APPENDICES

APPENDIX 1.0-1 NOTICE OF PREPARATION AND NOP COMMENT LETTER

INC'D MARCH 13 A.D. 1893

CITY OF GRASS VALLEY
Community Development Department
Thomas Last, Community Development Director

125 East Main Street
Grass Valley, CA 95945

Building Division
530-274-4340
Planning Division
530-274-4330

A CENTENNIAL CITY

May 17, 2013

To: See Attached Agency List

Re: **Notice of Preparation for an Environmental Impact Report** for the Southern Sphere of Influence Planning and Annexation Project

The City of Grass Valley will prepare an Environmental Impact Report (EIR) for the **Southern Sphere of Influence Planning and Annexation Project** (proposed project, project) and is issuing this Notice of Preparation (NOP) per Section 15082 of the California Environmental Quality Act (CEQA) Guidelines. The City is requesting input from the public and your agency on environmental issues associated with development of the proposed project as described in this NOP. As a responsible or trustee agency, your agency may need to use this EIR when considering issuance of a permit or other discretionary approval for the proposed project. Comments received during this public comment period will be used to focus the environmental analysis in the EIR.

Project Overview

The property is located along State Route 49 (SR49) adjacent to the southern city limit line beginning in the vicinity of McKnight Road and extending south along SR49 and La Barr Meadows Road. (**Figure 1, Regional Location Map**). The proposed project includes: 1) an amendment to the General Plan land use designations on 423 acres; 2) a prezone of 423 acres of land to various zone districts consistent with the proposed General Plan amendments; and 3) the annexation of approximately 120 acres (**Figure 2, Proposed General Plan Map, Figure 3, Prezoning Map and Figure 4, Annexation Map**). No development is proposed as part of this project, although several of the properties involved are either fully developed, or capable of additional development.

Comment Period

The NOP comment period commences on **May 21, 2013**, and will end on **June 20, 2013**. When submitting comments, please be specific in describing your environmental concerns. In particular, if there are changes to the project or measures you believe the City should take that would reduce the environmental impact of the project or address issues of concern, please include them in your response to this NOP. Please also include contact information so that the City can follow up with questions regarding comments if necessary. Comments must be sent to:

Thomas Last
Community Development Director
City of Grass Valley
125 E. Main Street
Grass Valley, CA 95945
toml@cityofgrassvalley.com

Scoping Meeting

Two scoping meetings will be conducted on **June 6, 2013**, in the City of Grass Valley City Council Chambers at the address shown above. **The meetings will be at 3:00 p.m. (primarily for agencies) and 6:00 p.m. (primarily for the public)**. The scoping meeting will provide public agencies and the public with the opportunity to learn more about the proposed project and to discuss environmental issues. The scoping meeting will include a presentation of the proposed project and a summary of the environmental issues to be analyzed in the EIR. Comments provided during the scoping meeting will assist the City in scoping the potential environmental effects of the project to be addressed by the EIR.

Anticipated Significant Environmental Impacts

The City has determined that the proposed project will require preparation of an EIR. As permitted by CEQA Section 15060(d), the City will not prepare an Initial Study. The City will prepare a program EIR as defined in Section 15168 of the CEQA Guidelines. The EIR will evaluate all of the topics in the CEQA checklist.

Based on experience with similar projects, the City anticipates the project may result in the following significant environmental impacts:

Air Quality: Future development of industrial uses will result in additional traffic, heavy trucks and passenger vehicles traveling to and from the project area. Project traffic will increase the amount of diesel and other air emissions in the city. The EIR will evaluate the air quality impacts associated with the proposed project.

Biological Resources: Portions of the project area contain wetlands and sensitive plant and animal species. Most of the project area has had past biological assessments and studies completed and have identified the specific location of biological resources. The EIR will summarize those studies and supplement as necessary with current available information.

Greenhouse Gases: It is likely that future development may contribute to cumulative increases in greenhouse gases. Measures contained in the California Building Code as well as future existing policies in the General

Plan may reduce the proposed project's impacts related to greenhouse gases, however it is anticipated that the cumulative impact to greenhouse gasses is likely to be significant. The EIR will estimate the proposed project's potential to generate greenhouse gases.

Hazardous Materials: Portions of the project area are known to have contamination created from historic mining and lumber operations. Most of the project area has undergone substantial study and has been fully characterized. In many cases cleanup plans have been completed or are in the process of being finalized. The EIR will identify those locations, characterize the site conditions, and summarize approved or proposed cleanup plans.

Noise: Increases in vehicle traffic and the addition of new residential, commercial and industrial uses may result in an increase in ambient noise near the project site and along transportation routes leading to the project site. The EIR will estimate noise impacts associated with the proposed project.

Transportation: Traffic associated with the proposed project may result in impacts on area roadways, intersections, and transportation facilities, including those outside of the City's jurisdiction. Improvements are planned for some of the area roadways, however the timing, extent of improvements and financing may be uncertain. The EIR will evaluate impacts to the transportation network resulting from development and operation of the proposed project.

Public Utilities: The EIR will evaluate the impact on city service such as wastewater treatment and storm drainage. Water impacts will be evaluated with the Nevada Irrigation District. While is it unlikely that the proposed project will result in significant impacts to utilities, the extent of the impacts will be discussed in the EIR.

Annexation: The intent of the prezoning is to provide for annexation of 120 acres of the project area. This will involve seeking approval of the annexation from the Local Agency Formation Commission (LAFCO). While this is not a significant environmental effect, the EIR will be designed to meet the LAFCO requirements for annexation.

Southern Sphere of Influence Planning and Annexation Project

1. Project Location and Setting

Regionally, the project site is located in the City of Grass Valley within Nevada County in northern California. (**Figure 1**, **Regional Location Map**). As shown in **Table 3.0-1**, the project includes 57 Nevada County Assessor's Parcel Numbers:

Table 3.0-1

Existing and Proposed General Plan Designations and Zoning

APN	Size Acres	Existing Use	Existing City Land Use Designation	Proposed Land Use Designation	Existing County Zoning	Proposed City PreZoning	Proposed for Annexation
Eastern Side of Highway 49							
09-620-12	19.10	Vacant	UED	UMD	RA-1.5	R-2	No
22-140-05	1.50	Grange Hall	BP	M/I	M-1	M-1	Yes
22-140-08	5.40	HBE/Industrial	BP	M/I	M-1	M-2	Yes
22-140-10	10.10	HBE/Industrial	BP	M/I	M-1	M-2	Yes
22-140-11	1.50	HBE/Industrial	BP	M/I	M-1	M-2	Yes
22-140-12	1.00	HBE/Rental Yard	BP	M/I	M-1	M-2	Yes
22-140-21	2.80	Vulcan/Industrial	BP	M/I	M-1	M-2	Yes
22-140-22	6.90	HBE/Industrial	BP	M/I	M-1	M-2	Yes
22-140-25	3.03	HBE/Industrial	BP	M/I	M-1	M-2	Yes
22-140-30	7.53	Vacant	BP	OS	RA-1.5	OS	No
22-140-35	36.63	Vacant	UED	M/I	RA-1.5	M-1	No
22-140-36	2.80	Ministorage	BP	M/I	M-1	M-2	Yes
22-140-38	2.20	Veterinary Hospital	BP	M/I	M-1	M-2	Yes
22-140-41	2.50	Dismantling Yard	Commercial	M/I	BP	M-2	Yes
22-140-43	2.60	Landscape Material	Commercial	M/I	BP	M-2	Yes
22-140-47	0.70	Plumbing Supply	BP	M/I	M-1	M-1	Yes
22-140-48	1.30	Plumbing Supply	BP	M/I	M-1	M-1	Yes
22-140-50	2.20	Dog Kennel	BP	M/I	M-1	M-2	Yes
22-140-51	0.04	Wireless Tower	BP	M/I	M-1	M-2	Yes
22-150-03	0.20	Vacant	BP	M/I	M-1	M-1	Yes
22-150-04	0.30	Vacant	BP	M/I	M-1	M-1	Yes
22-150-08	0.02	R-O-W	BP	M/I	M-1	M-1	Yes
22-150-09	0.10	Auto Repair	BP	M/I	M-1	M-1	Yes
22-150-10	0.50	SF Residential	BP	M/I	M-1	M-1	Yes
22-150-11	0.05	Vacant	BP	M/I	M-1	M-1	Yes
22-150-15	0.70	Auto Rep/Com	BP	M/I	M-1	M-1	Yes
22-150-16	0.30	SF Residential	BP	M/I	M-1	M-1	Yes
22-150-17	0.40	Vacant	BP	M/I	M-1	M-1	Yes
22-150-18	0.40	SF Residential	BP	M/I	M-1	M-1	Yes
22-150-21	1.20	SF Residential	BP	M/I	M-1	M-1	Yes
22-150-22	3.00	SF Residential	BP	M/I	M-1	M-1	Yes
22-150-23	0.30	Vacant	BP	M/I	M-1	M-1	Yes
22-150-28	0.30	SFR/Com	BP	M/I	M-1	M-1	Yes
22-150-30	7.80	Vacant	BP	M/I	M-1	M-1	Yes
22-150-32	0.50	SF Residential	BP	M/I	M-1	M-1	Yes
2~~9~~2-150-33	0.03	Vacant	BP	M/I	M-1	M-1	Yes
22-160-04	11.30	Landscape Material	SDA	M/I	BP	M-2	Yes
22-160-05	10.00	Vacant	UED	M/I	RA-1.5	M-1	No
22-160-06	25.50	Vacant	SDA	M/I	BP	M-2	Yes

22-160-33	8.30	Vacant	SDA	M/I	BP	M-2	Yes
22-2~~2~~00-36	14.60	Vacant	UED	OS	RA-1.5	OS	No
22-2~~2~~00-37	7.30	Vacant	UED	OS	RA-1.5	OS	No
~~22-220-66~~	~~14.60~~	~~Vacant~~	~~BP~~	~~OS~~	~~RA-1.5~~	~~OS~~	~~No~~
22-230-10	2.30	Vacant	UED	UMD	RA-1.5	R-2	No
22-230-52	42.90	Vacant	UED	M/I /UMD /OS	RA-1.5	M-1/R-2/OS	No
22-230-53	5.70	Vacant	UED	OS	RA-1.5	OS	No
22-331-05	11.60	Vacant	SDA	Public	BP	Public	No
22-331-06	2.10	Vacant	SDA	Public	BP	Public	No
22-331-07	0.60	Vacant	SDA	Public	BP	Public	No
22-331-08	0.50	SF Residential	SDA	UED	BP	RE	No
22-331-09	6.00	Vacant	SDA	Public	BP	Public	No
2~~2~~9-350-12	11.40	Vacant	BP	BP	BP	CBP	Yes
Western Side of Highway 49							
22-140-03	95.43	Vacant	UED/Com	ULD/UMD/ Com/OS	C2/R2/ RA-1.5	R-1/R-2/ C-2/OS	No
22-150-26	0.43	SFR	Commercial	Commercial	C2	C-2	No
22-150-27	0.54	SFR	Commercial	Commercial	C2	C-2	No
22-150-29	0.44	SFR	Commercial	Commercial	C2	C-2	No
22-160-02	8.06	Vacant	UED	Open Space	RA-1.5	OS	No
22-160-03	25.36	Vacant	UED	OS/UED	RA-1.5	OS/RE	No
Total	**4~~23~~16**						

Most of the project area is vacant or developed at less than the anticipated density and intensity in the Grass Valley General Plan. There are several existing businesses and homes within the project area. The types of businesses and uses on each parcel are noted above.

2. General Plan Amendment

The Grass Valley General Plan designates the project area as Urban Estate Density (UED), Commercial (C), Business Park (BP) and Special Development Area (SDA). The proposed project would change the general plan designations to include a range of residential, commercial and manufacturing land uses as shown in **Table 3.0-1**. **See also Figure 2, Proposed General Plan Map** for the location of the land use designations for land within the project area.

3. Prezoning

As part of the proposed project the City will prezone the properties consistent with the revised general plan. The California Government Code Section 65859 allows the City to adopt an ordinance zoning land outside of the City. The provisions of the prezone ordinance and zoning districts will not become effective until the property is annexed. Until the property is annexed the properties will be subject to the existing County zoning. Prezoning is a required component of the annexation process. **Table 3.0-1** lists the existing parcel zoning for land within the project area, and the anticipated zoning as part of the proposed project. (See also **Figure 3,**

Proposed PreZoning) The proposed zoning will be consistent with both the amended general plan land use designations and the existing business and manufacturing uses found within the project area.

4. Annexation

The proposed project includes annexation of approximately 120 acres as shown in **Figure 4, Proposed Annexation Area**. The proposed annexation area is smaller than the overall prezoning area of 423 acres. The 120 acres represents the next increment of growth anticipated by the City of Grass Valley.

Sincerely,

Thomas Last
Community Development Director

Figure 1, Regional Location Map
Figure 2, Proposed General Plan Map
Figure 3, Proposed Prezoning Map
Figure 4, Proposed Annexation Area

[Agency Distribution List]

REGIONAL LOCATION MAP

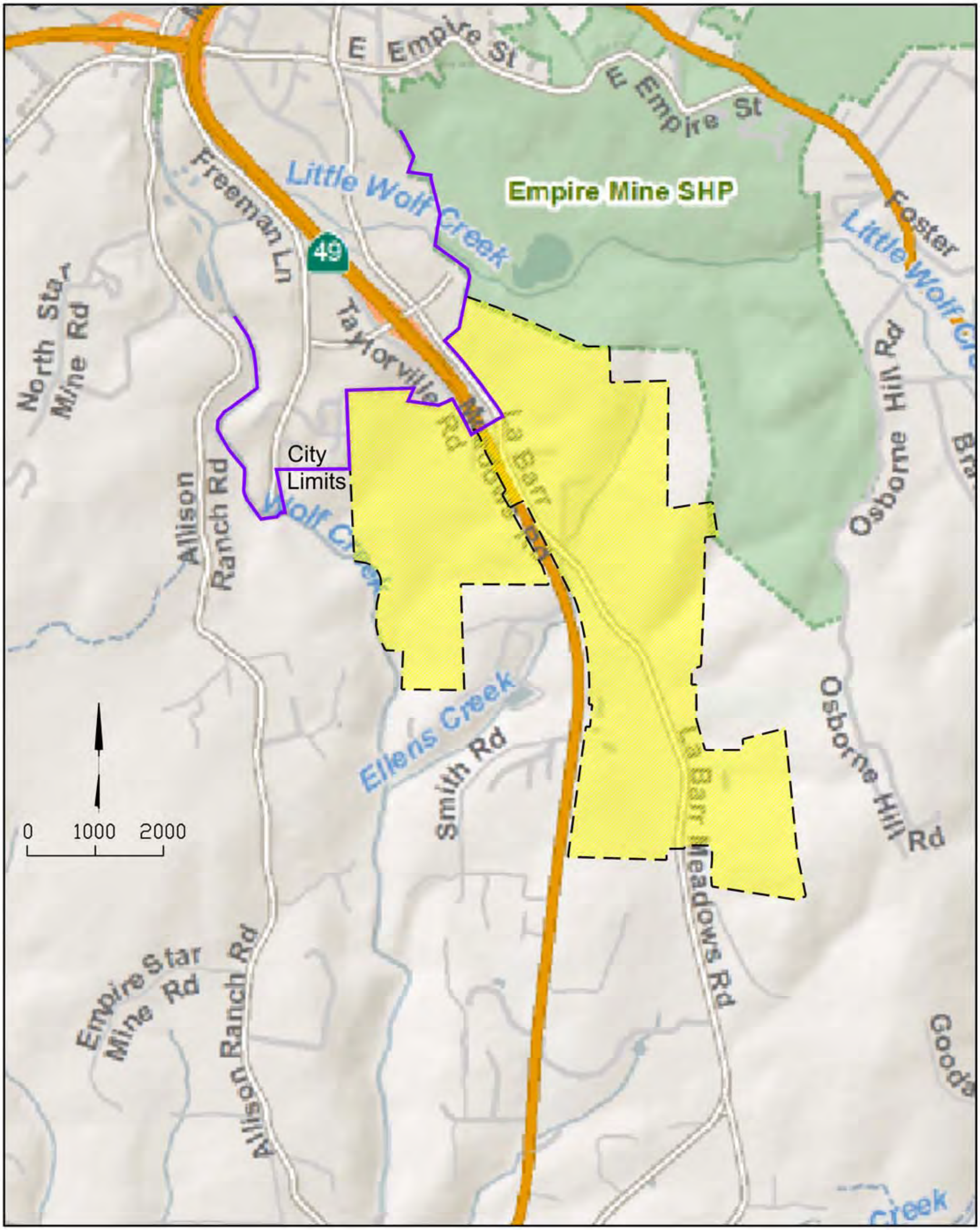


Figure 1

CITY OF GRASS VALLEY

Preliminary General Plan Map

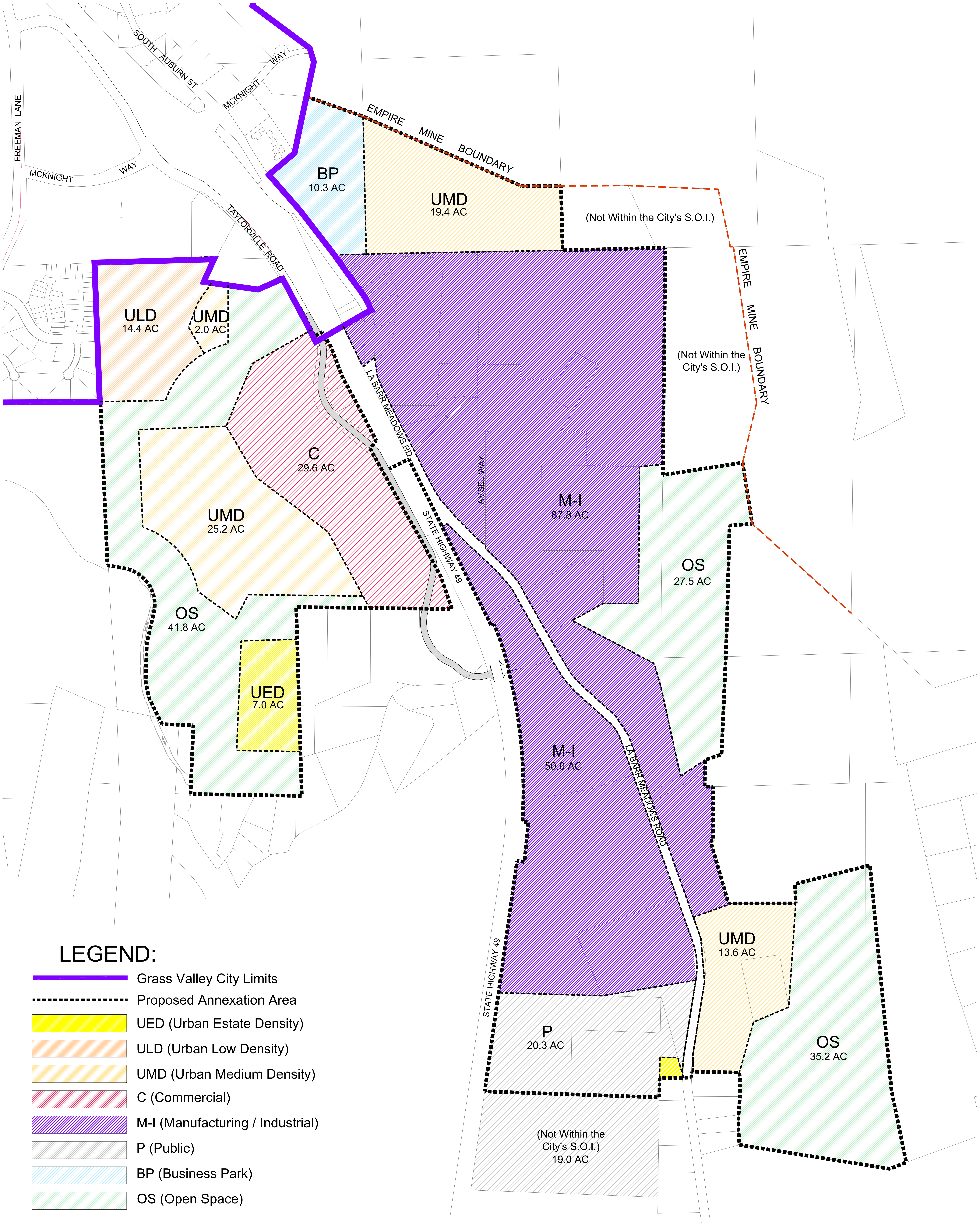


Figure 2

CITY OF GRASS VALLEY

Preliminary Zoning Map

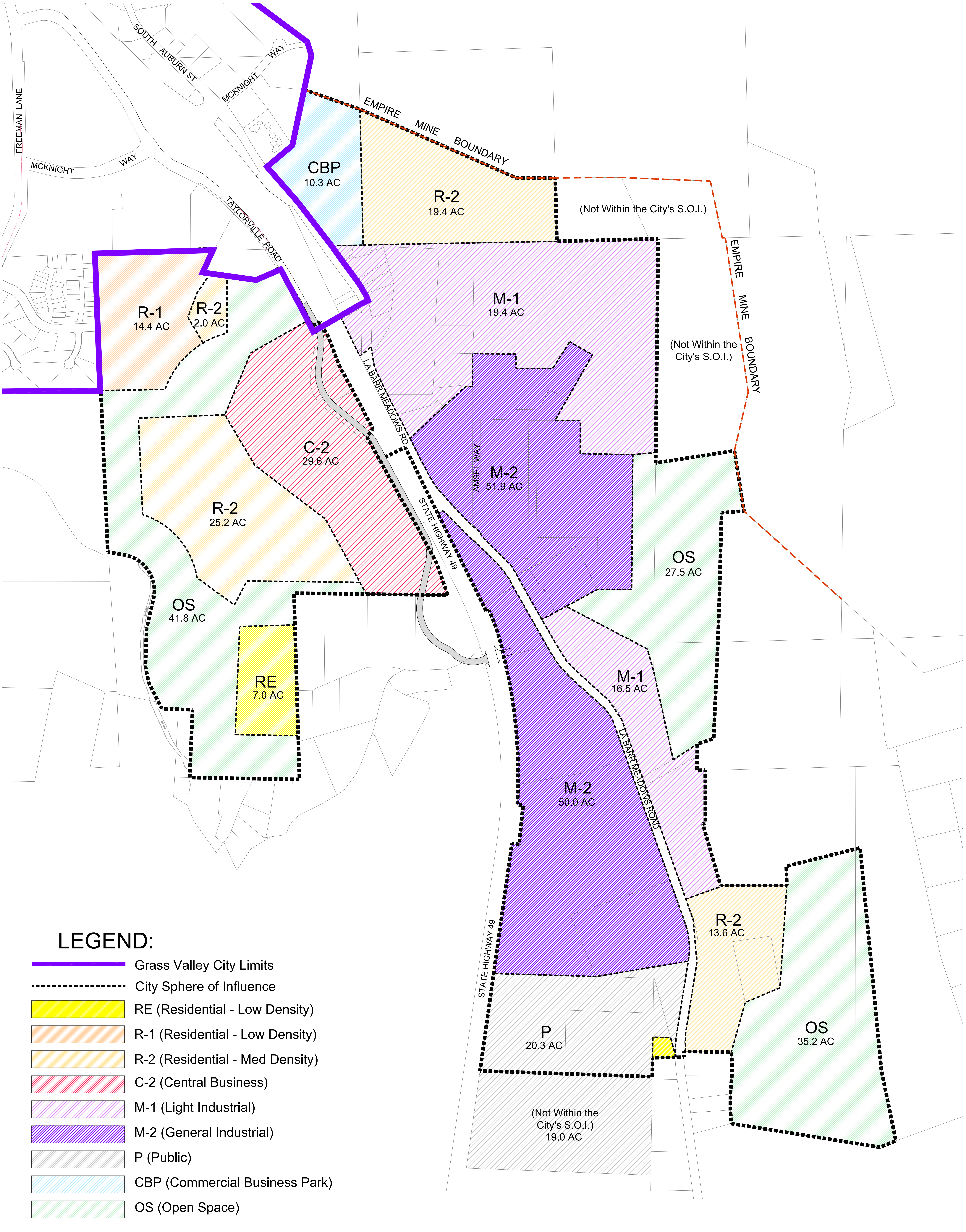
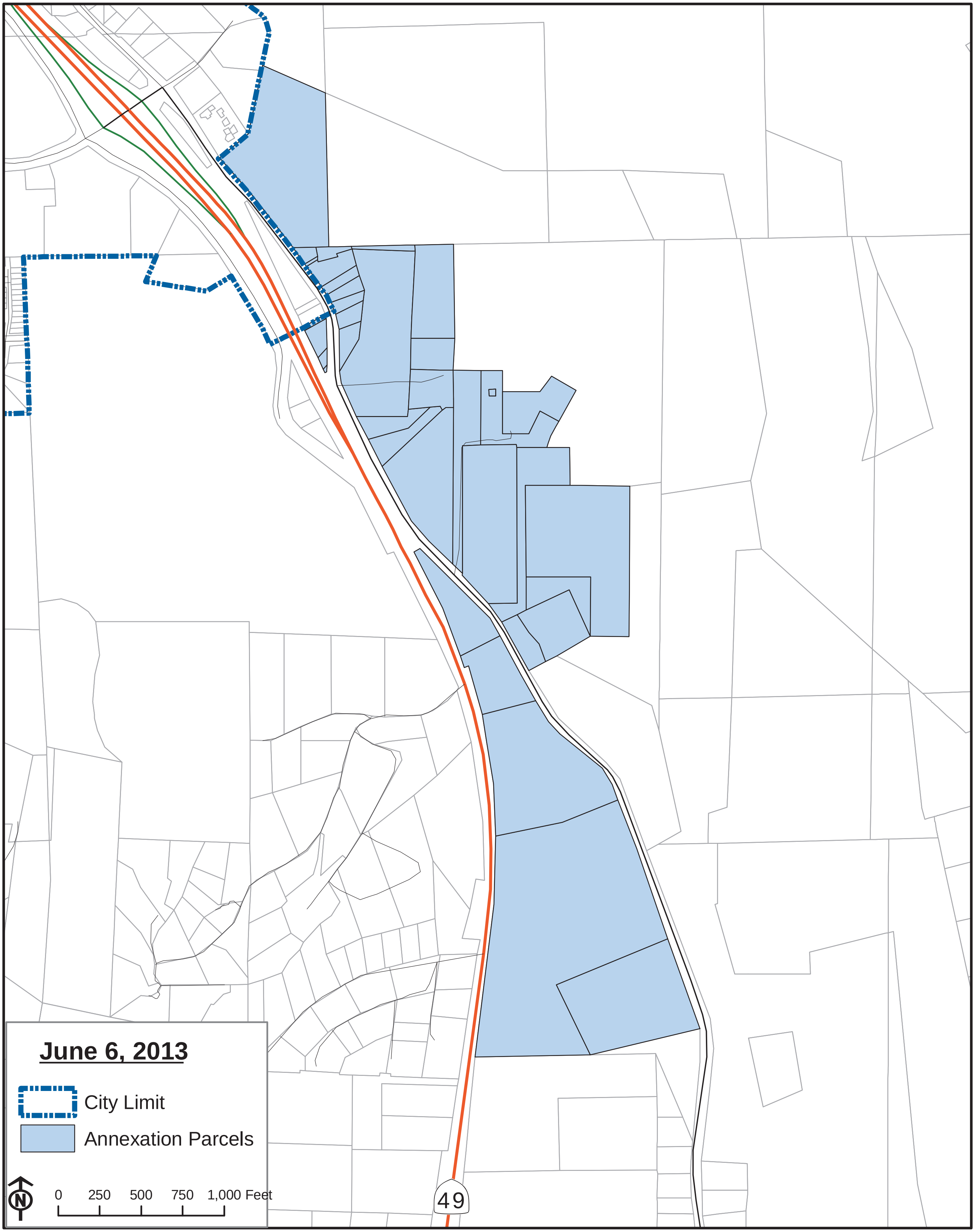


Figure 3

City of Grass Valley - Annexation



STATE OF CALIFORNIA
Governor's Office of Planning and Research
State Clearinghouse and Planning Unit

Edmund G. Brown Jr.
Governor

Ken Alex
Director

Notice of Preparation

May 20, 2013

To: Reviewing Agencies

Re: Southern Sphere of Influence Planning and Annexation Project
SCH# 2013052057

Attached for your review and comment is the Notice of Preparation (NOP) for the Southern Sphere of Influence Planning and Annexation Project draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

Thomas Last
City of Grass Valley
125 East Main Street
Grass Valley, CA 95945

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Scott Morgan

Scott Morgan
Director, State Clearinghouse

Attachments
cc: Lead Agency

Document Details Report
State Clearinghouse Data Base

SCH# **2013052057**
Project Title Southern Sphere of Influence Planning and Annexation Project
Lead Agency Grass Valley, City of

Type **NOP** Notice of Preparation

Description The proposed project includes: 1) an amendment to the General Plan land use designation on 423 acres; 2) a prezone of 423 acres of land to various zone districts consistent with the proposed General Plan amendments; and 3) the annexation of approximately 120 acres.

Lead Agency Contact

Name Thomas Last
Agency City of Grass Valley
Phone (530) 274-4711 *Fax*
email
Address 125 East Main Street
City Grass Valley *State* CA *Zip* 95945

Project Location

County Nevada
City Grass Valley
Region
Cross Streets Both sides of Hwy 49, S. of McKnight Way, along La Barr Meadows Rd
Lat / Long
Parcel No. 57 parcels
Township 15N *Range* 8E *Section* 1/2 *Base* MDB&M

Proximity to:

Highways Hwy 49 and 20
Airports
Railways
Waterways Wolf Creek
Schools
Land Use

Project Issues

Reviewing Agencies Resources Agency; Cal Fire; Department of Parks and Recreation; Department of Water Resources; Department of Fish and Wildlife, Region 2; Native American Heritage Commission; Public Utilities Commission; California Highway Patrol; Caltrans, District 3 N; Air Resources Board, Major Industrial Projects; Department of Toxic Substances Control; Regional Water Quality Control Bd., Region 5 (Redding)

Date Received 05/20/2013 *Start of Review* 05/20/2013 *End of Review* 06/18/2013

Note: Blanks in data fields result from insufficient information provided by lead agency.

Print Form

Appendix C

2013052057

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH #

Project Title: Southern Sphere of Influence Planning and Annexation Project
Lead Agency: City of Grass Valley
Contact Person: Thomas Last
Mailing Address: 125 East Main Street
Phone: (530) 274-4711
City: Grass Valley
Zip: 95945
County: Nevada

Project Location: County: Nevada
City/Nearest Community: Grass Valley
Cross Streets: Both sides of Highway 49, south of McKnight Way, along La Barr Meadows Rd
Zip Code: 95945
Longitude/Latitude (degrees, minutes and seconds): ____° ____′ ____″ N / ____° ____′ ____″ W
Total Acres: 423
Assessor's Parcel No.: 57 parcels - see attached NOP
Section: 1 &2
Twp.: 15N
Range: 8E
Base: Mt. Diablo
Within 2 Miles: State Hwy #: 49 and 20
Waterways: Wolf Creek
Airports: ____
Railways: ____
Schools: ____

Document Type:

CEQA: ☒ NOP
☐ Early Cons
☐ Neg Dec
☐ Mit Neg Dec
☐ Draft EIR
☐ Supplement/Subsequent EIR
(Prior SCH No.) ____
Other: ____

NEPA: ☐ NOI
☐ EA
☐ Draft EIS
☐ FONSI

Other: ☐ Joint Document
☐ Final Document
☐ Other: ____

RECEIVED

MAY 20 2013

STATE CLEARINGHOUSE

Local Action Type:

☐ General Plan Update
☒ General Plan Amendment
☐ General Plan Element
☐ Community Plan
☐ Specific Plan
☐ Master Plan
☐ Planned Unit Development
☐ Site Plan
☐ Rezone
☒ Prezone
☐ Use Permit
☐ Land Division (Subdivision, etc.)
☒ Annexation
☐ Redevelopment
☐ Coastal Permit
☐ Other: ____

Development Type:

☐ Residential: Units ____ Acres ____
☐ Office: Sq.ft. ____ Acres ____ Employees ____
☐ Commercial: Sq.ft. ____ Acres ____ Employees ____
☐ Industrial: Sq.ft. ____ Acres ____ Employees ____
☐ Educational: ____
☐ Recreational: ____
☐ Water Facilities: Type ____ MGD ____
☐ Transportation: Type ____
☐ Mining: Mineral ____
☐ Power: Type ____ MW ____
☐ Waste Treatment: Type ____ MGD ____
☐ Hazardous Waste: Type ____
☐ Other: ____

Project Issues Discussed in Document:

☐ Aesthetic/Visual
☐ Agricultural Land
☐ Air Quality
☐ Archeological/Historical
☐ Biological Resources
☐ Coastal Zone
☐ Drainage/Absorption
☐ Economic/Jobs
☐ Fiscal
☐ Flood Plain/Flooding
☐ Forest Land/Fire Hazard
☐ Geologic/Seismic
☐ Minerals
☐ Noise
☐ Population/Housing Balance
☐ Public Services/Facilities
☐ Recreation/Parks
☐ Schools/Universities
☐ Septic Systems
☐ Sewer Capacity
☐ Soil Erosion/Compaction/Grading
☐ Solid Waste
☐ Toxic/Hazardous
☐ Traffic/Circulation
☐ Vegetation
☐ Water Quality
☐ Water Supply/Groundwater
☐ Wetland/Riparian
☐ Growth Inducement
☐ Land Use
☐ Cumulative Effects
☐ Other: ____

Present Land Use/Zoning/General Plan Designation:
See Attached NOP

Project Description: *(please use a separate page if necessary)*
The proposed project includes: 1) an amendment to the General Plan land use designations on 423 acres; 2) a prezone of 423 acres of land to various zone districts consistent with the proposed General Plan amendments; and 3) the annexation of approximately 120 acres

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

Revised 2010

Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with and "**X**".
If you have already sent your document to the agency please denote that with an "**S**".

- X Air Resources Board
- ____ Boating & Waterways, Department of
- ____ California Emergency Management Agency
- ____ California Highway Patrol
- X Caltrans District # 3
- ____ Caltrans Division of Aeronautics
- ____ Caltrans Planning
- ____ Central Valley Flood Protection Board
- ____ Coachella Valley Mtns. Conservancy
- ____ Coastal Commission
- ____ Colorado River Board
- ____ Conservation, Department of
- ____ Corrections, Department of
- ____ Delta Protection Commission
- ____ Education, Department of
- ____ Energy Commission
- X Fish & Game Region # 2
- ____ Food & Agriculture, Department of
- X Forestry and Fire Protection, Department of
- ____ General Services, Department of
- ____ Health Services, Department of
- ____ Housing & Community Development
- X Native American Heritage Commission
- ____ Office of Historic Preservation
- ____ Office of Public School Construction
- ____ Parks & Recreation, Department of
- ____ Pesticide Regulation, Department of
- ____ Public Utilities Commission
- X Regional WQCB # ____
- ____ Resources Agency
- ____ Resources Recycling and Recovery, Department of
- ____ S.F. Bay Conservation & Development Comm.
- ____ San Gabriel & Lower L.A. Rivers & Mtns. Conservancy
- ____ San Joaquin River Conservancy
- ____ Santa Monica Mtns. Conservancy
- ____ State Lands Commission
- ____ SWRCB: Clean Water Grants
- ____ SWRCB: Water Quality
- ____ SWRCB: Water Rights
- ____ Tahoe Regional Planning Agency
- X Toxic Substances Control, Department of
- ____ Water Resources, Department of
- ____ Other: ____
- ____ Other: ____

Local Public Review Period (to be filled in by lead agency)

Starting Date May 21, 2013

Ending Date June 20, 2013

Lead Agency (Complete if applicable):

Consulting Firm: Pacific Municipal Consultants
Address: 2729 Prospect Park Drive, Suite 220
City/State/Zip: Rancho Cordova, CA 95670
Contact: Mark Teague
Phone: (916) 361-8384

Applicant: City of Grass Valley
Address: 125 East Main Street
City/State/Zip: Grass Valley, CA 95945
Phone: (530) 274-4711

Signature of Lead Agency Representative: ____ **Date:** 5/17/13

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.

NOP Distribution List

County: Nevada

SCH# 2013052057

Resources Agency

☒ **Resources Agency**
Nadell Gayou

☐ **Dept. of Boating & Waterways**
Nicole Wong

☐ **California Coastal Commission**
Elizabeth A. Fuchs

☐ **Colorado River Board**
Gerald R. Zimmerman

☐ **Dept. of Conservation**
Elizabeth Carpenter

☐ **California Energy Commission**
Eric Knight

☒ **Cal Fire**
Dan Foster

☐ **Central Valley Flood Protection Board**
James Herota

☐ **Office of Historic Preservation**
Ron Parsons

☒ **Dept of Parks & Recreation**
Environmental Stewardship Section

☐ **California Department of Resources, Recycling & Recovery**
Sue O'Leary

☐ **S.F. Bay Conservation & Dev't. Comm.**
Steve McAdam

☒ **Dept. of Water Resources Resources Agency**
Nadell Gayou

Fish and Game

☐ **Dept. of Fish & Wildlife**
Scott Flint
Environmental Services Division

☐ **Fish & Wildlife Region 1**
Donald Koch

☐ **Fish & Wildlife Region 1E**
Laurie Harnsberger

☒ **Fish & Wildlife Region 2**
Jeff Drongesen

☐ **Fish & Wildlife Region 3**
Charles Armor

☐ **Fish & Wildlife Region 4**
Julie Vance

☐ **Fish & Wildlife Region 5**
Leslie Newton-Reed
Habitat Conservation Program

☐ **Fish & Wildlife Region 6**
Gabrina Gatchel
Habitat Conservation Program

☐ **Fish & Wildlife Region 6 I/M**
Brad Henderson
Inyo/Mono, Habitat Conservation Program

☐ **Dept. of Fish & Wildlife M**
George Isaac
Marine Region

Other Departments

☐ **Food & Agriculture**
Sandra Schubert
Dept. of Food and Agriculture

☐ **Depart. of General Services**
Public School Construction

☐ **Dept. of General Services**
Anna Garbeff
Environmental Services Section

☐ **Dept. of Public Health**
Jeffery Worth
Dept. of Health/Drinking Water

☐ **Delta Stewardship Council**
Kevan Samsam

Independent Commissions,Boards

☐ **Delta Protection Commission**
Michael Machado

☐ **Cal EMA (Emergency Management Agency)**
Dennis Castrillo

☒ **Native American Heritage Comm.**
Debbie Treadway

☒ **Public Utilities Commission**
Leo Wong

☐ **Santa Monica Bay Restoration**
Guangyu Wang

☐ **State Lands Commission**
Jennifer Deleong

☐ **Tahoe Regional Planning Agency (TRPA)**
Cherry Jacques

Business, Trans & Housing

☐ **Caltrans - Division of Aeronautics**
Philip Crimmins

☐ **Caltrans - Planning**
Terri Pencovic

☒ **California Highway Patrol**
Suzann Ikeuchi
Office of Special Projects

☐ **Housing & Community Development**
CEQA Coordinator
Housing Policy Division

Dept. of Transportation

☐ **Caltrans, District 1**
Rex Jackman

☐ **Caltrans, District 2**
Marcelino Gonzalez

☒ **Caltrans, District 3** N
Gary Arnold

☐ **Caltrans, District 4**
Erik Alm

☐ **Caltrans, District 5**
David Murray

☐ **Caltrans, District 6**
Michael Navarro

☐ **Caltrans, District 7**
Dianna Watson

☐ **Caltrans, District 8**
Dan Kopulsky

☐ **Caltrans, District 9**
Gayle Rosander

☐ **Caltrans, District 10**
Tom Dumas

☐ **Caltrans, District 11**
Jacob Armstrong

☐ **Caltrans, District 12**
Marlon Regisford

Cal EPA

Air Resources Board

☐ Airport/Energy Projects
Jim Lerner

☐ Transportation Projects
Douglas Ito

☒ Industrial Projects
Mike Tollstrup

☐ **State Water Resources Control Board**
Regional Programs Unit
Division of Financial Assistance

☐ **State Water Resources Control Board**
Student Intern, 401 Water Quality Certification Unit
Division of Water Quality

☐ **State Water Resouces Control Board**
Phil Crader
Division of Water Rights

☒ **Dept. of Toxic Substances Control**
CEQA Tracking Center

☐ **Department of Pesticide Regulation**
CEQA Coordinator

Regional Water Quality Control Board (RWQCB)

☐ **RWQCB 1**
Cathleen Hudson
North Coast Region (1)

☐ **RWQCB 2**
Environmental Document Coordinator
San Francisco Bay Region (2)

☐ **RWQCB 3**
Central Coast Region (3)

☐ **RWQCB 4**
Teresa Rodgers
Los Angeles Region (4)

☐ **RWQCB 5S**
Central Valley Region (5)

☐ **RWQCB 5F**
Central Valley Region (5)
Fresno Branch Office

☒ **RWQCB 5R**
Central Valley Region (5)
Redding Branch Office

☐ **RWQCB 6**
Lahontan Region (6)

☐ **RWQCB 6V**
Lahontan Region (6)
Victorville Branch Office

☐ **RWQCB 7**
Colorado River Basin Region (7)

☐ **RWQCB 8**
Santa Ana Region (8)

☐ **RWQCB 9**
San Diego Region (9)

☐ Other ____________

____

____

☐ ____________
Conservancy

Last Updated 01/08/2013

APPENDIX 3.1-1 GENERAL PLAN CONSISTENCY ANALYSIS TABLE

APPENDIX 3.1-1 PROJECT CONSISTENCY WITH THE CITY OF GRASS VALLEY GENERAL PLAN POLICIES BY RESOURCE AREA

The proposed project was reviewed to determine if it would be generally consistent with applicable General Plan policies. However, to the extent that physical effects could occur, irrespective any potential for inconsistency with a particular general plan policy, those physical effects are addressed in the appropriate technical sections of Chapter 3 of this EIR. Because the policy language found in a City's General Plan is often susceptible to varying interpretations, it is often quite difficult to determine, in a draft EIR, whether a proposed project is consistent or inconsistent with such policies.

Case law interpreting the Planning and Zoning Law (Gov. Code, §65000 et seq.) makes it clear (i) that the meaning of such policies is to be determined by the City Council, as opposed to City Staff, EIR consultants, or members of the public, and (ii) that the City Council's interpretations of such policies will prevail if they are "reasonable," even though other reasonable interpretations are also possible. (See *No Oil, Inc. v. City of Los Angeles* (1987) 196 Cal.App.3d 223, 245-246, 249 (*No Oil*).) Courts have also recognized that, because General Plans often contain numerous policies emphasizing differing legislative goals, a development project may be "consistent" with a General Plan, taken as a whole, even though the project appears to be inconsistent or arguably inconsistent with some such policies. (*Sequoyah Hills Homeowners Association v. City of Oakland* (1993) 23 Cal.App.4th 704, 719.) Furthermore, courts strive to "reconcile" or "harmonize" seemingly disparate General Plan policies. (*No Oil*, *supra*, 196 Cal.App.3d at p.244.) Thus, for example, where a General Plan land use map or diagram permits certain land uses, it is unlikely that generic textual policies favoring open space preservation would be seen as trumping the map or diagram designation.

In light of these considerations, the discussions in this EIR on the subject of General Plan consistency, which are presented in Chapter 3 and the table below, represent the best attempt of City Staff and the City's EIR consultant to advise the City Council of their opinions as to whether the proposed project is consistent with identified goals and policies of the City's General Plan. Based on the evaluations contained in this EIR, the proposed project is generally consistent with the City of Grass Valley General Plan. However, the opinions expressed in this Draft EIR are in no way binding on the City Council in the exercise of its discretion.

City of Grass Valley General Plan Policies	Consistency Determination	Analysis
3.1 Aesthetics and Visual Resources		
Goal 1-COSG: Provide a balance between development and the natural environment, protecting and properly utilizing Grass Valley's sensitive environmental areas/features, natural resources and open space lands.		
2-COSO: Multi-purpose open space lands, accommodating the needs and requirements of open space/conservation, habitat, recreation and aesthetics.	Yes	Over 117 acres are proposed to be designated as open space. This provides the opportunity to meet multipurpose open space needs.
Goal 3-COSG: Ensure the protection of Grass Valley's trees and forested areas.		
9-COSO: Identification of heritage trees for special recognition and protection.	Yes	Future site-specific development will need to provide a tree plan and conform to the City's Heritage Tree Ordinance for the preservation of individual heritage trees.
10-COSO: Identification of significant groves and groupings of trees for permanent open space designation.	Yes	Future site-specific development will need to identify significant groves and groupings of trees.

City of Grass Valley General Plan Policies	Consistency Determination	Analysis
Goal 4-COSG: **Protect and enhance town entryways, visual corridors and important viewsheds including ridgelines.**		
3-COSP: Encourage clustering, density averaging, and other techniques in larger-scale new development, as means of preserving open space and natural systems.	Yes	As part of the Design Review process, the City will encourage future development projects to utilize clustering and density transfers to protect specific resources identified on individual properties.
4-COSP: Establish standards for inclusion and management of permanent open space in new developments.	Yes	The City's Design Review process will be used to establish specific management plans for both fire safety and open space.
5-COSP: Carefully regulate development on steep slopes.	Yes	The City's Design Review process will be used in conjunction with the Development Code to regulate development on steep terrain. The project proposes to place most of the steeper slopes within an Open Space zoning designation.
6-COSP: Prevent excessive alteration of the natural topography.	Yes	The City's Design Review process will be used in conjunction with the Development Code to regulate the alteration of topography. See 5-COSP.
20-CDP: Design all future major public and private development projects to include areas for public gathering and interaction.	Yes	The City's Design Review process will regulate the provision of public gathering places.
11-CDI: Require shielding or downward direction of lighting and require that illumination be so arranged as to reflect away from adjoining properties.	Yes	The City's Development Code regulates the use of outdoor lighting, which will be reviewed as part of the City's Design Review process.
6-CDP: Design and construct streetscape at the southern entrance to the community at Highway 49 to enhance the area visually.	Yes	The City's Design Review process will be used in conjunction with the Development Code to regulate development adjacent to State Route 49.
3.2 Air Quality		
Incorporate applicable mitigation measures specified in the Indirect Source Review Guidelines of the Northern Sierra Air Quality Management District, 1996-1997, in all future discretionary land use approvals. (Implementation Action 17-COSI)	Yes with mitigation	The proposed project would result in significant short- and long-term air quality impacts. Mitigation measures recommended by the NSAQMD have been incorporated to reduce short- and long-term air quality impacts.
3.3 Biological Resources		
2-COSP: Establish an active program of land/development rights acquisition in order to protect sensitive environmental areas and features.	Yes with mitigation	Mitigation measures MM 3.3.1 through MM 3.3.5 provide for preservation of identified special-status species and sensitive habitats within the study area. Furthermore, 117 acres are proposed for Open Space, which are applied to the most biologically sensitive areas of the project area.
3-COSP: Encourage clustering, density averaging, and other techniques in larger-scale new developments, as means of preserving open	Yes	The proposed project encourages inclusion of open space. See Section 2.0, Project Description. See 2-COSP.

City of Grass Valley General Plan Policies	Consistency Determination	Analysis
space and natural systems.		
4-COSP: Establish standards for inclusion and management of permanent open space in new developments.	Yes	The proposed project encourages inclusion of open space. See Section 2.0, Project Description. See 2-COSP.
5-COSP: Carefully regulate development on steep slopes.	Yes	The proposed project would designate the areas within the project area with the steepest slopes as open space, which would preclude development. See 5-COSP (above) and 2-COSP.
6-COSP: Prevent excessive alteration of the natural topography.	Yes	Future development within the project area would be regulated by the City's Development Code, which would ensure that excessive alteration of topography does not occur. See 5-COSP.
9-COSP: Carefully regulate development for location in flood hazard areas.	Yes	The study area is not located within a flood hazard area.
11-COSP: Return to open space, areas within which flooding poses a clear danger to life and property.	Yes	The study area is not located within a flood hazard area.
12-COSP: Enhance the City's tree ordinance addressing tree maintenance and protection both within new developments and elsewhere in the City.	Yes with mitigation	Mitigation measure MM 4.3.7 provides for protection of trees as identified in the City's tree ordinance.
13-COSP: Assist property owners wishing to preserve and protect heritage trees and significant groves.	Yes with mitigation	Mitigation measure MM 4.3.7 provides for protection of trees as identified in the City's tree ordinance.
3.4 Climate Change and Greenhouse Gases		
No Applicable Policies		
3.5 Cultural and Paleontological Resources		
10-HP: Where historic and prehistoric cultural resources have been identified, the City shall require that development be designed to protect such resources from damage, destruction, or defacement.	Yes with mitigation	Archaeological and historical investigations identified one potentially significant cultural resource in the project area. Mitigation measure MM 3.5.1 will reduce this impact to a level that is less than significant.
11-HP: If previously undiscovered cultural resources or human remains are encountered during construction or excavation, the procedures outlined in Section 15064.5 of the CEQA Guidelines shall be followed.	Yes with mitigation	The project has incorporated mitigation measures MM 3.5.1a through 3.5.1c to reduce the impacts on any undiscovered cultural resources or human remains during construction. Work shall be halted immediately within 50 feet of the discovery.
2-HO: Preservation of buildings of historic and/or architectural merit.	Yes	There are no historic buildings within the project area. Investigations identified foundations associated with the Bear Creek Mill (1956–78) and the farm house and structures associated with the Berriman Ranch property within the project area boundaries (Table 3.5-1).

City of Grass Valley General Plan Policies	Consistency Determination	Analysis
3.6 Geology, Soils, and Mineral Resources		
2-SI: Utilize open space/conservation reserves and easements to restrict development in high-risk areas, such as flood-prone areas, airport safety zones, and areas identified as subject to geologic risk.	Yes	Many of the areas that would be prone to geologic hazards, such as the steep slopes in the western portion of the project area, are proposed for designation as open space that will not be developed, thereby minimizing risks to the public.
1-SG: Reduce the potential risk of death, injury, property damage, and economic and social dislocation resulting from hazards.	Yes	The proposed project does not include any development and would not result in any hazards to the public or property. Future development within the project area would be subject to existing state and City regulations restricting development in earthquake fault zones and requiring preparation of site-specific geotechnical studies, which would identify geologic and soils hazards and provide necessary measures to minimize potential for property damage and risks to the public. In addition, future development would require further, project-level CEQA review, which would identify geologic hazards and provide necessary mitigation to reduce impacts.
4-SP: Based on location or probable need, require development plans in mined areas to include in-depth assessments of potential safety, including mining-related excavations, and health hazards and accompanying mitigation measures.	Yes	The proposed project does not include any development plans. Future development of the project area would be subject to the City's Municipal Code, which requires preparation of site-specific geotechnical studies that would identify mining-related excavations and associated geologic and soils hazards and provide necessary measures to minimize potential for property damage and risks to the public. In addition, future development would require further, project-level CEQA review, which would identify geologic and other safety hazards and provide necessary mitigation to reduce impacts. The Mineral Management Element (Map B) does not identify any of the project area as being within a designated area targeted for mining conservation.
Mineral Resources		
Mineral Management Element Policy 12: For development projects which may preclude mineral extraction, the City shall balance mineral values against alternative land uses and consider the importance of mineral resources to the state and nation as a whole.	Yes	See Impact 3.6.5. The proposed project does not include any development. Further, the Mineral Management Element, Action 15, of the City's General Plan and the City's Mining and Reclamation Ordinance allow for subsurface mining in all land use designations throughout the City, subject to obtaining a use permit from the Planning Commission. In addition, the Mineral Management Element allows surface access to subsurface mining in compatible General Plan designations. Therefore, inclusion of land within the City's SOI and annexation of

City of Grass Valley General Plan Policies	Consistency Determination	Analysis
		land into the City limits would not necessarily result in the loss of access to mineral resources.
Mineral Management Element Policy 13: When reviewing development projects which preclude mining at locations which have been classified as MRZ-2 by the Mineral Land Classification of Nevada County, CA, Special Report No. 164, the City will consider the feasibility of preserving mining extraction opportunities on the site to the extent feasible.	Yes	See analysis of Mineral Management Element Policy 12 and 4-SP.
Mineral Management Element Action 17: In reviewing development of a site classified as MRZ-2 by the Mineral Land Classification of Nevada County, CA, Special Report No. 164, the City may require as part of the development application submittal of a mineral resource report. Such reports shall include an evaluation of the significance of mineral deposits located on the project site, the feasibility of extraction and delivery of mineral deposits from the site, and the importance of these minerals to their market region.	Yes	The proposed project does not include any development. Future development projects on the project site would be subject to further, project-level review, which would identify potential impacts to mineral resources and provide measures to mitigate identified impacts. Such measures could include preparation of a mineral resource report in compliance with this policy The Mineral Management Element (Map B) does not identify any of the project area as being within a designated area targeted for mining conservation.
Mineral Management Element Action 18: In reviewing development of a site classified as MRZ-2 by the Mineral Land Classification of Nevada County, CA, Special Report No. 164, the City shall consider measures to preserve mining opportunities of the site. Such measures may include, but not limited to, development redesign to preserve mine access and mitigation of incompatible uses on the site and developing proper access routes to and from the site for mining vehicles and equipment.	Yes	The proposed project does not include any development. Although the project could allow for future development of the project area, no specific site designs or access plans are available. Future development projects within the project area would be subject to further, project-level CEQA review, which would identify potential impacts to mineral resources and provide measures to mitigate identified impacts.
3.7 Hazards and Hazardous Materials		
13-SI: Require new developments located on officially identified hazardous waste sites to conduct appropriate investigations, submit results to the City, and prepare a mitigation plan as part of the project review process.	Yes	See Impact 3.7.2. Several identified hazardous waste sites are located within the project area. These sites have either been remediated or have completed remediation plans, which must be implemented prior to development. Any additional necessary investigations and/or remediation plans will be prepared in compliance with this policy as part of future, project-level CEQA analysis for individual development projects.
17-SI: Consider the location and characteristics of documented hazardous waste sites as part of the environmental assessment process for proposed developments.	Yes	See Impact 3.7.2. The proposed project does not include any development plans. However, the project would result in annexation of a portion of the project area and would also establish land use designations that would allow for future development. Known hazardous waste sites within the project

City of Grass Valley General Plan Policies	Consistency Determination	Analysis
		area are identified and associated potential impacts are analyzed in Section 3.7 of the DEIR. In addition, individual future development projects would require further, project-level CEQA review, which would include project-specific analysis of hazardous waste sites.
3.8 Hydrology and Water Quality		
2-COSG: Protect, enhance and restore hydrologic features, including stream corridors, flood plains, wetlands, and riparian zones.	Yes	Development in the City would be required to comply with the City's NPDES permit, which is enforced by the Regional Water Quality Control Board. The permit requires that discharges of pollutants from areas of new development be reduced to the maximum extent practicable. Compliance with this standard requires that control measures be incorporated into the design of new development to reduce pollution discharges in site runoff over the life of the project. Compliance with the NPDES permit would result in consistency with this policy. Furthermore, 117 acres are proposed for Open Space, which are applied to the most biologically sensitive areas of the project area, including Wolf Creek and other wetland and riparian areas.
6-COSG: Assure compliance with and understanding of air and water quality regulations and standards.	Yes	See analysis of Policy 2-COSG.
8-COSG: Minimize interference with the natural functions of flood plains and naturally flood-prone areas.	Yes	The City of Grass Valley participates in the Federal Emergency Management Agency (FEMA) National Flood Insurance Program. FEMA uses a 100-year storm as the basis for its coverage and calculates probable inundation profiles for major drainages based on existing land uses. The project area was mapped by FEMA and determined to be outside of the 100-year floodplain and any naturally flood-prone area.
8-SI: Require new developments to utilize on-site storm water detention techniques.	Yes	Implementation of City Improvement Standards related to on-site storm water detention would ensure that post-development peak stormwater runoff discharge rates and velocities are designed to prevent or reduce downstream erosion and protect stream habitat.
3.9 Noise		
2-NP: Perform adequate acoustical analyses prior to approval of new development projects or transportation facilities, if warranted.	Yes with mitigation	The noise impacts associated with the proposed project, as well as the compatibility of the proposed land uses, have been evaluated. The City's General Plan noise standards related to transportation and non-transportation noise sources were relied upon for determination of impact significance. Projected noise contours for transportation and non-transportation noise sources were utilized for determination of land
3-NP: Utilize noise contour data to determine land uses affected by transportation-related noise sources.	Yes with mitigation	
5-NP: Utilize noise contour data to determine appropriate land use patterns in areas affected	Yes with	

City of Grass Valley General Plan Policies	Consistency Determination	Analysis
by stationary noise sources.	mitigation	use compatibility. One mitigation measure has been included to reduce significant noise-related impacts.
6-NP: Locate sensitive land uses (residential neighborhoods, medical facilities, senior care facilities and schools) away from high noise areas.	Yes with mitigation	
Implementation Action 1-NI: Prohibit development of new noise-sensitive land uses where the noise level due to fixed noise sources will exceed the noise level standards of Table 6-5 (as measured immediately within the property line or within a designated outdoor activity area of the new development) unless effective noise mitigation measures have been incorporated into the development design to achieve the standards specified in Table 6-5. [Refer to Table 3.9-6.]	Yes with mitigation	The specific location of proposed on-site residential land uses has not yet been determined. However, the proposed General Plan and prezoning place the residentially designated areas at the farthest distances from SR 49. Specifically, the closest proposed R-2 zoned lands are over 550 feet and 350 feet from SR 49 on the west side and east side, respectively. Residential development is expected to take place beyond the 60 dB contour, which is the acceptable noise standard for outdoor activities. Based on the proposed zoning locations for the residential areas, it is unlikely that projected traffic noise levels would exceed the City's applicable exterior and interior noise standards. However, specific mitigation has been incorporated to ensure interior and exterior noise levels will be within acceptable levels.
Implementation Action 2-NI: Require that noise created by new development of fixed noise sources be mitigated so as not to exceed the noise level standards of Table 6-5 as measured immediately within the property line of lands designated for noise-sensitive land uses. [Refer to Table 3.9-6.]	Yes with mitigation	Non-transportation noise levels could potentially exceed the City's noise standards at nearby residential land uses. Mitigation has been incorporated to require the preparation of a noise analysis for future proposed on-site stationary noise sources and that mitigation be included in the project design to reduce any significant operational noise impacts to within acceptable levels, as defined by the City's General Plan.
Implementation Action 4-NI: Require that an acoustical analysis be performed where new development of fixed noise sources, or modification of existing fixed noise sources, is likely to produce noise levels exceeding the performance standards of Table 6-5, and that noise mitigation be included in the project design. [Refer to Table 3.9-6.]	Yes with mitigation	
Implementation Action 5-NI: Prohibit new development of noise-sensitive land uses in areas exposed to existing or projected future levels of noise from transportation noise sources which exceed the levels specified in Table 6-6, unless the project design includes effective mitigation measures to reduce exterior noise and noise levels in interior spaces to the levels specified in Table 6-6. [Refer to Table 3.9-7.]	Yes with mitigation	Please refer to the analysis provided for Implementation Action 1-NI.
Implementation Action 6-NI: Require mitigation of noise created by new transportation noise sources so as not to exceed the levels specified in Table 6-6 at designated outdoor activity areas and interior spaces of existing noise-sensitive	Yes with mitigation	Please refer to the analysis provided for Implementation Action 1-NI.

City of Grass Valley General Plan Policies	Consistency Determination	Analysis
land uses. [Refer to Table 3.9-7.]		
Implementation Action 7-NI: Adopt the following criteria applicable to roadway improvement projects: (a) Where the existing traffic noise level at the designated outdoor activity area of the affected noise-sensitive use is 65 dB L_{dn} or less, noise created by a roadway improvement project shall be mitigated so as not to exceed the ambient noise level by more than 3 dB L_{dn}; and (b) Where the existing traffic noise level at the designated outdoor activity area of the affected noise-sensitive use exceeds 65 dB L_{dn}, noise created by a roadway improvement project shall be mitigated so as not to exceed the ambient noise level by more than 1.5 dB L_{dn}.	Yes	Implementation of the proposed project would result in increased vehicle traffic along area roadways. Roadway improvements would be constructed as part of the proposed project. The General Plan identifies the project area for urban uses. Specific roadway improvements are not known at this time. Please refer to the analysis provided for Implementation Action 1-NI. Future roadway improvement projects will need to comply with this standard.
Implementation Action 9-NI: Require an acoustical analysis and mitigation measures where noise-sensitive land uses are proposed in areas exposed to existing or projected exterior noise levels exceeding the levels specified in Table 6-5 or Table 6-6. [Refer to Tables 3.9-6 and 3.9-7.]	Yes	Please refer to the analysis provided for Policy 2-NP and Implementation Action 1-NI.
3.10 Land Use		
Housing Element Goal A: To designate sufficient land at appropriate densities and establish development standards and permit procedures to accommodate the City's share of Nevada County's housing needs for all income groups.)	Yes	The project does not affect any of the land considered in the City of Grass Valley's Housing Element for very low- and low-income housing. This project proposes to designate new lands for medium density residential development which will assist in meeting future housing needs for the region.
Housing Element Policy 1: The City shall maintain an adequate supply of residential land in appropriate land use designations with access to public facilities and services, to accommodate projected household growth and Grass Valley's share of Nevada County's housing construction need for all income groups.	Yes	See analysis of Housing Element Goal A above.
Housing Element Policy 2: As needed, the City shall annex land within its Sphere of Influence (SOI) to maintain an adequate supply of residential land.	Yes	The project area is located within the City of Grass Valley's Sphere of Influence. In order for the project to proceed as proposed, the City will need to apply to the Local Agency Formation Commission of Nevada County to annex the project area. Upon annexation, 534 residential units could be developed in the project area.
Housing Element Policy 3: The City shall implement flexible land use regulations, through a planned unit development process, allowances for mixed-use and other zoning techniques to encourage a range of housing types and densities within a single development.	Yes	As land within the project area is annexed into the City, future residential projects will be subject to City's development review and subdivision process. These processes will allow for opportunities to utilize the City's planned development and affordable housing density bonus provisions.

City of Grass Valley General Plan Policies	Consistency Determination	Analysis
Housing Element Policy 1: The City shall ensure that new residential construction meets minimum state standards for energy efficiency.	Yes	The City has adopted the most recent California Energy Codes. Furthermore, to reduce greenhouse gases, the project includes mitigation measures that go beyond the state minimum standards.
3-LUG: In areas of new development, plan for a diversity of land uses and housing types, including mixed use developments.	Yes	The proposed project includes a mix of land uses and provides opportunities for a mix of housing types.
5-LUG: Provide for a broad range of housing opportunities, including opportunities for low, moderate and middle income households.	Yes	The proposed project includes a range of housing densities that can meet a range of income groups.
Objective 7-LUO: Preservation of open space and unique property features.	Yes	The project proposes to designate 117 acres as open space. This includes the areas along Wolf Creek, steeper heavily forested hillsides, and riparian corridors.
Objective 13-LUO: Provision of sufficient affordable housing units for those working in Grass Valley.	Yes	See 5_LUG.
6-LUG: Promote a jobs/housing balance within the Grass Valley region in order to facilitate pleasant, convenient and enjoyable working conditions for residents, including opportunities for short home to work journeys.	Yes	The project proposes a mix of industrial, commercial, business park, and residential densities that are intended to provide for the full range of job opportunities and a mix of residential placed in close proximity to the jobs.
Policy 1-LUP: Maintain a General Plan that reflects the needs of the total community, including residents, business and industry.	Yes	See 6_LUG.
Policy 13-LUP: Encourage convenience goods and services opportunities to be incorporated into significant development proposals.	Yes	See 6 LUG. Furthermore, as noted in the project objectives, the project proposes to address the retail leakage of the community by providing opportunities to provide a full range of retail services.
Policy 24-LUP: On large parcels, encourage clustering of residential units on the most developable portions of the site in order to reduce infrastructure and other housing related costs.	Yes	The project proposes to transfer the currently allowed rural densities to create areas of open space and areas of higher residential densities to reduce overall infrastructure costs.
Policy 25-LUP: Encourage clustering and other land use techniques to protect environmentally sensitive resources, such as heritage trees and wetlands.	Yes	See Objective 7-LUO.
Policy 29-LUP: Promote the establishment and expansion of business and industries offering professional, light manufacturing and technical employment opportunities related to existing and future forms of technology.	Yes	The proposed project includes CBP, M-1 and M-2 zoned lands. This will provide opportunities for the full range of industrial, business park, and high tech uses. As noted in the project objectives, one intent of this project is to address the lack of M-1 and M-2 zoned lands in the region.
Policy 31-LUP: Promote primary jobs and core employment opportunities; those that export	Yes	See Policy 29-LUP.

City of Grass Valley General Plan Policies	Consistency Determination	Analysis
goods while importing capital.		
Goal 1-COSG: Provide a balance between development and the natural environment, protecting and properly utilizing Grass Valley's sensitive environmental areas/features, natural resources and open space lands. **Objective 2-COCO:** Multi-purpose open space lands, accommodating the needs and requirements of open space/conservation, habitat, recreation and aesthetics. **Policy 3-COSP:** Encourage clustering, density averaging, and other techniques in larger-scale new development, as means of preserving open space and natural systems. **Policy 4-COSP:** Establish standards for inclusion and management of permanent open space in new developments. **Policy 5-COSP:** Carefully regulate development on steep slopes. **Policy 6-COSP:** Prevent excessive alteration of the natural topography.	Yes	The proposed project provides for a mix of land uses and includes 117 acres of open space land which is intended to protect the environmentally sensitive areas of the project.
30-LUP: Encourage mixed use developments on larger parcels in newly developing areas incorporating jobs generating businesses and industry housing.	Yes	See analysis of Goal 6-LUG above.
3.11 Public Services		
6-SP: Incorporate fire hazard reduction considerations into land use plans/patterns, both public and private.	Yes	Development within the project area is required to abide by the California Fire Code and City requirements for setbacks and hydrant spacing. Vegetation management to reduce fire hazards is also required.
7-SP: Identify, maintain and mark evacuation routes for use in case of disasters or emergencies.	Yes	The primary evacuation routes are the two highways serving Grass Valley: SR 49 (toward the north and south) and SR 20 (toward the east). Secondary evacuation routes include La Barr Meadows Road (toward the south, paralleling SR 49 toward Auburn; Figure 7-4 General Plan). Future development in the area will be tied to La Barr Meadows Road and SR 49.
8-SP: Assure public awareness of fire-safety measures, including those addressing property maintenance and evacuation.	Yes	Future development adjacent to the wildland-urban interface will be responsible for annual implementation of a vegetation management and fire safety plan.
9-SP: Develop and implement fire-safe community design and landscaping standards, construction codes, and property maintenance	Yes	The City has adopted the latest building and fire codes. All projects that develop adjacent to open spaces are required to prepare a vegetation

City of Grass Valley General Plan Policies	Consistency Determination	Analysis
regulations.		management and fire safety plan that addresses maintenance.
10-SP: Adopt and implement appropriate standards for water supply, pressure and distribution for fire suppression purposes.	Yes	Installation of water lines and fire hydrants to City standards is required as a component of the tentative map and/or development review process.
11-SP: Maintain appropriate standards for water supply, pressure and distribution for fire suppression purposes.	Yes	See analysis discussion for Policy 10-SP.
4-SI: Require future developments to provide multiple ingress/egress points, to facilitate emergency vehicle access and mobility, and to facilitate emergency evacuation movements.	Yes	Future development is required to comply with the City's subdivision standards, Design Guidelines, and Development Code, all of which ensure adequate ingress/egress and internal circulation complies with the City's standards.
8-SI: Require new developments to utilize on-site storm water detention techniques.	Yes	The City's Municipal Code and Improvement Standards provide standards to address on- and off-site stormwater detention or retention.
Goal 1-RG: Allow for expanded and diverse recreational programs, areas and opportunities.		
1-RP: Provide parks and open spaces of different sizes and types to respond to the needs of a diverse population, including trails for pedestrian and equestrian use, bicycle pathways, linear parkways and park-like natural areas.	Yes	Once a specific development is proposed in the project area,, the City will evaluate the appropriate location of a neighborhood or pocket park in this area of the community. Future development that abuts La Barr Meadows Road and Wolf Creek will be required to provide a bike lane and trail respectively.
6-RP: Provide non-motorized linkages between parks and open spaces.	Yes	Even though no specific development is proposed as part of this project, future development will be required to comply with the City's General Plan and Park and Recreation Master Plan. This, in addition to the large areas proposed to be designated for open space, will provide opportunities to develop parks and trails consistent with the plans and allow for a potential future to connect to the Empire Mine State Park trail system.
Goal 2-RG: Facilitate community cultural opportunities.		
6-RO: Establishment of general-purpose community gathering places and facilities.	Yes	Please refer to analysis for Policy 6-RP.
Circulation Policies		
24-CP: Coordinate circulation and development plans with public safety agencies, fire departments/districts and emergency service providers.	Yes	The City's Development Review process and/or tentative map process requires the fire department to ensure projects have adequate on- and off-site access, in addition to hydrant locations, water pressure, and vegetation management and maintenance.
Annexation Policies for Special Development Areas (SDA)		
Annexation proposals within the City Sphere of	Yes	Once annexed, the City will provide full City

City of Grass Valley General Plan Policies	Consistency Determination	Analysis
influence shall require full City services, including police and fire services. The City shall request that any annexation territory served by a special district which can be reasonably and efficiently served by City services be detached form that special district.		services, with the exception of water, which the NID will provide. The City will become the primary provider of police and fire service, with continued mutual aid from other public service agencies.
Provide for local/regional park, recreation and/or community facility needs and address future maintenance costs.		See analysis for Policy 1-RP above.
3.12 Public Utilities		
Policy 37-LUP: Assure that new development pays its fair share of the cost of municipal services.	Yes	Future development will be required to pay the City's impact fees which are adopted to ensure future development pays its fair share of costs for municipal services.
20-COSI: Coordinate the timing and phasing of planned wastewater facility extensions/ improvements with planned extensions of the other services, expansions of City sewer service areas, annexations, sphere of influence amendments, and other extraterritorial activities.	Yes	There is sufficient capacity at the wastewater treatment plant to meet the needs of the project at buildout. The City's sewer collection system will need to be extended to serve the project area.
3.13 Transportation and Circulation		
Goal 2-CG: Ensure that street and roadway improvements complement and support land uses goals, objectives, policies and plans.		
4-CO: Placement of public transportation access at convenient locations.	Yes	Though no specific development is proposed at this time, the City anticipates the need to extend transit services into the project area as development takes place. The City utilizes its subdivision and Development Review processes to coordinate the location of future transit stops.
5-CO: Convenient, safe and functional facilities for pedestrians, bicyclists and equestrians.	Yes	As development proceeds along L Barr Meadows Road, applicants will be required to install street improvements, which will include bike lanes. With the proposed 117 acres of open space, there are opportunities to extend trails and other pedestrian facilities into those areas.
Goal 3-CG: Provide for the safe and efficient movement of people and goods in a manner that respects existing neighborhoods and the natural environment.		
10-CO: Protection of stream courses, riparian areas and other natural features.	Yes	The proposed project includes 117 acres of Open Space, which will include the areas along Wolf Creek, the steeper hillsides, and riparian areas.
11-CP: Design selected streets and intersections employing modern roundabouts and other traffic calming techniques.	Yes	No development is proposed at this time. However, as development takes place within the project area, the City will rely on its Development Review and subdivision process to ensure development incorporates traffic calming and traffic safety measures into the design.
24-CP: Coordinate circulation and development plans with public safety agencies, fire	Yes	See 11-CP.

