Santa Clara County
Department of Planning & Development

Planning Commission Workshop
Lehigh - Permanente Quarry

Reclamation Plan & Water Quality

October 23, 2014

Presentation Outline

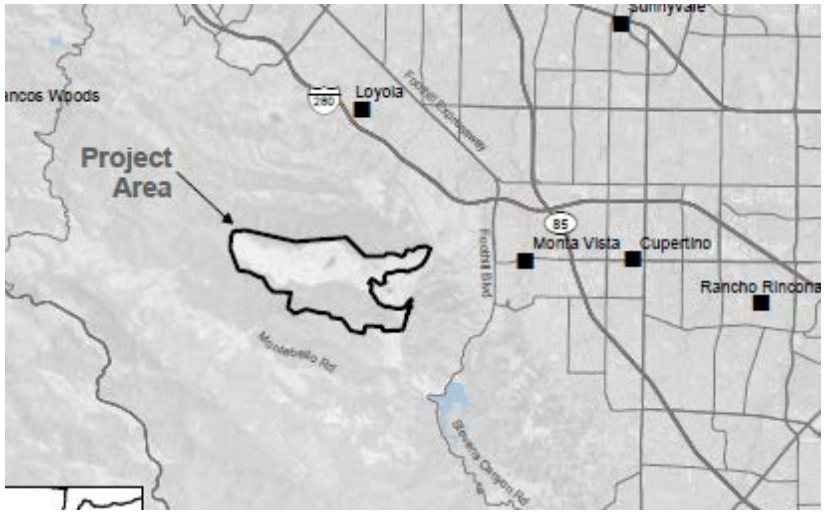
- Workshop Objectives
- Lehigh Permanente Quarry
  - Background & Permitting History
  - 2012 Reclamation Plan Amendment (RPA)
- Selenium
  - Limestone / Water Quality Concerns
  - Circumstances at Lehigh
  - 2012 Reclamation Plan Amendment– EIR
  - November PC Hearing

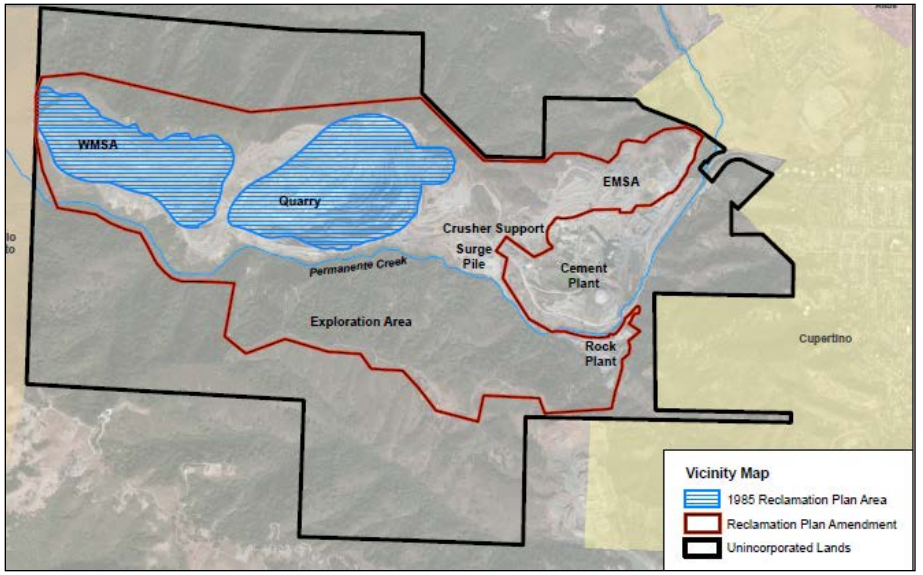
Workshop Objectives

- Provide Background Information regarding
  - Lehigh Permanente Quarry
  - Water Quality
  - November 20th Hearing action / findings.
- Well informed decision-making
- No deliberation of actions or findings today.

Lehigh Permanente Quarry

- Located in foothills west of Cupertino
- Quarrying began early 20th Century – Limestone
- 1985 Reclamation Plan (post mining restoration)
- 2011 – Vested Mine (Board of Supervisors)
- 2012 Reclamation Plan Amendment





