County of Santa Clara

Parks and Recreation Department

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Reservations (408) 355-2201
www.parkhere.org

PHASE II: SENADOR MINE RESTORATION PROJECT
ALMADEN QUICKSILVER COUNTY PARK
SANTA CLARA COUNTY, CALIFORNIA

FINAL REPORT

October 2016

Prepared by:
Santa Clara County Parks Department

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I. INTRODUCTION

The Senador Mine Restoration project is located in the western portion of Almaden Quicksilver County Park in Santa Clara County. This project is one of several remediation projects completed and planned within the park to remove mercury mine waste (calcines) from the greater Guadalupe River watershed.

The Senador Mine was one of eight cinnabar processing sites within present-day Almaden-Quicksilver County Park during the time period 1845 to 1975. Mercury was extracted from ore, known as Cinnabar, by heating the ore to high temperatures in on-site furnaces. The waste product, known as calcines, was discarded to areas near the furnaces, including slopes, gullies and swales. The most productive ore bodies were exhausted by the mid- 20th century and mining in the New Almaden District ceased altogether in the early 1970s. In 1975, the Santa Clara county Parks and Recreation Department purchased the former mining complex and undertook extensive remedial actions in the 1990s to reduce human health risk due to potential exposure to mercury. That effort included removal of all known calcine and furnace dust piles around the main retort sites, followed by capping, grading and revegetation. Since that time, concern over environmental impacts due to erosion and downstream transport of mercury contaminated wastes, methylation and bioavailability have arisen.

The Senador Mine and McAbee Creek Watershed encompasses 160 acres of the 3,750 acres of Almaden Quicksilver County Park. The project site includes a dirt/rock maintenance road, foot trails, two significant drainage swales and remnants of a historic furnace structure. Senador and McAbee Creeks begin and flow from the center of the project site into the Guadalupe Creek/River watershed and eventually to San Francisco Bay.

As a direct result of mining operations, the drainage swales, streams and landscape were left with deposits of calcine rock material containing mercury which detrimentally affects the fish and wildlife downstream. This project helps to address environmental impacts that have resulted from erosion and downstream transport of mercury contaminated waste. The objective of this project was the following:

1. to excavate and remove the concentrated calcine materials
2. establish and define two stream channels: Senador Creek and McAbee Creek
3. transport, deposit, spread, cover and compact the calcine material in an on-site protected repository.
4. Remediate on-going erosion/head cutting of Senador and McAbee Creeks
5. prevent further contamination of the downstream waterways leading to San Francisco Bay.

The scope of project consisted of the re-establishment and construction of two stream channels. This is being accomplished through clearing and grubbing of overgrown vegetation and debris, channel excavation of soil and rock, erosion control improvements, slope protection, planting, and hydro-seeding of disturbed areas as a result of construction activities. Contaminated soil and

rock within the channels have been removed and transported to an existing on-site repository located in the Mine Hill area of the park.

The County of Santa Clara worked with a consultant, AECOM, Inc. to design the restoration project, address all necessary permitting requirements for agency approval, and to provide on-site inspections, and environmental expertise during the course of construction of the project. In addition, AECOM provided expertise and monitoring in wildlife biology and environmental protection of endangered plant and animal species.

Construction of this project began on June 13, 2016 and was substantially complete on November 4, 2016. Stream Channel restoration was completed on October 14, 2016. During this time frame, trail access to the Senador Mine Trail had been closed on weekdays due to health and safety requirements and the presence of heavy equipment and truck hauling activities. The trail was opened to the public by the end of day, November 4, 2016.

The County's construction contract is with Innovative Construction Solutions, Inc., in the amount of $1,045,821.00. Of this amount, $248,151.00 has been provided by the San Francisco Bay Water Quality Improvement Fund, through a grant from the Environmental Protection Agency. The remainder of the funds is budgeted from the County Parks Charter Fund.

REDUCING MERCURY IMPACTS IN THE GUADALUPE RIVER

BACKGROUND: The Guadalupe River, the major waterway downstream of Senador Mine and the entire Almaden mining complex, flows into the southern portion of San Francisco Bay. Results of several studies of mercury in soil and water in the Guadalupe River triggered the development of the Guadalupe River Mercury Total Maximum Daily Load (TMDL) by the San Francisco Bay Regional Water Quality Board (SFBRWQCB). This TMDL provides a plan and rationale for reducing mercury impacts in the Guadalupe River itself as well as mercury loading contributions to the San Francisco Bay, also regulated by a mercury TMDL.

In an effort to implement the Guadalupe River Mercury TMDL, this site characterization of total mercury concentrations in the watershed draining Senador Mine was developed to help inform the design of this remediation and restoration project. A study enabled by a grant from the Estuary 2000 grant from the U.S. Environmental Protection Agency assessed the magnitude and spatial distribution of mercury in soils, road materials, and creek sediments in the area of the historic Senador Mine and retort. The Senador Creek Watershed area is complex, including environments that are nearly natural in morphology and others that have been modified during the mining and post mining eras. It was theorized that the soil, road materials, and creek sediments would be highly variable in mercury concentration. Therefore, the sampling design factored in the wide range of geomorphic and anthropogenic environments present in the watershed.

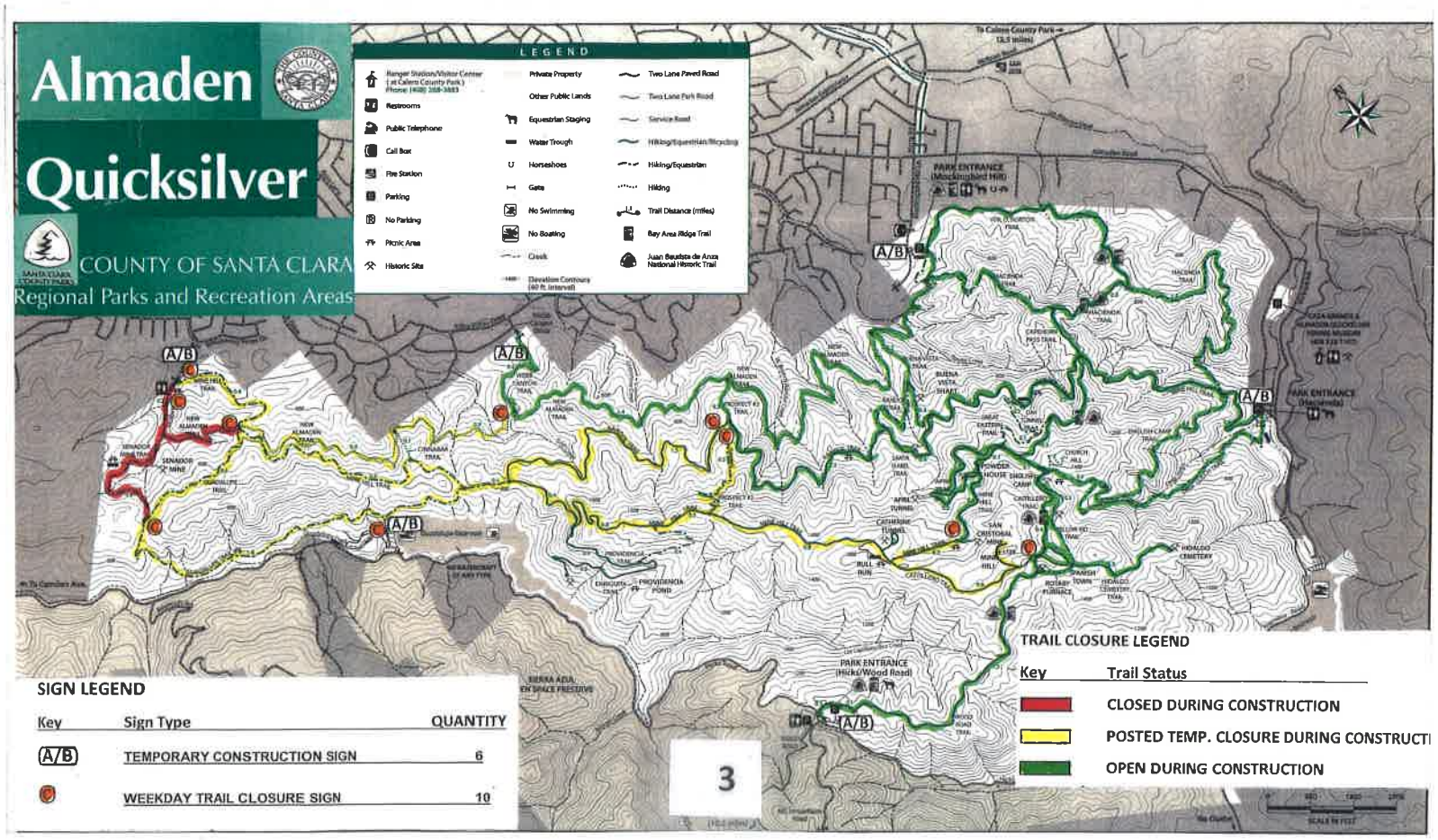
A report prepared by the San Francisco Estuary Institute entitled Total Mercury Concentrations in Soils, Road Materials, and Creek Sediments of the Senador Creek Watershed (August 2011) stated that the intent of the remediation project was to develop an approach that prioritizes areas based on mercury concentrations, erosional potential, and presence of listed biological species. The focus was to target specific erosive soil and contaminated areas within the watershed for erosion control, thus maximizing the potential for reductions in suspended mercury loadings to downstream waterbodies, the desired outcome of the EPS funded remediation effort.

In regards to the expected erosion potential within the watershed versus the expected mercury concentration, the report emphasized that the erosion potential and its impacts on the sediment carried downstream was much more important than the static mercury concentration not connected to the drainage system.

As stated in the Final Report prepared by URS, May 12, 2012, entitled Senador Creek Watershed Erosion Control Study Project, Prioritization, there were three areas identified that had the highest expected erosional potential:

1. Channels (beds, banks, adjacent hillsides) (39,119 sq. yards)
2. Furnace Area (Also had the highest expected mercury concentrations) (1,918 sq. yards)
3. Road Erosional Areas (376 sq. yards)

The following Summary of Goals and Results provides the estimated quantities of Mercury calcines prevented from entering the downstream watershed to the Guadalupe River in all three of the above mentioned locations.



II. SUMMARY OF PROJECT GOALS AND RESULTS

1. **GOAL:** Remove Mercury Mine Waste Deposits (Calcines) from drainage swales, creek channels, trails, and isolated deposit areas within the McAbee Creek watershed and thereby implementing the goal to reduce Guadalupe River's mercury total maximum daily load (TMDL).

   RESULTS: Calcine deposits are mostly easily recognized when excavating. Calcine rock is a reddish to pinkish color and when ground, is distinguishable from clay and silty soil. As excavation commenced, it was discovered that there were greater quantities of calcines to remove from the creek channels than anticipated during construction document preparation. The calcines were found to be deeper in the channel than estimated and covered a much broader area. Also, in two areas that were designated as having calcine deposits, none were detected. By the end of excavation, there were approximately five times more calcines discovered than from the original estimated quantity.

   As part of the Health and Safety Requirements of the project, mercury mine waste, when disturbed, can become airborne and may be a safety concern if ingested into the lungs or swallowed. Furthermore, mercury mine waste can be absorbed through the skin. Therefore, Personal Protective Equipment (PPE) and air monitoring equipment, which detects levels of mercury concentration in the air, were required before beginning construction.

