2 PROTECTION OF WORK AND PROPERTY

A. General:

1. Perform Work within the limits designated on the Drawings in a systematic manner that minimizes inconvenience to property owners and the public.
2. No residence shall be cut off from vehicular traffic. A private residence is located about 1 mile north of the site. Maintain access to the residence at all times.
3. There are no known utilities within the limits of the Project; however, if any are encountered, maintain in continuous service, unless other arrangements satisfactory to owners of said utilities have been made.
4. Where completion of the Work requires temporary or permanent removal and/or relocation of existing utility, coordinate all activities with owner of said utility and perform all work to their satisfaction.
5. Protect, shore, brace, support, and maintain underground pipes, conduits, drains, and other underground utility construction uncovered or otherwise affected by construction operations.
6. Maintain original site drainage wherever possible.

B. Site Security:

1. Prepare and submit a Site Security Plan to include barriers and site security fences to limit public access during the site restoration.
2. Erect barriers and temporary security fences prior to starting restoration work. Maintain fence throughout construction period. Obtain ENGINEER's written permission before removal of temporary security fencing.

C. Trees and Plantings:

1. Protect from damage and preserve trees, shrubs, and other plants outside limits of the Work and within limits of the Work, which are designated on the Drawings to remain undisturbed.
   a. No trees shall be removed without written approval of ENGINEER.
   b. Dispose of removed trees in a legal manner off the site.
2. In event of damage to bark, trunks, limbs, or roots of plants that are not designated for removal, treat damage by corrective pruning, bark
tracing, application of a heavy coating of tree paint, and other accepted horticultural and tree surgery practices.

D. Waterways: Keep ditches, culverts, and natural drainages continuously free of construction materials and debris.

E. Dewatering: Construct, maintain, and operate ditches, drains, sumps, pumps, or other temporary diversion and protection works. Furnish materials required, install, maintain, and operate necessary pumping and other equipment for the environmentally safe removal and disposal of water from the various parts of the Work.

F. Archaeological Finds:

1. General: Should finds of an archaeological or paleontological nature be made within the limits of the site, stop all Work and immediately notify OWNER and ENGINEER.

2. Archaeological Finds: Evidence of human occupation or use of an area within the contract limits prior to the Year 1840. Evidence may consist of skeletons, stone, or other utensils, or evidence of habitations or structures.

3. Paleontological Finds: Evidence of prehistoric plant or animal life, such as skeletons, bones, fossils, or casts and other indications such as pictographs.

4. Protection of Finds:
   a. Cover, fence, or otherwise protect finds until notice to resume the Work is given.
   b. Cover finds with plastic film held in place by earth, rocks, or other weights placed outside the find. Should additional backfilling be necessary for safety or to prevent caving, place backfill material loosely over the plastic film.
   c. Sheet or shore as necessary to protect excavations underway. Place temporary fence to prevent unauthorized access.
   d. Dewater finds made below water table as necessary to protect construction Work underway. Divert groundwater or surface runoff away from find by ditching or other acceptable means.

5. Removal of Finds:
   a. All finds are property of OWNER. Do not remove or disturb finds without OWNER's written authorization.
   b. Should OWNER elect to have a find removed, provide equipment, labor, and material to permit safe removal of find without damage. Provide transportation for delivery to individuals, institutions, or other places as OWNER may find desirable, expedient, or required by law.
3.3 TEMPORARY CONTROLS

A. Air Pollution Control:

1. Prepare and comply with Environmental Protection Plan relating to dust control, monitoring, surveillance, and protection.
2. Burning of cleared vegetation and waste materials, rubbish, or other debris that is not found in pyritic contaminated areas will be permitted onsite, provided CONTRACTOR obtains burning permits. Bury ash residual onsite at a location approved by the ENGINEER.
3. Conduct operations of dumping concrete rubble, rock, and fill material and of carrying these materials in trucks to cause a minimum of dust. Give unpaved streets, roads, detours, or haul roads used in construction area a dust-preventive treatment or periodically water to prevent dust. Strictly adhere to applicable environmental regulations for dust prevention.

B. Water Pollution Control:

1. Prior to commencing cleanup and restoration work, obtain ENGINEER's agreement with detailed plans showing procedures intended to handle and dispose of groundwater and stormwater flow, including dewatering pump discharges.
2. Comply with procedures outlined in U.S. Environmental Protection Agency manuals entitled, “Guidelines for Erosion and Sedimentation Control Planning” and “Implementation, Processes, Procedures, and Methods to Control Pollution Resulting from All Construction Activity,” and “Erosion and Sediment Control-Surface Mining in Eastern United States.”
3. Do not dispose of volatile wastes such as mineral spirits, oil, chemicals, or paint thinner into streams or waterways. Provide acceptable containers for collection and disposal of waste materials, debris, and rubbish.

C. Erosion, Sediment, and Flood Control: Provide, maintain, and operate temporary facilities to control erosion and sediment releases, and to protect the Work and existing facilities from flooding during construction period. See Section 02271, SEDIMENT AND SURFACE WATER RUNOFF CONTROLS.

3.4 ACCESS ROADS

A. Utilize existing roads where shown. Obtain County permit for use of County road. Do not use Sacramento River Trail for access to or from site.
B. Maintain drainage ways. Install and maintain culverts to allow water to flow beneath access roads. Provide corrosion-resistant culvert pipe of adequate strength to resist construction loads.

C. Provide gravel, crushed rock, or other stabilization material to permit access by all motor vehicles at all times.

D. Maintain road grade and crown to eliminate potholes, rutting, and other irregularities that restrict access.

E. Upon completion of construction, leave access roads in condition suitable for future use by OWNER. Replace culverts broken or damaged by the construction with new culvert pipe of same diameter and material.

3.5 PARKING AREAS

A. Control vehicular parking to preclude interference with access by emergency vehicles or construction operations.

B. Provide parking facilities for personnel working on the Project. No employee or equipment parking will be permitted on the Sacramento River Trail.

3.6 VEHICULAR TRAFFIC

A. Comply with Laws and Regulations regarding closing or restricting use of public streets or highways. No public or private road shall be closed, except by written permission of proper authority. Assure the least possible obstruction to traffic.