2012 RPA

WMSA

EMSA

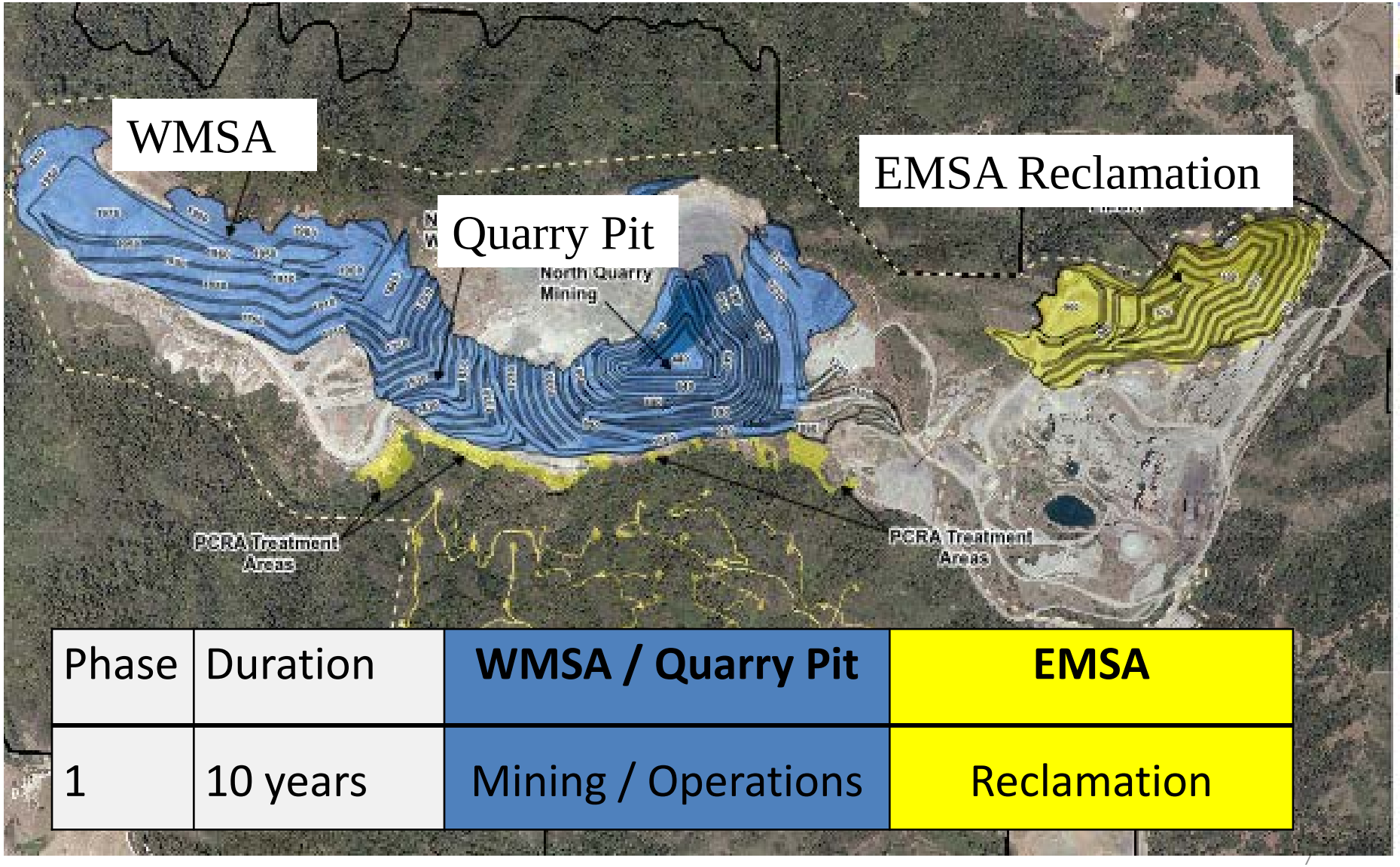
Quarry Pit

Creek Restoration

Reclamation Plan Amendment 20 years - Phases

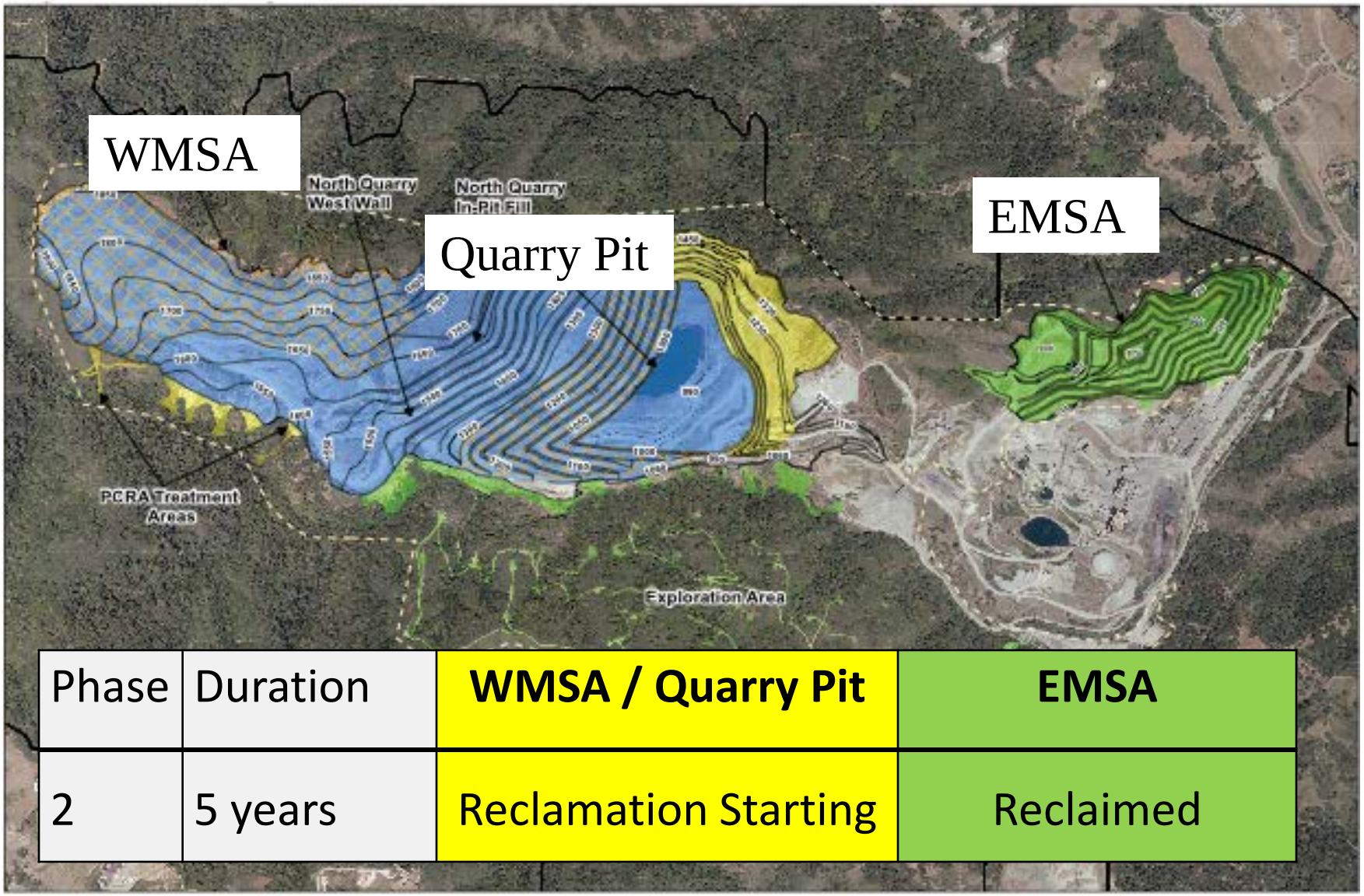
Phase	Duration	**WMSA / Quarry Pit**	**EMSA**