   The monitoring equipment used included 3 separate Jerome 431-X Mercury Vapor Analyzers. Each equipment unit came pre-calibrated from Pine Environmental. One piece of equipment was located at the San Francisco Open Cut Landfill, and two were located in the Senador Mine site. In addition to air monitoring of Mercury mine waste, testing of Naturally Occurring Asbestos (N.O.A.) was also conducted. The results of the probes and testing were negative.

   After all health and safety requirements were met, the Contractor successfully removed and transported the Calcine waste to San Francisco Open Cut (SFOC) by way of truck transport through the park site on park trails. By removing the mercury waste from the drainage swales in the Senador and McAbee Creeks and swales leading to these channels, the project implemented the goal to reduce Guadalupe River's mercury total maximum daily load (TMDL).

2. **GOAL:** Excavate and establish well defined stream channels within the McAbee Watershed.
   RESULTS: Contractor was successful in creating new stream channels by excavating, grading, and compacting streambed material, and providing imported erosion control rocks to create a series of rock lined streambeds and step pools. Several gradations of rock were used in the streambeds and step pools.

   Target Feature 31 proved to be a more challenging section to excavate, given the existing conditions. There were existing trees to be preserved to the west of the channel and a natural grade break down to the broad Area #2 fill deposit area. The Contractor was successful with

the formation of the channel, while providing a temporary "levee" that could be used for their construction vehicles. Feature 31 terminated at the junction of another drainage swale, which, when merged, flowed to the north and east of the broad Area #2 fill deposit area.

Another challenge was at Drainage Feature CC and CD where there was another critical drainage junction at two upstream swales. The Contractor was successful in excavating and grading the top section of the riprap with the existing drainage swale so that the natural flow of the water would enter the riprap rather than be diverted to a naturally fed spring and ultimately a secondary drainage channel.

3. **GOAL:** Transport, deposit, spread, cover and compact the calcine material in an on-site protected repository.
RESULTS: Although previous soil samples identified concentrations of mercury mine waste in very specific locations, there were concentrations in more variable quantities in the excavated channels, and in cut and fill areas of Area #2. Any detectable and measurable amount of excavated soil containing calcines was required to be transported to the San Francisco Open Cut Landfill (SFOC). Due to the Senador Mine being located in the farthest reach of the park in relation to the landfill site, the time duration and cost associated with the transport of additional calcine material escalated. In the end, the Contractor met the required timeline to complete the work within the channels before October 15.

4. **GOAL:** Provide slope protection and erosion control improvements that protect the stream channels and implementing the reduction of the Guadalupe River's Mercury Total Maximum Daily Load (TMDL).
RESULTS: In the McAbee channel, Target Feature 45, it was found that the distance from the edge of the maintenance road to the midpoint of the new stream channel was too steep, and the step pool too narrow for its design intent. The Contractor recommended shifting the maintenance road several feet to the north. Another option would have been to shift the centerline of the stream channel to the south, however, by doing this, there would have been a greater amount of calcines embedded in the hillside soil profile.

Road Erosional Areas: 376 sq. yards identified in the report

Estimated quantity of Mercury calcines (HgS, HgSe, and Hg) removed from Roadway excavation and re-routing to allow for wider step pool construction: Approx. 100 cubic yards.

Furnace Area: 1,918 sq. yards identified in the report)
After excavation of Target Feature 45 including the areas surrounding the Furnaces, the quantity of Mercury calcine deposits (HgS, HgSe, and Hg) removed and delivered to the SFOC was 250 cubic yards.

Channels (beds, banks, adjacent hillsides): (39,119 sq. yards identified in the report)
Excluding the Mercury deposits removed from the Furnace area in Target Feature 45, there were mercury calcines removed from Target Features 31, Area 2, and the remainder of Target Feature 45. The quantity of Mercury Calcine Deposits (HgS, HgSe, and Hg) removed and delivered to the SFOC was 164 cubic yards bringing the total quantity of calcines to 514 cubic yards.

5. **GOAL:** Prevent further contamination of the waterways leading to the Guadalupe River and San Francisco Bay by removing the calcine deposits in the stream channel, sealing calcines with compacted clay, and implementing the reduction of the Guadalupe River's Mercury Total Maximum Daily Load (TMDL).

   RESULTS: By removing and sealing calcine material within the new channels, the project prevents further contamination of the waterways leading to the river and bay.

   The Contractor placed a two foot clay cover over the contract amount of 100 cubic yards of new calcine material. In addition, when an additional 250 and 164 cubic yards of calcines were discovered in Target Feature 45 and Target Feature 31/Area 2, respectively, another area in the SFOC needed to be cleared and additional clay soil was required.

   During construction of Target Feature 31, additional grading was required to create a channel between an existing grove of trees and an existing grade break, one that sheets consistently and gradually across the maintenance road towards the McAbee channel. The construction of this channel was critical to be self-contained so that it could merge with another major swale to the north.

   As a result of this additional grading, calcine deposits were found, were variable, and were spread over a greater area of Target Feature 31 and Area 2 (See plan view, page 9). Therefore, this area which had not been initially probed to contain calcine deposits, had sufficient enough calcines in the soil profile to require delivery to the SFOC. The Contractor estimated that less than 20% of the 164 total cubic yards found in this area contained calcines.

   In summary of these Goals and Results, the goal had been achieved to:

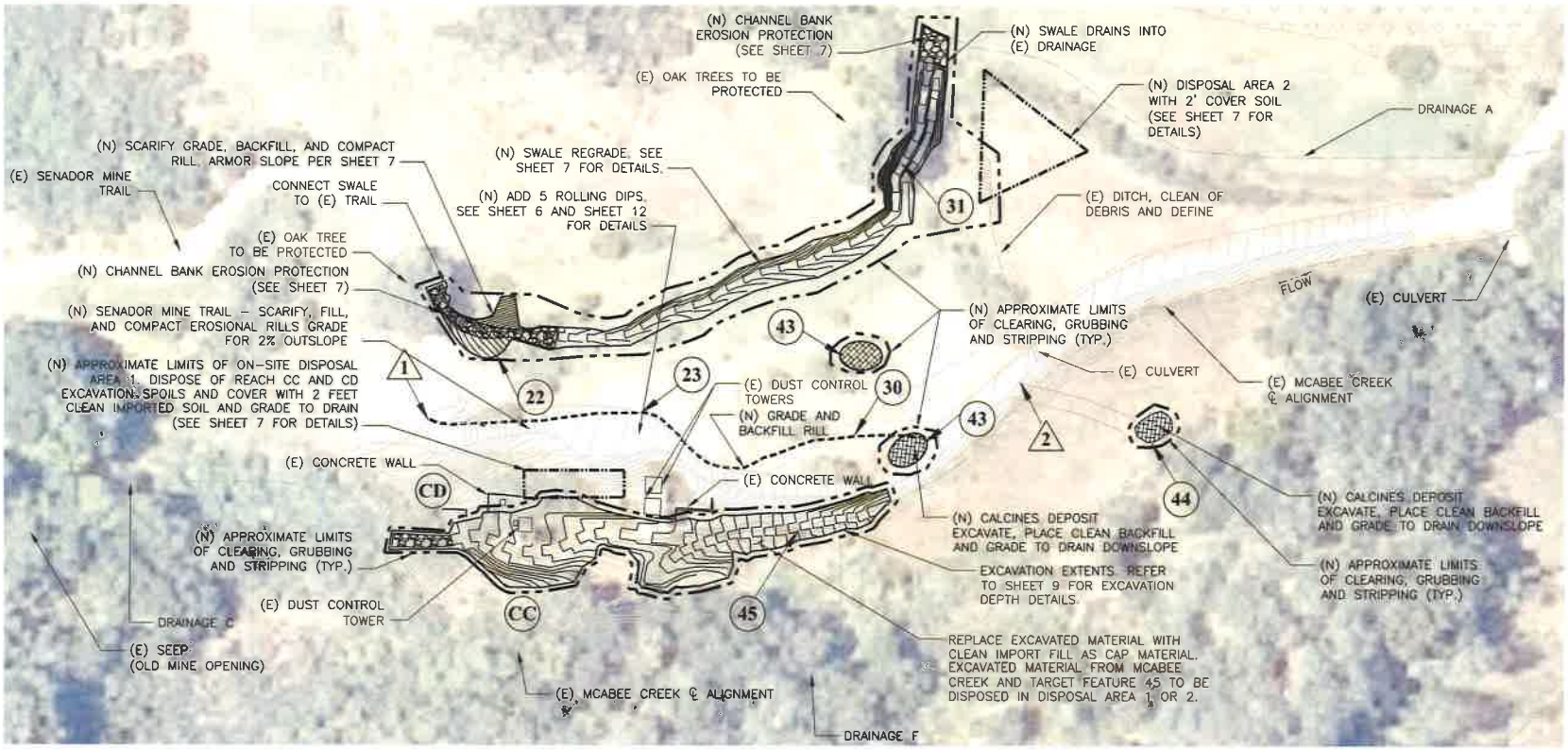
   1. Reduce the mercury impacts in the Guadalupe River watershed and the Mercury Total Maximum Daily Load (TMDL).
   2. Reduce the amount of erosive soil and contaminated areas within the watershed.
   3. Protect biological species – plant and animal
   4. In terms of overall quantities of Mercury Calcines (HgS, HgSe, & Hg) prevented from entering and affecting the downstream environment it is estimated as follows:
      A. Of 164 cubic yards removed, approximately 20% or 33 cubic yards were calcines.
      B. Of 250 cubic yards removed, approximately 80% or 200 cubic yards were calcines.
      C. Of 100 cubic yards removed, approximately 80% or 80 cubic yards were calcines.

III. PROJECT COMPONENTS

- Mobilization and Pre-Construction Activities.
  This work involved the Contractor providing a secure staging area for administrative work, construction materials, vehicles and equipment, porta-potties, eyewash station, project construction signs, barriers, fences, and detour signs.
- Site Preparation.
  This work involved the submittal of a Storm Water Pollution Prevention Plans (SWPPP) and Requirements, pre-construction video of the truck-hauling route to the landfill, erosion and sediment control, silt fencing, biological and wildlife awareness training, protection of sensitive plant species, and protection of trees by fencing off the dripline of the trees.
- Pre-Construction Submittals
  This work included submittals prior to commencement of project construction and included: Fire Protection, Health and Safety, Air, Water, and Noise Pollution Control Plans, temporary signage, Schedule for the project, hazardous and/or regulated materials storage list, sequence of work, quality control, registration of hazardous waste haulers, and Schedule of Values. Schedule of Values included a breakdown of costs in the lump sum of the Schedule of Quantities, Bid Item Number 1. It included specific costs for plant material, hydroseeding, and related preparation work.
- Clearing, Grubbing, Stripping
  Work included the clearing and grubbing of plant material within the scope of work. Much of this work included the removal of poison oak, loose rock material, overgrown Coyote Brush and Scotch Broom species.
- Excavation
  Excavation included the removal of dirt, rocks, and calcine waste material and stockpiling and separating the topsoil from the calcine material. Survey and establishment of the rough grades was critical during this phase of the project.
- Truck Hauling Calcines to the Open Cut Landfill
  Calcine materials excavated from Senador Mine were transported through the park, utilizing unimproved fire roads/trails to the San Francisco Open Cut (repository) located on Mine Hill within the park. During truck hauling, a small pilot vehicle preceded the trucks to alert hikers and bikers of on-coming trucks. Prior to hauling on this route, the trail was watered or dampened by a water truck which minimized dust production.