B. Conduct the Work to interfere as little as possible with public travel, whether vehicular or pedestrian.

C. Whenever it is necessary to cross or obstruct roads, whether public or private, provide and maintain suitable and safe bridges, detours, or other temporary expedients for accommodation of public and private travel.

D. Road Closures: Maintain satisfactory means for vehicular traffic through the site for persons residing or having occasion to transact business beyond the Work site.

E. In making crossings of the Sacramento River Trail, maintain at least one vehicular lane or provide temporary bypass to facilitate access to residence north of the Matheson site.

F. Maintain top of backfilled trenches to allow normal vehicular traffic to pass over.
3.7 CLEANING DURING CONSTRUCTION

A. Provide approved containers for collection and disposal of waste materials, debris, and rubbish. At least at weekly intervals, dispose of such waste materials, debris, and rubbish offsite.

B. At least weekly, brush sweep all paved roads affected by the Work.

END OF SECTION
PART 1 GENERAL

1.1 GENERAL

A. DESCRIPTION

1. The CONTRACTOR shall perform the site cleanup and restoration in such a manner to minimize the pollution of the air, water, or land during and as a result of the CONTRACTOR’s operations. For the purpose of these Specifications, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare, or unfavorably alter ecological balances of importance to human life. The requirements of this section are intended to apply to handling pollutants that are present at the site and to pollutants which can be generated by the Work.

2. Comply with all applicable federal, state, and county laws and regulations concerning environmental pollution control and abatement.

3. Perform all Work in such a manner that objectionable conditions will not be created.

4. The pyritic waste material contains arsenic and lead in concentrations exceeding the State of California Title 22 Total Threshold Limit Concentration (TTLC) regulatory limit and is classified as a waste material in accordance with the State of California Mining Regulations. For available analytical data, refer to Addendum 1, Draft Health and Safety Plan for ROD 4 Remedial Action Construction, Iron Mountain Mine, dated November 1999 (HASP). All Work related to handling of this material must be performed in compliance with Cal/OSHA Arsenic Standard (8CCR 5214) and the HASP.

1.2 SUBMITTALS

A. Within 15 calendar days of receipt of the Notice to Proceed submit an Environmental Protection Plan (EPP). The EPP shall contain details for implementing the requirements for environmental protection as specified herein. The EPP shall describe:

1. The proposed use of dust and pollution abatement measures including watering, application of approved dust suppressant, use and minimization of Work areas, and other proposed methods.

2. Site-specific dust and erosion control methods for excavation and handling of pyritic waste material.

3. Complete listing of equipment to be used for dust and erosion control.
4. Descriptive data of all materials proposed for use in dust and erosion control including Material Safety Data Sheets for any products to be applied to the site.

5. Air monitoring, medical surveillance, protective equipment, and other measures that shall be taken by the CONTRACTOR to confirm that Cal/OSHA requirements are being complied with when handling pyritic waste material.

6. Sediment control onsite and at the shoreline of Keswick Reservoir for all elements of the Work.

1.3 PROTECTION OF ENVIRONMENTAL RESOURCES

A. Land Resources: Restore to a condition after completion of the Work that will appear to be natural and not detract from the appearance of the site. Confine construction activities to the limits of the Work shown on Drawings.

B. Water Resources: Do not pollute streams or Keswick Reservoir. Assure proper disposal of fuels, oils, bitumen, calcium chloride, acids, or other potentially harmful construction related materials.

C. Do not allow water used during construction to enter a stream or other water resource. Reference is made to Section 02271, SEDIMENT AND SURFACE WATER CONTROLS.

1.4 DUST CONTROL

A. Control the amount of dust resulting from the Work to prevent the spread of dust and to avoid creation of a health or safety hazard, or a nuisance in the Project site or surrounding areas. Provide continuous fugitive dust control measures at the Project site. Provide for dust control for CONTRACTOR’s Work areas, fueling and fuel storage areas, access and haul roads, stockpiles, embankment, slopes, borrow areas, excavations, disposal areas, and other site areas in which construction work is being performed or that become potential sources of dust as a result of construction activities.

B. Key elements of the CONTRACTOR’s dust control program shall include:

1. Water application.
2. Covering loads of dust producing material.
3. Dust suppressant application.
5. Lowering vehicle speeds.
6. Removing mud, dirt, and pyritic waste materials from vehicles prior to leaving the Matheson site or the disposal areas.
1.5 TRASH AND DEBRIS DISPOSAL

A. The EPP shall include a description of the CONTRACTOR's plan for disposing of trash and debris resulting from the Work.

B. Pyritic contaminated consumable items such as respirator filters, dust masks, Personal Protective Equipment (PPE), equipment air filters, as well as miscellaneous debris currently in the waste areas shall be packaged in containers such as 55-gallon steel drums and placed in a designated spoil area for concrete piping and mining debris on Iron Mountain Mine.

C. CONTRACTOR shall decontaminate and remove all equipment at Project completion.

D. CONSTRUCTION-related waste and debris such as waste tires and oil filters generated by the CONTRACTOR shall be legally disposed of by the CONTRACTOR offsite.

1.6 FIELD QUALITY CONTROL

A. Continually inspect the Project site to assess the need for, and effectiveness of, pollution prevention and dust and erosion control measures. Conduct and document inspections at a minimum of once each working shift. Submit inspection reports to the ENGINEER.

B. Ensure measures are adequate to meet the requirements of the Contract Documents and applicable regulations. If the measures proposed in the EPP are inadequate to prevent pollution, dust generation, or erosion, take immediate corrective action to provide satisfactory results, and notify the ENGINEER of such action. Such actions shall be implemented at no additional cost to the OWNER.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION
PART 1  GENERAL

1.  SUBMITTALS

A.  Contract Closeout Submittals: Submit prior to application for final payment.

   1.  Record Documents.
   2.  Consent of Surety to Final Payment.
   3.  Releases or Waivers of Liens and Claims.
   4.  Releases from Agreements.
   5.  Final Application for Payment: Submit in accordance with procedures and requirements stated in Section 01025, MEASUREMENT AND PAYMENT.