City of Grass Valley General Plan Policies	Consistency Determination	Analysis
departments/districts and emergency service providers.		
26-CP: Develop design standards to ensure that road segments being improved to four lanes incorporated aesthetic treatments, including landscaping, landscaped medians, setbacks for sidewalks, street lights, street furniture, signage restrictions and other design elements.	Yes	All improvements will be constructed to City standards.

APPENDIX 3.2-1 AIR QUALITY MODELING DATA

Southern SOI Planning & Annexation Project - One Year of Construction

Nevada County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Office Park	17.73	1000sqft	0.41	17,730.00	0
General Heavy Industry	82.30	1000sqft	1.89	82,300.00	0
General Light Industry	65.53	1000sqft	1.50	65,530.00	0
Parking Lot	2.90	Acre	2.90	126,324.00	0
Condo/Townhouse	66.00	Dwelling Unit	4.13	66,000.00	189
Single Family Housing	11.00	Dwelling Unit	3.57	19,800.00	31
Regional Shopping Center	43.11	1000sqft	0.99	43,110.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	80
Climate Zone	1			**Operational Year**	2014
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Doubled Coating Duration

Grading -

Architectural Coating -

Vehicle Trips -

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2014	10.3913	80.8536	53.0539	0.0637	18.2141	3.8808	21.3533	9.9699	3.5703	12.8579	0.0000	6,728.0381	6,728.0381	1.9488	0.0000	6,768.9621
2015	191.3217	38.1388	39.7290	0.0603	1.9482	2.2688	4.2170	0.5255	2.1299	2.6553	0.0000	5,780.8278	5,780.8278	0.7857	0.0000	5,797.3273
Total	**201.7130**	**118.9924**	**92.7829**	**0.1240**	**20.1623**	**6.1496**	**25.5703**	**10.4954**	**5.7002**	**15.5132**	**0.0000**	**12,508.8659**	**12,508.8659**	**2.7345**	**0.0000**	**12,566.2894**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/1/2014	1/14/2014	5	10	
2	Grading	Grading	1/15/2014	2/25/2014	5	30	
3	Building Construction	Building Construction	2/26/2014	4/21/2015	5	300	
4	Paving	Paving	4/22/2015	5/19/2015	5	20	
5	Architectural Coating	Architectural Coating	5/20/2015	7/14/2015	5	40	

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Scrapers	2	8.00	361	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	125	0.42
Paving	Paving Equipment	2	8.00	130	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	186.00	63.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	37.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2014

Unmitigated Construction On-Site

Acres of Grading: 0

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	5.2910	57.6198	42.9609	0.0391		3.1377	3.1377		2.8867	2.8867		4,155.8914	4,155.8914	1.2281		4,181.6817
Total	**5.2910**	**57.6198**	**42.9609**	**0.0391**	**18.0663**	**3.1377**	**21.2040**	**9.9307**	**2.8867**	**12.8174**		**4,155.8914**	**4,155.8914**	**1.2281**		**4,181.6817**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.3910	0.1192	1.3237	1.7700e-003	0.1479	1.4500e-003	0.1493	0.0392	1.3000e-003	0.0405		155.8839	155.8839	0.0106		156.1058
Total	**0.3910**	**0.1192**	**1.3237**	**1.7700e-003**	**0.1479**	**1.4500e-003**	**0.1493**	**0.0392**	**1.3000e-003**	**0.0405**		**155.8839**	**155.8839**	**0.0106**		**156.1058**

3.3 Grading - 2014

Unmitigated Construction On-Site

Acres of Grading: 75

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	6.8480	80.7211	51.5831	0.0618		3.8792	3.8792		3.5689	3.5689		6,554.8337	6,554.8337	1.9370		6,595.5113
Total	**6.8480**	**80.7211**	**51.5831**	**0.0618**	**8.6733**	**3.8792**	**12.5525**	**3.5965**	**3.5689**	**7.1654**		**6,554.8337**	**6,554.8337**	**1.9370**		**6,595.5113**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.4344	0.1325	1.4708	1.9600e-003	0.1643	1.6100e-003	0.1659	0.0436	1.4400e-003	0.0450		173.2043	173.2043	0.0117		173.4509
Total	**0.4344**	**0.1325**	**1.4708**	**1.9600e-003**	**0.1643**	**1.6100e-003**	**0.1659**	**0.0436**	**1.4400e-003**	**0.0450**		**173.2043**	**173.2043**	**0.0117**		**173.4509**

3.4 Building Construction - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.8680	31.2537	18.9298	0.0268		2.2280	2.2280		2.0973	2.0973		2,709.1969	2,709.1969	0.6889		2,723.6630
Total	**3.8680**	**31.2537**	**18.9298**	**0.0268**		**2.2280**	**2.2280**		**2.0973**	**2.0973**		**2,709.1969**	**2,709.1969**	**0.6889**		**2,723.6630**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	2.4835	8.5854	9.9524	0.0153	0.4201	0.2223	0.6424	0.1201	0.2043	0.3245		1,558.8802	1,558.8802	0.0203		1,559.3072
Worker	4.0399	1.2322	13.6782	0.0182	1.5280	0.0149	1.5429	0.4053	0.0134	0.4187		1,610.8004	1,610.8004	0.1092		1,613.0932
Total	**6.5234**	**9.8176**	**23.6305**	**0.0335**	**1.9481**	**0.2372**	**2.1853**	**0.5254**	**0.2177**	**0.7431**		**3,169.6806**	**3,169.6806**	**0.1295**		**3,172.4004**

3.4 Building Construction - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.6591	30.0299	18.7446	0.0268		2.1167	2.1167		1.9904	1.9904		2,689.5771	2,689.5771	0.6748		2,703.7483
Total	**3.6591**	**30.0299**	**18.7446**	**0.0268**		**2.1167**	**2.1167**		**1.9904**	**1.9904**		**2,689.5771**	**2,689.5771**	**0.6748**		**2,703.7483**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	2.1769	7.0407	9.1889	0.0152	0.4203	0.1386	0.5588	0.1202	0.1273	0.2475		1,537.9456	1,537.9456	0.0149		1,538.2590
Worker	3.5798	1.0683	11.7955	0.0182	1.5280	0.0135	1.5414	0.4053	0.0122	0.4174		1,553.3051	1,553.3051	0.0960		1,555.3200
Total	**5.7567**	**8.1089**	**20.9845**	**0.0334**	**1.9482**	**0.1520**	**2.1002**	**0.5255**	**0.1395**	**0.6649**		**3,091.2507**	**3,091.2507**	**0.1109**		**3,093.5790**

3.5 Paving - 2015

Unmitigated Construction On-Site

Acres of Paving: 0

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3172	25.1758	14.9781	0.0223		1.4148	1.4148		1.3016	1.3016		2,339.8984	2,339.8984	0.6986		2,354.5681
Paving	0.3799					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.6971**	**25.1758**	**14.9781**	**0.0223**		**1.4148**	**1.4148**		**1.3016**	**1.3016**		**2,339.8984**	**2,339.8984**	**0.6986**		**2,354.5681**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2887	0.0862	0.9513	1.4700e-003	0.1232	1.0900e-003	0.1243	0.0327	9.8000e-004	0.0337		125.2665	125.2665	7.7400e-003		125.4290
Total	**0.2887**	**0.0862**	**0.9513**	**1.4700e-003**	**0.1232**	**1.0900e-003**	**0.1243**	**0.0327**	**9.8000e-004**	**0.0337**		**125.2665**	**125.2665**	**7.7400e-003**		**125.4290**

3.6 Architectural Coating - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	190.2030					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.4066	2.5703	1.9018	2.9700e-003		0.2209	0.2209		0.2209	0.2209		281.4481	281.4481	0.0367		282.2177
Total	**190.6096**	**2.5703**	**1.9018**	**2.9700e-003**		**0.2209**	**0.2209**		**0.2209**	**0.2209**		**281.4481**	**281.4481**	**0.0367**		**282.2177**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.7121	0.2125	2.3464	3.6200e-003	0.3040	2.6800e-003	0.3066	0.0806	2.4200e-003	0.0830		308.9908	308.9908	0.0191		309.3916
Total	**0.7121**	**0.2125**	**2.3464**	**3.6200e-003**	**0.3040**	**2.6800e-003**	**0.3066**	**0.0806**	**2.4200e-003**	**0.0830**		**308.9908**	**308.9908**	**0.0191**		**309.3916**

Southern SOI Planning Annexation Project

Nevada County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Office Park	124.15	1000sqft	2.85	124,146.00	0
General Heavy Industry	576.10	1000sqft	13.23	576,103.00	0
General Light Industry	458.88	1000sqft	10.53	458,882.00	0
Parking Lot	20.30	Acre	20.30	884,268.00	0
Condo/Townhouse	461.00	Dwelling Unit	28.81	461,000.00	1318
Single Family Housing	73.00	Dwelling Unit	23.70	131,400.00	209
Regional Shopping Center	301.76	1000sqft	6.93	301,762.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	80
Climate Zone	1			**Operational Year**	2020
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Vehicle Trips - Trip Generation per Traffic Study

Area Mitigation -

Energy Mitigation -

Water Mitigation -

Table Name	Column Name	Default Value	New Value
tblLandUse	LandUseSquareFeet	124,150.00	124,146.00
tblLandUse	LandUseSquareFeet	576,100.00	576,103.00
tblLandUse	LandUseSquareFeet	458,880.00	458,882.00
tblLandUse	LandUseSquareFeet	301,760.00	301,762.00
tblProjectCharacteristics	OperationalYear	2014	2020
tblVehicleTrips	ST_TR	7.16	8.70
tblVehicleTrips	ST_TR	1.50	3.80
tblVehicleTrips	ST_TR	1.32	6.47
tblVehicleTrips	ST_TR	1.64	9.46
tblVehicleTrips	ST_TR	0.00	10.59
tblVehicleTrips	ST_TR	49.97	42.69
tblVehicleTrips	ST_TR	10.08	6.20
tblVehicleTrips	SU_TR	6.07	8.70
tblVehicleTrips	SU_TR	1.50	3.80
tblVehicleTrips	SU_TR	0.68	6.47
tblVehicleTrips	SU_TR	0.76	9.46
tblVehicleTrips	SU_TR	0.00	10.59
tblVehicleTrips	SU_TR	25.24	42.69
tblVehicleTrips	SU_TR	8.77	6.20
tblVehicleTrips	WD_TR	6.59	8.70
tblVehicleTrips	WD_TR	1.50	3.80
tblVehicleTrips	WD_TR	6.97	6.47
tblVehicleTrips	WD_TR	11.42	9.46
tblVehicleTrips	WD_TR	0.00	10.59
tblVehicleTrips	WD_TR	42.94	42.69
tblVehicleTrips	WD_TR	9.57	6.20

2.0 Emissions Summary

2.1 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	895.9769	11.6003	1,051.0950	0.3956		141.6846	141.6846		141.6804	141.6804	14,830.1042	6,299.1805	21,129.2847	13.7640	1.1665	21,779.9425
Energy	0.3789	3.3729	2.3653	0.0207		0.2618	0.2618		0.2618	0.2618		4,133.9404	4,133.9404	0.0792	0.0758	4,159.0989
Mobile	241.8686	255.1803	881.7735	1.9313	114.1711	3.6584	117.8295	30.5868	3.3697	33.9565		155,503.1261	155,503.1261	5.2075		155,612.4835
Total	**1,138.2245**	**270.1534**	**1,935.2338**	**2.3475**	**114.1711**	**145.6048**	**259.7759**	**30.5868**	**145.3119**	**175.8987**	**14,830.1042**	**165,936.2470**	**180,766.3512**	**19.0507**	**1.2423**	**181,551.5249**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	79.6790	0.5127	44.4052	2.3400e-003		0.8882	0.8882		0.8814	0.8814	0.0000	10,257.0629	10,257.0629	0.2733	0.1866	10,320.6435
Energy	0.3789	3.3729	2.3653	0.0207		0.2618	0.2618		0.2618	0.2618		4,133.9404	4,133.9404	0.0792	0.0758	4,159.0989
Mobile	241.8686	255.1803	881.7735	1.9313	114.1711	3.6584	117.8295	30.5868	3.3697	33.9565		155,503.1261	155,503.1261	5.2075		155,612.4835
Total	**321.9265**	**259.0658**	**928.5440**	**1.9543**	**114.1711**	**4.8084**	**118.9795**	**30.5868**	**4.5129**	**35.0997**	**0.0000**	**169,894.1294**	**169,894.1294**	**5.5600**	**0.2624**	**170,092.2259**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**71.7168**	**4.1042**	**52.0190**	**16.7507**	**0.0000**	**96.6976**	**54.1992**	**0.0000**	**96.8944**	**80.0455**	**100.0000**	**-2.3852**	**6.0145**	**70.8146**	**78.8793**	**6.3119**

3.0 Operational Detail - Mobile

3.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	241.8686	255.1803	881.7735	1.9313	114.1711	3.6584	117.8295	30.5868	3.3697	33.9565		155,503.1261	155,503.1261	5.2075		155,612.4835
Unmitigated	241.8686	255.1803	881.7735	1.9313	114.1711	3.6584	117.8295	30.5868	3.3697	33.9565		155,503.1261	155,503.1261	5.2075		155,612.4835

3.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Condo/Townhouse	4,010.70	4,010.70	4010.70	11,479,622	11,479,622
General Heavy Industry	2,189.18	2,189.18	2189.18	6,391,335	6,391,335
General Light Industry	2,968.95	2,968.95	2968.95	8,667,893	8,667,893
Office Park	1,174.46	1,174.46	1174.46	2,943,485	2,943,485
Parking Lot	0.00	0.00	0.00		
Regional Shopping Center	12,882.13	12,882.13	12882.13	22,586,308	22,586,308
Single Family Housing	452.60	452.60	452.60	1,295,454	1,295,454
Total	23,678.03	23,678.03	23,678.03	53,364,097	53,364,097

3.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Condo/Townhouse	10.80	7.30	7.50	42.30	19.60	38.10	86	11	3
General Heavy Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
General Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
Office Park	9.50	7.30	7.30	33.00	48.00	19.00	82	15	3
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Regional Shopping Center	9.50	7.30	7.30	16.30	64.70	19.00	54	35	11
Single Family Housing	10.80	7.30	7.50	42.30	19.60	38.10	86	11	3

3.4 Fleet Mix

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.335831	0.055862	0.254270	0.152608	0.080298	0.009454	0.018482	0.075995	0.001648	0.000531	0.009425	0.000593	0.005002

4.0 Energy Detail

Historical Energy Use: N

4.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.3789	3.3729	2.3653	0.0207		0.2618	0.2618		0.2618	0.2618		4,133.9404	4,133.9404	0.0792	0.0758	4,159.0989
NaturalGas Unmitigated	0.3789	3.3729	2.3653	0.0207		0.2618	0.2618		0.2618	0.2618		4,133.9404	4,133.9404	0.0792	0.0758	4,159.0989

4.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Condo/Townhouse	8685.63	0.0937	0.8004	0.3406	5.1100e-003		0.0647	0.0647		0.0647	0.0647		1,021.8390	1,021.8390	0.0196	0.0187	1,028.0578
General Heavy Industry	5808.38	0.0626	0.5695	0.4783	3.4200e-003		0.0433	0.0433		0.0433	0.0433		683.3389	683.3389	0.0131	0.0125	687.4976
General Light Industry	4626.54	0.0499	0.4536	0.3810	2.7200e-003		0.0345	0.0345		0.0345	0.0345		544.2984	544.2984	0.0104	9.9800e-003	547.6109
Office Park	6176.69	0.0666	0.6056	0.5087	3.6300e-003		0.0460	0.0460		0.0460	0.0460		726.6693	726.6693	0.0139	0.0133	731.0916
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	6275	0.0677	0.6152	0.5168	3.6900e-003		0.0468	0.0468		0.0468	0.0468		738.2348	738.2348	0.0142	0.0135	742.7276
Single Family Housing	3566.26	0.0385	0.3287	0.1399	2.1000e-003		0.0266	0.0266		0.0266	0.0266		419.5600	419.5600	8.0400e-003	7.6900e-003	422.1134
Total		**0.3789**	**3.3729**	**2.3652**	**0.0207**		**0.2618**	**0.2618**		**0.2618**	**0.2618**		**4,133.9404**	**4,133.9404**	**0.0792**	**0.0758**	**4,159.0989**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Condo/Townhouse	8.68563	0.0937	0.8004	0.3406	5.1100e-003		0.0647	0.0647		0.0647	0.0647		1,021.8390	1,021.8390	0.0196	0.0187	1,028.0578
General Heavy Industry	5.80838	0.0626	0.5695	0.4783	3.4200e-003		0.0433	0.0433		0.0433	0.0433		683.3389	683.3389	0.0131	0.0125	687.4976
General Light Industry	4.62654	0.0499	0.4536	0.3810	2.7200e-003		0.0345	0.0345		0.0345	0.0345		544.2984	544.2984	0.0104	9.9800e-003	547.6109
Office Park	6.17669	0.0666	0.6056	0.5087	3.6300e-003		0.0460	0.0460		0.0460	0.0460		726.6693	726.6693	0.0139	0.0133	731.0916
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	6.275	0.0677	0.6152	0.5168	3.6900e-003		0.0468	0.0468		0.0468	0.0468		738.2348	738.2348	0.0142	0.0135	742.7276
Single Family Housing	3.56626	0.0385	0.3287	0.1399	2.1000e-003		0.0266	0.0266		0.0266	0.0266		419.5600	419.5600	8.0400e-003	7.6900e-003	422.1134
Total		**0.3789**	**3.3729**	**2.3652**	**0.0207**		**0.2618**	**0.2618**		**0.2618**	**0.2618**		**4,133.9404**	**4,133.9404**	**0.0792**	**0.0758**	**4,159.0989**

5.0 Area Detail

5.1 Mitigation Measures Area

Use only Natural Gas Hearths

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	79.6790	0.5127	44.4052	2.3400e-003		0.8882	0.8882		0.8814	0.8814	0.0000	10,257.0629	10,257.0629	0.2733	0.1866	10,320.6435
Unmitigated	895.9769	11.6003	1,051.0950	0.3956		141.6846	141.6846		141.6804	141.6804	14,830.1042	6,299.1805	21,129.2847	13.7640	1.1665	21,779.9425

5.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	14.5219					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	62.8638					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	817.2309	11.0876	1,006.7407	0.3932		141.4410	141.4410		141.4368	141.4368	14,830.1042	6,219.5294	21,049.6336	13.6857	1.1665	21,698.6487
Landscaping	1.3603	0.5126	44.3543	2.3400e-003		0.2436	0.2436		0.2436	0.2436		79.6511	79.6511	0.0782		81.2938
Total	**895.9769**	**11.6003**	**1,051.0950**	**0.3956**		**141.6846**	**141.6846**		**141.6804**	**141.6804**	**14,830.1042**	**6,299.1805**	**21,129.2847**	**13.7640**	**1.1665**	**21,779.9425**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	14.5219					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	62.8638					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.9329	4.0000e-005	0.0509	0.0000		0.6446	0.6446		0.6378	0.6378	0.0000	10,177.4118	10,177.4118	0.1951	0.1866	10,239.3498
Landscaping	1.3603	0.5126	44.3543	2.3400e-003		0.2436	0.2436		0.2436	0.2436		79.6511	79.6511	0.0782		81.2938
Total	**79.6790**	**0.5127**	**44.4052**	**2.3400e-003**		**0.8882**	**0.8882**		**0.8814**	**0.8814**	**0.0000**	**10,257.0629**	**10,257.0629**	**0.2733**	**0.1866**	**10,320.6436**

Southern SOI Planning Annexation Project

Nevada County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Office Park	124.15	1000sqft	2.85	124,146.00	0
General Heavy Industry	576.10	1000sqft	13.23	576,103.00	0
General Light Industry	458.88	1000sqft	10.53	458,882.00	0
Parking Lot	20.30	Acre	20.30	884,268.00	0
Condo/Townhouse	461.00	Dwelling Unit	28.81	461,000.00	1318
Single Family Housing	73.00	Dwelling Unit	23.70	131,400.00	209
Regional Shopping Center	301.76	1000sqft	6.93	301,762.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	80
Climate Zone	1			**Operational Year**	2020
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Vehicle Trips - Trip Generation per Traffic Study

Area Mitigation -

Energy Mitigation -

Water Mitigation -

Table Name	Column Name	Default Value	New Value
tblLandUse	LandUseSquareFeet	124,150.00	124,146.00
tblLandUse	LandUseSquareFeet	576,100.00	576,103.00
tblLandUse	LandUseSquareFeet	458,880.00	458,882.00
tblLandUse	LandUseSquareFeet	301,760.00	301,762.00
tblProjectCharacteristics	OperationalYear	2014	2020
tblVehicleTrips	ST_TR	7.16	8.70
tblVehicleTrips	ST_TR	1.50	3.80
tblVehicleTrips	ST_TR	1.32	6.47
tblVehicleTrips	ST_TR	1.64	9.46
tblVehicleTrips	ST_TR	0.00	10.59
tblVehicleTrips	ST_TR	49.97	42.69
tblVehicleTrips	ST_TR	10.08	6.20
tblVehicleTrips	SU_TR	6.07	8.70
tblVehicleTrips	SU_TR	1.50	3.80
tblVehicleTrips	SU_TR	0.68	6.47
tblVehicleTrips	SU_TR	0.76	9.46
tblVehicleTrips	SU_TR	0.00	10.59
tblVehicleTrips	SU_TR	25.24	42.69
tblVehicleTrips	SU_TR	8.77	6.20
tblVehicleTrips	WD_TR	6.59	8.70
tblVehicleTrips	WD_TR	1.50	3.80
tblVehicleTrips	WD_TR	6.97	6.47
tblVehicleTrips	WD_TR	11.42	9.46
tblVehicleTrips	WD_TR	0.00	10.59
tblVehicleTrips	WD_TR	42.94	42.69
tblVehicleTrips	WD_TR	9.57	6.20

2.0 Emissions Summary

2.1 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	895.9769	11.6003	1,051.0950	0.3956		141.6846	141.6846		141.6804	141.6804	14,830.1042	6,299.1805	21,129.2847	13.7640	1.1665	21,779.9425
Energy	0.3789	3.3729	2.3653	0.0207		0.2618	0.2618		0.2618	0.2618		4,133.9404	4,133.9404	0.0792	0.0758	4,159.0989
Mobile	287.9908	284.4644	1,355.7434	1.8400	114.1711	3.6807	117.8518	30.5868	3.3902	33.9770		148,198.4349	148,198.4349	5.2232		148,308.1216
Total	**1,184.3467**	**299.4375**	**2,409.2037**	**2.2562**	**114.1711**	**145.6271**	**259.7982**	**30.5868**	**145.3324**	**175.9192**	**14,830.1042**	**158,631.5558**	**173,461.6600**	**19.0664**	**1.2423**	**174,247.1630**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	79.6790	0.5127	44.4052	2.3400e-003		0.8882	0.8882		0.8814	0.8814	0.0000	10,257.0629	10,257.0629	0.2733	0.1866	10,320.6435
Energy	0.3789	3.3729	2.3653	0.0207		0.2618	0.2618		0.2618	0.2618		4,133.9404	4,133.9404	0.0792	0.0758	4,159.0989
Mobile	287.9908	284.4644	1,355.7434	1.8400	114.1711	3.6807	117.8518	30.5868	3.3902	33.9770		148,198.4349	148,198.4349	5.2232		148,308.1216
Total	**368.0487**	**288.3499**	**1,402.5139**	**1.8630**	**114.1711**	**4.8307**	**119.0018**	**30.5868**	**4.5334**	**35.1202**	**0.0000**	**162,589.4382**	**162,589.4382**	**5.5757**	**0.2624**	**162,787.8640**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**68.9239**	**3.7028**	**41.7852**	**17.4288**	**0.0000**	**96.6828**	**54.1945**	**0.0000**	**96.8807**	**80.0362**	**100.0000**	**-2.4950**	**6.2678**	**70.7563**	**78.8793**	**6.5765**

3.0 Operational Detail - Mobile

3.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	287.9908	284.4644	1,355.7434	1.8400	114.1711	3.6807	117.8518	30.5868	3.3902	33.9770		148,198.4349	148,198.4349	5.2232		148,308.1216
Unmitigated	287.9908	284.4644	1,355.7434	1.8400	114.1711	3.6807	117.8518	30.5868	3.3902	33.9770		148,198.4349	148,198.4349	5.2232		148,308.1216

3.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Condo/Townhouse	4,010.70	4,010.70	4010.70	11,479,622	11,479,622
General Heavy Industry	2,189.18	2,189.18	2189.18	6,391,335	6,391,335
General Light Industry	2,968.95	2,968.95	2968.95	8,667,893	8,667,893
Office Park	1,174.46	1,174.46	1174.46	2,943,485	2,943,485
Parking Lot	0.00	0.00	0.00		
Regional Shopping Center	12,882.13	12,882.13	12882.13	22,586,308	22,586,308
Single Family Housing	452.60	452.60	452.60	1,295,454	1,295,454
Total	23,678.03	23,678.03	23,678.03	53,364,097	53,364,097

3.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Condo/Townhouse	10.80	7.30	7.50	42.30	19.60	38.10	86	11	3
General Heavy Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
General Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
Office Park	9.50	7.30	7.30	33.00	48.00	19.00	82	15	3
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Regional Shopping Center	9.50	7.30	7.30	16.30	64.70	19.00	54	35	11
Single Family Housing	10.80	7.30	7.50	42.30	19.60	38.10	86	11	3

3.4 Fleet Mix

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.335831	0.055862	0.254270	0.152608	0.080298	0.009454	0.018482	0.075995	0.001648	0.000531	0.009425	0.000593	0.005002

4.0 Energy Detail

Historical Energy Use: N

4.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.3789	3.3729	2.3653	0.0207		0.2618	0.2618		0.2618	0.2618		4,133.9404	4,133.9404	0.0792	0.0758	4,159.0989
NaturalGas Unmitigated	0.3789	3.3729	2.3653	0.0207		0.2618	0.2618		0.2618	0.2618		4,133.9404	4,133.9404	0.0792	0.0758	4,159.0989

4.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Condo/Townhouse	8685.63	0.0937	0.8004	0.3406	5.1100e-003		0.0647	0.0647		0.0647	0.0647		1,021.8390	1,021.8390	0.0196	0.0187	1,028.0578
General Heavy Industry	5808.38	0.0626	0.5695	0.4783	3.4200e-003		0.0433	0.0433		0.0433	0.0433		683.3389	683.3389	0.0131	0.0125	687.4976
General Light Industry	4626.54	0.0499	0.4536	0.3810	2.7200e-003		0.0345	0.0345		0.0345	0.0345		544.2984	544.2984	0.0104	9.9800e-003	547.6109
Office Park	6176.69	0.0666	0.6056	0.5087	3.6300e-003		0.0460	0.0460		0.0460	0.0460		726.6693	726.6693	0.0139	0.0133	731.0916
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	6275	0.0677	0.6152	0.5168	3.6900e-003		0.0468	0.0468		0.0468	0.0468		738.2348	738.2348	0.0142	0.0135	742.7276
Single Family Housing	3566.26	0.0385	0.3287	0.1399	2.1000e-003		0.0266	0.0266		0.0266	0.0266		419.5600	419.5600	8.0400e-003	7.6900e-003	422.1134
Total		**0.3789**	**3.3729**	**2.3652**	**0.0207**		**0.2618**	**0.2618**		**0.2618**	**0.2618**		**4,133.9404**	**4,133.9404**	**0.0792**	**0.0758**	**4,159.0989**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Condo/Townhouse	8.68563	0.0937	0.8004	0.3406	5.1100e-003		0.0647	0.0647		0.0647	0.0647		1,021.8390	1,021.8390	0.0196	0.0187	1,028.0578
General Heavy Industry	5.80838	0.0626	0.5695	0.4783	3.4200e-003		0.0433	0.0433		0.0433	0.0433		683.3389	683.3389	0.0131	0.0125	687.4976
General Light Industry	4.62654	0.0499	0.4536	0.3810	2.7200e-003		0.0345	0.0345		0.0345	0.0345		544.2984	544.2984	0.0104	9.9800e-003	547.6109
Office Park	6.17669	0.0666	0.6056	0.5087	3.6300e-003		0.0460	0.0460		0.0460	0.0460		726.6693	726.6693	0.0139	0.0133	731.0916
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	6.275	0.0677	0.6152	0.5168	3.6900e-003		0.0468	0.0468		0.0468	0.0468		738.2348	738.2348	0.0142	0.0135	742.7276
Single Family Housing	3.56626	0.0385	0.3287	0.1399	2.1000e-003		0.0266	0.0266		0.0266	0.0266		419.5600	419.5600	8.0400e-003	7.6900e-003	422.1134
Total		**0.3789**	**3.3729**	**2.3652**	**0.0207**		**0.2618**	**0.2618**		**0.2618**	**0.2618**		**4,133.9404**	**4,133.9404**	**0.0792**	**0.0758**	**4,159.0989**

5.0 Area Detail

5.1 Mitigation Measures Area

Use only Natural Gas Hearths

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	79.6790	0.5127	44.4052	2.3400e-003		0.8882	0.8882		0.8814	0.8814	0.0000	10,257.0629	10,257.0629	0.2733	0.1866	10,320.6435
Unmitigated	895.9769	11.6003	1,051.0950	0.3956		141.6846	141.6846		141.6804	141.6804	14,830.1042	6,299.1805	21,129.2847	13.7640	1.1665	21,779.9425

5.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	14.5219					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	62.8638					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	817.2309	11.0876	1,006.7407	0.3932		141.4410	141.4410		141.4368	141.4368	14,830.1042	6,219.5294	21,049.6336	13.6857	1.1665	21,698.6487
Landscaping	1.3603	0.5126	44.3543	2.3400e-003		0.2436	0.2436		0.2436	0.2436		79.6511	79.6511	0.0782		81.2938
Total	**895.9769**	**11.6003**	**1,051.0950**	**0.3956**		**141.6846**	**141.6846**		**141.6804**	**141.6804**	**14,830.1042**	**6,299.1805**	**21,129.2847**	**13.7640**	**1.1665**	**21,779.9425**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	14.5219					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	62.8638					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.9329	4.0000e-005	0.0509	0.0000		0.6446	0.6446		0.6378	0.6378	0.0000	10,177.4118	10,177.4118	0.1951	0.1866	10,239.3498
Landscaping	1.3603	0.5126	44.3543	2.3400e-003		0.2436	0.2436		0.2436	0.2436		79.6511	79.6511	0.0782		81.2938
Total	**79.6790**	**0.5127**	**44.4052**	**2.3400e-003**		**0.8882**	**0.8882**		**0.8814**	**0.8814**	**0.0000**	**10,257.0629**	**10,257.0629**	**0.2733**	**0.1866**	**10,320.6436**

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           CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                    JUNE 1989 VERSION
                    PAGE   1

               JOB: McKnight Way - Tayorville Road
               RUN: Hour 1           (WORST CASE ANGLE)
         POLLUTANT: Carbon Monoxide


   I.  SITE VARIABLES

         U=    .5 M/S             Z0= 100. CM            ALT=  2450. (M)
       BRG= WORST CASE            VD=   .0 CM/S
      CLAS=     7 (G)             VS=   .0 CM/S
      MIXH=  300. M              AMB=   .0 PPM
     SIGTH=    5. DEGREES       TEMP=  8.0 DEGREE (C)


  II.  LINK VARIABLES

      LINK      *  LINK COORDINATES (M)   *                EF     H     W
   DESCRIPTION  *   X1    Y1    X2    Y2  * TYPE  VPH  (G/MI)  (M)   (M)
 ---------------*-------------------------*------------------------------
 A. Tayorville R *  -135   135    30  -135 *  AG     41  23.5     .0  25.8
 B. McKight Way  *    -3    -3  -135   -30 *  AG   1504  23.5     .0  25.8


 III.  RECEPTOR LOCATIONS

             *    COORDINATES (M)
   RECEPTOR  *    X      Y      Z
 ------------*---------------------
  1. Recpt 1  *   -98     45   1.8
  2. Recpt 2  *   -75     15   1.8
  3. Recpt 3  *  -113     45   1.8
  4. Recpt 4  *   -90     14   1.8
  5. Recpt 5  *  -113    -60   1.8
  6. Recpt 6  *   -90    -68   1.8
  7. Recpt 7  *   -75    -68   1.8
  8. Recpt 8  *   -45    -68   1.8
  9. Recpt 9  *   -30     90   1.8
 10. Recpt 10 *   -15     60   1.8
 11. Recpt 11 *     0     30   1.8
 12. Recpt 12 *    30    -30   1.8


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           CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                    JUNE 1989 VERSION
                    PAGE   2

               JOB: McKnight Way - Tayorville Road
               RUN: Hour 1           (WORST CASE ANGLE)
         POLLUTANT: Carbon Monoxide


  IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

             *       * PRED  * CONC/LINK
```

```
             *  BRG  * CONC  *   (PPM)
  RECEPTOR   * (DEG) * (PPM) *   A    B
-------------*-------*-------*----------
 1. Recpt 1  *  141. *   1.0 *   .2   .8
 2. Recpt 2  *  114. *   1.5 *   .0  1.4
 3. Recpt 3  *  123. *    .9 *   .0   .9
 4. Recpt 4  *  110. *   1.5 *   .0  1.4
 5. Recpt 5  *   54. *   1.5 *   .0  1.5
 6. Recpt 6  *   44. *   1.2 *   .0  1.1
 7. Recpt 7  *   38. *   1.1 *   .0  1.1
 8. Recpt 8  *   22. *   1.0 *   .0   .9
 9. Recpt 9  *  213. *    .8 *   .0   .7
10. Recpt 10 *  225. *   1.0 *   .0  1.0
11. Recpt 11 *  239. *   1.7 *   .0  1.7
12. Recpt 12 *  277. *   1.7 *   .0  1.7


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           CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                    JUNE 1989 VERSION
                    PAGE   1

               JOB: McKnight Way - SR 49 Southbound Ramp
               RUN: Hour 1           (WORST CASE ANGLE)
         POLLUTANT: Carbon Monoxide


   I.  SITE VARIABLES

        U=    .5 M/S             Z0= 100. CM           ALT=  2450. (M)
      BRG= WORST CASE            VD=   .0 CM/S
     CLAS=     7 (G)             VS=   .0 CM/S
     MIXH=  300. M              AMB=   .0 PPM
    SIGTH=    5. DEGREES       TEMP=  8.0 DEGREE (C)


  II.  LINK VARIABLES

     LINK      *  LINK COORDINATES (M)   *                EF     H     W
   DESCRIPTION  *   X1    Y1    X2    Y2  * TYPE  VPH  (G/MI)  (M)   (M)
 ----------------*------------------------*------------------------------
 A. Tayorville R *  -135   135    30  -135 *  AG    974  23.5     .0  25.8
 B. McKight Way  *    -3    -3  -135   -30 *  AG   1441  23.5     .0  25.8


 III.  RECEPTOR LOCATIONS

             *    COORDINATES (M)
   RECEPTOR  *    X      Y      Z
 ------------*---------------------
  1. Recpt 1  *   -120     45   1.8
  2. Recpt 2  *   -105     15   1.8
  3. Recpt 3  *   -135     45   1.8
  4. Recpt 4  *   -120     14   1.8
  5. Recpt 5  *   -128    -60   1.8
  6. Recpt 6  *   -113    -68   1.8
  7. Recpt 7  *    -90    -68   1.8
  8. Recpt 8  *    -60    -68   1.8
  9. Recpt 9  *    -60     90   1.8
 10. Recpt 10 *    -45     60   1.8
 11. Recpt 11 *    -15     30   1.8
 12. Recpt 12 *     15    -30   1.8

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           CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                    JUNE 1989 VERSION
                    PAGE   2

               JOB: McKnight Way - SR 49 Southbound Ramp
               RUN: Hour 1           (WORST CASE ANGLE)
         POLLUTANT: Carbon Monoxide


  IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

             *       * PRED  * CONC/LINK
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                                       SR 49 SB Ramp Output
             *  BRG  * CONC  *   (PPM)
  RECEPTOR   * (DEG) * (PPM) *   A    B
-------------*-------*-------*----------
 1. Recpt 1  *  135. *   2.0 *  1.2   .8
 2. Recpt 2  *  131. *   2.2 *  1.1  1.1
 3. Recpt 3  *  132. *   1.7 *  1.0   .8
 4. Recpt 4  *  128. *   2.0 *   .9  1.1
 5. Recpt 5  *   58. *   2.0 *   .4  1.6
 6. Recpt 6  *   48. *   1.7 *   .5  1.2
 7. Recpt 7  *   44. *   1.6 *   .5  1.1
 8. Recpt 8  *  346. *   1.9 *  1.0   .8
 9. Recpt 9  *  164. *   1.7 *  1.1   .6
10. Recpt 10 *  165. *   1.8 *  1.1   .7
11. Recpt 11 *  236. *   2.1 *   .6  1.4
12. Recpt 12 *  277. *   2.4 *   .7  1.7


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           CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                    JUNE 1989 VERSION
                    PAGE   1

               JOB: McKnight Way - La Barr Meadows Road
               RUN: Hour 1           (WORST CASE ANGLE)
         POLLUTANT: Carbon Monoxide


   I.  SITE VARIABLES

        U=    .5 M/S             Z0= 100. CM            ALT=  2450. (M)
      BRG= WORST CASE            VD=   .0 CM/S
     CLAS=     7 (G)             VS=   .0 CM/S
     MIXH=  300. M              AMB=   .0 PPM
    SIGTH=    5. DEGREES       TEMP=  8.0 DEGREE (C)


  II.  LINK VARIABLES

      LINK      *  LINK COORDINATES (M)   *                EF     H     W
   DESCRIPTION  *   X1    Y1    X2    Y2  * TYPE  VPH  (G/MI)  (M)   (M)
 ---------------*-------------------------*------------------------------
 A. La Barr Mead *  -135   135    30  -135 *  AG   1526  23.5     .0  25.8
 B. McKight Way  *    -3    -3  -135   -30 *  AG   1095  23.5     .0  25.8


 III.  RECEPTOR LOCATIONS

             *    COORDINATES (M)
   RECEPTOR  *    X      Y      Z
 ------------*---------------------
 1. Recpt 1  *   -128     45   1.8
 2. Recpt 2  *   -113     15   1.8
 3. Recpt 3  *   -143     45   1.8
 4. Recpt 4  *   -128     14   1.8
 5. Recpt 5  *   -135    -60   1.8
 6. Recpt 6  *   -120    -68   1.8
 7. Recpt 7  *    -98    -68   1.8
 8. Recpt 8  *    -68    -68   1.8
 9. Recpt 9  *    -68     90   1.8
10. Recpt 10 *    -53     60   1.8
11. Recpt 11 *    -23     30   1.8
12. Recpt 12 *      8    -30   1.8


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           CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
                    JUNE 1989 VERSION
                    PAGE   2

               JOB: McKnight Way - La Barr Meadows Road
               RUN: Hour 1           (WORST CASE ANGLE)
         POLLUTANT: Carbon Monoxide


  IV.  MODEL RESULTS (WORST CASE WIND ANGLE )

             *       * PRED  * CONC/LINK
```

```
             *  BRG  * CONC  *   (PPM)
  RECEPTOR   * (DEG) * (PPM) *   A    B
-------------*-------*-------*----------
 1. Recpt 1  *  133. *   2.2 *  1.6   .6
 2. Recpt 2  *  130. *   2.3 *  1.4   .8
 3. Recpt 3  *  130. *   1.9 *  1.3   .6
 4. Recpt 4  *  127. *   2.0 *  1.2   .8
 5. Recpt 5  *   60. *   2.0 *   .6  1.3
 6. Recpt 6  *   54. *   1.7 *   .7  1.0
 7. Recpt 7  *  357. *   1.7 *  1.0   .7
 8. Recpt 8  *  348. *   2.0 *  1.3   .7
 9. Recpt 9  *  162. *   2.3 *  1.8   .5
10. Recpt 10 *  163. *   2.4 *  1.9   .6
11. Recpt 11 *  169. *   2.2 *  1.4   .8
12. Recpt 12 *  312. *   2.7 *  1.7  1.0


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APPENDIX 3.3-1 BIOLOGICAL RESOURCES DATABASE QUERIES

Scientific N	Common N	Family	Lifeform	Rare Plant	State Rank	Global Ran	CESA	FESA	Elevation H	Elevation L	CA Endemic
Allium san	Congdon's	Alliaceae	perennial b	4.3	S3.3	G3T3	None	None	990	300	T
Allium san	Sanborn's	Alliaceae	perennial b	4.2	S3.2	G3T3	None	None	1510	260	F
Azolla micr	Mexican m	Azollaceae	annual / pe	4.2	S3.2?	G5	None	None	100	30	F
Brodiaea si	Sierra foot	Themidace	perennial b	4.3	S3	G3	None	None	945	50	T
Bulbostylis	thread-lea	Cyperacea	annual her	4.2	S3.2	G5	None	None	2075	395	F
Calystegia	Stebbins'	Convolvula	perennial r	1B.1	S1	G1	CE	FE	1090	185	T
Chlorogalu	Red Hills sc	Agavaceae	perennial b	1B.2	S3	G3	None	None	1240	245	T
Clarkia bilo	Brandegee	Onagracea	annual her	4.2	S4	G4G5T4	None	None	915	75	T
Didymodor	Norris' bea	Pottiaceae	moss	2B.2	S3S4	G3G4	None	None	1973	600	F
Fremontod	Pine Hill fla	Malvaceae	perennial e	1B.2	S1	G1	CR	FE	760	425	T
Fritillaria e	Butte Coun	Liliaceae	perennial b	3.2	S3	G3Q	None	None	1500	50	F
Juncus dig	finger rush	Juncaceae	annual her	1B.1	S1	G1	None	None	790	660	T
Lathyrus s	dubious pe	Fabaceae	perennial h	3	S1S2	G1G2	None	None	930	150	T
Lewisia car	Cantelow's	Montiacea	perennial h	1B.2	S3	G3	None	None	1370	330	T
Lilium hum	Humboldt	Liliaceae	perennial b	4.2	S3.2	G4T3	None	None	1280	90	T
Lycopodiel	inundated	Lycopodiac	perennial r	2B.2	S1?	G5	None	None	1000	5	F
Mielichhof	elongate c	Mniaceae	moss	2B.2	S2	G4?	None	None	1300	500	F
Monardell	Follett's m	Lamiaceae	perennial s	1B.2	S2	G2	None	None	2000	600	T
Plagioboth	Cedar Cres	Boraginace	annual her	3	SH	G3THQ	None	None	870	870	T
Poa sierrae	Sierra blue	Poaceae	perennial r	1B.3	S2S3	G2G3	None	None	1500	365	T
Rhynchosp	brownish b	Cyperacea	perennial h	2B.2	S2S3	G5	None	None	2000	45	F
Sidalcea gi	giant check	Malvaceae	perennial r	4.3	S3	G3	None	None	1950	670	T
Sidalcea sti	Scadden Fl	Malvaceae	perennial r	1B.1	S1	G1	CE	None	730	700	T

Occurrence Count	Scientific Name	Common Name	Federal Listing	State Listing	Rare Plank Rank
5	Calystegia stebbinsii	Stebbins' morning-glory	Endangered	Endangered	1B.1
1	Chlorogalum grandiflorum	Red Hills soaproot	None	None	1B.2
14	Clarkia biloba ssp. brandegeeae	Brandegee's clarkia	None	None	4.2
1	Didymodon norrisii	Norris' beard moss	None	None	2B.2
3	Fremontodendron decumbens	Pine Hill flannelbush	Endangered	Rare	1B.2
1	Fritillaria eastwoodiae	Butte County fritillary	None	None	3.2
1	Juncus digitatus	finger rush	None	None	1B.1
5	Laterallus jamaicensis coturniculus	California black rail	None	Threatened	
3	Lathyrus sulphureus var. argillaceus	dubious pea	None	None	3
2	Lewisia cantelovii	Cantelow's lewisia	None	None	1B.2
1	Mielichhoferia elongata	elongate copper moss	None	None	2B.2
7	Phrynosoma blainvillii	coast horned lizard	None	None	
8	Rana boylii	foothill yellow-legged frog	None	None	
1	Rhynchospora capitellata	brownish beaked-rush	None	None	2B.2
2	Sidalcea stipularis	Scadden Flat checkerbloom	None	Endangered	1B.1

Scientific N	Common N	Family	Lifeform	Rare Plant	State Rank	Global Ran	CESA	FESA	Elevation H	Elevation L	CA Endemic	
Allium san	Sanborn's	Alliaceae	perennial b	4.2	S3.2	G3T3	None	None	1510	260	F	
Brodiaea si	Sierra foot	Themidace	perennial b	4.3	S3	G3	None	None	945	50	T	
Calystegia	Stebbins' m	Convolvula	perennial r	1B.1	S1	G1	CE	FE	1090	185	T	
Clarkia bilo	Brandegee	Onagracea	annual her	4.2	S4	G4G5T4	None	None	915	75	T	
Fremontod	Pine Hill fla	Malvaceae	perennial e	1B.2	S1	G1	CR	FE	760	425	T	
Juncus digi	finger rush	Juncaceae	annual her	1B.1	S1	G1	None	None	790	660	T	
Lathyrus su	dubious pe	Fabaceae	perennial h	3	S1S2	G1G2	None	None	930	150	T	
Lilium hum	Humboldt l	Liliaceae	perennial b	4.2	S3.2	G4T3	None	None	1280	90	T	
Monardell	Follett's m	Lamiaceae	perennial s	1B.2	S2	G2	None	None	2000	600	T	
Plagioboth	Cedar Cres	Boraginace	annual her	3	SH	G3THQ	None	None	870	870	T	
Rhynchosp	brownish b	Cyperacea	perennial h	2B.2	S2S3	G5	None	None	2000	45	F	
Sidalcea gi	giant check	Malvaceae	perennial r	4.3	S3	G3	None	None	1950	670	T	
Sidalcea sti	Scadden Fl	Malvaceae	perennial r	1B.1	S1	G1	CE	None	730	700	T	

1mi					
Occurrence Count	**Scientific Name**	**Common Name**	**Federal Listing**	**State Listing**	**Rare Plant Rank**
1	Laterallus jamaicensis coturniculus	California black rail	None	Threatened	
1	Lathyrus sulphureus var. argillaceus	dubious pea	None	None	3
1	Rhynchospora capitellata	brownish beaked-rush	None	None	2.2
1	Sidalcea stipularis	Scadden Flat checkerbloom	None	Endangered	1B.1
5mi					
Occurrence Count	**Scientific Name**	**Common Name**	**Federal Listing**	**State Listing**	**Rare Plant Rank**
5	Calystegia stebbinsii	Stebbins' morning-glory	Endangered	Endangered	1B.1
3	Clarkia biloba ssp. brandegeeae	Brandegee's clarkia	None	None	4.2
1	Didymodon norrisii	Norris' beard moss	None	None	2.2
3	Fremontodendron decumbens	Pine Hill flannelbush	Endangered	Rare	1B.2
1	Juncus digitatus	finger rush	None	None	1B.1
3	Laterallus jamaicensis coturniculus	California black rail	None	Threatened	
2	Lathyrus sulphureus var. argillaceus	dubious pea	None	None	3
5	Phrynosoma blainvillii	coast horned lizard	None	None	
1	Rhynchospora capitellata	brownish beaked-rush	None	None	2.2
2	Sidalcea stipularis	Scadden Flat checkerbloom	None	Endangered	1B.1

Map Symbol	Map Unit Name	Acreage
Ao	Alluvial land, clayey	28.71
Ct	Cut and fill land	32.46
HnE	Hoda sandy loam, 15 to 50 percent slopes	10.69
HrC	Horseshoe gravelly loam, 9 to 15 percent slopes	14.31
MrC	Musick sandy loam, 5 to 15 percent slopes	56.13
MrE	Musick sandy loam, 15 to 50 percent slopes	143.72
MsE	Musick-Rock outcrop complex, 5 to 50 percent slopes	0.00
Pr	Placer diggings	13.21
SlB	Sites loam, 2 to 9 percent slopes	7.20
SlD	Sites loam, 15 to 30 percent slopes	10.71
SmE	Sites very stony loam, 15 to 50 percent slopes	116.70

These buttons will not appear on your list.

Revise Selection

Print this page

Print species list before going on to letter.

Make Official Letter

U.S. Fish & Wildlife Service

Sacramento Fish & Wildlife Office

Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in the Counties and/or U.S.G.S. 7 1/2 Minute Quads you requested

Document Number: 130805093013

Database Last Updated: September 18, 2011

Quad Lists

Listed Species

Invertebrates

- Branchinecta lynchi
  - vernal pool fairy shrimp (T)

- Desmocerus californicus dimorphus
  - valley elderberry longhorn beetle (T)

- Lepidurus packardi
  - vernal pool tadpole shrimp (E)

Fish

- Hypomesus transpacificus
  - delta smelt (T)

- Oncorhynchus mykiss
  - Central Valley steelhead (T) (NMFS)

- Oncorhynchus tshawytscha
  - Central Valley spring-run chinook salmon (T) (NMFS)
  - winter-run chinook salmon, Sacramento River (E) (NMFS)

Amphibians

- Rana draytonii
  - California red-legged frog (T)
  - Critical habitat, California red-legged frog (X)

Plants

- Calystegia stebbinsii
  - Stebbins's morning-glory (E)

- Fremontodendron californicum ssp. decumbens
  - Pine Hill flannelbush (E)

Candidate Species

Mammals

- Martes pennanti
  - fisher (C)

Quads Containing Listed, Proposed or Candidate Species:

CHICAGO PARK (541B)

COLFAX (541C)

GRASS VALLEY (542A)

ROUGH AND READY (542B)

WOLF (542C)

LAKE COMBIE (542D)

NORTH BLOOMFIELD (557C)

FRENCH CORRAL (558C)

NEVADA CITY (558D)

County Lists

Nevada County

Listed Species

Invertebrates

- Branchinecta lynchi
  - vernal pool fairy shrimp (T)

- Desmocerus californicus dimorphus
    - valley elderberry longhorn beetle (T)

- Lepidurus packardi
    - vernal pool tadpole shrimp (E)

Fish

- Hypomesus transpacificus
    - delta smelt (T)

- Oncorhynchus (=Salmo) clarki henshawi
    - Lahontan cutthroat trout (T)

- Oncorhynchus mykiss
    - Central Valley steelhead (T) (NMFS)
    - Critical habitat, Central Valley steelhead (X) (NMFS)

- Oncorhynchus tshawytscha
    - Central Valley spring-run chinook salmon (T) (NMFS)
    - Critical Habitat, Central Valley spring-run chinook (X) (NMFS)
    - winter-run chinook salmon, Sacramento River (E) (NMFS)

Amphibians

- Rana draytonii
    - California red-legged frog (T)
    - Critical habitat, California red-legged frog (X)

- Rana sierrae
    - Mountain yellow legged frog (PX)

Reptiles

- Thamnophis gigas
    - giant garter snake (T)

Plants

- Calystegia stebbinsii
    - Stebbins's morning-glory (E)

- Fremontodendron californicum ssp. decumbens
    - Pine Hill flannelbush (E)

- Senecio layneae
  - Layne's butterweed (=ragwort) (T)

Candidate Species

Amphibians

- Rana muscosa
  - mountain yellow-legged frog (C)

Mammals

- Martes pennanti
  - fisher (C)

Plants

- Ivesia webberi
  - Webber's ivesia (C)

Key:

- (E) Endangered - Listed as being in danger of extinction.
- (T) Threatened - Listed as likely to become endangered within the foreseeable future.
- (P) Proposed - Officially proposed in the Federal Register for listing as endangered or threatened.
- (NMFS) Species under the Jurisdiction of the National Oceanic & Atmospheric Administration Fisheries Service. Consult with them directly about these species.
- Critical Habitat - Area essential to the conservation of a species.
- (PX) Proposed Critical Habitat - The species is already listed. Critical habitat is being proposed for it.
- (C) Candidate - Candidate to become a proposed species.
- (V) Vacated by a court order. Not currently in effect. Being reviewed by the Service.
- (X) Critical Habitat designated for this species

Important Information About Your Species List

How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey 7½ minute quads. The United States is divided into these quads, which are about the size of San Francisco.

The animals on your species list are ones that occur within, or may be affected by projects within, the quads covered by the list.

- Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them.
- Amphibians will be on the list for a quad or county if pesticides applied in that area may be carried to their habitat by air currents.
- Birds are shown regardless of whether they are resident or migratory. Relevant birds on the county

> list should be considered regardless of whether they appear on a quad list.

Plants

Any plants on your list are ones that have actually been observed in the area covered by the list. Plants may exist in an area without ever having been detected there. You can find out what's in the surrounding quads through the California Native Plant Society's online Inventory of Rare and Endangered Plants.

Surveying

Some of the species on your list may not be affected by your project. A trained biologist and/or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We recommend that your surveys include any proposed and candidate species on your list.
See our Protocol and Recovery Permits pages.

For plant surveys, we recommend using the Guidelines for Conducting and Reporting Botanical Inventories. The results of your surveys should be published in any environmental documents prepared for your project.

Your Responsibilities Under the Endangered Species Act

All animals identified as listed above are fully protected under the Endangered Species Act of 1973, as amended. Section 9 of the Act and its implementing regulations prohibit the take of a federally listed wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such animal.

> Take may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR §17.3).

Take incidental to an otherwise lawful activity may be authorized by one of two procedures:

- If a Federal agency is involved with the permitting, funding, or carrying out of a project that may result in take, then that agency must engage in a formal consultation with the Service.
- During formal consultation, the Federal agency, the applicant and the Service work together to avoid or minimize the impact on listed species and their habitat. Such consultation would result in a biological opinion by the Service addressing the anticipated effect of the project on listed and proposed species. The opinion may authorize a limited level of incidental take.
- If no Federal agency is involved with the project, and federally listed species may be taken as part of the project, then you, the applicant, should apply for an incidental take permit. The Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project.
- Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that minimizes the project's direct and indirect impacts to listed species and compensates for project-related loss of habitat. You should include the plan in any environmental documents you file.

Critical Habitat

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as critical habitat. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Boundary descriptions of the critical habitat may be found in the Federal Register. The information is also reprinted in the Code of Federal Regulations (50 CFR 17.95). See our Map Room page.

Candidate Species

We recommend that you address impacts to candidate species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

Species of Concern

The Sacramento Fish & Wildlife Office no longer maintains a list of species of concern. However, various other agencies and organizations maintain lists of at-risk species. These lists provide essential information for land management planning and conservation efforts. More info

Wetlands

If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site specific mitigation and monitoring. For questions regarding wetlands, please contact Mark Littlefield of this office at (916) 414-6520.

Updates

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed and candidate species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be November 03, 2013.

APPENDIX 3.4-1
GREENHOUSE GAS EMISSIONS DATA

Southern SOI Planning & Annexation Project - One Year of Construction

Nevada County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Office Park	17.74	1000sqft	0.41	17,735.00	0
General Heavy Industry	82.30	1000sqft	1.89	82,300.00	0
General Light Industry	65.53	1000sqft	1.50	65,526.00	0
Regional Shopping Center	43.11	1000sqft	0.99	43,108.00	0
Single Family Housing	11.00	Dwelling Unit	3.57	19,800.00	31
Condo/Townhouse	66.00	Dwelling Unit	4.13	66,000.00	189
Parking Lot	2.90	Acre	2.90	126,324.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	80
Climate Zone	1			**Operational Year**	2020
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Land Use -

Construction Phase -

Grading -

Architectural Coating -

Vehicle Trips -

Table Name	Column Name	Default Value	New Value
tblProjectCharacteristics	OperationalYear	2014	2020

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2014	1.3344	6.1112	6.3082	7.7000e-003	0.4289	0.3465	0.7754	0.1600	0.3240	0.4840	0.0000	689.1414	689.1414	0.1142	0.0000	691.5395
2015	4.2329	1.8086	1.9728	2.6300e-003	0.0775	0.1061	0.1835	0.0210	0.0994	0.1204	0.0000	230.7650	230.7650	0.0351	0.0000	231.5015
Total	**5.5673**	**7.9198**	**8.2810**	**0.0103**	**0.5064**	**0.4525**	**0.9589**	**0.1810**	**0.4234**	**0.6044**	**0.0000**	**919.9064**	**919.9064**	**0.1493**	**0.0000**	**923.0410**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/1/2014	1/14/2014	5	10	
2	Grading	Grading	1/15/2014	2/25/2014	5	30	
3	Building Construction	Building Construction	2/26/2014	4/21/2015	5	300	
4	Paving	Paving	4/22/2015	5/19/2015	5	20	
5	Architectural Coating	Architectural Coating	5/20/2015	6/16/2015	5	20	

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Scrapers	2	8.00	361	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	125	0.42
Paving	Paving Equipment	2	8.00	130	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	186.00	63.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	37.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2014

Unmitigated Construction On-Site

Acres of Grading: 0

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0903	0.0000	0.0903	0.0497	0.0000	0.0497	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0265	0.2881	0.2148	2.0000e-004		0.0157	0.0157		0.0144	0.0144	0.0000	18.8508	18.8508	5.5700e-003	0.0000	18.9678
Total	**0.0265**	**0.2881**	**0.2148**	**2.0000e-004**	**0.0903**	**0.0157**	**0.1060**	**0.0497**	**0.0144**	**0.0641**	**0.0000**	**18.8508**	**18.8508**	**5.5700e-003**	**0.0000**	**18.9678**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0300e-003	7.2000e-004	6.7800e-003	1.0000e-005	7.0000e-004	1.0000e-005	7.1000e-004	1.9000e-004	1.0000e-005	1.9000e-004	0.0000	0.6606	0.6606	5.0000e-005	0.0000	0.6616
Total	**2.0300e-003**	**7.2000e-004**	**6.7800e-003**	**1.0000e-005**	**7.0000e-004**	**1.0000e-005**	**7.1000e-004**	**1.9000e-004**	**1.0000e-005**	**1.9000e-004**	**0.0000**	**0.6606**	**0.6606**	**5.0000e-005**	**0.0000**	**0.6616**

3.3 Grading - 2014

Unmitigated Construction On-Site

Acres of Grading: 75

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1301	0.0000	0.1301	0.0540	0.0000	0.0540	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1027	1.2108	0.7738	9.3000e-004		0.0582	0.0582		0.0535	0.0535	0.0000	89.1967	89.1967	0.0264	0.0000	89.7502
Total	**0.1027**	**1.2108**	**0.7738**	**9.3000e-004**	**0.1301**	**0.0582**	**0.1883**	**0.0540**	**0.0535**	**0.1075**	**0.0000**	**89.1967**	**89.1967**	**0.0264**	**0.0000**	**89.7502**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.7600e-003	2.3900e-003	0.0226	3.0000e-005	2.3500e-003	2.0000e-005	2.3700e-003	6.2000e-004	2.0000e-005	6.5000e-004	0.0000	2.2020	2.2020	1.6000e-004	0.0000	2.2054
Total	**6.7600e-003**	**2.3900e-003**	**0.0226**	**3.0000e-005**	**2.3500e-003**	**2.0000e-005**	**2.3700e-003**	**6.2000e-004**	**2.0000e-005**	**6.5000e-004**	**0.0000**	**2.2020**	**2.2020**	**1.6000e-004**	**0.0000**	**2.2054**

3.4 Building Construction - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.4274	3.4535	2.0918	2.9600e-003		0.2462	0.2462		0.2318	0.2318	0.0000	271.5805	271.5805	0.0691	0.0000	273.0306
Total	**0.4274**	**3.4535**	**2.0918**	**2.9600e-003**		**0.2462**	**0.2462**		**0.2318**	**0.2318**	**0.0000**	**271.5805**	**271.5805**	**0.0691**	**0.0000**	**273.0306**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.3056	0.9921	1.6499	1.6900e-003	0.0446	0.0247	0.0693	0.0128	0.0227	0.0356	0.0000	155.7901	155.7901	2.0600e-003	0.0000	155.8332
Worker	0.4634	0.1635	1.5485	1.8900e-003	0.1608	1.6500e-003	0.1625	0.0428	1.4800e-003	0.0443	0.0000	150.8608	150.8608	0.0109	0.0000	151.0906
Total	**0.7690**	**1.1556**	**3.1985**	**3.5800e-003**	**0.2054**	**0.0264**	**0.2318**	**0.0556**	**0.0242**	**0.0799**	**0.0000**	**306.6508**	**306.6508**	**0.0130**	**0.0000**	**306.9238**

3.4 Building Construction - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1445	1.1862	0.7404	1.0600e-003		0.0836	0.0836		0.0786	0.0786	0.0000	96.3778	96.3778	0.0242	0.0000	96.8856
Total	**0.1445**	**1.1862**	**0.7404**	**1.0600e-003**		**0.0836**	**0.0836**		**0.0786**	**0.0786**	**0.0000**	**96.3778**	**96.3778**	**0.0242**	**0.0000**	**96.8856**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0963	0.2907	0.5552	6.0000e-004	0.0159	5.5100e-003	0.0215	4.5900e-003	5.0600e-003	9.6500e-003	0.0000	54.9375	54.9375	5.4000e-004	0.0000	54.9489
Worker	0.1467	0.0507	0.4748	6.7000e-004	0.0575	5.3000e-004	0.0580	0.0153	4.8000e-004	0.0158	0.0000	51.9896	51.9896	3.4400e-003	0.0000	52.0618
Total	**0.2429**	**0.3414**	**1.0300**	**1.2700e-003**	**0.0734**	**6.0400e-003**	**0.0795**	**0.0199**	**5.5400e-003**	**0.0254**	**0.0000**	**106.9271**	**106.9271**	**3.9800e-003**	**0.0000**	**107.0106**

3.5 Paving - 2015

Unmitigated Construction On-Site

Acres of Paving: 0

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0232	0.2518	0.1498	2.2000e-004		0.0142	0.0142		0.0130	0.0130	0.0000	21.2272	21.2272	6.3400e-003	0.0000	21.3603
Paving	3.8000e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0270**	**0.2518**	**0.1498**	**2.2000e-004**		**0.0142**	**0.0142**		**0.0130**	**0.0130**	**0.0000**	**21.2272**	**21.2272**	**6.3400e-003**	**0.0000**	**21.3603**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.9900e-003	1.0300e-003	9.6900e-003	1.0000e-005	1.1700e-003	1.0000e-005	1.1800e-003	3.1000e-004	1.0000e-005	3.2000e-004	0.0000	1.0614	1.0614	7.0000e-005	0.0000	1.0629
Total	**2.9900e-003**	**1.0300e-003**	**9.6900e-003**	**1.0000e-005**	**1.1700e-003**	**1.0000e-005**	**1.1800e-003**	**3.1000e-004**	**1.0000e-005**	**3.2000e-004**	**0.0000**	**1.0614**	**1.0614**	**7.0000e-005**	**0.0000**	**1.0629**

3.6 Architectural Coating - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	3.8040					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.0700e-003	0.0257	0.0190	3.0000e-005		2.2100e-003	2.2100e-003		2.2100e-003	2.2100e-003	0.0000	2.5533	2.5533	3.3000e-004	0.0000	2.5602
Total	**3.8081**	**0.0257**	**0.0190**	**3.0000e-005**		**2.2100e-003**	**2.2100e-003**		**2.2100e-003**	**2.2100e-003**	**0.0000**	**2.5533**	**2.5533**	**3.3000e-004**	**0.0000**	**2.5602**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.3900e-003	2.5500e-003	0.0239	3.0000e-005	2.8900e-003	3.0000e-005	2.9200e-003	7.7000e-004	2.0000e-005	7.9000e-004	0.0000	2.6182	2.6182	1.7000e-004	0.0000	2.6219
Total	**7.3900e-003**	**2.5500e-003**	**0.0239**	**3.0000e-005**	**2.8900e-003**	**3.0000e-005**	**2.9200e-003**	**7.7000e-004**	**2.0000e-005**	**7.9000e-004**	**0.0000**	**2.6182**	**2.6182**	**1.7000e-004**	**0.0000**	**2.6219**

Southern SOI Planning Annexation Project - Operational Buildout

Nevada County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Office Park	124.15	1000sqft	2.85	124,146.00	0
General Heavy Industry	576.10	1000sqft	13.23	576,103.00	0
General Light Industry	458.88	1000sqft	10.53	458,882.00	0
Parking Lot	20.30	Acre	20.30	884,268.00	0
Condo/Townhouse	461.00	Dwelling Unit	28.81	461,000.00	1318
Single Family Housing	73.00	Dwelling Unit	23.70	131,400.00	209
Regional Shopping Center	301.76	1000sqft	6.93	301,762.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	80
Climate Zone	1			**Operational Year**	2020
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Land Use -

Vehicle Trips - Trip Generation per Traffic Study

Area Mitigation -

Energy Mitigation -

Water Mitigation -

Table Name	Column Name	Default Value	New Value
tblProjectCharacteristics	OperationalYear	2014	2020
tblVehicleTrips	ST_TR	7.16	8.70
tblVehicleTrips	ST_TR	1.50	3.80
tblVehicleTrips	ST_TR	1.32	6.47
tblVehicleTrips	ST_TR	1.64	9.46
tblVehicleTrips	ST_TR	0.00	10.59
tblVehicleTrips	ST_TR	49.97	42.69
tblVehicleTrips	ST_TR	10.08	6.20
tblVehicleTrips	SU_TR	6.07	8.70
tblVehicleTrips	SU_TR	1.50	3.80
tblVehicleTrips	SU_TR	0.68	6.47
tblVehicleTrips	SU_TR	0.76	9.46
tblVehicleTrips	SU_TR	0.00	10.59
tblVehicleTrips	SU_TR	25.24	42.69
tblVehicleTrips	SU_TR	8.77	6.20
tblVehicleTrips	WD_TR	6.59	8.70
tblVehicleTrips	WD_TR	1.50	3.80
tblVehicleTrips	WD_TR	6.97	6.47
tblVehicleTrips	WD_TR	11.42	9.46
tblVehicleTrips	WD_TR	0.00	10.59
tblVehicleTrips	WD_TR	42.94	42.69
tblVehicleTrips	WD_TR	9.57	6.20