- Application of Calcines in the San Francisco Open Cut Landfill (SFOC repository)
  This procedure included the following steps:
  1. Strip the top two feet of clay cover over the existing calcine deposits and stockpile to the side of the spread area.
  2. Transport additional clay soil to supplement the cover being removed to provide a uniform two foot cover over the new calcine deposits.
  3. Transport calcines from Senador Mine to the SFOC through the park
  4. Spread the calcines and compact in 8" lifts, compact to 90% density.
  5. Deposit and spread two feet of clay cover over the calcines. Compact to 90% density.
  6. Hydroseed the disturbed areas at the end of project.

- Grading and Compaction of the Streambed Channels
  Contractor graded the two stream channels to attain positive drainage of the watershed. This was verified through continual surveys within the channel, followed by compaction of the base of the channel. One of the challenges in channel 31 was the narrow area of drainage to be created between the drip line of the trees and the grade break to Area #2.
- Riprap Installation: Channel 22/31
  The upper channel, known as Target features 22 and 31, received riprap rock (average ½ ton rock) after compaction of the channel was completed. With completion of this work, the upper area of this watershed was connected to another tributary stream to create a more defined stream channel.
- Step Pool Construction: Drainage Feature CC and CD, and Target Feature 45
  The McAbee channel includes the installation of multiple step pools consisting of a variety of shapes, sizes, and configurations of rocks within the channel corridor. The rocks ranged in size from 6" to 30" diameter and ranged from several pounds each to one ton each. The step pools were constructed similar to stairway steps except the reverse slope on the front side created pools of water. After temporarily collecting water, the volume of water upstream would force water to the next level. The step heights ranged from .5' to .75' over a length of 7 to 10 feet.
- Installation of Slope Erosion Control and Protection Fabric
  This item of work protects the stream channel from erosion along the banks of the channel.
- Rolling Dip Construction
  Rolling dips (5 in quantity) were installed across the access roads/trails adjacent to the project site to direct sheet flow and concentrated storm runoff off the road surface, thereby minimizing erosion of the road surface. On the downhill edge of each rolling dip, a rolling dip apron is constructed to help prevent further erosion on the side of the trail.
- Hydro-seeding
  This item of work consists of the application of hydroseed mulch to all disturbed areas of construction. This includes the excavated and graded areas of the stream channels and banks, the excavated individual calcine deposit areas, the SFOC repository, the Wood Road trail area (clay soil borrow site), and all areas where construction vehicles and equipment disturbed the native landscape.
- Planting
  The planting of 120 count, 5 gallon container Coyote Brush (Baccharis pilularis) provided additional vegetation and erosion control along the stream channel banks and also direct hikers to keep within the boundaries of the trail corridor.
- Clean-Up and Demobilization
  This work consists of clearing and cleaning of the staging area, construction stockpile and storage areas, removal of construction fencing and temporary construction and detour signs, provide as-built drawings and survey information, punch-list implementation, and attend a close-out conference.



SITE LAYOUT PLAN
SCALE: 1"=40'

SITE 52 LAYOUT PLAN
SCALE: 1"=50'

NOTE:

1. IF REMOVAL OF CALCINES DISTURBS BANKS, RESTORE BANKS TO EXISTING TOPOGRAPHY AND HYDROSEED.

NOTES

DRAINAGE FEATURE CC

LOCATED UPSTREAM OF TARGET FEATURE 45. IT INCLUDES ALL 3 DUST TOWERS. THIS REACH IS RELATIVELY FLAT AND IS APPROXIMATELY 120 FEET IN LENGTH.

DRAINAGE FEATURE CD

LOCATED APPROXIMATELY UPSTREAM OF REACH CC. REACH CD IS 160 FEET IN LENGTH. NO WELL-DEFINED CHANNEL IS EVIDENT IN THIS REACH. THE FAR WEST END OF REACH CD IS RELATIVELY STEEP, AND OVERGROWN WITH NATIVE VEGETATION.

TARGET FEATURE 22

EROSIONAL FEATURE THAT CONSISTS OF A SERIES OF SHALLOW RILLS AND FURROWS STARTING AT SENADOR MINE TRAIL ADJACENT TO THE LARGE OAK TREE AND EXTENDING DOWN SLOPE TO AN EAST-FACING FILL SLOPE.

TARGET FEATURE 23

EROSIONAL FEATURE THAT CONSISTS OF A SERIES OF EROSIONAL RILLS THAT EXTENDS DOWN THE UPLAND SIDE OF SENADOR MINE TRAIL. THE RILLS ARE RELATIVELY SHALLOW AND DISSECT WELL-CONSOLIDATED FILL. RUNOFF FROM FEATURE 23 FLOWS DOWNSLOPE AND IS PARTIALLY RESPONSIBLE FOR EROSIVE FEATURES AT TARGET FEATURE 30.

TARGET FEATURE 30

EROSIONAL FEATURE THAT CONSISTS OF A SERIES OF SHALLOW EROSIONAL SCARS AND FURROWS EXTENDING DOWN AN EAST-FACING FILL SLOPE NORTH ON THE UPLAND SIDE OF SENADOR MINE TRAIL. ALTHOUGH THESE RILLS ARE OF LIMITED EXTENT, THIS FEATURE RECEIVES CONCENTRATED RUNOFF FROM SENADOR MINE TRAIL DURING STORM EVENTS.

TARGET FEATURE 44

EXPOSED CALCINE DEPOSIT ABOVE THE SOUTH UPPER BANK OF MCABEE CREEK. THE SITE IS A NARROW LENS OF CALCINES, APPROXIMATELY 20 FEET IN LENGTH BY 10 FEET WIDE, UNDERLYING COLLUVIAL SOIL, AND IS ESTIMATED TO BE LESS THAN 2 FEET IN DEPTH.

TARGET FEATURE 45

AN ACTIVELY MIGRATING HEADCUT IN MCABEE CREEK LOCATED APPROXIMATELY 30 FEET DOWNSTREAM OF THE TWIN DUST TOWERS. THE HEADCUT AND RELATED IN-CHANNEL SCAR IS APPROXIMATELY 25 FEET LONG AND UP TO 5 FEET DEEP.

TARGET FEATURE 52

EXPOSED CALCINE DEPOSIT ON THE NORTH BANK OF MCABEE CREEK. IT IS LOCATED APPROXIMATELY 150 FEET UPSTREAM OF THE MINE HILL TRAIL CROSSING. IT IS LOCATED ON THE NORTH BANK OF MCABEE CREEK, APPROXIMATELY 15 FEET IN LENGTH, 5 FEET WIDE, AND 12 INCHES DEEP.

TARGET FEATURE 31

EROSIONAL FEATURE CONSISTS OF TWO LARGE EROSIONAL SCARS THAT HAVE FORMED ON THE EASTERN SLOPE OF THE FILL PAD LOCATED JUST SOUTH OF DRAINAGE A. THE SCARS CUT THROUGH APPROXIMATELY 5 FEET OF FILL BEFORE EXPOSING SANDSTONE BEDROCK. TWO LARGE QUARTZ CARBONATE BOULDERS.

TARGET FEATURE 43

TWO (2) EXPOSED DISCONNECTED CALCINES DEPOSITS. ONE DEPOSIT IS ADJACENT TO SENADOR MINE TRAIL, AND THE OTHER IS FURTHER UP SLOPE. BOTH DEPOSITS ARE WITHIN THE SPECIAL STATUS PLANT AREA. THE EXPOSED SURFACES ARE APPROXIMATELY 20 FEET BY 30 FEET AT THE SURFACE, AND 1 TO 2 FEET DEEP.

NOTE:

1. SCARIFY, RECOMPACT AND GRADE (E) TRAIL TO 2% OUTSLOPE FROM POINT 1 TO 2

50' 0' 50' 100'
HOR SCALE: 1"= 50'

40' 0' 40' 80'
HOR SCALE: 1"= 40'

20' 0' 20' 40'
HOR SCALE: 1"= 20'

COUNTY OF SANTA CLARA
298 GARDEN HILL DRIVE
LOS GATOS, CA 95032-7669
PHONE: (408) 355-2200

SANTA CLARA COUNTY PARKS

SENADOR MINE RESTORATION PROJECT
SITE LAYOUT

DESIGNED BY:	MV/SIL	NUM	DATE:	BY	REVISIONS
DRAWN BY:	BV	1 (80%)	01/30/13	MV	Rev 0
CHECKED BY:	MV/SIL	2 (90%)	09/18/13	MV	Rev 0
		3 (100%)	01/23/14	MV/SIL	Rev 1
		4 (100%)	07/22/14	MV/SIL	Rev 2
		5 (100%)	03/02/15	MV/SIL	Rev 3

URS
1333 BROADWAY, SUITE 800
OAKLAND, CA 94612
PHONE: (510) 893-3600
FAX: (510) 874-3268

Sheet No.
SHEET 5 OF 13

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IV. PARTNERSHIPS

This project was coordinated with:

- The County Board of Supervisors (BOS), County Attorney's Office and the following coordinating agencies:
- Santa Clara County Parks Department, Construction Services Division
- Innovative Construction Solutions, Inc. (I.C.S.), General Contractor
- AECOM, Design Consultant
- Environmental Protection Agency (EPA)
- San Francisco Estuary Project (SFEP)
- Association of Bay Area Governments (ABAG)
- San Francisco Regional Water Quality Board
- State Department of Toxic Substance Control (DTSC)
- U.S. Army Corps of Engineers (Permits)
- California Department of Fish and Wildlife (CDFW)
- United States Department of Fish and Wildlife Services (DFWS)

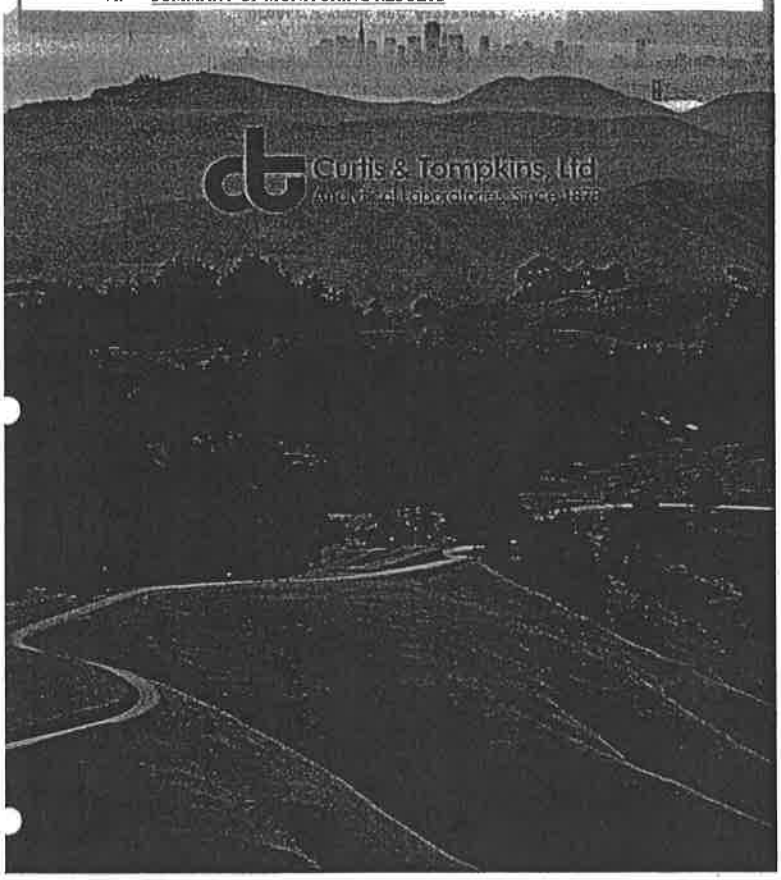
V. PROJECT EVALUATION

A. Summary of Monitoring and Testing Results (Attached):
   1. N.O.A. (Naturally Occurring Asbestos)- provided by Curtis and Tompkins, Ltd.
   2. Mercury Monitoring Equipment Log

B. Summary of Expected Outputs, Outcomes, and Accomplished Deliverables:
   The Schedule of Quantities provided by the Consultant and inserted into the Bid Proposal documents did not match the bid received by the County from ICS, Inc.
   The following table illustrates three lists of quantities:
   1. The Original Bid Quantities,
   2. The Addendum to the Bid Quantities during the bid period, and
   3. The actual quantities completed during the project construction

McAbee Creek – Looking downstream from above TF 45. Gray area on the left (north bank) has been excavated to remove calcines. The concrete wall is shown on the left side of the photo.