1.2  RELEASES FROM AGREEMENTS

A.  Furnish OWNER written releases from property owners or public agencies where side agreements or special easements have been made, or where CONTRACTOR's operations have not been kept within the OWNER'S construction right-of-way.

B.  In the event CONTRACTOR is unable to secure written releases, inform the OWNER as follows:

   1.  Inform OWNER of the reasons.
   2.  OWNER or its representatives will examine the site, and OWNER will direct CONTRACTOR to complete Work that may be necessary to satisfy terms of the side agreement or special easement.
   3.  Should CONTRACTOR refuse to perform this Work, OWNER reserves the right to have it done by separate contract and deduct the cost of same from the Contract Price, or require the CONTRACTOR to furnish a satisfactory Bond in a sum to cover legal claims for damages.
   4.  When OWNER is satisfied that Work has been completed in agreement with the Contract Documents and terms of side agreement or special easement, the right is reserved to waive the requirement for written release if: (i) CONTRACTOR's failure to obtain such statement is due to the grantor's refusal to sign, and this refusal is not based upon any legitimate claims that CONTRACTOR has failed to fulfill the terms of the side agreement or special easement, or (ii) CONTRACTOR is unable to contact or has had undue hardship in contacting the grantor.

PART 2  PRODUCTS (NOT USED)
PART 3 EXECUTION

3.1 MAINTENANCE OF RECORD DOCUMENTS

A. General:

1. Promptly following commencement of Contract Times, secure from ENGINEER at no cost to CONTRACTOR, one complete set of Contract Documents. Drawings will be full size.
2. Delete ENGINEER title block and seal from all documents.
3. Label or stamp each record document with title, "RECORD DOCUMENTS," in neat large printed letters.
4. Record information concurrently with construction progress and within 24 hours after receipt of information that change has occurred. Do not cover or conceal Work until required information is recorded.

B. Preservation:

1. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
2. Make documents and Samples available at all times for observation by ENGINEER.

C. Making Entries on Drawings:

1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe change by graphic line and note as required.
   a. Color Coding:
      1) Green when showing information deleted from Drawings.
      2) Red when showing information added to Drawings.
      3) Blue and circled in blue to show notes.
2. Date entries.
3. Call attention to entry by "cloud" drawn around area or areas affected.
4. Legibly mark to record actual changes made during construction, including, but not limited to:
   a. Changes made by Addenda and Field Orders, Work Change Directive, Change Order, Written Amendment, and ENGINEER's written interpretation and clarification using consistent symbols for each and showing appropriate document tracking number.

3.2 FINAL CLEANING

A. At completion of Work or of a part thereof and immediately prior to CONTRACTOR's request for certificate of Substantial Completion; or if no certificate is issued, immediately prior to CONTRACTOR's notice of completion, clean entire site or parts thereof, as applicable.
1. Remove all barriers, signs, and security fences.
2. Leave the Work and adjacent areas affected in a cleaned condition satisfactory to OWNER and ENGINEER.
3. Prepare notification of reopening of the Sacramento River Trail and advertise one time in the Record Searchlight, minimum three columns by 6-inch advertisement.
4. Grade access road and clean paved haul roads.

END OF SECTION
PART 1 GENERAL

1.1 DEFINITIONS

A. Interfering or Objectionable Material: Trash, rubbish, and junk including bedsprings, cables, tires, timbers, metal, bottles, cans, etc.; vegetation and other organic matter, whether alive, dead, or decaying. See Section 02220, DEMOLITION, for removal and disposal of concrete.

B. Clearing: Removal of interfering or objectionable material lying on or protruding above ground surface.

C. Grubbing: Removal of vegetation and other organic matter including stumps, buried logs, and roots greater than 2 inches caliper to a depth of 6 inches below subgrade.

D. Site Cleanup and Restoration Limits: Areas, as shown or specified, within which Work is to be performed.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 GENERAL

A. Clear and grub areas actually needed for concrete waste disposal or borrow within limits shown or specified.

B. Do not injure or deface vegetation that is not designated for removal.

3.2 LIMITS

A. As follows, but not to extend beyond site cleanup and restoration limits.

1. Concrete Rubble Disposal Area:
   a. Clearing: 5 feet beyond perimeter.
   b. Scalping and Stripping: Not required.
   c. Grubbing: Around perimeter as necessary for neat finished appearance.

B. Remove rubbish, trash, and junk from entire area within site cleanup and restoration limits as shown on Drawings.
3.3 CLEARING
A. Clear areas within the concrete rubble disposal area.

3.4 GRUBBING
A. Grub areas within the concrete rubble disposal area.

3.5 DISPOSAL
A. Clearing and Grubbing of Debris Removed from the Concrete Disposal Area:
   1. Temporarily stockpile for drying and burning onsite when allowed.
   2. Obtain and follow all requirements of burning permit.
   3. Bury residual ash onsite at an approved location.

B. Trash, Rubbish, and Junk:
   1. Wood materials that are mixed in with the pyritic waste material shall be hauled and disposed of at a designated disposal site at Iron Mountain Mine. Wood materials in noncontaminated areas may be burned onsite or disposed of at an approved landfill. Metal materials that have a salvage value may be cleaned of pyritic contaminate and recycled. Conform to all State requirements for handling, hauling, and disposal of chemicals.
   2. Concrete shall be disposed of onsite in accordance with Section 02220, DEMOLITION.
   3. Dispose of other debris, trash, or junk onsite at an approved landfill. Pay all costs and retain all profits for the disposal of debris.

END OF SECTION
PART 1  GENERAL

1.1  SCOPE

A. This section describes the requirements for supplying, processing, hauling, excavation of pyritic waste material, placement and compaction of concrete rubble and fill materials, and all other earthwork activities necessary for construction of the cleanup and site restoration at the Matheson site.

1.2  DEFINITIONS

A. Common Borrow: Naturally occurring granular soils or rock particles from local excavation or other borrow sources, with suitable physical properties and composition.