1	10 years	Mining / Operations	Reclamation
2	5 years	Reclamation Starting	Reclaimed
3	5 years	Reclamation Completion	Reclaimed

Phase 1



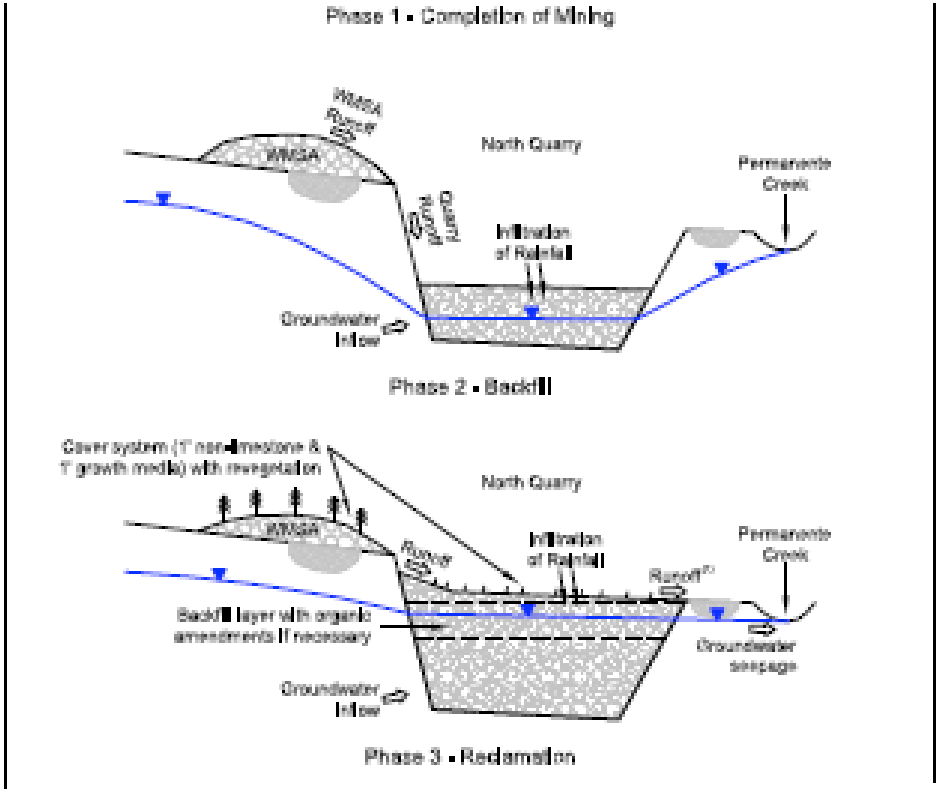
Phase	Duration	**WMSA / Quarry Pit**	**EMSA**
1	10 years	Mining / Operations	Reclamation