VI. SUMMARY OF MONITORING RESULTS



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

Laboratory Job Number 278020
ANALYTICAL REPORT

Innovative Construction Solutions	Project : NC-16-1114 Location : Senador Mine Level : II

Sample ID	Lab ID
CREEK1-1A-2'	278020-001
CREEK1-1A-4'	278020-002
CREEK1-1B-2'	278020-003
CREEK1-1B-4'	278020-004
CREEK2-2A-2'	278020-005
CREEK2-2A-4'	278020-006
CREEK2-2B-2'	278020-007
CREEK2-2B-4'	278020-008
TRIANGLE 3-1-2'	278020-009
TRIANGLE 3-1-4'	278020-010

This data package has been reviewed for technical correctness and completeness. Release of this data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature. The results contained in this report meet all requirements of NELAC and pertain only to those samples which were submitted for analysis. This report may be reproduced only in its entirety.

Signature: Will Rice Date: 07/05/2016

Will Rice
Project Manager
will.rice@ctberk.com

CA ELAP# 2896, NELAP# 4044-001

Curtis & Tompkins, Ltd

CASE NARRATIVE

Laboratory number:	278020
Client:	Innovative Construction Solutions
Project:	NC-16-1114
Location:	Senador Mine
Request Date:	06/27/16
Samples Received:	06/27/16

This data package contains sample and QC results for ten soil samples, requested for the above referenced project on 06/27/16. The samples were received cold and intact.

CARB 435 Asbestos (CARB 435):
Forensic Analytical in Hayward, CA performed the analysis (not NELAP certified). Please see the Forensic Analytical case narrative.

CHAIN OF CUSTODY

Curtis & Tompkins Laboratories
ENVIRONMENTAL ANALYTICAL TESTING LABORATORY
In Business Since 1878
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Berkeley, CA 94710
Phone (510) 486-0900
Fax (510) 486-0532

Page 1 of 1
Chain of Custody #
CAT LOGIN # 278020

Project No: NC-16-1114
Project Name: Senador Mine
Project P.O. No: 16-1114
EDD Format: Report Level II III IV
Turnaround Time: Standard Rush
Sampler: J. French
Report to: Mike Dahlquist
Company: Curtis and Tompkins
Telephone: (510) 297-2225
Email: mike.dahlquist@ctberk.com

Lab No.	Sample ID.	SAMPLING Date Collected	Time Collected	MATRIX Water	Solid	# of Containers	CHEMICAL PRESERVATIVE HCl	H2SO4	HNO3	NaOH	None	ANALYTICAL REQUEST
1	CREEK 1-1A-2'	06/24/16	12:10pm	X		1					X	X
2	CREEK 1-1A-4'	06/24/16	12:15pm	X		1					X	X
3	CREEK 1-1B-2'	06/24/16	12:25pm	X		1					X	X
4	CREEK 1-1B-4'	06/24/16	12:35pm	X		1					X	X
5	CREEK 2-2A-2'	06/24/16	1:00pm	X		1					X	X
6	CREEK 2-2A-4'	06/24/16	1:15pm	X		1					X	X
7	CREEK 2-2B-2'	06/24/16	1:30pm	X		1					X	X
8	CREEK 2-2B-4'	06/24/16	1:45pm	X		1					X	X
9	TRIANGLE 3-1-2'	06/24/16	2:00pm	X		1					X	X
10	TRIANGLE 3-1-4'	06/24/16	2:15pm	X		1					X	X

Notes:

RELINQUISHED BY: DATE: TIME:

RECEIVED BY: DATE: 6/24/16 TIME: 6:20

SAMPLE RECEIPT ☐ Intact ☐ Cold ☐ On Ice ☐ Ambient

Curtis & Tompkins, Ltd.

Detections Summary for 278020

Results for any subcontracted analyses are not included in this summary.

Client : Innovative Construction Solutions
Project : NC-16-1114
Location : Senador Mine

Client Sample ID : CREEK1-1A-2' Laboratory Sample ID : 278020-001
No Detections

Client Sample ID : CREEK1-1A-4' Laboratory Sample ID : 278020-002
No Detections

Client Sample ID : CREEK1-1B-2' Laboratory Sample ID : 278020-003
No Detections

Client Sample ID : CREEK1-1B-4' Laboratory Sample ID : 278020-004
No Detections

Client Sample ID : CREEK2-2A-2' Laboratory Sample ID : 278020-005
No Detections

Client Sample ID : CREEK2-2A-4' Laboratory Sample ID : 278020-006
No Detections

Client Sample ID : CREEK2-2B-2' Laboratory Sample ID : 278020-007
No Detections

Client Sample ID : CREEK2-2B-4' Laboratory Sample ID : 278020-008
No Detections

Client Sample ID : TRIANGLE 3-1-2' Laboratory Sample ID : 278020-009
No Detections

Curtis & Tompkins, Ltd.

Client Sample ID : TRIANGLE 3-1-4' Laboratory Sample ID : 278020-010
No Detections

McAbee Creek – Looking north from south bank of creek at the additional calcine excavation adjacent to the concrete wall. This excavation is at Senador Mine Trail.

Forensic Analytical LABORATORIES

Final Report

Bulk Asbestos Material Analysis

(Air Resources Board Method 435, June 6, 1991)

Curtis & Tompkins Ltd
Project Manager
2323 Fifth St.
Berkeley, CA 94710

Client ID: 1137
Report Number: N008358
Date Received: 06/27/16
Date Analyzed: 07/05/16
Date Printed: 07/05/16

Job ID/Site: NC-16-1114 - Senador Mine

FALI Job ID: 1137
Total Samples Submitted: 10
Total Samples Analyzed: 10

PLM Report Number: N/A

Sample Preparation and Analysis:

Samples were analyzed by the Air Resources Board's Method 435, Determination of Asbestos Content of Serpentine Aggregate. Samples were ground to 200 particle size in the laboratory. Approximately 1 pint was retained for analysis. Samples were prepared for observation according to the guidelines of Exception I and Exception II as defined by the 435 Method. Samples which contained less than 10% asbestos were prepared for observation according to the point count technique as defined by the 435 Method. This analysis was performed with a standard cross-hair reticle.

Sample ID	Lab Number	Layer Description
Creek1-1A-2	11779386	Brown Soil
Visual Estimation Results:		
Matrix percentage of entire	100	
Visual estimation percentage:	None Detected	
Asbestos type(s) detected:	None Detected	
Comment: This result meets the requirements of Exception I as defined by the 435 Method.		
Creek1-1A-4	11779387	Brown Soil
Visual Estimation Results:		
Matrix percentage of entire	100	
Visual estimation percentage:	None Detected	
Asbestos type(s) detected:	None Detected	
Comment: This result meets the requirements of Exception I as defined by the 435 Method.		
Creek1-1B-2	11779388	Brown Soil
Visual Estimation Results:		
Matrix percentage of entire	100	
Visual estimation percentage:	None Detected	
Asbestos type(s) detected:	None Detected	
Comment: This result meets the requirements of Exception I as defined by the 435 Method.		
Creek1-1B-4	11779389	Brown Soil
Visual Estimation Results:		
Matrix percentage of entire	100	
Visual estimation percentage:	None Detected	
Asbestos type(s) detected:	None Detected	
Comment: This result meets the requirements of Exception I as defined by the 435 Method.		

Forensic Analytical LABORATORIES

Bulk Asbestos Material Analysis

(Air Resources Board Method 435, June 6, 1991)

Curtis & Tompkins Ltd
Project Manager
2323 Fifth St.

Berkeley, CA 94710

Client ID: 1137
Report Number: N008358
Date Received: 06/27/16
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Job ID/Site: NC-16-1114 - Senador Mine

FALI Job ID: 1137
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Sample Preparation and Analysis:

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Sample ID	Lab Number	Layer Description
Creek2-2A-2	11779390	Brown Soil
Visual Estimation Results:		
Matrix percentage of entire	100	
Visual estimation percentage:	None Detected	
Asbestos type(s) detected:	None Detected	
Comment: This sample meets the requirements of Exception I as defined by the 435 Method.		
Creek2-2A-4	11779391	Brown Soil
Visual Estimation Results:		
Matrix percentage of entire	100	
Visual estimation percentage:	None Detected	
Asbestos type(s) detected:	None Detected	
Comment: This sample meets the requirements of Exception I as defined by the 435 Method.		
Creek2-2B-2	11779392	Brown Soil
Visual Estimation Results:		
Matrix percentage of entire	100	
Visual estimation percentage:	None Detected	
Asbestos type(s) detected:	None Detected	
Comment: This sample meets the requirements of Exception I as defined by the 435 Method.		
Creek2-2B-4	11779393	Brown Soil
Visual Estimation Results:		
Matrix percentage of entire	100	
Visual estimation percentage:	None Detected	
Asbestos type(s) detected:	None Detected	
Comment: This sample meets the requirements of Exception I as defined by the 435 Method.		

Final Report

Forensic Analytical LABORATORIES

Bulk Asbestos Material Analysis

(Air Resources Board Method 435, June 6, 1991)

Curtis & Tompkins Ltd
Project Manager
2323 Fifth St.

Berkeley, CA 94710

Client ID: 1137
Report Number: N008358
Date Received: 06/27/16
Date Analyzed: 07/05/16
Date Printed: 07/05/16

Job ID/Site: NC-16-1114 - Senador Mine

FALI Job ID: 1137
Total Samples Submitted: 10
Total Samples Analyzed: 10

PLM Report Number: N/A

Sample Preparation and Analysis:

Samples were analyzed by the Air Resources Board's Method 435, Determination of Asbestos Content of Serpentine Aggregate. Samples were ground to 200 particle size in the laboratory. Approximately 1 pint was retained for analysis. Samples were prepared for observation according to the guidelines of Exception I and Exception II as defined by the 435 Method. Samples which contained less than 10% asbestos were prepared for observation according to the point count technique as defined by the 435 Method. This analysis was performed with a standard cross-hair reticle.

Sample ID	Lab Number	Layer Description
Triangle3-1-2	11779394	Brown Soil
Visual Estimation Results:		
Matrix percentage of entire	100	
Visual estimation percentage:	None Detected	
Asbestos type(s) detected:	None Detected	
Comment: This sample meets the requirements of Exception I as defined by the 435 Method.		
Triangle3-1-4	11779395	Brown Soil
Visual Estimation Results:		
Matrix percentage of entire	100	
Visual estimation percentage:	None Detected	
Asbestos type(s) detected:	None Detected	
Comment: This sample meets the requirements of Exception I as defined by the 435 Method.		