2.0 Emissions Summary

2.1 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	47.7518	0.5007	45.2683	0.0163		5.8210	5.8210		5.8208	5.8208	551.5994	237.8360	789.4354	0.5154	0.0434	813.7094
Energy	0.0692	0.6156	0.4317	3.7700e-003		0.0478	0.0478		0.0478	0.0478	0.0000	4,755.2652	4,755.2652	0.1972	0.0506	4,775.1020
Mobile	46.0240	50.1460	211.4844	0.3375	19.8127	0.6667	20.4795	5.3296	0.6141	5.9437	0.0000	24,682.6864	24,682.6864	0.8599	0.0000	24,700.7436
Waste						0.0000	0.0000		0.0000	0.0000	401.9201	0.0000	401.9201	23.7528	0.0000	900.7288
Water						0.0000	0.0000		0.0000	0.0000	101.0610	551.4874	652.5484	10.4049	0.2503	948.6286
Total	**93.8449**	**51.2623**	**257.1844**	**0.3576**	**19.8127**	**6.5355**	**26.3482**	**5.3296**	**6.4827**	**11.8123**	**1,054.5804**	**30,227.2751**	**31,281.8555**	**35.7301**	**0.3443**	**32,138.9123**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	14.2836	0.0461	3.9940	2.1000e-004		0.0484	0.0484		0.0481	0.0481	0.0000	385.0477	385.0477	0.0136	6.9400e-003	387.4856
Energy	0.0605	0.5381	0.3742	3.3000e-003		0.0418	0.0418		0.0418	0.0418	0.0000	4,533.9180	4,533.9180	0.1894	0.0478	4,552.7112
Mobile	46.0240	50.1460	211.4844	0.3375	19.8127	0.6667	20.4795	5.3296	0.6141	5.9437	0.0000	24,682.6864	24,682.6864	0.8599	0.0000	24,700.7436
Waste						0.0000	0.0000		0.0000	0.0000	401.9201	0.0000	401.9201	23.7528	0.0000	900.7288
Water						0.0000	0.0000		0.0000	0.0000	80.8488	448.1472	528.9960	8.3227	0.2000	765.7580
Total	**60.3681**	**50.7302**	**215.8526**	**0.3410**	**19.8127**	**0.7569**	**20.5696**	**5.3296**	**0.7040**	**6.0336**	**482.7688**	**30,049.7993**	**30,532.5682**	**33.1384**	**0.2547**	**31,307.4271**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**35.6725**	**1.0379**	**16.0709**	**4.6397**	**0.0000**	**88.4187**	**21.9317**	**0.0000**	**89.1404**	**48.9213**	**54.2217**	**0.5871**	**2.3953**	**7.2536**	**26.0232**	**2.5872**

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	1,301.00	441.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	260.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.0 Operational Detail - Mobile

3.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	46.0240	50.1460	211.4844	0.3375	19.8127	0.6667	20.4795	5.3296	0.6141	5.9437	0.0000	24,682.6864	24,682.6864	0.8599	0.0000	24,700.7436
Unmitigated	46.0240	50.1460	211.4844	0.3375	19.8127	0.6667	20.4795	5.3296	0.6141	5.9437	0.0000	24,682.6864	24,682.6864	0.8599	0.0000	24,700.7436

3.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Condo/Townhouse	4,010.70	4,010.70	4010.70	11,479,622	11,479,622
General Heavy Industry	2,189.19	2,189.19	2189.19	6,391,369	6,391,369
General Light Industry	2,968.97	2,968.97	2968.97	8,667,931	8,667,931
Office Park	1,174.42	1,174.42	1174.42	2,943,390	2,943,390
Parking Lot	0.00	0.00	0.00		
Regional Shopping Center	12,882.22	12,882.22	12882.22	22,586,458	22,586,458
Single Family Housing	452.60	452.60	452.60	1,295,454	1,295,454
Total	23,678.10	23,678.10	23,678.10	53,364,223	53,364,223

3.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Condo/Townhouse	10.80	7.30	7.50	42.30	19.60	38.10	86	11	3
General Heavy Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
General Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
Office Park	9.50	7.30	7.30	33.00	48.00	19.00	82	15	3
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Regional Shopping Center	9.50	7.30	7.30	16.30	64.70	19.00	54	35	11
Single Family Housing	10.80	7.30	7.50	42.30	19.60	38.10	86	11	3

3.4 Fleet Mix

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.335831	0.055862	0.254270	0.152608	0.080298	0.009454	0.018482	0.075995	0.001648	0.000531	0.009425	0.000593	0.005002

4.0 Energy Detail

Historical Energy Use: N

4.1 Mitigation Measures Energy

Exceed Title 24

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	3,935.0988	3,935.0988	0.1779	0.0368	3,950.2477
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	4,070.8450	4,070.8450	0.1841	0.0381	4,086.5165
NaturalGas Mitigated	0.0605	0.5381	0.3742	3.3000e-003		0.0418	0.0418		0.0418	0.0418	0.0000	598.8192	598.8192	0.0115	0.0110	602.4635
NaturalGas Unmitigated	0.0692	0.6156	0.4317	3.7700e-003		0.0478	0.0478		0.0478	0.0478	0.0000	684.4202	684.4202	0.0131	0.0126	688.5855

4.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Condo/Townhouse	3.17026e+006	0.0171	0.1461	0.0622	9.3000e-004		0.0118	0.0118		0.0118	0.0118	0.0000	169.1769	169.1769	3.2400e-003	3.1000e-003	170.2065
General Heavy Industry	2.12006e+006	0.0114	0.1039	0.0873	6.2000e-004		7.9000e-003	7.9000e-003		7.9000e-003	7.9000e-003	0.0000	113.1344	113.1344	2.1700e-003	2.0700e-003	113.8229
General Light Industry	1.68869e+006	9.1100e-003	0.0828	0.0695	5.0000e-004		6.2900e-003	6.2900e-003		6.2900e-003	6.2900e-003	0.0000	90.1147	90.1147	1.7300e-003	1.6500e-003	90.6631
Office Park	2.25449e+006	0.0122	0.1105	0.0928	6.6000e-004		8.4000e-003	8.4000e-003		8.4000e-003	8.4000e-003	0.0000	120.3082	120.3082	2.3100e-003	2.2100e-003	121.0404
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	2.29037e+006	0.0124	0.1123	0.0943	6.7000e-004		8.5300e-003	8.5300e-003		8.5300e-003	8.5300e-003	0.0000	122.2231	122.2231	2.3400e-003	2.2400e-003	122.9669
Single Family Housing	1.30168e+006	7.0200e-003	0.0600	0.0255	3.8000e-004		4.8500e-003	4.8500e-003		4.8500e-003	4.8500e-003	0.0000	69.4629	69.4629	1.3300e-003	1.2700e-003	69.8856
Total		**0.0692**	**0.6155**	**0.4317**	**3.7600e-003**		**0.0478**	**0.0478**		**0.0478**	**0.0478**	**0.0000**	**684.4202**	**684.4202**	**0.0131**	**0.0125**	**688.5855**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Heavy Industry	1.82884e+006	9.8600e-003	0.0897	0.0753	5.4000e-004		6.8100e-003	6.8100e-003		6.8100e-003	6.8100e-003	0.0000	97.5938	97.5938	1.8700e-003	1.7900e-003	98.1878
General Light Industry	1.45672e+006	7.8500e-003	0.0714	0.0600	4.3000e-004		5.4300e-003	5.4300e-003		5.4300e-003	5.4300e-003	0.0000	77.7362	77.7362	1.4900e-003	1.4300e-003	78.2093
Office Park	1.91632e+006	0.0103	0.0939	0.0789	5.6000e-004		7.1400e-003	7.1400e-003		7.1400e-003	7.1400e-003	0.0000	102.2620	102.2620	1.9600e-003	1.8700e-003	102.8844
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	1.94682e+006	0.0105	0.0954	0.0802	5.7000e-004		7.2500e-003	7.2500e-003		7.2500e-003	7.2500e-003	0.0000	103.8896	103.8896	1.9900e-003	1.9000e-003	104.5219
Single Family Housing	1.17397e+006	6.3300e-003	0.0541	0.0230	3.5000e-004		4.3700e-003	4.3700e-003		4.3700e-003	4.3700e-003	0.0000	62.6477	62.6477	1.2000e-003	1.1500e-003	63.0289
Condo/Townhouse	2.89878e+006	0.0156	0.1336	0.0568	8.5000e-004		0.0108	0.0108		0.0108	0.0108	0.0000	154.6899	154.6899	2.9600e-003	2.8400e-003	155.6313
Total		**0.0605**	**0.5381**	**0.3742**	**3.3000e-003**		**0.0418**	**0.0418**		**0.0418**	**0.0418**	**0.0000**	**598.8192**	**598.8192**	**0.0115**	**0.0110**	**602.4635**

4.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Condo/Townhouse	2.13143e+006	620.0585	0.0280	5.8000e-003	622.4455
General Heavy Industry	2.72497e+006	792.7242	0.0358	7.4200e-003	795.7760
General Light Industry	2.17051e+006	631.4268	0.0286	5.9100e-003	633.8576
Office Park	1.03041e+006	299.7586	0.0136	2.8000e-003	300.9126
Parking Lot	778156	226.3745	0.0102	2.1200e-003	227.2459
Regional Shopping Center	4.62903e+006	1,346.6376	0.0609	0.0126	1,351.8218
Single Family Housing	528906	153.8649	6.9600e-003	1.4400e-003	154.4572
Total		**4,070.8450**	**0.1841**	**0.0381**	**4,086.5165**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Condo/Townhouse	2.0971e+006	610.0696	0.0276	5.7100e-003	612.4182
General Heavy Industry	2.65929e+006	773.6184	0.0350	7.2400e-003	776.5966
General Light Industry	2.1182e+006	616.2085	0.0279	5.7600e-003	618.5807
Office Park	998941	290.6033	0.0131	2.7200e-003	291.7221
Parking Lot	778156	226.3745	0.0102	2.1200e-003	227.2459
Regional Shopping Center	4.35201e+006	1,266.0501	0.0573	0.0118	1,270.9240
Single Family Housing	523096	152.1745	6.8800e-003	1.4200e-003	152.7604
Total		**3,935.0988**	**0.1779**	**0.0368**	**3,950.2477**

5.0 Area Detail

5.1 Mitigation Measures Area

Use only Natural Gas Hearths

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	14.2836	0.0461	3.9940	2.1000e-004		0.0484	0.0484		0.0481	0.0481	0.0000	385.0477	385.0477	0.0136	6.9400e-003	387.4856
Unmitigated	47.7518	0.5007	45.2683	0.0163		5.8210	5.8210		5.8208	5.8208	551.5994	237.8360	789.4354	0.5154	0.0434	813.7094

5.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	2.6503					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	11.4726					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	33.5065	0.4546	41.2764	0.0161		5.7991	5.7991		5.7989	5.7989	551.5994	231.3328	782.9322	0.5090	0.0434	807.0720
Landscaping	0.1224	0.0461	3.9919	2.1000e-004		0.0219	0.0219		0.0219	0.0219	0.0000	6.5032	6.5032	6.3900e-003	0.0000	6.6374
Total	**47.7518**	**0.5007**	**45.2683**	**0.0163**		**5.8210**	**5.8210**		**5.8208**	**5.8208**	**551.5994**	**237.8360**	**789.4354**	**0.5154**	**0.0434**	**813.7094**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	2.6503					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	11.4726					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0383	0.0000	2.0900e-003	0.0000		0.0264	0.0264		0.0262	0.0262	0.0000	378.5445	378.5445	7.2600e-003	6.9400e-003	380.8483
Landscaping	0.1224	0.0461	3.9919	2.1000e-004		0.0219	0.0219		0.0219	0.0219	0.0000	6.5032	6.5032	6.3900e-003	0.0000	6.6374
Total	**14.2836**	**0.0461**	**3.9940**	**2.1000e-004**		**0.0484**	**0.0484**		**0.0481**	**0.0481**	**0.0000**	**385.0477**	**385.0477**	**0.0137**	**6.9400e-003**	**387.4856**

6.0 Water Detail

6.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	528.9960	8.3227	0.2000	765.7580
Unmitigated	652.5484	10.4049	0.2503	948.6286

6.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Condo/Townhouse	30.036 / 18.9357	76.0896	0.9817	0.0237	104.0630
General Heavy Industry	133.223 / 0	251.9750	4.3506	0.1045	375.7206
General Light Industry	106.116 / 0	200.7052	3.4653	0.0832	299.2722
Office Park	22.0656 / 13.5241	55.5045	0.7212	0.0174	76.0534
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	22.3521 / 13.6997	56.2252	0.7306	0.0177	77.0409
Single Family Housing	4.75624 / 2.9985	12.0489	0.1555	3.7600e-003	16.4785
Total		**652.5484**	**10.4049**	**0.2503**	**948.6286**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Condo/Townhouse	24.0288 / 17.7807	63.5516	0.7854	0.0190	85.9285
General Heavy Industry	106.579 / 0	201.5800	3.4798	0.0834	300.5226
General Light Industry	84.8928 / 0	160.5642	2.7718	0.0665	239.3748
Office Park	17.6525 / 12.6991	46.3177	0.5769	0.0139	62.7552
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	17.8817 / 12.864	46.9190	0.5844	0.0141	63.5700
Single Family Housing	3.805 / 2.81559	10.0635	0.1244	3.0100e-003	13.6069
Total		**528.9960**	**8.3227**	**0.2000**	**765.7580**

7.0 Waste Detail

7.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	401.9201	23.7528	0.0000	900.7288
Unmitigated	401.9201	23.7528	0.0000	900.7288

7.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Condo/Townhouse	212.06	43.0463	2.5440	0.0000	96.4695
General Heavy Industry	714.36	145.0086	8.5698	0.0000	324.9737
General Light Industry	569.01	115.5039	6.8261	0.0000	258.8517
Office Park	115.46	23.4373	1.3851	0.0000	52.5246
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	316.85	64.3177	3.8011	0.0000	144.1401
Single Family Housing	52.25	10.6063	0.6268	0.0000	23.7694
Total		**401.9201**	**23.7528**	**0.0000**	**900.7288**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Condo/Townhouse	212.06	43.0463	2.5440	0.0000	96.4695
General Heavy Industry	714.36	145.0086	8.5698	0.0000	324.9737
General Light Industry	569.01	115.5039	6.8261	0.0000	258.8517
Office Park	115.46	23.4373	1.3851	0.0000	52.5246
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	316.85	64.3177	3.8011	0.0000	144.1401
Single Family Housing	52.25	10.6063	0.6268	0.0000	23.7694
Total		**401.9201**	**23.7528**	**0.0000**	**900.7288**

APPENDIX 3.6-1 PRELIMINARY GEOTECHNICAL AND GEOLOGICAL HAZARDS REPORT FOR BEAR RIVER MILL SITE, NEVADA COUNTY

PRELIMINARY GEOTECHNICAL AND GEOLOGIC HAZARDS REPORT
for
BEAR RIVER MILL SITE
Nevada County, California

Prepared for:
Catlin Properties
3620 Fair Oaks Boulevard, Suite 150
Sacramento, California 95864

Prepared by:
Holdrege & Kull
792 Searls Avenue
Nevada City, California 95959

Project No. 977-01
August 20, 1999

HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS

Project No. 977-01
August 20, 1999

Catlin Properties
3620 Fair Oaks Boulevard, Suite 150
Sacramento, CA 95864

Attention: Stephen J. Dolim

Reference: ***Bear River Mill Site***
Nevada County, California

Subject: Preliminary Geotechnical and Geologic Hazards Report

Dear Mr. Dolim:

This report presents the results of our geohazards and preliminary geotechnical investigation for the Bear River Mill Site. The approximately 85-acre site is located between Highway 49 and La Barr Meadows Road in Nevada County, California. The purpose of our investigation and report was to provide a description of geologic and geotechnical conditions at the site to facilitate future planning and development.

The findings presented in this report are based on our subsurface investigation, laboratory test results, and a review of published geologic literature pertaining to the project site. From a geotechnical standpoint, our primary concerns are localized poor site drainage and expansive soil, the presence of several loose fill areas, and the questionable stability of existing earth dams at the site. Rock fill at the site may pose a significant regulatory concern if determined to originate from adjacent, historic, hard rock mining operations.

Please contact us if you have any questions regarding our investigation or report.

Sincerely,

HOLDREGE & KULL

Jason Muir
Staff Engineer

Charles R. Kull
G.E. 2359/C.E.G. 1622

copies: 3 to Catlin Properties
2 to Sylvester & Creighton

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1 INTRODUCTION

1.1 Purpose

The purpose of our investigation was to perform a preliminary geotechnical and geohazards investigation of the site to facilitate future planning and development. This report provides a description of general soil/rock conditions and site geology, as well as preliminary recommendations for site grading, erosion control, foundation design criteria and site drainage.

1.2 Scope of Services

To prepare this report, we performed the following scope of services:

- Reviewed a topographic map for the site provided by Sylvester & Creighton, Inc.

- Performed a cursory geologic reconnaissance of the project site.

- Reviewed historic maps and publications pertaining to hard rock mining near the project site.

- Excavated 33 exploratory trenches across the project site to depths of 3 to 13 feet at the approximate locations shown on the Geologic/Geotechnical Site Map, Sheet 1. Relatively undisturbed and bulk soil samples were collected from the exploratory trenches for laboratory testing.

- Reviewed published geologic maps and literature pertaining to the site.

- Performed laboratory swell testing to estimate the expansion potential of native soil.

- Provided preliminary recommendations regarding site grading, erosion control, foundation design criteria and site drainage.

1.3 Project Location and Description

The approximately 85-acre property is located between State Highway 49 and La Barr Meadows Road in Nevada County, California. The site is comprised of Nevada County Assessor's Parcel Numbers (APNs) 22-160-04 and 06; 22-250-12; 22-280-02 and 03; and 22-282-01, 02 and 05. The approximate elevations range from 2560 feet, mean sea level (MSL), at the central portion of the southern property boundary to 2360 feet, MSL, at the northwest corner of the property. The elevation of the larger pond in the central west portion of the site was approximately 2340 feet, MSL. Land west of the pond was lower in elevation; however, the ground surface was obscured by trees and dense brush in that area. A site map for the project is presented as Sheet 1.

2 FIELD INVESTIGATION

We performed our field investigation on August 5 and 6, 1999. Our investigation included a limited site reconnaissance and excavation of 33 exploratory trenches. The ground surface was obscured by dense brush in portions of the site, and access by excavation equipment was limited in some areas due to steep slopes. The site conditions and the soil/rock conditions described below are based on observations made during our field investigation and exploratory trenching.

2.1 General Site Conditions

Much of the central and northern portions of the site had been previously graded. The grading was predominantly associated with historic lumber milling operations; however, soil may have been exported from the central portion of the site for other purposes. Several fill areas were observed near the perimeter of the graded areas. In general, the fill was relatively loose and contained a significant amount of wood waste.

A significant amount of debris was observed in the vicinity of the historic mill operations. Reinforced concrete slabs-on-grade, concrete foundations, rubble and debris piles were common in the central east and northeast portions of the site. Many stockpiles in this area contained debris and organic material and would not be suitable for use as structural fill.

Rock fill and stockpiles were common in the central portion of the site. The rock may have originated from nearby historic gold mining activities or from another offsite source. Waste rock originating from hard rock mining activities may pose a regulatory concern because of possible elevated levels of heavy metals such as arsenic, mercury or lead.

We observed several areas of saturated surface soil, standing water or riparian vegetation on the site. Evidence of seasonal ponding and poor drainage was common in the central portion of the property. Two ponds were located near the western property boundary of Parcel 3. The earth dam for the larger pond had apparently experienced a significant amount of seepage. The dam had been breached at least once, as evidenced by erosion over the top of the dam.

2.2 General Soil and Rock Conditions

The soil conditions described in the following paragraphs are generalized, based on our 33 exploratory trenches and a review of published soil survey information. More detailed soil descriptions are presented in the trench logs, Figures 1 through 33.

The *Soil Survey of Nevada County Area, California* (soil survey) published by the United States Department of Agriculture Soil Conservation Service and Forest Service (1993) depicts three general soil types at the project site: Musick Sandy Loam, Hoda Sandy Loam, and Alluvial land.

Musick and Hoda soil types dominate the higher portions of the site, comprising most of the western half and the northern end of the property. Both soil types are characterized by well drained surface soil underlain by weathered granodiorite rock at depths of 5 to 8 feet below ground surface (bgs). Depth to weathered rock was less in cut areas. Areas of resistant rock outcrop typically comprise 10% of the total ground surface in areas of Musick and Hoda soil types. Rock outcrop areas and shallow, resistant rock were observed on Parcels 1, 2 and 3 during our field investigation.

Alluvial deposits are prevalent in the central and southwestern portions of the site. Alluvial land is characterized by clayey soil of slow to very slow permeability. Runoff is typically slow and flooding is common during the rainy season. Clayey alluvial deposits are likely to exhibit high shrink/swell characteristics when subjected to moisture variation. We typically observed firm clay and medium dense, clayey silt at depths of 3 to 6 feet bgs in the eastern portions of Parcels 1, 2, 3 and 4 in our exploratory trenches. Standing water, saturated surface soil, and evidence of seasonal flooding was common in these areas.

Soil conditions in the central east and northern portions of the site have been altered by previous grading and are not specifically classified by the soil survey. The cut/fill area in the northern end of the site is in an area of Musick Sandy Loam, and the cut/fill area in the central western portion of the site would likely have been classified as alluvial land prior to grading.

2.3 Groundwater Conditions

We encountered seepage and/or shallow groundwater at depths of 2 to 8 feet bgs in the alluvial areas of the site, which are located predominantly in the eastern portions of Parcels 1, 2, 3 and 4 and in the vicinity of the ponds on Parcel 3. Seepage was commonly observed along the upper surface of the clay and clayey silt typically found at a depth of approximately 5 feet bgs in the alluvial areas. Evidence of seasonal flooding and soil saturation was common. Seepage and standing water was observed at the ground surface in and near several marsh areas, as shown on Sheet 1.

We did not encounter groundwater or seepage during excavation of our exploratory trenches in the higher, western portions of the site. However, isolated areas of seepage or saturated near-surface soil may be encountered during grading or excavation, particularly during or immediately after the rainy season.

Our experience in the foothill region has been that groundwater lies at various depths bgs depending on the hydrogeologic conditions. In many cases, groundwater is controlled by bedrock fractures; this results in groundwater depths and conditions that are virtually unpredictable without performing an extensive hydrogeologic investigation. In other cases, groundwater may lie in perched zones above a resistant rock type or impermeable soil. Based on our experience in the local area, we would expect to encounter groundwater beneath the higher, western portions of the site within 60 feet of the ground surface, with static levels as high as 30 feet bgs.

2.4 Vegetation

Dominant vegetation across the site included ponderosa pine, black oak, manzanita, Scotch broom, annual grasses and forbs, and occasional madrone, sweet birch and ceonothus. Vegetation in the lower, western portions of the site included annual grasses and yellow star thistle, as well as a variety of riparian vegetation in marsh areas. Dense brush, including blackberry and Scotch broom, restricted access to the interior of Parcel 3 in the area east of the ponds. Parcel 6 and portions of the remaining parcels supported little vegetation due to previous grading.

2.5 Historic Lumber Milling Activities

Evidence of historic lumber milling activities was most apparent on Parcels 4, 5 and 6 and the eastern Portion of Parcel 3. We observed relic mill sites in the southwestern quadrant of Parcel 6 and in the eastern half of Parcels 4 and 5. Numerous debris stockpiles and several fill areas across the site were an indirect result of historic milling operations. The two ponds in the western portion of Parcel 3 were likely associated with milling activities.

Concrete slabs-on-grade up to 14 inches thick covered the ground surface across much of the relic mill site on Parcel 6. Reinforcement in the slab and walls, where exposed, consisted of No. 5 rebar. We observed steel up to ⅞ inches thick embedded in the concrete slabs. Several stockpiles of broken concrete and other debris were observed in the vicinity of the mill site. An adjacent concrete foundation exposed in exploratory trench 11 extended from 2 feet to deeper than 8 feet bgs. Shallow fill was common in the area of the mill site. We observed layers of gravel, clay, clean sand, and organic debris to depths of approximately 6 feet bgs near the mill site.

Asphalt pavement and several concrete slabs-on-grade covered the ground surface at the relic mill site located on Parcels 4 and 5. Slab thickness was at least 12 inches. We observed a fill slope on underlying the west side of the southern concrete slab. Backhoe access to the slope was limited; however, the fill may be more than 10 feet deep based on local topography. Other minor fill areas may be present in the vicinity of the mill site.

2.6 Existing Fill Areas

We encountered several significant fill areas and numerous smaller fills during our field investigation. The larger fill areas are discussed below.

Exploratory trenches 13 through 15 were excavated in a fill area located in the northeastern portion of Parcel 2. Based on local topography, the fill may encompass an area approximately 200 feet in diameter and may extend further to the east. In general, the fill consisted of medium to dark brown, sandy silt interbedded with abundant peat and wood debris. The fill extended to depths of approximately 7 to 9 feet bgs in exploratory trenches 13 through 15 and was underlain by blue-grey, firm clay. We encountered a corrugated metal culvert at a depth of approximately 8 feet bgs in exploratory trench 13.

Exploratory trenches 16 through 18 were excavated in and near a relatively large fill area near the western boundary of Parcel 2. Based on local topography, the fill extends approximately 250 feet along a west-facing slope and continues approximately 100 feet east of the hinge point of the slope. Near the hinge point of the slope, the fill was more than 13 feet deep. In general, the fill consisted of medium brown to dark brown, sandy silt interbedded with layers of peat and wood debris. We encountered logs up to 16 inches in diameter during excavation through the fill.

Exploratory trench 21 was excavated in a cut and fill area in the southwest portion of Parcel 1. The approximately 1:1 (horizontal:vertical, H:V) cut slope on the southern side of the area was approximately 10 to 12 feet high. The fill slope on the northern side of the area was approximately 10 to 15 feet high. Based on local topography, the graded area consisted predominantly of cut native soil. The native soil was derived from completely, residually weathered rock and was classified as orange-brown, silty sand. An apparently inhabited travel trailer was parked in this area at the time of our field investigation.

Exploratory trench 23 was excavated in a relatively deep, rock fill area located northwest of the historic mill site on Parcel 6. In general, the fill consisted of angular rock to 18 inches in diameter. Three apparently abandoned electrical conduits were observed in the trench at a depth of approximately 2.5 feet bgs. We observed a perforated, corrugated, 18 to 24-inch diameter metal pipe at a depth of approximately 4 feet bgs.

The excavation was terminated at a depth of 8 feet bgs due to extensive caving. The rock fill is located in a natural drainage swale that would flow northwest towards the ponds located in Parcel 3. The open graded rock and perforated metal pipe are likely components of a subsurface drain for the area. Corrugated metal drainage pipes were also encountered in exploratory trenches near the historic mill site on Parcel 6 and are likely part of a drainage system for the area.

We observed miscellaneous fill and soil stockpiles around the perimeter of the graded areas in the central and northern portions of the site, particularly in the southeast quadrant of Parcel 3. Exploratory trench 8 was excavated in one of the larger soil stockpiles on Parcel 3. Soil revealed in the approximately 8 foot high stockpile was classified as orange-brown, clayey silt with variable fine sand and minor isolated pockets of wood debris. Selective borrow would likely be possible from soil stockpiles of this composition.

We observed numerous debris stockpiles throughout the graded areas in the central and northern portions of the site. Exploratory trenches 1, 2, 3, 5, 9, 28, 29 and 32 were excavated in debris stockpiles that appeared to be representative of other stockpiles in the immediate vicinity. The majority of the debris stockpiles observed contained a significant amount of wood waste and would not be suitable for use as structural fill. A number of shallow rubbish fills were also observed throughout the site. Some of the more notable areas of debris and rubbish observed at the site are noted on Sheet 1.

2.7 Existing Earth Dams

Two ponds were present near the western site boundary in the northern half of Parcel 3. The smaller, southern pond was approximately 0.1 acre in area and was retained by an earth dam along its northern and eastern shores. The earth dam was approximately 225 feet long and approximately 12 feet wide at its crest. The downslope height of the dam was approximately 25 to 30 feet. The outlet structure consisted of a 24-inch diameter, corrugated metal pipe whose outfall was directed towards a defunct water conveyance structure that apparently transported water to the adjacent pond.

The larger, northern pond was approximately ½ acre in area and was retained by an earth dam along its western boundary. The earth dam was approximately 300 feet long and approximately 10 feet wide at its crest. The downslope height of the dam was approximately 25 to 30 feet. The outlet structure for the larger pond consisted of a 30-inch diameter corrugated metal pipe located near the northern end of the dam. The outlet structure discharged to an eroded, partially rock lined, earth swale that drained to the southwest. The earth dam appeared to have experienced a significant amount of seepage. The dam had been breached at least once, as evidenced by erosion over the top of the dam.

2.8 Historic Mining Activities

To investigate the historic mining activities at the subject site and surrounding areas, we conducted research at the Searls Historical Library in Nevada City. We reviewed various maps and publications which referenced hard rock mining in the site vicinity, maps of mining properties in the Grass Valley Mining District dated 1897 and 1930, and issues of the *State Mineralogists Report* published by the California State Mining Bureau, particularly the 1918 issue titled *Mines and Mineral Resources of Nevada County*.

The subject site is located in the Grass Valley Mining District. This district was an area of intensive gold mining activities dating back to 1849 when placer gold deposits were discovered in the sediments along Wolf Creek and nearby drainages.

Hard rock mining in the area began in the early 1850s. The 1897 map showed three mining properties located along the northern and eastern edges of the subject site, including the Galena, Smuggler and Yukon Jack mines. No shafts associated with those mines were indicated on the 1897 map. The 1930 map indicated that the Bullion Consolidated Mining Company, located directly north and east of the subject site also encompassed the northern and eastern portions of the site. The Bullion Shaft was located across present day La Barr Meadows Road, approximately 400 feet to the east of the site. The Bullion Shaft was advanced along a 1- to 5-foot wide vein of gold-bearing quartz which dipped to the east (away from the site). The ore contained free gold, pyrite and “considerable amounts of galena” (lead sulfate). The shaft reached an inclined depth of at least 1,700 feet and reportedly ceased operating after 1906. A 10-stamp mill was located on the Bullion property.

We observed a stockpile of apparent mine waste rock (gangue) in a downslope direction from the former location of the Bullion Shaft on the property east of the site. The gangue consisted of granitic, metamorphic and quartz rock fragments. We estimated the stockpile volume at approximately 5,000 cubic yards. The shaft had been backfilled or is obscured by vegetation.

We observed rock fill and numerous rock stockpiles in the central portion of the site. The rock may have originated from nearby historic gold mining activities or from another offsite source. Waste rock originating from hard rock mining activities may pose a regulatory concern because of possible elevated levels of heavy metals such as arsenic, mercury or lead.

Other than the presence of possible mine waste rock, we did not observe evidence of mining activity onsite during our field investigation. The Geologic Map of the Chico Quadrangle, California (Geologic Map) (California Department of Conservation Division of Mines and Geology, 1992) indicates that the site is underlain by plutonic rocks. Hydrothermal zones mined for precious metals were typically situated along the contacts between granitic and metamorphic rocks. This type of contact is located east of the site in the approximate location of the Bullion Shaft and dips away from the property. Therefore, extensive hard rock mining excavation is not likely to extend at shallow depths beneath the site.

3 LABORATORY TESTING

Laboratory swell testing was performed on bulk soil samples CB-1, CB-3, CB-6 and CB-9. Swell testing was used to estimate soil expansion potential when remolded and subjected to an increase in moisture content. The results of swell testing are summarized in Table 3.1 below.

Table 3.1 - Results of Swell Testing

Sample Number	Trench Number	Depth (feet)	Swell (%)	Estimated Expansion Potential
CB-1	4	0.75-1.5	1.8	very low

CB-3	4	3.5-4.25	11.2	high
CB-6	10	4.0-4.75	13.6	very high
CB-9	19	0.75-1.5	1.2	very low

Note:
The samples were remolded to approximately 90% of the ASTM D 1557 maximum dry density at a moisture content below the optimum. The remolded sample was confined in a 1.0-inch thick ring and loaded with a 144 psf surcharge. We immersed the soil in water and measured the swell (or settlement) of the sample with a dial micrometer until the micrometer readings stabilized.

4 GEOLOGIC SETTING

The property is located within a region underlain by a complex assemblage of igneous and metamorphic rocks in the western foothills of the Sierra Nevada. The regional structure of the foothills is characterized by the north-northwest trending Foothills Fault System, a feature formed during the Mesozoic era (between 65 million and 230 million years before present (MYBP)) in a compressional tectonic environment. A change to an extensional tectonic environment during the Late Cenozoic (last 9 million years) resulted in normal faulting which has occurred coincident with some segments of the older faults near the site.

To determine the site geology, we reviewed the Geologic Map of the Grass Valley - Colfax Area (Grass Valley Geologic Map) (A. Tuminas, 1983). According to the Grass Valley Geologic Map, the site is underlain by early Cretaceous, La Barr Meadows quartz diorite. The early Cretaceous period encompasses a time frame of approximately 100 to 136 MYBP. The Geologic Map indicates that the project site is underlain by Mesozoic plutonic rock, including quartz diorite, tonalite, trondhjmite, and quartz monzonite.

4.1 Site Seismicity

The site lies in a region of low to moderate historic seismicity. Several earthquakes have occurred in the vicinity since 1850 which have produced noticeable ground shaking in the area. Two earthquakes with epicenters located approximately 35 miles west-northwest of Nevada City occurred in 1909. The causative faults are unknown.

Their magnitudes were estimated to be in the range of 5.0 to 5.5 on the Richter scale. The Oroville earthquake of 1975, which occurred along the Cleveland Hill Fault located approximately 28 miles northwest of the project site had a Richter magnitude of 5.6. The Dunnigan Hills Fault, located approximately 54 miles southwest of the project site, is believed to be the source of the 1892 Vacaville-Winters earthquake. The October 17, 1989, Loma Prieta Earthquake, measuring 7.1 magnitude centered near Santa Cruz, produced ground shaking as far east as Reno, Nevada. An unnamed fault located near Emigrant Gap, approximately 13 miles east of the site, has been the source of several small earthquakes since 1989 which produced ground shaking in the Nevada City area. Another regional fault with known historic activity is an unnamed fault approximately 50 miles northeast of the site, near Stampede Reservoir in eastern Nevada County. Ground breakage occurred along that fault in 1966. Several known active faults, including the Green Valley Fault, the Hayward Fault, and the San Andreas Fault, lie approximately 100 to 130 miles to the southwest of the project site.

The Fault Activity Map of California and Adjacent Areas (California Division of Mines and Geology, Map No. 6, 1994) shows that several known faults are present in the region. One branch of the Gillis Hill Fault is within 4 miles of the site. The main branch of the Gillis Hill Fault is located approximately 6 miles east of the project site. The Wolf Creek Fault zone is approximately 1 mile west of the site. The Foresthill Fault is approximately 11 miles east of the site. These three faults are believed to have been most recently active during the Mesozoic era (65 to 230 MYBP). Segments of the Wolf Creek and Bear Mountain Fault Zones located approximately 6, 19 and 26 miles south of the site show evidence of displacement during the late Quaternary period (0.7 MYBP). The Fault Activity Map shows that the Grass Valley Fault lies approximately 2 miles north of the site. The Grass Valley Fault is depicted as either a Pre-Quaternary fault (older than 1.7 million years) or as a fault without recognized Quaternary displacement. Faults in this category are described as not necessarily inactive.

The Gillis Hill Fault, Foresthill Fault, Grass Valley Fault, and the Wolf Creek Fault Zone are all part of the Foothills Fault System. The Foothills Fault System is a group of northwest trending, steeply dipping to vertical faults with localized thrust faulting, whose major tectonic activity occurred in the late Jurassic (135 to 150 MYBP). This fault system extends approximately 200 miles along the western foothills of the Sierra Nevada.

Based on studies performed for the Auburn Dam project, portions of the Foothills Fault System should be considered potentially active. In 1976, trenching was performed by Woodward-Clyde Consultants along a lineament associated with the Foothills shear zone as a part of the Auburn Dam project. The trenching, located northwest of the site along the Spenceville lineament zone, revealed evidence that the latest movement along this fault had occurred within the last 100,000 years. Seismologists have postulated that movement along the Foothills faults could produce a maximum credible Richter magnitude 6.5 earthquake. However, the maximum credible seismic event has a fairly long postulated return period, upward of 1,000 years and possibly as long as 100,000 years. The maximum probable earthquake (return period of 100 years) is postulated to have a Richter magnitude of 5.0. Postulated maximum credible bedrock accelerations for the region are less than 0.2g (Greensfelder, 1974).

Known active faults which could produce ground shaking that may be felt at the site include the following:

- Cleveland Hill Fault - (source of the 1975 Oroville earthquake) approximately 28 miles to the northwest.
- Unnamed fault - approximately 13 miles to the east, in eastern Nevada County.
- Green Valley Fault, Hayward Fault, and San Andreas Fault - all of which lie in a northwest trending zone approximately 100 to 130 miles to the southwest.

The site is not contained within an Alquist-Priolo special studies zone. The Alquist-Priolo Earthquake Fault Zoning Act was passed following the 1971 San Fernando Earthquake and only addresses the hazards associated with surface fault ruptures. Ground shaking, liquefaction, seismically induced slope instability, and other seismic hazards are not addressed.

The Uniform Building Code's (UBC's) Seismic Zone Map of the United States (Figure 16.2 in the Volume 2 of the 1997 edition of the UBC) classifies the region containing the site as Seismic Zone 3. The corresponding UBC Seismic Zone Factor, Z, for Zone 3 is 0.30. The soil profile type, as described in Table 16-J of the 1997 UBC, is S_A.

5 GEOLOGIC AND SEISMIC HAZARDS

5.1 Liquefaction, Ground Lurching, and Lateral Spreading

Based on our site observations, exploratory trenching and review of published references, the site is underlain by relatively thin, medium dense soil derived from residually weathered rock. Granodiorite was encountered at shallow depths, 0.5 to 5 feet bgs in areas where grading had taken place. We anticipate that bedrock will be found at deeper depths (10 to 30 feet bgs) in areas where surface soil has not been disturbed. Based on these assumptions, and the distance to known active faults, we consider the potential for liquefaction, ground lurching, surface rupture, or lateral spreading in native soil/rock onsite to be minimal. However, several areas of loose alluvium and fill were observed on the site that may be susceptible to liquefaction, ground lurching and/or lateral spreading. These areas are addressed in the *Preliminary Geotechnical Recommendations* section on page 14.

Our opinion is that the primary seismic activity which may affect the site is moderate ground shaking associated with an offsite fault. Small scale, seismically induced slope instability could occur on cut or fill slopes established onsite, particularly if surface soil was saturated at the time of earthquake induced ground shaking. This hazard could be reduced by removing relatively loose fill, if present, and ensuring that cut and fill slopes established onsite are constructed and drained in accordance with recommendations provided in a design level geotechnical report. Seismically induced settlement could be a factor for buildings placed directly on the unconsolidated fill areas.

6 PRELIMINARY GEOTECHNICAL RECOMMENDATIONS

The following sections present our preliminary recommendations for site grading, erosion control, foundation design and site drainage. Our recommendations are based on our understanding of the project as currently proposed. Additional investigation and testing would be necessary to produce a design level geotechnical report.

6.1 Grading

The following preliminary grading recommendations pertain to specific features observed during our field investigation:

- Much of the central portion of the site has been previously graded. A large percentage of the graded area appears to consist of cut native soil. We do not anticipate that significant grading will be required for the cut areas observed during our preliminary field investigation.

- We observed a number of relatively small fill areas near the perimeter of the graded area, near the historic mill sites, and occasionally in the interior of the graded areas. Based on our preliminary subsurface excavation, we anticipate that the majority of the small fill areas will need to be removed and recompacted to support structure and roadway loads.

- Moderately to slightly weathered rock outcrop and subsurface rock may be encountered during grading and foundation construction. Rock outcrop areas and shallow, resistant rock were observed on Parcels 1, 2 and 3 during our field investigation. Rock encountered during foundation construction may require blasting or splitting to facilitate its removal.

- We anticipate that selective borrow would be possible from the soil stockpiles in the southeast quadrant of Parcel 3, based on observations made during excavation of exploratory trench 8.

- The numerous debris stockpiles located in the graded areas are not suitable for use as structural fill due to the presence of large amounts of wood waste. Exploratory trenches 1,2, 3, 5, 9, 28, 29 and 32 were excavated in debris stockpiles. We anticipate that the majority of the material contained in the debris stockpiles would need to be removed from the site. Some material in the stockpiles may be suitable for landscaping.

- Several relatively large fill areas were observed during our field investigation, as described in the *Existing Fill Areas* section on page 6. Several of the large fill areas contained relatively loose soil and large amounts of wood debris. Any structural improvements in the loose or organic fill areas would require extensive grading and/or deep foundations. The relatively deep rock fill located northwest of the historic mill site in Parcel 6 may be suitable for support of structural improvements; however, further subsurface investigation would be required in that area.

- Clayey alluvial deposits are common in the central and southwestern portions of the site. Based on our laboratory testing, some of the alluvial deposits exhibit high shrink/swell characteristics. If located in the zone of seasonal moisture variation in structural areas, expansive soil must be removed or mixed with predominantly granular soil. Typically, the mixing ratio for potentially expansive soil to granular, non-expansive soil should be 1:4. We should be allowed to observe all soil mixing operations.

- The stability of the two onsite earth dams is questionable; therefore, all or portions of the dams may require renovation or removal.

- We anticipate that the majority of the severely to moderately weathered rock encountered across the site should be rippable to depths of approximately 10 feet with conventional grading equipment. Deeper cuts or areas of more resistant, moderately to slightly weathered rock may require larger grading equipment (e.g., CAT D9 high track). Large, resistant, subsurface boulders or “floaters” may be encountered within the matrix of severely to moderately weathered rock. Our experience with grading in the area has been that if areas of dense, slightly to moderately weathered rock are encountered, blasting or pre-splitting may be required. Our opinion is that blasting or pre-splitting, if needed, will most likely be required in deeper cuts associated with utility trenches or in areas adjacent to exposed or near-surface rock outcrops.

- Fill material should consist of uncontaminated, predominantly granular, native soil and rock or approved import material. Rock should be broken into pieces no larger than 12 inches in diameter. Rock up to 24 inches in diameter may be used in deep fill areas, not within 3 feet of finish subgrade in roadways, parking areas, or building pad areas.

- Rocks larger than 24 inches should be stockpiled for off-haul or later use as landscape material, for stacked rock walls or rip-rap on fill slopes. Rocks used in fill must be separated so nesting does not occur and compaction of soil around the rocks is possible. Rock windrows may be used in deep fills where rocks are placed end to end. Windrows should be placed at least one equipment width apart to allow compaction equipment access to soil between windrows. Windrows should not be located on the same vertical plane.

- Import soil should be granular and free of deleterious material. Import material proposed for use onsite should be submitted to H&K for approval at least 72 hours prior to transportation to the site.

6.2 Utilities

Utility trench excavations in native soil/rock should be stable to a depth of 4 feet without shoring during dry weather. If trenches deeper than 4 feet are anticipated, the contractor should follow CalOSHA guidelines for trench excavation safety. H&K can provide design of shoring, if requested.

As discussed in the *Grading* section on page 15, we anticipate that the majority of the severely to moderately weathered rock encountered across the site should be rippable to depths of approximately 10 feet with conventional grading equipment. Larger grading equipment may be required for deeper cuts or areas of more resistant, moderately to slightly weathered rock. Large, resistant, subsurface boulders or “floaters” may be encountered within the matrix of severely to moderately weathered rock. If areas of dense, slightly to moderately weathered rock are encountered, blasting or pre-splitting may be required. Our opinion is that blasting or pre-splitting, if needed, will most likely be required in deeper cuts associated with utility trenches or in areas adjacent to exposed or near-surface rock outcrops.

6.3 Allowable Slope Gradients

The gradient for fill slopes established on the site should not exceed 2:1(H:V). We recommend overfilling the slope and then cutting back to the proper gradient.

The completely to severely weathered rock and overlying, predominantly fine grained soil observed in many of our exploratory trenches may be cut to a maximum gradient of 1½:1 (H:V). Steeper slope gradients may be achieved in competent rock.

V-ditches should be established at the top of all cut and fill slopes to reduce the surface water runoff from flowing down the slope faces.

6.4 Expansive Soil

Laboratory test results indicate that soil samples CB-3 and CB-6, described as yellow brown medium clay and fine sandy clay, experienced 11.2% and 13.6% expansion, respectively, under the test conditions described in the *Laboratory Testing* section on page 9. This soil is likely to have a high to very high expansion potential.

Sample CB-3 was collected from a depth of 3 to 5.5 feet bgs in exploratory trench 4. Sample CB-6 was collected from a depth of 3.5 to 6.5 feet bgs in exploratory trench 10. The clay stratum extended below the bottom of both trenches. Similar clayey soils are likely to be encountered throughout the alluvial deposits on the eastern side of the site.

The expansive soil in exploratory trenches CB-3 and CB-6 were located within the typical zone of seasonal moisture variation. Our opinion is that mitigative measures will likely be required for foundations in areas of expansive soil. Typical measures include mixing the clayey soil with granular soil, deepening foundations through the clayey zone, or increasing footing depth beyond the influence of pronounced, seasonal moisture variations. Specific recommendations should be provided on a case-by-case basis.

6.5 Erosion Control

Disturbed surface soil resulting from previous or future grading may be susceptible to surface water erosion. Graded portions of the site should be seeded as soon as possible following grading to allow vegetation to become established prior to the rainy season. A seed mixture can be obtained from the local office of the United States Soil Conservation District. We recommend covering cut and fill slopes with a layer of straw immediately after seeding to help keep seeds in place. Jute netting should be placed and secured over the straw to keep the straw from being washed or blown away. Tackifiers or binding agents may be used in lieu of jute netting.

6.6 Foundations

Our opinion is that the site is suitable for one- to four-story structures using conventional perimeter and isolated footings with framed or slab-on-grade floors. Large concentrated loads may require deep footings or drilled pier foundations. Structures to be located in areas of alluvial deposits or areas of existing fill may require extensive grading and/or deep footings or drilled pier foundations. A design level geotechnical report should contain foundation recommendations specific to each area of the site. Historic mining relics and other areas of disturbed soil will require specific consideration.

6.7 Surface Drainage

We anticipate that significant grading will be required in specific areas to improve surface drainage. Potential surface drainage issues were observed in the following areas during our preliminary investigation:

- Erosional gullies were observed near the northwestern corner of Parcel 6 and to the north of this area towards the ponds in Parcel 3. This area serves as a local outlet for runoff from portions of Parcel 6 and the adjacent cut slope in Parcel 3.

- Marsh areas as noted on Sheet 1 are likely to be inundated during the rainy season.

- The existing earth dams on Parcel 3 are of questionable stability and have inadequate outlet structures. Erosion control at the outfalls of both outlet structures is inadequate.

Proper surface drainage is important to the successful development of the project. We recommend the following measures to help mitigate surface water drainage problems. Specific drainage issues should be addressed in a design level geotechnical report.

Final grade in structural areas should be sloped so that surface water drains away from buildings at a minimum of 2% for a distance not less than 10 feet. Backfill placed adjacent to building foundations should be compacted and sloped so that water is not allowed to pond next to the buildings. Backfill should be free of deleterious material.

Downspouts should be directed to a closed collector pipe which discharges flow to a natural drainage area or properly designed drainage facility.

V-ditches should be excavated at the top of all slopes established onsite to prevent surface water from flowing over slope faces. Surface water collected in V-ditches should be directed away and downslope from the proposed building pad and driveway into a rip-rap lined drainage channel.

6.8 Subsurface Drainage

As discussed in the *General Soil and Rock Conditions* and *Groundwater Conditions* sections of this report, clayey alluvial deposits were common in the eastern portions of Parcels 1, 2, 3 and 4 and in the vicinity of the ponds in Parcel 3. Seepage was commonly observed along the upper surface of the clay and clayey silt typically found at a depths of 2 to 8 feet bgs in the alluvial deposits.

Based on our site observations and the soil conditions revealed in our exploratory trenches, we anticipate that areas of extensive subsurface seepage may be encountered during grading and utility trench excavation in these areas. Subdrains may be necessary during grading, and extensive area drains may be required in areas of seasonal inundation or soil saturation. Seasonal precipitation may limit grading work to the drier months, even with the use of subdrains. Subdrain depth, dimension, and location should be determined in the field.

7 LIMITATIONS

7.1 Review, Observation and Testing

The recommendations and conclusions in this report are preliminary in nature based on our understanding of the project and on our limited site reconnaissance and limited subsurface investigation. The recommendations provided herein are contingent upon our review of final plans and specifications, and upon completion of a design level geotechnical investigation.

7.2 Uniformity of Conditions

The recommendations in this report are based on the assumption that the soil conditions do not deviate from those we observed in our exploratory trenches. If, during construction, different subsurface conditions from those revealed during our limited investigation are observed, we must be advised promptly. We can then review those conditions and reconsider our recommendations where necessary.

The ground surface was obscured by dense vegetation in some portions of the site. Access by excavation equipment was limited in some areas due to steep slopes. Additional fill areas, mill relics, tunnels, shafts, and other mining relics may be uncovered during grading and should be dealt with on a case-by-case basis.

7.3 Services Provided

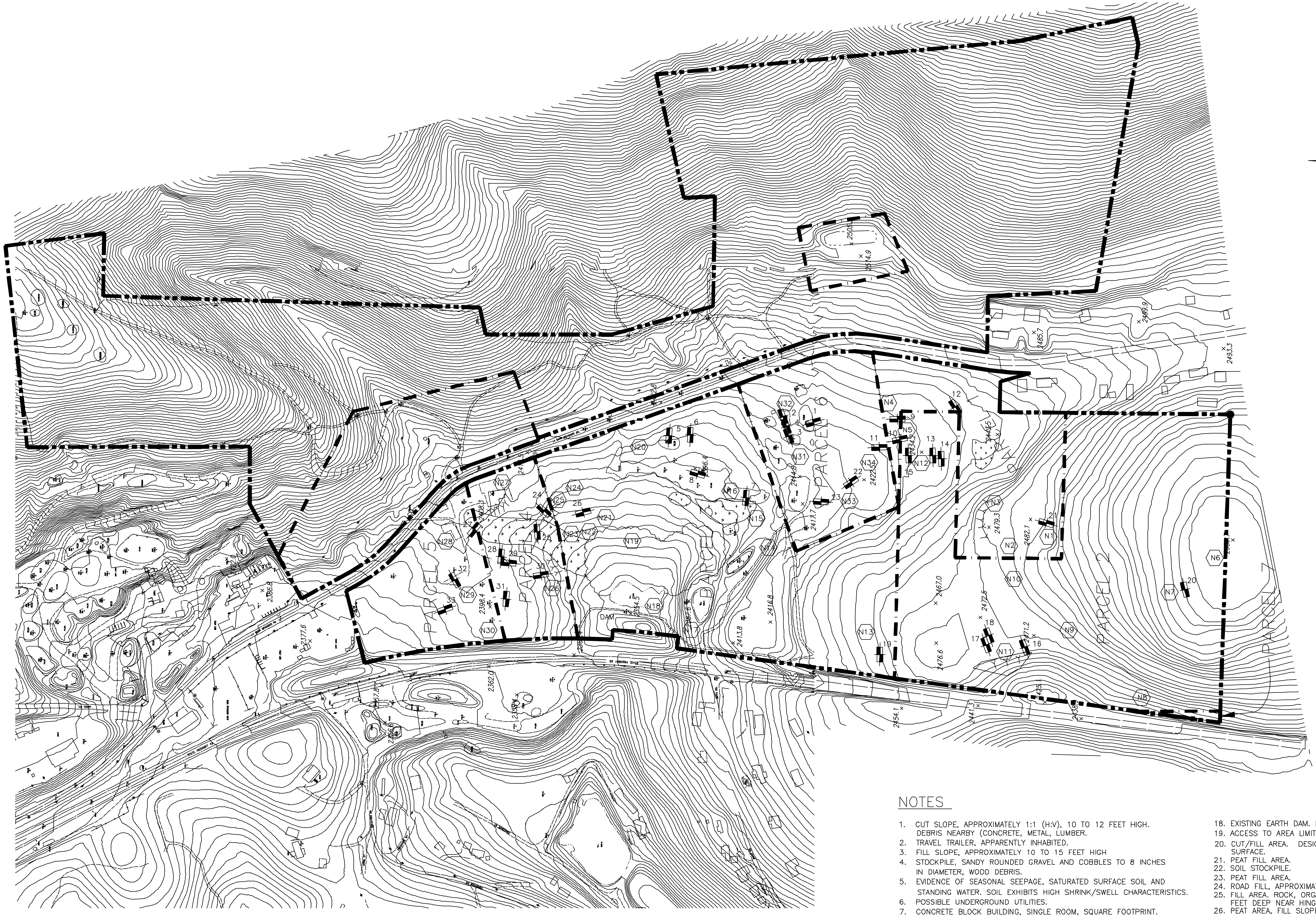
The preliminary conclusions and recommendations contained herein are professional opinions derived in accordance with the current standards of professional practice. No warranty, expressed or implied, including any implied warranty of merchantability or fitness for the purpose is made or intended in connection with our work. Additional investigation and testing would be necessary to produce a design level geotechnical report. We did not conduct any studies to determine the presence of hazardous materials or wetlands. We did not perform stability analyses for slopes or earth dams.

7.4 Time Limitations

The findings of this report are valid as of the present date. However, changes in the conditions of the property can occur with the passage of time. The changes may be due to natural processes or to the works of man, on the project site or adjacent properties. In addition, changes in applicable or appropriate standards can occur, whether they result from legislation or the broadening of knowledge. Accordingly, our recommendations should not be relied upon after a period of two years without our review.

SHEETS

Sheet 1	**Geologic/Geotechnical Site Map**



1" = 200'
C.I.=4'

100 0 100 200
SCALE IN FEET

LEGEND

- ▬ APPROXIMATE LOCATION OF EXPLORATORY TRENCH
- MARSH
- DENSE VEGETATION
- N19 NOTES
- YYY FILL SLOPE

NOTES

1. CUT SLOPE, APPROXIMATELY 1:1 (H:V), 10 TO 12 FEET HIGH. DEBRIS NEARBY (CONCRETE, METAL, LUMBER.
2. TRAVEL TRAILER, APPARENTLY INHABITED.
3. FILL SLOPE, APPROXIMATELY 10 TO 15 FEET HIGH
4. STOCKPILE, SANDY ROUNDED GRAVEL AND COBBLES TO 8 INCHES IN DIAMETER, WOOD DEBRIS.
5. EVIDENCE OF SEASONAL SEEPAGE, SATURATED SURFACE SOIL AND STANDING WATER. SOIL EXHIBITS HIGH SHRINK/SWELL CHARACTERISTICS.
6. POSSIBLE UNDERGROUND UTILITIES.
7. CONCRETE BLOCK BUILDING, SINGLE ROOM, SQUARE FOOTPRINT.
8. DEBRIS, RUBBISH.
9. POSSIBLE MINE WASTE ROCK.
10. DEBRIS, RUBBISH.
11. FILL AREA. HIGH ORGANIC CONTENT, WOOD DEBRIS. MORE THAN 13 FEET DEEP NEAR HINGE POINT.
12. FILL AREA, HIGH ORGANIC CONTENT. 6 TO 9 FEET DEEP IN EXPLORATORY TRENCH.
13. ABANDONED RUNWAY FOR MODEL AIRPLANE CLUB, CARPET REMNANTS.
14. ROADWAY CUT/FILL.
15. EROSIONAL GULLIES DRAIN TO NORTH.
16. SEASONAL SEEPAGE AND SATURATED SURFACE SOIL.
17. RELIC SADDLE FOUNDATION, WATER CONVEYANCE, OUTLET STRUCTURE.
18. EXISTING EARTH DAM. EVIDENCE OF SEEPAGE AND BREECHING.
19. ACCESS TO AREA LIMITED BY DENSE VEGETATION.
20. CUT/FILL AREA. DESICCATION CRACKS OBSERVED AT GROUND SURFACE.
21. PEAT FILL AREA.
22. SOIL STOCKPILE.
23. PEAT FILL AREA.
24. ROAD FILL, APPROXIMATELY 3 FEET DEEP.
25. FILL AREA. ROCK, ORGANICS, WOOD DEBRIS. APPROXIMATELY 8 FEET DEEP NEAR HINGE POINT OF SLOPE.
26. PEAT AREA, FILL SLOPE ON SOUTH EDGE.
27. RELIC CONCRETE SLAB-ON-GRADE, 12 INCHES THICK IN EXPOSED SECTION. FILL TO WEST OF SLAB MAY BE MORE THAN 10 FEET DEEP BASED ON TOPOGRAPHY.
28. CONCRETE SLAB ON GRADE. LIKELY SHALLOW FILL UNDER NORTH PORTION.
29. LOCAL DEPRESSION, SEASONAL PONDING.
30. DEBRIS, RUBBISH.
31. DEBRIS.
32. DEBRIS STOCKPILES. SOIL, ROCK WOOD, CONCRETE, METAL.
33. ROCK FILL AREA, POSSIBLE RELIC SUBDRAIN.
34. RELIC MILL SITE. CONCRETE SLABS ON GRADE TO 14 INCHES THICK WITH #5 REBAR WHERE OBSERVED. STEEL TO 7/8" THICK. CONCRETE WALLS TO 12" THICK WITH #5 REBAR. MISCELLANEOUS PILES OF BROKEN CONCRETE AND DEBRIS.

BASE MAP PREPARED BY
SYLVESTER & CREIGHTON, INC.

DESIGNED BY:	JWM
DRAWN BY:	SLW
DATE:	AUGUST 1999
DRAWING NAME:	977-01SP
PROJECT NO.:	977-01

NO.	REVISIONS	DATE

GEOLOGIC/GEOTECHNICAL SITE MAP FOR
BEAR RIVER MILL SITE
NEVADA COUNTY, CALIFORNIA

HK HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS
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1 OF 1

FIGURES

Figures 1 - 33 **Trench Logs**

TRENCH 1

PROJECT NO. 977–01	**PROJECT NAME** BEAR RIVER MILL SITE	**ELEVATION** 2425 FEET MSL	**DATE** 8/5/99	**PAGE** 1 OF 1	**FIGURE NO.** 1

EXCAVATING METHOD CASE 580B EXTENDAHOE	**SAMPLING METHOD** NONE	**GROUNDWATER ENCOUNTERED** NONE	**CAVED** 0 – 7 FEET

SAMPLE NO.	**DRY DENSITY (PCF)**	**PERCENT MOISTURE**	**DEPTH (FT)**		**USCS**	**DESCRIPTIONS/REMARKS**
			1 2 3 4 5 6		OL	DARK BROWN, MOIST, LOOSE SANDY SILT WITH ORGANICS (PEAT, WOOD DEBRIS) AND UP TO 50% SUBANGULAR TO SUBROUNDED GRAVEL AND COBBLES, 3 TO 12 INCH DIAMETER (STOCKPILE IS UNSUITABLE FOR USE AS STRUCTURAL FILL)
			7 8 9 10			TRENCH TERMINATED AT 7 FEET AT BOTTOM OF STOCKPILE

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TRENCH 2

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-01	BEAR RIVER MILL SITE	2425 FEET MSL	8/5/99	1 OF 1	2

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	0 - 7.5 FEET

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)	USCS	DESCRIPTIONS/REMARKS
			0	OL	DARK BROWN, MOIST, LOOSE SANDY SILT WITH ORGANICS (PEAT, WOOD DEBRIS) AND APPROXIMATELY 10% GRAVEL AND COBBLES, 3 TO 12 INCH DIAMETER (STOCKPILE UNSUITABLE FOR USE AS STRUCTURAL FILL)
			1		
			2		
			3		
			4		INTERBEDS OF ORANGE BROWN, MOIST, LOOSE, SILTY SAND WITH ROCK
			5		
			6		
			7		
			7.5		TRENCH TERMINATED AT 7.5 FEET NEAR BASE OF STOCKPILE
			8		
			9		
			10		

TRENCH 3

PROJECT NO. 977–01	**PROJECT NAME** BEAR RIVER MILL SITE	**ELEVATION** 2427 FEET MSL	**DATE** 8/5/99	**PAGE** 1 OF 1	**FIGURE NO.** 3

EXCAVATING METHOD CASE 580B EXTENDAHOE	**SAMPLING METHOD** NONE	**GROUNDWATER ENCOUNTERED** NONE	**CAVED** 0 – 6.5 FEET

SAMPLE NO.	**DRY DENSITY (PCF)**	**PERCENT MOISTURE**	**DEPTH (FT)**		**USCS**	**DESCRIPTIONS/REMARKS**
						DARK BROWN, MOIST, LOOSE SANDY SILT WITH ORGANICS (PEAT, WOOD DEBRIS), GRAVEL AND COBBLES (3 TO 12 INCH DIAMETER), AND METAL DEBRIS (STOCKPILE UNSUITABLE FOR USE AS STRUCTURAL FILL)
			1			
			2			
			3		OL	
			4			
			5			
			6			
						TRENCH TERMINATED AT 6.5 FEET NEAR BOTTOM OF STOCKPILE
			7			
			8			
			9			
			10			

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TRENCH 4

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-01	BEAR RIVER MILL SITE	2424 FEET MSL	8/5/99	1 OF 1	4

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	SLIDE HAMMER	5 FEET	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)	USCS	DESCRIPTIONS/REMARKS
					DARK RED BROWN, DRY TO SLIGHTLY MOIST, STIFF, SILTY CLAY TO CLAYEY FINE SAND WITH MINOR GRAVEL
CB-1 4-1			1	CL	
			2		RED BROWN, MOIST TO DAMP, MEDIUM, SANDY CLAY WITH GRAVEL
CB-2				CL	
			3		YELLOW BROWN, DAMP TO WET, MEDIUM CLAY WITH MINOR GRAVEL
CB-3			4	CH	
			5	▼	STANDING WATER AT 5 FEET
					TRENCH TERMINATED AT 5.5 FEET
			6		
			7		
			8		
			9		
			10		

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TRENCH 5

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-01	BEAR RIVER MILL SITE	2406 FEET MSL	8/5/99	1 OF 1	5

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
						DARK BROWN, MOIST, LOOSE SANDY SILT WITH ORGANICS (PEAT, WOOD DEBRIS) INTERBEDDED WITH MINOR ORANGE BROWN TO YELLOW BROWN, MOIST TO DAMP, LOOSE, CLAYEY SILT (STOCKPILE IS UNSUITABLE FOR USE AS STRUCTURAL FILL)
			1			
			2			
			3			
			4		OL	
			5			
			6			
			7			
			8			
			9			TRENCH TERMINATED AT 9 FEET NEAR BASE OF STOCKPILE
			10			

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TRENCH 6

PROJECT NO.	**PROJECT NAME**	**ELEVATION**	**DATE**	**PAGE**	**FIGURE NO.**
977-01	BEAR RIVER MILL SITE	2404 FEET MSL	8/5/99	1 OF 1	6

EXCAVATING METHOD	**SAMPLING METHOD**	**GROUNDWATER ENCOUNTERED**	**CAVED**
CASE 580B EXTENDAHOE	SLIDE HAMMER	SEEPAGE AT 7 FEET	NONE

SAMPLE NO.	**DRY DENSITY (PCF)**	**PERCENT MOISTURE**	**DEPTH (FT)**	**USCS**	**DESCRIPTIONS/REMARKS**
				SM	MEDIUM BROWN TO YELLOW BROWN, DRY, MEDIUM DENSE, SILTY FINE SAND WITH MINOR CLAY AND COMMON ROOTS (FINE TO MEDIUM)
			1		
6-1					
				ML	YELLOW BROWN, DRY TO SLIGHTLY MOIST, MEDIUM DENSE, CLAYEY SILT WITH FINE SAND
			2		
6-2					
			3	ML	COMPLETELY WEATHERED GRANODIORITE ROCK (EXCAVATES AS LIGHT GREY, MOIST TO DAMP, MEDIUM DENSE, CLAYEY SILT)
			4		
			5		
			6		
			7		MINOR SEEPAGE AT 7 FEET
			8		TRENCH TERMINATED AT 8 FEET
			9		
			10		

TRENCH 7

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-01	BEAR RIVER MILL SITE	2402 FEET MSL	8/5/99	1 OF 1	7

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	SEEPAGE AT 2 FEET	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
					OL	MEDIUM BROWN, WET, LOOSE, SANDY SILT WITH DENSE ROOTS
						DARK GREY, WET, LOOSE, SANDY SILT WITH ORGANICS
			1		OL	
						SEEPAGE AT 2 FEET
			2			DARK GREY, WET, LOOSE, SILTY CLAY WITH ORGANICS
			3		OL	
			4		▽	
						TRENCH TERMINATED AT 4.5 FEET
			5			
			6			
			7			
			8			
			9			
			10			

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TRENCH 8

PROJECT NO.	**PROJECT NAME**	**ELEVATION**	**DATE**	**PAGE**	**FIGURE NO.**
977–01	BEAR RIVER MILL SITE	2396 FEET MSL	8/5/99	1 OF 1	8

EXCAVATING METHOD	**SAMPLING METHOD**	**GROUNDWATER ENCOUNTERED**	**CAVED**
CASE 580B EXTENDAHOE	NONE	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
						ORANGE BROWN, DRY TO DAMP, LOOSE, CLAYEY SILT WITH VARIABLE FINE SAND CONTENT AND POCKETS OF WOOD DEBRIS (STOCKPILE REQUIRES SELECTIVE BORROW)
			1			
			2			
			3			
			4		ML	INCREASING MOISTURE WITH DEPTH
			5			
			6			
			7			
					ML	MEDIUM BROWN TO YELLOW BROWN, DAMP, MEDIUM DENSE, SANDY SILT (APPARENT ORIGINAL GROUND SURFACE)
			8			TRENCH TERMINATED AT 8 FEET
			9			
			10			

TRENCH 9

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977–01	BEAR RIVER MILL SITE	2432 FEET MSL	8/5/99	1 OF 1	9

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	0 – 7 FEET

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)	USCS	DESCRIPTIONS/REMARKS
				OL	DARK BROWN, DRY TO MOIST, SANDY SILT WITH ORGANICS (WOOD DEBRIS), MINOR DEBRIS (STEEL, RUBBER) AND ABUNDANT GRAVEL AND COBBLES TO 8 INCHES IN DIAMETER (STOCKPILE IS UNSUITABLE FOR USE AS STRUCTURAL FILL)
			1		
			2		
			3		
			4	OL	DARK BROWN, MOIST TO DAMP, LOOSE, SANDY SILT WITH ORGANICS (WOOD DEBRIS), MINOR GRAVEL, AND MINOR DEBRIS (STOCKPILE IS UNSUITABLE FOR USE AS STRUCTURAL FILL)
			5		
			6		
			7	ML	DARK BROWN, MOIST TO DAMP, LOOSE, SANDY SILT WITH MINOR ORGANICS (SELECTIVE BORROW MAY BE POSSIBLE)
			8		TRENCH TERMINATED AT 8 FEET NEAR BOTTOM OF STOCKPILE
			9		
			10		

TRENCH 10

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-01	BEAR RIVER MILL SITE	2428 FEET MSL	8/5/99	1 OF 1	10

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	SLIDE HAMMER	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)	USCS	DESCRIPTIONS/REMARKS
			1	SM	MEDIUM BROWN, DRY, LOOSE, SILTY FINE SAND WITH MINOR DEBRIS AND VARIABLE ROCK CONTENT (UP TO APPROXIMATELY 50%) (FILL)
CB-7			2	SW	LIGHT GREY, MOIST, LOOSE, FINE TO MEDIUM SAND (FILL)
			3	SM	DARK BROWN, MOIST, LOOSE, SILTY FINE SAND WITH MINOR CLAY AND WOOD DEBRIS (FILL – POSSIBLE RELIC CULVERT BACKFILL)
CB-6			4 5 6	CH	YELLOW BROWN, MOIST, MEDIUM, FINE SANDY CLAY
			7 8 9 10		TRENCH TERMINATED AT 6.5 FEET

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TRENCH 11

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977–01	BEAR RIVER MILL SITE	2424 FEET MSL	8/5/99	1 OF 1	11