B. Common Fill: Common borrow placed and compacted to specified density for areas other than in pipeline trenches.

C. Trench Backfill: Granular material that meets the specified requirements for trench backfill material placed and compacted to specified density as required for trench backfill.

D. Bedding Material: Decomposed granite (DG) material placed in the trench under and/or around the pipes, as shown.

E. Aggregate Base: Imported granular material for road restoration.

F. Crushed Rock Surfacing: Imported granular material for Sacramento River Trail surfacing.

G. Unsuitable Materials: Unsuitable materials include those excavated soils with particles of excessive dimensions, pyritic waste material, petroleum contaminated material, excessive organic matter, including vegetation, stumps and roots, and miscellaneous debris.

H. Subgrade: Bottom of excavations prepared to receive materials prior to installation of initial lift or fill.

I. Lift: The layer that fill material is placed in, before being compacted with the specified compaction effort.

J. Pass: For self-propelled compactors and tracked equipment, one pass is defined as one pass in one direction of the entire vehicle, excluding any central zone or zones that are not contacted by the compacting drums, tracks,
or compacting wheels. For towed rollers, a pass is defined as one pass in one direction of the drum. Each pass shall have sufficient overlay to ensure complete coverage of the entire lift surface.

1.3 SUBMITTALS

A. Pyritic Waste Material Removal and Disposal Plan: Submit a pyritic waste material removal and disposal plan at least 30 calendar days prior to handling any of the pyritic waste material. The plan shall describe the proposed methods for pyritic waste material excavation, handling and disposal, and shall include a detailed description of dust control measures as specified in Section 01510, ENVIRONMENTAL PROTECTION PLAN, worker personal protective equipment, and health and safety monitoring.

B. Submit delivery tickets for each load of imported crushed gravel surfacing and aggregate base material. The delivery tickets shall include the following information for each load if imported material:

1. Name and location of supplier.
2. Type and weight of material delivered (weights shall be reported in tons rounded to the nearest tenth of a ton).
3. Results of laboratory tests performed within 60 days, certified by the testing laboratory, demonstrating conformance of the supplied material with the physical and chemical property requirements of the specifications.

1.4 FIELD QUALITY CONTROL

A. Lines and Grades: The disposal cell for concrete rubble disposal shall be constructed to the lines and grades shown on the Drawings or as directed by the ENGINEER. The extent of the fill may be varied depending of the final amount of pyritic waste material removed and the amount of concrete rubble fill.

B. Acceptance Testing:

1. The CONTRACTOR shall be responsible for quality control.
2. Retain an approved Independent Testing Laboratory to perform field test and laboratory acceptance testing of earthwork materials at the minimum frequencies indicated below. The ENGINEER will select the test locations. The CONTRACTOR shall survey the coordinates and elevations of the test locations.
3. Perform tests in accordance with the following methods and frequencies:
### Test Location

<table>
<thead>
<tr>
<th>Test Location</th>
<th>Test and Test Method</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Fill, Trench Backfill</td>
<td>Laboratory Moisture-Density Relations ASTMD698</td>
<td>Minimum one from each source of soil material placed and one from each apparent variation in material quality as determined by the ENGINEER</td>
</tr>
<tr>
<td></td>
<td>In-place Density: ASTM D1556 or D2922</td>
<td>Minimum of one for each compacted lift or 100 cubic yards, whichever is completed first</td>
</tr>
<tr>
<td></td>
<td>Particle Size Analysis ASTM C117, ASTM C136</td>
<td>Minimum one test per each 500 cubic yards or portion thereof</td>
</tr>
<tr>
<td>Aggregate Base and Crushed Rock Surfacing</td>
<td>Laboratory Moisture-Density Relations ASTMD698</td>
<td>Minimum two tests each on the aggregate base and the crushed rock surfacing material</td>
</tr>
<tr>
<td></td>
<td>In-place Density: ASTM D1556 or D2922</td>
<td>Minimum one test per 500 linear feet</td>
</tr>
<tr>
<td>Moisture Content for All Materials Requiring In-Place Density Test</td>
<td>Laboratory Moisture Content ASTM D2216 or In-place Moisture Content: ASTM D3017</td>
<td>Minimum on test per each in-place density test</td>
</tr>
</tbody>
</table>

### WEATHER CONDITIONS

A. Pyritic contaminated material shall not be excavated during inclement weather, including precipitation or windy conditions (steady or gusty winds over 15 mph). Stop Work at the start of inclement weather. Restart Work only after inclement weather has past and the material has drained. Pyritic waste material shall not be moved if in standing water.
B. Divert surface runoff from the pyritic waste removal area in accordance with the surface water control plan specified in Section 02271, SEDIMENT AND SURFACE WATER RUNOFF CONTROLS.

1.6 PERMITS
A. Obtain all required federal, state, and local permits for offsite borrow areas and offsite transport of pyritic waste materials, borrow, trash, debris, and junk. Submit copies of such permits to the ENGINEER.

PART 2 PRODUCTS

2.1 COMMON BORROW
A. Unless otherwise approved in writing, common borrow material shall be decomposed granite obtained from the designated borrow source at Iron Mountain Mine. The identified source is downhill from Minnesota Flats Treatment Facility adjacent to Iron Mountain Mine Road just beyond the entrance gate to the Iron Mountain Site. Approval of a borrow source does not mean that all material within that area is suitable for use in the Work. Processing shall be performed as required. Only suitable material shall be utilized. Unsuitable material shall be removed and replaced at the expense of the CONTRACTOR. Material containing brush, roots, peat, sod, or other organic, perishable, or other deleterious materials, or frozen material shall not be used for fill.

B. If materials that are soluble, or are unsuitable for any reason, as determined by the ENGINEER, are encountered in any borrow source, such materials shall be segregated and not placed as fill. Materials that have pyrite content or other materials or contaminants shall not be used.