Phase 2



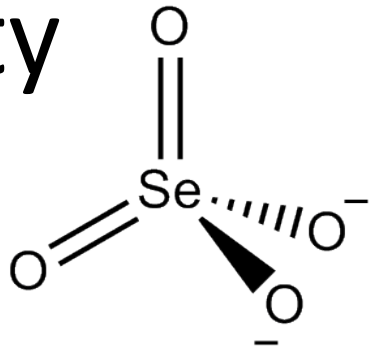
Phase	Duration	**WMSA / Quarry Pit**	**EMSA**
2	5 years	Reclamation Starting	Reclaimed

Phase 3 – Final Reclamation



Phase	Duration	**WMSA / Quarry Pit**	**EMSA**
End	---	Reclaimed	Reclaimed

Selenium – Water Quality



- Selenium (Se)-
  - Basic chemical element
  - Essential micronutrient for human, wildlife, fish
  - Overconcentration - toxicity in wildlife & fish

- Water Quality Standards
  - Human Health (drinking water) – 50 µg/L
  - Fish and Wildlife – 5 µg/L
    - *Standard Used in Permanente Creek*

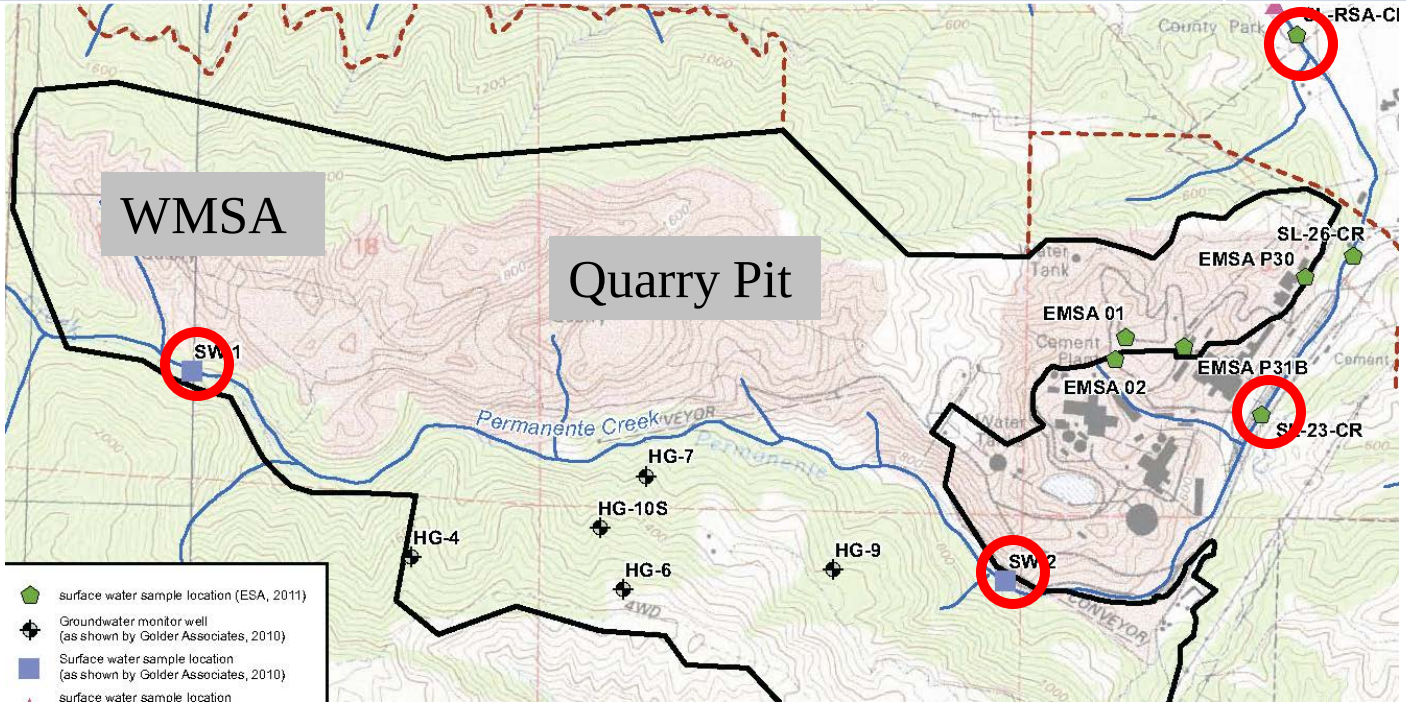
Selenium / Water Quality

- Selenium @ Lehigh
  - Naturally occurring in onsite limestone
  - If exposed to air, easily leaches into water – highly mobile
  - Surface mining exposes limestone
  - Surface water runoff into Permanente Creek

- Permanente Creek – listed as impaired for Selenium (RWQCB, 2007).