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	SEEPAGE AT 5.5 FEET	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
						DARK RED BROWN, MOIST, LOOSE, SANDY SILT WITH CLAY, MINOR ROCK AND MINOR DEBRIS (FILL)
			1			
			2			CONCRETE FOUNDATION (WALL) EXPOSED AT 2 FEET BGS EXTENDS BELOW BOTTOM OF EXCAVATION
			3		ML	
			4			
			5			MINOR SEEPAGE AT 5.5 FEET
						YELLOW BROWN, DAMP, MEDIUM, FINE SANDY CLAY
			6			
			7		CL	
					▽	
			8			TRENCH TERMINATED AT 8 FEET
			9			
			10			

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TRENCH 12

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-01	BEAR RIVER MILL SITE	2440 FEET MSL	8/5/99	1 OF 1	12

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
				▨	SC	DARK BROWN TO RED BROWN, DRY, LOOSE TO MEDIUM DENSE, CLAYEY SAND AND CLAYEY SILT (ALLUVIAL DEPOSIT)
			1	▨		
				▥	ML	DARK BROWN, DRY, MEDIUM DENSE, FINE SANDY SILT
			2	▥		
			3			TRENCH TERMINATED AT 3 FEET (REUSAL OF BACKHOE ON GRANODIORITE ROCK)
			4			
			5			
			6			
			7			
			8			
			9			
			10			

TRENCH 13

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-01	BEAR RIVER MILL SITE	2435 FEET MSL	8/5/99	1 OF 1	13

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	3-9 FEET

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
			0–3		ML	MEDIUM BROWN TO DARK BROWN, DRY TO MOIST, LOOSE, SANDY SILT (FILL)
			3–5		PT	WOOD DEBRIS, BURNT WOOD DEBRIS (FILL)
			5–6		ML	MEDIUM BROWN TO DARK BROWN, DRY TO MOIST, LOOSE, SANDY SILT (FILL)
			6–9		CL	YELLOW BROWN, DAMP, SOFT CLAY WITH ABUNDANT ROCK TO 3 INCHES IN DIAMETER (FILL) 2 FOOT DIAMETER CMP CULVERT AT 8 FEET BGS BEARING ROUGHLY NORTH-SOUTH
			9–10		CL	BLUE GREY MOTTLED WITH YELLOW BROWN, MOIST, STIFF CLAY WITH FINE SAND (NATIVE)
			10			TRENCH TERMINATED AT 10 FEET

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TRENCH 14

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-01	BEAR RIVER MILL SITE	2434 FEET MSL	8/5/99	1 OF 1	14

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	2-6 FEET

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
						MEDIUM BROWN TO DARK BROWN, DRY TO MOIST, LOOSE, SANDY SILT WITH ORGANICS (WOOD DEBRIS) (FILL)
			1			
			2			
			3		OL	
			4			
			5			
			6			
						BLUE GREY MOTTLED WITH YELLOW BROWN, MOIST, STIFF CLAY WITH FINE SAND (NATIVE)
			7		CL	
			8			
						TRENCH TERMINATED AT 10 FEET
			9			
			10			

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TRENCH 15

PROJECT NO. 977–01	**PROJECT NAME** BEAR RIVER MILL SITE	**ELEVATION** 2430 FEET MSL	**DATE** 8/5/99	**PAGE** 1 OF 1	**FIGURE NO.** 15

EXCAVATING METHOD CASE 580B EXTENDAHOE	**SAMPLING METHOD** NONE	**GROUNDWATER ENCOUNTERED** NONE	**CAVED** 0–7 FEEET

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
					OL	MEDIUM BROWN TO DARK BROWN, DRY TO MOIST, LOOSE, SANDY SILT WITH ORGANICS (WOOD DEBRIS) (FILL)
			1			
			2			
			3			
			4			
			5			
			6			
			7		CL	BLUE GREY MOTTLED WITH YELLOW BROWN, MOIST, STIFF CLAY WITH FINE SAND (NATIVE)
			8			
			9			
			10			TRENCH TERMINATED AT 10 FEET

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TRENCH 16

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-01	BEAR RIVER MILL SITE	2430 FEET MSL	8/5/99	1 OF 1	16

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
			1		OL	MEDIUM BROWN TO DARK BROWN, DRY TO MOIST, LOOSE TO MEDIUM DENSE, SANDY SILT INTERBEDDED WITH ORGANICS (WOOD DEBRIS) (FILL)
			2			
			3			
			4			
			5			
			6			
			7			
			8			
			9			
			10			16 INCH DIAMETER LOG ENCOUNTERED AT 10 FEET BGS
			11		ML	RED BROWN, DAMP, MEDIUM DENSE, CLAYEY SILT
			12		CL	YELLOW BROWN TO ORANGE BROWN, MOIST, FIRM, SILTY CLAY (NATIVE)
			13			TRENCH TERMINATED AT 13 FEET
			14			
			15			
			16			
			17			
			18			
			19			
			20			

TRENCH 17

PROJECT NO. 977-01	**PROJECT NAME** BEAR RIVER MILL SITE	**ELEVATION** 2470 FEET MSL	**DATE** 8/5/99	**PAGE** 1 OF 1	**FIGURE NO.** 17

EXCAVATING METHOD CASE 580B EXTENDAHOE	**SAMPLING METHOD** NONE	**GROUNDWATER ENCOUNTERED** NONE	**CAVED** NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
				¦¦¦	OL	MEDIUM BROWN TO DARK BROWN, DRY TO MOIST, LOOSE TO MEDIUM DENSE, SANDY SILT INTERBEDDED WITH ORGANICS (WOOD DEBRIS) (FILL)
			1	¦¦¦		
			2	¦¦¦		
			3	¦¦¦		
						TRENCH TERMINATED AT 4 FEET (REFUSAL OF BACKHOE ON LARGE WOOD DEBRIS)
			4			
			5			
			6			
			7			
			8			
			9			
			10			

TRENCH 18

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-01	BEAR RIVER MILL SITE	2470 FEET MSL	8/5/99	1 OF 1	18

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
						LIGHT ORANGE BROWN, DRY TO SLIGHTLY MOIST, MEDIUM DENSE, SANDY SILT WITH MINOR CLAY
			1			
			2		ML	
			3			TRENCH TERMINATED AT 3 FEET
			4			
			5			
			6			
			7			
			8			
			9			
			10			

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TRENCH 19

PROJECT NO. 977–01	**PROJECT NAME** BEAR RIVER MILL SITE	**2460** 2460 FEET MSL	**DATE** 8/5/99	**PAGE** 1 OF 1	**FIGURE NO.** 19

EXCAVATING METHOD CASE 580B EXTENDAHOE	**SAMPLING METHOD** SLIDE HAMMER	**GROUNDWATER ENCOUNTERED** NONE	**CAVED** NONE

SAMPLE NO.	**DRY DENSITY** (PCF)	**PERCENT MOISTURE**	DEPTH (FT)		**USCS**	DESCRIPTIONS/REMARKS
						DARK ORANGE BROWN, DRY, MEDIUM DENSE, CLAYEY SILT
CB–9			1	▨	ML	
19–1			2	◣		COMPLETELY WEATHERED GRANODIORITE ROCK (EXCAVATES AS ORANGE BROWN, MOIST, MEDIUM DENSE SILT WITH MINOR SAND)
			3			
			4			
					ML	
			5			
			6			
			7			TRENCH TERMINATED AT 7 FEET
			8			
			9			
			10			

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TRENCH 20

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-01	BEAR RIVER MILL SITE	2548 FEET MSL	8/5/99	1 OF 1	20

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	SLIDE HAMMER	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
						DARK RED BROWN TO ORANGE BROWN, DRY, MEDIUM DENSE TO DENSE, CLAYEY SILT WITH OCCASIONAL ROCK TO 12 INCHES IN DIAMETER
CB-10			1			
			2		ML	
			3			
			4		ML	COMPLETELY WEATHERED GRANODIORITE ROCK (EXCAVATES AS ORANGE BROWN, DRY, DENSE, SANDY SILT) INCREASING ROCK STRUCTURE WITH DEPTH
			5			TRENCH TERMINATED AT 5 FEET
			6			
			7			
			8			
			9			
			10			

TRENCH 21

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-01	BEAR RIVER MILL SITE	2484 FEET MSL	8/5/99	1 OF 1	21

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)	USCS	DESCRIPTIONS/REMARKS
				GP	ANGULAR ROCK TO 3 INCHES IN DIAMETER
				ML	LIGHT BROWN, DRY, LOOSE, SANDY SILT
					COMPLETELY TO MODERATELY WEATHERED ROCK (EXCAVATES AS ORANGE BROWN, DRY TO SLIGHTLY MOIST, MEDIUM DENSE, SILTY SAND WITH COBBLES)
			1		
				SM	
			2		
			3		
					TRENCH TERMINATED AT 4 FEET
			4		
			5		
			6		
			7		
			8		
			9		
			10		

TRENCH 22

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-01	BEAR RIVER MILL SITE	2420 FEET MSL	8/6/99	1 OF 1	22

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	SEEPAGE AT 5.5 FEET	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
			1	≋	PT	ORGANICS (PEAT, WOOD DEBRIS)
			2	▨	SC	DARK BROWN, MOIST, LOOSE, CLAYEY SAND WITH ROCK TO 12 INCHES IN DIAMETER (FILL)
			3 4 5	▨	SC	LIGHT GREY MOTTLED WITH ORANGE BROWN, DAMP, LOOSE TO MEDIUM DENSE, CLAYEY SAND WITH ROCK (FILL) SEEPAGE AT 5.5 FEET
			6 7 8	▧	CL ▽	ORANGE BROWN MOTTLED WITH LIGHT GREY, MOIST, MEDIUM SANDY CLAY
			9 10			TRENCH TERMINATED AT 8 FEET

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TRENCH 23

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977–01	BEAR RIVER MILL SITE	2416 FEET MSL	8/6/99	1 OF 1	23

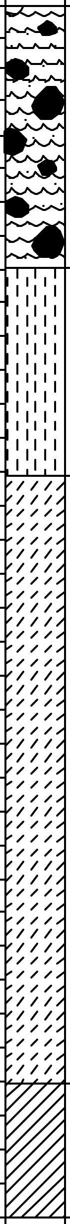
EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	0 – 8 FEET

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
						ANGULAR ROCK TO 18 INCHES IN DIAMETER WITH VARIABLE SOIL CONTENT (BROWN SILTY SAND) AND MINOR DEBRIS (METAL) (FILL)
			1			
			2			THREE APPARENTLY RELIC ELECTRICAL CONDUITS SEVERED IN EXCAVATION AT APPROXIMATELY 2.5 FEET (ALUMINUM STRANDS, PLASTIC CASING, BEARING NORTH–SOUTH)
			3			
			4		GP	PERFORATED, APPROXIMATELY 12 INCH DIAMETER CORRUGATED METAL PIPE ENCOUNTERED AT 4 FEET (POSSIBLE RELIC SUBSURFACE DRAIN)
			5			
			6			
			7			
			8			TRENCH TERMINATED AT 8 FEET (EXTENSIVE CAVING)
			9			
			10			

TRENCH 24

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-01	BEAR RIVER MILL SITE	2392 FEET MSL	8/6/99	1 OF 1	24

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	NONE



SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
			1		GP PT	ANGULAR ROCK TO 3 INCH DIAMETER WITH ORGANICS (PEAT) (FILL)
			2 3		OL	DARK YELLOW BROWN TO GREY, MOIST, SOFT TO MEDIUM, SANDY CLAY WITH ORGANICS (WOOD DEBRIS) (FILL) 24 INCH DIAMETER LOG AT APPROXIMATELY 3 FEET
			4 5 6 7 8		OH	DARK BLUE GREY, MOIST TO DAMP, SOFT TO MEDIUM, SANDY CLAY (FILL) STEEL CABLE AT APPROXIMATELY 4 FEET
			9		CL	YELLOW BROWN, MOIST, FIRM, SILTY CLAY (NATIVE)
			10			TRENCH TERMINATED AT 9 FEET

TRENCH 25

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-01	BEAR RIVER MILL SITE	2324 FEET MSL	8/6/99	1 OF 1	25

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
			1		OL	DARK BROWN, DRY, LOOSE, SANDY SILT WITH ORGANICS (PEAT, WOOD DEBRIS) (FILL)
			2		PT	PEAT, WOOD DEBRIS (FILL)
			3		PT	ANGULAR ROCK AND WOOD DEBRIS INTERBEDDED WITH CLAY (FILL)
			4		CL	GREEN GREY, SLIGHTLY MOIST, FIRM, SANDY CLAY
						TRENCH TERMINATED AT 4 FEET
			5			
			6			
			7			
			8			
					CL	
			9			
			10			

TRENCH 26

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977–01	BEAR RIVER MILL SITE	2384 FEET MSL	8/6/99	1 OF 1	26

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
				▥	ML	DARK RED BROWN, DRY TO SLIGHTLY MOIST, MEDIUM DENSE, CLAYEY SILT
			1	▥		
			2	▥		
			3	▨	CL	YELLOW BROWN MOTTLED WITH LIGHT GREY, MOIST, MEDIUM, SANDY CLAY
			4	▨		
			5			TRENCH TERMINATED AT 5 FEET
			6			
			7			
			8			
			9			
			10			

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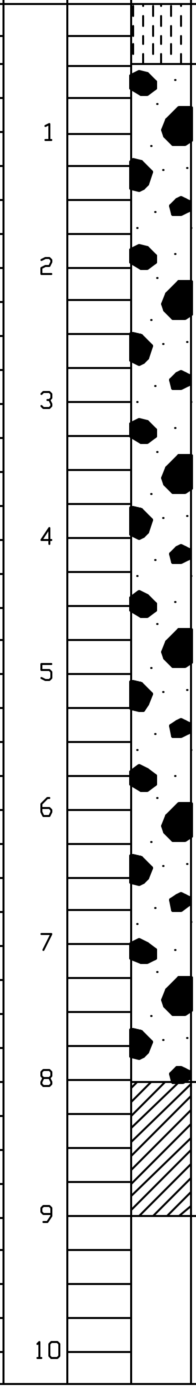
TRENCH 27

PROJECT NO.	**PROJECT NAME**	**ELEVATION**	**DATE**	**PAGE**	**FIGURE NO.**
977–01	BEAR RIVER MILL SITE	2404 FEET MSL	8/5/99	1 OF 1	27

EXCAVATING METHOD	**SAMPLING METHOD**	**GROUNDWATER ENCOUNTERED**	**CAVED**
CASE 580B EXTENDAHOE	SLIDE HAMMER	NONE	1 – 8 FEET



SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)	USCS	DESCRIPTIONS/REMARKS
				OL	DARK BROWN, DRY, LOOSE, SILTY SAND WITH ORGANICS AND COMMON ROOTS (FILL)
				GP	ANGULAR ROCK TO 12 INCH DIAMETER WITH DARK BROWN, DRY, LOOSE, TO MEDIUM DENSE, SANDY SILT (FILL)
				CL	YELLOW BROWN MOTTLED WITH ORANGE BROWN, DAMP, SOFT, SANDY CLAY (NATIVE)
					TRENCH TERMINATED AT 9 FEET

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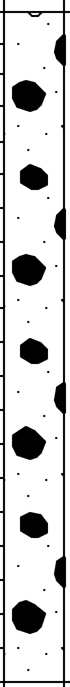
TRENCH 28

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977–01	BEAR RIVER MILL SITE	2396 FEET MSL	2396	1 OF 1	28

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	SLIDE HAMMER	NONE	0 – 5 FEET

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
					GP	ANGULAR ROCK TO 18 INCHES IN DIAMETER WITH MINOR DARK BROWN SILTY SAND AND MINOR DEBRIS (SELECTIVE BORROW REQUIRED FROM STOCKPILE)
			1			
			2			
			3			
			4			
			5			TRENCH TERMINATED AT 5 FEET NEAR BOTTOM OF STOCKPILE
			6			
			7			
			8			
			9			
			10			

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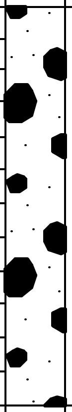
TRENCH 29

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977–01	BEAR RIVER MILL SITE	2396 FEET MSL	8/6/99	1 OF 1	29

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	0 – 3 FEET

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
			0–3		GP	ANGULAR ROCK TO 18 INCHES IN DIAMETER WITH MINOR DARK BROWN SILTY SAND AND MINOR DEBRIS (SELECTIVE BORROW REQUIRED FROM STOCKPILE)
			3			TRENCH TERMINATED AT 3 FEET WITHIN STOCKPILE
			4			
			5			
			6			
			7			
			8			
			9			
			10			

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TRENCH 30

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977–01	BEAR RIVER MILL SITE	2388 FEET MSL	8/6/99	1 OF 1	30

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
					PT	PEAT, WOOD DEBRIS (FILL)
			1		CL	YELLOW BROWN, SLIGHTLY MOIST, MEDIUM, SANDY CLAY
			2		SC	ORANGE BROWN TO YELLOW BROWN, MOIST, MEDIUM DENSE, CLAYEY SAND (NATIVE)
			3			TRENCH TERMINATED AT 3 FEET
			4			
			5			
			6			
			7			
			8			
			9			
			10			

TRENCH 31

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977–01	BEAR RIVER MILL SITE	2398 FEET MSL	8/6/99	1 OF 1	31

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
					ML	DARK BROWN, DRY, MEDIUM DENSE, CLAYEY SILT
			1			
					ML	COMPLETELY WEATHERED ROCK (EXCAVATES AS ORANGE BROWN, SLIGHTLY MOIST, MEDIUM DENSE, CLAYEY SILT)
			2			
			3			
			4			TRENCH TERMINATED AT 4 FEET
			5			
			6			
			7			
			8			
			9			
			10			

TRENCH 32

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-01	BEAR RIVER MILL SITE	2401 FEET MSL	8/6/99	1 OF 1	32

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
						PEAT, DEBRIS (WOOD, PLASTIC, METAL, CONCRETE)
			1		PT	
			2			ORANGE BROWN, SLIGHTLY MOIST, MEDIUM DENSE, CLAYEY SAND (NATIVE)
			3		SC	
			4			TRENCH TERMINATED AT 4 FEET
			5			
			6			
			7			
			8			
			9			
			10			

TRENCH 33

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-01	BEAR RIVER MILL SITE	2394 FEET MSL	8/6/99	1 OF 1	33

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
				▨	SC	ORANGE BROWN, DRY TO SLIGHTLY MOIST, MEDIUM DENSE, CLAYEY SAND (FILL)
			1	▨	SC	ORANGE BROWN, SLIGHTLY MOIST, MEDIUM DENSE, CLAYEY SAND (NATIVE)
			2			
			3			TRENCH TERMINATED AT 3 FEET
			4			
			5			
			6			
			7			
			8			
			9			
			10			

APPENDIX 3.6-2 PRELIMINARY GEOLOGIC HAZARDS REPORT FOR THE VILLAGE AT SOUTHHILL

PRELIMINARY GEOLOGIC HAZARDS REPORT
for
THE VILLAGE AT SOUTHHILL
Nevada County, California

Prepared for:
PMC
140 Independence Circle, Suite C
Chico, California 95973

Prepared by:
Holdrege & Kull
792 Searls Avenue
Nevada City, California 95959

Project No. 3594-01
October 10, 2008

HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS

Project No. 3594-01
October 10, 2008

PMC
140 Independence Circle, Suite C
Chico, CA 95973

Attention: Mike Martin, Senior Planner

Reference: ***The Village at SouthHill***
Nevada County, California

Subject: ***Preliminary Geologic Hazards Report***

Dear Mr. Martin:

This report presents the results of Holdrege & Kull's (H&K's) preliminary geologic hazards investigation for the 65-acre Village at SouthHill Master Plan area and the 75-acre Annexation Area, which are collectively referred to as the project. This report was prepared to facilitate planning and development by providing a description of geologic and geotechnical conditions at the site.

The proposed Village at SouthHill is located east of State Route 49 and west of La Barr Meadows Road, approximately one tenth of a mile south of the City of Grass Valley, in Nevada County, California. As proposed, the Village at SouthHill development includes commercial and residential development, as well as open space. The Annexation Area comprises 33 parcels located east of State Route 49, between the Village at SouthHill and the Grass Valley city limits. The Annexation Area is designated as commercial and business park per the City's 2020 General Plan.

The findings presented in this geologic hazards report are based on H&K's observation of surface and subsurface conditions, review of previous reports, and review of published maps and literature. The estimate of preliminary seismic design criteria was based on observation of soil conditions revealed in previous exploratory trenches, and should be confirmed by a design-level geotechnical engineering investigation. H&K's opinion is that the project can be completed as proposed, provided the potential geological hazards at the site are addressed in the project design per the findings of a design-level geotechnical engineering report.

From a geotechnical engineering standpoint, H&K's primary concerns are localized poor site drainage and expansive soil, the presence of several loose fill areas, shallow underground mine workings, and the stability of existing earth dams. Potential chemical hazards associated with rock and soil fill that has been determined to originate from adjacent, historic, hard rock mining operations are to be addressed prior to site development in accordance with cleanup recommendations that have been approved by the California EPA.

We appreciate the opportunity to provide geotechnical engineering services for the Village at SouthHill. Please contact the undersigned if you have any questions regarding our observations or the recommendations presented in this report.

Sincerely,

HOLDREGE & KULL

No. 2697
Exp. 06/10

Jason W. Muir, G.E. 2697
Principal Engineer

copies: 3 to PMC / Attn: Mike Martin

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APPENDICES

1 INTRODUCTION

At the request of Mike Martin, Project Manager for PMC, Holdrege & Kull (H&K) performed a geologic hazards investigation for the Village at SouthHill Master Plan and Annexation Area, which are collectively referred to as the project. The investigation was performed in general accordance with H&K's October 19, 2007 proposal for the project. The geologic hazards investigation focused on the proposed Village at SouthHill development area; therefore, this report does not contain specific findings pertaining to development of the Annexation Area.

1.1 PROJECT LOCATION AND DESCRIPTION

The proposed 65-acre Village at SouthHill is located east of State Route 49 and west of La Barr Meadows Road, approximately one tenth of a mile south of the City of Grass Valley, in Nevada County, California. A site location map is presented as Figure 1. Per the Village at SouthHill Master Plan (SCO Planning & Engineering, Inc., 2007), elevations on the Village at SouthHill property range from approximately 2,340 feet to 2,420 feet above sea level. The property generally slopes to the west from La Barr Meadows Road towards State Route 49. The site retains features from past industrial operations such as the Bear River lumber mill, Valley Veneer Plant, and Bullion gold mine. The Village at SouthHill comprises seven parcels, which are designated as Nevada County Assessor's Parcel Numbers (APNs) 22-160-04, 22-160-06, 22-250-12, 22-282-01, 22-282-02, 22-282-03, and 22-282-04.

The 75-acre Annexation Area comprises 33 parcels located east of State Route 49, between the Village at SouthHill and the southern boundary of the City of Grass Valley. Some of the Annexation Area parcels currently support commercial and residential development. The Annexation Area APNs are: 22-140-05, 22-140-08, 22-140-10, 22-140-11, 22-140-12, 22-140-21, 22-140-22, 22-140-25, 22-140-36, 22-140-37, 22-140-38, 22-140-41, 22-140-43, 22-140-47, 22-140-48, 22-150-03, 22-150-04, 22-150-08, 22-150-09, 22-150-10, 22-150-11, 22-150-15, 22-150-16, 22-150-17, 22-150-18, 22-150-21, 22-150-22, 22-150-23, 22-150-28, 22-150-30, 22-150-32, 22-150-33, and 29-290-09.

Land to the west of the project, across State Route 49, is occupied by rural residential properties ranging from 5 acres to ½ acre in size. Wolf Creek is located approximately 2,200 feet west of State Route 49 and approximately 200 feet lower in elevation than the lowest area of the project site. Rural residential and vacant land are located beyond La Barr Meadows Road to the east of the project site.

There are existing light industrial and rural residential land uses to the north as well as rural residential uses to the south of the project site.

1.2 PREVIOUS SITE USE

Hard rock gold mining was performed in the vicinity of the Village at SouthHill site from the mid 1800s to the early 1900s. Workings of the Bullion mine (Figure 2) are located near the eastern site boundary. Shallow mine workings (Figure 3) and former processing operations extend east onto the site, and mine waste was deposited on the site as a result of past mining activities. Deeper mine workings generally extend towards the northeast, away from the site.

Lumber milling and wood products production facilities were located on the site from 1956 until 1978 (Jensen, 1999). Former Bear River Sawmill facilities were located centrally within the site, and former Valley Veneer Plant facilities were located in the northeastern portion of the site. Two existing ponds, one abandoned pond, and their associated earth dams are located in the central-western portion of the site. These features are depicted on Sheet 1.

1.3 PROPOSED IMPROVEMENTS

Per the Village at SouthHill Master Plan (SCO, 2007), the proposed Village at SouthHill includes five development areas: Central Business, Commercial Business Park, Single-family Residential, Multi-family Residential and Open Space. Development is to include significant earthwork cut and fill, retaining walls, installation of underground utilities, construction of commercial and residential structures, and paving.

The master plan includes realignment and expansion of a portion of the Crestview Road intersection with State Route 49, which would serve as the project's primary access. La Barr Meadows Road is to be realigned, and three traffic roundabouts and four storm drainage detention basins are proposed near the realigned road.

The site drains to a pond at the central-western portion of the site. The pond discharges in an existing culvert beneath State Route 49 and then flows into Wolf Creek. Per the Master Plan (SCO, 2007) Caltrans requires that the project result in no net increase in storm water runoff through the existing storm drainage system. Therefore, the project design intends to detain all surface storm water on-site via the proposed detention basins.

In order to annex the Village at SouthHill into the City of Grass Valley, the proposed project includes the annexation of 75 acres of land between the SouthHill property and the city limits. This Annexation Area is designated as Commercial and Business Park per the City's 2020 General Plan.

1.4 PURPOSE

The purpose of the geologic hazards evaluation is to identify potential geologic hazards at the proposed Village at SouthHill site, to provide information about seismicity, and to provide preliminary seismic design criteria. This geologic hazards investigation report was prepared to facilitate planning and development by providing a description of geologic and geotechnical conditions at the site.

1.5 SCOPE OF SERVICES

To prepare this report, H&K performed a geologic hazards investigation that included a literature review and review of subsurface data obtained during H&K's previous investigations. H&K also reviewed the findings of previous reports prepared by H&K and others, as referenced herein.

Although the proposed Annexation Area is to be annexed to the City as part of the proposed project, development of the parcels within the Annexation Area will be evaluated by the project Environmental Impact Report (EIR) at a programmatic level rather than at the project level. Therefore, this geologic hazards report does not contain specific findings pertaining to development of the Annexation Area.

H&K's scope of services did not include a design-level geotechnical engineering investigation, groundwater flow analysis, nor testing for hazardous materials.

2 SUMMARY OF PREVIOUS INVESTIGATION

2.1 PREVIOUS GEOTECHNICAL INVESTIGATION

H&K (1999) performed a preliminary geotechnical and geologic hazards investigation for the Bear River Mill Site, which included the subject Village at SouthHill site. The investigation included review of historical mining documents, surface reconnaissance, and excavation of 33 exploratory trenches (Nos. 1 through 33 in Appendix A) to depths ranging from 3 to 13 feet below the ground surface (bgs). Exploratory trench locations are depicted on Sheet 1. Remolded swell testing (Table 1) was performed on selected bulk soil samples to determine their expansion indices. Findings and preliminary geotechnical engineering recommendations are presented in H&K's *Preliminary Geotechnical and Geologic Hazards Report for Bear River Mill Site* (August 20, 1999). H&K issued an amendment to the report (January 31, 2000) which discussed shallow mine workings identified in the northeast portion of the site and provided general recommendations for their physical closure.

H&K (2001) performed a preliminary characterization of abandoned mine features at the Bear River Mill Site. H&K's investigation included review of historic maps and publications pertaining to hard rock mining on and near the site, and observation of subsurface conditions in an additional 16 exploratory trenches (Nos. 34 through 49 in Appendix A) to depths ranging from 10 to 23 feet bgs. Findings and recommendations are presented in H&K's *Preliminary Abandoned Mine Site Characterization for Bear River Mill Site, Nevada County, California* (October 3, 2001).

H&K (2005) performed a preliminary geotechnical engineering investigation for proposed improvement of the intersection of State Route 49 and Crestview Drive. Findings are presented in H&K's *Preliminary Geotechnical Engineering Report for Crestview Drive / State Route 49 Intersection, Nevada County, California* (July 13, 2005).

2.2 PREVIOUS ENVIRONMENTAL INVESTIGATION

Environmental investigation and remediation activities have been performed at the site since 1988. The early site investigations focused on the prior release of wood treating chemicals and diesel fuel. Investigation findings and monitoring results were presented in approximately 26 reports prepared by Emcon Associates, Vector

Engineering, Kennedy/Jenks/Chilton Consultants, Inc., Anderson Consulting Group and Sierra Pacific Industries.

Diesel contamination was not detected in site groundwater after 1999. The California Regional Water Quality Control Board (RWQCB) issued a “No Further Action Required” letter pertaining to the diesel fuel release on October 6, 2004.

Concrete and soil impacted by pentachlorophenol (PCP, a fungicide) were removed from the Green Chain Area of the former Bear River Sawmill and disposed at a landfill in 1989 and 1991. Subsequent verification soil sampling was performed by Carlton Engineering, Inc. (Carlton) under the oversight of the California EPA Department of Toxic Substances Control (DTSC). No PCP or other semi-volatile organic compounds were detected in soil samples obtained from the excavation areas. Wood treating chemicals were not reported to have been used at the Valley Veneer Plant and were not detected in soil or groundwater samples collected from that area.

Jensen & Associates (1999) prepared an archeological inventory survey that identified past lumber milling operations. Construction, operation and subsequent demolition of the facilities included substantial re-countouring of the original topography, installation of subsurface pipelines, and construction of log decks, earth dams and settling ponds. Findings are presented in *Archeological Inventory Survey, Bear River Mill Site Development Project, Approximately 135 acres South of Grass Valley, Nevada County, California* (Jensen & Associates, October 19, 1999).

Kennedy/Jenks Consultants (1999) performed a Phase I Environmental Site Assessment (ESA). Findings are presented in *Phase I Environmental Site Assessment, Former Bear River Sawmill and Valley Veneer Facility, Grass Valley, California* (November 22, 1999).

H&K (2001) performed a preliminary characterization of abandoned mine features at the Bear River Mill Site as described above in the *Previous Geotechnical Investigation* section of this report. H&K’s investigation included review of historic maps and publications pertaining to hard rock mining on and near the site, observation of subsurface conditions in 16 exploratory trenches, collection of soil and rock samples, and laboratory analysis for total arsenic, lead and mercury.

H&K (2005) performed an environmental investigation pertaining to the proposed improvement of the intersection of State Route 49 and Crestview Drive. Findings are presented in *Limited Environmental Site Assessment Report for Crestview Drive / State Route 49 Intersection, Grass Valley, California* (July 19, 2005).

Carlton (2005) characterized abandoned mine features at the site and prepared a Removal Action Work Plan (RAWP). Findings are presented in Carlton's *Final Removal Action Workplan, Bear River Mill Site, Grass Valley, California* (September 23, 2005). The RAWP was approved by DTSC in 2005; however, implementation of the RAWP is contingent upon approval and construction of The Village at SouthHill project.

3 GEOLOGIC HAZARDS INVESTIGATION

H&K's evaluation of geologic hazards was based on review of geologic maps and literature, review of regional aerial photographs, site reconnaissance, and review of the findings of previous investigation.

3.1 AERIAL PHOTOGRAPH REVIEW

H&K reviewed aerial photographs dated 1952, 1962, 1987 and 1998 for the site and vicinity provided by Environmental Data Resources, Inc. Copies of the photographs are presented in Appendix B.

The 1952 aerial photograph post-dates the majority of hard-rock gold mining activity in the site vicinity, but pre-dates the reported development of lumber milling facilities at the site. The photograph is of poor resolution and depicts disturbed soil conditions across the eastern and central portions of the site. Structures/and or foundations are faintly visible in the southeastern portion of the site. Roads are visible along the approximate current alignments of State Route 49 and La Barr Meadows Road. Little evidence of development is apparent on adjacent properties in the immediate site vicinity.

The 1962 photograph more clearly depicts graded portions of the site. Vegetation is present only in isolated areas near the western site boundary. Industrial structures and equipment assumed to be associated with lumber milling operations are visible in the central eastern and southeastern portions of the site. Industrial operations to the north of the site are visible, as are structures to the north of the site near the present day McKnight Way interchange.

The relatively poor-quality 1987 aerial photograph post-dates the reported lumber milling activities, and indicates that additional clearing and grading had been performed since 1962. Land to the east of the site, across La Barr Meadows Road, had been cleared. Industrial operations to the north of the site had been expanded. State Highway 49 and the McKnight Way interchange had been constructed.

The 1998 photograph depicts vegetation in much of the previously cleared portions of the site and offers little evidence of continued industrial activity on the site. The industrial activity depicted to the north of the site, as well as general development near the southern boundary of the City of Grass Valley, increased significantly since 1987.

3.2 LITERATURE REVIEW

H&K reviewed geologic maps and literature pertaining to the project site. A list of references is presented in Section 5 of this report. Findings are summarized below.

3.2.1 Soil Survey

The *Soil Survey of Nevada County Area, California* (soil survey) published by the United States Department of Agriculture Soil Conservation Service and Forest Service (1993) depicts three general soil types at the project site: Musick Sandy Loam, Hoda Sandy Loam, and Alluvial Land. Soil types are depicted on Figure 4.

Musick and Hoda soil types dominate the higher, southern portion of the site. Both soil types are characterized by well drained surface soil underlain by weathered granodiorite rock at depths of 5 to 8 feet bgs. Depth to weathered rock will typically be less in cut areas, as was observed during H&K's previous subsurface investigation. Per the soil survey, areas of resistant rock outcrop typically comprise 10% of the total ground surface in areas of Musick and Hoda soil types. H&K observed rock outcrop areas and shallow, resistant rock in the southern and central-western portions of the site.

The soil survey depicts Alluvial Land in the central and eastern portions of the site. Alluvial Land is characterized by clayey soil of slow to very slow permeability. Runoff is typically slow and flooding is common during the rainy season. Clayey alluvial deposits are likely to exhibit high shrink/swell characteristics when subjected to moisture variation. H&K typically observed firm clay and medium dense, clayey silt at depths of 3 to 6 feet bgs in the exploratory trenches excavated in the lower, eastern portions of the site. Standing water, saturated surface soil, and evidence of seasonal flooding was common in these areas, as depicted approximately on Sheet 1.

Soil conditions in the central-eastern portion of the site and the northern end of the site have been altered by previous grading and are not specifically classified by the soil survey. The cut/fill area in the northern end of the site is in an area of Musick Sandy Loam, and the cut/fill area in the central western portion of the site would likely have been classified as alluvial land prior to grading.

3.2.2 Geologic Setting

The site is located in the Sierra Nevada Foothills, on the western side of the Sierra Nevada geomorphic province. The Sierra Nevada province is an elongate, northwest trending structural block that is tilted upward to form a steep scarp above the adjacent Basin and Range province to the east. The western slope of the Sierra Nevada dips gently westward, and extends beneath sediment of the Great Valley province. Continual uplift and erosion of the Sierra Nevada contributes to sediment within the Great Valley.

The western foothills of the Sierra Nevada consist of a complex assemblage of igneous and metamorphic rocks. The regional structure of the foothills is characterized by the north-northwest trending Foothills Fault System, a feature formed during the Mesozoic era (between 65 million and 230 million years before present (MYBP)) in a compressional tectonic environment. A change to an extensional tectonic environment during the Late Cenozoic (last 9 million years) resulted in normal faulting which has occurred coincident with some segments of the older faults near the site.

The California Department of Conservation (1992) indicates that the site is underlain by plutonic rocks. According to Tuminas (1983), the site is underlain by early Cretaceous, La Barr Meadows quartz diorite. The early Cretaceous period encompasses a time frame of approximately 100 to 136 MYBP. Geologic conditions depicted by Johnston (1939) are reproduced in Figure 2.

3.3 SITE INVESTIGATION

H&K performed field reconnaissance and subsurface exploration on August 5 and 6, 1999, and September 12 and 13, 2001. We returned to the site on September 16, 2008 to observe changes in surface conditions since our previous investigations. The ground surface was obscured by dense brush in portions of the site, and access by excavation equipment was limited in some areas due to steep slopes. The site conditions and the soil/rock conditions described below are based on observations made during the surface reconnaissance and exploratory trenching.

3.3.1 General Site Conditions

Dominant vegetation across the site included ponderosa pine, black oak, manzanita, Scotch broom, annual grasses and forbs, and occasional madrone and ceonothus. Vegetation in the lower, western portions of the site included annual grasses and yellow star thistle, as well as a variety of riparian vegetation in marsh areas. Dense brush, including blackberry and Scotch broom, restricted access to the interior of the site east of the ponds, as depicted approximately on Sheet 1.

Dense manzanita (Photo 1) was present in the southern end of the site. Relatively little vegetation was present in the northern and eastern portions of the site.

Much of the central and northern portions of the site had been previously graded. The grading was predominantly associated with historic lumber milling operations; however, soil may have been exported from the central portion of the site for other purposes. Several fill areas were observed near the perimeter of the graded areas. In general, the fill was relatively loose and contained a significant amount of wood waste.

A significant amount of debris was observed in the vicinity of the historic mill operations (Sheet 1). Reinforced concrete slabs-on-grade, concrete foundations, rubble and debris piles were common in the central east and northeast portions of the site. Many stockpiles in this area contained debris and organic material and would not be suitable for use as structural fill.

Rock fill and stockpiles were common in the central portion of the site. Some of the rock originated from nearby historic gold mining activities. Rock and soil originating from hard rock mining activities has the potential to contain elevated metals concentrations, and is to be addressed by remedial action under the oversight of DTSC prior to site development.

H&K observed several areas of saturated surface soil, standing water or riparian vegetation on the site. Evidence of seasonal ponding and poor drainage was common in the central portion of the property. Two ponds were located near the western property boundary. The earth dam for the larger pond had apparently experienced a significant amount of seepage. The dam had been breached at least once, as evidenced by erosion over the top of the dam. A third, dry pond was identified southeast of the existing ponds.

H&K encountered seepage and/or shallow groundwater at depths of 2 to 8 feet bgs in the alluvial areas, which are located predominantly on the eastern side of the site, and in the vicinity of the ponds on the western side of the site. Seepage was commonly observed along the upper surface of the clay and clayey silt typically found at a depth of approximately 5 feet bgs in the alluvial areas. Evidence of seasonal flooding and soil saturation was common. Seepage and standing water was observed at the ground surface in and near saturated areas, as shown on Sheet 1.

H&K did not encounter groundwater or seepage during excavation of exploratory trenches in the higher, western portions of the site. However, isolated areas of seepage or saturated near-surface soil may be encountered during grading or excavation, particularly during or immediately after the rainy season.

Carlton (2005) reports the results of groundwater investigation at the site near the former Bear River Mill by others during the late 1980s. Groundwater was reported to be first encountered during drilling at depths of 15 to 25 feet bgs. Groundwater generally stabilized in well casings at depths 3 to 10 feet higher than the first encountered depths, suggesting partially confined conditions. The groundwater gradient was reported to be toward the north/northwest, generally following surface topography.

3.3.2 Subsurface Conditions

The soil conditions described in the following paragraphs are generalized, based on a review of subsurface descriptions resulting from H&K's exploratory trenching in 1999 and 2001. Detailed descriptions of subsurface conditions are presented in trench logs 1 through 49 in Appendix A. Trench locations are depicted on Sheet 1.

Stockpiles containing wood debris and other organic material that would be unsuitable for use as structural fill were encountered at locations including exploratory trenches 1, 2, 3, 5 and 9. A typical stockpile is shown in Photo 2. Soil and rock stockpiles that may be suitable, from a geotechnical standpoint, for use as structural fill were encountered at locations such as exploratory trench 8.

Fill containing wood debris and other organic material that would be unsuitable for use as structural fill were encountered at locations including exploratory trenches 13, 14, 15, 16, 17, 22, 24, 42 and 45. Rock and soil fill that may be suitable, from a geotechnical standpoint, for use as structural fill was observed in exploratory trenches 10, 11, 23, 27, 37, 41 and others.

Shallow saturated soil conditions were encountered at locations including exploratory trenches 4 and 7. Shallow resistant rock was encountered in exploratory trench 12. Potentially expansive soil was encountered at locations including trenches 4, 10, 14, 15 and 19.

3.3.3 Past Lumber Milling Operations

Numerous debris stockpiles and several fill areas (Sheet 1) resulted from historic milling operations. The three ponds in the western portion of the site were associated with milling activities.

Concrete slabs-on-grade up to 14 inches thick covered the ground surface across much of the former Bear River Sawmill location (Photos 3 and 4). Reinforcement in the slabs and walls, where exposed, consisted of No. 5 rebar. Steel up to ⅞ inches thick was embedded in the concrete slabs. Several stockpiles of broken concrete and other debris were observed in the vicinity of the mill site. An adjacent concrete foundation exposed in exploratory trench 11 extended from 2 feet to deeper than 8 feet bgs. Shallow fill was common in the area of the mill site. H&K observed layers of gravel, clay, clean sand, and organic debris to depths of approximately 6 feet bgs near the mill site.

Asphalt pavement and several concrete slabs-on-grade covered the ground surface at the former Valley Veneer Plant location (Photos 5 and 6). Slab thickness was at least 12 inches. Fill underlies the west side of the southern concrete slab. Backhoe access to the slope was limited; however, the fill may be more than 10 feet deep based on local topography. Other minor fill areas may be present in the vicinity of the plant.

3.3.4 Existing Fill Areas

H&K encountered several significant fill areas and numerous smaller fills during previous field investigations. The larger fill areas are discussed below.

Exploratory trenches 13 through 15 were excavated into fill which, based on local topography, may encompass an area greater than 200 feet in diameter and may extend further to the east. In general, the fill consisted of medium to dark brown, sandy silt interbedded with abundant peat and wood debris. The fill extended to depths of approximately 7 to 9 feet bgs in exploratory trenches 13 through 15 and was underlain by blue-grey, firm clay. A corrugated metal culvert was encountered at a depth of approximately 8 feet bgs in exploratory trench 13.

Exploratory trenches 16 through 18 were excavated in and near a relatively large fill area near the western site boundary. Based on local topography, the fill extends approximately 250 feet along a west-facing slope and continues approximately 100 feet east of the hinge point of the slope. Near the hinge point of the slope, the fill was more than 13 feet deep. In general, the fill consisted of medium brown to dark brown, sandy silt interbedded with layers of peat and wood debris. Logs up to 16 inches in diameter were encountered during excavation in the fill.

Exploratory trench 21 was excavated in a cut and fill area. The approximately 1:1, horizontal:vertical (H:V) cut slope on the southern side of the area was approximately 10 to 12 feet high. The fill slope on the northern side of the area was approximately 10 to 15 feet high. Based on local topography, the graded area consisted predominantly of cut native soil. The native soil was derived from residually weathered rock and was described as orange-brown, silty sand.

Exploratory trenches 23, 45 and 46 were excavated in a relatively deep, rock fill area located northwest of the former Bear River Sawmill location. In general, the fill consisted of angular rock to 18 inches in diameter. Three apparently abandoned electrical conduits were observed in the trench at a depth of approximately 2.5 feet bgs. A perforated, corrugated, 18 to 24-inch diameter metal pipe was observed at a depth of approximately 4 feet bgs. The excavation was terminated at a depth of 8 feet bgs due to extensive caving. The rock fill is located in a natural drainage swale that would flow northwest towards the ponds. The open graded rock and perforated metal pipe are likely components of a subsurface drain for the area.

We observed miscellaneous fill and soil stockpiles around the perimeter of the graded areas in the central and northern portions of the site. Exploratory trench 8 was excavated in one of the larger soil stockpiles. Soil revealed in the approximately 8-foot-high stockpile was classified as orange-brown, clayey silt with variable fine sand and minor isolated pockets of wood debris. Selective borrow may be possible from soil stockpiles of this composition, provided that the stockpiles do not contain elevated concentrations of metals or other environmental contaminants.

Numerous debris stockpiles were observed throughout the graded areas in the central and northern portions of the site. Exploratory trenches 1, 2, 3, 5, 9, 28, 29 and 32 were excavated in debris stockpiles that appeared to be representative of other stockpiles in the immediate vicinity. The majority of the debris stockpiles observed contained a significant amount of wood waste and would not be suitable for use as structural fill. A number of shallow rubbish fills were also observed throughout the site. Some of the more notable areas of debris and rubbish observed at the site are noted on Sheet 1.

3.3.5 Existing Earth Dams

A former pond (Pond 1; Photo 7) and two existing ponds were located near the western site boundary. Per the Master Plan (SCO, 2007) the two existing ponds are to be renovated as part of site development. The smaller, southern pond (Pond 2; Photo 8) was approximately 0.1 acre in area and was retained by an earth dam along its northern and eastern shores. The pond was dry at the time of H&K's September 2008 site reconnaissance. The earth dam was approximately 225 feet long and approximately 12 feet wide at its crest. The down slope height of the dam was approximately 25 to 30 feet. The outlet structure (Photo 9) consisted of a 24-inch diameter, corrugated metal pipe whose outfall was directed towards a defunct water conveyance structure that apparently transported water to the adjacent Pond 3.

The larger, northern pond (Pond 3; Photo 10) was approximately ½ acre in area and was retained by an earth dam along its western boundary. The earth dam was approximately 300 feet long and approximately 10 feet wide at its crest. The down slope height of the dam was approximately 25 to 30 feet. The outlet structure for the larger pond consisted of a 30-inch diameter corrugated metal pipe located near the northern end of the dam. The outlet structure discharged to an eroded, partially rock lined, earth swale that drained to the southwest. The earth dam appeared to have experienced a significant amount of seepage. The dam had been breached at least once, as evidenced by erosion over the top of the dam.

3.3.6 Past Mining Operations

The site is located in the Grass Valley Mining District. This district was an area of intensive gold mining activities dating back to 1849 when placer gold deposits were discovered in the sediments along Wolf Creek and nearby drainages.

Hard rock mining in the area began in the early 1850s. Uren (1897) depicts three mining properties located along the northern and eastern edges of the subject site, including the Galena, Smuggler and Yukon Jack mines. No shafts associated with those mines were depicted on the 1897 map. Logan (1930) indicates that Bullion Consolidated Mining Company holdings encompassed the northern and eastern portions of the site, as well as land to the north and east of the site. The Bullion Shaft is depicted across present day La Barr Meadows Road, approximately 400 feet to the east of the site.

The apparent portal location of the Bullion Shaft was observed east of La Barr Meadows Road. The mining maps indicate that the shaft dips to the east away from the subject site. Relic foundations for the shaft headworks were observed on both sides of La Barr Meadows Road.

According to the California State Mining Bureau (1918 and 1940), the Bullion Shaft was advanced along a 1- to 5-foot wide vein of gold-bearing quartz which dipped to the east (away from the site). The ore contained free gold, pyrite and “considerable amounts of galena” (lead sulfate). The shaft reached an inclined depth of at least 1,700 feet and reportedly ceased operating after 1906. A 10-stamp mill was located on the Bullion property.

Johnston (1939; Figure 2) indicates that the site is generally underlain by plutonic rocks without significant gold-bearing veins, except for the eastern-dipping veins exploited by the Bullion mine near the eastern property boundary, as discussed below. The Diamond tunnel, Bullion shaft and Alaska shaft are depicted near the site boundaries.

H&K reviewed anonymous and undated maps of mine workings associated with legal proceedings from the United States Circuit Court of Appeals for the Ninth Circuit in the late 1930s. According to an undated map of the surface and upper workings of the Bullion Mine at the apex of the Galena Lode, the apex of the lode within the Galena Claim roughly follows La Barr Meadows Road along the eastern edge of the site. The Bullion Shaft is shown approximately 80 feet east of La Barr Meadows Road.

One of the maps (Figure 3) indicated that approximately 90 feet of horizontal tunnels (labeled as 71 and 72 on the map) and one vertical shaft (70) are located on the site. The horizontal tunnels were labeled as part of the “30" Level, which is likely to be located less than 30 feet below ground surface, because distance to a level was typically measured along an inclined shaft. A series of surface excavations (A11, A12, A12½, A 13 and A14) and related stockpiles were also shown on the site, farther south along the eastern site boundary.

The map also indicates that a second vertical shaft (80) and approximately 25 feet of horizontal tunnel (81) are located on the eastern edge of the property. The shaft and tunnel are not depicted as being connected to other workings. It is likely that the tunnel is located on the “30" level. Exploratory trench 40 was excavated in an east-west orientation immediately south of the approximate location of shaft 80 as shown on Figure 3. An apparent mine adit was encountered at a depth of 16 to 20 feet bgs in the eastern end of the northern excavation wall. The apparent adit was roughly circular, approximately 4 feet in diameter, and appeared to be roughly horizontal. Seepage was observed at a depth of approximately 17 feet bgs, and extensive caving was observed in the excavation side wall from 9 to 20 feet bgs. The map also shows extensive workings on the “50" Level and “100" Level near the site.

Rock fill and numerous rock stockpiles in the central portion of the site may have originated from nearby historic gold mining activities. Mine waste impacted by elevated metals concentrations is to be addressed by remedial action prior to site development. The remedial action is to be overseen by DTSC.

The Diamond Tunnel (Figure 2) is located north of the site. MacBoyle (1918) describes the Diamond Claim as being owned by the Bullion Consolidated Gold Mining Company. According to the publication, the Big Diamond vein strikes north 20 degrees west and dips 45 degrees east. The vein was thought to be an extension of the Galena and Bullion vein. The Little Diamond vein dips 48 degrees south and crosses the Big Diamond vein, east to west. The veins outcrop in granodiorite. The publication describes a vertical shaft, an inclined shaft, and a 1000-foot tunnel whose workings extended to a depth of approximately 125 feet, with approximately 1200 feet of exploratory drifts. Crawford (1894) describes shaft development on the Diamond Mining and Development Company claim, but does not describe the Diamond Tunnel. A mill was located on the claim, presumably near the shaft.

Angular rock fill was encountered west, northwest and southwest of an existing concrete slab-on-grade located at the former Valley Veneer Plant location (see exploratory trenches 27, 37, 41, 42 and 43). The rock fill extended to approximately 8 feet bgs at the location of trenches 27 and 37. Granitic and metamorphic rock fragments to 12 inches in diameter with significant mineralization were observed within the fill.

Angular rock fill was also encountered in trenches 23, 45 and 46. Angular rock to 18 inches in diameter was observed within the fill, which was up to approximately 8 feet deep at the location of our trenches. Extensive caving was observed during excavation into the fill.

Exploratory trenches 1, 2, 3, 5, 9 were excavated in debris stockpiles that contained significant amounts of rock. The stockpiles also contained a large amount of soil and wood debris.

A thin layer of rock covered portions of the ground surface along the eastern edge of the northern portion of the site. Granitic and metamorphic rock fragments to 4 inches in diameter were observed.

Carlton (2005) identified an estimated 11,400 cubic yards of mine waste rock that is to be addressed as part of a remedial action under the oversight of DTSC in conjunction with site development. Sheet 2 depicts the reported locations of this rock fill.

3.4 LABORATORY TESTING

Laboratory swell testing was performed as part of H&K's 1999 investigation. Results of swell testing, which was performed on bulk soil samples CB-1, CB-3, CB-6 and CB-9, were used to estimate soil expansion potential when remolded and subjected to an increase in moisture content. The results of swell testing are summarized in Table 1. Test results correspond to expansion potential ranging from very low to very high.

3.5 SITE SEISMICITY

H&K reviewed California Division of Mines and Geology Open File Report OFR96-08, *Probabilistic Seismic Hazard Assessment for the State of California*, and the on-line revisions and the California Geological Survey updates to the report, *2003 California Fault Parameters*. The documents categorize faults as Class A, B, or C. Class A faults are capable of producing large magnitude events, and have a high rate of slip. Class C faults are not capable of producing large magnitude earthquakes, and have a relatively low slip rate. Class B faults are all other type faults. The report indicates only B and C type faults are within 100 kilometers of the subject site.

3.5.1 Alquist-Priolo Fault Zones

The 1997 version of Special Publication 43 (updated 2003), *Fault Rupture Hazard Zones in California*, describes active faults and fault zones (activity within 11,000 years), pursuant to the Alquist-Priolo Earthquake Fault Zoning Act. According to Special Publication 43, the site area is not contained within or near an Alquist-Priolo special studies zone. The Alquist-Priolo Earthquake Fault Zoning Act was passed following the 1971 San Fernando Earthquake and only addresses the hazards associated with surface fault ruptures. Ground shaking, liquefaction, seismically induced slope instability, and other seismic hazards are not addressed by the Alquist-Priolo Act.

3.5.2 Regional Seismic Sources

According to the *California Geological Survey Fault Parameters Map* (2002), the project site is located within the Foothills Fault System that extends approximately 150 miles along the western foothills of the Sierra Nevada.

Foothills Fault System

The Foothills Fault System is a group of northwest trending, steeply dipping to vertical faults whose major tectonic activity occurred in the late Jurassic period (135 to 150 MYBP). The Foothills Fault System is designated as a Class C fault zone, with low seismicity and a low rate of recurrence. The present day hazard is derived from the evaluation of the Foothills Fault System as an areal source, rather than as individual faults. The Foothills Fault system is believed to be capable of producing an earthquake with a maximum magnitude 6.5.

The Fault Activity Map of California and Adjacent Areas (California Division of Mines and Geology, Map No. 6, 1994) shows several known faults in the region that are part of the Foothills Fault System, including the Gillis Hill Fault, Foresthill Fault, Grass Valley Fault, and the Wolf Creek Fault Zone. One branch of the Gillis Hill Fault is within 4 miles of the site. The main branch of the Gillis Hill Fault is located approximately 6 miles east of the project site. The Wolf Creek Fault zone is approximately 1 mile west of the site. The Foresthill Fault is approximately 11 miles east of the site. These three faults are believed to have been most recently active during the Mesozoic era (65 to 230 MYBP). Segments of the Wolf Creek and Bear Mountain Fault Zones located approximately 6, 19 and 26 miles south of the site show evidence of displacement during the late Quaternary period (0.7 MYBP). The Fault Activity Map shows that the Grass Valley Fault lies approximately 2 miles north of the site. The Grass Valley Fault is depicted as either a Pre-Quaternary fault (older than 1.7 million years) or as a fault without recognized Quaternary displacement.

Other Seismic Sources

The California Geological Survey earthquake catalog (2002) identifies other potential seismic sources including the fault zones noted below. Fault hazard sources are typically those within 100 kilometers, or approximately 62.5 miles. The seismic sources within 100 kilometers of the site are designated as areal sources with the hazard distributed over a zone rather than a specific fault or fault strand. The fault zones are shown on the Fault Parameters Map presented as Figure 5.

The Western Nevada Fault Zones 1 through 3 are located in the eastern portion of California and western portion of Nevada between 55 and 96 miles east of the site. The Western Nevada zone is designated as a Class C areal zone that accommodates dextral shear from the Walker Zone, with the hazard distributed over the area of the zone. The Western Nevada Zone is capable of producing earthquakes of magnitude 7.1.

Mohawk-Honey Lake Fault Zones 3, 4, and 5 are located between 48 and 98 miles northeast of the site, north of the Western Nevada Zone. The Mohawk-Honey Lake Fault Zone is designated as a Class C dextral shear zone capable of producing magnitude 7.3 earthquakes.

3.5.3 Historic Seismicity

Several earthquakes have occurred since 1850 which have produced noticeable ground shaking in the vicinity. Some of the earthquakes felt in the area include:

- In 1867, an earthquake with estimated 5.0 magnitude occurred approximately 18 miles east of the site. No details about the earthquake were available.
- The Dunnigan Hills Fault, located approximately 54 miles southwest of the project site, is believed to be the source of the 1892 Vacaville-Winters earthquake.
- In 1909, two earthquakes with estimated Richter magnitudes of 5.0 to 5.5 occurred approximately 35 miles west-northwest of Nevada City.
- An earthquake with magnitude 6.0 on the Dog Valley fault, located near Stampede Reservoir approximately 70 miles northeast of the site, produced noticeable shaking and ground rupture in 1966.
- In 1975, a magnitude 6.2 earthquake occurred on the Cleveland Hill fault, located within the Foothills Fault System approximately 36 miles west of the site. The event was strongly felt in the Grass Valley/Nevada City area; however, no major damage or injuries were reported.
- The October 17, 1989 Loma Prieta Earthquake, measuring 7.1 magnitude and centered near Santa Cruz, produced ground shaking as far east as Reno, Nevada.
- An unnamed fault located near Emigrant Gap, approximately 13 miles east of the site, has been the source of several small earthquakes since 1989 which produced ground shaking in the Nevada City area.

3.5.4 Seismic Design Parameters

The seismic design parameters provided in Table 3.5.4.1 below are for planning purposes only and should be confirmed by a design-level geotechnical investigation. The seismic design criteria are based on Section 1613 of the 2007 California Building Code, CCR Title 24, Part 2, and were calculated using the United States Geological Survey (USGS) *Java Ground Motion Parameter Calculator, Earthquake Ground Motion Tools, Version 5.0.8*.

3.5.4.1 - Seismic Design Parameters

Description	**Value**	**Reference**	**Description**	**Value**	**Reference**
Latitude Longitude	39.1876 -121.0448	1	Site Class	D	2
Site Coefficient, F_A	1.393	6	Site Coefficient, F_V	2.009	7
Short (0.2 sec) Spectral Response, S_S	0.509*g*	3, 5	Long (1.0 sec) Spectral Response, S_1	0.198*g*	4, 5
S_S modified for Site Class Effects, S_{MS}	0.708*g*	8, 5	S_1 modified for Site Class Effects, S_{M1}	0.397*g*	9, 5
Design Short Spectral Response, S_{DS}	0.472*g*	10, 5	Design Short Spectral Response, S_{D1}	0.265*g*	11, 5

References:

1. *USGS 7.5 min*
2. *2007 CBC, Table 1613.5.2*
3. *CBC Figure 1613.5(3)*
4. *CBC Figure 1613.5(4)*
5. *USGS Uniform Hazard Response Spectra, v 5.0.8 (ASCE 7 Standard, 2005)*
6. *2007 CBC, Table 1613.5.3(1)*
7. *2007 CBC, Table 1613.5.3(2)*
8. *2007 CBC, Equation 16-37*
9. *2007 CBC, Equation 16-38*
10. *2007 CBC, Equation 16-39*
11. *2007 CBC, Equation 16-40*

H&K's classification of the native on-site soil was based on field observation of subsurface conditions revealed in the previous exploratory trenches. The on-site soil consists of fine-grained and granular soil composed of clay, silt, sand, and gravel derived from weathering of the underlying, variably weathered, granodiorite rock. Based on the presence of residual silt and clay, we used a generalized soil classification of low plasticity silt (ML) and used Site Class D for the soil profile. A design-level report may reveal that a more favorable site class is appropriate for the site, depending on the deeper subsurface conditions encountered.

4 GEOLOGIC HAZARDS

Based on the findings of H&K's surface reconnaissance and subsurface investigations, and review of aerial photographs and published documents, H&K considered the following potential geological hazards for the site. Generalized locations associated with potential geologic hazards are depicted on Sheet 2.

4.1 SEISMIC HAZARDS

As described in Section 3 of this report, the project site is located within the Foothills Fault System and is not contained within or near an Alquist-Priolo special studies zone. H&K's opinion is that ground rupture and surface faulting at the site is not likely. The site may experience moderate ground shaking caused by earthquakes occurring along offsite faults. Earthquakes may cause cracking of concrete slabs, building walls, and pavement at the site. Secondary seismic hazards are discussed below.

4.1.1 Secondary Seismic Hazards

Ground motions may initiate secondary events such as differential compaction, liquefaction, seismically induced flooding, landslides, or seiches within large bodies of water. The likelihood of secondary seismic hazard impacts will be reduced if site grading is performed in accordance with the recommendations of a geotechnical engineering report and the California Building Code.

Differential Compaction

Major seismic shaking of loose, non-uniform soil can initiate differential soil compaction. The majority of the site is underlain by dense soil and weathered rock, and the potential hazard of differential compaction in a large earthquake is low. However, areas of existing, loose fill are present on the site and may be subject to seismically induced settlement. To avoid creating an environment for differential compaction, site grading should be performed in accordance with the recommendations of the geotechnical report. Over-excavation and replacement of loose soil, removal of organic fill material (Sheet 2), and creation of cut and fill pads should be performed in accordance with the findings of a design-level geotechnical engineering investigation to avoid conditions that would be likely to cause significant differential settlement.

Liquefaction

Soil liquefaction results from loss of bond strength during cyclic loading, such as imposed by earthquakes. Soil most susceptible to liquefaction is generally clean, loose, uniformly graded sandy soil, although gravelly soil, silts, and some clay-rich soil may be prone to liquefaction under certain conditions. The majority of on-site soil is derived from weathering of granitic rock and is not typically subject to liquefaction. The stability of fill areas and earth dams (Sheet 2) that are to be incorporated into the proposed development should be addressed as part of a design-level geotechnical engineering investigation for the project.

Seismically Induced Flooding

As noted in the Flooding section below, the project is not located within a designated flood hazard zone. The site is separated from potential open water sources by distance and topography. Other than the potential for seismically-induced earth dam instability, as mentioned above, our opinion is that the hazard of seismically induced flooding is low.

Seismically Induced Landslides

H&K did not observe evidence of landslides nor conditions that would be prone to seismically induced landslides. Our opinion is that the hazard of seismically induced landslides is low, provided that the stability of existing fill slopes is addressed as part of a design-level geotechnical investigation as described above.

4.2 FLOODING

Flood Insurance Rate Map 0602100608D, dated February 5, 1997, prepared by the Federal Emergency Management Agency (FEMA), indicates the project site is not situated within a designated special flood hazard area. The map does not necessarily identify all areas subject to flooding from local drainage sources of small size; however, H&K anticipates that localized drainage conditions are adequately addressed in the project development plans to reduce the risk of localized flooding.

4.3 LANDSLIDES

H&K observed no evidence of past slope failure at the Village at SouthHill site, other than localized erosion, and slumping and settlement of fill slopes containing loose fill and/or organic materials. H&K's opinion is that, in general, the landslide hazard at the site is low. H&K does not anticipate that the proposed improvements are likely to be affected by possible landslides on adjacent property. The stability of existing earth dams and fill slopes (Sheet 2) that are to be incorporated into the proposed site development should be evaluated as part of a design-level geotechnical investigation for the project.

4.4 SLUMPS OR LAND SUBSIDENCE

The Village at SouthHill site is primarily underlain by soil originating from completely weathered rock. Such residual soil generally does not present a hazard of slumping or subsidence. However, H&K observed several areas of existing, untested fill (Sheet 2) and soft alluvial sediment (Sheet 2) that may not be suitable for support of site improvements.

The vertical and lateral extent of these areas has not been completely characterized. H&K did not review density testing results associated with existing fill at the site. Based on the general condition of the fill and the early date of its placement, such testing was not likely performed.

Some of the fill areas contain organic materials that are not suitable for support of site improvements. Existing fill and sediment that is to be incorporated into the proposed development should be evaluated as part of a design-level geotechnical investigation for the project. Fill material that has been deemed suitable for use as engineered fill will likely need to be reworked as part of site grading.

Loose fill and organic materials beneath foundations may contribute to future settlement-induced distress. Slopes comprised of loose fill or organic materials may increase the risk of erosion, slumping and slope failure. Options to mitigate loose or organic-rich fill include fill excavation and replacement, the use of deep foundations or mat foundations, and deep dynamic compaction.

4.5 EXPANSIVE SOIL

Clayey, potentially expansive soil was encountered in trenches 4, 10, 14, and 15 (Sheet 1), which were excavated in an area mapped as alluvium (Sheet 2) in the central-eastern portion of the site. The results of laboratory swell testing performed as part of H&K’s 1999 investigation indicates that some of the soil tested has high expansion potential. The presence of potentially expansive soil within proposed improvement areas should be evaluated as part of a design-level geotechnical investigation for the project, and recommendations for mitigation of expansive soil should be based on the findings of the investigation.

4.6 SOIL CORROSION

Based on H&K's experience in the area, H&K does not anticipate that the site soil will exhibit significant sulfate content or corrosion potential. To confirm this, site soil should be tested for corrosion potential as part of a design-level geotechnical engineering investigation.

4.7 VOLCANIC HAZARDS

According to the US Geological Survey Map of Potential Areas of Volcanic Hazards (Miller, 1989), the property is not within a recognized active volcanic area. The nearest known active volcanic zone is the Mt. Lassen area, located approximately 80 miles northwest of the site.

4.8 NATURALLY OCCURRING ASBESTOS

Naturally occurring asbestos commonly occurs in geologic settings dominated by ultramafic rock and serpentinite. Ultramafic rock and serpentinite are not known to occur at the site, and the underlying granitic rock formation is typically not associated with naturally occurring asbestos. Naturally occurring asbestos was not identified as a constituent of concern for the mine waste rock at the site that originated from hard rock gold mining operations east of the site. H&K's opinion is that the likelihood of encountering naturally occurring asbestos at the site is low.

4.9 UNUSUAL OR EXCEPTIONAL CONDITIONS

4.9.1 Shallow Mining Excavation

Areas of recorded shallow mining excavation near the eastern site boundary are depicted on Sheet 2. H&K (2000) provided general recommendations pertaining to the physical closure of shallow mining excavations. The applicability of these general recommendations to the proposed site development should be confirmed as part of a design-level geotechnical investigation.

4.9.2 Elevated Metals Concentrations

According to the Master Plan (SCO, 2007), environmental conditions associated with past mining and milling activities are to be mitigated as part of a purchase agreement and pursuant to a Voluntary Cleanup Agreement (VCA) with the DTSC. Elevated concentrations of metals in mine waste at the site are considered to present a potential health concern in the event of routine exposure resulting from incidental ingestion, dust inhalation and dermal contact with affected soil. Carlton

(2005) identified approximately 11,000 cubic yards of mine waste (Sheet 2) that are to be consolidated at the site beneath a roadway or parking lot, away from surface water drainage courses, and capped with a low-permeability material. The placement location is to be surveyed, and a deed restriction is to be filed with the Nevada County Recorder's office. The cleanup plan was approved by DTSC in 2005; however, the final remedial design and cleanup are contingent upon approval and construction of The Village at SouthHill project. As outlined by SCO (2007), the following environmental remediation activities are to be performed in conjunction with grading of the site:

- Obtain approval of the final remedial design from the DTSC.
- Manage mine waste in accordance with the remedial design and document conformance.
- File a Completion Report with the DTSC.
- Survey the mine waste placement area and record deed restriction accordingly.
- Prepare an Operations and Maintenance Agreement (OMA) and obtain OMA approval from the DTSC. The OMA will identify requirements for periodic inspection and water quality monitoring.
- Obtain "Certification" of the site from the DTSC, which is subject to 5-year reviews.

4.9.3 Other Potential Conditions

H&K did not evaluate the site for the presence of radon, onsite septic systems, or high nitrate concentrations. H&K anticipates that the potential for these environmental conditions was considered as part of the site's long history of regulation by the RWQCB and DTSC. If unusual or exceptional conditions are encountered during site development, such conditions should be evaluated at that time.

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6 LIMITATIONS

The following limitations apply to the findings, conclusions and recommendations presented in this report:

1. H&K’s professional services were performed consistent with the generally accepted geotechnical engineering principles and practices employed in northern California. This warranty is in lieu of all other warranties, either expressed or implied.

2. These services were performed consistent with our agreement with our client. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of our services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this report. This report is solely for the use of our client unless noted otherwise. Any reliance on this report by a third party is at the party's sole risk.

3. If changes are made to the nature or design of the project as described in this report, then the conclusions and recommendations presented in this report should be considered invalid. Only our firm can determine the validity of the conclusions and recommendations presented in this report. Therefore, we should be retained to review all project changes and prepare written responses with regards to their impacts on our conclusions and recommendations. However, we may require additional fieldwork and laboratory testing to develop any modifications to our recommendations. Costs to review project changes and perform additional fieldwork and laboratory testing necessary to modify our recommendations are beyond the scope of services presented in this report. Any additional work will be performed only after receipt of an approved scope of services, budget, and written authorization to proceed.

4. The analyses, conclusions and recommendations presented in this report are based on site conditions as they existed at the time we performed our surface and subsurface field investigations, as well as review of information provided by others. We have assumed that the subsurface soil and groundwater conditions encountered at the location of our exploratory trenches are generally representative of the subsurface conditions throughout the entire project site. However, the actual subsurface conditions at locations between and beyond our exploratory trenches may differ. Therefore, if the subsurface conditions encountered during construction are different than those described

in this report, then we should be notified immediately so that we can review these differences and, if necessary, modify our recommendations.