Tad Thrower

Tad Thrower, Laboratory Supervisor, Hayward Laboratory

Note: Limit of Quantification (LOQ) = 0.25%. Trace denotes the presence of asbestos below the LOQ. ND = None Detected.

VI. SUMMARY OF MONITORING RESULTS

Dump Site/SP open cut

Innovative Construction Solutions

AIR MONITORING LOG

Date: 8/3/16
Project Name: Senador / SP open cut
Project No.: NC16-1114
Name: Jose R.

CALIBRATION RECORD			
Time	Location	PID/FID (ppm)	Comments

DAILY LOG				
Time	Location	PID/FID (ppm)	Comments	
10:10 AM	SP open cut	0.00	5-10 wheel dumps	RND 1
10:12	SP open cut	0.00	Dump + pile 5 loads	
10:18	SP open cut	0.00	NO LAPTOP READINGS	
10:26	SP open cut	0.00	All = 0.00	
12:25 pm	SP open cut	0.00	5-10 wheel dump trk	RND 2
12:30 pm	SP open cut	0.00	5 loads dump in piles	
12:33 pm	SP open cut	0.00	Water truck keeping	
12:37 pm	SP open cut	0.00	Dust down	
12:40 pm	SP open cut	0.00		
2:55 pm	SP open cut	0.00	5-Dump trk	RND 3
2:58 pm	SP open cut	0.00	Dump + pile 5 loads	
3:05 pm	SP open cut	0.00		
3:08 pm	SP open cut	0.00		
3:15 pm	SP open cut	0.00	3x5 = 15 loads in	
3:20 pm	SP open cut	0.00	today	

Innovative Construction Solutions

AIR MONITORING LOG

Date: 8/12/16
Project Name: Senador Mine - SP open cut
Project No.: NC16-1114
Name: Jose Rivas

CALIBRATION RECORD			
Time	Location	PID/FID (ppm)	Comments

DAILY LOG			
Time	Location	PID/FID (ppm)	Comments
10:15AM	SP open cut	0.00	Trucks dump piles
10:20am	SP open cut	0.00	Dirt hauled in
10:24am	SP open cut	0.00	3-10 wheel loads
2:20pm	SP open cut	0.00	3-trucks dump
2:25pm	SP open cut	0.00	3 loads
2:29pm	SP open cut	0.00	All readings good
2:35pm	SP open cut	0.00	

Dump site / SP open cut

Innovative Construction Solutions

AIR MONITORING LOG

Date: 8/8/16
Project Name: Senador Mine
Project No.: NC 16-1114
Name: Jose R

CALIBRATION RECORD			
Time	Location	PID/FID (ppm)	Comments

DAILY LOG			
Time	Location	PID/FID (ppm)	Comments
9:30AM	SP open cut	0.00	4-trucks haul +
9:40AM	SP open cut	0.00	Dump 4 loads
9:44AM	SP open cut	0.00	
9:50AM	SP open cut	0.00	
9:58AM	SP open cut	0.00	
10:10AM	SP open cut	0.00	Dozer spread loads
10:20AM	SP open cut	0.00	Water truck process
10:45AM	SP open cut	0.00	+ keep dust down.
11:10 AM	SP open cut	0.00	
11:40AM	SP open cut	0.00	
12:55pm	"	0.00	4-trucks dump 27 loads
1:00 pm	"	0.00	
1:05 pm	"	0.00	
1:10 pm	"	0.00	
1:15 pm	"	0.00	
3:30 pm	"	0.00	1-truck dump 1 load
3:35 pm	"	0.00	Last load
3:40 pm	"	0.00	Dozer spread
3:50pm	"	0.00	Water truck water
4:25pm	"	0.00	

9 loads dumped

Dump site / SP open cut

Innovative Construction Solutions

AIR MONITORING LOG

Date: 9/15/16
Project Name: Senador Mine
Project No.: NC16-1114
Name: Jose R

CALIBRATION RECORD			
Time	Location	PID/FID (ppm)	Comments

DAILY LOG			
Time	Location	PID/FID (ppm)	Comments
8:30 AM	SP open cut	0.00	5-Dump trucks
8:36AM	SP open cut	0.00	Dump 5 loads
8:40 AM	SP open cut	0.00	Dozer spreading
8:55AM	SP open cut	0.00	Material & water truck
9:20AM	SP open cut	0.00	Processing + dust
9:45AM	SP open cut	0.00	Control
10:30AM	SP open cut	0.00	5 loads
11:00AM	SP open cut	0.00	
12:30AM	SP open cut	0.00	Shut down pile to truck access

Innovative Construction Solutions

AIR MONITORING LOG

Date: 9/21/16
Project Name: SENADOR MINE
Project No.: NC16-1114
Name: JOSE R.

CALIBRATION RECORD			
Time	Location	PID/FID (ppm)	Comments

DAILY LOG			
Time	Location	PID/FID (ppm)	Comments
7:45 AM	SP OPEN CUT	0.00	4-TEN WHEELERS
7:50	" "	0.00	DUMPED 4 LOADS OF CALCINES
7:59 AM	" "	0.00	
8:20 AM	" "	0.00	
8:30 AM	" "	0.00	WATER TRUCK RUNG
8:40 AM	" "	0.00	DUST CONTROL
9 AM	" "	0.00	
10:40 AM	" "	0.00	
10:45 AM	" "	0.00	
10:55 AM	" "	0.00	
11:10 AM	" "	0.00	
2:00 PM	" "	0.00	
2:10 PM	" "	0.00	
2:15 PM	" "	0.00	
2:30 PM	" "	0.00	
2:35 PM	" "	0.00	
2:50 PM	" "	0.00	

11 LOADS CALCINES IN

Innovative Construction Solutions

AIR MONITORING LOG

Date: 9/22/16
Project Name: SENADOR MINE
Project No.: NC16-1114
Name: JOSE R.

CALIBRATION RECORD			
Time	Location	PID/FID (ppm)	Comments

DAILY LOG			
Time	Location	PID/FID (ppm)	Comments
8:55 AM	SP OPEN CUT	0.00	4-10 CY DUMP TRUCK IMPORT 4 FOR LOADING
9:05 AM	SP OPEN CUT	0.00	
9:17 AM	SP OPEN CUT	0.00	
9:20 AM	SP OPEN CUT	0.00	
9:28 AM	SP OPEN CUT	0.00	
11:55 AM	SP OPEN CUT	0.00	4 FOR 10 YARD DUMP TRK IMPORT 4 LOADS
11:58 AM	SP OPEN CUT	0.00	
12:05 AM	SP OPEN CUT	0.00	
12:10 AM	SP OPEN CUT	0.00	
12:15 AM	SP OPEN CUT	0.00	
2:50 PM	SP OPEN CUT	0.00	4 - 10 YARD DUMP TRK IMPORT 4 LOADS
3:00 PM	SP OPEN CUT	0.00	
3:10 PM	SP OPEN CUT	0.00	
3:20 PM	SP OPEN CUT	0.00	
3:25 PM	SP OPEN CUT	0.00	
3:35 PM	SP OPEN CUT	0.00	

IMPORT 12 LOADS

Innovative Construction Solutions

AIR MONITORING LOG

Date: 9/23/16
Project Name: SENADOR MINE
Project No.: NC16-1114
Name: JOSE R.

CALIBRATION RECORD			
Time	Location	PID/FID (ppm)	Comments

DAILY LOG			
Time	Location	PID/FID (ppm)	Comments
8:30AM	SP OPEN CUT	0.00	5 EA-10 WHEEL DUMP
8:35AM	SP OPEN CUT	0.00	TRUCK IMPORT 5 LOADS
8:40AM	SP OPEN CUT	0.00	CALCINES
8:50AM	SP OPEN CUT	0.00	
11:45AM	" "	0.00	4 EA-10 WHEEL DUMP
11:50AM	" "	0.00	TRUCK IMPORT 4 LOADS
11:55AM	" "	0.00	CALCINES.
12:00PM	" "	0.00	
01:05 PM	" "	0.00	

9 LOADS IMPORT

Innovative Construction Solutions

AIR MONITORING LOG

Date: 9/26/16
Project Name: SENADOR MINE
Project No.: NC16-1114
Name: JOSE R.

CALIBRATION RECORD			
Time	Location	PID/FID (ppm)	Comments

DAILY LOG			
Time	Location	PID/FID (ppm)	Comments
7:30AM	SP OPEN CUT	0.00	NO TRUCKING TODAY
7:35	" "	0.00	DOZER SPREAD CALCINES + COVER W/ DUST CLAY CAP MATERIAL
7:40	" "	0.00	
7:50	" "	0.00	
8:05	" "	0.00	WATER TRUCK RUNG
8:20	" "	0.00	DUST PROCESSING +
8:50	" "	0.00	DUST CONTROL
9:30	" "	0.00	ALL CALCINES CAPPED
9:57	" "	0.00	TODAY.
10:55	" "	0.00	
11:30	" "	0.00	
12:30 PM	" "	0.00	
1:20 PM	" "	0.00	
2:00 PM	" "	0.00	
2:30	" "	0.00	
3:20 PM	" "	0.00	
3:35 PM	" "	0.00	
4:00 PM	" "	0.00	

pg 1 of 2

LOAD SITE | SENADOR MINE

innovative construction solutions

AIR MONITORING LOG

Date: 8/3/16
Project Name: SENADOR MINE
Project No.: NC 116-1114
Name: Gary C

CALIBRATION RECORD

Time	Location	PID/FID (ppm)	Comments

DAILY LOG

Time	Location	PID/FID (ppm)	Comments
7:30 AM	TF 52	0.00	EXCAVATE HUMP @
7:35 AM	TF 52	0.00	CREEK BANK @ ARCABEE
7:40 AM	TF 52	0.00	CRK.
7:44 AM	TF 52	0.00	WATER FOR DUST
7:58 AM	TF 52	0.00	CONTROL
8:10 AM	TF 52	0.00	ALL READINGS OK
8:25 AM	TF 52	0.00	0.00 / 3 LOADS OUT
8:55 AM	NORTH SLOPE @ RETAINING WALL @ ROAD EDGE	0.00	PROCESS W/ WATER FOR DUST + COMPACTION -
9:00 AM	" "	0.00	ALL READINGS OK
9:05 AM	" "	0.00	NO VAPOR
9:15 AM	" "	0.00	
9:22 AM	" "	0.00	2 LOADS OUT
11:00	" "	0.00	USE WATER FOR DUST
11:15	" "	0.00	CONTROL, LOT'S OF
11:20	" "	0.00	CALCINES ALONG CONCRETE
11:25	" "	0.00	RET. WALL. ALL READINGS
11:30	" "	0.00	OR 0.00
			5 LOADS OUT

Round 1

Round 2

pg 2 of 2

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AIR MONITORING LOG

Date: 8/2/16
Project Name: SENADOR MINE
Project No.: NC 116-1114
Name: GARY COGWELL