Past water testing results – Permanente Creek (2010, 2011)

Permanente Creek	Near WMSA	Downstream - Quarry Pit	Below Cement Plant	Downstream of site
Selenium Concentration (average – µg/L)	7.2	62	24	9.9



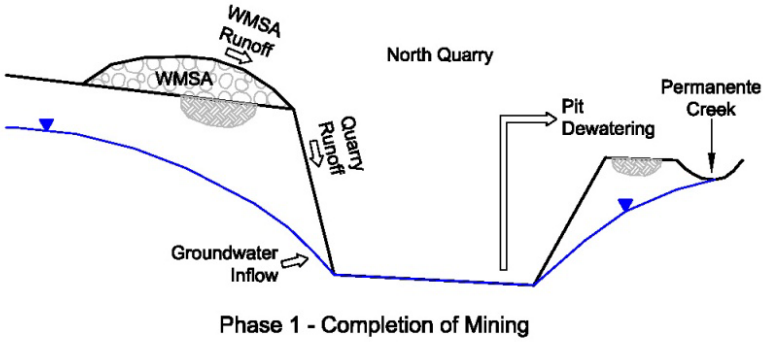
SMARA Standards – Water Quality

- SMARA requires compliance with water quality standards.
- 2012 Reclamation Plan approach -reduce selenium concentrations

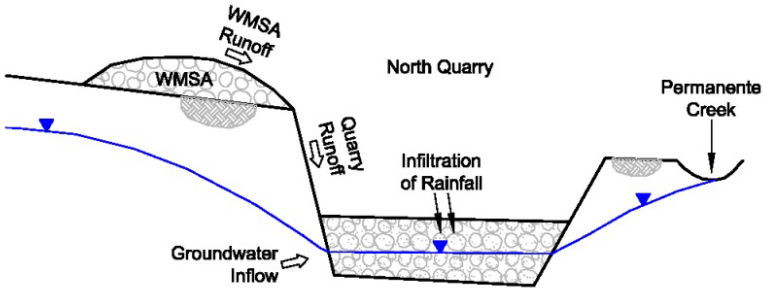
- EMSA Overburden Area –
  - One foot thick cover – non-limestone
  - Greenstone, Chert, Graywacke
  - One foot Soil cover and vegetation

Reclamation Plan - Selenium

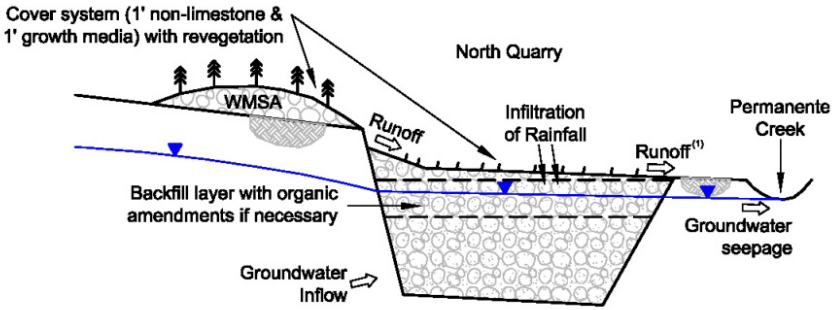
- WMSA and Main Quarry Pit
  - Backfill Pit with WMSA Overburden
  - Blend top 25-50 feet with organic material
  - Creates Anaerobic Environment
  - Reduces Selenium concentration
- WMSA / other areas – cover limestone