C. Comply with all State requirements regarding the handling and transport of chemicals.

2.2 TRENCH BACKFILL
A. Common borrow material meeting the following requirements:
   1. Environmentally clean, noncalcareous and free of refuse, debris, frozen material, miscellaneous or deleterious materials, vegetation, roots, and interspersed organic content in excess of 1 percent by weight.
   2. Possesses a liquid limit not exceeding 40 and plasticity index not exceeding 7.
   3. Contain no stones larger than 1 inch in the greatest dimension, unless otherwise approved in writing by the ENGINEER prior to placement.
2.3 CONCRETE RUBBLE DISPOSAL CELL FILL AND CAP

A. Material to be mixed with the concrete rubble and for the cap over the rubble fill shall be common borrow material meeting the following requirements:

1. Free of refuse, debris, frozen materials, vegetation, roots, and interspersed organic content in excess of 1 percent by weight

2. Gradation after Compaction:
   a. 80 to 100 percent passing the 6-inch sieve.
   b. 10 to 100 percent passing the 3/4-inch sieve.
   c. 0 to 50 percent passing the No. 4 sieve.
   d. 0 to 25 percent passing the No. 200 sieve.

3. Free of stones greater than 12 inches in the greatest dimension.

2.4 CULVERT BEDDING

A. Common borrow material consisting of decomposed granite (DG) meeting the gradation requirements for trench backfill material as approved by the ENGINEER. Approval of a source by the ENGINEER does not mean that all material from that source is suitable for use in the Work. Only suitable material from the source shall be utilized. Unsuitable material placed by the CONTRACTOR shall be removed and replaced at the expense of the CONTRACTOR.

2.5 NON-AMD PRODUCING, NONCALCAREOUS SOIL

A. Gradation After Compaction:

1. 80 to 100 percent passing the No. 4 sieve
2. 0 to 40 percent passing the No. 200 sieve.

B. Free of refuse, debris, frozen material, miscellaneous or deleterious materials, vegetation, roots, and interspersed organic content in excess of 1 percent by weight. Maximum particle size shall not exceed 3/4 inch.

2.6 AGGREGATE BASE

A. Obtain from offsite sources

B. Non-AMD producing, noncalcareous and consist of noncohesive soil.

C. Clean, durable aggregate meeting the quality and gradation requirements of Class 2, 3/4-Inch Aggregate Base, as specified in Article 26-1.02A of the Caltrans Standard Specifications.

2.7 CRUSHED GRAVEL SURFACING

A. Obtain from offsite sources
B. Non-AMD producing, noncalcareous and consist of noncohesive soil.

C. 3/8-minus material meeting the Bureau of Land Management Specifications for surfacing the Sacramento River Trail.

2.8 GROUTED CONCRETE RUBBLE

A. Utilize concrete pieces 12-inch to 6-inch in greatest dimension. Use six sacks of Portland Type 2 cement mixed with coarse and fine concrete aggregate.

B. Add additional water at location of placement to produce 11-inch slump in concrete.

2.9 CORRUGATE STEEL PIPE


PART 3 EXECUTION

3.1 SEQUENCING AND SCHEDULE

A. The following is a general sequence of Work for the removal and disposal of the pyritic waste material.

1. Prepare the disposal cell at the designated location at Iron Mountain Mine.
2. Prepare and submit for information.
   b. Environmental Protection Plan.
   c. Sediment and Surface Water Control Plan.
   d. Pyrite Excavation and Haul Plan.
4. Secure the site with fencing and barriers as required.
5. Install sediment and surface water controls.
6. Remove trash, debris, and junk from the site.
7. Clear vegetation in the gully on the south side of the site.
8. Remove pyrite material and haul to disposal site.
10. Finish grading.
11. Place granular road and trail surfacing.

3.2 SITE PREPARATION PRIOR TO START OF PYRITIC WASTE MATERIAL REMOVAL

A. Fencing and Barriers: Install in accordance with the CONTRACTOR’s Safety Plan prior to disturbing pyritic contaminated material.
IMM – MATHESON SITE RESTORATION

B. Sediment and Surface Water Controls: Install in accordance with the CONTRACTOR's Sedimentation and Surface Water Control Plan prior to disturbing pyritic contaminated material.

C. Communications: The Matheson site is located in a canyon where reception for some communication equipment may be poor. CONTRACTOR shall have working radio and/or telephone communications at the Matheson site at all times during the restoration work. Communications shall be tested to confirm strong reception before starting Work and shall be monitored to ensure the ability to call in or out at the site at all times during the CONTRACTOR's operation.

3.3 LIMITS OF WORK

A. Excavate pyritic material within the limits of the site cleanup and restoration shown on the Drawings. The depths of the material vary from surface contamination to depths up to 14 feet. The intent of the restoration work is to remove all of the pyritic waste materials from the Matheson site and dispose of it in the designated disposal cell on the Iron Mountain Mine site near the Minnesota Flat Treatment Facility. The ENGINEER shall determine the final depths of the excavation based on site observations during the restoration work.

B. Remove the pyritic material downstream for the culvert outlets after the reservoir is lowered. Remove material to the shoreline.

3.4 EXCAVATION, LOADING, HAULING, AND DISPOSAL OF PYRITIC CONTAMINATED MATERIAL

A. All operations involving pyritic waste material shall be in accordance with the CONTRACTOR's Pyritic Waste Material Removal and Disposal Plan.

B. Excavate and load pyrite material in trucks in a manner to minimize airborne dust in accordance with the CONTRACTOR's Environmental Protection Plan.

C. Truck beds shall be sealed so that material does not seep through openings such as through the tail gate during hauling.

D. Clean trucks used for hauling materials to the disposal site with shovels and broom to remove spilled material from the outside of the truck prior to driving truck off of the Matheson site. No extra payment will be made for removal of spilled material.

E. Excavate materials from the outside of the site toward the inside. Do not drive the trucks across the contaminated material. Remove pyrite materials using hand-held and motorized equipment. Shovels, vacuum equipment, excavators,
loaders, and specialized equipment may be needed and should be available for use. Do not excavate deeper than directed by ENGINEER.

F. Cover the loaded truck bed with a tarp. Secure the tarp to avoid material falling or blowing off during hauling.

G. Dispose of material at the prepared disposal cell on the Iron Mountain Mine site. Do not drive over pyritic waste material. Clean any pyritic contaminated material from the truck prior to exiting the disposal site.