CALIBRATION RECORD

Time	Location	PID/FID (ppm)	Comments

TF = TARGET FEATURE **DAILY LOG**

Time	Location	PID/FID (ppm)	Comments
8:00 AM	TF 43 LOWER	0.00	CALCINE PRESENT / NO READING
8:10 AM	TF 43 LOWER	0.00	" "
8:30 AM	TF 43 LOWER	0.00	KEEP DUST DOWN W/ WATER
8:43 AM	TF 43 LOWER	0.00	THIS AREA COMPLETE 3'LO
11:40 AM	TF 44 HILLSIDE	0.00	KEEP DUST DOWN, WATER PROCESS
11:45 AM	TF 44 HILLSIDE	0.00	" "
11:49 AM	TF 44 HILLSIDE	0.00	" "
11:55 AM	TF 44 HILLSIDE	0.00	" "
12:10 PM	TF 44 HILLSIDE	0.00	" "
12:22 PM	TF 44 HILLSIDE	0.00	" "
12:38 PM	TF 44 HILLSIDE	0.00	" "
12:55 PM	TF 44 HILLSIDE	0.00	" "
			THIS AREA COMPLETE 3'LO

innovative construction solutions

AIR MONITORING LOG

Date: 8/3/16
Project Name: SENADOR MINE
Project No.: NC 116-1114
Name: GARY C

CALIBRATION RECORD

Time	Location	PID/FID (ppm)	Comments

DAILY LOG

Time	Location	PID/FID (ppm)	Comments
1:30 PM	NORTH SLOPE @ RETAINING WALL @ ROAD EDGE	0.00	PROCESS WITH WATER FOR
1:35	" "	0.00	DUST CONTROL & COMPACTION
1:39	" "	0.00	5 TRUCKS = 5 LOADS OUT
1:45	" "	0.00	
1:48	" "	0.00	
1:50	" "	0.00	15 LOADS

Round 2

innovative construction solutions

AIR MONITORING LOG

Date: 8/5/16
Project Name: SENADOR MINE
Project No.: NC 116-1114
Name: JOSE R

CALIBRATION RECORD

Time	Location	PID/FID (ppm)	Comments

DAILY LOG

Time	Location	PID/FID (ppm)	Comments
7:30 AM	NORTH SLOPE @ RETAINING WALL @ ROAD EDGE	0.00	REMOVE REMAINING CALCINES FROM RETAIN-
7:35 AM	" "	0.00	ING WALL AREA &
7:40 AM	" "	0.00	STOCKPILE @ DISPOSAL
7:50 AM	" "	0.00	AREA # 2. FOR LATER
7:58 AM	" "	0.00	EXPORT.
8:20 AM	" "	0.00	
8:30 AM	" "	0.00	
8:35 AM	" "	0.00	
8:45 AM	" "	0.00	
8:50 AM	" "	0.00	

LOAD SITE / SEWARD MAINE

Innovative Construction Solutions

AIR MONITORING LOG

Date: 9/15/16
Project Name: SEWARD MAINE
Project No.: NC 16-1114
Name: GARY C / JESSE R

CALIBRATION RECORD			
Time	Location	PID/FID (ppm)	Comments

DAILY LOG			
Time	Location	PID/FID (ppm)	Comments
6:45 AM	DISPOSAL AREA #2	0.00	5-TEN WHEEL DUMP
6:50 AM	STOCKPILE	0.00	TRUCKS ONSITE SEWARD
6:55 AM	" "	0.00	LOAD CALCULATIONS FROM
7:20 AM	" "	0.00	STOCKPILE @ DISPOSAL AREA
			#2 + HAUL TO SEARSPORT
			CONTROL DUST + PROCESS
			W/ WATER TRUCK.
			NO MORE LOADS TODAY
			TRUCKS OFF

ONSITE WORK / SEWARD

LOAD SITE / SEWARD MAINE

Innovative Construction Solutions

AIR MONITORING LOG

Date: 8/9/16
Project Name: SEWARD MAINE
Project No.: NC 16-1114
Name: GARY C

CALIBRATION RECORD			
Time	Location	PID/FID (ppm)	Comments

DAILY LOG			
Time	Location	PID/FID (ppm)	Comments
7:30 AM	DISPOSAL AREA	0.00	4-10 WHEEL DUMP TRUCKS
7:35 AM	TP 2	0.00	LOADED FOR EXPORT
7:40 AM	" "	0.00	4 LOADS
7:44 AM	" "	0.00	
7:50 AM	" "	0.00	
7:55 AM	" "	0.00	
11:15 AM	DISP AREA #2	0.00	4-10 WHEEL DUMPS
11:20 AM	" "	0.00	LOADED FOR EXPORT
11:24 AM	" "	0.00	4 LOADS
11:30 AM	" "	0.00	
11:35 AM	" "	0.00	
11:40 AM	" "	0.00	
2:25 PM	DISP AREA #2	0.00	1-10 WHEEL DUMP
2:30 PM	" "	0.00	HAUL LAST LOAD TO
			SP OPEN CUT 1 LOAD

LOAD SITE / SEWARD

Innovative Construction Solutions

AIR MONITORING LOG

Date: 8/16/16 + 8/19/16
Project Name: SEWARD MAINE
Project No.: NC 16-1114
Name: GARY C

CALIBRATION RECORD			
Time	Location	PID/FID (ppm)	Comments

DAILY LOG			
Time	Location	PID/FID (ppm)	Comments
8/16/16 8:00 AM	MEADER CREEK CONTRACTORS	0.00	EVALUATE CALCULATIONS +
8:10 AM	TRUE SOUTH SLOPE	0.00	RELOCATE TO STOCKPILE @
8:20 AM	" "	0.00	DISPOSAL AREA 2
8:40 AM	" "	0.00	COVER WITH VISQUEEN
9:00 AM	" "	0.00	WATER TRUCK WET
9:30 AM	" "	0.00	ALL MATERIAL.
9:45 AM	" "	0.00	
10:20 AM	" "	0.00	
10:40 AM	" "	0.00	
11:00 AM	" "	0.00	
12:30 AM	" "	0.00	
12:20 AM	" "	0.00	
8/19/16 7:20 AM	TP 2/5 SOUTH SLOPE	0.00	11 SAME AS ABOVE 4
7:25 AM		0.00	
7:35 AM		0.00	
7:42 AM		0.00	
7:50 AM		0.00	
8:30 AM		0.00	
9:45 AM		0.00	
9:30 AM		0.00	
10:00 AM		0.00	

Innovative Construction Solutions

AIR MONITORING LOG

Date: 9/21/16
Project Name: SEWARD MAINE
Project No.: NC 16-1114
Name: GARY C

CALIBRATION RECORD			
Time	Location	PID/FID (ppm)	Comments

DAILY LOG			
Time	Location	PID/FID (ppm)	Comments
6:30 AM	DISP AREA #2	0.00	4-TEN WHEEL DUMP
6:35 AM	STOCKPILE	0.00	HAULING CALCULATIONS OUT
6:38 AM	" "	0.00	TO SP OPEN CUT
6:45 AM	" "	0.00	WATER TRUCK DOWN
6:50 AM	" "	0.00	DUST CONTROL
9:15 AM	" "	0.00	
9:20 AM	" "	0.00	
9:25 AM	" "	0.00	
9:30 AM	" "	0.00	
12:20 PM			
12:25 PM			
12:33 PM			
12:50 PM			

11 LOADS CALCULATED BUILT

LOADSITE / SENADOR MINES

Innovative Construction Solutions

AIR MONITORING LOG

Date: 9/23/16
Project Name: SENADOR MINE
Project No.: NC16-1114
Name:

CALIBRATION RECORD

Time	Location	PID/FID (ppm)	Comments

DAILY LOG

Time	Location	PID/FID (ppm)	Comments
6:30AM	DISPOSAL ACCESS RD	0.00	5-10CY DUMP TRUCK
6:35AM	"	0.00	HAUL & EXPORT SOILS
6:45AM	"	0.00	CALCINES
6:50AM	"	0.00	
7:10AM	"	0.00	
7:20AM	"	0.00	
10:08AM	DISP ACCESS RD	0.00	
10:20AM	"	0.00	
10:25AM	"	0.00	
10:30AM	"	0.00	
10:57AM	"	0.00	

9 LOADS EXPORT CALCINES

Innovative Construction Solutions

AIR MONITORING LOG

Date: 9/22/16
Project Name: SENADOR MINE
Project No.: NC16-1114
Name: GREY CO.

CALIBRATION RECORD

Time	Location	PID/FID (ppm)	Comments

DAILY LOG

Time	Location	PID/FID (ppm)	Comments
7:15AM	DISPOSAL ACCESS RD	0.00	4 EA TEN WHEEL DUMP
7:27AM	STOCKPILE	0.00	HAUL FROM SENADOR MINE
7:30AM	"	0.00	TO STOCKPILE CUT
#1 7:54AM	"	0.00	4,000 LF
7:58AM	"	0.00	
10:30AM	"	0.00	4-10 WHEEL DUMP TRUCKS
10:35AM	"	0.00	DUMP 4 LOADS TO
10:40AM	"	0.00	STOCKPILE CUT
#2 10:45AM	"	0.00	4,000 LF
10:55AM	"	0.00	
11:00AM	"	0.00	
1:00PM	"	0.00	4 EA 10 WHEEL DUMP
1:25PM	"	0.00	EXPORT 4 LOADS
#3 1:30PM	"	0.00	
1:46PM	"	0.00	
1:55PM	"	0.00	
1:58PM	"	0.00	

EXPORT 12 LOADS TOTAL

McAbee Creek – Closer view of additional calcine excavation adjacent to the concrete wall. Calcine materials above to be deposited underneath Senador Mine Trail.

VII. OUTPUTS AND OUTCOMES – SUMMARY

Item of Work	$Addition/ ($Deletion)
Samples and Analysis of borings for N.O.A.	$2,450.00
Reduction in the number of temporary construction signs	($6,300.00)
Deletion of collection of seed collecting, use County standard	($25,884.00)
Addition of 400 C.Y. Import Clay soil – cap at SFOC	$34,596.00
Time Extension for Contract due to discovery of add. Calcines	$0
Additional excavation of calcines, hauling to SFOC- 164 C.Y.	$31,980.00
Spreading and Compaction of additional 164 CY calcines	$1,504.00
Additional Clay Soil Hauling to cover/cap calcines – 400 C.Y.	$20,600.00
Grading and smoothing of excavated areas- Wood Rd. Trail	$11,000.00
Hydroseed disturbed areas at Wood Road Trail	$21,200.00
Excavation, stockpile, place & compact ex. Clay cap material	$1,750.00
Excavation, hauling, additional calcines from stream channel	$48,750.00
Excavation & demolition of concrete rock, rubble – 450 C.Y.	$13,500.00
Excavation & hauling clay soil to stream channels-Wood Rd.	$7,310.00
Place and compact clay soil to cover calcine material- channel	$4,062.00
Additional grading required in Target feature 31channel	$33,930.00
Reduced quantity of fill soil to create Areas 1 and 2	($16,432.00)
Reduced quantity of excavated soil in areas CC, CD, 45	($3,060.00)
Reduced quantity of excavated soil in areas 22 and 31	($9,474.00)
Reduced quantity of import backfill in areas 43, 44, and 52	($17,645.00)
Additional backfill in in areas CC, CD, and 45	$42,760.00
Reduced quantity of imported fill – Areas 1 and 2	($47,040.00)
Reduced quantity of fill soil in Areas 23, 30, and Trail	($10,166.00)
Reduced cost for watering Hydroseed	($29,365.00)
Reduced Cost- Trail Damage Repair (Add Alternate No. 1)	($15,200.00)
Reduced quantity of rip rap in Target features 22, 31	($35,734.00)