Phase 1 - Completion of Mining

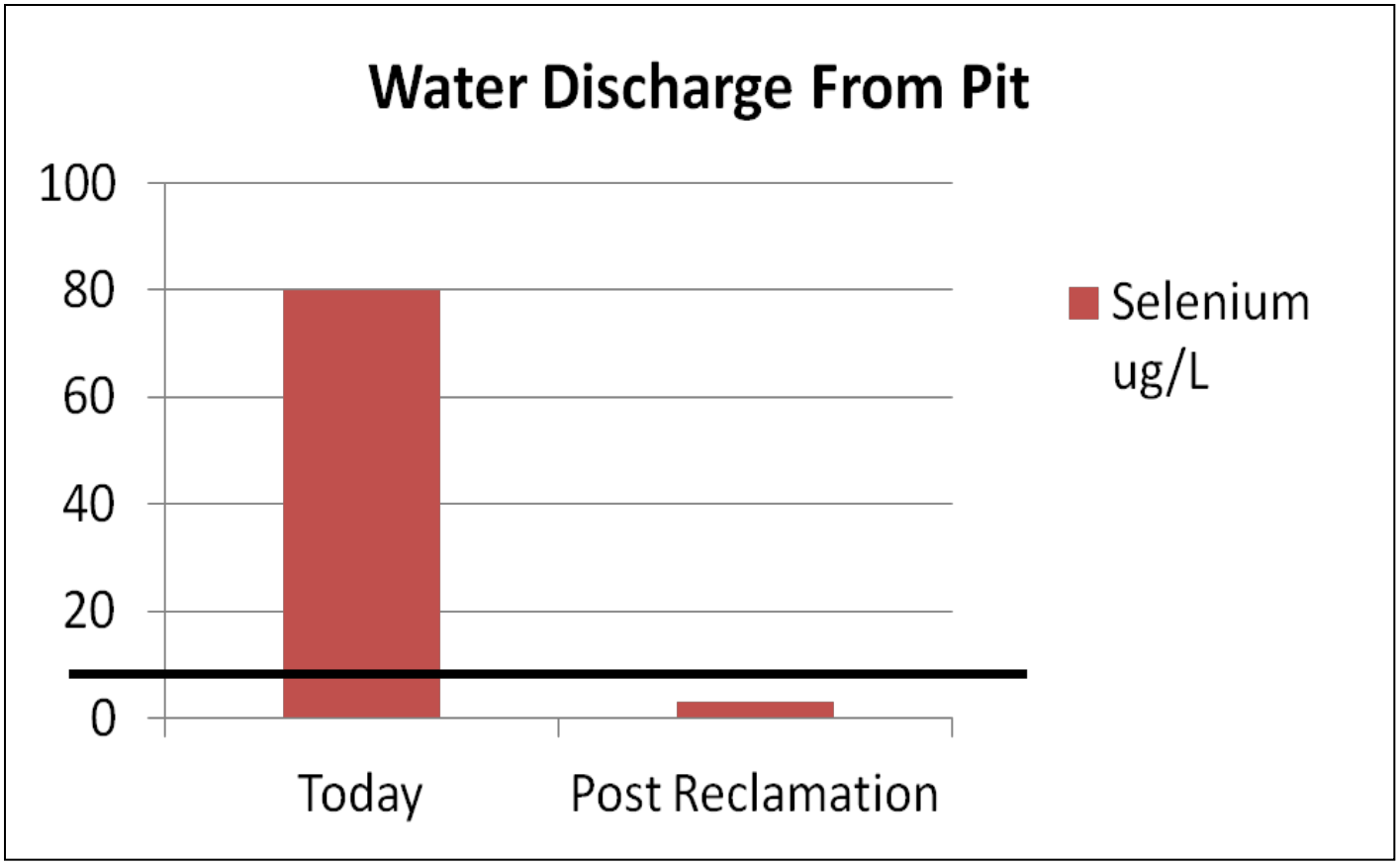


Phase 2 - Backfill



Phase 3 - Reclamation

Final Reclamation and Selenium reduction



Interim Reclamation
2012 EIR Analysis

- Movement of overburden
- Could be temporary increases in selenium

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1	10 years	Mining / Operations	Reclamation
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EIR Analysis - Interim Reclamation

- Implement BMPs to prevent contact between limestone and stormwater
- Insufficient water testing data to support effectiveness of this approach.

- Alternative mitigation to prevent selenium in runoff – Treatment
- EIR – insufficient research and data to support conclusion that treatment plant feasible

2012 FEIR Mitigation Measures & Conditions of Approval

- Conduct BMP's during reclamation to prevent limestone exposure – selenium runoff. *(#78)*

- Test surface water discharge into Permanente Creek (Pond #30) *(#79, 80, 81)*

2012 FEIR Mitigation Measures & Conditions of Approval

- Lehigh to continue research, pilot testing, evaluation of installing selenium treatment facility. *(#82)*

- PC Hearing in 30 months (12/2014), - re-evaluate feasibility of installing selenium treatment facility. *(#82)*

November 20 Questions?

- Has stormwater discharge from EMSA exceeded water quality standards?
- Can Selenium Treatment facility be installed for Main Pit / WMSA?
- Can Selenium Treatment facility be installed for EMSA area?

  - Stormwater Sampling Results
  - Feasibility Study (Lehigh)
  - Peer Review
  - Data / Study sent to RWQCB

Pilot System / Consent Decree

- Lehigh / Sierra Club – 2013 Consent Decree
  - Lehigh to install water treatment facility for Main Pit.
  - Pilot System (Frontier Technologies) installed near Main Pit (Pond 4A) – September 2014

November 20th PC Hearing

Three Actions by Planning Commission

(1)Accept Annual Report for Reclamation– July 1, 2013 – June 30, 2014.

(2)Evaluate stormwater testing results from EMSA (Pond 30) – determine if exceed water quality standards.

(3)Determine if installation of selenium treatment facility (or alternate) is feasible.

Determination of Feasibility

- Questions?

- BACKUP SLIDES

CH2M Hill Study

- DEIR Comments – Infeasibility of treatment

- CH2MHill – Feasibility Study
  - No system in operation for similar site constraints
  - Possible to engineer system for Quarry Pit
  - Fluidizied Bed Reactor (FBR) System
  - Need water management study, additional study
  - Cost - $33 million to $127 million construction
  - $6.5 million/yr. operations ($100 million total)

Interim Selenium Impacts

- Due to uncertainty in costs, further site evaluation needed– treatment as mitigation measure **today** infeasible.

- New Mitigation Measures - (4.10-2b, 2c, 2d)
  - Requires additional evaluation - feasibility
  - Hearing in 30 months - determination of feasibility

What is Reclamation?