H. Place and spread pyritic waste material in maximum 24-inch loose lifts, within the designated disposal site, and compact each lift a minimum of four passes of a D-7 or larger bulldozer, unless approved by the ENGINEER. The tracked area of each pass shall overlap. Provide decontaminated area for all equipment that leaves waste disposal site.

3.5 EXCAVATION OF CONCRETE DISPOSAL CELL AND CULVERTS

A. Classification: Classify, stockpile, and protect excavated material which is suitable for fill from unsuitable material.

B. Unauthorized Excavation: Where unauthorized excavations are made below or outside limits indicated on the Drawings or specified by the ENGINEER, restore the excavation(s) to proper elevations with approved backfill materials placed and compacted using construction techniques as specified herein, and as directed by the ENGINEER, at no cost.

C. Sheeting, Shoring, and Bracing:

1. Method, design, and adequacy of any required sheeting, shoring, and bracing shall meet the OSHA requirements of 29 VFR Patt 1926 and are the responsibility of the CONTRACTOR. All damage related to or caused by excavation shall be repaired at the expense of the CONTRACTOR. The design and construction of any sheeting, shoring, and bracing system shall provide means for its removal as backfill progresses without disturbance to completed Work.

2. Sheetin and shoring shall be provided as required to ensure safe working conditions, maintain required excavation dimensions for proper construction, and to prevent accidents, cave-ins, and damage to adjacent structures, facilities, and surfaces. Sheetin, shoring, and bracing shall be placed so as not to interfere with the Work and shall be entirely independent of all foundations and structures.

3. Sheetin, shoring, bracing, and all wood forms shall be removed concurrently with backfilling operations. Such removal shall be accomplished in a manner that precludes settlement of the backfill, cave-in of the excavation sides, and prevents damage to adjacent surfaces. Voids left or caused by the removal shall be promptly filled.
D. Excavation:

1. Following clearing and grubbing in concrete disposal cell area, excavate to the width and depth dimensions indicated on the Drawings.
2. Excavations left overnight, or during periods when the CONTRACTOR's forces are present, shall be protected or enclosed and marked so as to cause no damage to the public or others.
3. Where permitted by the ENGINEER, sides of culvert excavations may be sloped from a point 1 foot above the top of pipes to grade. Such slopes shall be at no additional cost. Slopes shall be cut so as not to allow displacement of material or present a danger to personnel and shall conform to OSHA 29 CFR 1926.
4. Minimum Trench Width: Provide a width sufficient, but not greater than necessary, to ensure working room to properly and safely place and compact materials around the culvert. The space between the pipe and trench wall shall be wider than the compacted equipment used in the pipe zone.

3.6 SUBGRADE PREPARATION FOR CONCRETE DISPOSAL CELL

A. Prior to subgrade preparation, the area shall be cleared and grubbed, and the debris shall be removed in accordance with Section 02100, SITE PREPARATION.

B. No material shall be placed over the subgrade until the subgrade is approved by the ENGINEER. The CONTRACTOR shall minimize disturbance to the subgrade once approval has been obtained. Subgrade preparation shall include the following:

1. Clear and grub all vegetation.
2. Remove all pyritic waste material as directed by ENGINEER.
3. Remove any deposits of weak or soft material as directed by ENGINEER.
4. Excavate and stockpile suitable clean material to use for fill and cell cap.
5. When fill is to be placed against existing slopes, cut a bench into the existing slopes for each lift of material. The bench shall be wide enough to allow the fill material to be compacted over the full width of the lift.

3.7 CONCRETE DEMOLITION

A. Remove all pyritic materials from around concrete walls, footings, and slabs prior to commencing demolition unless approved by ENGINEER.

B. Remove lids of vaults and removal all materials inside prior to commencing wall demolition.
C. Following approval of ENGINEER, remove all concrete to 3 feet below finish grade. Utilize power hammers, rams and heavy equipment to remove concrete. No blasting is allowed.

D. Take care to keep broken concrete from being disposed throughout the site. Utilize tarps, fine screens, hand picking, or fabric to collect broken concrete. Large pieces may be removed and taken to the lower area for further breakdown.

E. Break concrete into 12-inch minus material prior to placing it in the disposal cell. Use torches to removal all steel flush with concrete pieces.

F. Collect all pieces of metal of whatever type and size and remove from site.

3.8 PLACEMENT AND COMPACTION IN CONCRETE DISPOSAL CELL

A. General:

1. No material shall be placed until the subgrade has been approved by the ENGINEER.

2. No material shall be placed upon a puddled or frozen surface nor shall any ice or frozen earth be incorporated in the material. Earthwork construction for which moisture conditioning is required shall be suspended when the ambient temperature is 32 degrees F and falling.

3. In any areas where materials become soft or yielding due to becoming wet, saturated, or for any other reason, such material shall be removed by and at the expense of the CONTRACTOR.

4. For culvert installation, provide a firm, stable, and uniform bedding for the pipe barrel and any protruding features of its joints. Provide a minimum of 6 inches of bedding under the pipe.

B. Common Borrow:

1. Material shall be placed in uniform lifts not exceeding 6 inches in uncompacted (loose) thickness unless otherwise specified or approved by the ENGINEER.

2. Compaction within 2 feet of any pipeline shall be completed with hand-operated compaction equipment that will not damage the pipeline.

3. Compaction higher than 4 feet above the top of pipes shall be accomplished by running compaction equipment parallel to the pipes.

4. After removal of steel and breakdown to 12-inch minus material, place concrete rubble in disposal cell in 24-inch maximum loose lifts. Compact with four passes of D6 dozer or equivalent. Where directed by ENGINEER, mix concrete rubble with common borrow material.

5. Material placed around a below-grade pipeline shall be brought up evenly on all sides so that no unbalanced lateral pressures will be imposed on the pipeline. Work in and tamp the material below the pipe.
spring line before placing and compacting the remainder of the material around the pipe.

6. Each loose lift of material shall be thoroughly mixed before compaction to ensure uniform distribution of moisture content. Distribute larger particles of permissible sizes throughout the material.