5. The elevation or depth to groundwater underlying the project site may differ with time and location.

6. The project site map shows approximate exploratory trench locations as determined by pacing distances from identifiable site features. Therefore, the t locations should not be relied upon as being exact nor located with surveying methods.

7. Hazardous materials associated with historic mining and processing, as well as past chemical release, have been identified at the site. Project personnel should be careful and take the necessary precautions should hazardous materials be encountered during construction.

8. The findings of this report are valid as of the present date. However, changes in the conditions of the property can occur with the passage of time. The changes may be due to natural processes or to the works of man, on the project site or adjacent properties. In addition, changes in applicable or appropriate standards can occur, whether they result from legislation or the broadening of knowledge. Therefore, the recommendations presented in this report should not be relied upon after a period of two years from the issue date without our review.

TABLES

Table 1 Laboratory Expansion Index Test Results

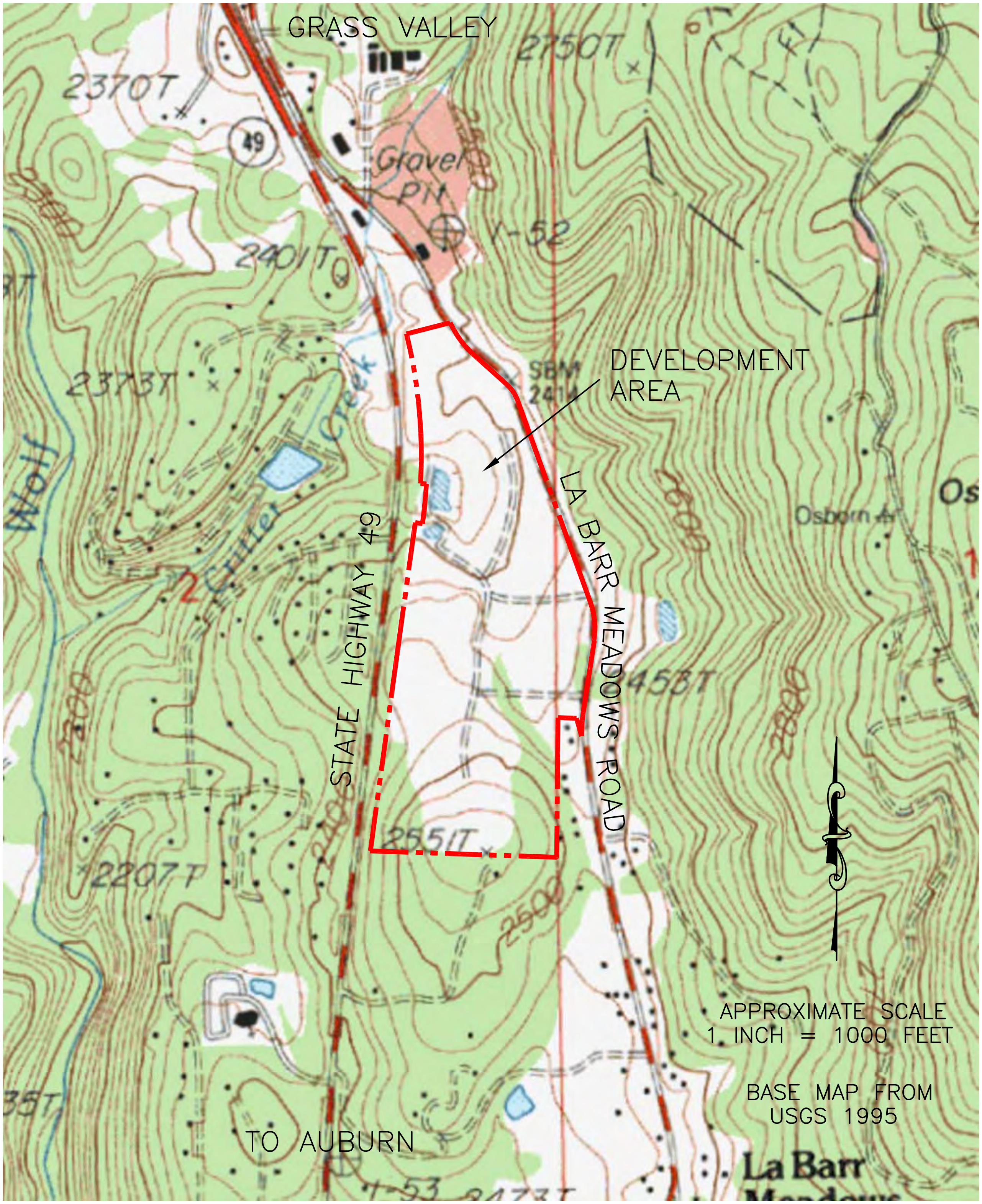
Table 1. Laboratory Expansion Index Test Results

Sample Number	Trench Number	Sample Depth (feet)	Swell (%)	Estimated Expansion Potential
CB-1	4	0.75-1.5	1.8	Very low
CB-3	4	3.5-4.25	11.2	High
CB-6	10	4.0-4.75	13.6	Very high
CB-9	19	0.75-1.5	1.2	Very low

Note:

The samples were remolded to approximately 90% of the ASTM D 1557 maximum dry density at a moisture content below the optimum. The remolded sample was confined in a 1.0-inch thick ring and loaded with a 144 psf surcharge. The remolded sample was immersed in water, and the swell (or settlement) of the sample was measured with a dial micrometer until the micrometer readings stabilized.

FIGURES



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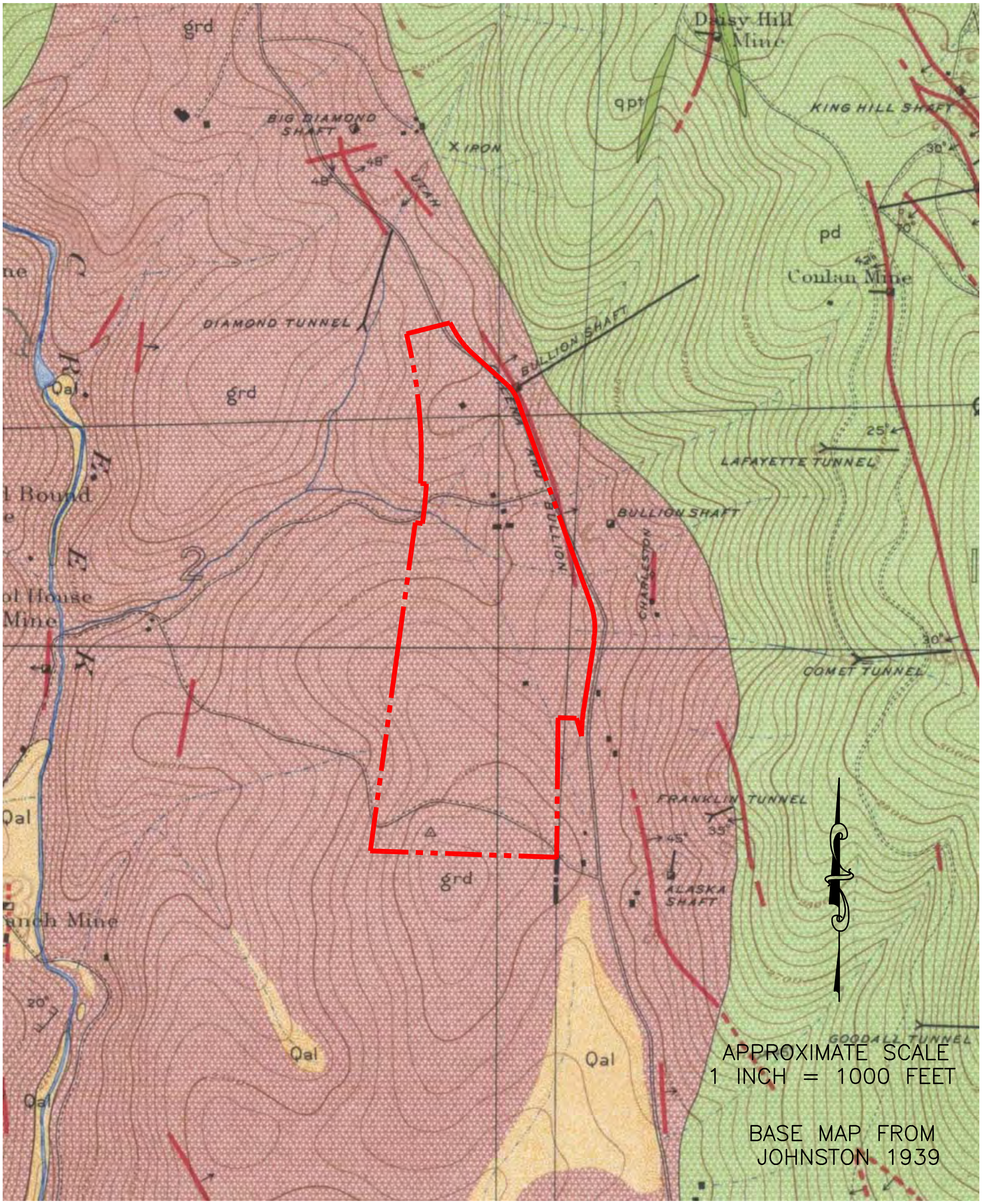
LOCATION MAP

THE VILLAGE AT SOUTHHILL

NEVADA COUNTY, CALIFORNIA

PROJ NO.: 3594-01
DATE: SEPTEMBER 2008
FIGURE NO.: 1



APPROXIMATE SCALE
1 INCH = 1000 FEET

BASE MAP FROM
JOHNSTON 1939

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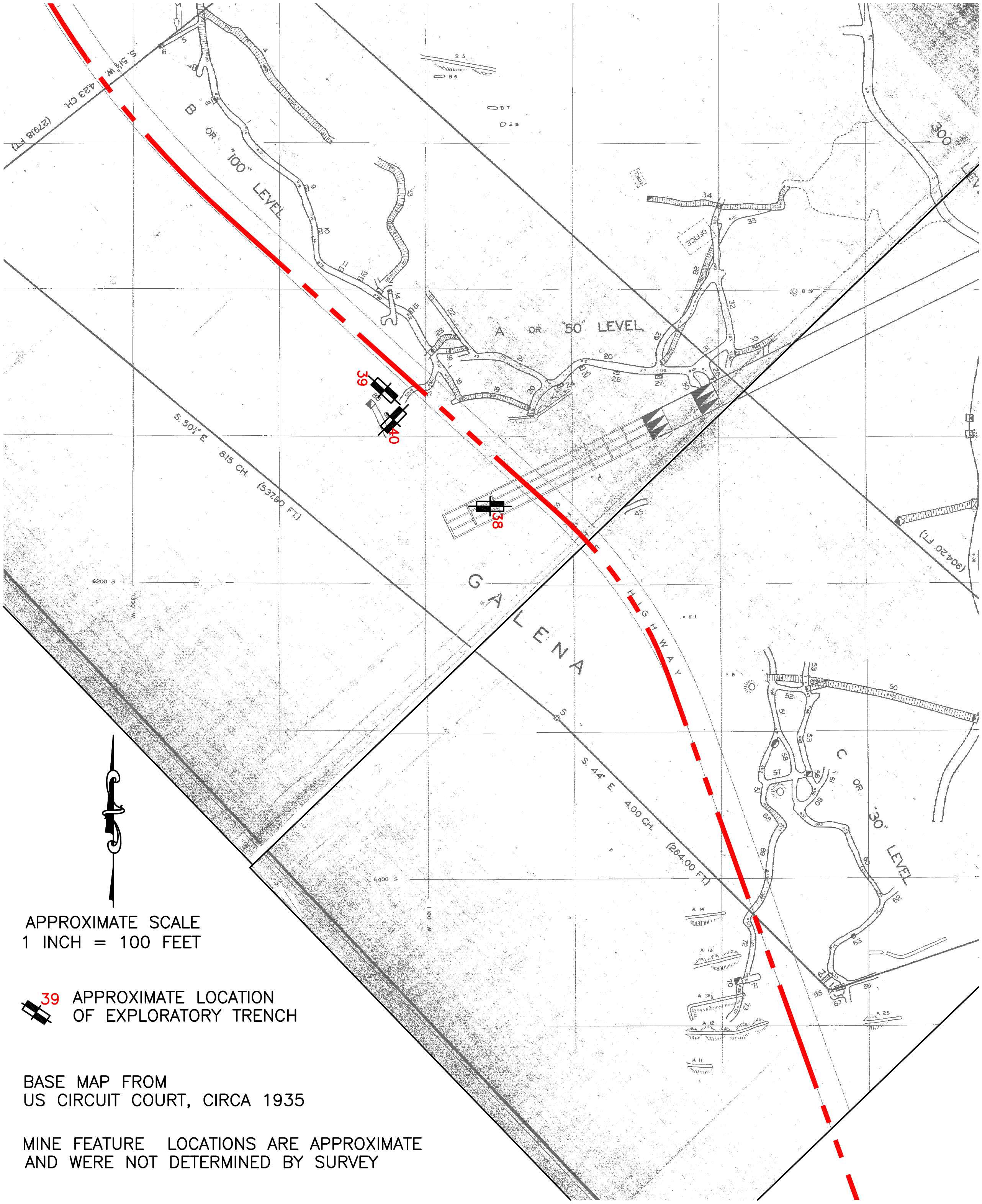
1939 USGS TOPOGRAPHICAL MAP
THE VILLAGE AT SOUTHHILL
NEVADA COUNTY, CALIFORNIA

PROJ NO.: 3594-01
DATE:SEPTEMBER 2008
FIGURE NO.: 2



APPROXIMATE SCALE
1 INCH = 100 FEET

39 APPROXIMATE LOCATION
OF EXPLORATORY TRENCH

BASE MAP FROM
US CIRCUIT COURT, CIRCA 1935

MINE FEATURE LOCATIONS ARE APPROXIMATE
AND WERE NOT DETERMINED BY SURVEY

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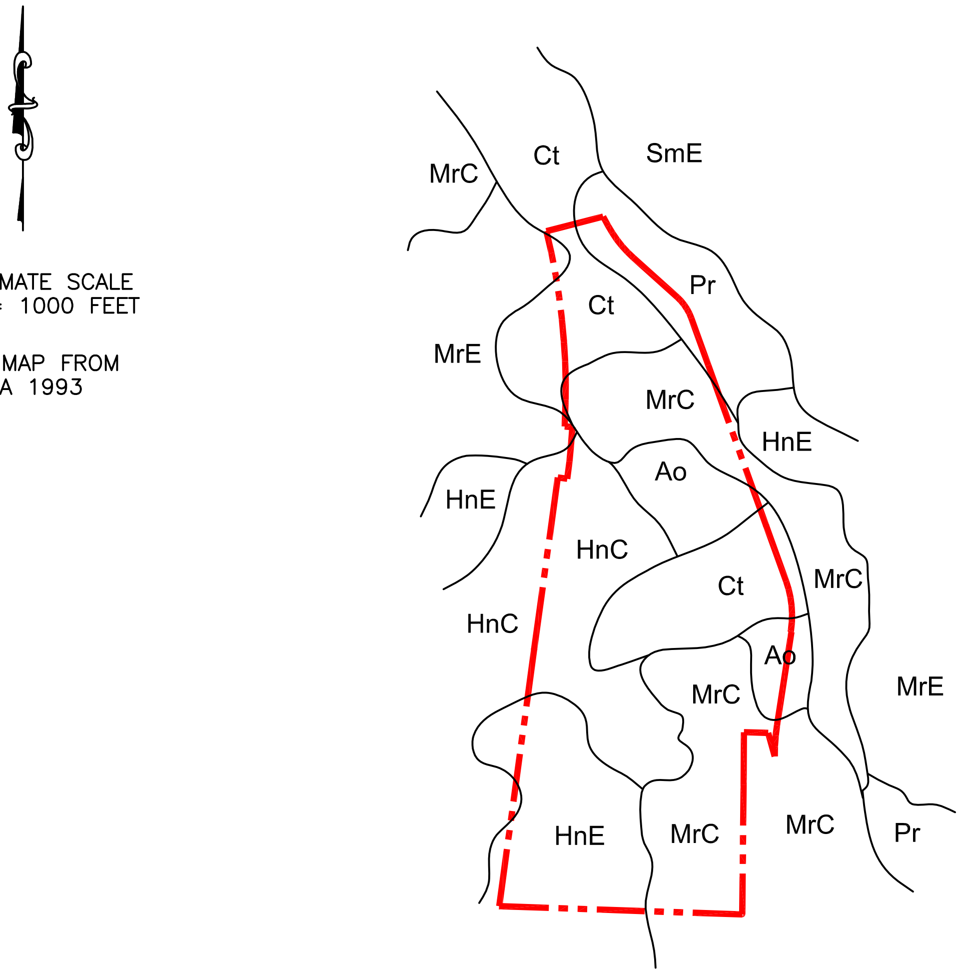
BULLION MINE UPPER WORKINGS
THE VILLAGE AT SOUTHHILL
NEVADA COUNTY, CALIFORNIA

PROJ NO.: 3594-01
DATE: SEPTEMBER 2008
FIGURE NO.: 3



LEGEND

Ao	ALLUVIAL LAND, CLAYEY, 0-15% SLOPES
Ct	CUT AND FILL LAND, 0-50% SLOPES
HnC	HODA SANDY LOAM, 9-15% SLOPES
HnE	HODA SANDY LOAM, 15-50% SLOPES
MrC	MUSICK SANDY LOAM, 5-15% SLOPES
MrE	MUSICK SANDY LOAM, 15-50% SLOPES
Pr	PLACER DIGGINGS
SmE	SITES VERY STONY LOAM, 15-30% SLOPES

SOIL TYPES BASED ON SOIL SURVEY OF THE NEVADA COUNTY AREA, CALIFORNIA (USDA SOIL CONSERVATION SERVICE, 1993)

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SOILS MAP

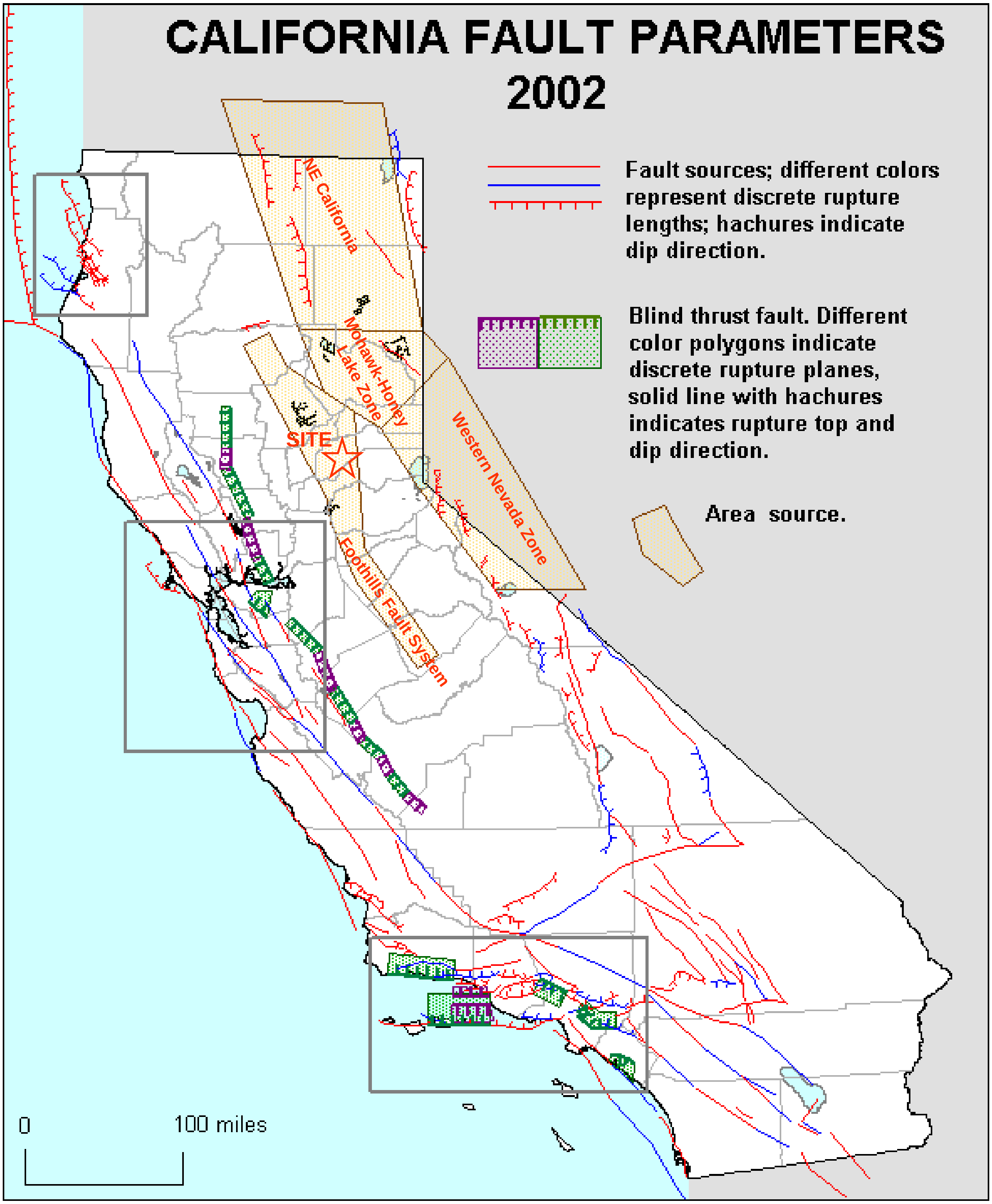
THE VILLAGE AT SOUTHHILL

NEVADA COUNTY, CALIFORNIA

PROJ NO.: 3594-01

DATE: SEPTEMBER 2008

FIGURE NO.: 4



Source: California Geological Survey, 2002, Interactive Fault Parameters Map
http://www.consrv.ca.gov/CGS/rghm/psha/fault_parameters/htm/index.htm

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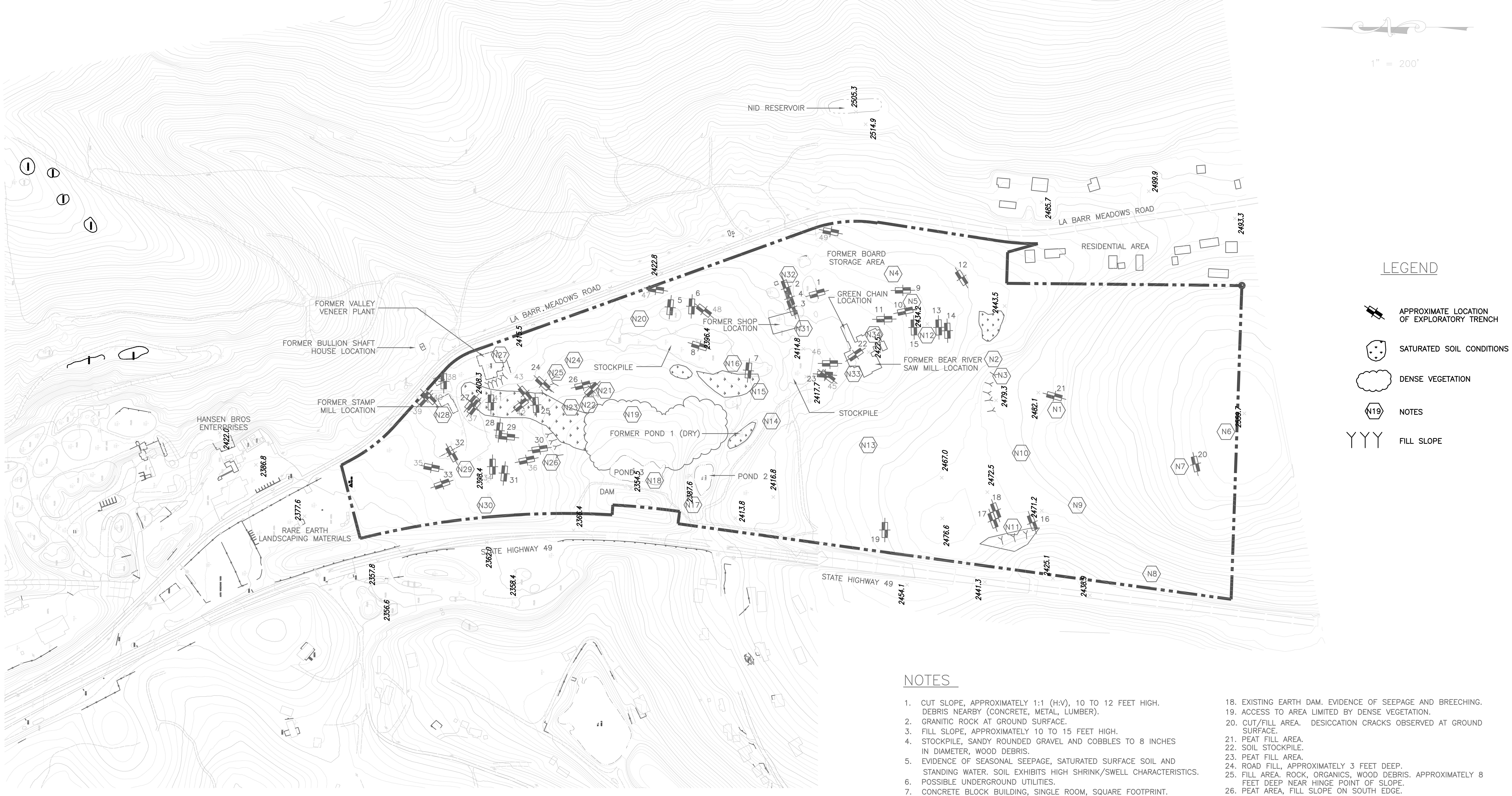
REGIONAL FAULT MAP
THE VILLAGE AT SOUTHHILL
GRASS VALLEY, CALIFORNIA

FIGURE 5
PROJECT NO. 3594-01
OCTOBER 2008

SHEETS



NOTES

1. CUT SLOPE, APPROXIMATELY 1:1 (H:V), 10 TO 12 FEET HIGH. DEBRIS NEARBY (CONCRETE, METAL, LUMBER).
2. GRANITIC ROCK AT GROUND SURFACE.
3. FILL SLOPE, APPROXIMATELY 10 TO 15 FEET HIGH.
4. STOCKPILE, SANDY ROUNDED GRAVEL AND COBBLES TO 8 INCHES IN DIAMETER, WOOD DEBRIS.
5. EVIDENCE OF SEASONAL SEEPAGE, SATURATED SURFACE SOIL AND STANDING WATER. SOIL EXHIBITS HIGH SHRINK/SWELL CHARACTERISTICS.
6. POSSIBLE UNDERGROUND UTILITIES.
7. CONCRETE BLOCK BUILDING, SINGLE ROOM, SQUARE FOOTPRINT.
8. DEBRIS, RUBBISH.
9. POSSIBLE MINE WASTE ROCK.
10. DEBRIS, RUBBISH.
11. FILL AREA. HIGH ORGANIC CONTENT, WOOD DEBRIS. MORE THAN 13 FEET DEEP NEAR HINGE POINT.
12. FILL AREA, HIGH ORGANIC CONTENT. 6 TO 9 FEET DEEP IN EXPLORATORY TRENCH.
13. GRANITIC ROCK AT GROUND SURFACE.
14. ROADWAY CUT/FILL.
15. EROSIONAL GULLIES DRAIN TO NORTH.
16. SEASONAL SEEPAGE AND SATURATED SURFACE SOIL.
17. RELIC SADDLE FOUNDATION, WATER CONVEYANCE, OUTLET STRUCTURE.
18. EXISTING EARTH DAM. EVIDENCE OF SEEPAGE AND BREECHING.
19. ACCESS TO AREA LIMITED BY DENSE VEGETATION.
20. CUT/FILL AREA. DESICCATION CRACKS OBSERVED AT GROUND SURFACE.
21. PEAT FILL AREA.
22. SOIL STOCKPILE.
23. PEAT FILL AREA.
24. ROAD FILL, APPROXIMATELY 3 FEET DEEP.
25. FILL AREA. ROCK, ORGANICS, WOOD DEBRIS. APPROXIMATELY 8 FEET DEEP NEAR HINGE POINT OF SLOPE.
26. PEAT AREA, FILL SLOPE ON SOUTH EDGE.
27. RELIC CONCRETE SLAB—ON—GRADE, 12 INCHES THICK IN EXPOSED SECTION. FILL TO WEST OF SLAB MAY BE MORE THAN 10 FEET DEEP BASED ON TOPOGRAPHY.
28. CONCRETE SLAB ON GRADE. LIKELY SHALLOW FILL UNDER NORTH PORTION.
29. LOCAL DEPRESSION, SEASONAL PONDING.
30. DEBRIS, RUBBISH.
31. DEBRIS.
32. DEBRIS STOCKPILES. SOIL, ROCK WOOD, CONCRETE, METAL.
33. ROCK FILL AREA, POSSIBLE RELIC SUBDRAIN.
34. RELIC MILL SITE. CONCRETE SLABS ON GRADE TO 14 INCHES THICK WITH #5 REBAR WHERE OBSERVED. STEEL TO 7/8" THICK. CONCRETE WALLS TO 12" THICK WITH #5 REBAR. MISCELLANEOUS PILES OF BROKEN CONCRETE AND DEBRIS.

1 OF 2

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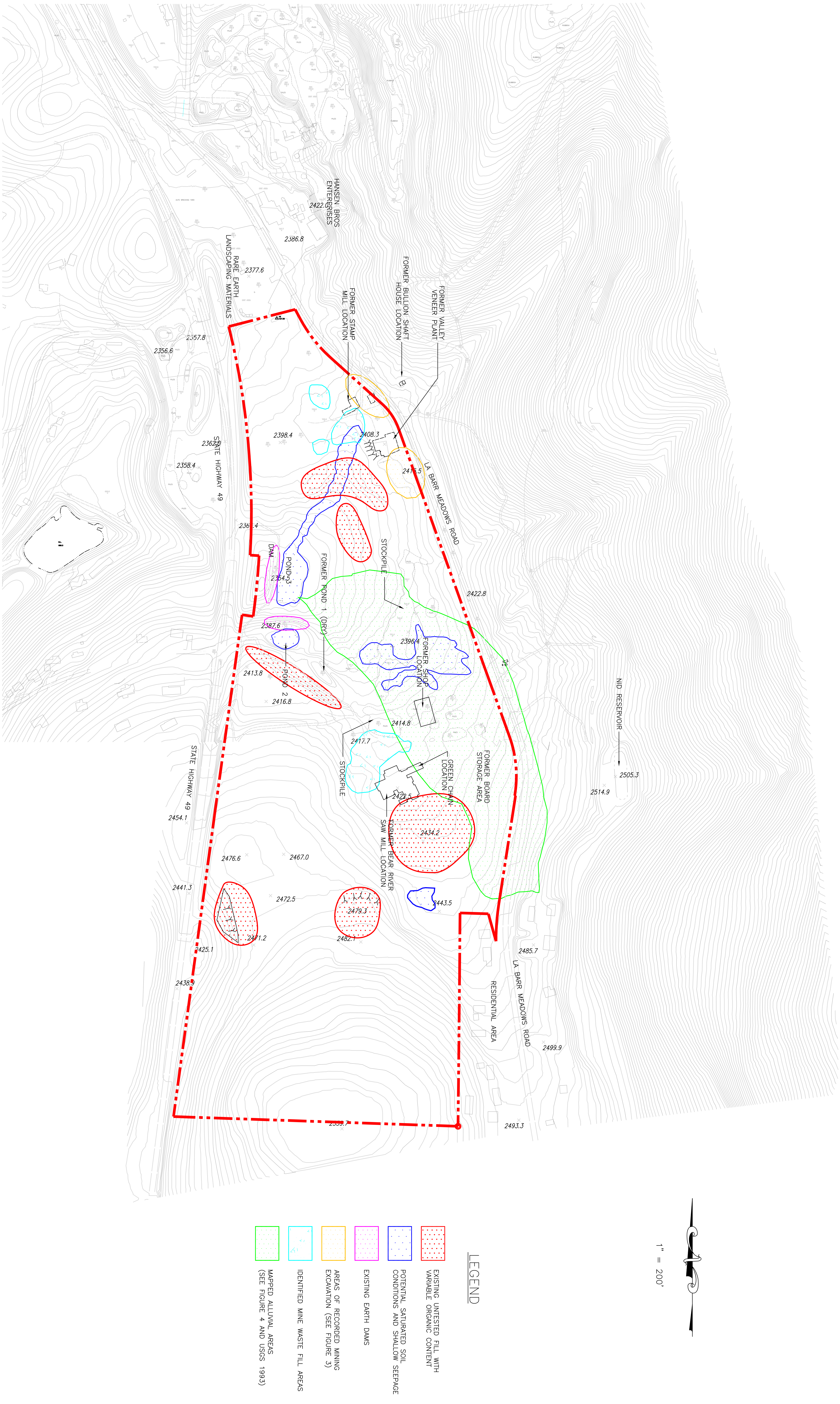
SITE MAP
THE VILLAGE AT SOUTHHILL
NEVADA COUNTY, CALIFORNIA

NO.	REVISIONS	DATE

DESIGNED BY: JWM
DRAWN BY: DFD
DATE: SEPTEMBER 2008
DRAWING NAME: 3594-01.SH1
PROJECT NO.: 3594-01



BASE MAP PREPARED BY
SCO PLANNING AND ENGINEERING, INC.

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GEOLOGIC CONDITIONS
THE VILLAGE AT SOUTHHILL
NEVADA COUNTY, CALIFORNIA

NO.	REVISIONS	DATE

DESIGNED BY: JWM
DRAWN BY: JWM
DATE: SEPTEMBER 2008
DRAWING NAME: 3594-01.SH2
PROJECT No.: 3594-01

APPENDIX A EXPLORATORY TRENCH LOGS

TRENCH 1

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977–01	BEAR RIVER MILL SITE	2425 FEET MSL	8/5/99	1 OF 1	1

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	0 – 7 FEET

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
			0 – 7	▨	OL	DARK BROWN, MOIST, LOOSE SANDY SILT WITH ORGANICS (PEAT, WOOD DEBRIS) AND UP TO 50% SUBANGULAR TO SUBROUNDED GRAVEL AND COBBLES, 3 TO 12 INCH DIAMETER (STOCKPILE IS UNSUITABLE FOR USE AS STRUCTURAL FILL)
			7 – 10			TRENCH TERMINATED AT 7 FEET AT BOTTOM OF STOCKPILE

DEPTH (FT) scale: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

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TRENCH 2

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-01	BEAR RIVER MILL SITE	2425 FEET MSL	8/5/99	1 OF 1	2

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	0 - 7.5 FEET

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)	USCS	DESCRIPTIONS/REMARKS
					DARK BROWN, MOIST, LOOSE SANDY SILT WITH ORGANICS (PEAT, WOOD DEBRIS) AND APPROXIMATELY 10% GRAVEL AND COBBLES, 3 TO 12 INCH DIAMETER (STOCKPILE UNSUITABLE FOR USE AS STRUCTURAL FILL)
			1		
			2		
			3		
				OL	
			4		INTERBEDS OF ORANGE BROWN, MOIST, LOOSE, SILTY SAND WITH ROCK
			5		
			6		
			7		
					TRENCH TERMINATED AT 7.5 FEET NEAR BASE OF STOCKPILE
			8		
			9		
			10		

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TRENCH 3

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977–01	BEAR RIVER MILL SITE	2427 FEET MSL	8/5/99	1 OF 1	3

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	0 – 6.5 FEET

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
						DARK BROWN, MOIST, LOOSE SANDY SILT WITH ORGANICS (PEAT, WOOD DEBRIS), GRAVEL AND COBBLES (3 TO 12 INCH DIAMETER), AND METAL DEBRIS (STOCKPILE UNSUITABLE FOR USE AS STRUCTURAL FILL)
			1			
			2			
			3		OL	
			4			
			5			
			6			
						TRENCH TERMINATED AT 6.5 FEET NEAR BOTTOM OF STOCKPILE
			7			
			8			
			9			
			10			

TRENCH 4

PROJECT NO. 977-01	**PROJECT NAME** BEAR RIVER MILL SITE	**ELEVATION** 2424 FEET MSL	**DATE** 8/5/99	**PAGE** 1 OF 1	**FIGURE NO.** 4

EXCAVATING METHOD CASE 580B EXTENDAHOE	**SAMPLING METHOD** SLIDE HAMMER	**GROUNDWATER ENCOUNTERED** 5 FEET	**CAVED** NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)	USCS	DESCRIPTIONS/REMARKS
					DARK RED BROWN, DRY TO SLIGHTLY MOIST, STIFF, SILTY CLAY TO CLAYEY FINE SAND WITH MINOR GRAVEL
			1	CL	
CB-1 4-1					
			2		RED BROWN, MOIST TO DAMP, MEDIUM, SANDY CLAY WITH GRAVEL
CB-2				CL	
			3		YELLOW BROWN, DAMP TO WET, MEDIUM CLAY WITH MINOR GRAVEL
CB-3			4		
				CH	
			5	▼	STANDING WATER AT 5 FEET
					TRENCH TERMINATED AT 5.5 FEET
			6		
			7		
			8		
			9		
			10		

TRENCH 5

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977–01	BEAR RIVER MILL SITE	2406 FEET MSL	8/5/99	1 OF 1	5

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
						DARK BROWN, MOIST, LOOSE SANDY SILT WITH ORGANICS (PEAT, WOOD DEBRIS) INTERBEDDED WITH MINOR ORANGE BROWN TO YELLOW BROWN, MOIST TO DAMP, LOOSE, CLAYEY SILT (STOCKPILE IS UNSUITABLE FOR USE AS STRUCTURAL FILL)
			1			
			2			
			3			
			4			
					OL	
			5			
			6			
			7			
			8			
			9			TRENCH TERMINATED AT 9 FEET NEAR BASE OF STOCKPILE
			10			

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TRENCH 6

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-01	BEAR RIVER MILL SITE	2404 FEET MSL	8/5/99	1 OF 1	6

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	SLIDE HAMMER	SEEPAGE AT 7 FEET	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)	USCS	DESCRIPTIONS/REMARKS
					MEDIUM BROWN TO YELLOW BROWN, DRY, MEDIUM DENSE, SILTY FINE SAND WITH MINOR CLAY AND COMMON ROOTS (FINE TO MEDIUM)
				SM	
			1		
6-1					
					YELLOW BROWN, DRY TO SLIGHTLY MOIST, MEDIUM DENSE, CLAYEY SILT WITH FINE SAND
			2		
6-2					
				ML	
			3		
					COMPLETELY WEATHERED GRANODIORITE ROCK (EXCAVATES AS LIGHT GREY, MOIST TO DAMP, MEDIUM DENSE, CLAYEY SILT)
			4		
			5		
				ML	
			6		
			7		MINOR SEEPAGE AT 7 FEET
				▽	
			8		
					TRENCH TERMINATED AT 8 FEET
			9		
			10		

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TRENCH 7

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977–01	BEAR RIVER MILL SITE	2402 FEET MSL	8/5/99	1 OF 1	7

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	SEEPAGE AT 2 FEET	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
					OL	MEDIUM BROWN, WET, LOOSE, SANDY SILT WITH DENSE ROOTS
			1 2		OL	DARK GREY, WET, LOOSE, SANDY SILT WITH ORGANICS SEEPAGE AT 2 FEET
			3 4		OL ▽	DARK GREY, WET, LOOSE, SILTY CLAY WITH ORGANICS
			5 6 7 8 9 10			TRENCH TERMINATED AT 4.5 FEET

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TRENCH 8

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-01	BEAR RIVER MILL SITE	2396 FEET MSL	8/5/99	1 OF 1	8

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
						ORANGE BROWN, DRY TO DAMP, LOOSE, CLAYEY SILT WITH VARIABLE FINE SAND CONTENT AND POCKETS OF WOOD DEBRIS (STOCKPILE REQUIRES SELECTIVE BORROW)
			1			
			2			
			3			
			4		ML	INCREASING MOISTURE WITH DEPTH
			5			
			6			
			7			
					ML	MEDIUM BROWN TO YELLOW BROWN, DAMP, MEDIUM DENSE, SANDY SILT (APPARENT ORIGINAL GROUND SURFACE)
			8			TRENCH TERMINATED AT 8 FEET
			9			
			10			

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TRENCH 9

PROJECT NO. 977–01	**PROJECT NAME** BEAR RIVER MILL SITE	**ELEVATION** 2432 FEET MSL	**DATE** 8/5/99	**PAGE** 1 OF 1	**FIGURE NO.** 9

EXCAVATING METHOD CASE 580B EXTENDAHOE	**SAMPLING METHOD** NONE	**GROUNDWATER ENCOUNTERED** NONE	**CAVED** 0 – 7 FEET

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)	USCS	DESCRIPTIONS/REMARKS
			0–4	OL	DARK BROWN, DRY TO MOIST, SANDY SILT WITH ORGANICS (WOOD DEBRIS), MINOR DEBRIS (STEEL, RUBBER) AND ABUNDANT GRAVEL AND COBBLES TO 8 INCHES IN DIAMETER (STOCKPILE IS UNSUITABLE FOR USE AS STRUCTURAL FILL)
			4–7	OL	DARK BROWN, MOIST TO DAMP, LOOSE, SANDY SILT WITH ORGANICS (WOOD DEBRIS), MINOR GRAVEL, AND MINOR DEBRIS (STOCKPILE IS UNSUITABLE FOR USE AS STRUCTURAL FILL)
			7–8	ML	DARK BROWN, MOIST TO DAMP, LOOSE, SANDY SILT WITH MINOR ORGANICS (SELECTIVE BORROW MAY BE POSSIBLE)
			8		TRENCH TERMINATED AT 8 FEET NEAR BOTTOM OF STOCKPILE
			9		
			10		

TRENCH 10

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-01	BEAR RIVER MILL SITE	2428 FEET MSL	8/5/99	1 OF 1	10

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	SLIDE HAMMER	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)	USCS	DESCRIPTIONS/REMARKS
			0–2	SM	MEDIUM BROWN, DRY, LOOSE, SILTY FINE SAND WITH MINOR DEBRIS AND VARIABLE ROCK CONTENT (UP TO APPROXIMATELY 50%) (FILL)
CB-7			2–2.5	SW	LIGHT GREY, MOIST, LOOSE, FINE TO MEDIUM SAND (FILL)
			2.5–3.5	SM	DARK BROWN, MOIST, LOOSE, SILTY FINE SAND WITH MINOR CLAY AND WOOD DEBRIS (FILL – POSSIBLE RELIC CULVERT BACKFILL)
CB-6			3.5–6.5	CH	YELLOW BROWN, MOIST, MEDIUM, FINE SANDY CLAY
			6.5		TRENCH TERMINATED AT 6.5 FEET

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TRENCH 11

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977–01	BEAR RIVER MILL SITE	2424 FEET MSL	8/5/99	1 OF 1	11

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	SEEPAGE AT 5.5 FEET	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
						DARK RED BROWN, MOIST, LOOSE, SANDY SILT WITH CLAY, MINOR ROCK AND MINOR DEBRIS (FILL)
			1			
			2			CONCRETE FOUNDATION (WALL) EXPOSED AT 2 FEET BGS EXTENDS BELOW BOTTOM OF EXCAVATION
			3		ML	
			4			
			5			MINOR SEEPAGE AT 5.5 FEET
						YELLOW BROWN, DAMP, MEDIUM, FINE SANDY CLAY
			6			
			7		CL	
			8		▽	TRENCH TERMINATED AT 8 FEET
			9			
			10			

TRENCH 12

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-01	BEAR RIVER MILL SITE	2440 FEET MSL	8/5/99	1 OF 1	12

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
				▨	SC	DARK BROWN TO RED BROWN, DRY, LOOSE TO MEDIUM DENSE, CLAYEY SAND AND CLAYEY SILT (ALLUVIAL DEPOSIT)
			1	▨		
				▥	ML	DARK BROWN, DRY, MEDIUM DENSE, FINE SANDY SILT
			2	▥		
			3			TRENCH TERMINATED AT 3 FEET (REUSAL OF BACKHOE ON GRANODIORITE ROCK)
			4			
			5			
			6			
			7			
			8			
			9			
			10			

TRENCH 13

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-01	BEAR RIVER MILL SITE	2435 FEET MSL	8/5/99	1 OF 1	13

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	3-9 FEET

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
					ML	MEDIUM BROWN TO DARK BROWN, DRY TO MOIST, LOOSE, SANDY SILT (FILL)
			1			
			2			
			3		PT	WOOD DEBRIS, BURNT WOOD DEBRIS (FILL)
			4			
			5		ML	MEDIUM BROWN TO DARK BROWN, DRY TO MOIST, LOOSE, SANDY SILT (FILL)
			6		CL	YELLOW BROWN, DAMP, SOFT CLAY WITH ABUNDANT ROCK TO 3 INCHES IN DIAMETER (FILL) 2 FOOT DIAMETER CMP CULVERT AT 8 FEET BGS BEARING ROUGHLY NORTH-SOUTH
			7			
			8			
			9		CL	BLUE GREY MOTTLED WITH YELLOW BROWN, MOIST, STIFF CLAY WITH FINE SAND (NATIVE)
			10			TRENCH TERMINATED AT 10 FEET

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TRENCH 14

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977–01	BEAR RIVER MILL SITE	2434 FEET MSL	8/5/99	1 OF 1	14

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	2–6 FEET

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
			1 2 3 4 5 6	┆	OL	MEDIUM BROWN TO DARK BROWN, DRY TO MOIST, LOOSE, SANDY SILT WITH ORGANICS (WOOD DEBRIS) (FILL)
			7 8	▨	CL	BLUE GREY MOTTLED WITH YELLOW BROWN, MOIST, STIFF CLAY WITH FINE SAND (NATIVE)
			9 10			TRENCH TERMINATED AT 10 FEET

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TRENCH 15

PROJECT NO. 977–01	**PROJECT NAME** BEAR RIVER MILL SITE	**ELEVATION** 2430 FEET MSL	**DATE** 8/5/99	**PAGE** 1 OF 1	**FIGURE NO.** 15

EXCAVATING METHOD CASE 580B EXTENDAHOE	**SAMPLING METHOD** NONE	**GROUNDWATER ENCOUNTERED** NONE	**CAVED** 0–7 FEEET

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
			1 2 3 4 5 6 7	┆	OL	MEDIUM BROWN TO DARK BROWN, DRY TO MOIST, LOOSE, SANDY SILT WITH ORGANICS (WOOD DEBRIS) (FILL)
			8 9 10	▨	CL	BLUE GREY MOTTLED WITH YELLOW BROWN, MOIST, STIFF CLAY WITH FINE SAND (NATIVE)
						TRENCH TERMINATED AT 10 FEET

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TRENCH 16

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-01	BEAR RIVER MILL SITE	2430 FEET MSL	8/5/99	1 OF 1	16

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
			1			MEDIUM BROWN TO DARK BROWN, DRY TO MOIST, LOOSE TO MEDIUM DENSE, SANDY SILT INTERBEDDED WITH ORGANICS (WOOD DEBRIS) (FILL)
			2			
			3			
			4			
			5			
			6		OL	
			7			
			8			
			9			
			10			16 INCH DIAMETER LOG ENCOUNTERED AT 10 FEET BGS
			11		ML	RED BROWN, DAMP, MEDIUM DENSE, CLAYEY SILT
			12		CL	YELLOW BROWN TO ORANGE BROWN, MOIST, FIRM, SILTY CLAY (NATIVE)
			13			TRENCH TERMINATED AT 13 FEET
			14			
			15			
			16			
			17			
			18			
			19			
			20			

TRENCH 17

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-01	BEAR RIVER MILL SITE	2470 FEET MSL	8/5/99	1 OF 1	17

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
					OL	MEDIUM BROWN TO DARK BROWN, DRY TO MOIST, LOOSE TO MEDIUM DENSE, SANDY SILT INTERBEDDED WITH ORGANICS (WOOD DEBRIS) (FILL)
			1			
			2			
			3			
						TRENCH TERMINATED AT 4 FEET (REFUSAL OF BACKHOE ON LARGE WOOD DEBRIS)
			4			
			5			
			6			
			7			
			8			
			9			
			10			

TRENCH 18

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-01	BEAR RIVER MILL SITE	2470 FEET MSL	8/5/99	1 OF 1	18

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
						LIGHT ORANGE BROWN, DRY TO SLIGHTLY MOIST, MEDIUM DENSE, SANDY SILT WITH MINOR CLAY
			1			
			2		ML	
			3			TRENCH TERMINATED AT 3 FEET
			4			
			5			
			6			
			7			
			8			
			9			
			10			

TRENCH 19

PROJECT NO.	PROJECT NAME	2460	DATE	PAGE	FIGURE NO.
977-01	BEAR RIVER MILL SITE	2460 FEET MSL	8/5/99	1 OF 1	19

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	SLIDE HAMMER	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)			USCS	DESCRIPTIONS/REMARKS
							DARK ORANGE BROWN, DRY, MEDIUM DENSE, CLAYEY SILT
CB-9			1	▨		ML	
19-1			2	◣			COMPLETELY WEATHERED GRANODIORITE ROCK (EXCAVATES AS ORANGE BROWN, MOIST, MEDIUM DENSE SILT WITH MINOR SAND)
			3				
			4				
						ML	
			5				
			6				
			7				TRENCH TERMINATED AT 7 FEET
			8				
			9				
			10				

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TRENCH 20

PROJECT NO. 977–01	**PROJECT NAME** BEAR RIVER MILL SITE	**ELEVATION** 2548 FEET MSL	**DATE** 8/5/99	**PAGE** 1 OF 1	**FIGURE NO.** 20

EXCAVATING METHOD CASE 580B EXTENDAHOE	**SAMPLING METHOD** SLIDE HAMMER	**GROUNDWATER ENCOUNTERED** NONE	**CAVED** NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)	USCS	DESCRIPTIONS/REMARKS
				ML	DARK RED BROWN TO ORANGE BROWN, DRY, MEDIUM DENSE TO DENSE, CLAYEY SILT WITH OCCASIONAL ROCK TO 12 INCHES IN DIAMETER
CB–10			1		
			2		
			3		
			4	ML	COMPLETELY WEATHERED GRANODIORITE ROCK (EXCAVATES AS ORANGE BROWN, DRY, DENSE, SANDY SILT) INCREASING ROCK STRUCTURE WITH DEPTH
			5		TRENCH TERMINATED AT 5 FEET
			6		
			7		
			8		
			9		
			10		

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TRENCH 21

PROJECT NO. 977-01	**PROJECT NAME** BEAR RIVER MILL SITE	**ELEVATION** 2484 FEET MSL	**DATE** 8/5/99	**PAGE** 1 OF 1	**FIGURE NO.** 21

EXCAVATING METHOD CASE 580B EXTENDAHOE	**SAMPLING METHOD** NONE	**GROUNDWATER ENCOUNTERED** NONE	**CAVED** NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)	USCS	DESCRIPTIONS/REMARKS
				GP	ANGULAR ROCK TO 3 INCHES IN DIAMETER
				ML	LIGHT BROWN, DRY, LOOSE, SANDY SILT
			1	SM	COMPLETELY TO MODERATELY WEATHERED ROCK (EXCAVATES AS ORANGE BROWN, DRY TO SLIGHTLY MOIST, MEDIUM DENSE, SILTY SAND WITH COBBLES)
			2		
			3		
					TRENCH TERMINATED AT 4 FEET
			4		
			5		
			6		
			7		
			8		
			9		
			10		

TRENCH 22

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-01	BEAR RIVER MILL SITE	2420 FEET MSL	8/6/99	1 OF 1	22

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	SEEPAGE AT 5.5 FEET	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)	USCS	DESCRIPTIONS/REMARKS
			1	PT	ORGANICS (PEAT, WOOD DEBRIS)
			2	SC	DARK BROWN, MOIST, LOOSE, CLAYEY SAND WITH ROCK TO 12 INCHES IN DIAMETER (FILL)
			3 4 5	SC	LIGHT GREY MOTTLED WITH ORANGE BROWN, DAMP, LOOSE TO MEDIUM DENSE, CLAYEY SAND WITH ROCK (FILL) SEEPAGE AT 5.5 FEET
			6 7	CL	ORANGE BROWN MOTTLED WITH LIGHT GREY, MOIST, MEDIUM SANDY CLAY
			8 9 10		TRENCH TERMINATED AT 8 FEET

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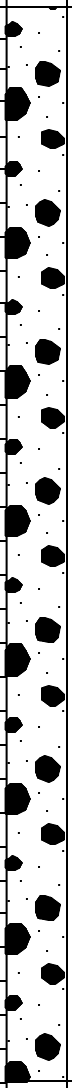
TRENCH 23

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977–01	BEAR RIVER MILL SITE	2416 FEET MSL	8/6/99	1 OF 1	23

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	0 – 8 FEET

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
						ANGULAR ROCK TO 18 INCHES IN DIAMETER WITH VARIABLE SOIL CONTENT (BROWN SILTY SAND) AND MINOR DEBRIS (METAL) (FILL)
			1			
			2			THREE APPARENTLY RELIC ELECTRICAL CONDUITS SEVERED IN EXCAVATION AT APPROXIMATELY 2.5 FEET (ALUMINUM STRANDS, PLASTIC CASING, BEARING NORTH–SOUTH)
			3			
			4		GP	PERFORATED, APPROXIMATELY 12 INCH DIAMETER CORRUGATED METAL PIPE ENCOUNTERED AT 4 FEET (POSSIBLE RELIC SUBSURFACE DRAIN)
			5			
			6			
			7			
			8			TRENCH TERMINATED AT 8 FEET (EXTENSIVE CAVING)
			9			
			10			

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TRENCH 24

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-01	BEAR RIVER MILL SITE	2392 FEET MSL	8/6/99	1 OF 1	24

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)	USCS	DESCRIPTIONS/REMARKS
				GP PT	ANGULAR ROCK TO 3 INCH DIAMETER WITH ORGANICS (PEAT) (FILL)
				OL	DARK YELLOW BROWN TO GREY, MOIST, SOFT TO MEDIUM, SANDY CLAY WITH ORGANICS (WOOD DEBRIS) (FILL) 24 INCH DIAMETER LOG AT APPROXIMATELY 3 FEET
				OH	DARK BLUE GREY, MOIST TO DAMP, SOFT TO MEDIUM, SANDY CLAY (FILL) STEEL CABLE AT APPROXIMATELY 4 FEET
				CL	YELLOW BROWN, MOIST, FIRM, SILTY CLAY (NATIVE)
					TRENCH TERMINATED AT 9 FEET

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TRENCH 25

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-01	BEAR RIVER MILL SITE	2324 FEET MSL	8/6/99	1 OF 1	25

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
			1	┆	OL	DARK BROWN, DRY, LOOSE, SANDY SILT WITH ORGANICS (PEAT, WOOD DEBRIS) (FILL)
			2	〰	PT	PEAT, WOOD DEBRIS (FILL)
			3	〰	PT	ANGULAR ROCK AND WOOD DEBRIS INTERBEDDED WITH CLAY (FILL)
			4	▨	CL	GREEN GREY, SLIGHTLY MOIST, FIRM, SANDY CLAY
			5			TRENCH TERMINATED AT 4 FEET
			6			
			7			
			8			
					CL	
			9			
			10			

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TRENCH 26

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977–01	BEAR RIVER MILL SITE	2384 FEET MSL	8/6/99	1 OF 1	26

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
			0–3	▥	ML	DARK RED BROWN, DRY TO SLIGHTLY MOIST, MEDIUM DENSE, CLAYEY SILT
			3–5	▨	CL	YELLOW BROWN MOTTLED WITH LIGHT GREY, MOIST, MEDIUM, SANDY CLAY
			5			TRENCH TERMINATED AT 5 FEET
			6			
			7			
			8			
			9			
			10			

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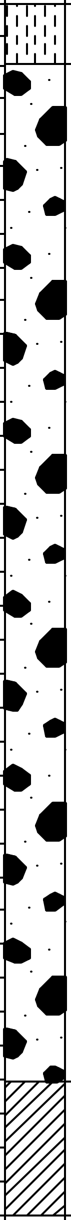
TRENCH 27

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977–01	BEAR RIVER MILL SITE	2404 FEET MSL	8/5/99	1 OF 1	27

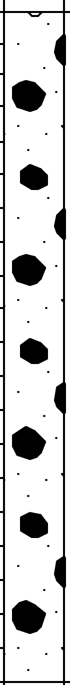
EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	SLIDE HAMMER	NONE	1 – 8 FEET



SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)	USCS	DESCRIPTIONS/REMARKS
				OL	DARK BROWN, DRY, LOOSE, SILTY SAND WITH ORGANICS AND COMMON ROOTS (FILL)
			1 2 3 4 5 6 7	GP	ANGULAR ROCK TO 12 INCH DIAMETER WITH DARK BROWN, DRY, LOOSE, TO MEDIUM DENSE, SANDY SILT (FILL)
			8	CL	YELLOW BROWN MOTTLED WITH ORANGE BROWN, DAMP, SOFT, SANDY CLAY (NATIVE)
			9 10		TRENCH TERMINATED AT 9 FEET

TRENCH 28

PROJECT NO. 977–01
PROJECT NAME BEAR RIVER MILL SITE
ELEVATION 2396 FEET MSL
DATE 2396
PAGE 1 OF 1
FIGURE NO. 28
EXCAVATING METHOD CASE 580B EXTENDAHOE
SAMPLING METHOD SLIDE HAMMER
GROUNDWATER ENCOUNTERED NONE
CAVED 0 – 5 FEET

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
					GP	ANGULAR ROCK TO 18 INCHES IN DIAMETER WITH MINOR DARK BROWN SILTY SAND AND MINOR DEBRIS (SELECTIVE BORROW REQUIRED FROM STOCKPILE)
			1			
			2			
			3			
			4			
			5			TRENCH TERMINATED AT 5 FEET NEAR BOTTOM OF STOCKPILE
			6			
			7			
			8			
			9			
			10			

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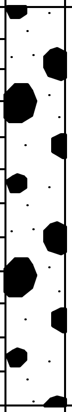
TRENCH 29

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977–01	BEAR RIVER MILL SITE	2396 FEET MSL	8/6/99	1 OF 1	29

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	0 – 3 FEET

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
						ANGULAR ROCK TO 18 INCHES IN DIAMETER WITH MINOR DARK BROWN SILTY SAND AND MINOR DEBRIS (SELECTIVE BORROW REQUIRED FROM STOCKPILE)
			1			
					GP	
			2			
			3			TRENCH TERMINATED AT 3 FEET WITHIN STOCKPILE
			4			
			5			
			6			
			7			
			8			
			9			
			10			

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TRENCH 30

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977–01	BEAR RIVER MILL SITE	2388 FEET MSL	8/6/99	1 OF 1	30

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
				∿	PT	PEAT, WOOD DEBRIS (FILL)
			1	▨	CL	YELLOW BROWN, SLIGHTLY MOIST, MEDIUM, SANDY CLAY
			2	▨	SC	ORANGE BROWN TO YELLOW BROWN, MOIST, MEDIUM DENSE, CLAYEY SAND (NATIVE)
			3			TRENCH TERMINATED AT 3 FEET
			4			
			5			
			6			
			7			
			8			
			9			
			10			

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TRENCH 31

PROJECT NO. 977-01	**PROJECT NAME** BEAR RIVER MILL SITE	**ELEVATION** 2398 FEET MSL	**DATE** 8/6/99	**PAGE** 1 OF 1	**FIGURE NO.** 31

EXCAVATING METHOD CASE 580B EXTENDAHOE	**SAMPLING METHOD** NONE	**GROUNDWATER ENCOUNTERED** NONE	**CAVED** NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
			1		ML	DARK BROWN, DRY, MEDIUM DENSE, CLAYEY SILT
			2		ML	COMPLETELY WEATHERED ROCK (EXCAVATES AS ORANGE BROWN, SLIGHTLY MOIST, MEDIUM DENSE, CLAYEY SILT)
			3			
			4			TRENCH TERMINATED AT 4 FEET
			5			
			6			
			7			
			8			
			9			
			10			

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TRENCH 32

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977–01	BEAR RIVER MILL SITE	2401 FEET MSL	8/6/99	1 OF 1	32

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
				≈	PT	PEAT, DEBRIS (WOOD, PLASTIC, METAL, CONCRETE)
			1			
			2	▨	SC	ORANGE BROWN, SLIGHTLY MOIST, MEDIUM DENSE, CLAYEY SAND (NATIVE)
			3			
			4			TRENCH TERMINATED AT 4 FEET
			5			
			6			
			7			
			8			
			9			
			10			

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TRENCH 33

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977–01	BEAR RIVER MILL SITE	2394 FEET MSL	8/6/99	1 OF 1	33

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
CASE 580B EXTENDAHOE	NONE	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
				▨	SC	ORANGE BROWN, DRY TO SLIGHTLY MOIST, MEDIUM DENSE, CLAYEY SAND (FILL)
			1	▨		ORANGE BROWN, SLIGHTLY MOIST, MEDIUM DENSE, CLAYEY SAND (NATIVE)
			2	▨	SC	
			3			TRENCH TERMINATED AT 3 FEET
			4			
			5			
			6			
			7			
			8			
			9			
			10			

TRENCH 34

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
877-02	BEAR RIVER MILL SITE	2398 FEET MSL	8/12/01	1 OF 1	34

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
KOMATSU PC300LC EXCAVATOR	NONE	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
					ML	RED BROWN, DRY, LOOSE TO MEDIUM DENSE, CLAYEY SILT (FILL)
			1			COMPLETELY WEATHERED GRANODIORITE ROCK (EXCAVATES AS ORANGE BROWN, SLIGHTLY MOIST, MEDIUM DENSE SANDY SILT WITH VARIABLE MINOR CLAY CONTENT)
			2			
			3			
			4			
			5			
			6			
			7			
			8			
			9			
			10		ML	OCCASIONAL RESISTANT ROCK TO 24" DIAMETER
			11			
			12			
			13			
			14			
			15			
			16			
			17			
			18			
			19			TRENCH TERMINATED AT 19 FEET
			20			

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TRENCH 35

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-02	BEAR RIVER MILL SITE	2396 FEET MSL	9/12/01	1 OF 1	35

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
KOMATSU PC300LC EXCAVATOR	NONE	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
						COMPLETELY WEATHERED GRANODIORITE ROCK (EXCAVATES AS ORANGE BROWN, DRY TO SLIGHTLY MOIST, MEDIUM DENSE SANDY SILT WITH CLAY)
			1			
			2			
			3			SHALLOW, RESISTANT, SLIGHTLY WEATHERED ROCK AT 3 FEET BGS IN PORTIONS OF TRENCH ALIGNMENT
			4			
			5		ML	DENSITY AND ROCK STRUCTURE INCREASES AT 5 FEET BGS, DENSE SOIL WITH MODERATELY TO SLIGHTLY WEATHERED FRACTURED ROCK; DIFFICULT DIGGING
			6			
			7			
			8			
			9			
			10			TRENCH TERMINATED AT 10 FEET
			11			
			12			
			13			
			14			
			15			
			16			
			17			
			18			
			19			
			20			

TRENCH 36

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-02	BEAR RIVER MILL SITE	2393 FEET MSL	9/12/01	1 OF 1	36

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
KOMATSU PC300LC EXCAVATOR	NONE	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
					PT	PEAT FILL, UPPER 6 INCHES
			1			COMPLETELY WEATHERED GRANODIORITE ROCK (EXCAVATES AS ORANGE BROWN, SLIGHTLY MOIST, MEDIUM DENSE SANDY SILT WITH VARIABLE CLAY CONTENT)
			2			
			3			
			4			
			5			OCCASIONAL ISOLATED RESISTANT ROCK
			6			
			7			
			8			
			9			
			10		ML	
			11			
			12			
			13			
			14			
			15			DENSITY AND RESISTANCE INCREASES WITH DEPTH
			16			
			17			TRENCH TERMINATED AT 17 FEET
			18			
			19			
			20			

TRENCH 37

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-02	BEAR RIVER MILL SITE	2402 FEET MSL	9/12/01	1 OF 1	37

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
KOMATSU PC300LC EXCAVATOR	HAND	NONE	0 - 6 FEET

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)	USCS	DESCRIPTIONS/REMARKS
					ANGULAR, GRANODIORITE ROCK TO 12" DIAMETER WITH DARK BROWN, DRY TO SLIGHTLY MOIST, SANDY SILT (FILL)
			1		
			2		
			3	ML	
			4		
PB 37-1					
PB 37-2					
			5		
			6		
					YELLOW BROWN TO GRAY, LOOSE, MOIST TO DAMP, SANDY CLAY (COMPLETELY WEATHERED ROCK); PETROLEUM ODOR
			7		
			8		
			9		
PB 37-3					
			10		
			11		
			12	CL	
			13		
			14		
			15		
			16		
			17		
			18		
					TRENCH TERMINATED AT 18 FEET
			19		
			20		

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TRENCH 38

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-02	BEAR RIVER MILL SITE	2411 FEET MSL	9/12/01	1 OF 1	38

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
KOMATSU PC300LC EXCAVATOR	HAND	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
						COMPLETELY TO SEVERELY WEATHERED GRANODIORITE ROCK (EXCAVATES AS LIGHT BROWN, SANDY SILT WITH VARIABLE MINOR CLAY)
			1			
			2			
			3			
			4			
			5			
			6			
			7			
			8			
			9			
			10		ML	
			11			
			12			
			13			
			14			
			15			INCREASING DENSITY AND RESISTANCE AT 15 FEET
			16			
			17			
			18			
			19			TRENCH TERMINATED AT 19 FEET
			20			

TRENCH 39

PROJECT NO. 977-02	**PROJECT NAME** BEAR RIVER MILL SITE	**ELEVATION** 2406 FEET MSL	**DATE** 9/12/01	**PAGE** 1 OF 1	**FIGURE NO.** 39

EXCAVATING METHOD KOMATSU PC300LC EXCAVATOR	**SAMPLING METHOD** NONE	**GROUNDWATER ENCOUNTERED** NONE	**CAVED** NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
					ML	COMPLETELY WEATHERED GRANODIORITE ROCK (EXCAVATES AS LIGHT BROWN, DRY TO SLIGHTLY MOIST, MEDIUM DENSE, SANDY SILT WITH MINOR CLAY)
			1			
			2			
			3			
			4			
			5			
			6			
			7			
			8			
			9			
			10			
			11			
			12		SM	LIGHT BROWN, MOIST, MEDIUM DENSE, SILTY SAND
			13			
			14			
			15			
			16			
			17			TRENCH TERMINATED AT 17 FEET
			18			
			19			
			20			

HOLDREGE & KULL

TRENCH 40

PROJECT NO. 977-02	**PROJECT NAME** BEAR RIVER MILL SITE	**ELEVATION** 2407 FEET MSL	**DATE** 9/12/01	**PAGE** 1 OF 1	**FIGURE NO.** 40

EXCAVATING METHOD KOMATSU PC300LC EXCAVATOR	**SAMPLING METHOD** NONE	**GROUNDWATER ENCOUNTERED** 17 FEET	**CAVED** 9 – 20 FEET

SAMPLE NO.	**DRY DENSITY (PCF)**	**PERCENT MOISTURE**	**DEPTH (FT)**		**USCS**	**DESCRIPTIONS/REMARKS**
						LIGHT BROWN, DRY TO SLIGHTLY MOIST, LOOSE TO MEDIUM DENSE, SANDY SILT WITH GRAVEL (FILL)
			1			
			2		ML	
			3			COMPLETELY TO SEVERELY WEATHERED GRANODIORITE ROCK (EXCAVATES AS LIGHT BROWN, SLIGHTLY MOIST, MEDIUM DENSE SANDY SILT WITH MINOR CLAY AND ISOLATED RESISTANT ROCK)
			4			
			5			
			6			
			7			
			8			
			9		ML	SECONDARY CAVING 9 FEET TO APPROXIMATELY 17 FEET
			10			
			11			
			12			
			13			
			14			
			15			
			16			APPARENT NORTH BEARING MINE ADIT AT 16 TO 20 FEET BGS, 4-FOOT DIAMETER, IN NORTH WALL AT EAST END OF TRENCH. LIGHT BROWN TO LIGHT GRAY, DAMP TO SATURATED, LOOSE, CLAYEY SAND ENCOUNTERED IN ADIT, SEEPAGE AT 17 FEET BGS
			17	▼		
			18		SC	
			19			
			20			TRENCH TERMINATED AT 20 FEET

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TRENCH 41

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-02	BEAR RIVER MILL SITE	2398 FEET MSL	9/12/01	1 OF 1	41