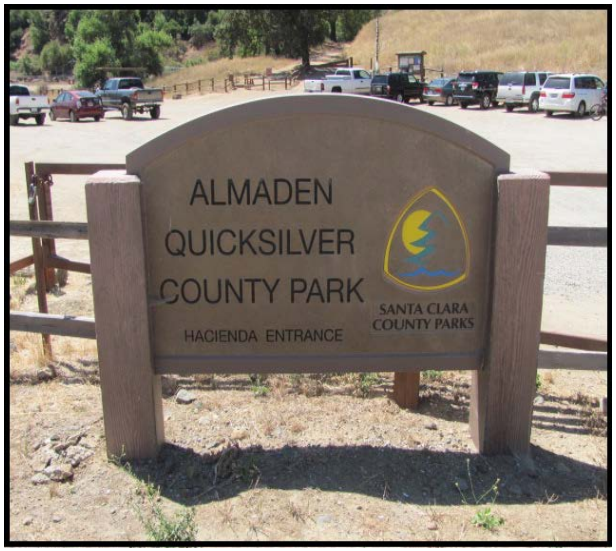
- Every Surface Mine **must** have a Reclamation Plan
- Reclamation = Exit Strategy, Leave the Site in a usable end state.

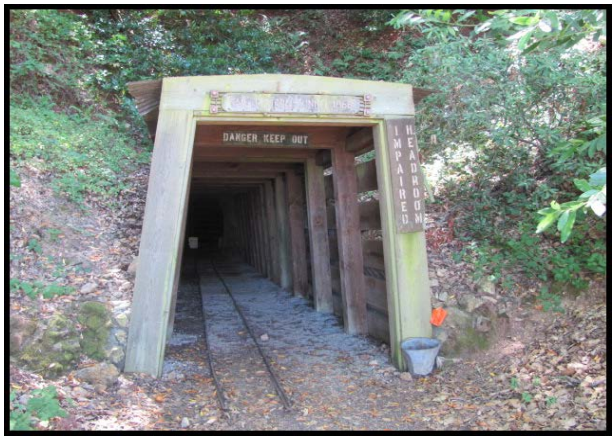
Past surface mining without Reclamation

Abandoned Talc Mine – Death Valley, CA

What is Reclamation?

Past surface mining without Reclamation





Est. County costs - $7.5 million +

What is Reclamation?

What is Mined-Land Reclamation?

- The process of reclamation includes maintaining water and air quality, minimizing flooding, erosion and damage to wildlife and aquatic habitats caused by surface mining. The final step in this process is often topsoil replacement and revegetation with suitable plant species (http://www.conservation.ca.gov/omr/reclamation)

- Reclamation Plan. The applicant's (operator's) completed and approved plan for reclaiming the lands affected by his surface mining operations conducted after January 1, 1976,