C. Culvert Bedding: Bedding shall be placed in uniform lifts, with each lift not exceeding 6 inches in uncompacted (loose) thickness.

D. Grouted Concrete Rubble Erosion Protection:

1. Concrete material for slope or erosion protection shall be free of small pieces and placed to full layer thickness, as shown on the Drawings, in one operation in such a manner as to minimize segregation and avoid displacement of underlying materials. The larger pieces shall be well distributed throughout the mass and the smaller pieces placed to fill the spaces between the larger pieces. The finished slope/erosion protection shall be free from small concrete pieces and clusters of larger rubble. Rearranging of individual pieces by mechanical equipment or by hand may be required to the extent necessary to obtain a well-keyed reasonably well-graded distribution of sizes.

2. The material shall be locked together using 1 cubic yard of concrete per 2 cubic yards of concrete rubble.

3.9 AGGREGATE BASE AND CRUSHED ROCK SURFACING

A. Place at the locations and to the thickness shown on the Drawings.

3.10 COMPACtion

A. Each of the following fill materials shall be compacted to at least the following percentage of maximum dry density, as determined by ASTM D698, unless specified otherwise or approved by the ENGINEER.

1. Common Fill: 90 percent.
2. Trench Backfill: 90 percent.
3. Aggregate Base ad Crushed Rock Surfacing: 95 percent.

3.11 FINISH GRADING

A. All areas disturbed during the Work shall be graded to the satisfaction of the ENGINEER.

B. Grading operations shall be performed so that the Work and prepared subgrade will be well drained at all times. Final grading shall blend into the surrounding areas and have a natural appearance. Grading shall be finished to neat, regular lines in accordance with the criteria set forth herein or in a
manner acceptable to the ENGINEER. Grading work shall be performed in proper sequence with all other associated operations.

C. Fill all depressions left from the removal of the pyritic waste material and removal of concrete structures.

D. Compact fills in lifts of no greater than 8 inches to achieve a minimum of 90 percent maximum dry density as determined by ASTM D698.

E. Embankment and Cut Slopes:
   1. Shape, trim, and finish cut slope after removing concrete retaining walls and structures. Round tops of cut slopes in soil to not less than 6-foot radius.
   2. Remove stones and rock that exceed 3-inch diameter and that are loose and may roll down slope. Remove roots from cut slope.
   3. Remove loose soil from ditches at the toe of the cut slope.

F. Grade offsite common borrow area to stable slopes. Minimum slopes shall be 1 horizontal to 1 vertical for soils and 1 horizontal to 4 vertical for rock.

END OF SECTION
PART 1  GENERAL

1.1  SECTION INCLUDES

A. This section applies to demolition of concrete structures both above ground and below ground including, but not limited to, retaining walls, vaults, bunkers, foundations, supports, slabs, and other concrete debris within the limits of the Matheson cleanup and restoration site shown on the Drawings. See Section 02100, SITE PREPARATION, for cleanup and disposal of trash, rubbish, and junk.

1.2  SUBMITTALS

A. Quality Control Submittals: Methods of demolition and equipment proposed.

PART 2  PRODUCTS (NOT USED)

PART 3  EXECUTION

3.1  DEMOLITION

A. Demolish the tops of vaults and walls of vaults and bunkers to 3 feet below the finished ground level shown on the Drawings. Completely demolish and remove all other concrete retaining walls, foundations, footings, anchors, equipment slabs, etc.

B. Remove dirt and pyritic contaminated materials from within concrete vaults and bunkers prior to performing any concrete demolition of walls. Scrape clean concrete surfaces with flat-bladed shovel. Haul phritic contaminated materials to the disposal site as specified in Section 02200, EARTHWORK. Do not use water or sand blasting to clean concrete.

C. Break concrete into pieces with the maximum dimension being no greater than 12 inches.

D. Remove or cut off concealed or embedded reinforcing steel, conduit, boxes, rock bolts, anchor bolts, drill bits, or other materials flush with finished surface.

E. Extract rock bolts, drill bits, or other metal used to anchor concrete.

F. Remove all steel pieces from site and take to scrap disposal company or approved landfill.
3.2 PREPARATION OF CONCRETE DISPOSAL AREA
A. Clear and grub concrete disposal area. Stockpile for future burning onsite.
B. Excavate and dispose of pyritic waste material as specified in Section 02200, EARTHWORK.
C. Excavate and stockpile uncontaminated soils and stockpile for filling voids in concrete rubble and capping concrete.
D. Construct new culvert.

3.3 DISPOSAL
A. Dispose of debris and other nonsalvaged materials as specified in Section 02200, SITE PREPARATION.
B. Dispose of concrete in the area shown on the Drawings. Fill disposal cell in 12-inch layers with concrete rubble mixed with soil to within 24 inches of final grade. Provide sufficient soil to fill voids between concrete. Compact each layer with a minimum four passes of a 10-ton sheepsfoot or vibratory roller. Cap the concrete rubble fill with 24 inches of decomposed granite placed in maximum 8-inch layers and compact each layer with a minimum four passes of a minimum 10-ton sheepsfoot roller.

3.4 BACKFILLING
A. Backfill in accordance with Section 02200, EARTHWORK.

3.5 SALVAGE
A. Salvageable reinforcing materials will become the property of CONTRACTOR.

END OF SECTION
IMM – MATHESON SITE RESTORATION

SECTION 02271
SEDIMENT AND SURFACE WATER RUNOFF CONTROLS

PART 1  GENERAL

1.1  SCOPE

A. This section describes the requirements for sediment and surface water runoff controls for the Work. The CONTRACTOR shall install sediment controls to prevent erosion during construction and provide surface water diversions to prevent surface water flow through the site during the removal of pyritic contaminated material and the removal and replacement of culverts.

1.2  RELATED SECTIONS

A. Section 01300, SUBMITTALS.

1.3  COMPLIANCE WITH REGULATORY REQUIREMENTS

A. All erosion and sediment control and surface water diversions work shall comply with applicable requirements of governing authorities having jurisdiction. The CONTRACTOR shall obtain all required construction permits prior to starting construction. The Specifications and Drawings are not comprehensive, but rather convey the intent to provide complete slope protection and erosion control.