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
KOMATSU PC300LC EXCAVATOR	NONE	13 FEET	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
			1		ML	DARK BROWN TO MEDIUM BROWN, SLIGHTLY MOIST TO MOIST, LOOSE TO MEDIUM DENSE SANDY SILT WITH GRAVEL AND COBBLES (FILL)
			2			
			3			
			4			
			5			
			6			
			7		SM – ML	COMPLETELY WEATHERED GRANODIORITE ROCK (EXCAVATES AS LIGHT BROWN, MOIST, MEDIUM DENSE SILTY SAND AND SANDY SILT WITH CLAY)
			8			
			9			
			10			
			11			
			12			
			13	▼		GROUNDWATER ENCOUNTERED AT 13 FEET BGS
			14			TRENCH TERMINATED AT 14 FEET
			15			
			16			
			17			
			18			
			19			
			20			

TRENCH 42

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-02	BEAR RIVER MILL SITE	2390 FEET MSL	9/12/01	1 OF 1	42

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
KOMATSU PC300LC EXCAVATOR	HAND	NONE	0 – 3 FEET

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)	USCS	DESCRIPTIONS/REMARKS
			1		PEAT WITH ANGULAR ROCK (FILL)
PB 42–1			2	PT	
			3		
			4		COMPLETELY WEATHERED GRANODIORITE ROCK (EXCAVATES AS YELLOW BROWN TO GRAY, MOIST, LOOSE TO MEDIUM DENSE CLAYEY SILT)
			5		
			6		
			7	ML	
			8		
			9		
			10		
			11		TRENCH TERMINATED AT 11 FEET
			12		
			13		
			14		
			15		
			16		
			17		
			18		
			19		
			20		

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TRENCH 43

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-02	BEAR RIVER MILL SITE	2396 FEET MSL	9/12/01	1 OF 1	43

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
KOMATSU PC300LC EXCAVATOR	HAND	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
						ANGULAR ROCK TO 12" DIAMETER WITH DARK BROWN, DRY TO SLIGHTLY MOIST, LOOSE TO MEDIUM DENSE SILTY SAND
			1			
PB 43-1			2		SM	
			3			YELLOW BROWN TO GRAY, MOIST, SOFT, CLAYEY SAND
			4			
			5			
			6			
			7		SC	
			8			
			9			
			10			
			11			YELLOW BROWN, MOIST, MEDIUM, SANDY CLAY
			12		SC	
			13			TRENCH TERMINATED AT 13 FEET
			14			
			15			
			16			
			17			
			18			
			19			
			20			

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TRENCH 44

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-02	BEAR RIVER MILL SITE	2381 FEET MSL	9/12/01	1 OF 1	44

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
KOMATSU PC300LC EXCAVATOR	NONE	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
					PT	PEAT, UPPER 6 INCHES
			1			RED BROWN, DRY TO SLIGHTLY MOIST, MEDIUM DENSE CLAYEY SILT
			2			
			3			
			4			
			5			
			6			
			7		ML	
			8			
			9			
			10			
			11			
			12			
			13			
			14			TRENCH TERMINATED AT 14 FEET
			15			
			16			
			17			
			18			
			19			
			20			

TRENCH 45

PROJECT NO. 977-02	**PROJECT NAME** BEAR RIVER MILL SITE	**ELEVATION** 2416 FEET MSL	**DATE** 9/12/01	**PAGE** 1 OF 1	**FIGURE NO.** 45

EXCAVATING METHOD KOMATSU PC300LC EXCAVATOR	**SAMPLING METHOD** HAND	**GROUNDWATER ENCOUNTERED** NONE	**CAVED** 0 – 10 FEET

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
			1		ML	DARK BROWN, DRY TO SLIGHTLY MOIST, LOOSE TO MEDIUM DENSE, SANDY SILT WITH ABUNDANT ANGULAR ROCK TO 12" DIAMETER AND MINOR ORGANIC DEBRIS (FILL)
			2			
PB 45–1			3			
			4			
			5		SM	DARK BROWN, SLIGHTLY MOIST, LOOSE, SILTY SAND WITH ABUNDANT ORGANIC DEBRIS (FILL PEAT)
			6			
			7			
			8			
			9			
			10			
			11		ML	COMPLETELY WEATHERED GRANODIORITE ROCK (EXCAVATES AS BLUE GRAY, MOIST, SOFT TO MEDIUM, CLAYEY SILT)
			12			
			13			
			14			
			15			
			16			
			17			TRENCH TERMINATED AT 16 FEET
			18			
			19			
			20			

TRENCH 46

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-02	BEAR RIVER MILL SITE	2414 FEET MSL	9/12/01	1 OF 1	46

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
KOMATSU PC300LC EXCAVATOR	HAND	NONE	0 – 8 FEET

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
			1			ANGULAR ROCK TO 12" DIAMETER WITH DARK BROWN, DRY TO SLIGHTLY MOIST, LOOSE TO MEDIUM DENSE, SANDY SILT
			2			
			3			STEEL AND PLASTIC PIPE ENCOUNTERED IN TRENCH
			4			
			5			
PB 46–1			6		ML	CONCRETE SLAB ON GRADE (POSSIBLY 12" THICK, RESISTANT)
			7			
			8			COMPLETELY WEATHERED GRANODIORITE ROCK (EXCAVATES AS BLUE GRAY, MOIST, SOFT TO MEDIUM, CLAYEY SILT)
			9		ML	
			10			TRENCH TERMINATED AT 10 FEET
			11			
			12			
			13			
			14			
			15			
			16			
			17			
			18			
			19			
			20			

TRENCH 47

PROJECT NO. 977-02	**PROJECT NAME** BEAR RIVER MILL SITE	**ELEVATION** 2418 FEET MSL	**DATE** 9/13/01	**PAGE** 1 OF 1	**FIGURE NO.** 47

EXCAVATING METHOD KOMATSU PC300LC EXCAVATOR	**SAMPLING METHOD** NONE	**GROUNDWATER ENCOUNTERED** NONE	**CAVED** NONE

SAMPLE NO.	**DRY DENSITY (PCF)**	**PERCENT MOISTURE**	**DEPTH (FT)**		**USCS**	**DESCRIPTIONS/REMARKS**
						COMPLETELY WEATHERED GRANODIORITE ROCK (EXCAVATES AS ORANGE BROWN, SLIGHTLY MOIST TO MOIST, MEDIUM DENSE, SANDY SILT WITH CLAY
			2			
			4			
			6			
			8			
			10			
			12		ML	
			14			
			16			
			18			
			20			
			22			
						TRENCH TERMINATED AT 23 FEET
			24			
			26			
			28			
			30			
			32			
			34			
			36			
			38			
			40			

TRENCH 48

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-02	BEAR RIVER MILL SITE	2403 FEET MSL	9/13/01	1 OF 1	48

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
KOMATSU PC300LC EXCAVATOR	HAND	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
			1		SM	MEDIUM BROWN, SLIGHTLY MOIST, MEDIUM DENSE, SILTY SAND
			2		ML	DARK BROWN, SLIGHTLY MOIST, MEDIUM DENSE, SANDY SILT
			3		CL	COMPLETELY WEATHERED GRANODIORITE ROCK (EXCAVATES AS BLUE GRAY, MOIST, MEDIUM, SILTY CLAY)
			4			
PB 48-1			5	☒		
			6			
			7			
			8			
			9			
			10		SM	COMPLETELY WEATHERED GRANODIORITE ROCK (EXCAVATES AS LIGHT BROWN, MOIST, MEDIUM DENSE, SILTY SAND)
			11			
			12			
			13			
			14			TRENCH TERMINATED AT 14 FEET
			15			
			16			
			17			
			18			
			19			
			20			

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TRENCH 49

PROJECT NO.	PROJECT NAME	ELEVATION	DATE	PAGE	FIGURE NO.
977-02	BEAR RIVER MILL SITE	2442 FEET MSL	9/13/01	1 OF 1	49

EXCAVATING METHOD	SAMPLING METHOD	GROUNDWATER ENCOUNTERED	CAVED
KOMATSU PC300LC EXCAVATOR	NONE	NONE	NONE

SAMPLE NO.	DRY DENSITY (PCF)	PERCENT MOISTURE	DEPTH (FT)		USCS	DESCRIPTIONS/REMARKS
			1			DARK BROWN, SLIGHTLY MOIST, LOOSE TO MEDIUM DENSE, SANDY SILT WITH ANGULAR ROCK TO 6" DIAMETER (FILL)
			2		ML	
			3			
			4			COMPLETELY WEATHERED GRANODIORITE ROCK (EXCAVATES AS LIGHT BROWN, SLIGHTLY MOIST, MEDIUM DENSE, SANDY SILT TO SILTY SAND WITH VARIABLE MINOR CLAY CONTENT)
			5			
			6			
			7			
			8			
			9			
			10			
			11		ML – SM	
			12			INCREASING SAND CONTENT
			13			
			14			
			15			
			16			
			17			
			18			TRENCH TERMINATED AT 18 FEET
			19			
			20			

APPENDIX B AERIAL PHOTOGRAPHS

INQUIRY #: 1934911.4

YEAR: 1952

= 555'

INQUIRY #: 1934911.4

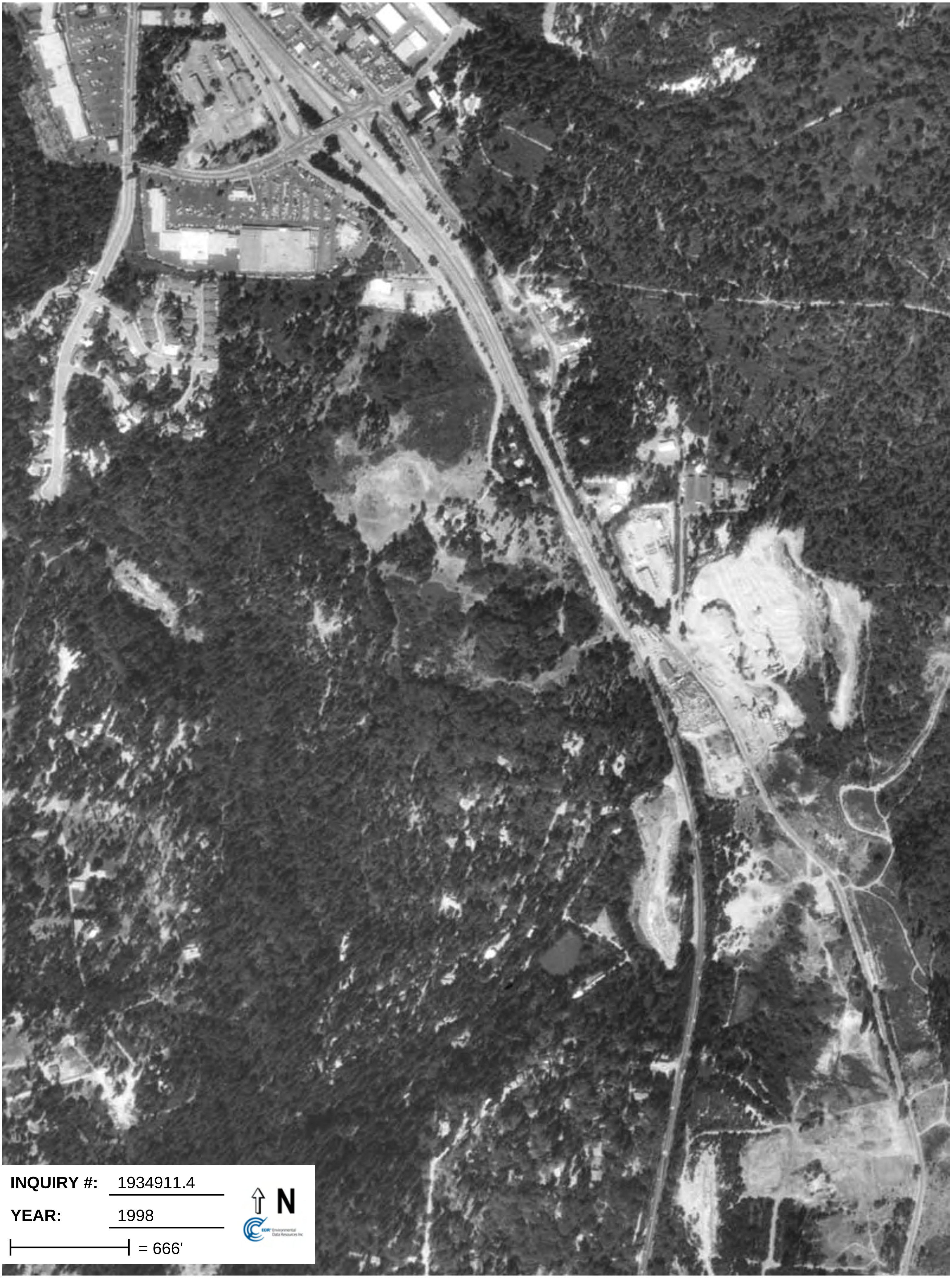
YEAR: 1962

= 555'

INQUIRY #: 1934911.4

YEAR: 1987

= 666'



INQUIRY #: 1934911.4

YEAR: 1998

= 666'

APPENDIX C PHOTOGRAPHS

Photo 1. Dense manzanita near southern site boundary.

Photo 2. Stockpiles near exploratory trench location 1 viewed from the southwest.

Photo 3. Former Bear River Saw Mill location viewed from the east.

Photo 4. Former Bear River Saw Mill location viewed from the west.

Photo 5. Former Valley Veneer Plant location viewed from the southwest.

Photo 6. Former Valley Veneer Plant location viewed from the east.

Photo 7. Former Pond 1 (dry).

Photo 8. Pond 2 (dry).

Photo 9. Pond 2 outlet structure.

Photo 10. Pond 3.

APPENDIX 3.6-3 PRELIMINARY GEOTECHNICAL REPORT FOR BERRIMAN RANCH PROPERTY

PRELIMINARY GEOTECHNICAL ENGINEERING REPORT
for
BERRIMAN RANCH
APN 22-140-03 and 22-160-03
Nevada County, California

Prepared for:
Kent Holdings and Affiliates
P.O. Box 787
Solana Beach, California 92075

Prepared by:
Holdrege & Kull
792 Searls Avenue
Nevada City, California 95959

Project No. 1746-02
December 13, 2006

HK HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS

Project No. 1746-02
December 13, 2006

Kent Holdings and Affiliates
P.O. Box 787
Solana Beach, California 92075

Attention: Sandy Kahn

Reference: ***Berriman Ranch***
APNs 22-140-03 and 22-160-03
Taylorville Road
Nevada County, California

Subject: ***Preliminary Geotechnical Engineering Report***

Dear Mr. Kahn:

This report presents the results of our preliminary geotechnical engineering investigation for the proposed Berriman Ranch site on Taylorville Road in Nevada County, California. The approximate 120-acre property is located on a southwest-facing slope directly west of Taylorville Road and Highway 49, approximately a quarter mile south of the intersection of Highway 49 and McKnight Way. As currently proposed, the project will include the creation of individual residential lots, as well as associated access roads and subsurface utilities.

The preliminary findings presented in this report are based on a cursory surface reconnaissance at the site, review of selected geologic references, and our experience with subsurface conditions in the area. Based on our preliminary findings, our opinion is the project as currently proposed appears to be feasible from a geotechnical engineering standpoint. Furthermore, we should be retained to perform a design level investigation prior to construction to confirm the preliminary recommendations presented in this report and provide alternate recommendations, if appropriate, based on the subsurface conditions encountered.

(530) 478-1305 • FAX (530) 478-1019 • E-mail: handk@HandK.net • 792 Searls Avenue • Nevada City, CA 95959 • A California Corporation

Please contact us if you have any questions regarding our observations or the preliminary recommendations presented in this report.

Sincerely,

HOLDREGE & KULL

Prepared by:

Zack Wa

ZACHARY WASHBURN
No. 8254

Zack Washburn, P.G. 8254
Staff Geologist

Reviewed by:

ROBERT E. FINGERSON
No. 2699
Exp. 12/07

Robert Fingerson, G.E. 2699
Senior Engineer

copies: 4 to Sandy Kahn / Kent Holdings and Affiliates
1 to Fred Oliver / Asset Property Group

F:\1 Projects\1746 Berriman Ranch\1746-02 PrelimGtk\Prlm GTK.wpd

TABLE OF CONTENTS

1 INTRODUCTION

At the request of Sandy Kahn, Holdrege & Kull (H&K) performed a preliminary geotechnical engineering investigation for the proposed Berriman Ranch project site in Nevada County, California. The preliminary geotechnical investigation was performed in general accordance with the scope of services presented in our November 16, 2006 proposal for the project, a copy of which is included as Appendix A of this report. For your review, Appendix B contains a document prepared by ASFE entitled *Important Information About Your Geotechnical Engineering Report*, which summarizes the general limitations, responsibilities, and use of geotechnical reports.

1.1 SITE DESCRIPTION

The approximate 120-acre site is located on the southwest-facing slopes directly west of Taylorville Road and Highway 49, approximately a quarter mile south of the intersection of Highway 49 and McKnight Way. The Assessor's Parcel Numbers (APNs) for the site are 22-140-03 and 22-160-03. APN 22-140-03 consists of approximately 95 acres which lie north of the rectangular shaped, approximate 25-acre APN 22-160-03. The site is bordered by commercial development at McKnight Way on the north, by Wolf Creek to the west, and by rural residential and undeveloped property to the south and east. A site map showing the approximate property boundaries is attached as Figure 1.

1.2 PROPOSED IMPROVEMENTS

Our understanding of the project is based on our review of a November 2006 preliminary site plan prepared by SCO Planning and Engineering, Inc. We understand that, as currently proposed, the project may include construction of 147 single-family residences. Associated improvements would likely include construction of paved roads and driveways, underground utilities, and an onsite sewage treatment facility.

1.3 SCOPE OF SERVICES

To prepare this report, we performed the following scope of services:

- We reviewed selected geologic and soil survey literature.

- We performed a cursory surface reconnaissance of the site.
- Based on observations made during our site reconnaissance, the results of our literature review, and our experience with soil conditions in the area, we prepared this report to provide preliminary geotechnical engineering recommendations for the proposed improvements.

2 SITE INVESTIGATION

The following sections summarize our literature review and field reconnaissance.

2.1 LITERATURE REVIEW

The property is located in the Sierra Nevada Foothills, on the western side of the Sierra Nevada geomorphic province. The Sierra Nevada province is an elongate, north-west trending structural block that is tilted upward to form a steep scarp above the adjacent Basin and Range province to the east. The western slope of the Sierra Nevada dips gently westward, and extends beneath sediment of the Great Valley province. Sediment within the Great Valley is derived from continual uplift and erosion of the Sierra Nevada.

According to the Geologic Map of Western Nevada County, California (California Division of Mines and Geology, 1990), the site is underlain by Cretaceous-aged quartz diorite. The Cretaceous period occurred between 144 to 65 million years before present.

We reviewed California Geological Survey Open File Report 96-08, Probabilistic Seismic Hazard Assessment for the State of California, and the 2002 update entitled California Fault Parameters. The documents indicate the project site is located within the Foothills Fault System. The Foothills Fault System is designated as a Type C fault zone, with low seismicity and a low rate of recurrence. The 1997 edition of California Geological Survey Special Publication 43, Fault Rupture Hazard Zones in California, describes active faults and fault zones (activity within 11,000 years), as part of the Alquist-Priolo Earthquake Fault Zoning Act. The map and document indicate the site is not located within an Alquist-Priolo active fault zone.

We reviewed the *Soil Survey of Nevada County, California, Western Part* prepared by the USDA Soil Conservation Service (1975; reissued 1992). The soil survey map indicated that onsite soil likely consists of Musick sandy loam on 5 to 15 percent slopes and Musick-Rock outcrop complex on 5 to 50 percent slopes

According to the soil survey, the Musick sandy loam typically consists of brown to reddish brown, sandy loam, light loam and loam from the surface to a depth of 25 inches. From approximately 25 to 98 inches, the soil consists of yellowish red and red heavy clay loam and reddish yellow and yellow loam. Weathered granodiorite is typically encountered at a depth of approximately 98 inches.

The Musick sandy loam was described as 18 to 35 percent mixed clay soil with moderately slow permeability and moderate erosion potential. Corrosion potential, acid reaction, and shrink-swell potential were also described as moderate. The Musick-Rock outcrop complex was described as 10 to 25 percent rock outcrop with moderate to high erosion hazard and medium to rapid runoff.

We also reviewed a December 19, 2002 letter prepared by H&K entitled *Summary of Percolation Testing, Soil Sampling and Laboratory Test Results,* which described the results of preliminary observations and testing performed during November 2002 to evaluate apparent mine excavations and the potential for wastewater disposal on the project site.

During our November 2002 site work, we observed two apparent glory holes in the northwestern portion of the site, east of the barrier at the end of Picadilly Lane. The glory holes ranged from 3 to 5 feet in depth and were surrounded by waste rock tailings. H&K obtained five discrete soil samples from a possible waste rock stockpile located near the apparent glory holes. Samples were analyzed for total arsenic and lead using United States Environmental Protection Agency (EPA) Test Method 6010B. All lead concentrations detected in the samples were well below the Preliminary Remediation Goals. Arsenic was not detected in the five samples analyzed.

We also excavated 11 trenches to determine the dominant soil types onsite and to determine the suitability of the soil conditions for construction of onsite sewage disposal systems for single family homes and clustered housing. Trenches were excavated to maximum depths of 7.5 to 8 feet. Percolation tests were then performed in accordance with the percolation test guidelines recommended by the

Nevada County Department of Environmental Health (NCDEH). The soil observations and percolation test results indicated that wastewater disposal is feasible on portions of the project site.

2.2 FIELD INVESTIGATION

We performed our site reconnaissance on November 21 and 27, 2006 to observe existing surface conditions at the project site.

2.2.1 Surface Conditions

At the time of our site visit, the majority of the property was undeveloped, with the exception of an existing residence, barn and associated outbuilding located in the eastern portion of the site. In addition, a rough graded dirt road extended from near the existing residence southward toward Wolf Creek. Numerous smaller logging roads and skidder trails were observed on APN 22-160-03 and the western margin of APN 22-140-03. These areas containing the logging roads appeared to have been logged fairly recently, possibly in the last ten years.

The site topography generally slopes to the southwest. In the northern, central, and eastern portions of the site, the surface sloped gently to the southwest at gradients between 5 and 15 percent. In the western and southern portions of the site, the topography sloped moderately to steeply towards Wolf Creek, with gradients ranging from 20 to 40 percent.

The ground surface throughout the majority of the site was generally covered with pine needle duff, leaves, and/or dense undergrowth. However, limited exposures of the surface soil and rock were observed in the rough graded dirt road in the central and southern portions of the site. The surface soil exposed in the roadway consisted of yellowish brown, medium dense, sandy silt. We also observed cobbles of granodiorite exposed in the previously graded access road near the confluence of the two seasonal drainages in the northern portion of APN 22-160-03. We observed boulders and rock outcrop in the northeastern portion of the site.

A few piles of woody debris up to 100 feet in diameter and 10 feet in height were observed in the clearing south of the existing residence. Blackberry canes were growing in the piles.

In the northern portion of the site, a seasonal drainage trended southwest to its confluence with Wolf Creek. Another seasonal drainage was observed a few hundred feet south of the existing residence. This drainage also trended southwest to its confluence with Wolf Creek in the southern portion of the site. A third seasonal drainage was observed near the northeast corner of APN 22-160-03. This drainage originates offsite, flows southwest onto APN 22-160-03, and joins the drainage that was observed a few hundred feet south of the existing residence. This third drainage had steep, irregularly eroded banks and was incised up to 15 feet below the surrounding topography. These features are commonly associated with historic mining activities.

The two glory holes that were identified during our previous investigation in 2002 were not visible at the time of our recent site visit. Recent clearing of brush and timber harvest activities appear to have obscured the glory holes. Based on our previous observation and our review of the proposed site plan, we anticipate that the past excavations were located in the area of proposed Lots 62, 63, and 64. In addition, our experience in the area has revealed the presence of undocumented historic mining excavations in the McKnight Way area.

We observed an area of saturated ground and daylighting seepage east of proposed Lot 55 in an area of proposed road grading. We also observed what appeared to be an abandoned irrigation ditch in the northwestern corner of APN 22-160-03 (Figure 1) .

We observed existing fill to an estimated maximum depth of 6 feet for the culvert crossing in the northern portion of APN 22-160-03. In the southern portion of the site, a log deck contained existing fill to an estimated depth 6 feet and logging roads contained fill to an estimated maximum depth of 8 feet.

2.2.2 Surface Water and Ground Water Conditions

We observed flowing water in the southernmost seasonal drainage, in the northern portion of APN 22-160-03 and saturated ground in the area east of proposed Lot 55. We anticipate that seepage will be encountered in excavations, particularly during or after the rainy season.

3 LABORATORY TESTING

Laboratory testing was not included in the scope of our preliminary geotechnical engineering investigation. Laboratory testing would typically be performed as part of a design-level geotechnical engineering investigation for the project.

4 CONCLUSIONS

The following conclusions are based on our field observations and our experience in the area.

- Based on the results of our preliminary geotechnical investigation, our opinion is that the project is feasible from a geotechnical standpoint.

- We encountered existing fill during our site reconnaissance generally associated with previously graded access roads. Existing fill should not be relied upon to support proposed improvements without testing and evaluation. If existing fill is encountered, we anticipate that the most economical approach to deal with areas of existing fill would be to overexcavate, moisture condition, and recompact during grading for the proposed improvements.

- Based on our site observations and our experience in the area, we anticipate that potentially expansive clay soil may be encountered in isolated areas, particularly near the soil/rock interface. Expansive clay soil is typically encountered in this area in thin layers which can often be mitigated either through overexcavation and mixing with granular material during grading, or by deepening proposed footings through the clay layer into underlying, more competent soil or weathered rock. Predominantly fine grained soil encountered onsite should be sampled and tested to determine expansion potential.

- Based on our previous observation of glory holes near Picadilly Lane and mining features identified on adjacent properties, we anticipate that mine shafts, tunnels, and other mining related features will likely be encountered during site development, and will need to be addressed on a case-by-case basis. Furthermore, the two glory holes observed during our 2002 site visits will need to be located during site preparation and grading, observed by a representative of Holdrege & Kull, and mitigated in accordance with the recommendations presented by the project geotechnical engineer.

- We anticipate that areas of seepage will likely be encountered during grading onsite, particularly during the rainy season and/or in excavations which reveal the surface soil/weathered rock contact. Preliminary recommendations regarding subsurface drainage are presented in this report.

- Based on the site geology and the presence of rock outcrop we anticipate that relatively shallow, resistant rock may be encountered in portions of the site during grading or excavation for utilities. Preliminary recommendations for resistant rock are presented in the following sections. Fill material resulting from excavation onsite may contain significant gravel and oversized rock that will require specific recommendations for use as fill. General recommendations for placement of rock fill and oversized material are presented in the following sections.

5 PRELIMINARY RECOMMENDATIONS

The following preliminary geotechnical engineering recommendations are based on our understanding of the project as currently proposed, our literature review, our field observations during surface reconnaissance, and our experience in the area. The recommendations are preliminary, and are provided for planning purposes only. The preliminary conclusions and recommendations in this report should be verified by a design-level geotechnical engineering investigation and/or observation during grading.

5.1 GRADING

5.1.1 Glory Hole Closure

The glory holes that we observed in 2002 appeared to be shallow surface depressions. Those features should be regraded if they are located within 100 feet of proposed building footprints or within 40 feet of roads, pedestrian pathways, utilities, or other proposed improvements. Assuming that the glory holes are confirmed to be relatively shallow features, (i.e., less than approximately 15 feet in depth) they will need to be located and overexcavated to the depth necessary to reveal competent native soil or weathered rock. Following the removal of loose soil and debris, the resulting excavation should be backfilled with compacted soil. The soil should be placed in 8-inch loose lifts and compacted to a minimum of 90 percent compaction based on ASTM D1557. As an alternative to the use of compacted fill, controlled density backfill such as a three-sack, sand-cement slurry may be used.

Deeper excavations may require structural closure through the use of reinforced concrete slabs, concrete plugs, or collapse and fill placement. The actual closure methods used will need to be determined by the project geotechnical engineer following observation of the individual features.

Glory holes more than 100 feet from proposed building footprints or 40 feet from proposed improvements do not necessarily need to be backfilled with compacted fill. However, all apparent mining excavations encountered during site preparation, grading, and construction onsite should be reviewed in an attempt to determine the potential hazards, if any, and provide recommended mitigation measures, if appropriate.

5.1.2 Clearing and Grubbing

Areas proposed for fill placement, paved areas, and building pads should be cleared and grubbed of vegetation and other deleterious materials as described below.

1. Strip and remove organic surface soil containing shallow vegetation and any other deleterious materials. This organic soil can be stockpiled onsite and used in landscape areas, but is not suitable for use as fill. The actual depth of stripping may vary across the site. Areas of deeper organic surface soil may be encountered in drainage swales and low lying areas.

2. Overexcavate any loose fill, debris and/or other onsite excavations to underlying, competent material. Possible excavations include exploratory trenches excavated by others, mantles or soil test pits, and tree stump holes.

3. Remove all rocks greater than 8 inches in greatest dimension (oversized rock) by scarifying to a depth of 12 inches or to resistant weathered rock, if shallower, in proposed building pads and areas to support pavement, slabs-

on-grade, and other flatwork. Oversized rock should be placed in deep fill per the recommendations of the project geotechnical engineer, stockpiled for later use in landscape areas, drainage features, or stacked rock walls, or removed from the site.

4. Vegetation, tree stumps and exposed root systems, and any other deleterious materials and oversized rocks not used in landscape areas should be removed from the site.

5.1.3 Preparation for Fill Placement

Upon completion of site clearing, grubbing and overexcavation, the exposed native soil should be observed by a representative of our firm prior to placement of fill at the project site. Fill placed on slopes steeper than 5:1, H:V, should be benched into the existing slope to allow placement of fill in horizontal lifts.

5.1.4 Fill Placement

Fill should be placed according to the following guidelines:

1. Material used for fill construction should consist of uncontaminated, predominantly granular, non-expansive native soil or approved import soil. Rock used in fill should be no larger than 8 inches in diameter. Rocks larger than 8 inches are considered oversized material and should be placed in deep fill per the recommendations of the project geotechnical engineer, stockpiled for use in landscape areas or rock walls, or removed from the site.

2. Oversized material may be windrowed in deeper fill under the observation of the project geotechnical engineer. The windrows should be separated by at least one equipment width. Compacted fill should be worked into the sides of each windrow, and remaining voids should be filled with smaller rock. If the oversized material is to be incorporated into a rock fill that does not permit density testing by nuclear methods, the contractor should prepare a test fill during initial fill placement for observation and testing. The means and methods of subsequent fill placement will be evaluated for conformance with the approved test fill.

3. Imported fill material should be predominantly granular, non-expansive and free of deleterious or organic material. If imported material is required to grade the site, it should be submitted to H&K for approval and laboratory analysis at least 72 hours prior to import to the site.

4. Clay soil, if encountered, may be used as fill if mixed with granular soil at a ratio determined by the project geotechnical engineer.

5. Fill should be uniformly moisture conditioned and placed in maximum 8-inch thick loose lifts (layers) prior to compacting.

6. The moisture content, density and relative compaction of fill should be evaluated by our firm during construction.

5.1.5 Cut/Fill Slope Grading

1. Cut and fill slopes should generally be no steeper than 2:1, H:V. Based on our experience in the area, steeper cut slope gradients may be feasible in areas that have significant rock structure. Steeper cut slope gradients must be verified based on the results of laboratory testing and observation of slope conditions.

2. Fill slopes should be constructed by overbuilding the slope face and then cutting it back to the design slope gradient. Fill slopes should not be constructed or extended horizontally by placing soil on an existing slope face and/or compacted by track walking.

3. Benching during placement of fill on an existing slope must extend through loose surface soil into firm material, and be performed at intervals such that no loose soil is left beneath the fill.

4. Our observation of rock outcrop in the northeastern portion of the site and our experience in the area has shown that areas of moderately or slightly weathered rock that is difficult to trench with conventional trenching equipment may be encountered during grading or trenching. Pre-ripping, blasting, or splitting may be required in these areas. The scope of a future design level investigation should include excavation of exploratory trenches along

proposed road and utility trench alignments to allow observation of subsurface soil and rock conditions.

5.1.6 Erosion Control

Graded portions of the site should be seeded following grading to allow vegetation to become established prior to and during the rainy season. In addition, grading that results in greater than one acre of soil disturbance or in sensitive areas may require the preparation of a storm water pollution prevention plan. As a minimum, the following controls should be installed prior to and during grading to reduce erosion.

1. Prior to commencement of site work, fiber rolls should be installed down slope of the proposed area of disturbance to reduce migration of sediment and small rocks from the site.

2. Soil exposed in permanent slope faces should be hydroseeded or hand seeded/strawed with an appropriate seed mixture compatible with the soil and climate conditions of the site as recommended by the local Resource Conservation District.

3. Following seeding, jute netting or erosion control blankets should be placed and secured over graded slopes steeper than 2:1, H:V, to keep seeds and straw from being washed or blown away. Tackifiers or binding agents may be used in lieu of jute netting.

4. Surface water drainage ditches should be established as necessary to intercept and redirect concentrated surface water away from cut and fill slope faces. Under no circumstances should surface water be directed over slope faces. The intercepted water should be discharged into natural drainage courses or into other collection and disposal structures.

5.1.7 Subsurface Drainage

If grading is performed during or immediately following the rainy season, seepage will likely be encountered. If groundwater or saturated soil conditions are encountered during grading, we anticipate that dewatering may be possible by gravity or by installation of sump pumps in excavations.

Control of subsurface seepage at the base of fill areas can typically be accomplished by placement of an area drain. Underlying, saturated soil is typically removed and replaced with free draining, granular drain rock enveloped in geotextile fabric. Fill soil can be placed after placing the granular rock to an elevation that is higher than the encountered groundwater. H&K should review proposed drainage improvements with regard to the site conditions prior to construction.

5.1.8 Surface Water Drainage

Proper surface water drainage is important to the successful development of the project. We recommend the following measures to help mitigate surface water drainage problems:

1. Slope final grade adjacent to structural areas so that surface water drains away from building pad finish subgrades at a minimum 2 percent slope for a minimum distance of 10 feet.

2. Compact and slope all soil placed adjacent to building foundations such that water is not retained to pond or infiltrate. Backfill should be free of deleterious material.

3. Direct downspouts to a solid collector pipe which discharges flow to positive drainage.

5.1.9 Construction Monitoring

Construction monitoring includes review of plans and specifications and observation of onsite activities during construction as described below.

1. We should be retained to review the final grading plans prior to construction to determine whether our recommendations have been implemented, and if necessary, to provide additional and/or modified recommendations.

2. We should be retained to perform construction monitoring during grading performed by the contractor to determine whether our recommendations have been implemented, and if necessary, provide additional and/or modified recommendations.

5.2 FOUNDATION SYSTEMS

Our preliminary opinion is that conventional shallow spread footings will be suitable for relatively lightly loaded, framed structures across much of the subject site. Footings should be founded on native, undisturbed soil, weathered rock or compacted and tested fill. Foundation design criteria and construction recommendations are typically provided as part of a design-level geotechnical engineering report.

Footings should be deepened through expansive clay soil, if encountered at the base of the footing excavations. Expansive clay soil is typically encountered in relatively thin layers near the soil/weathered rock interface.

Shallow, resistant rock may be encountered during construction which limits footing excavation. The presence of shallow rock within building footprints may require the use of rock anchors or dowels to provide uplift and sliding resistance. H&K can provide site specific anchor recommendations during construction if requested.

6 LIMITATIONS

The following limitations apply to the findings, conclusions and recommendations presented in this report:

1. Our professional services were performed consistent with the generally accepted geotechnical engineering principles and practices employed in northern California. This warranty is in lieu of all other warranties, either expressed or implied.

2. These services were performed consistent with our agreement with our client. We are not responsible for the impacts of any changes in environmental standards, practices or regulations subsequent to performance of our services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this report. This report is solely for the use of our client. Any reliance on this report by a third party is at the risk of that party.

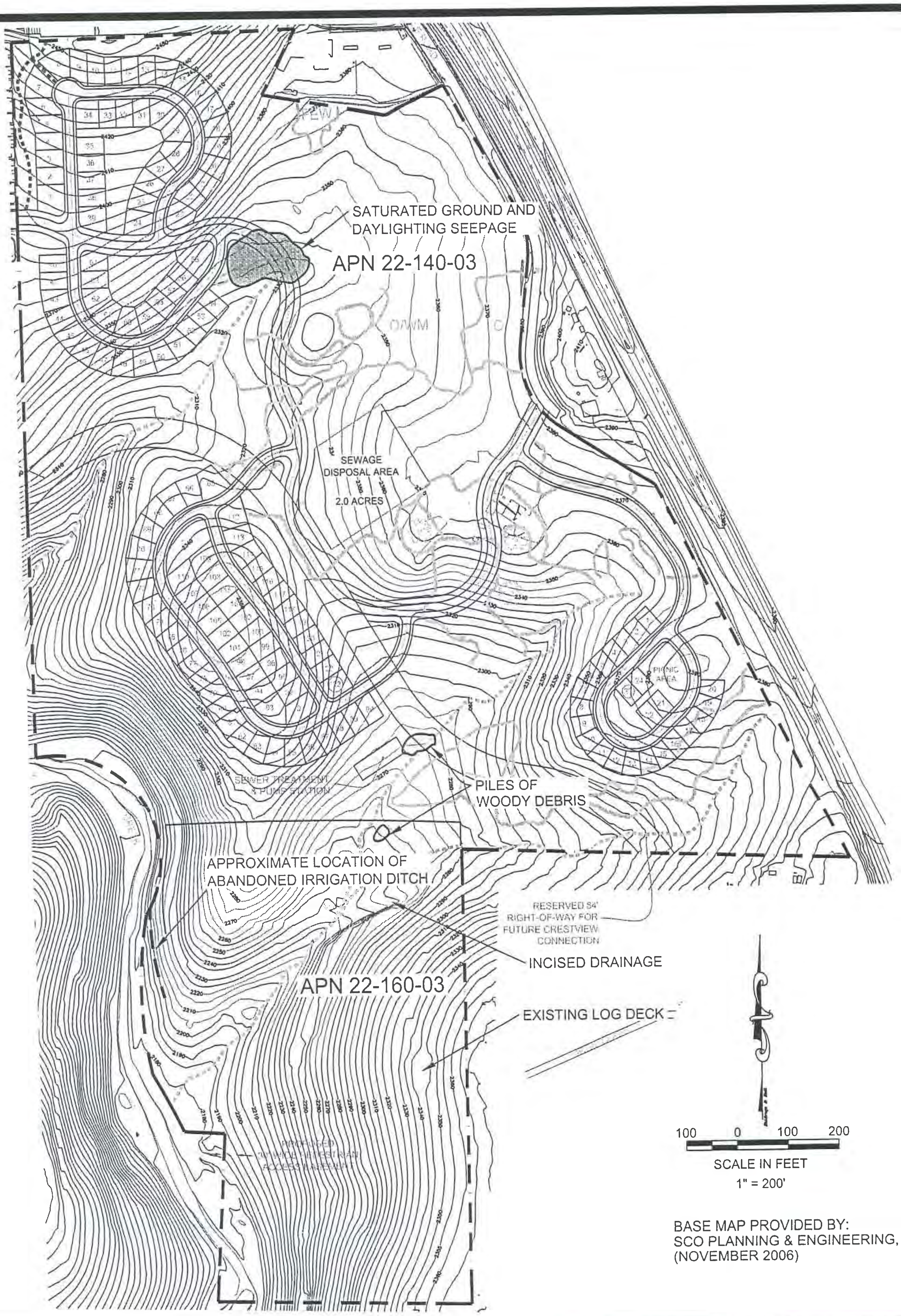
3. If changes are made to the nature or design of the project as described in this report, then the conclusions and recommendations presented in this report should be considered invalid by all parties. Only our firm can determine the validity of the conclusions and recommendations presented in this report. Therefore, we should be retained to review all project changes and prepare written responses with regards to their impacts on our conclusions and recommendations. Subsurface investigation and laboratory testing will be required to develop design-level recommendations.

4. The analyses, conclusions and recommendations presented in this report are preliminary, based on site conditions as they existed at the time we performed our surface observations. The subsurface conditions should be confirmed by a design-level geotechnical investigation prior to construction.

5. Our scope of services did not include evaluating the project site for the presence of hazardous materials. Project personnel should be careful and take the necessary precautions should hazardous materials be encountered during construction.

6. The findings of this report are valid as of the present date. Changes in the conditions of the property can occur with the passage of time. The changes may be due to natural processes or to the works of man, on the project site or adjacent properties. In addition, changes in applicable or appropriate standards can occur, whether they result from legislation or the broadening of knowledge. Therefore, the recommendations presented in this report should not be relied upon after a period of two years from the issue date without our review.

FIGURES



BASE MAP PROVIDED BY:
SCO PLANNING & ENGINEERING, INC.
(NOVEMBER 2006)

SITE PLAN
BERRIMAN RANCH
NEVADA COUNTY, CALIFORNIA

1746–02–FIG1

HK

HOLDREGE & KULL
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(530) 478–1305 FAX 478–1019

DRAWN BY: DFD
CHECKED BY: ZW
PROJECT NO.: 1746–02
DATE: DECEMBER 2006
FIGURE NO.: 1

APPENDIX 3.6-4 GEOTECHNICAL REPORT FOR APN 29-350-12

Geotechnical Report

Prepared for:
11759 La Barr Meadows Road
APN 29-350-12
Nevada County, California

Owner:
The Chrisetta Company, LLC
15476 Carrie Drive
Grass Valley, California 95949

Prepared by:
Sierra Geotechnical
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Chicago Park, California 95712

MARC E. ORMAN
3/3/2008
No. C47689
GE2330
EXP. 12/31/09

March 2008

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1.0 GENERAL

This report presents the results of Sierra Geotechnical's (Sierra) geotechnical investigation for the proposed development of Assessor's Parcel Number (APN) 29-350-12, located at 11759 La Barr Meadows Road in Grass Valley, California. The purpose of our investigation was to explore the surface and near subsurface site conditions, evaluate the materials encountered, and provide recommendations related to geotechnical aspects of the project design and construction.

1.1 PROPOSED PROJECT

The project site is a 11.36 acre undeveloped lot situated near the City of Grass Valley and is composed of one parcel, APN 29-350-12 (Figure 1). The site is bounded to the west by State Highway 49, to the north and south by developed lots, and to the east the Empire Mine State Park. Access to the site is provided by La Barr Meadows road.

Based on a review of the project grading plan prepared by the California Survey Company, dated June 2007, it is our understanding the project will consist of the construction of single and two story office buildings surrounded by a paved parking lots and landscaped areas. Associated with the development will be the construction of paved access roads, and retaining walls.

It is anticipated that the office buildings will be founded on a shallow, lightly loaded foundation system (less than 5 kips per lineal foot and 30 kips for perimeter and isolated foundation systems, respectively). The foundation system is expected to consist of a shallow spread foundation with a slab-on-grade floor.

Based on the review of the preliminary grading plan, cuts and fills up to a maximum thickness of about 10 feet are anticipated. Moreover, some of the proposed structure pads are proposed to reside on partial cut and partial fill, resulting in a high potential for excessive differential settlement to occur beneath the foundation. Recommendations are provided, herein, to reduce the estimated amount of settlement.

1.2 SCOPE OF SERVICES

Services performed for this study are in general conformance with our stated scope of services presented in Sierra's proposal dated February 1, 2008. Our scope of services included the following:

- Reconnaissance of the site surface conditions, topography, and existing drainage features.
- Review of existing, available geotechnical data for the project region.
- Exploration of the subsurface conditions within the project site using exploratory test pits. Eight test pits were excavated at the time of our field investigation using a John Deere 50D back hoe equipped with a two foot wide bucket. The backhoe and operator were provided by Mader's Grading and Paving. At the time of our investigation we logged the materials encountered in the test pits and collected

samples for laboratory testing.

- Laboratory testing was performed on selected samples obtained during our field investigation so that the soil properties could be determined for design purposes. Laboratory testing included plasticity characteristics, moisture content, density, gradations, direct shear, corrosion properties, and resistance value for pavement design and a consolidation /swell test.
- Engineering analyses consisting of pavement design, seismic hazard evaluation, settlement, retaining wall design parameters, and foundation bearing capacity.
- Preparation of a report stamped by a liscensed civil and geotechnical engineer, which includes:
  - A description of the proposed project;
  - A summary of our field exploration and laboratory testing programs;
  - A description of site surface and subsurface conditions encountered during our field investigation;
  - A description of ground shaking conditions expected at the site and UBC seismic design parameters for the site;
  - Geotechnical recommendations for:
    - Site preparation and engineered fill;
    - Temporary excavations, shoring and trench backfill;
    - Foundation design and construction;
    - Retaining wall parameters;
    - Concrete slabs supported on-grade;
    - Gross and differential settlement; and
    - Pavement section design.
  - A summary of our field exploration and laboratory testing programs;
  - Appendices that present a summary of our field investigation procedures, test pit logs, site specific seismic hazard data, and laboratory test data.

Our scope of services only included items specifically addressed within this report.

2.0 SITE CONDITIONS

2.1 SURFACE CONDITIONS

The proposed site is dominated by tree covered ground that has a west sloping topographic surface with moderate relief. Elevations across the site range from about 2,450 feet to 2,600 feet above mean sea level (MSL). Runoff from the site would flow west towards Wolf creek. The vegetative cover across the site consists of manzanita, oaks, pines and seasonal grasses. Some of the large pines have been removed from the site within the last few years. Evidence of past mining activities such as small waste rock dumps, and exploration pits were observed on the site during our field investigation.

2.2 REGIONAL GEOLOGIC SETTING

The project site is located in the foothills of the Sierra Nevada Physiographic province. The Sierra Nevada province is bordered to the north by the Cascade Range Physiographic province, to the east by the Basin and Range Physiographic province, to the west by the Great Valley Physiographic province, and to the south by the Mojave Desert Physiographic province.

The Sierra Nevada Physiographic province is a tilted fault block that is nearly 400 miles long. The east side is comprised of steep and rugged multiple fault blocks which contrast with the gentle western slopes where this project is located. The western slopes are cut by numerous deep river canyons. The upper areas of the province are made up massive diorites while the western slopes are composed of numerous rock types which have undergone varying degrees of alteration by weathering and metamorphism.

2.3 SUBSURFACE SOIL CONDITIONS

The subsurface soil conditions were explored through eight, shallow (up to 10 feet deep) test pits located randomly about the site. Appendix A provides a summary of the exploration procedures in addition to providing the logs of test pits. The approximate locations of the test pits are presented on Figure 2.

According to Saucedo and Wagner (1992), the site is mostly underlain by Cretaceous- Jurassic tonalite and trondhjemite rock types. Locally, these rock types have weathered into residual soils made up of stiff to very stiff silty clay with some gravel size particles, and reach depths greater than 10 feet thick. In general the soils become stiffer with depth and grade into soft rock.

Laboratory testing was performed on select soil samples recovered during our field investigation. Testing included classification and material property testing as needed for design purposes. The laboratory testing data sheets are presented in Appendix B.

2.4 GROUNDWATER

Groundwater was encountered at a depth of 5.5 feet in test pit number 2. Test pit number 2 was located close to the lowest area of the property. The groundwater encountered in this test pit appeared to be perched above a lower permeability soil, and is not connected to an underlying groundwater table that is estimated to exist below the depths explored during our field investigation. Ground water was not encountered in any of the other test pits

Groundwater elevations can vary throughout the year and from year to year. Intense and long duration precipitation, modification of topography, and cultural land uses, such as irrigation, water well usage, on site waste disposal systems, and water diversions can contribute to fluctuations in groundwater levels. It is not unusual for perched groundwater to be present a few feet below the natural ground surface during and for many months following winter. If groundwater is encountered during construction, it is the Contractor's responsibility to install mitigation measures for adverse impacts caused by groundwater encountered in excavations.

2.5 SEISMIC SETTING AND SEISMIC DESIGN PARAMETERS

The State of California designates faults as active, potentially active, and inactive depending on the recency of movement that can be substantiated for a fault. Fault activity is rated as follows:

FAULT ACTIVITY RATINGS

Fault Activity Rating	**Geologic Period of Last Rupture**	**Time Interval (Years)**
Active	Holocene	Within last 10,000 Years
Potentially Active	Quaternary	>10,000 to 1.6 Million Years
Inactive	Pre-Quaternary	Greater than 1.6 Million Years

The California Geologic Survey (CGS) evaluates the activity rating of a fault in fault evaluation reports (FER). FERs compile available geologic and seismologic data and evaluate if a fault should be zoned as active, potentially active, or inactive. If an FER evaluates a fault as active, then it is typically incorporated into a Special Studies Zone in accordance with the Alquist-Priolo Earthquake Hazards Act (AP). AP Special Studies Zones require site-specific evaluation of fault location and require a structure setback if the fault is found traversing a project site.

Peak horizontal ground accelerations were estimated for the project site using attenuation relations from Boore et al. (1997) and the computer program EQFAULT (Blake, 2000a).

No faults are known to pass through the project site (Jennings, 1994; Hart & Bryant, 1997), however, a number of regional and local faults traverse the project region. The most significant of these faults is the foothills fault system, located about 8 miles west of the site (Jennings, 1994). Other active faults in the area include the Mohawk – Honey Lake Zone located about 37 miles from the site, and the Great Valley 3 fault located approximately 62 miles from the site. A map showing the location of these and other known active faults located within 100 miles of the site are presented in Appendix C along with other site specific seismic hazard information. Based on the attenuation relation developed by Boore the Foothills Fault system could potentially create a site acceleration of 0.32 g.

A search of historical earthquakes occurring between 1800 and 2007, listed in the CGS catalog, was performed for a 100-mile radius around the project site (Blake, 2000b). That search found that 340 earthquakes have occurred within that area which had magnitudes greater than 4.0. Historically over the last 100 years, seventy earthquakes with local magnitudes (M_l) equal or greater than 5.0 have occurred within about 100 miles of the site, based on a search of selected earthquake catalogs (Real, 1978 and USGS, 1973 to present). The most recent significant earthquake to affect the project area was an earthquake with a moment magnitude (M_w) of 4.6 that occurred on May 15, 1906 about 2.4 miles from the site. This event was attenuated to the site using the method by Boore and indicated that the site acceleration from this event would have about 0.11 g. A listing of all the earthquakes with a magnitude greater than 4.0 is presented in Appendix C.

At a minimum, structures should be designed in accordance with the 2006 Uniform Building Code (UBC) criteria. UBC-based design requires the definition of the following seismic parameters: a Seismic Zone Factor (Z); a Soil Profile Type (S); Seismic Source Type; Near-Source Factors (Na and Nv); and Seismic Coefficients (Ca and Cv).

The Structural Engineers Association of California (SEAOC) Commentary to the UBC indicates that "the primary function of the UBC design requirements are to provide minimum standards for use in building design regulations to maintain public safety in the extreme earthquakes….not to limit damage, maintain function, or provide for easy repair". The owner should note that in the event of severe ground motions, structures designed per the UBC may be subject to structural damage.

The 1997 UBC places this area in Seismic Zone 3. A Soil Profile Type S_D, or stiff soil, may be used for design, based on the conditions encountered during our field investigation. The maximum magnitude expected for Battle Creek Fault is 6.5, with a slip rate estimated to be less than 0.1 millimeters per year (USGS, 2008). In accordance with the 1997 UBC, the Seismic Source Type would be "B". The seismic parameters, based on the site conditions described above and in accordance with the 1997 UBC, are summarized in the following table.

UBC SEISMIC DESIGN PARAMETERS

Parameter	**UBC Designation**
Seismic Zone	3
Soil Profile Type	S_D (Stiff Soil)
Seismic Source Type	"B"
Distance to Seismic Source	8 miles
Near Source Factor, N_a	1.0
Near Source Factor, N_v	1.0
Seismic Coefficient, C_a	0.36
Seismic Coefficient, C_v	0.54

The Structural Engineering Institute (SEI) and American Society of Civil Engineers (ASCE), have published a standard entitled "Minimum Design Loads for Buildings and Other Structures", 7-05 (2006) which has now been adopted by the State of California. This standard requires site classification procedures for seismic design (Chapter 20). Based on this standard the site would have the parameters listed in the following table:

ASCE 7-05 SITE CLASSIFICATION PARAMETERS

Parameter	**7-05 Parameter**
Site Class	D (stiff soil)
Shear Wave Velocity (V_s)	1,000 ft/sec
Standard Penetration Resistance (N)	15
Average Undrained Shear Strength (S_u)	1,500 psf

2.6 LIQUEFACTION

Liquefaction is described as the sudden loss of soil shear strength due to a rapid increase of soil pore water pressures caused by cyclic loading from a seismic event. In simple terms, it means that a liquefied soil acts more like a fluid than a solid when shaken during an earthquake. In order for liquefaction to occur, the following are needed:

- Granular soils (sand, silty sand, sandy silt, and some gravels);
- A high groundwater table; and
- A low density in the granular soils underlying the site.

If those criteria are present, then there is a potential that the soils could liquefy during a seismic event.

Soils encountered during this investigation are estimated to have a low potential for liquefaction under the anticipated seismic ground motions at the site. The soils were generally stiff to very stiff within the depths explored, with a significant amount of clay.

2.7 EXPANSIVE SOILS

There is a direct relationship between plasticity of a soil and the potential for expansive behavior, with expansive soil generally having a high plasticity. Based on the plasticity index test results ranging from 19 to 28, the clay soil materials at the site have a medium swelling potential (Coduto, 2002). The swell test conducted in the laboratory indicates that while the soils have a medium swelling potential, the swell pressure measured was less than 1 pound per square inch (psi) for the sample tested which would be considered very low.

2.8 PHYSICAL RISKS FROM HISTORICAL MINING ACTIVITIES

The project site is located adjacent to the historical Empire Mine. Evidence of historical mining in this area include shallow pits, and waste rock piles. All of the mining in this area was performed using underground mining techniques along deep vein systems. No auriferous gravels were observed on the site, making it unlikely that surface or shallow mining activities were performed. The shallow pits observed on the site were most likely used for exploration purposes in order to find veins. The rock that was mined in this area was generally hard competent material that required little if any structural support.

The greatest risk from the historical mining activities would be from a collapse of a covered air or access shaft. Based on our field exploration program this risk would be minimal and should not affect the development of the site since this same level of risk is present throughout most of the foothill communities including Grass Valley and Nevada City.

The risk could be reduced by inspection during and after development of the site and making sure that all concrete slabs, interior and exterior, are steel reinforced with welded wire or bars spaced at a maximum distance of 12-inches in both directions. Inspection would involve the observation of the appearance of low spots in areas which were previously graded level. These areas are easily observed in paved parking areas by the appearance of "bird baths" after storm events.

2.9 CORROSIVE SOILS

Corrosion testing was performed in general accordance with the California Department of Transportation (Caltrans) test methods for pH, minimum resistivity, chloride content, and sulfate content. The test data is presented in Appendix C and summarized below:

CORROSION TESTING SUMMARY

Parameter	Test Result
pH	4.35
Minimum Resistivity	15,810 ohm-cm
Chloride Content	14.5 ppm
Sulfate Content	0.5 ppm

Based on the Caltrans guidelines (September 2003) this soil would be considered corrosive since the pH is less than 5.5. However, it meets the other criteria for non-corrosive soils since the resistivity is greater 1,500 ohm-cm, the chloride content is less than 500 ppm, and the sulfate content is less than 2,000 ppm. Reinforcing steel embedded within concrete would not be at risk. However, it is recommended that all culverts installed on the site should be constructed of concrete or polyethylene. Only non-corrosive or coated materials should be used for any mechanically stabilized embankment (MSE) structures, ground anchors, pipes, or other buried elements.

3.0 CONCLUSIONS AND RECOMMENDATIONS

3.1 GENERAL

Based on the results of our investigation, it is our opinion that the site may be developed for the proposed improvements utilizing conventional grading and shallow foundation construction techniques, provided recommendations presented herein are incorporated into the design of the project.

The primary geotechnical site considerations are: 1) the potential for excessive differential settlement of the foundation that spans between cut and fill areas, and 2) the potential for groundwater to become perched above some of the natural soils, creating saturated ground surface conditions. Recommendations are provided below to reduce the potential adverse impact of these considerations

Recommendations presented herein are based upon our current understanding of the project. Changes in the proposed grading and elevations, or site conditions that vary from those studied during this investigation may require supplemental recommendations.

3.2 SITE PREPARATION AND GRADING

3.2.1 Stripping

Prior to general site grading and/or construction of planned improvements, existing vegetation, organic topsoil, and all debris and deleterious materials should be stripped and disposed of off-site or outside the construction limits. Stripped topsoil (less any debris, boulders or large tree roots) may be stockpiled and reused for landscape purposes; however, this material should not be incorporated into any engineered fill. Based on our field investigation, the depth of topsoil requiring stripping ranges from about 6 to 12-inches.

3.2.2 Existing Utilities, Wells, and/or Foundations

Although unlikely to be present within the undeveloped project site, all below-grade utility lines, septic tanks, cesspools, wells, on-site waste disposal fields and tanks, irrigation ponds and/or foundations that are encountered within the area of construction should be removed and disposed of off-site. Buried tanks, if present, should be removed in compliance with applicable regulatory agency requirements. Existing, below-grade utility pipelines (if any) that extend beyond the limits of the proposed construction and will be abandoned in-place should be plugged with lean concrete or grout to prevent migration of soil and/or water. All excavations resulting from removal and demolition activities should be cleaned of loose or disturbed material prior to placing any fill or backfill.

3.2.3 Scarification and Compaction

Following any site stripping and overexcavation, areas to receive engineered fill should be scarified to a depth of 8 inches, uniformly moisture-conditioned to near optimum moisture content, and compacted to at least 90 percent of the maximum dry density as determined using standard test method ASTM D1557[1].

3.2.4 Wet/Unstable Soil Conditions

If site preparation or grading is performed in the winter or spring season, or shortly after significant precipitation, near-surface on-site soils may be significantly over optimum moisture content. This condition could hinder equipment as well as efforts to compact site soils to a specified level of compaction. In addition, perched water can be present in subsurface layers throughout the year and contribute to wet soil conditions. If over optimum soil moisture content conditions are encountered during construction, disking to aerate, replacement with imported material, chemical treatment, stabilization with a geotextile fabric or grid, and/or other methods will likely be required to facilitate earthwork operations. The applicable method of stabilization is the contractor's responsibility and will depend on the contractor's capabilities and experience, as well as other project-related factors beyond the scope of this investigation. Therefore, if over-optimum moisture within the soil is encountered during construction, Sierra should review these conditions (as well as the contractor's capabilities) and, if requested, provide recommendations for their treatment.

3.2.5 Site Drainage

Finished grading should be performed in such a manner that provides a minimum of 10 horizontal feet of positive surface gradients away from all structures. The ponding of water should not be allowed adjacent to structures or fill slopes. Surface runoff should be directed toward engineered collection systems or suitable discharge areas. Roof downspouts should also be collected and discharged away from all structures.

3.2.6 Shrinkage or Bulking Estimates

The upper foot or so of soil consisted of loose or soft soil that would be expected to have an associated shrinkage factor for grading calculations. Below the upper soil layer, stiff to very stiff materials were often encountered that would be expected to have an associated bulking factor for grading calculations. The shrinkage or bulking factors are anticipated to be approximately plus or minus 10 percent.

3.2.7 Excavatability

Stiff to very stiff soil conditions were encountered in all of the test pits excavated as part of our investigation. Based on the soils encountered during our investigation the site excavations can be performed using conventional earth moving equipment and blasting should not be required.

3.2.8 Cut and Fill Slopes

Based on the soils encountered during our investigation and the laboratory test results all final and cut or fill slopes should be graded to a maximum slope angle of 2 to 1 (horizontal to vertical). All slopes need to be protected from erosion with drainage control at the top and bottom. In areas

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[1] This test procedure applies wherever relative compaction, maximum dry density, or optimum moisture content is referenced within this report.

where space is available, cut and fill slopes should be graded to 3 to 1. Flatter slopes are easier to work on, establish vegetation on, and control erosion on. All fill should be installed on properly benched and keyed subgrade surfaces. Keyways and benches should be a minimum of 4 feet deep and 10 feet wide.

3.3 ENGINEERED FILL

3.3.1 On-Site Soil Materials

It is our opinion that most of the near-surface soils encountered during exploration can be used for engineered fill, provided that oversize material greater than 6 inches is removed prior to compaction of the fill within lifts. If highly plastic clayey materials are encountered during grading, those materials should be segregated and excluded from engineered fill, where possible.

3.3.2 Imported Fill Materials - General

All imported engineered fill should consist of soil and/or soil-aggregate mixtures generally less than 3 inches in maximum dimension, free of visible organic or other deleterious debris, and essentially non-plastic. Typically, well-graded mixtures of gravel, sand, non-plastic silt, and small quantities (less than 15 percent) of clay are acceptable for use as imported engineered fill. Imported fill materials should be sampled and tested prior to importation to the project site to verify that those materials meet recommended material criteria noted below. Specific requirements for imported fill materials, as well as applicable test procedures to verify material suitability are as follows:

IMPORTED ENGINEERED FILL – GENERAL

Gradation		**Test Procedures**	
Sieve Size	***Percent Passing***	***ASTM***	***AASHTO***
3-inch	100	D 422	T 88
¾-inch	70 – 100	D 422	T 88
No. 200	0 – 15	D 422	T 88
Plasticity			
Liquid Limit	***Plasticity Index***		
Less than 30	Less than 12	D 4318	T 89, T 90
Organic Content			
Less than 3%		D 2974	

3.3.3 Granular Fill

All granular fill should consist of imported soil mixtures less than 3 inches in maximum dimension, free of visible organic or other deleterious debris, and essentially non-plastic. Specific requirements for granular fill, as well as applicable test procedures to verify material suitability are as follows:

IMPORTED ENGINEERED FILL – GRANULAR

Gradation		**Test Procedures**	
Sieve Size	*Percent Passing*	*ASTM*	*AASHTO*
3-inch	100	D 422	T 88
¾-inch	70 – 100	D 422	T 88
No. 200	<5	D 422	T 88
Plasticity Index			
Nonplastic		D 4318	T 89, T 90
Organic Content			
Less than 3%		D 2974	

3.3.4 Placement and Compaction

Soil and/or soil-aggregate mixtures used for fill should be uniformly moisture-conditioned to within 2 percent of optimum moisture content, placed in horizontal lifts less than 8 inches in loose thickness, and compacted to at least 90 percent relative compaction. Testing should be performed to verify that the relative compaction is being obtained as recommended herein. Compaction testing, at a minimum, should consist of one test per every 500 cubic yards of soil being placed or at every 1.5-foot vertical fill interval, whichever comes first.

In general, a "sheep's foot" or "wedge foot" compactor should be used to compact fine-grained fill materials. A vibrating smooth drum roller could be used to compact granular fill materials and final fill surfaces.

3.4 FOUNDATIONS

3.4.1 Minimum Footing Embedment and Dimensions

We recommend that shallow isolated and continuous wall footings be founded entirely on engineering fill, or entirely within native soil materials. The allowable bearing pressures provided below are based on a minimum embedment depth of 18 inches and a minimum width of 18 inches.

It should be noted that frost heave is not typically a hazard in the Grass Valley area and is generally not considered in design of foundation systems. Therefore, no recommendations for frost protection have been provided herein.

3.4.2 Allowable Bearing Pressures

Following site preparation as recommended, foundations may be constructed. Foundations should be founded entirely within native, undisturbed soil or upon a uniform thickness of engineered fill.

All foundation excavations should be made level, with the exception of where vertical steps are required.

We recommend that isolated and continuous foundations be designed so they do not exceed an allowable bearing pressure of 1,500 pounds per square foot (psf) for dead load plus live loads. We recommend a minimum footing width of 18 inches and a minimum depth of embedment of 18 inches. The allowable bearing pressure may be increased by 10 percent for each additional foot of width or foot of embedment, up to a maximum allowable bearing pressure of 2,500 psf. The allowable bearing pressure includes a factor of safety of 3, and is a net value; therefore, the weight of the foundation extending below the subgrade level may be neglected when computing dead loads. The allowable bearing values may be increased by one-third to account for the short-term effects of wind and/or seismic loading. The allowable bearing value is for vertical loads only; eccentric loads may require adjustment to the values recommended above.

3.4.3 Sliding and Passive Resistance

Resistance to lateral loads such as from wind or earthquake loads may be provided by frictional resistance between the bottom of concrete foundations and the underlying soils, and by passive soil pressure against the sides of the foundations. The provided lateral resistance parameters are ultimate values; therefore, a suitable factor of safety should be applied to these values for design purposes.

A sliding friction coefficient of 0.35 may be used for the footing/soil contact. Frictional resistance may be calculated in conjunction with a lateral passive pressure represented by an equivalent fluid weighing 350 pounds per cubic foot (pcf). Lateral passive pressure can be calculated where footings bear laterally against competent undisturbed native soils, or engineered fill for that portion of the foundation element extending below a depth of 1 foot below the lowest adjacent grade.

Sliding resistance and passive pressure may be used together without reduction in conjunction with recommended safety factors outlined below. A minimum factor of safety of 2 is recommended for foundation sliding, where sliding resistance and passive pressure are used together. The safety factor for sliding can be reduced to 1.5 if passive pressure is neglected.

3.4.4 Estimated Settlements

The anticipated total post-construction settlement for the proposed structure foundations, if construction occurs as recommended within this report, should be less than 1-inch, based on the proposed grading we reviewed on the preliminary grading plans available at the time of preparation of this report. Differential settlement for the structure foundations is anticipated to be less than 3/4-inch in 30 feet, provided that the construction considerations for the pad that spans both cut and fill are adhered to as described in the following section.

Settlements should be less for structures founded completely on cut.

3.4.5 Pads Supported Partially on Cut and Fill

Following site preparation as recommended, the proposed foundation for the office buildings may be constructed, provided the footings are founded entirely within native, undisturbed soil or entirely within engineered fill materials. Currently the grading plans show some of the pads partially founded in fill and partially in cut. To correct for this, the foundation in areas of fill can be deepened so that they rest on native, undisturbed soils. This is practical where fills are relatively thin (less than about five feet). Alternatively, the cut portion of pad can be over excavated and replaced with engineered fill so that foundation bottoms rest on a minimum of three feet of engineered fill (depending on the footing width). Over excavation should extend below the bottom of foundations a minimum of three times the width of the footing in all cut areas extending a minimum of five feet outside the perimeter of proposed structures. The bottom of over excavations should be approved by Sierra prior to fill placement and engineered fill materials should be placed and compacted in accordance with recommendations made in Section 3.3 of this report.

3.5 INTERIOR CONCRETE FLOOR SLABS SUPPORTED ON-GRADE

All ground-supported slabs should be designed by a Civil Engineer to support the anticipated loading conditions but at a minimum should be at least 4 inches thick. Reinforcement for floor slabs should be designed by a Civil Engineer to maintain structural integrity, and should not be less than that required to meet pertinent code, shrinkage, and temperature requirements. Reinforcement should be placed at mid-thickness in the slab with provisions to ensure it stays in that position during construction and concrete placement.

Subgrade soils supporting interior concrete floor slabs should be scarified to a minimum depth of 8 inches, uniformly moisture-conditioned to between 0 to 3 percent above the optimum moisture content, and compacted to at least 90 percent relative compaction.

Interior concrete floor slabs supported-on-grade should be underlain by a capillary break consisting of a blanket of compacted, free-draining, durable gravel at least 4 inches thick, graded such that 100 percent passes the 1-inch sieve and less than 5 percent passes the No. 4 sieve. Furthermore, a vapor retarder should be placed beneath all interior concrete floor slabs supported-on-grade that will be covered with moisture-sensitive floor coverings. This vapor retarder should consist of a plastic or vinyl membrane with a minimum thickness of 10 mils placed directly over the rock capillary break. If a vapor retarder is not installed, there is a risk of moisture vapors and salts penetrating the slab-on-grade. To promote more uniform curing of the slab and provide protection of the membrane during construction, the membrane should be covered with 2 inches of sand prior to placing concrete.

Sand placed above the membrane should be moistened just prior to concrete placement to aid in curing. Concrete should not be placed if sand overlying the vapor retarder has been allowed to become saturated (due to precipitation or excessive moistening) or if standing water is present above the membrane. Excessive water beneath interior floor slabs could result in significant vapor transmission through the slab, adversely affecting moisture-sensitive floor coverings.

3.6 EXTERIOR CONCRETE SLABS SUPPORTED-ON-GRADE

Subgrade soils supporting exterior concrete slabs[2] should be scarified to a minimum depth of 8 inches, uniformly moisture-conditioned to between 0 to 3 percent above the optimum moisture content, and compacted to at least 90 percent relative compaction. In the event the exposed subgrade is dense and uniformly compacted, scarification and compaction may be omitted if approved by Sierra during construction. The subgrade should not be allowed to dry such that desiccation cracks form within the exposed subgrade prior to concrete placement.