Summary of Expected Outputs, Outcomes, and Accomplished Deliverables:
The Schedule of Quantities provided by the Consultant and inserted into the Bid Proposal documents did not match the bid received by the County from ICS, Inc.
The following table illustrates three lists of quantities:

1. The Original Bid Quantities,
2. The Addendum to the Bid Quantities during the bid period, and
3. The actual quantities completed during the project construction

TABLE 1: SCHEDULE OF QUANTITIES						
Bid Item	Description	Original Bid Consultant	Addendum Bid Consultant	Actual Amount Contractor	Addition/ Deletion	Comments
1	General Conditions, Mobilization,	$ 403,196.00	$ 403,196.00	($25,884.00)	Deletion	Lump Sum was itemized
	Demobilization, Submittals, Temporary			($29,365.00)	Deletion	through Schedule of Values
	Facilities, Equipment, Hydroseed, Install					
	Hydroseed, Watering of Hydroseed,					
	Planting Preparation, Planting, S.W.P.P.P.					
	Survey, Clearing and Grubbing, Seed					
	Collecting, Compaction Testing					
2	Excavation, Haul Calcines to SFOC	200 C.Y.	100 C.Y.	514 C.Y.	Addition	Unanticipated large quantity
						of calcines found during
						excavation of channels
3	Excavation, Haul to Areas 1 and 2 -	950 CY	1400 CY	1200 CY	Deletion	Disposal Area #1 was not
	New Channel through Reaches CC and					required, therefore reduced
	CD and Feature 45					
4	Excavation, Haul to Areas 1 and 2 - New	1000 CY	1400 CY	800 CY	Deletion	Disposal Area #1 was not
	Channel at Target Features 22 and 31					required, therefore reduced
5	Excavation and Temporary Stockpile -	700 CY	1400 CY	600 CY	Deletion	Disposal Area #1 was not
	Create Disposal Areas 1 and 2					required, therefore reduced
6	Backfill- Imported Fill - Calcine 43, 44, 52	185 CY	100 CY	0	Deletion	No areas to backfill
7	Backfill with Imported Fill - Reaches CC,	700 CY	500 CY	900 CY	Addition	Addition due to increased
	CD, and Feature 45					Calcines quantities removed
8	Backfill Material and Cover at Areas 1, 2	1300 CY	4000 CY	1000 CY	Deletion	Decrease cover material
9	Backfill Erosional Target Features 23 and	130 CY	130 CY	0	Deletion	Not needed
	30 and Senador Mine Trail Grading					
10	Rolling Dip Construction	5	5	5		No Change
11	SFOC - Stockpile Existing Cover, Place	400 CY	250 CY	500 CY	Addition	2 phases of cap material
	and Compact Calcines, Restore Cover					to be removed
12	Temporary Closure Signs	0	22	16	Deletion	
13	Slope Erosion Control Protection Fabric	350 CY	350 CY	350 CY		No change
14	Step Pool Streambed Construction	Lump Sum	Lump sum	Lump Sum		No change
15	Riprap Swale Constr. At Feature 22-31	300 CY	1100 CY	900 CY	Deletion	plans and details better
						matched in addendum
16	Floodplain Bench & Slope Construction	250 CY	100 CY	100 CY		No change
17	Traffic Control/Soil Transport	Lump Sum	Lump sum	Lump Sum		No change
AddAlt#1	Trail Damage Repair	0	10 CY	0	Deletion	Truck hauling actually
						helped with smoothing of
						the road/trail.

VIII. KEY MESSAGES, LESSONS LEARNED

Key staff from both the County of Santa Clara and the Consultant, AECOM left their respective positions with their agencies in late 2015 and early 2016. The project had not progressed to the final document approval stage until March 2016. Furthermore, as part of the condition of the grant, this project was required to be significantly complete by September 2016 in order to secure Federal Grant funding for the project.

The mercury mining that took place at Senador Mine produced an abundant amount of Calcine waste that was deposited on trails, roads, hillside dumps, and buried in the landscape. Estimates for future projects should allow for increased quantities of excavated soil and increased truck loads to the repository. During the next phase of the project, the County will need to determine whether another repository site within the park may be needed and to coordinate a new site within the park with the California Water Board.

Truck hauling operations from Wood Road trail to Hicks Road, in either direction, is very dangerous. Hicks Road has very steep grades with winding turns in a narrow right-of-way. There are few guard rails and very abrupt drop-offs on the side of the road. Hicks Road will not be used for further truck hauling in future phases.

The amount of disturbed area as a result of construction equipment and vehicular access was more than anticipated. Working within the stream channels and accessing locations off of the maintenance trail resulted in greater areas of disturbance. These areas have since been finely graded and smoothed and received hydroseed at the conclusion of the project.

FUTURE WORK

The County of Santa Clara is presently reviewing the 100% plans and specifications for the Calcine Paved Road Remediation Project. This project will include the excavation and removal of calcines that had been used to pave the trails during period when Mercury mining was active on the site. The quantities of Calcine removal will be approximately eight times (8 x) the amount taken from the Senador Mine Restoration Project. While the scope of this upcoming project is primarily along the roads and trails and the drainage ditches adjacent to the trails, the large quantities to be delivered to the repository and capped will be more easily estimated.

CONCLUSIONS

The Senador Mine Restoration Project Construction Team worked well together and made critical decisions and approved alternatives to materials in a timely manner. The most time consuming part of the project was during the submittal approval process especially in regards to the Health and Safety Requirements and the Imported Soil. The Contractor lost approximately two weeks of time in initiating and waiting for N.O.A. testing and for the submittal and provision of Air Monitoring Equipment to determine air-born Mercury dust/waste.

In regards to construction action items, the discovery of a seemingly endless supply of calcine waste, where unanticipated, proved to be a critical moment in determining the cost-benefit of continual removal. It is possible that a combination of insufficient number of soil probes completed several years ago, and the inconsistency of calcine depths and deposits contributed to the under-estimation of quantities in the bid items.

The Senador Mine Restoration Project Construction Contract, in the amount of $1,045,821.00, had a 10% construction contingency ($104,582.00) provided by the County of Santa Clara. Of that 10% contingency, $59,092.00 or 56.5% of the contingency amount was expended for extra work. Most of the extra work was in the form of two major items:

1. Additional calcines to excavate and transport to the SFOC
2. Additional grading needed for the channel formation in Target Feature 31 and the shifting of the Maintenance Road to allow for a greater width to the McAbee channel and step pools.

Fortunately, these high unit costs were offset by credits received during construction consisting of:

1. Elimination of stockpile Area #1: Not needed
2. Reduced quantity of Rip Rap in Target Feature 22/31
3. Reduced quantity of Trail Damage
4. Reduced quantity of soil export, stockpile and compaction in Area 2
5. Reduced quantity of water requirements for hydro-seed establishment

The length of Construction Contract with Innovative Construction Solutions was 120 Calendar Days. The last day of the contract was initially scheduled for October 11, 2016, a timeline that left little cushion for delays in relation to the October 15 deadline for work in the stream channels.

After delays in submittal approvals and a delay in the testing results of N.O.A. and Mercury Air Monitoring Equipment and Protective Wear, it appeared that the Contractor could make up for those lost days. However, when the additional calcine deposits were discovered, the Contractor requested an additional 21 days to the contract. After the County approved the time extension, the final day of the contract was November 1, 2016 and the final acceptance meeting with the contractor the following week. All work in the stream channels was completed by October 15, 2016. Remaining work outside the stream channels, consisting of the final compaction and hydro-seed of the SFOC, the final survey work of grades of both the Senador Mine project site and the SFOC, and the demobilization work was completed in the final three weeks.

PROJECT CONSTRUCTION TEAM MEMBERS

County of Santa Clara Parks Department: Robb Courtney, Director

Mark Frederick, Tom McLauchlan, David Lake, Christian Elliott

Innovative Construction Solutions, Inc.

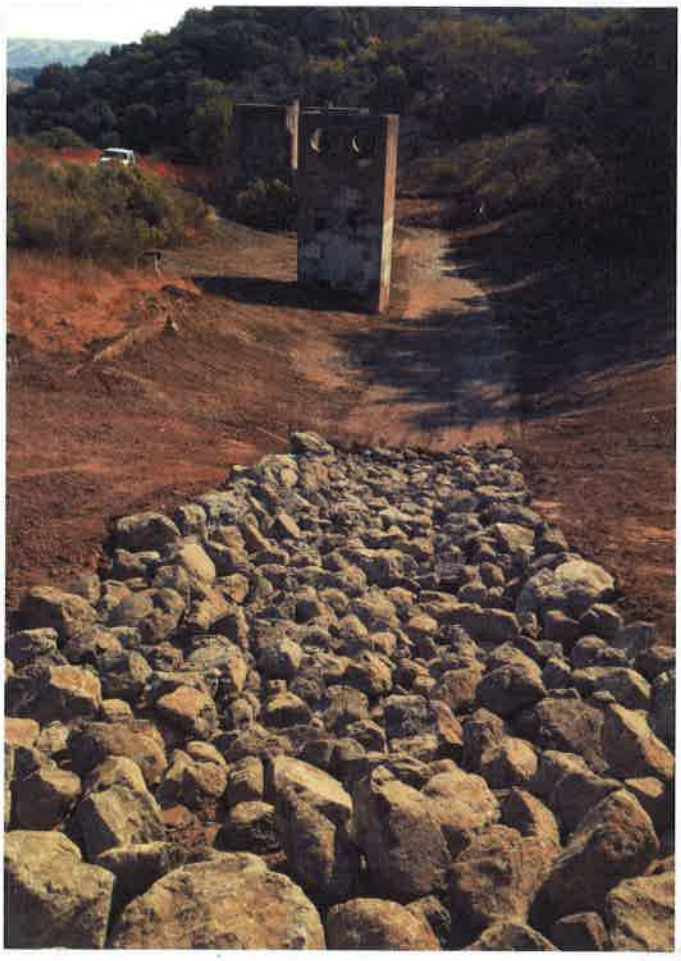
Keith Dorsa, Jake French, Gary Cogwell

AECOM, Inc.