B. Fines and related costs resulting from failure to provide adequate protection against soil erosion and sedimentation or surface water diversions are the obligation of the CONTRACTOR.

1. Silt, sediment, mud, or pyritic polluted water leaving the Work site will be construed as damage to Keswick Reservoir and/or to neighboring areas and evidence of negligence on the part of the CONTRACTOR.

2. Damages to Keswick Reservoir and/or to neighboring areas shall be rectified by the CONTRACTOR.

1.4  QUALITY ASSURANCE

A. Erosion and surface water control measures shall be established at the beginning of construction and maintained during the entire period of construction.

B. All land-disturbing activities shall be planned and conducted to minimize the size of the area to be exposed at any one time and the length of the time of exposure.

JUNE 25, 2001
C. All land disturbing activities shall be planned and conducted so as to avoid sedimentation damage or water contamination.

1.5 SUBMITTALS

A. The CONTRACTOR shall submit the following as a separate section of the Environmental Protection Plan required in Section 01510, ENVIRONMENTAL PROTECTION PLAN:

1. Description of erosion and surface water control measures employed. Control measures shall include provisions to avoid erosion and water contamination. Sand bags with waterproof polyethylene sheets or other positive water control barrier shall be used to dam water from Keswick Reservoir so that it does not back up into Work areas during removal of materials in the culverts and removal and replacement of culverts. The plan shall also include equipment and methods to divert surface water during the Work. The CONTRACTOR shall indicate the location, type, and extent of temporary erosion control structures and surface water diversion to be used during site preparation and construction activities.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 GENERAL

A. Prior to initiating Work site activities, implement the soil erosion and sedimentation controls and surface water diversions in accordance with the accepted Environmental Protection Plan.

B. Surface water runoff originating upgrade of the pyritic contaminated areas shall be controlled to reduce erosion and sediment loss during the period of exposure and to positively avoid water pollution. When water is flowing, employ and maintain pumps and piping to divert water around site. Pumps shall be operated 24 hours a day when necessary.

3.2 MAINTENANCE

A. Maintain sediment and water control measures during the construction period.

B. If pumps are used for the water diversion, provide labor and fuel to maintain full-time pump operation when there is surface water runoff. At a minimum, provide a spare pump as backup.
C. Remove temporary controls at the completion of the Work.

END OF SECTION
PART 1  GENERAL

1.1 DESCRIPTION

A. This section includes requirements for restabilization of all other disturbed areas, including seeding and mulching.

1.2 SUBMITTALS

A. Prior to delivery to the site, submit certificates of compliance to the Specifications for the following items:

1. Seed.
2. Fertilizer.
3. Lime.
4. Mulch.

PART 2  PRODUCTS

2.1 SEED

A. Unless otherwise specified herein, seed shall conform to the requirements of Section 20-2.10 of the State of California Department of Transportation (Caltrans) Standard Specifications.

B. Provide the following seed mix:

<table>
<thead>
<tr>
<th>Species</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fescue &quot;zorro&quot; annual</td>
<td>10 pounds per acre</td>
</tr>
<tr>
<td>Fescue &quot;scaldis,&quot; &quot;durar,&quot; or &quot;covar&quot;</td>
<td>16 pounds per acre</td>
</tr>
<tr>
<td>Delvar &quot;small burnet&quot;</td>
<td>4 pounds per acre</td>
</tr>
<tr>
<td>Rose clover</td>
<td>14 pounds per acre</td>
</tr>
</tbody>
</table>

C. Seed rates are based upon pure live seed rates (PLS) greater than 90 percent. Adjust pounds per acre to meet PLS specified.

D. Areas to be stabilized shall be seeded immediately after final grade is reached.
2.2 FERTILIZER

A. Fertilizer shall be uniform in composition, free flowing, and delivered to the site fully labeled according to applicable state fertilizer laws and shall bear the name, trade name or trademark, and warranty of the producer.

B. At a minimum, fertilize at 700 pounds of 10-20-20 per acre.

C. Fertilizer and limestone shall be prior to application.

2.3 LIME

A. Lime shall be ground limestone containing at least 50 percent total oxides, calcium oxide plus magnesium oxide. Limestone shall be ground to a fineness such that at least 50 percent will pass through a 100-mesh sieve and 98 percent will pass through a 20-mesh sieve.

B. Provide, as a minimum, 2 tons per acre.

2.4 MULCH

A. Mulch shall conform to the following requirements:

1. Wood cellulose fiber applied at a minimum rate of 500 pounds per acre.
2. Hydroseeding shall conform to the requirements of Section 20-3 of the State of California (Caltrans) Standard Specifications.

B. Mulch anchoring shall be accomplished as follows:

1. Tackifiers: Tackifiers shall be applied in accordance with the manufacturers’ recommendations. Applications of liquid mulch binders shall be heavier at edges, in valleys, and at crests of banks and other areas where the mulch may be moved by wind or water.

PART 3 EXECUTION

3.1 GRADING FOR PREPARATION OF AREA FOR SEEDING

A. Earthwork: Earth cut and fill slopes shall be graded to promote sheet flow and avoid flow concentration.

3.2 SEEDING – GENERAL

A. Only earth surfaces shall be seeded. Rock cuts, road and trail surfaces, rock outcrop areas, and areas covered with riprap do not require seeding. The ENGINEER will determine the final area to be seeded after completion of the waste and concrete removal and final grading.
B. Harrow, disc, or otherwise loosen subsoil to a depth of 1 to 3 inches.

C. Remove objectionable material such as stones, 2 inches or larger, clods, brush, roots, and trash from the top 4 inches of soil.

D. Apply fertilizer and lime at the rates specified herein. Thoroughly mix into the top 6 inches. Scarify the area and rake until the surface is leveled to provide a maximum of 2 inches in variation, and the soil is friable and uniform fine texture.

E. Apply seed mixture uniformly with hydroteching equipment. Slurry for hydrotecher may contain seed, fertilizer, and limestone only.

F. Apply mulch and tackifier at the rates specified herein.

END OF SECTION