Exterior concrete slabs should also be reinforced with either welded wire fabric or number 4 bars spaced at 12-inches on center in both directions.

3.7 RETAINING WALLS

Retaining walls that retain onsite soil materials derived from local excavated soils with a horizontal back slope, may be designed to resist active lateral soil pressures represented by the equivalent fluid weight of 34 pounds per cubic foot for cantilevered walls (capable of tilting at least 0.2 percent of the wall height), provided the walls have drains installed behind them as recommended below.

For a uniform vertical surcharge applied next to the wall within a distance equal to the height of the wall, a lateral earth pressure coefficient of 0.28 should be applied to the vertical surcharge load to compute the increased active pressure on the wall due to the surcharge.
For inclined back slopes and retaining walls that are part of structures such as basements, the lateral earth pressure coefficient will need to be adjusted accordingly. For a 25 degree back slope angle (approximately 2h:1v), the active lateral equivalent fluid weight can be considered to be about 42 pounds per cubic foot and the lateral earth pressure coefficient to be about 0.35. For back slopes that deviate from horizontal or 25 degrees, Sierra should be contacted to develop the appropriate coefficient based on on-site conditions.

All retaining wall foundations should be embedded into competent, undisturbed native soils or compacted, engineered fill. Lateral forces may be resisted by both the passive pressure exerted on the side of the footing and by friction along the base.

Sliding and passive resistance may be assumed to be the same as recommended for foundations. Where the retaining wall is located near the top of a slope, a lateral resistance value of zero should be assigned wherever the horizontal distance from the edge of the retaining wall footing to the crest of the slope is less than twice the embedment depth of the footing.

The design active soil pressures presented above are dependent upon positive drainage being provided behind the retaining walls to avert potential hydrostatic pressure build-up. Retaining walls should be backfilled with pervious gravel material within a minimum one-foot wide zone directly behind the wall for the entire wall height up to within 1 foot of the ground surface. Drainage gravel

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[2] Within this report, exterior concrete slabs supported-on-grade refers to walkways, driveways, patios, etc. and specifically excludes roadway pavements.

material should be free-draining granular material with less than 3 percent passing the No. 200 sieve. Separation cloth consisting of 4-ounce per square yard minimum weight, non-woven geotextile fabric (Amoco Propex 4545, Contech C45NW, or equivalent) should be placed between the drainage gravel and the native soil or fill material behind the wall. Water collected behind the walls should either be collected and conveyed at the base of the drainage gravel through 3" perforated pipe and discharged away from the structure, or discharged through weep holes placed near the base of the walls at a maximum spacing of 10 feet.

3.8 UTILITY TRENCHES

3.8.1 General

All temporary excavations must comply with applicable local, state, and federal safety regulations, including the current OSHA Excavation and Trench Safety Standards. Construction site safety generally is the responsibility of the contractor, who should be solely responsible for the means, methods, and sequencing of construction operations so that a safe working environment is maintained.

3.8.2 Construction Considerations

Heavy construction equipment, building materials, excavated soil, and vehicular traffic should not be allowed within a 1:1 (horizontal to vertical) projection from the toe of open excavations to the ground surface. Support systems such as shoring or bracing should be used to provide structural stability and to protect personnel working within the excavation in accordance with good construction practices and all applicable safety regulations.

During wet weather, earthen berms or other methods should be used to prevent runoff water from entering excavations. All runoff water entering the excavation(s) should be collected and disposed of outside the construction limits.

3.8.3 Dewatering

Groundwater should be anticipated during wet periods of the year within the depths of typical trench excavations and could enter utility trenches excavated for this project, especially if excavations are made during wet seasons of the year. If groundwater is encountered during construction, it is recommended that the contractor install measures to divert the groundwater from entering the excavation. If this is not possible, then the contractor should channel groundwater to flow towards collection points to be removed from the trench and disposed of at an approved area. The rate that groundwater might flow into trenches was not assessed during this study. If groundwater is high at the time of construction, the contractor might need to install dewatering wells in areas of excavation to lower groundwater elevations prior to construction.

3.8.4 Backfill Materials

Pipe zone backfill (i.e., material placed from the trench bottom to a minimum of 6 inches over the pipeline crown) should consist of imported soil having a Sand Equivalent (SE) of no less than 30 and having a particle size no greater than ½-inch in maximum dimension. On site soils will likely not meet this recommendation. Trench zone backfill (i.e., material placed between the pipe zone backfill and finished subgrade) may consist of on-site soil that meets the material requirements previously provided for engineered fill with 100 percent passing the ¾-inch sieve.

If imported material is used for pipe or trench zone backfill, we recommend it consist of fine-grained sand. In general, use of coarse-grained sand and/or gravel is not recommended due to the potential for soil migration into and water seepage along trenches backfilled with this type of material. If coarse-grained materials are used as trench backfill, a lower permeability plug should be placed and compacted within the trench at regular intervals. We recommend that the lower permeability material consist of grout or a well graded soil with greater than 15 percent passing the No. 200 sieve. The plug should be placed for a length of 10 feet at an interval of about every 200 feet along the length of the trench.

Recommendations provided above for pipe zone backfill are minimum requirements only. More stringent material specifications may be required to fulfill local codes and/or bedding requirements for specific types of pipe. We recommend the project Civil Engineer develop these material specifications based on planned pipe types, bedding conditions, and other factors beyond the scope of this investigation.

3.8.5 Backfill Placement and Compaction

Backfill in temporary excavations should be placed and compacted in accordance with recommendations previously provided for engineered fill. Mechanical compaction is strongly recommended; ponding or jetting should not be allowed unless specifically reviewed and approved by Sierra prior to construction. Special care should be given to ensuring that adequate compaction is made beneath the haunches of utility pipes (that area from the pipe springline to the pipe invert) and that no voids remain in this space.

3.8.6 Subgrade Stabilization

Soft and yielding subgrade could be encountered along the bottom of excavations. It is recommended that the bottom of excavations be stabilized prior to placement of the pipeline bedding or engineered fill so that, in the judgment of the geotechnical engineer, the subgrade is firm and unyielding. The Contractor should have the sole responsibility for design and implementation of subgrade stabilization techniques. Some methods that we have observed used to stabilize excavation subgrades include the following:

- Use of ¾–inch to 1½-inch floatrock worked into the excavation bottom and covered with a geotextile fabric such as Mirafi 500X;
- Placement of a geotextile fabric, such as Mirafi 500X, on the excavation bottom and covered with at least one foot of compacted processed miscellaneous base (PMB) conforming to the requirements of Section 200-2.5 of the Greenbook, latest edition;
- Overexcavation of excavation subgrade and placement of two-sack sand-cement slurry; and

- In extreme conditions, injection grouting.

If floatrock is used, typically sand with an SE of 50 or more should be used to fill the voids in the rock prior to placement of pipe bedding materials.

3.9 INTERIOR CONCRETE FLOOR SLABS SUPPORTED ON-GRADE

All ground-supported slabs should be designed by a Civil Engineer to support the anticipated loading conditions but at a minimum should be at least 4 inches thick. Reinforcement for floor slabs should be designed by a Civil Engineer to maintain structural integrity, and should not be less than that required to meet pertinent code, shrinkage, and temperature requirements. Reinforcement should be placed at mid-thickness in the slab with provisions to ensure it stays in that position during construction and concrete placement.

Subgrade soils supporting interior concrete floor slabs should be scarified to a minimum depth of 8 inches, uniformly moisture-conditioned to between 0 to 3 percent above the optimum moisture content, and compacted to at least 90 percent relative compaction.

Interior concrete floor slabs supported-on-grade should be underlain by a capillary break consisting of a blanket of compacted, free-draining, durable gravel at least 4 inches thick, graded such that 100 percent passes the 1-inch sieve and less than 5 percent passes the No. 4 sieve. Furthermore, a vapor retarder should be placed beneath all interior concrete floor slabs supported-on-grade that will be covered with moisture-sensitive floor coverings. This vapor retarder should consist of a plastic or vinyl membrane with a minimum thickness of 10 mils placed directly over the rock capillary break. If a vapor retarder is not installed, there is a risk of moisture vapors and salts penetrating the slab-on-grade. To promote more uniform curing of the slab and provide protection of the membrane during construction, the membrane should be covered with 2 inches of sand prior to placing concrete.

Sand placed above the membrane should be moistened just prior to concrete placement to aid in curing. Concrete should not be placed if sand overlying the vapor retarder has been allowed to become saturated (due to precipitation or excessive moistening) or if standing water is present above the membrane. Excessive water beneath interior floor slabs could result in significant vapor transmission through the slab, adversely affecting moisture-sensitive floor coverings.

3.10 EXTERIOR CONCRETE SLABS SUPPORTED-ON-GRADE

Subgrade soils supporting exterior concrete slabs[3] should be scarified to a minimum depth of 8 inches, uniformly moisture-conditioned to between 0 to 3 percent above the optimum moisture content, and compacted to at least 90 percent relative compaction. In the event the exposed subgrade is dense and uniformly compacted, scarification and compaction may be omitted if approved by Sierra during construction. The subgrade should not be allowed to dry such that desiccation cracks form within the exposed subgrade prior to concrete placement.

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[3] Within this report, exterior concrete slabs supported-on-grade refers to walkways, driveways, patios, etc. and specifically excludes roadway pavements.

3.11 POSTS, LIGHT POLES, OR INDIVIDUAL EMBEDDED COLUMNS

For lateral soil resistance design of posts, light poles, or individual columns embedded into the ground, we recommend the Nonconstrained and Constrained formulas presented in Chapter 18 of the current UBC. Allowable values for S1 and S3 can be derived using an allowable lateral bearing pressure of 200 pounds per square foot per foot of depth where embedded into competent, well compacted engineered fill or native materials.

3.12 SUBSURFACE DRAINAGE

Subdrains should be installed under certain conditions where necessary to intercept shallow perched water flow thereby minimizing the nuisance of saturated conditions occurring within the near-surface soil.

Prior to placement of engineered fill within existing drainage swales, we recommend that subdrains be constructed along the thalwag (lowest part along the flowline) of the swale. The subdrain will serve to intercept and remove subsurface water that will naturally accumulate within the low areas of the natural terrain, and limit the risk of subsurface water surfacing within the lower elevations of the developed areas.

The subdrains should be constructed using perforated pipe surrounded by clean drain rock and wrapped in geosynthetic, non-woven filter fabric. Figure 3 provides a typical drawing of subdrain applications. Corrugated polyethylene dual wall pipe such as that manufactured by Advanced Drainage Systems (ADS) N-12 can be substituted for the schedule 40 PVC pipe shown in the figure.

3.13 PAVEMENT DESIGN

3.13.1 R-Values

One R-value tests was performed on a select sample of the on-site soils obtained during our subsurface exploration program. The R-value test was performed in accordance with Caltrans test method CT-301 and is presented in Appendix C. The laboratory R-value was 30 for this sample recovered from test pit 5 at a depth of 1.5 feet. Because the actual subgrade materials that will be present at finish subgrade are unknown at this time, we recommend that confirmatory R-value tests be obtained during construction. If the construction R-values are significantly different than the R-value reported above, then we can modify the pavement design at that time to reflect the constructed conditions.

3.13.2 Subgrade Preparation

All subgrade soils should be scarified to a minimum depth of 1-foot; moisture conditioned as necessary to near optimum moisture conditions and compacted to a minimum of 95 percent of the maximum dry density as determined by AASHTO (American Association of State Highway and Transportation Officials) Test Method T-180. The subgrade should be smooth and unyielding prior to the placement of aggregate base rock. Density testing and proof rolling of the subgrade using a loaded water truck should be performed with satisfactory results prior to placement of the aggregate base rock. Concrete curbs and landscape planters that border pavement sections should be embedded into the subgrade soils a minimum of 3 inches to prevent the migration of meteoric and irrigation water into the pavement section.

3.13.3 Aggregate Sub-Base

The aggregate sub-base (AS) should be of such quality as to meet or exceed Caltrans specifications for Class 4 AS and should have a minimum R-value of 50. The AS should be spread in thin lifts restricted to 6 inches in loose thickness or less, moisture conditioned as necessary to near optimum moisture content and compacted to a minimum of 95 percent of the maximum dry density as determined by AASHTO T-180. Density testing and/or proof rolling should be performed prior to placement of the aggregate base.

3.13.4 Aggregate Base

The aggregate base (AB) should be of such quality as to meet or exceed Caltrans specifications for Class 2 AB and should have a minimum R-value of 78. The AB should be spread in thin lifts restricted to 8 inches in loose thickness or less, moisture conditioned as necessary to near optimum moisture content and compacted to a minimum of 95 percent of the maximum dry density as determined by AASHTO T-180. Density testing and/or proof rolling should be performed prior to placement of the asphalt paving.

3.13.5 Asphalt Concrete Paving

An R-value obtained for this study had a value of 30. Traffic indices (TI) for proposed project access roads and parking areas were not available to us at the preparation time of this report. To provide recommendations for structural pavement sections, we evaluated design criteria for three TIs: 4, 5, and 6. Using those criteria, we have prepared AC structural pavement section recommendations. Recommendations for full depth AC, AC and AB, and AC, AB, and aggregate subbase (AS) sections are provided in the following table:

Section	Traffic Index	Type B AC Thickness (in)	Class 2 AB Thickness (in)	Class 4 AS Thickness (in)
Full Depth AC	4.0	4.5	- - -	- - -
	5.0	5.5	- - -	- - -
	6.0	7.0	- - -	- - -
AC and AB	4.0	2.0	5.5	- - -
	5.0	2.5	6.5	- - -
	6.0	3.0	8.5	- - -
AC, AB, and AS	4.0	2.0	2.0	4.0
	5.0	2.5	3.0	4.5
	6.0	3.0	4.0	5.0

Asphalt paving materials and equipment should meet or exceed current Caltrans specifications.

4.0 ADDITIONAL SERVICES

We recommend Sierra review final grading and foundation plans, and specifications to evaluate that recommendations contained herein have been properly interpreted and implemented during design. Further, a representative from Sierra should monitor all site earthwork activities (including site preparation, over-excavations, placement of engineered fill and trench backfill, construction of slab and pavement subgrades, and all foundation excavations).

Monitoring services are an essential component of our design services. Monitoring allows us to observe the subsurface conditions encountered during construction, evaluate the applicability of the recommendations presented in this report to the conditions encountered, and recommend appropriate changes in design or construction procedures if conditions differ from those described herein.

5.0 LIMITATIONS

This report has been prepared in substantial accordance with the generally accepted geotechnical engineering practice, as it existed in the site area at the time our services were rendered. No other warranty, either expressed or implied, is made. Conclusions and recommendations contained in this report were based on the conditions encountered during our field investigation and are applicable only to those project features described herein (see the Proposed Project section). It is possible subsurface conditions could vary between or beyond the points explored. If conditions are encountered during construction that differ from those described in this report, or if the scope or nature of the proposed construction changes, we should be notified immediately in order to review and, if deemed necessary, conduct additional studies and/or provide supplemental recommendations.

Recommendations provided in this report are based on the assumption that Sierra will conduct an adequate program of testing and observation during the construction phase in order to evaluate compliance with our recommendations.

The scope of services provided by Sierra for this project did not include the investigation and/or evaluation of toxic substances, or soil or groundwater contamination of any type. If such conditions are encountered during site development, additional studies may be required. Further, services provided by Sierra for this project did not include the evaluation of the presence of critical environmental habitats or culturally sensitive areas.

This report may be used only by our client and their agents and only for the purposes stated herein, within a reasonable time from its issuance. Land use, site conditions, and other factors may change over time that may require additional studies. In the event a significant period of time elapses between the issuance date of this report and construction, Sierra shall be notified of such occurrence in order to review current conditions. Depending on that review, Sierra may require that additional studies be conducted and that an updated or revised report is issued.

Any party other than our client who wishes to use all or any portion of this report shall notify Sierra of such intended use. Based on the intended use as well as other site-related factors, Sierra may require that additional studies be conducted and that an updated or revised report be issued. Failure to comply with any of the requirements outlined above by the client or any other party shall release Sierra from any liability arising from the unauthorized use of this report.

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Figure 1. - Site Location Map

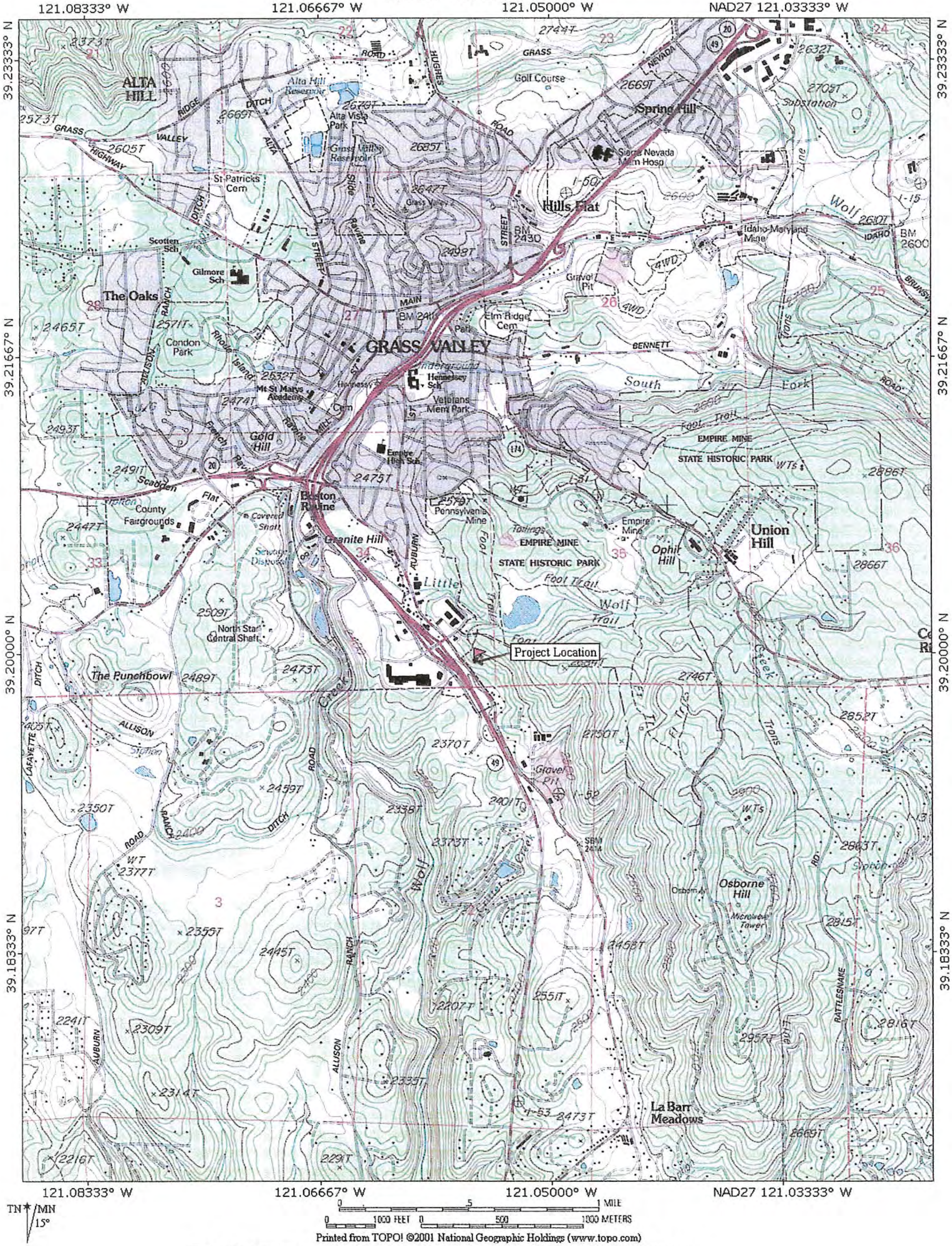

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FIGURE 1 SITE LOCATION MAP

APPENDIX A
SUBSURFACE EXPLORATION

The subsurface exploration program for the proposed project consisted of the excavation and logging of eight test pits, as indicated on Figure 2. The test pits were advanced on February 7, 2006, using a John Deere Backhoe 50D excavator equipped with a 24-inch bucket. The exploratory test pits were excavated to a maximum depth of 10 feet below the ground surface. The soils encountered within the test pits were logged in general accordance with the Unified Soil Classification System. After the test pits were logged, they were backfilled with the excavated soil; however, the backfill was not compacted to the requirements for engineered fill. As a result, all test pits will need to be located and re-excavated and refilled with compacted engineered fill during construction. The approximate test pit locations are shown in Figure 2, and detailed descriptions of soils encountered are presented on the soil logs within this Appendix.

Selected samples of the native subsoil were collected during our subsurface investigation, and laboratory tests were performed in order to evaluate the characteristics of the materials encountered. The results of the soil laboratory tests are presented within Appendix B.

The logs of the test pits advanced for this investigation are presented as Plates 3 through 10, and the legend to the Unified Soil Classification System and Keys to Terms and Symbols are presented as Plates 1 and 2.

MAJOR DIVISIONS			USCS SYM.	DESCRIPTION
COARSE-GRAINED SOILS MORE THAN 50% OF SAMPLE OR MATERIAL IS LARGER THAN THE #200 SIEVE (0.0029 INCHES)	**GRAVELS** MORE THAN 50% OF THE COARSE FRACTION IS RETAINED ON THE #4 SIEVE (0.1870 INCHES)	**GRAVELS** CLEAN GRAVELS WITH LITTLE OR NO FINES	**GW**	WELL GRADED GRAVELS AND SAND MIXTURES WITH LITTLE TO NO FINES
			GP	POORLY GRADED GRAVELS & GRAVEL/ SAND MIXTURES W/LITTLE TO NO FINES
		GRAVELS WITH FINES IN APPRECIABLE AMOUNTS	**GM**	SILTY GRAVELS AND GRAVEL/ SAND/ SILT MIXTURES
			GC	CLAYEY GRAVELS AND GRAVEL/ SAND/ CLAY MIXTURES
	SANDS MORE THAN 50% OF THE COARSE FRACTION PASSES THE #4 SIEVE (0.1870 INCHES)	**SANDS** CLEAN SANDS WITH LITTLE OR NO FINES	**SW**	WELL GRADED SANDS AND GRAVELLY SANDS WITH LITTLE TO NO FINES
			SP	POORLY GRADED SANDS AND GRAVELLY SANDS WITH LITTLE TO NO FINES
		SANDS WITH FINES IN APPRECIABLE AMOUNTS	**SM**	SILTY SANDS AND SAND/ GRAVEL/ SILT MIXTURES
			SC	CLAYEY SANDS AND SAND/ GRAVEL/ CLAY MIXTURES
FINE-GRAINED SOILS MORE THAN 50% OF SAMPLE OR MATERIAL IS SMALLER THAN THE #200 SIEVE (0.0029 INCHES)	**SILTS AND CLAYS** LIQUID LIMIT LESS THAN 50		**ML**	INORGANIC SILTS AND VERY FINE SANDS, SILTY AND/OR CLAYEY FINE SANDS, CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS WITH LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS AND CLAYS WITH HIGH PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50		**MH**	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDS OR SILTS
			CH	INORGANIC CLAYS WITH HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC SILTS AND CLAYS WITH HIGH PLASTICITY
HIGHLY ORGANIC SOILS			**PT**	PEAT, HUMUS, SWAMP SOIL WITH HIGH ORGANIC CONTENT

GENERAL NOTES

- Dual symbols (such as ML/CL or SM/SC) are used to indicate borderline soil classifications.
- In general, USCS designations shown on the logs were evaluated utilizing visual methods. Actual designations (based on laboratory tests) may vary.
- Logs represent general soil conditions observed on the date and locations indicated. No warranty is provided regarding soil continuity between locations.
- Lines separating soil strata's on the logs are approximate. Actual transitions may be gradual and vary in depth.

Sierra Geotechnical

UNIFIED SOIL CLASSIFICATION SYSTEM
Empire Business Park

GRASS VALLEY, CALIFORNIA

Plate
1

SAMPLERS AND SAMPLE SYMBOLS

Symbol	Blow Count Representation	Samplers and Sample Types
◣	45	Split-Spoon Sampler (SPT): 1-3/8" ID, 2" OD, Driven
■	(35)	California Modified Split-Spoon Sampler, 2-3/8" ID, 3" OD, Driven
☒	NA	Hand Driven Tube or Bulk Sample (bag, grab sample, etc.)
⊡	NA	No Sample Recovery
▩	NA	Shelby Tube, 2-7/8" ID, 3" OD, Pushed

Blow counts are recorded as the number of blows required for one foot of sampler penetration using a 140-lb. hammer falling 30 inches. Typically, a sampler is driven 18" and the initial 6" of sample is discarded.

SYMBOLS SHOWN ON LOGS

Symbol	Represents
———	Separation between geologic formations
-·-·-·-·-	Separation between lithologic units within a geologic formation
▽	Initial water level measurement**
▼	Water level after initial measurement**

**(both measurements may not represent stabilized water levels)

LABORATORY TEST ABBREVIATIONS

DS - Direct Shear; Consol - Consolidation; GS - Grain-Size Distribution; EI - Expansion Index; UC - Unconfined Compression; TC - Triaxial Compression; SC - Soil-Chemistry; AL - Atterberg Limits; SE - Sand Equivalent; R - R-value; S - Swell; Proctor - Curve; PP - Pocket Penetrometer; TV - Torvane

NOTES FOR ALL LOGS

The data presented on the logs are a generalization of actual geologic conditions present at the site of the exploration at the time and location the exploration was performed. Actual subsurface geologic and geotechnical conditions may vary at the exploration site and other locations, with the passage of time. In addition, lines separating strata and geologic units are approximate boundaries only and those contacts might be gradual. No Warranty is provided as to the continuity of soil conditions between sample locations. In general, the USCS designations presented on the logs were estimated by visual methods only and actual designations (based on laboratory tests) may vary.

Sierra Geotechnical	LEGEND FOR SOIL LOGS Empire Business Park Grass Valley, CALIFORNIA	Plate **2**

Exploration Date	Logged By	Final Exploration Depth	Test Pit No.
February 8, 2008	*Marc Orman*	*9.0'*	**TP- 1**

Exploration Equipment: *John Deere 50D excavator w/ 2' bucket*

Location: see map

DEPTH (feet)	SAMPLE (Location)	USCS SYMBOL	Surface Condition (at time of investigation): *west sloping terrain, pines, oaks and manzanita* Approx. Groundwater El. (at time of investigation): *not encountered*	MOISTURE (%)	Dry Density (pcf)	LIQUID LIMIT	Plasticity Index	Expansion Index	*Comments*
			Dark Brown Topsoil, moist, loose.						
1									
2	x	CL	Red Silty Clay, some sand, moist, moderate plasticity, stiff, no dilatancy reaction.	23.5	105.4				
3									
4									
5									
6									
7		MH	Reddish-Yellow sandy SILT, some clay and sand, moist but drier then above, low plasticity, very stiff. some residual rock fabric						
8									
9									
10			**Total Depth 9.0 feet.** no groudwater encountered no caving						
11									
12									
13			X = sample location						
14									
15									

Sierra Geotechnical

Lat. 39.1986

Long. 121.0561

LOG OF EXPLORATORY TEST PIT

Empire Business Park, Labarr Meadows Rd.

Grass Valley, Califonia

Plate **3**

Exploration Date: *February 8, 2008*

Logged By: *Marc Orman*

Final Exploration Depth: *9.0'*

Test Pit No. **TP- 2**

Exploration Equipment: *John Deere 50D excavator w/ 2' bucket*

Location: see map

Surface Condition (at time of investigation): *west sloping terrain, pines, oaks and manzanita*

Approx. Groundwater El. (at time of investigation): *5.5 ft.*

DEPTH (feet)	SAMPLE (Location)	USCS SYMBOL		MOISTURE (%)	PASSING #4 (%)	LIQUID LIMIT	Plasticity Index	R-VALUE	*Comments*
1			Brown fill						
2 3 4 5	X	CL	Brown Silty Clay, some sand, wet, plastic, soft to medium stiff		100	42	19		
6 7 8		MH	Reddish-Yellow sandy SILT, some clay and sand, moist but drier then above, low plasticity, very stiff. some residual rock fabric						
9 10 11 12 13 14 15			**Total Depth 8.5 feet.** Seepage encountered at contact at 5.5 ft. no caving X = sample location						

Sierra Geotechnical

Lat.	39.1984
Long.	121.055

LOG OF EXPLORATORY TEST PIT
Empire Business Park, Labarr Meadows Rd.
Grass Valley, Califonia

Plate **4**

Exploration Date
February 8, 2008

Logged By
Marc Orman

Final Exploration Depth
9.0'

Test Pit No.
TP- 3

Exploration Equipment
John Deere 50D excavator w/ 2' bucket

Location
see map

DEPTH (feet)	SAMPLE (Locat	USCS SYMBOL	Surface Condition (at time of investigation) *west sloping terrain, pines, oaks and manzanita* Approx. Groundwater El. (at time of investigation) *not encountered*	MOISTURE (%)	Dry Density (pcf)	LIQUID LIMIT	Plasticity Index	Expansion Index	Comments
1			Dark Brown Topsoil, moist, loose.						
2 3 4 5 6		CL	Red Silty Clay, some sand and gravel, moist, moderate plasticity, stiff, no dilatancy reaction. angular gravel up to 4" dia.						
7 8 9 10		MH	Reddish-Yellow sandy SILT, some clay and sand, moist but drier then above, low plasticity, very stiff. some residual rock fabric						
11 12 13 14 15			**Total Depth 10.0 feet.** **no groudwater encountered** no caving X = sample location						

Sierra Geotechnical
Lat. 39.1993
Long. 121.0552

LOG OF EXPLORATORY TEST PIT
Empire Business Park, Labarr Meadows Rd.
Grass Valley, Califonia

Plate
5

Exploration Date: *February 8, 2008*
Logged By: *Marc Orman*
Final Exploration Depth: *9.0'*
Test Pit No. **TP- 4**
Exploration Equipment: *John Deere 50D excavator w/ 2' bucket*
Location: see map

Surface Condition (at time of investigation): *west sloping terrain, pines, oaks and manzanita*
Approx. Groundwater El. (at time of investigation): *not encountered*

DEPTH (feet)	*SAMPLE (Locat*	*USCS SYMBOL*	Description	*MOISTURE (%)*	*PASSING #4 (%)*	*LIQUID LIMIT*	*Plasticity Index*	*R-VALUE*	*Comments*
			Dark Brown Topsoil, moist, loose.						
1		CH	Red Silty Clay, some sand and gravel, moist, low plasticity, stiff, no dilatancy reaction. angular gravel up to 4" dia.						
2	X								
3									
4									
5									
6		MH	Reddish-Yellow sandy SILT, some clay and sand, moist but drier then above, low plasticity, very stiff. some residual rock fabric						
7									
8									
9			**Total Depth 9.0 feet.** **no groudwater encountered** **no caving** X = sample location						
10									
11									
12									
13									
14									
15									

Sierra Geotechnical
Lat. 39.1997
Long. 121.0562

LOG OF EXPLORATORY TEST PIT
Empire Business Park, Labarr Meadows Rd.
Grass Valley, Califonia

Plate **6**

Exploration Date *February 8, 2008*

Logged By *Marc Orman*

Final Exploration Depth *9.0'*

Exploration Equipment *John Deere 50D excavator w/ 2' bucket*

Location see map

Test Pit No.

TP- 5

Surface Condition (at time of investigation) *west sloping terrain, pines, oaks and manzanita*

Approx. Groundwater El. (at time of investigation) *not encountered*

DEPTH (feet)	SAMPLE (Locat	USCS SYMBOL		MOISTURE (%)	Dry Density (pcf)	LIQUID LIMIT	Plasticity Index	Expansion	Comments
			Dark Brown Topsoil, moist, loose.						
1	x	CL	Red Silty Clay, some sand, moist, low plasticity, medium stiff, no dilatancy reaction.					X	< 1 psi expan.
2									
3									
4									
5		MH	Reddish-Yellow sandy SILT, some clay and sand, moist but drier then above, low plasticity, very stiff. some residual rock fabric						
6									
7			Reddish-Yellow, friable rock, moist.						
8			**Total Depth 7.0 feet** **no groudwater encountered** **no caving, excavator refusal at 7.0 feet**						
9									
10									
11									
12									
13			X = sample location						
14									
15									

Sierra Geotechnical

Lat.	39.2006
Long.	121.056

LOG OF EXPLORATORY TEST PIT
Empire Business Park, Labarr Meadows Rd.
Grass Valley, Califonia

Plate

7

Exploration Date	Logged By	Final Exploration Depth	Test Pit No.
February 8, 2008	*Marc Orman*	*9.0'*	**TP- 6**
Exploration Equipment *John Deere 50D excavator w/ 2' bucket*		Location see map	

DEPTH (feet)	SAMPLE (Locat	USCS SYMBOL	Surface Condition (at time of investigation) *Rolling terrain, sparse pines and manzanita, old hydrauliced area* Approx. Groundwater El. (at time of investigation) *not encountered*	MOISTURE (%)	PASSING #4 (%)	LIQUID LIMIT	Plasticity Index	R-VALUE	Comments
			Dark Brown Topsoil, moist, loose.						
1		MH	Red SILT, some clay, and sand,						
2	X		moist, low plasticity, stiff, no dilatancy reaction.		100	54	23		
3									
4									
5									
6									
7		MH	Reddish-Yellow sandy SILT, some clay and sand, moist but drier then above, low plasticity, very stiff. some residual rock fabric						
8									
9									
10			**Total Depth 9.0 feet.** **no groudwater encountered** **no caving**						
11									
12									
13			X = sample location						
14									
15									

Sierra Geotechnical

Lat. 39.2002

Long. 121.0552

LOG OF EXPLORATORY TEST PIT

Empire Business Park, Labarr Meadows Rd.

Grass Valley, Califonia

Plate

8

Exploration Date
February 8, 2008

Logged By
Marc Orman

Final Exploration Depth
9.0'

Test Pit No.
TP- 7

Exploration Equipment
John Deere 50D excavator w/ 2' bucket

Location
see map

DEPTH (feet)	*SAMPLE (Locat*	*USCS SYMBOL*	Surface Condition (at time of investigation) *west sloping terrain, pines, oaks and manzanita* Approx. Groundwater El. (at time of investigation) *not encountered*	*MOISTURE (%)*	*Dry Density (pcf)*	*LIQUID LIMIT*	*Plasticity Index*	*Expansion*	*Comments*
			Dark Brown Topsoil, moist, loose.						
1		CL	Red Silty Clay, some sand,						
2	X		moist, low plasticity, stiff, no dilatancy reaction.						
3									
4									
5									
6		MH	Reddish-Yellow sandy SILT, some clay and sand, moist but drier then above, low plasticity, very stiff. some residual rock fabric						
7									
8									
9			**Total Depth 9.0 feet.** **no groudwater encountered** **no caving**						
10									
11									
12									
13			X = sample location						
14									
15									

Sierra Geotechnical
Lat. 39.1997
Long. 121.0549

LOG OF EXPLORATORY TEST PIT
Empire Business Park, Labarr Meadows Rd.
Grass Valley, Califonia

Plate
9

Exploration Date	Logged By	Final Exploration Depth	Test Pit No.
February 8, 2008	*Marc Orman*	*9.0'*	**TP- 8**
Exploration Equipment *John Deere 50D excavator w/ 2' bucket*		Location see map	

DEPTH (feet)	SAMPLE (Locat	USCS SYMBOL	Surface Condition (at time of investigation) *Rolling terrain, sparse pines and manzanita, old hydrauliced area* Approx. Groundwater El. (at time of investigation) *not encountered*	MOISTURE (%)	PASSING #4 (%)	LIQUID LIMIT	Plasticity Index	R-VALUE	*Comments*
			Dark Brown Topsoil, moist, loose.						
1	X	CH	Red Clay, some sand, moist, low plasticity, stiff, no dilatancy reaction.		100	51	28		
2									
3									
4									
5		MH	Reddish-Yellow sandy SILT, some clay and sand, moist but drier then above, low plasticity, very stiff. some residual rock fabric						
6									
7									
8									
9			**Total Depth 8.0 feet.** **no groudwater encountered** **no caving**						
10									
11									
12									
13			X = sample location						
14									
15									

Sierra Geotechnical
Lat. 39.1997
Long. 121.0565

LOG OF EXPLORATORY TEST PIT
Empire Business Park, Labarr Meadows Rd.
Grass Valley, Califonia

Plate
10

APPENDIX B
LABORATORY TESTING

LABORATORY ANALYSES

Laboratory tests were performed on selected undisturbed and bulk soil samples to estimate selected engineering characteristics of encountered earth materials. Testing was performed under procedures described in one of the following references:

1. ASTM Standards for Soil Testing, latest revision;
2. Lambe, T.W. (1951), Soil Testing for Engineers, Wiley, New York;
3. Laboratory Testing, U.S. Army, Office of the Chief of Engineers, Engineer Manual No. 1110-2-1906, November 30, 1970

GRAIN SIZE DISTRIBUTION

Grain size distribution was determined for four soil samples in accordance with standard test method ASTM D1140. The grain size distribution data are shown on the attached plate labeled Laboratory Sieve Analysis. Oversize material generally greater than 3 inches was not included in the sample. Oversize material was generally less than about 5 percent of the native soil material.

ATTERBERG LIMITS

Atterberg Limits (plastic limit, liquid limit and plasticity index) tests were performed on four selected samples in accordance with standard test method ASTM D4318. The samples with higher plasticity based on visual-manual observation were generally selected for testing. Results of the Atterberg Limits tests are presented on the Log of Test Pits and on the attached plate labeled *Atterberg Limits Tests.*

RESISTANCE R-VALUE TEST

One R-value test was performed on a selected relatively undisturbed sample using standard test method California Test Method 301. The results of the test are presented on the attached plate labeled *R-Value.*

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ATTERBERG LIMITS

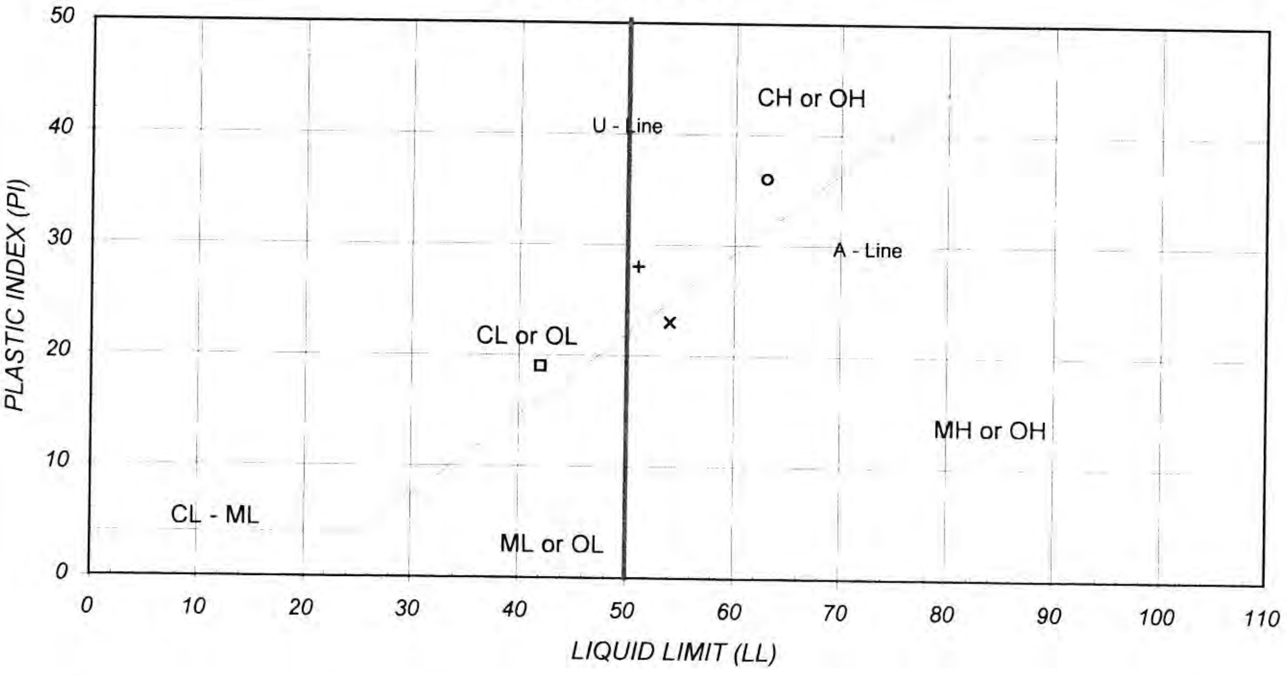
Summary Report

ASTM D-4318

Client: Sierra Geotechnical
Project No: 021704.07
Lab Log No: **2447**
Project Name: Empire Business Park
Report Date: February 7, 2008

LSN	SYMBOL	SAMPLE IDENTIFICATION	SAMPLE DESCRIPTION	LIQUID LIMIT	PLASTIC LIMIT	PLASTIC INDEX
2447D	☐	TP-2, 1.5'-2.0' (Rec'd 2/7/08)	Reddish Brown Lean Clay w/ Sand (CL)	42	23	19
2447H	+	TP-8, 1.5'-2.0' (Rec'd 2/7/08)	Reddish Brown Fat Clay w/ Sand (CH)	51	23	28
2447F-1	x	TP-6, 1.5'-2.0' (Rec'd 2/7/08)	Reddish Brown Elastic Silt (MH)	54	31	23

PLASTICITY CHART



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LABORATORY SERVICES

SOIL SUMMARY

Client: Sierra Geotechnical
Project No: 021704.07
Lab Log: **2447**
Project Name: Empire Business Park
Report Date: February 12, 2008

LSN	Sample ID	Soil Classification **	R-Value	Water Content %	Dry Density pcf	Void Ratio	Saturation %	Porosity %
2447I	TP-1, 1.5'-2'	Reddish Brown Lean Clay (CL)		23.5	105.4	0.6	106.0	37.5
2447C	TP-5, 1.5'-2'	Red Brown Clayey Silt	30					

Notes: ** Classifications are based on ASTM D-2487 when appropriate test results are available and per ASTM D-2488 when visual
Specific Gravity is assumed at 2.70

Entered By: JL
Rev. By:

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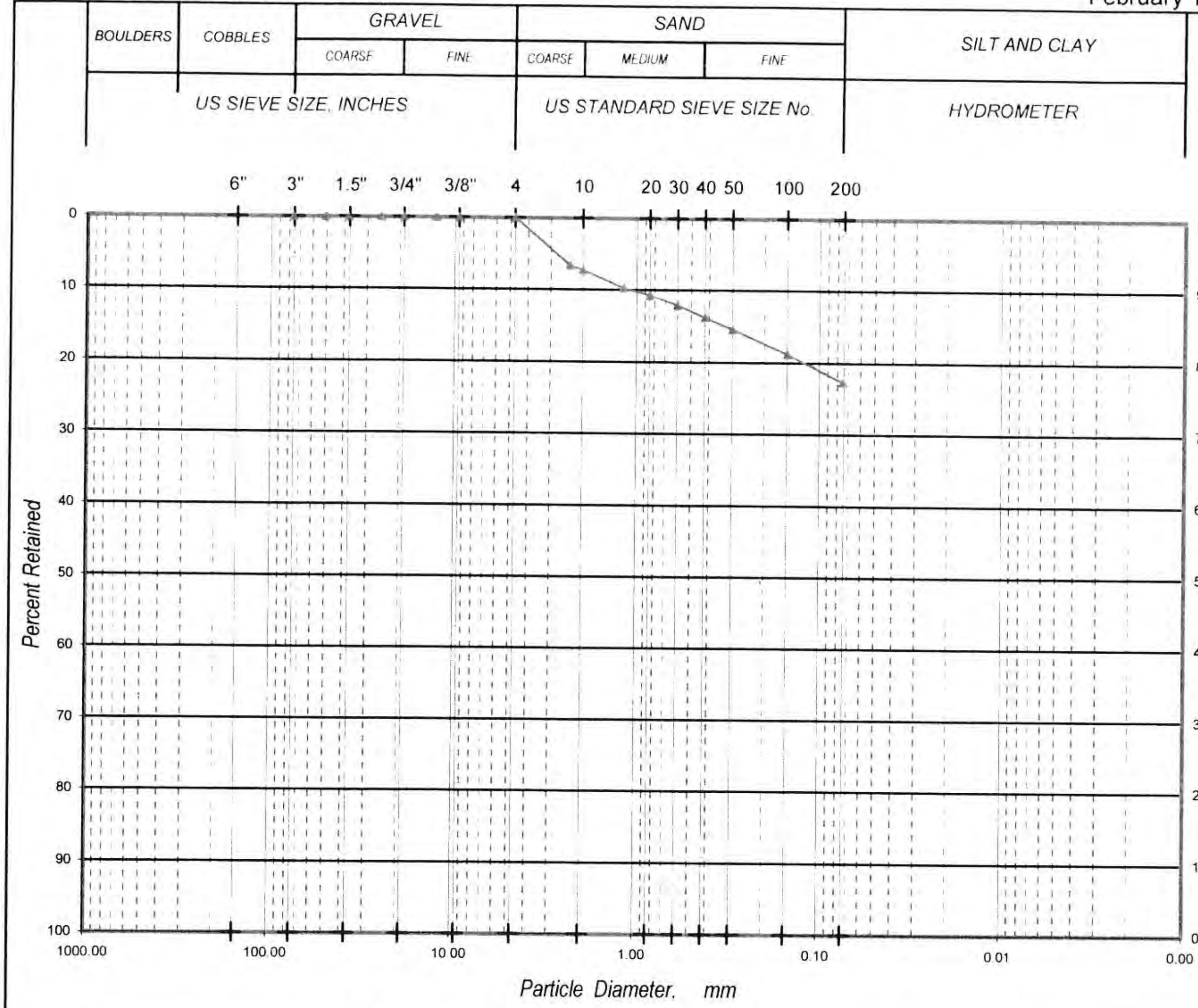
LABORATORY SERVICES

PARTICLE SIZE ANALYSIS

TEST REPORT

ASTM D-422

Client: SIERRA GEOTECHNICAL
Project No: 021704.07
Lab Sample No: **2447D**
Project Name: EMPIRE BUSINESS PARK
Report Date: February 13, 2008



Symbol	Sample ID	Description	% Gravel	% Sand	% Silt - Clay
▲	TP-2, 1.5'-2.0' (Rec'd 2/7/08)	Reddish Brown Lean Clay w/ Sand (CL)	0.0	22.7	77.3

Size Passing, mm D_{60} = N/A D_{30} = N/A D_{10} = N/A

Coefficient of Curvature, C_c: N/A Coefficient of Uniformity, C_u: N/A Fineness Modulus = 0.62

Note: * Percentages are +/- 0.1% based on computer rounding as allowed by ASTM D-6026-01 Section 5.2.3.

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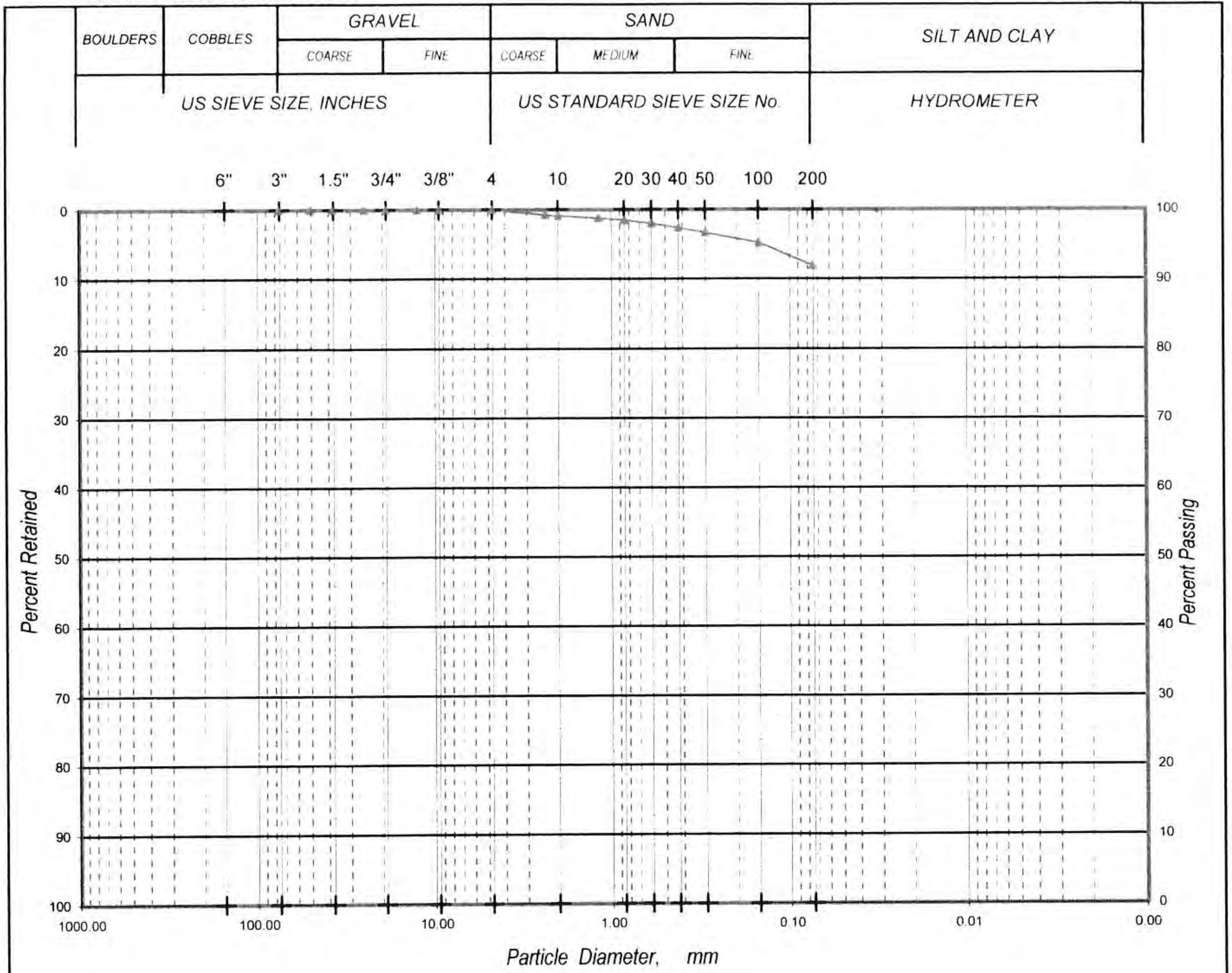
PARTICLE SIZE ANALYSIS

TEST REPORT

ASTM D-422

Client: SIERRA GEOTECHNICAL
Project No: 021704.07
Lab Sample No: **2447F**
Project Name: EMPIRE BUSINESS PARK
Report Date: February 13, 2008



Symbol	Sample ID	Description	% Gravel	% Sand	% Silt - Clay
▲	TP-6, 1.5'-2.0' (Rec'd 2/7/08)	Reddish Brown Fat Clay (CH)	0.0	8.0	92.0

Size Passing, mm D_{60} = N/A D_{30} = N/A D_{10} = N/A

Coefficient of Curvature, C_c: N/A Coefficient of Uniformity, C_u: N/A Fineness Modulus = 0.12

Note: * Percentages are +/- 0.1% based on computer rounding as allowed by ASTM D-6026-01 Section 5.2.3.

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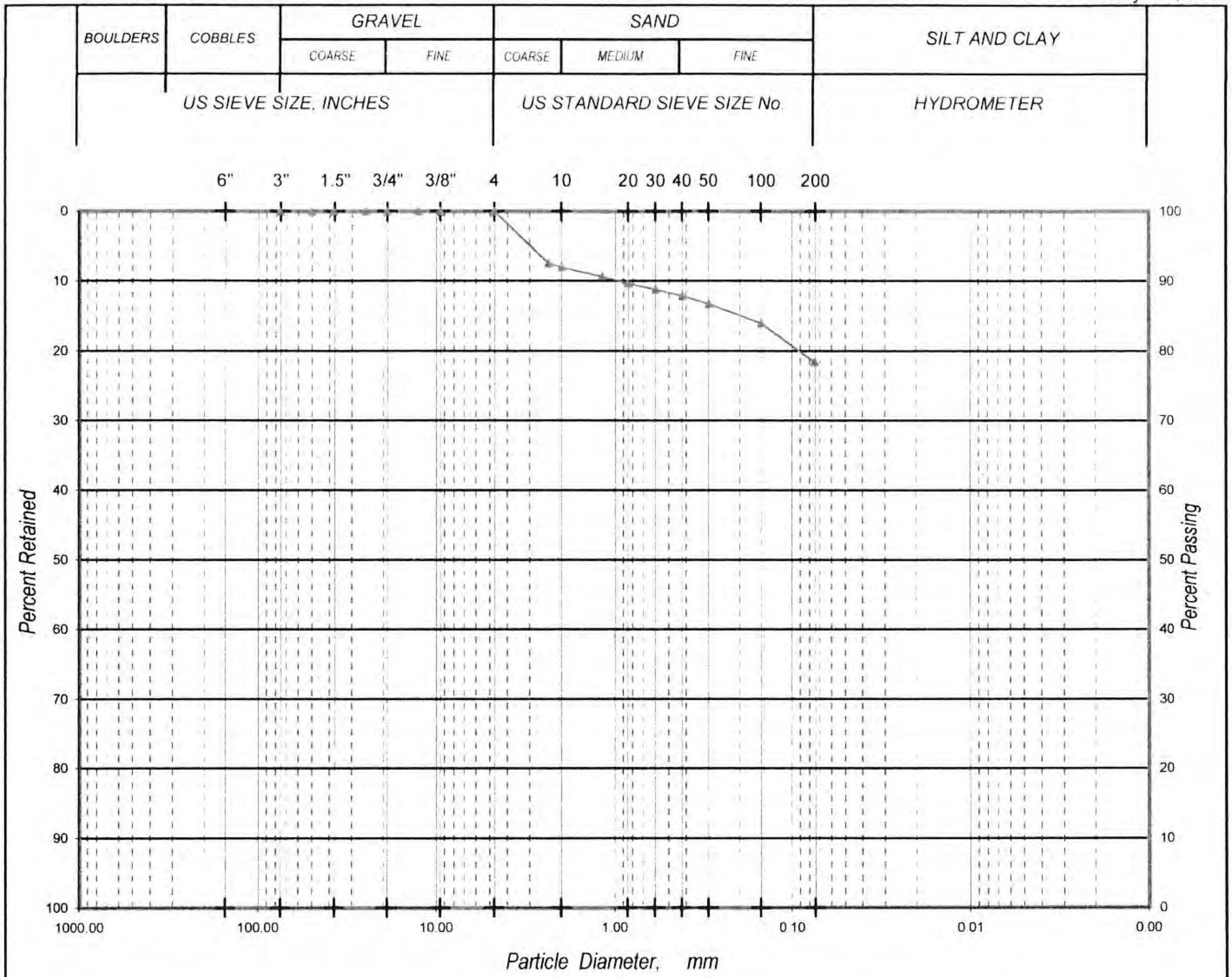
LABORATORY SERVICES

PARTICLE SIZE ANALYSIS
TEST REPORT
ASTM D-422

Client: SIERRA GEOTECHNICAL
Project No: 021704.07
Lab Sample No: **2447H**
Project Name: EMPIRE BUSINESS PARK
Report Date: February 13, 2008



Symbol	Sample ID	Description	% Gravel	% Sand	% Silt - Clay
▲	TP-8, 1.5'-2.0' (Rec'd 2/7/08)	Reddish Brown Fat Clay w/ Sand (CH)	0.0	21.5	78.5

Size Passing, mm D_{60} = N/A D_{30} = N/A D_{10} = N/A

Coefficient of Curvature, C_c: N/A Coefficient of Uniformity, C_u: N/A Fineness Modulus = 0.57

Note: * Percentages are +/- 0.1% based on computer rounding as allowed by ASTM D-6026-01 Section 5.2.3.

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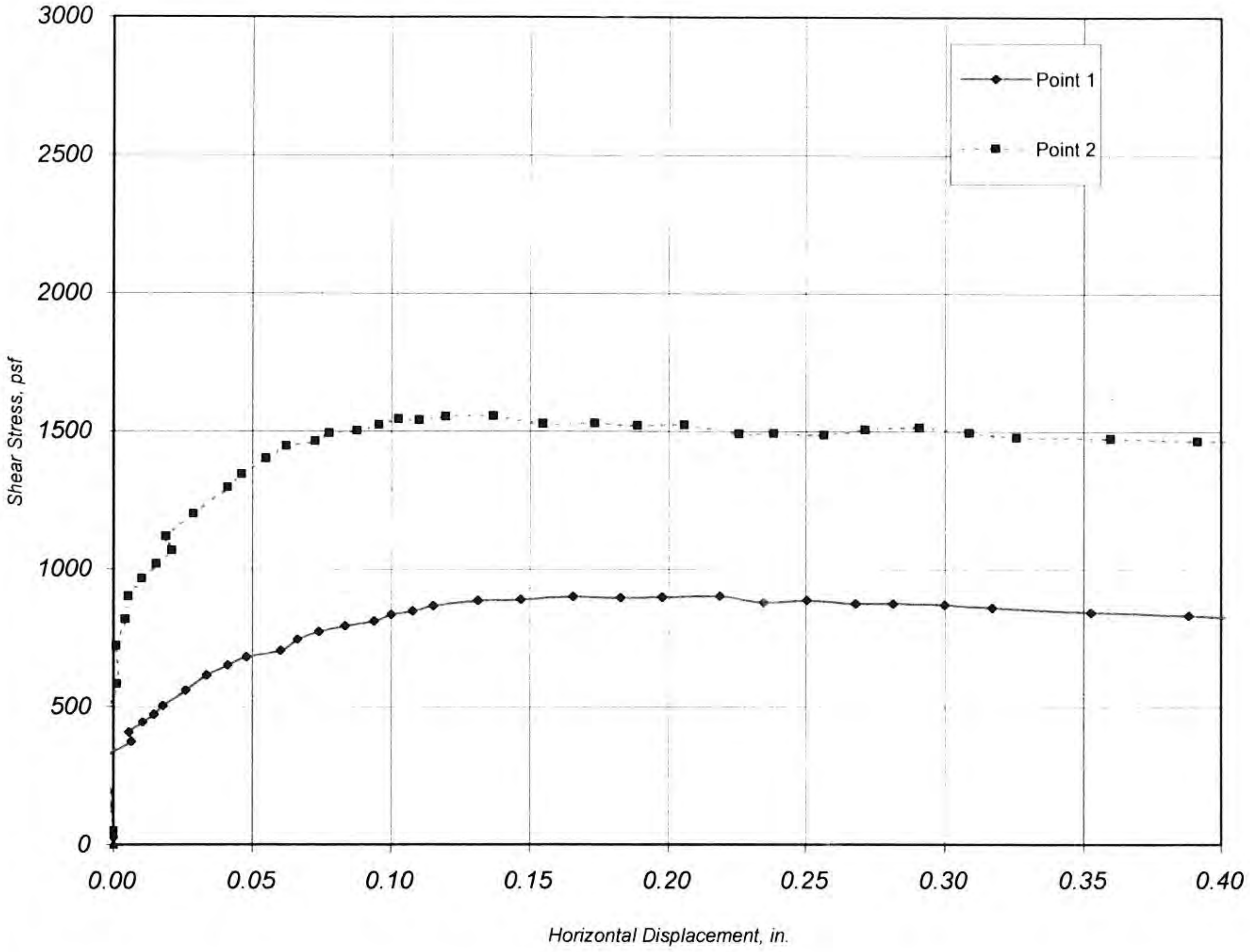
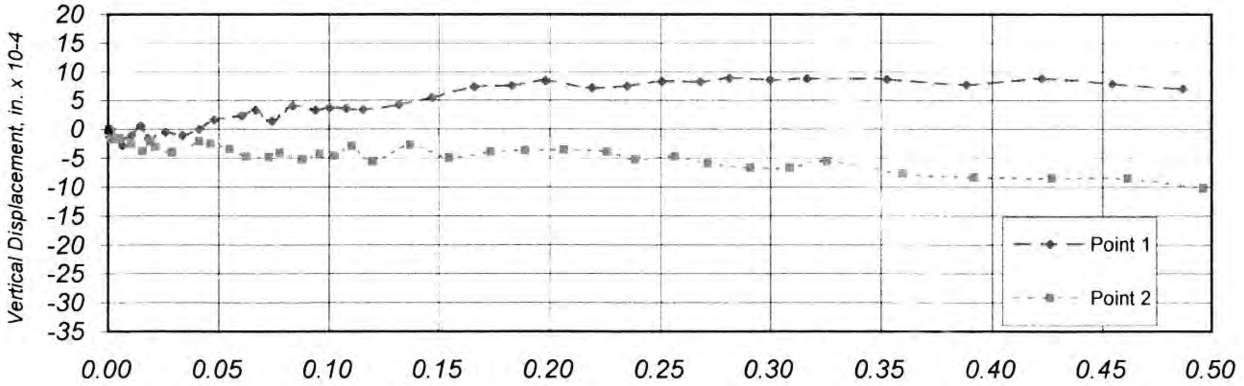
DIRECT SHEAR REPORT

ASTM D- 3080, Unconsolidated - Undrained Test

Client / Project Name Sierra Geotechnical / Empire Business Park
Project No. 021704.07
Lab Log 2447L&N
Sample TP-5, 1.5'-2' & TP-7, 1.5-2'
Soil Description Reddish Brown Clay
Report Date February 14, 2008





NORMAL STRESSES, psf : Point - 1 800 Point - 2 2000

L:Labexcel \ Projects \ 2002 \ 021704 \ 2447L&N-SDS

Entered By: slc
Reviewed By:
Lab Log: **2447L&N**

DCN: SDS-rp (rev. 02/20/04)

Vector Engineering Inc.
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Laboratory Services

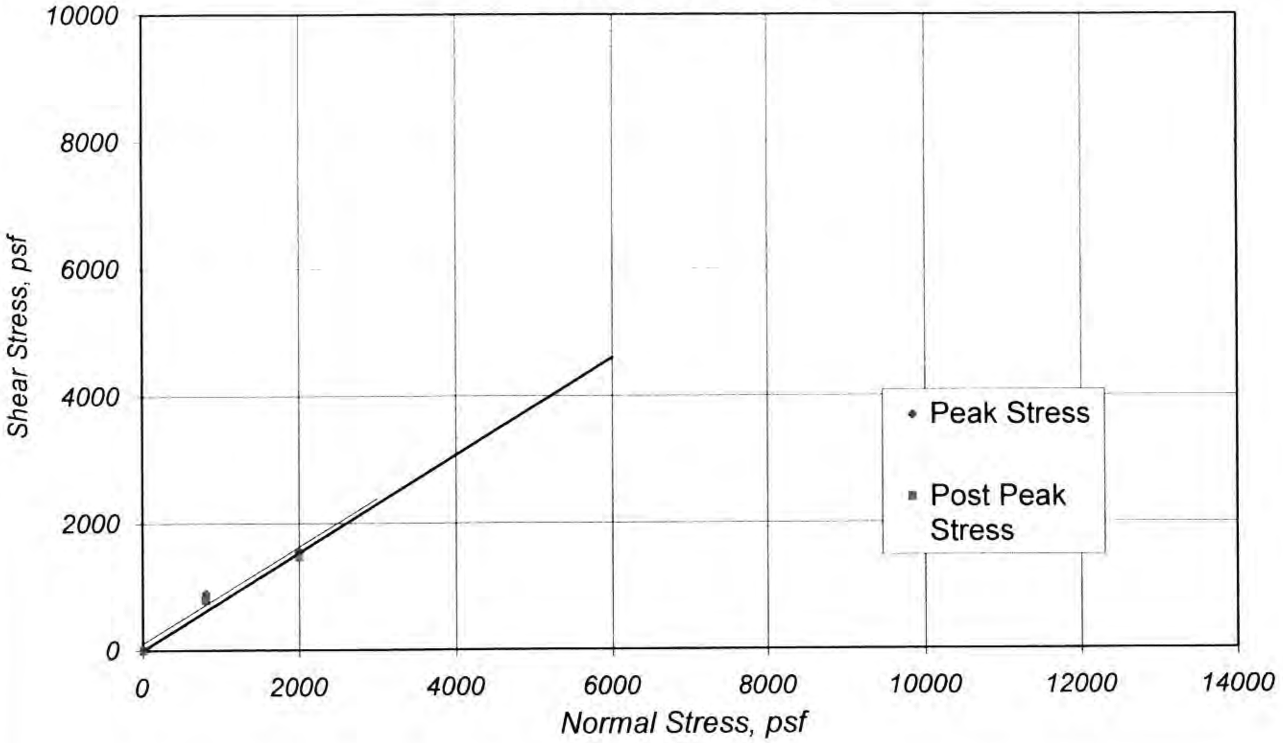
DIRECT SHEAR REPORT

ASTM D- 3080, Unconsolidated - Undrained Test

Client / Project Name	Project No. :	Lab Log
Sierra Geotechnical / Empire Business Park	021704.07	2447L&N

Sample	Soil Description	Report Date:
TP-5, 1.5'-2' & TP-7, 1.5-2'	Reddish Brown Clay	February 14, 2008

STRENGTH ENVELOPE



		Peak	Post Peak
Coefficient of Friction	:	0.760	0.719
Friction Angle	:	37.2	35.7
Cohesion, psf:	:	110	80

Point No.	Normal Stress psf	Shear Stress Peak psf	Shear Stress Post-Peak psf		Initial Water Content %	Initial Dry Density pcf	Final Water Content %	Final Dry Density pcf
1	800	903	790		33.8	80.3	33.4	81.2
2	2000	1556	1465		31.7	84.8	31.2	87.2

Horizontal Displacement Rate, in. / min. : 0.026 *Sample Diameter, in.:* 2.43

The test results given here are based on a mathmatically determined best fit line. Further interpretation should be conducted by a qualified professional experienced in Geotechnical Engineering.

By accepting the data and results presented on this page, Client agrees to limit the liability of Vector Engineering Inc. from Client and all other parties claims arising out of the use of this data to the cost for the respective test(s) represented here, and Client agrees to indemnify and hold harmless Vector Engineering Inc. from and against all liability in excess of these limits.