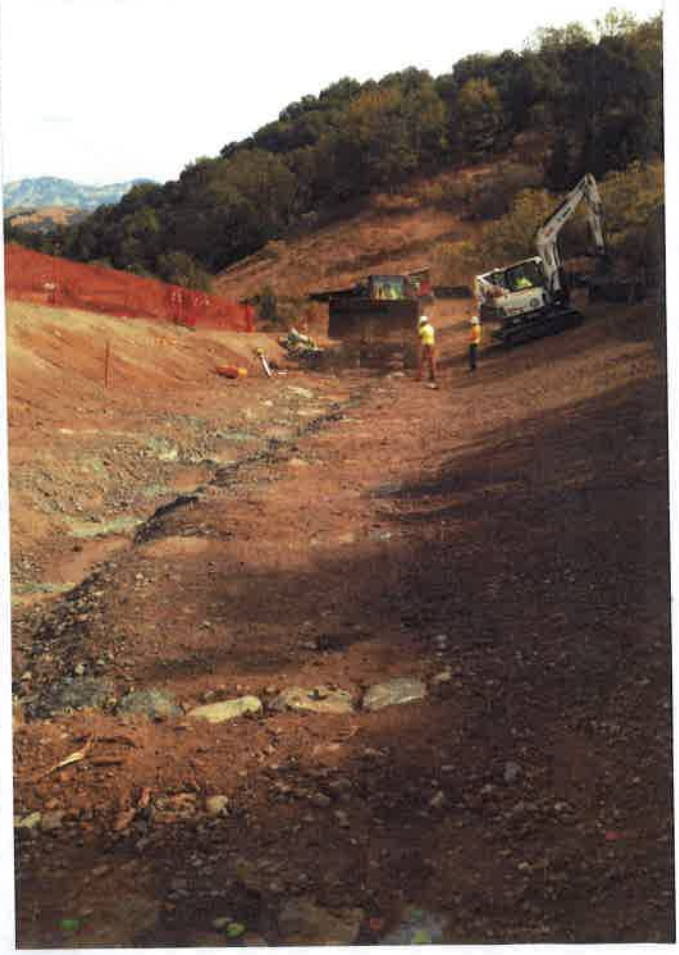
Jenn Hyman, Paul Boddie, Stacy Ball, Jason Pearson, Mike Velzy

EXISTING CONDITIONS: STREAM CHANNEL CC/CD/45; FACING EAST

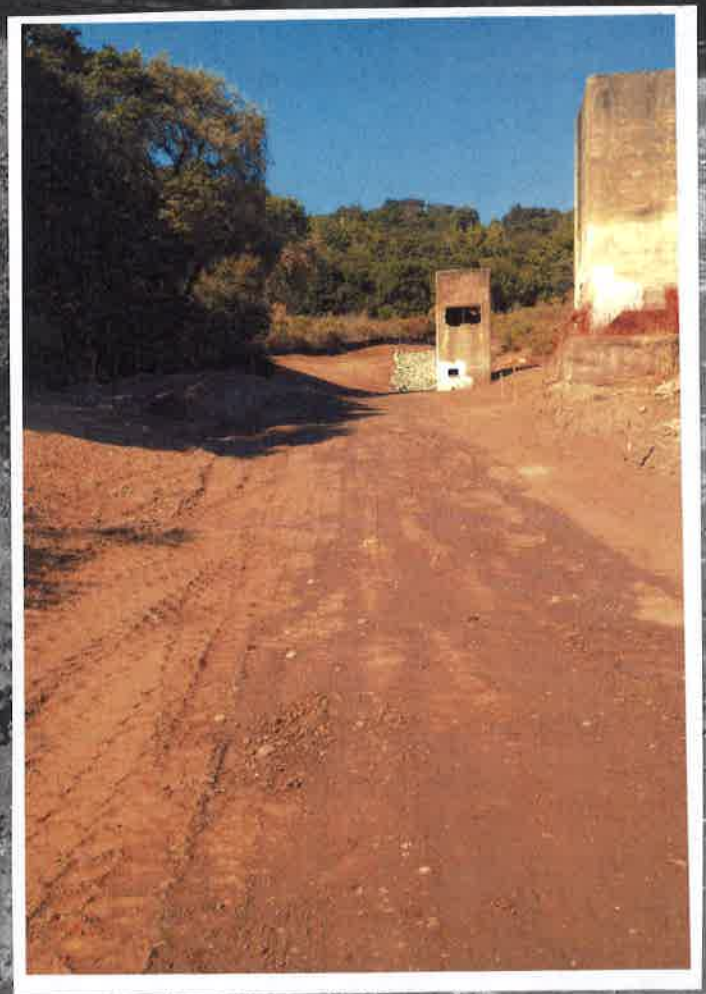
CLEARING, GRADING, COMPACTION: STREAM CHANNEL CC/CD/45; FACING EAST

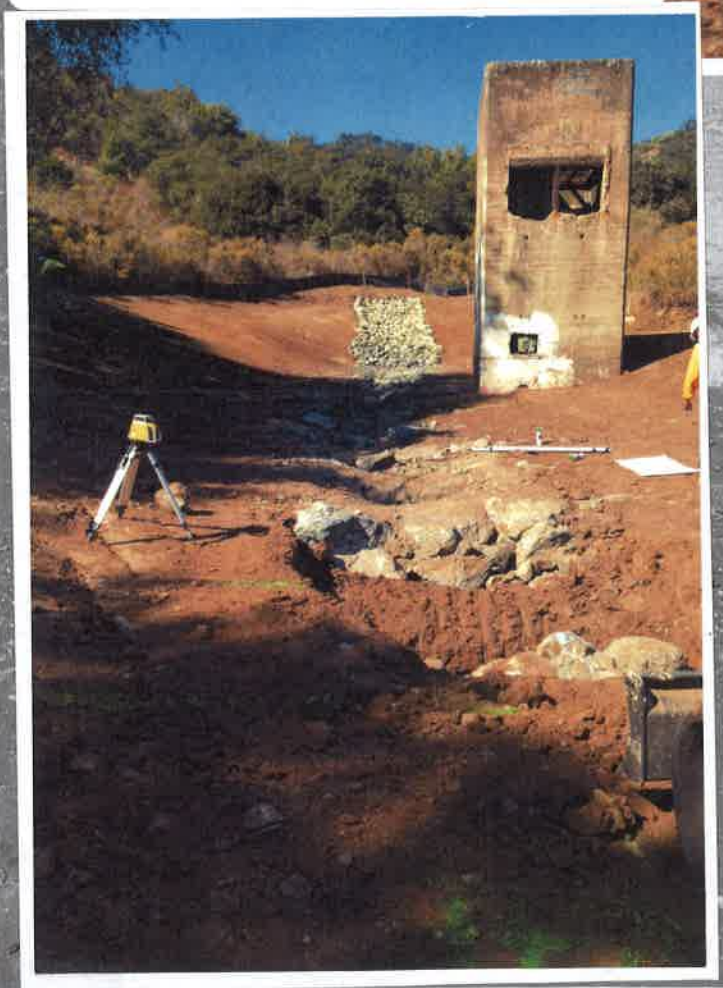


RIP RAP INSTALLATION: STREAM CHANNEL CC/CD/45; FACING EAST



CLEARING, GRADING, COMPACTION: STREAM CHANNEL CC/CD/45; FACING WEST





STEP POOL PREPARATION: STREAM CHANNEL CC/CD/45; FACING WEST

STEP POOL PREPARATION: STREAM CHANNEL CC/CD/45; FACING WEST

SENADOR MINE RESTORATION PROJECT, SANTA CLARA COUNTY PARKS

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STEP POOL PREPARATION: STREAM CHANNEL CC/CD/45; FACING WEST

SENADOR MINE RESTORATION PROJECT, SANTA CLARA COUNTY PARKS

STEP POOL PREPARATION: STREAM CHANNEL CC/CD/45; FACING WEST

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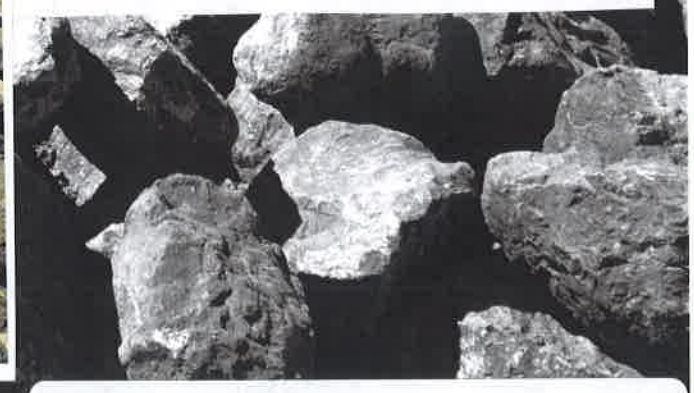
SENADOR MINE RESTORATION PROJECT, SANTA CLARA COUNTY PARKS

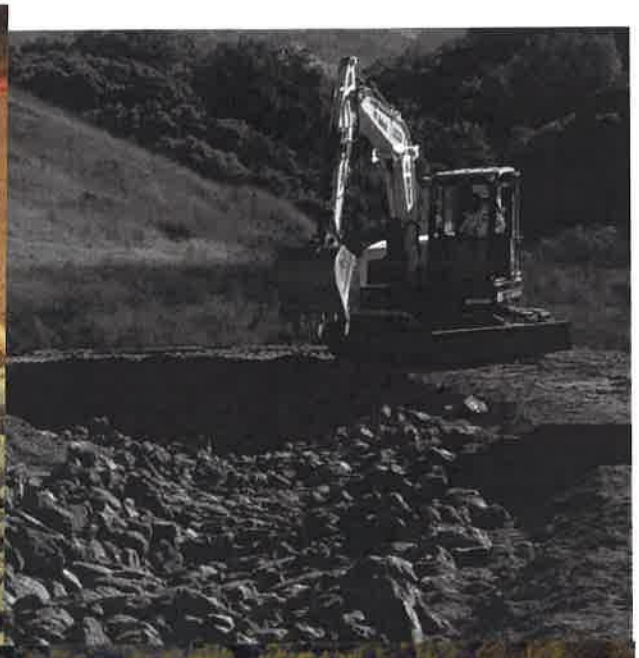


RIP RAP INSTALLATION: STREAM CHANNEL 22; FACING WEST

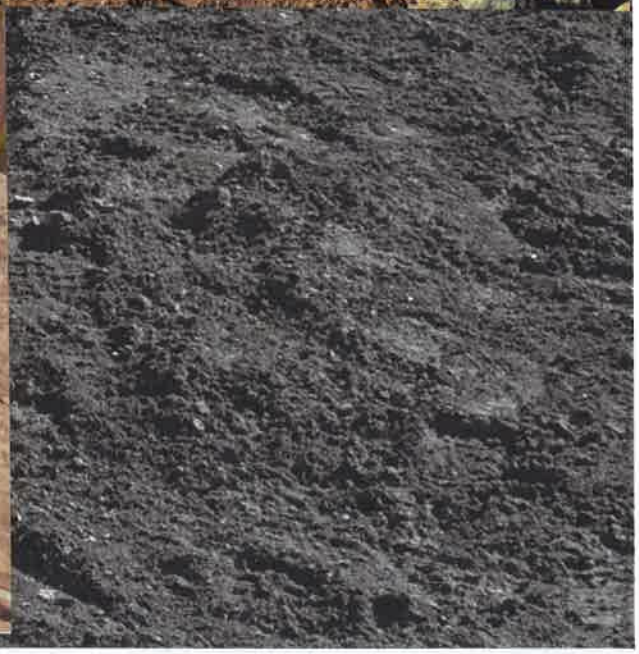
SENADOR MINE RESTORATION PROJECT, SANTA CLARA COUNTY PARKS

RIP RAP INSTALLATION: STREAM CHANNEL 31: FACING NORTH

CHANNEL FORMATION: STREAM CHANNEL 22/31; FACING EAST



CHANNEL FORMATION: STREAM CHANNEL 22; FACING WEST



RIP RAP INSTALLATION: STREAM CHANNEL 31: FACING NORTH

CLEARING, GRUBBING, ROUGH GRADING: STREAM CHANNEL 22; FACING WEST

RIP RAP INSTALLATION: STREAM CHANNEL 22; FACING WEST

The San Francisco Open Cut repository (SFOC) is located on Mine Hill, near the juncture of Castillero Trail and Wood Road Trail. Approximately 20,000 square feet of clay topsoil were excavated to prepare for the deposit of over 500 cubic yards of calcine waste. Photo below illustrates the excavation and stockpiling of the existing soil to expose the calcine deposits.

Photo below illustrates the import and spreading of additional clay soil to cover the calcine waste material prior to leveling and compaction.