Scope of Reclamation Plan

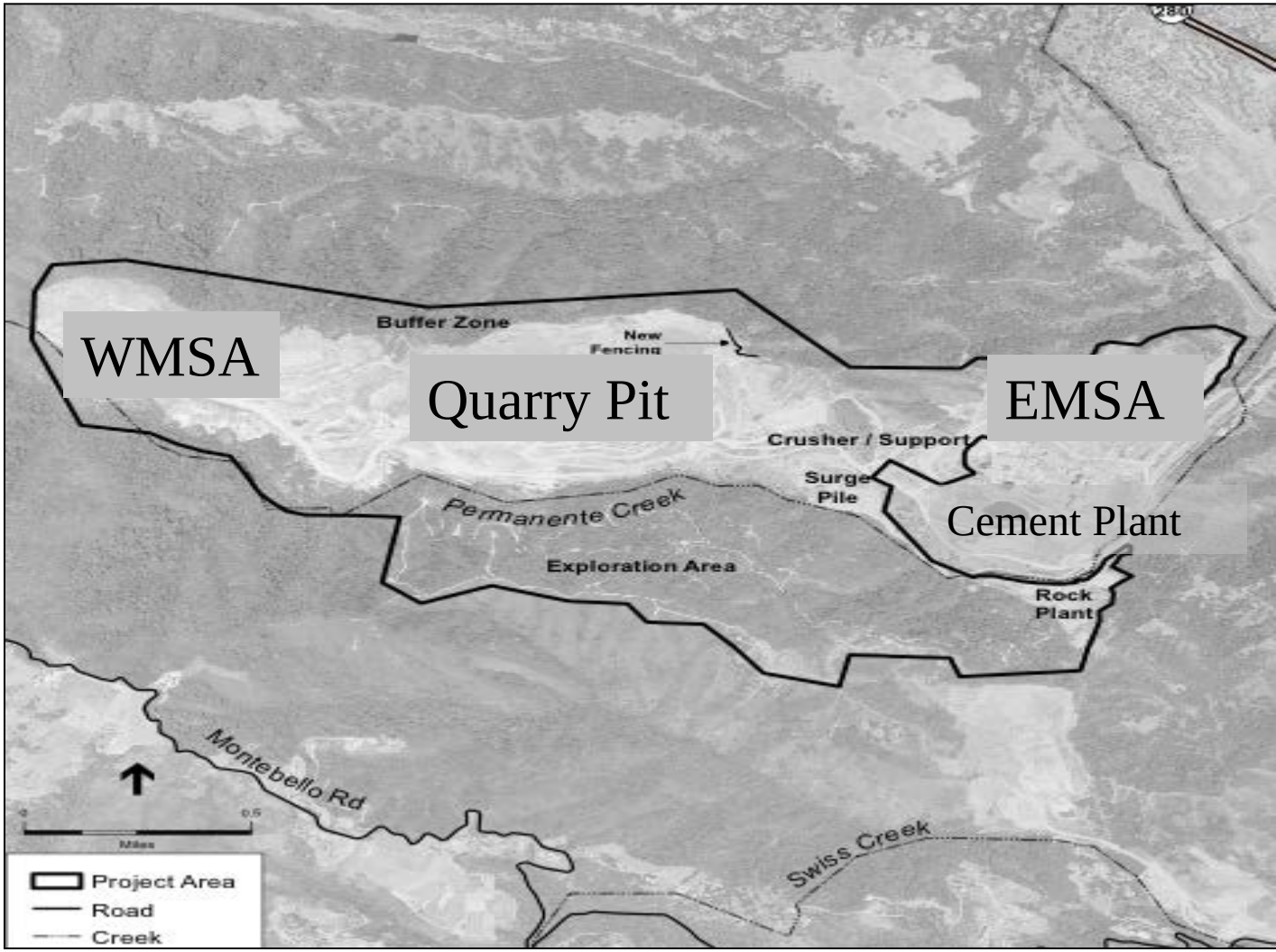
<u>Does not include:</u>

- On-going mining (operations)
  - Surface mine is existing,
  - Surface mine is vested (BOS, 2011)

- Cement plant operations
- No new Quarry Pit proposed

Reclamation Plan Amendment

- New Overburden Storage (EMSA)
- Backfill of Quarry Pit with Overburden (WMSA)
- Permanente Creek Restoration
- 20 Year Plan

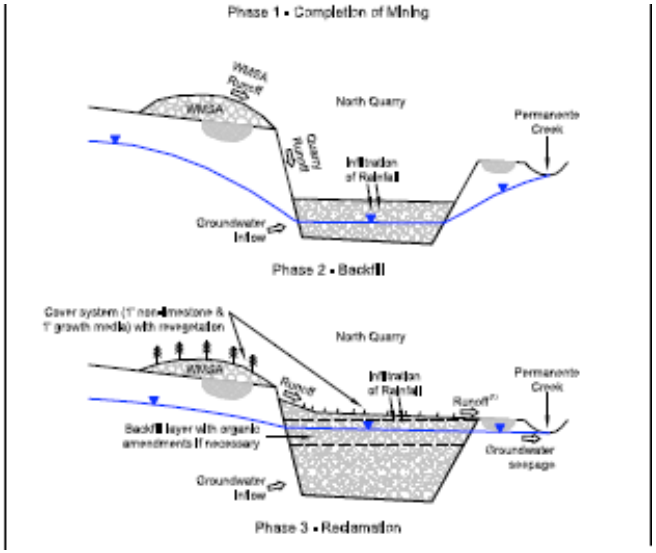


Reclamation Plan

WMSA

EMSA

Quarry Pit



Creek Restoration

Environmental Impact Report

- Significant and Unavoidable impacts
  - Impacts from Reclamation – 22 significant impacts
  - All mitigated except following areas

  - Visual impacts during reclamation
  - Adverse impacts to historic resources
  - Interim selenium concentrations in runoff into Permanente Creek during reclamation (Water Quality and Biological impacts)

Selenium

- What are the Human Health Effects of Excessive Selenium?

- Drinking Water Standard – 50 μg /L (EPA)

- An early toxic effect of selenium is on endocrine function, particularly on the synthesis of thyroid hormones following dietary exposure of around 300 micrograms Se/d, and on the metabolism of growth hormone and insulin-like growth factor-1
- Other adverse effects of selenium exposure can be the impairment of natural killer cells activity and at higher levels, hepatotoxicity.
- Dermatologic effects, such as nail and hair loss and dermatitis, occur after exposure to high levels of environmental selenium.

(Source: . Department of Hygiene, Microbiology and Biostatistics, University of Modena and Reggio Emilia, Italy).

Selenium Treatment - Costs

- During Reclamation – could exacerbate selenium.
- CH2M Hill Study – Treatment Options
  - Need water management study, additional study
  - Cost - $33 million to $127 million construction
  - $6.5 million/yr. operations ($100 million total)

- Uncertainty of treatment- further studies needed
- Once studies completed, costs known – future determination of feasibility - Planning Commission

Water Quality Monitoring

- Is there sufficient water quality monitoring?

- Groundwater emergence from Pit following Reclamation – 14 years.
- Requirement to monitor 5 years to demonstrate compliance with standards - before reclamation complete.