L:Labexcel \ Projects \ 2002 \ 021704 \ 2447L&N-SDS

Entered By: slc *Reviewed By:* *Lab Log:* **2447L&N**

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Laboratory Services

DIRECT SHEAR REPORT

ASTM D- 3080, Unconsolidated - Undrained Test

Client / Project Name: Sierra Geotechnical / Empire Business Park

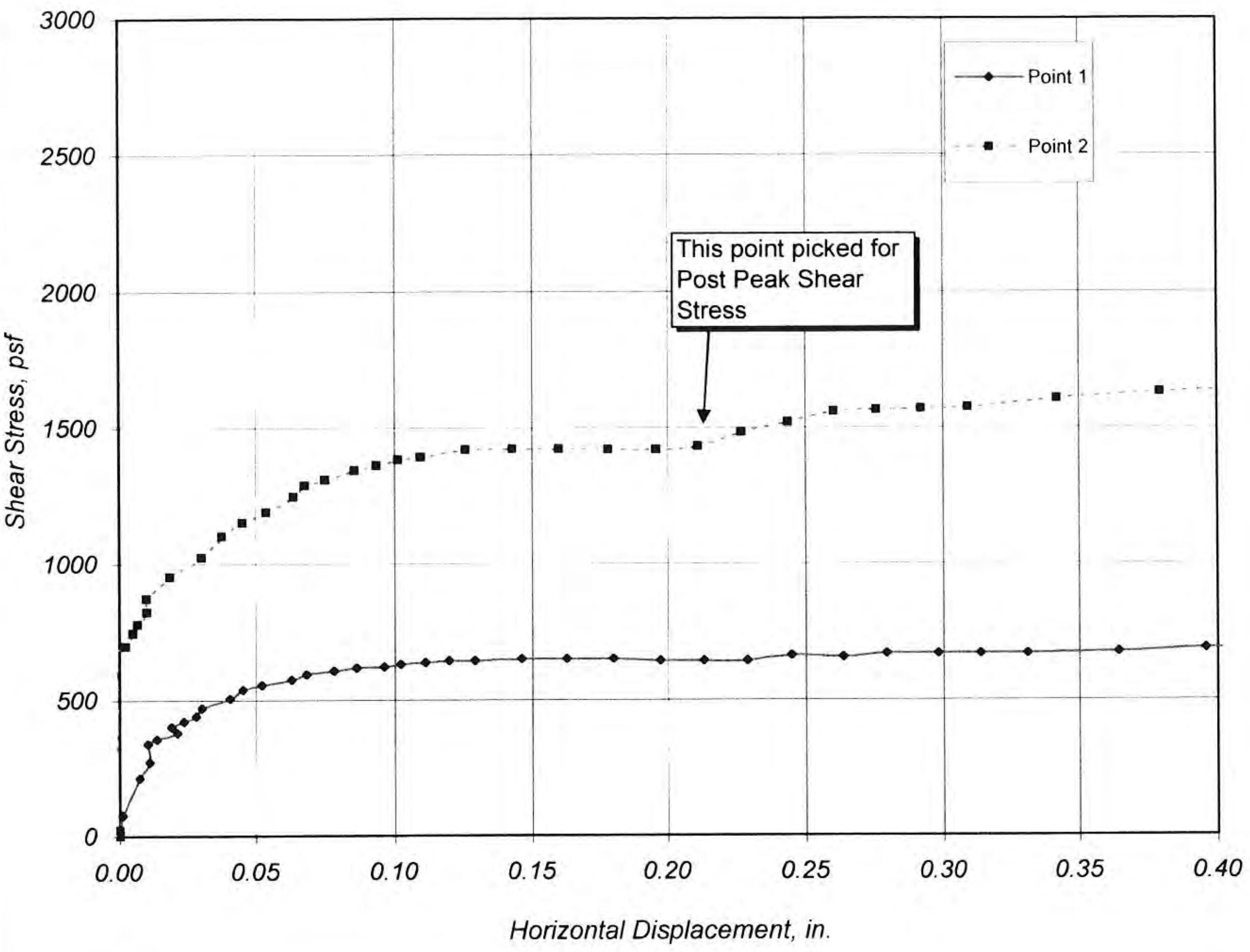
Project No.: 021704.07

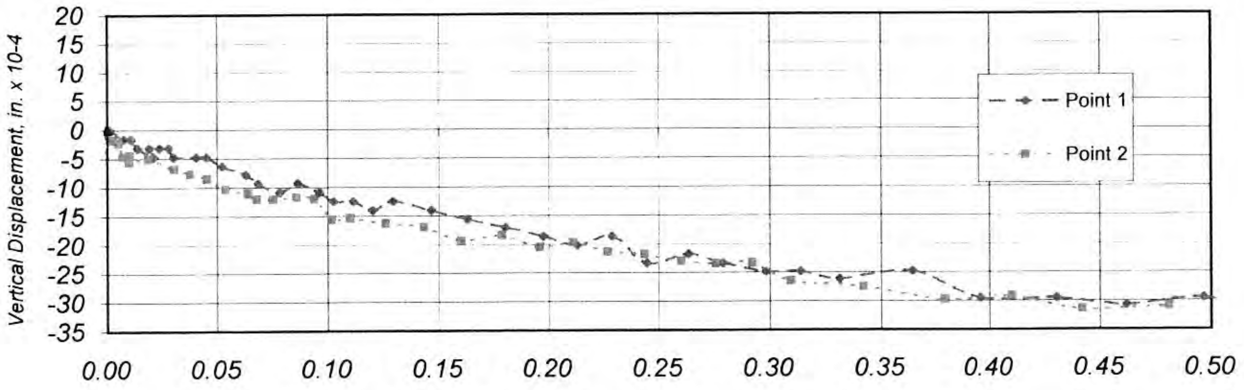
Lab Log: 2447J&K

Sample: TP-2, 1.5'-2'

Soil Description: Reddish Brown Clay

Report Date: February 14, 2008





NORMAL STRESSES, psf : Point - 1 800 Point - 2 2000

L:Labexcel \ Projects \ 2002 \ 021704 \ 2447J&K-SDS

Entered By:

Reviewed By:

Lab Log:

slc

2447J&K

DCN: SDS-rp (rev. 02/20/04)

Vector Engineering Inc.
143E Spring Hill Drive Grass Valley CA 95945 (530)272-2448
Laboratory Services

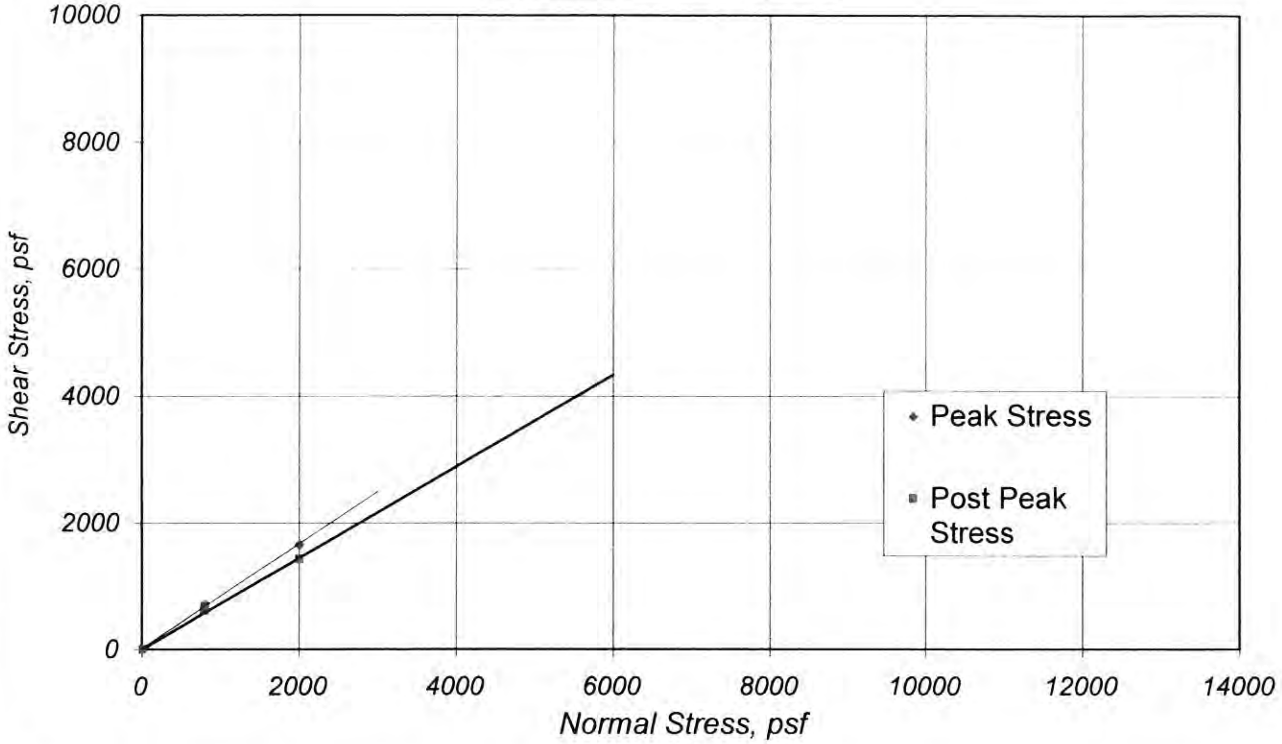
DIRECT SHEAR REPORT

ASTM D- 3080, Unconsolidated - Undrained Test

Client / Project Name	Project No.	Lab Log
Sierra Geotechnical / Empire Business Park	021704.07	2447J&K

Sample	Soil Description	Report Date
TP-2, 1.5'-2'	Reddish Brown Clay	February 14, 2008

STRENGTH ENVELOPE



		Peak	Post Peak
Coefficient of Friction	:	0.826	0.713
Friction Angle	:	39.5	35.5
Cohesion, psf:	:	20	20

Point No.	Normal Stress psf	Shear Stress Peak psf	Shear Stress Post-Peak psf		Initial Water Content %	Initial Dry Density pcf	Final Water Content %	Final Dry Density pcf
1	800	720	613		35.0	78.2	32.9	79.1
2	2000	1659	1431		34.2	81.1	31.3	83.2

Horizontal Displacement Rate, in. / min. : 0.026 *Sample Diameter, in.:* 2.43

The test results given here are based on a mathmatically determined best fit line. Further interpretation should be conducted by a qualified professional experienced in Geotechnical Engineering.

By accepting the data and results presented on this page, Client agrees to limit the liability of Vector Engineering Inc. from Client and all other parties claims arrising out of the use of this data to the cost for the respective test(s) represented here, and Client agrees to indemnify and hold harmless Vector Engineering Inc. from and against all liability in excess of these limits

L:Labexcel \ Projects \ 2002 \ 021704 \ 2447J&K-SDS

Entered By: slc

Reviewed By:

Lab Log: **2447J&K**

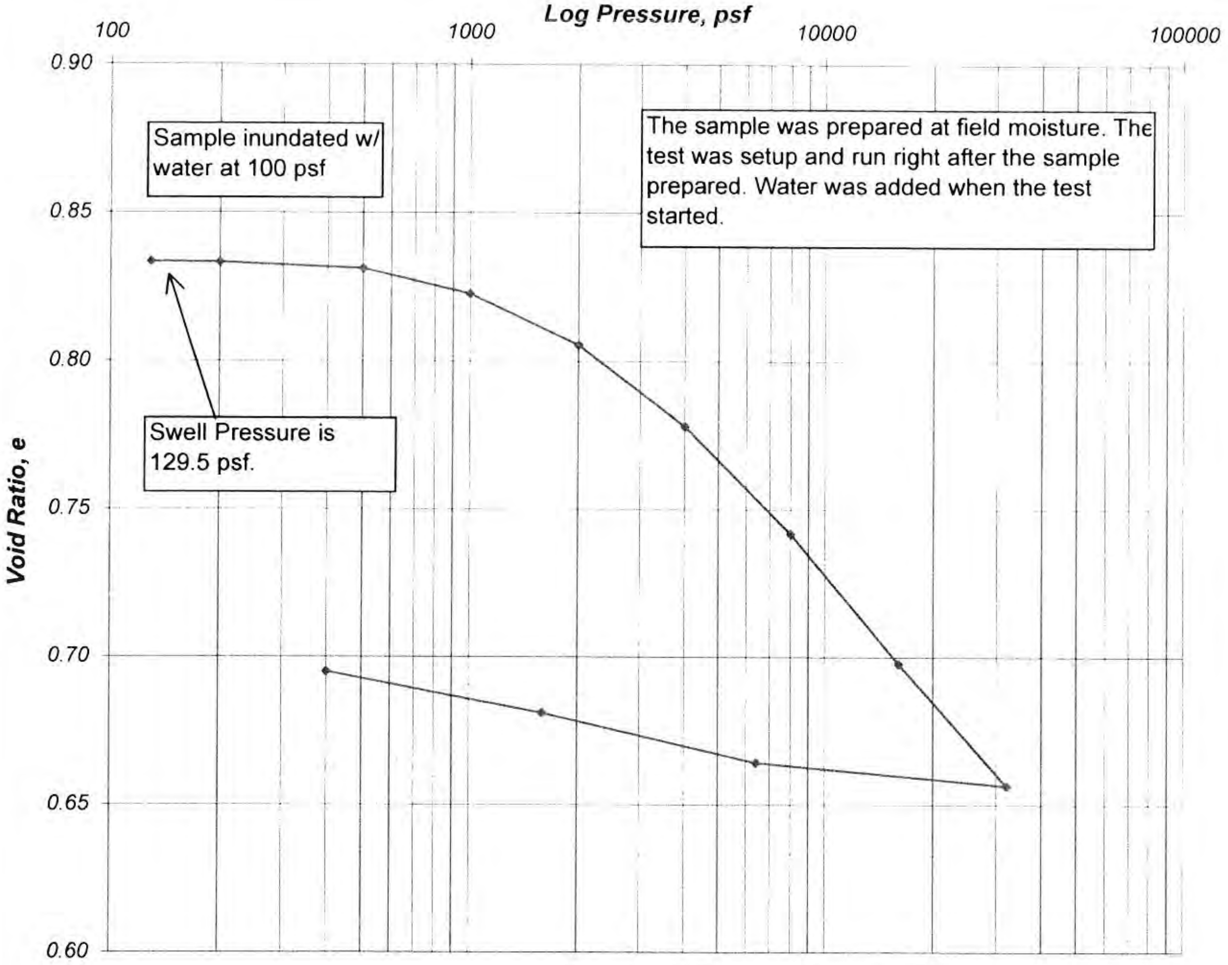
DCN: SDS-rp (rev. 02/20/04)

Vector Engineering Inc.
143E Spring Hill Dr., Grass Valley, CA 95945, 530-272-2448
Laboratory Services

CONSOLIDATION REPORT

ASTM D- 2435

Client Name Sierra Geotechnica	Project Name Empire Business Park	Project No 021704.07	Lab Log 2247M
Sample ID TP-5, 1'-1.5'	Soil Description Reddish Silty Clay		Report Date March 6, 2008



Sample inundated w/ water at 100 psf

The sample was prepared at field moisture. The test was setup and run right after the sample prepared. Water was added when the test started.

Swell Pressure is 129.5 psf.

SPECIMEN DATA

	Initial	Final
Water Content, %	30.9	26.2
Dry Density	90.3	97.6
Void Ratio (Specific Gravity = 2.7)	0.83	0.70
Saturation	98.3	99.9

		psf	kPa
Estimated Overburden Pressure	Po		
Maximum Past Pressure	Pp		
Compression Index	Cc, last increment		

L:Labexcel \ Projects \ 2002 \ 021704 \ 2247M-Cns.xls

DCN: CNS-ws (rev. 08/24/06)

Entered By: LM

Reviewed By: DN

Lab Sample No.: **2247M**

Vector Engineering Inc.
143E Spring Hill Dr., Grass Valley, CA 95945, 530-272-2448
Laboratory Services

CONSOLIDATION REPORT

ASTM D- 2435

Client Name: Sierra Geotechnica
Project Name: Empire Business Park
Project No.: 021704.07
Lab Log: 2247M
Sample: TP-5, 1'-1.5'
Soil Description: Reddish Silty Clay
Report Date: March 6, 2008

Inc.	Load Stress kPa	Load Stress PSF			Sample Height in.	Sample Height cm	Height Change %	Strain, %	Void Ratio, e	
1	6.18	129			1.001	2.541	0.050	0.0500	0.8336	
2	9.58	200			1.000	2.541	0.040	0.0400	0.8334	
3	23.94	500			0.999	2.538	-0.070	0.0700	0.8314	
4	47.88	1000			0.995	2.526	-0.540	0.5400	0.8228	
5	95.76	2000			0.985	2.502	-1.480	1.4800	0.8056	
6	191.52	4000			0.970	2.465	-2.970	2.9700	0.7783	
7	383.04	8000			0.951	2.414	-4.950	4.9500	0.7420	
8	766.08	16000			0.926	2.353	-7.360	7.3600	0.6978	
9	1532.17	32000			0.904	2.296	-9.619	9.6190	0.6564	
10	306.43	6400			0.908	2.307	-9.180	9.1800	0.6644	
11	76.61	1600			0.917	2.330	-8.270	8.2700	0.6811	
12	19.15	400			0.925	2.350	-7.500	7.5000	0.6952	

L:Labexcel \ Projects \ 2002 \ 021704 \ 2247M-Cns.xls

Entered By: LM
Reviewed By: DN
Lab Log: **2247M**

Sunland Analytical
11353 Pyrites Way, Suite 4
Rancho Cordova, CA 95670
(916) 852-8557

FEB 1 2008

Date Reported 02/15/2008
Date Submitted 02/12/2008

To: Eric Olhoffer
Vector Engineering Inc.
143E Spring Hill Dr.
Grass Valley, CA 95945

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 021704.07/EMPIRE BUS Site ID : TP-6/1.5-2.0'.
Thank you for your business.

* For future reference to this analysis please use SUN # 52541-105060.

EVALUATION FOR SOIL CORROSION

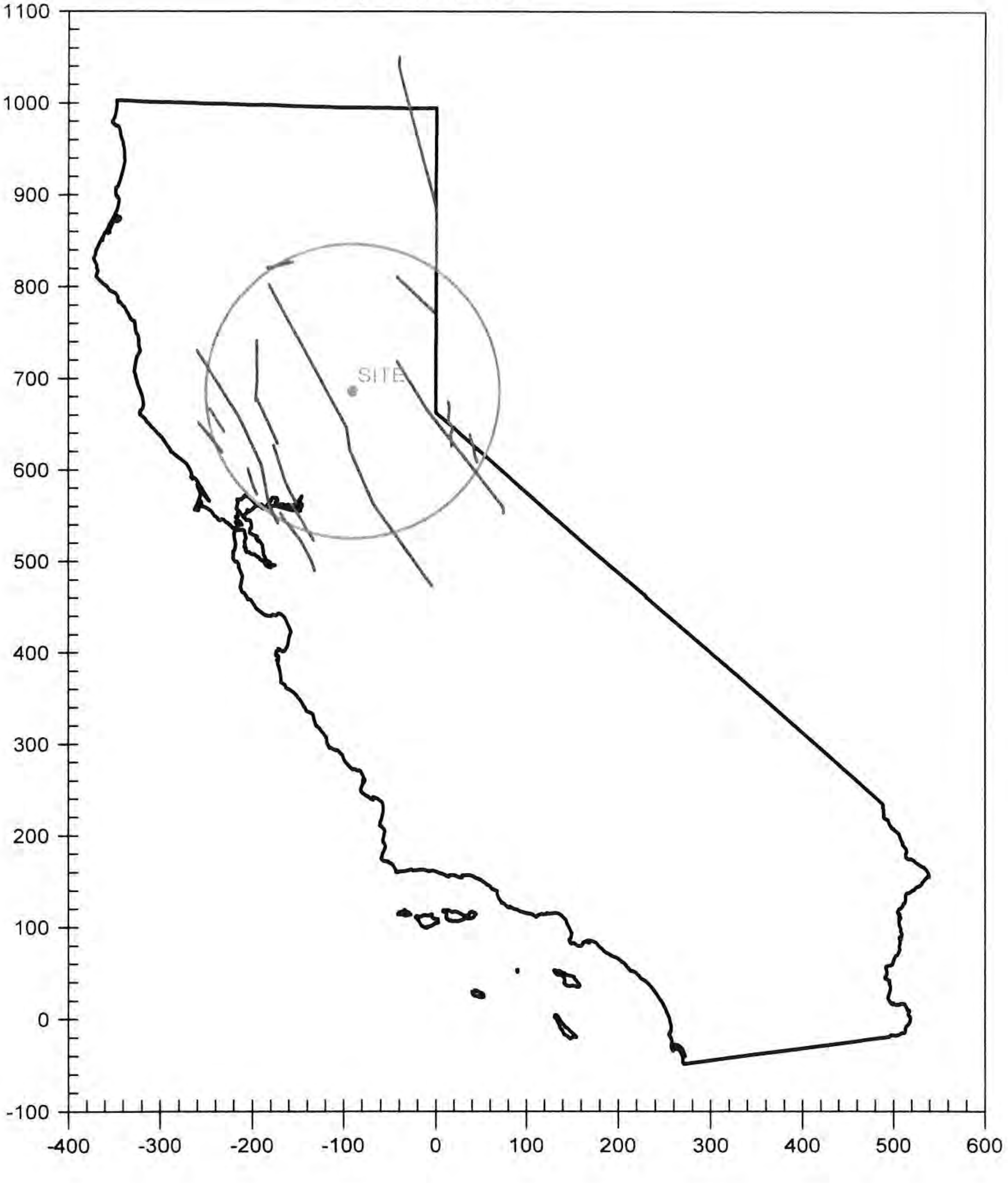
Soil pH	4.35	
Minimum Resistivity	15.81 ohm-cm (x1000)	
Chloride	14.5 ppm	00.00145 %
Sulfate	0.5 ppm	00.00005 %

METHODS
pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422

APPENDIX C
SITE SPECIFIC SEISMIC HAZARD DATA

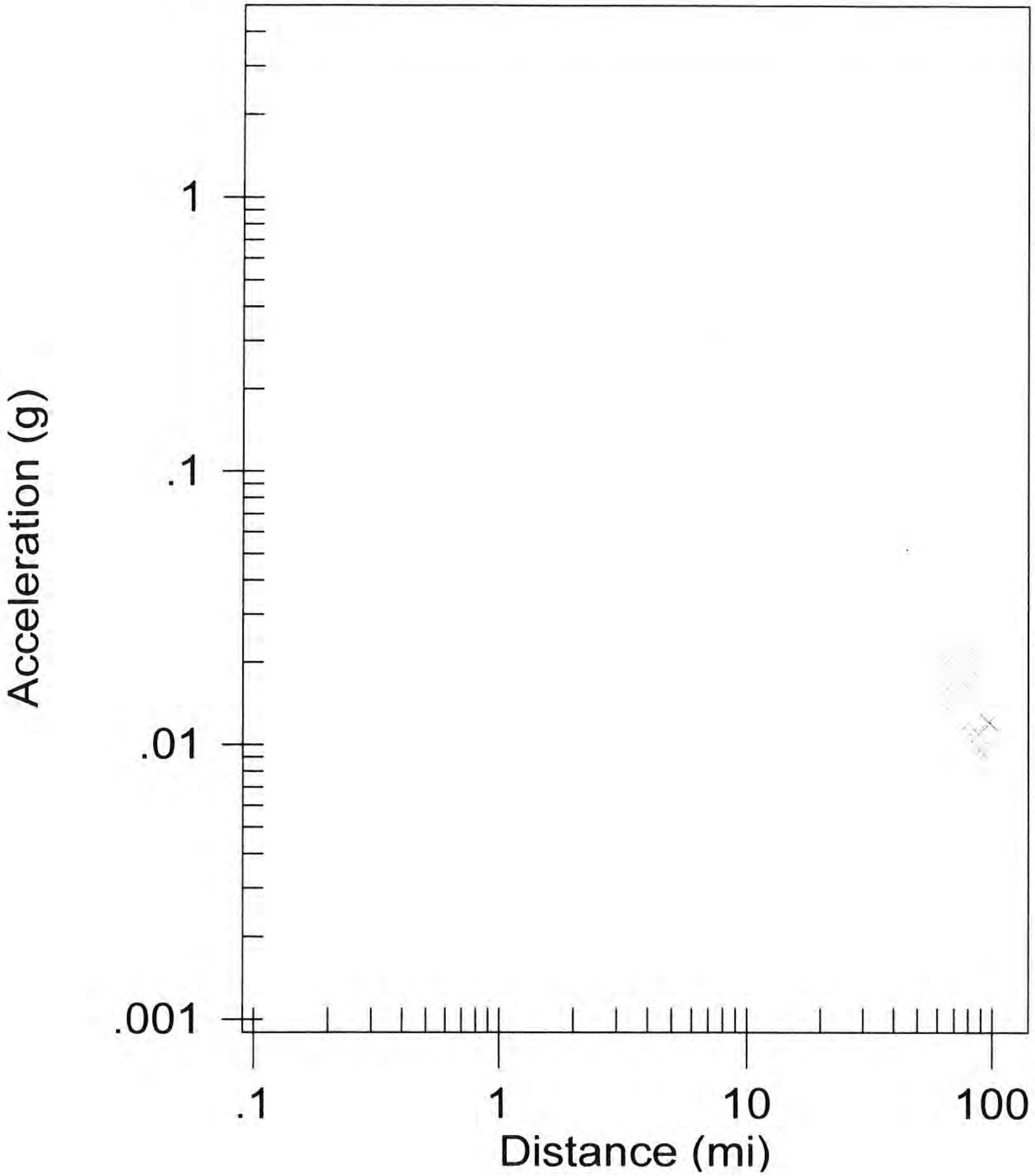
CALIFORNIA FAULT MAP

Empire Business Park



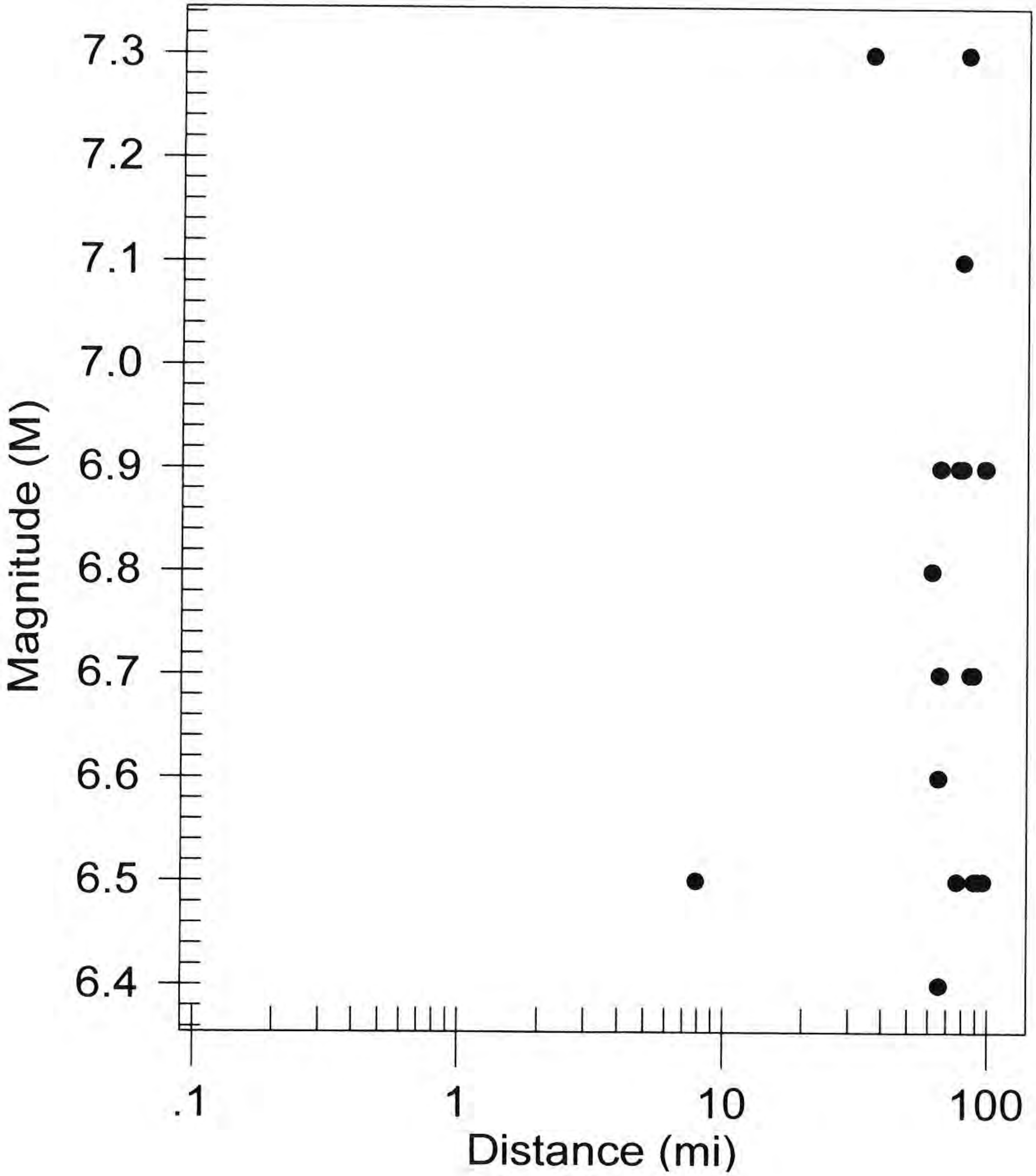
MAXIMUM EARTHQUAKES

Empire Business Park



EARTHQUAKE MAGNITUDES & DISTANCES

Empire Business Park



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                    *                     *
                    *   E Q F A U L T     *
                    *                     *
                    *   Version 3.00      *
                    *                     *
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                 DETERMINISTIC ESTIMATION OF
             PEAK ACCELERATION FROM DIGITIZED FAULTS

JOB NUMBER: 020808
                                             DATE: 02-16-2008

JOB NAME: Empire Business Park

CALCULATION NAME: empire

FAULT-DATA-FILE NAME: CDMGFLTE.DAT

SITE COORDINATES:
   SITE LATITUDE:  39.1995
   SITE LONGITUDE:  121.0556

SEARCH RADIUS:   100  mi

ATTENUATION RELATION:   4) Boore et al. (1997) Horiz. - Rock (620)
   UNCERTAINTY (M=Median, S=Sigma): M       Number of Sigmas:  0.0
   DISTANCE MEASURE:  cd_2drp
   SCOND:   1
   Basement Depth:  5.00 km     Campbell SSR:        Campbell SHR:
   COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED:  CDMGFLTE.DAT

MINIMUM DEPTH VALUE (km):  0.0
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                              ---------------
                              EQFAULT SUMMARY
                              ---------------


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                         DETERMINISTIC SITE PARAMETERS
                         -----------------------------

Page  1
-------------------------------------------------------------------------------
                               |              |ESTIMATED MAX. EARTHQUAKE EVENT
                               | APPROXIMATE  |-------------------------------
      ABBREVIATED              |   DISTANCE   | MAXIMUM  |   PEAK   |EST. SITE
      FAULT  NAME              |  mi    (km)  |EARTHQUAKE|   SITE   |INTENSITY
                               |              | MAG.(Mw) | ACCEL. g |MOD.MERC.
===============================|==============|==========|==========|=========
FOOTHILLS FAULT SYSTEM         |   3.4(   5.4)|   6.5    |  0.318   |   IX
MOHWAK - HONEY LAKE ZONE       |  36.2(  58.3)|   7.3    |  0.083   |   VII
GREAT VALLEY 3                 |  61.5(  98.9)|   6.8    |  0.051   |   VI
GENOA                          |  65.0( 104.6)|   6.9    |  0.052   |   VI
GREAT VALLEY 4                 |  65.4( 105.2)|   6.6    |  0.044   |   VI
GREAT VALLEY 2                 |  65.8( 105.9)|   6.4    |  0.039   |   V
GREAT VALLEY 1                 |  65.9( 106.0)|   6.7    |  0.046   |   VI
GREAT VALLEY 5                 |  76.6( 123.3)|   6.5    |  0.037   |   V
HONEY LAKE                     |  77.4( 124.5)|   6.9    |  0.037   |   V
HUNTING CREEK - BERRYESSA      |  77.7( 125.0)|   6.9    |  0.037   |   V
BARTLETT SPRINGS               |  79.7( 128.3)|   7.1    |  0.040   |   V
CONCORD - GREEN VALLEY         |  80.0( 128.7)|   6.9    |  0.036   |   V
RATE FOR NE CA                 |  83.0( 133.5)|   7.3    |  0.043   |   VI
ANTELOPE VALLEY                |  84.7( 136.3)|   6.7    |  0.038   |   V
GREAT VALLEY 6                 |  88.0( 141.6)|   6.7    |  0.037   |   V
WEST NAPA                      |  88.9( 143.1)|   6.5    |  0.027   |   V
COLLAYOMI                      |  91.8( 147.7)|   6.5    |  0.026   |   V
BATTLE CREEK                   |  95.9( 154.3)|   6.5    |  0.031   |   V
GREENVILLE                     |  96.9( 156.0)|   6.9    |  0.031   |   V
MAACAMA (South)                |  97.7( 157.3)|   6.9    |  0.031   |   V
******************************************************************************
-END OF SEARCH-   20 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE FOOTHILLS FAULT SYSTEM          FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 3.4 MILES (5.4 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.3178 g
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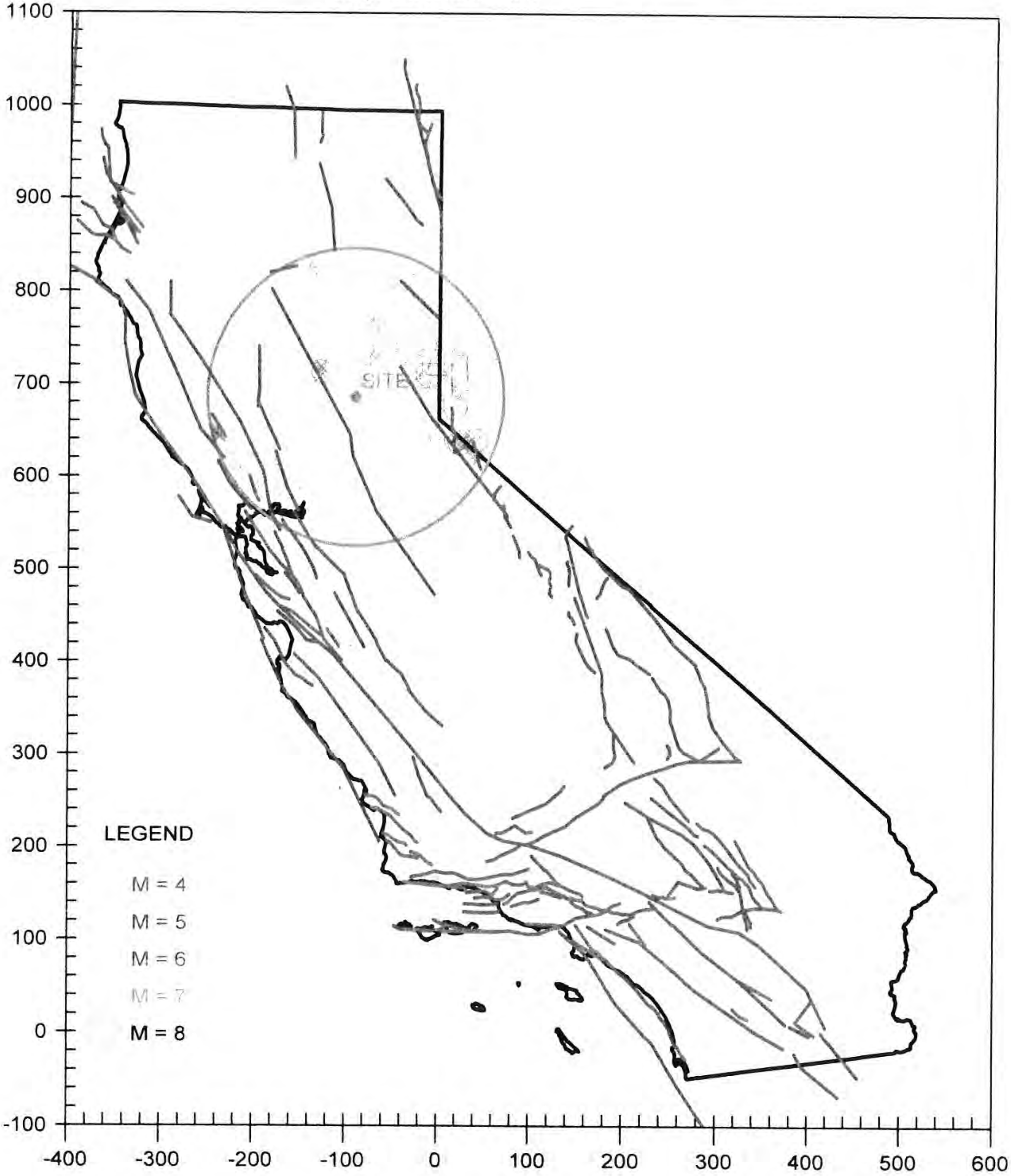
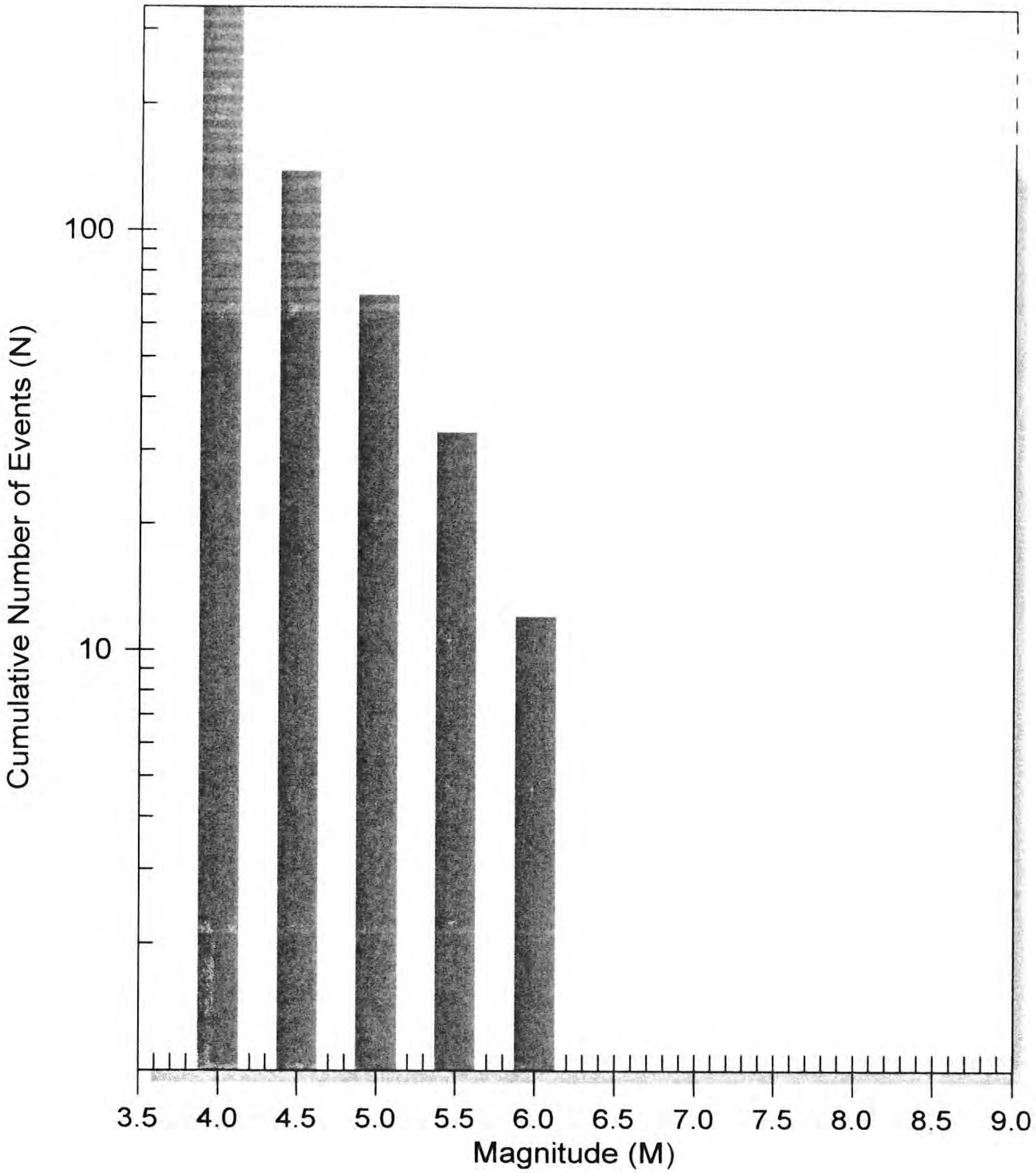
EARTHQUAKE EPICENTER MAP

Empire Business Park



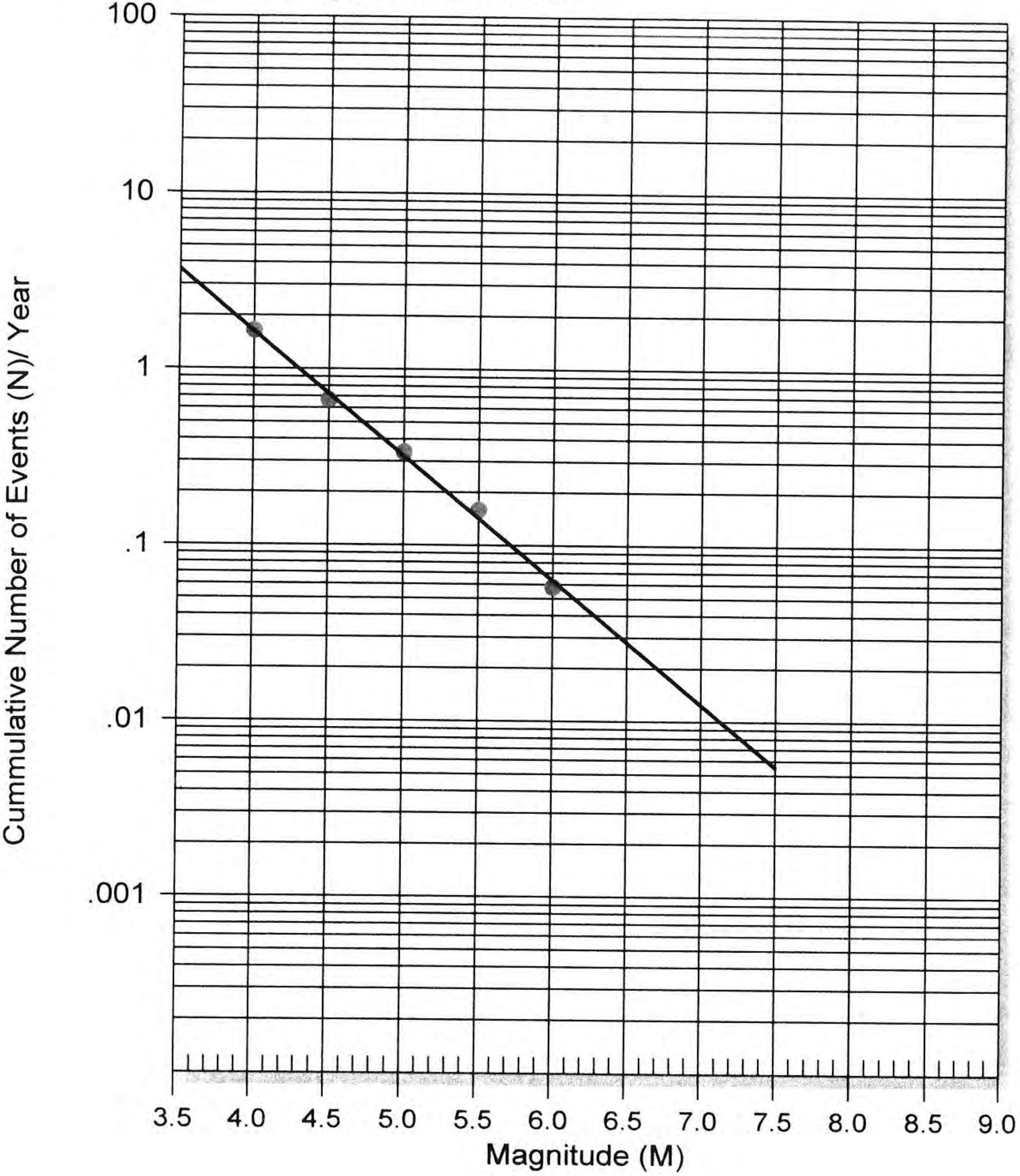
Number of Earthquakes (N) Above Magnitude (M)

Empire Business Park



EARTHQUAKE RECURRENCE CURVE

Empire Business Park



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                    *                       *
                    *     E Q S E A R C H   *
                    *                       *
                    *      Version 3.00     *
                    *                       *
                    *************************

                         ESTIMATION OF
                     PEAK ACCELERATION FROM
                  CALIFORNIA EARTHQUAKE CATALOGS

 JOB NUMBER: 020808
                                                   DATE: 02-16-2008

 JOB NAME: Empire Business Park

 EARTHQUAKE-CATALOG-FILE NAME: ALLQUAKE.DAT

 MAGNITUDE RANGE:
    MINIMUM MAGNITUDE:  4.00
    MAXIMUM MAGNITUDE:  9.00

 SITE COORDINATES:
    SITE LATITUDE:  39.1995
    SITE LONGITUDE:  121.0556

 SEARCH DATES:
            START DATE:   1800
            END DATE:   2007

 SEARCH RADIUS:
            100.0 mi
            160.9 km

 ATTENUATION RELATION:   4) Boore et al. (1997) Horiz. - Rock (620)
    UNCERTAINTY (M=Median, S=Sigma): M       Number of Sigmas:  0.0
    ASSUMED SOURCE TYPE:  SS [SS=Strike-slip, DS=Reverse-slip, BT=Blind-thrust]
    SCOND:   1  Depth Source:  A
    Basement Depth:  5.00 km     Campbell SSR:  1     Campbell SHR:  0
    COMPUTE PEAK HORIZONTAL ACCELERATION

 MINIMUM DEPTH VALUE (km):  0.0
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                          -------------------------
                          EARTHQUAKE SEARCH RESULTS
                          -------------------------

Page  1
------------------------------------------------------------------------------------------
    |       |        |          |  TIME   |     |     |  SITE  |SITE|  APPROX.
FILE|  LAT. |  LONG. |   DATE   |  (UTC)  |DEPTH|QUAKE|  ACC.  | MM |  DISTANCE
CODE| NORTH |  WEST  |          | H M Sec | (km)| MAG.|   g    |INT.|  mi   [km]
----+-------+--------+----------+--------+-----+-----+------+----+-------------
T-A |39.1700|121.0700|12/03/1875| 0 0  0.0|  0.0| 4.30| 0.093 | VII|  2.2(  3.5)
MGI |39.2000|121.1000|05/15/1906| 932  0.0|  0.0| 4.60| 0.107 | VII|  2.4(  3.8)
T-A |39.2500|121.0000|12/01/1867| 712  0.0|  0.0| 5.00| 0.103 | VII|  4.6(  7.4)
DMG |39.3000|121.0000|08/18/1864|1318  0.0|  0.0| 4.50| 0.060 | VI |  7.5( 12.1)
DMG |39.4000|120.9000|03/03/1909|12 0  0.0|  0.0| 5.00| 0.045 | VI | 16.1( 26.0)
DMG |39.4000|120.8000|06/23/1909| 724  0.0|  0.0| 5.50| 0.051 | VI | 19.4( 31.3)
USG |39.4330|121.4750|08/02/1975|2059  0.0|  5.1| 5.20| 0.034 |  V | 27.6( 44.4)
USG |39.4170|121.4900|11/15/1975| 335  1.6|  8.4| 4.10| 0.019 | IV | 27.6( 44.5)
DMG |38.8000|121.1000|05/30/1908|1938  0.0|  0.0| 4.00| 0.018 | IV | 27.7( 44.5)
USG |39.4310|121.4820|08/02/1975|2140  1.1|  5.7| 4.10| 0.019 | IV | 27.8( 44.8)
USG |39.4490|121.4730|08/02/1975|202216.2|  4.1| 5.20| 0.033 |  V | 28.2( 45.3)
USG |39.3910|121.5230|01/22/1988|175848.8| 22.5| 4.10| 0.019 | IV | 28.3( 45.5)
USG |39.4050|121.5170|07/06/1976| 35517.5|  6.4| 4.10| 0.018 | IV | 28.4( 45.8)
DMG |39.6000|120.9000|12/02/1867| 820  0.0|  0.0| 4.00| 0.017 | IV | 28.9( 46.5)
MGI |39.5800|120.8300|03/12/1918|1230  0.0|  0.0| 4.30| 0.020 | IV | 28.9( 46.5)
MGI |39.5800|120.8300|03/12/1918|1030  0.0|  0.0| 5.70| 0.042 | VI | 28.9( 46.5)
USG |39.4580|121.4830|08/11/1975| 61136.3|  3.1| 4.40| 0.021 | IV | 29.0( 46.6)
T-A |39.5800|120.8200|12/31/1851| 0 0  0.0|  0.0| 4.30| 0.020 | IV | 29.1( 46.9)
USG |39.4740|121.4850|08/02/1975|203548.4|  4.5| 4.00| 0.017 | IV | 29.7( 47.9)
USG |39.4360|121.5230|08/01/1975|2020  4.4|  8.8| 4.50| 0.022 | IV | 29.8( 48.0)
USG |39.4360|121.5230|08/01/1975|202913.0|  8.8| 4.60| 0.023 | IV | 29.8( 48.0)
USG |39.4360|121.5230|08/01/1975|202012.0|  8.8| 5.70| 0.041 |  V | 29.8( 48.0)
USG |39.4360|121.5230|08/01/1975|2025  0.0|  8.8| 4.70| 0.024 |  V | 29.8( 48.0)
USG |39.4800|121.4830|08/02/1975|172429.0|  5.4| 4.40| 0.021 | IV | 29.9( 48.2)
USG |39.4430|121.5220|08/01/1975|162717.6|  8.2| 4.50| 0.022 | IV | 30.0( 48.4)
UNR |39.2450|120.4960|11/28/1980|182112.4|  1.5| 5.20| 0.032 |  V | 30.1( 48.4)
DMG |39.6000|120.8000|08/27/1948|205945.0|  0.0| 4.00| 0.016 | IV | 30.8( 49.6)
USG |39.4810|121.5060|08/03/1975| 247  8.6|  7.4| 4.10| 0.017 | IV | 30.9( 49.8)
USG |39.4700|121.5280|08/16/1975| 548  9.1|  8.5| 4.10| 0.017 | IV | 31.4( 50.5)
USG |39.4890|121.5160|08/03/1975| 1 3  5.5|  8.8| 4.60| 0.022 | IV | 31.7( 51.0)
USG |39.4970|121.5110|08/08/1975| 7 0 49.8|  7.7| 4.80| 0.024 |  V | 31.8( 51.2)
USG |39.4880|121.5210|09/26/1975| 231  6.7| 10.3| 4.00| 0.016 | IV | 31.8( 51.2)
DMG |39.5000|120.6000|12/21/1869| 4 0  0.0|  0.0| 4.80| 0.024 |  V | 32.0( 51.4)
USG |39.4960|121.5300|08/06/1975| 35029.8|  9.2| 4.70| 0.023 | IV | 32.6( 52.4)
T-A |39.6700|121.0000|07/03/1862| 1 0  0.0|  0.0| 5.00| 0.027 |  V | 32.6( 52.5)
GSB |39.3750|120.4670|09/21/1989|114813.1| 24.0| 4.00| 0.015 | IV | 33.7( 54.2)
USG |39.5200|121.5320|09/27/1975|223437.7| 10.4| 4.60| 0.021 | IV | 33.7( 54.2)
GSB |39.3790|120.4510|12/02/2000|153415.4| 14.0| 4.40| 0.019 | IV | 34.6( 55.7)
DMG |39.4300|120.4000|03/30/1943|21 7 28.0|  0.0| 5.30| 0.027 |  V | 38.5( 61.9)
DMG |39.7000|120.7000|04/29/1888| 448  0.0|  0.0| 5.90| 0.037 |  V | 39.4( 63.4)
MGI |39.3300|120.3200|03/31/1925| 6 5  0.0|  0.0| 4.00| 0.013 | III| 40.3( 64.9)
MGI |39.3300|120.3200|03/31/1925| 547  0.0|  0.0| 4.60| 0.018 | IV | 40.3( 64.9)
DMG |39.5000|120.4000|03/28/1872|13 0  0.0|  0.0| 4.90| 0.021 | IV | 40.7( 65.5)
DMG |39.6000|120.4700|11/18/1960|11 3 14.0|  0.0| 4.40| 0.016 | IV | 41.7( 67.1)
DMG |39.6700|120.5500|06/14/1959| 12632.0|  0.0| 4.50| 0.017 | IV | 42.2( 67.9)
USG |39.3830|120.2970|07/03/1983|15 8 19.5| 21.0| 4.00| 0.013 | III| 42.5( 68.3)
DMG |39.4700|120.3300|05/29/1954| 42020.0|  0.0| 4.10| 0.013 | III| 43.0( 69.2)
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DMG |38.9200|120.3300|08/31/1912| 453 0.0|  0.0| 4.50| 0.016 | IV | 43.4( 69.9)
GSB |39.7700|120.6700|10/21/1998|083101.0| 16.0| 4.10| 0.013 | III| 44.4( 71.5)
DMG |39.5000|120.3000|01/25/1855| 6 0 0.0|  0.0| 5.50| 0.027 |  V | 45.4( 73.0)
DMG |39.4300|120.2600|04/27/1971| 5 147.7|  0.0| 4.40| 0.015 | IV | 45.4( 73.0)
DMG |39.2700|120.2000|08/12/1961| 45720.0|  0.0| 4.00| 0.012 | III| 46.0( 74.0)
DMG |39.3000|120.2000|09/08/1947| 552 0.0|  0.0| 4.50| 0.016 | IV | 46.3( 74.5)


                         -------------------------
                         EARTHQUAKE SEARCH RESULTS
                         -------------------------

Page  2
-------------------------------------------------------------------------------
    |       |        |          | TIME  |     |     | SITE  |SITE|  APPROX.
FILE| LAT.  | LONG.  |   DATE   | (UTC) |DEPTH|QUAKE| ACC.  | MM |  DISTANCE
CODE| NORTH | WEST   |          | H M Sec| (km)| MAG.|   g   |INT.|  mi  [km]
----+-------+--------+----------+-------+-----+-----+-------+----+-----------
DMG |39.3000|120.2000|09/08/1947| 713 0.0|  0.0| 4.70| 0.017 | IV | 46.3( 74.5)
GSB |39.8360|120.7240|06/18/1995|222323.1| 12.0| 4.30| 0.014 | IV | 47.4( 76.2)
DMG |39.5700|120.3000|10/01/1958|214211.0|  0.0| 4.60| 0.016 | IV | 47.7( 76.8)
GSB |39.8230|120.6460|08/10/2001|201926.6| 17.0| 5.10| 0.021 | IV | 48.3( 77.7)
DMG |39.6000|120.3000|05/10/1947| 81042.0|  0.0| 4.20| 0.013 | III| 48.9( 78.7)
GSB |39.8280|120.6280|08/11/2001|120130.7| 18.0| 4.30| 0.013 | III| 49.0( 78.9)
DMG |39.7000|120.4000|06/22/1950|171318.0|  0.0| 4.10| 0.012 | III| 49.1( 79.1)
DMG |39.4700|120.2000|01/10/1967|102823.4|  0.0| 4.00| 0.011 | III| 49.4( 79.4)
MGI |39.7500|121.6500|04/20/1945| 53610.0|  0.0| 5.00| 0.019 | IV | 49.5( 79.6)
DMG |39.3700|120.1500|04/07/1954| 7 5 2.0|  0.0| 4.30| 0.013 | III| 49.8( 80.1)
T-A |39.9200|120.9200|11/30/1867| 0 0 0.0|  0.0| 4.30| 0.013 | III| 50.3( 80.9)
GSB |39.9120|120.8450|11/05/1997|174928.4|  5.0| 4.80| 0.017 | IV | 50.5( 81.2)
DMG |39.4200|120.1500|09/13/1966|201622.0|  0.0| 4.10| 0.012 | III| 50.7( 81.6)
DMG |39.4200|120.1500|09/12/1966|174439.0|  0.0| 4.10| 0.012 | III| 50.7( 81.6)
DMG |39.4200|120.1500|09/12/1966|165112.0|  0.0| 4.40| 0.014 | IV | 50.7( 81.6)
DMG |39.4200|120.1500|09/22/1966| 7 127.0|  0.0| 4.40| 0.014 | IV | 50.7( 81.6)
DMG |39.4200|120.1500|09/12/1966|165329.0|  0.0| 4.30| 0.013 | III| 50.7( 81.6)
DMG |39.4200|120.1500|09/12/1966|172011.0|  0.0| 5.30| 0.022 | IV | 50.7( 81.6)
DMG |39.4200|120.1500|09/12/1966|171657.0|  0.0| 4.30| 0.013 | III| 50.7( 81.6)
DMG |39.4200|120.1500|09/12/1966|164731.0|  0.0| 4.10| 0.012 | III| 50.7( 81.6)
DMG |39.4200|120.1500|09/14/1966|224028.0|  0.0| 4.60| 0.015 | IV | 50.7( 81.6)
DMG |39.4200|120.1500|09/12/1966|1641 1.9|  0.0| 6.00| 0.032 |  V | 50.7( 81.6)
DMG |39.4200|120.1500|09/12/1966|171923.0|  0.0| 4.20| 0.012 | III| 50.7( 81.6)
DMG |39.4200|120.1500|09/14/1966|22 028.0|  0.0| 4.60| 0.015 | IV | 50.7( 81.6)
GSB |39.3050|120.0930|06/26/2005|184557.8|  0.0| 4.80| 0.017 | IV | 52.0( 83.6)
DMG |39.8300|120.5000|12/15/1931|1620 0.0|  0.0| 4.00| 0.011 | III| 52.6( 84.7)
DMG |38.7000|120.3000|03/05/1946|14 427.0|  0.0| 4.10| 0.011 | III| 53.2( 85.7)
GSB |39.9550|120.8420|12/25/1992|042509.6| 16.0| 4.20| 0.012 | III| 53.4( 85.9)
MGI |39.9000|121.5000|11/18/1942|2035 0.0|  0.0| 5.00| 0.018 | IV | 53.8( 86.6)
MGI |39.9000|121.5000|11/18/1942|2020 0.0|  0.0| 5.00| 0.018 | IV | 53.8( 86.6)
UNR |39.9400|120.7180|02/19/1982| 45315.6|  6.6| 4.00| 0.011 | III| 54.2( 87.2)
DMG |39.5000|122.0000|07/24/1903|2026 0.0|  0.0| 4.50| 0.014 | IV | 54.5( 87.7)
GSB |39.9780|120.8480|02/02/1996|004030.3|  5.0| 4.00| 0.011 | III| 54.9( 88.3)
DMG |39.7500|121.8000|01/24/1931| 721 0.0|  0.0| 4.00| 0.011 | III| 54.9( 88.4)
DMG |39.7800|121.7700|05/24/1966| 34955.1| 20.0| 4.60| 0.014 | IV | 55.3( 88.9)
MGI |40.0000|121.0000|07/19/1935| 122 0.0|  0.0| 5.00| 0.018 | IV | 55.3( 89.1)
DMG |40.0000|121.0000|05/01/1941|1329 0.0|  0.0| 4.50| 0.014 | III| 55.3( 89.1)
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 DMG  |40.0000|121.0000|06/06/1934|2214  0.0|   0.0| 4.50| 0.014  | III|  55.3( 89.1)
 GSB  |39.3300|120.0210|06/03/2004|085445.6|   8.0| 4.20| 0.012  | III|  56.0( 90.2)
 GSB  |39.9800|120.7620|10/20/1992|130201.7|   8.0| 4.00| 0.010  | III|  56.1( 90.3)
 DMG  |39.2000|120.0000|04/09/1930|2157  0.0|   0.0| 4.30| 0.012  | III|  56.5( 90.9)
 MGI  |39.2500|120.0000|12/27/1948|1245  0.0|   0.0| 4.30| 0.012  | III|  56.6( 91.0)
 DMG  |39.5400|122.0200|04/29/1968|  02138.6|   0.0| 4.70| 0.015  | IV |  56.6( 91.1)
 GSB  |39.6930|120.2070|09/19/1992|031739.5|  13.0| 4.00| 0.010  | III|  56.6( 91.1)
 DMG  |39.3000|120.0000|09/03/1857|  3 5 0.0|   0.0| 6.00| 0.029  |  V |  56.9( 91.5)
 DMG  |39.5500|120.0800|12/29/1948|125328.0|   0.0| 6.00| 0.029  |  V |  57.4( 92.4)
 DMG  |39.5500|120.0800|01/20/1949|  75923.0|   0.0| 4.80| 0.015  | IV |  57.4( 92.4)
 DMG  |39.5500|120.0800|01/08/1949|  33921.0|   0.0| 4.30| 0.012  | III|  57.4( 92.4)
 MGI  |39.5500|120.0800|12/28/1948|  526 8.0|   0.0| 4.30| 0.012  | III|  57.4( 92.4)
 GSB  |39.9000|120.4600|02/17/1998|220839.0|  10.0| 4.50| 0.013  | III|  57.8( 93.1)
 GSB  |39.3000|119.9800|10/30/1998|095330.0|  10.0| 5.30| 0.020  | IV |  57.9( 93.2)
 DMG  |39.7200|120.2000|04/01/1959|181830.0|   0.0| 5.60| 0.023  | IV |  58.1( 93.4)
 UNR  |39.0970|119.9790|02/01/1977|184758.1|  13.9| 4.20| 0.011  | III|  58.1( 93.5)



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                         EARTHQUAKE SEARCH RESULTS
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     |        |         |           |   TIME    |     |      | SITE   |SITE|   APPROX.
FILE|  LAT.  |  LONG.  |   DATE    |   (UTC)   |DEPTH|QUAKE|  ACC.  | MM |   DISTANCE
CODE| NORTH  |  WEST   |           | H M Sec| (km)| MAG.|    g   |INT.|  mi    [km]
----+-------+--------+----------+--------+----+-----+------+---+-----------
DMG  |38.8000|120.1000|08/06/1937|  324  0.0|   0.0| 4.50| 0.013  | III|  58.2( 93.7)
MGI  |39.2500|122.1500|09/29/1942|  829  0.0|   0.0| 4.30| 0.012  | III|  58.6( 94.4)
DMG  |40.0300|121.3000|07/16/1972|1442  9.2|   0.0| 4.10| 0.011  | III|  58.8( 94.6)
DMG  |39.0800|119.9500|01/22/1951|151453.0|   0.0| 4.80| 0.015  | IV |  59.8( 96.2)
BRK  |38.6300|121.9000|09/08/1978|165947.0|   0.0| 4.20| 0.011  | III|  60.0( 96.6)
DMG  |39.5000|120.0000|08/07/1944|  11854.0|   0.0| 4.20| 0.011  | III|  60.1( 96.6)
MGI  |39.5000|120.0000|02/20/1914|10 0  0.0|   0.0| 5.00| 0.017  | IV |  60.1( 96.6)
DMG  |39.1800|122.2000|12/04/1943|201343.0|   0.0| 4.00| 0.010  | III|  61.3( 98.6)
DMG  |39.7000|120.1000|10/30/1959|  3 633.0|   0.0| 4.10| 0.010  | III|  61.6( 99.1)
DMG  |39.5300|119.9800|09/26/1953|  33429.0|   0.0| 5.30| 0.019  | IV |  61.8( 99.4)
DMG  |40.0000|121.6000|02/08/1940|  8 559.0|   0.0| 5.70| 0.023  | IV |  62.4(100.4)
DMG  |40.0800|120.7700|10/26/1952|113640.0|   0.0| 4.30| 0.011  | III|  62.7(100.8)
DMG  |39.2200|122.2300|11/15/1943|  53628.0|   0.0| 4.00| 0.009  | III|  62.8(101.1)
DMG  |40.0700|120.7000|02/19/1951|2236  7.0|   0.0| 4.20| 0.011  | III|  63.0(101.4)
MGI  |39.5000|122.1700|12/29/1920|  959  0.0|   0.0| 4.00| 0.009  | III|  63.0(101.4)
MGI  |39.5000|122.1700|01/13/1921|1030  0.0|   0.0| 4.00| 0.009  | III|  63.0(101.4)
DMG  |38.8200|119.9800|03/22/1953|  519  0.0|   0.0| 5.00| 0.016  | IV |  63.4(102.0)
DMG  |38.8200|119.9800|03/22/1953|141025.0|   0.0| 4.30| 0.011  | III|  63.4(102.0)
DMG  |39.0000|119.9000|03/28/1948|182620.0|   0.0| 4.60| 0.013  | III|  63.4(102.1)
DMG  |39.5000|119.9000|06/10/1942|2251  0.0|   0.0| 4.10| 0.010  | III|  65.1(104.7)
MGI  |39.5000|119.9000|11/22/1907|  930  0.0|   0.0| 4.30| 0.011  | III|  65.1(104.7)
GSB  |39.6720|119.9800|11/15/1995|203358.5|   5.0| 4.80| 0.014  | IV |  66.0(106.2)
DMG  |38.8700|119.9000|12/17/1942|15 743.0|   0.0| 5.10| 0.016  | IV |  66.0(106.2)
DMG  |38.5000|121.9000|04/21/1892|1743  0.0|   0.0| 6.20| 0.029  |  V |  66.3(106.7)
T-A  |38.2500|121.3200|08/04/1850|  0 0  0.0|   0.0| 4.30| 0.011  | III|  67.1(108.0)
DMG  |39.2000|119.8000|06/03/1887|1048  0.0|   0.0| 6.30| 0.030  |  V |  67.2(108.1)
DMG  |39.3000|119.8000|11/25/1947|18 9  2.0|   0.0| 4.00| 0.009  | III|  67.5(108.6)
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DMG  |39.1000|119.8000|12/27/1869|10 0  0.0|  0.0| 5.90| 0.024  |  V  | 67.6(108.7)
DMG  |38.4000|121.8000|04/30/1892| 0 9  0.0|  0.0| 5.50| 0.020  | IV  | 68.2(109.8)
UNR  |39.2900|119.7740|04/29/1981|115553.2|  6.8| 4.20| 0.010  | III| 68.8(110.7)
DMG  |38.7000|122.1700|05/08/1969|221053.1|  0.0| 4.00| 0.009  | III| 69.1(111.1)
DMG  |39.5000|119.8200|04/17/1928|1039  0.0|  0.0| 4.50| 0.011  | III| 69.2(111.3)
DMG  |39.4200|119.7800|05/09/1952|153132.0|  0.0| 5.10| 0.016  | IV  | 69.8(112.4)
DMG  |38.5000|122.0000|07/30/1904|1026  0.0|  0.0| 4.50| 0.011  | III| 70.1(112.8)
DMG  |39.5000|119.8000|02/18/1914|1817  0.0|  0.0| 5.00| 0.015  | IV  | 70.2(112.9)
DMG  |39.5000|119.8000|04/24/1914|  834  0.0|  0.0| 6.40| 0.031  |  V  | 70.2(112.9)
DMG  |38.6200|122.1300|11/30/1949|  83154.0|  0.0| 4.00| 0.009  | III| 70.2(113.0)
GSB  |39.2220|119.7410|01/03/1991|020851.9|  7.0| 4.00| 0.009  | III| 70.3(113.2)
GSB  |39.2120|119.7330|01/02/1991|231635.6|  5.0| 4.70| 0.013  | III| 70.8(113.9)
GSB  |39.1680|119.7330|11/18/1994|205059.2|  6.0| 4.40| 0.011  | III| 70.8(114.0)
DMG  |40.2000|121.4700|12/12/1965|125749.8|  0.0| 4.00| 0.008  | III| 72.5(116.7)
DMG  |39.3000|119.7000|05/30/1868|  510  0.0|  0.0| 5.80| 0.022  | IV  | 72.8(117.2)
DMG  |39.6200|119.8000|01/21/1951|  62827.0|  0.0| 4.10| 0.009  | III| 73.0(117.5)
UNR  |38.7960|119.7980|09/04/1978|22 335.0|  9.3| 4.00| 0.008  | III| 73.0(117.5)
UNR  |38.7960|119.7950|09/04/1978|  45231.9| 10.0| 4.60| 0.012  | III| 73.2(117.7)
GSG  |38.7720|119.8030|09/13/1994|212238.2|  0.0| 4.40| 0.010  | III| 73.4(118.1)
UNR  |38.7940|119.7900|09/04/1978|215452.8| 10.1| 5.20| 0.016  | IV  | 73.5(118.2)
GSB  |39.6700|119.8200|04/06/1992|040129.0|  9.0| 4.40| 0.010  | III| 73.5(118.2)
DMG  |39.0300|119.7000|10/02/1962|  35058.4|  0.0| 4.30| 0.010  | III| 73.6(118.4)
DMG  |39.4000|119.7000|12/27/1869|  155  0.0|  0.0| 6.10| 0.025  |  V  | 73.7(118.7)
DMG  |40.2700|121.2300|08/21/1949|204816.0|  0.0| 4.50| 0.011  | III| 74.5(119.9)
UNR  |39.9920|120.1050|02/22/1979|155729.0|  9.0| 5.10| 0.015  | IV  | 74.5(119.9)
DMG  |40.0000|122.0000|01/07/1881|  225  0.0|  0.0| 5.00| 0.014  | IV  | 74.7(120.2)


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                          EARTHQUAKE SEARCH RESULTS
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     |        |         |          |  TIME   |     |      | SITE  |SITE|  APPROX.
FILE|  LAT.  |  LONG.  |   DATE   |  (UTC)  |DEPTH|QUAKE|  ACC.  | MM |  DISTANCE
CODE| NORTH  |  WEST   |          | H M Sec| (km)| MAG.|   g    |INT.|  mi   [km]
----+-------+--------+----------+-------+----+----+-------+---+-----------
DMG  |38.4000|122.0000|04/19/1892|1050  0.0|  0.0| 6.40| 0.029  |  V  | 75.0(120.7)
DMG  |40.2000|120.5000|01/24/1875|12 0  0.0|  0.0| 5.80| 0.021  | IV  | 75.1(120.9)
DMG  |39.7000|119.8000|07/18/1949|1531  5.0|  0.0| 4.50| 0.011  | III| 75.3(121.2)
DMG  |40.2900|121.2300|02/13/1965|215346.4|  0.0| 4.30| 0.010  | III| 75.9(122.1)
DMG  |38.6100|122.2500|09/17/1973|  2 854.6|  0.0| 4.00| 0.008  | III| 76.0(122.3)
UNR  |39.1070|119.6340|01/09/1983|145857.9|  9.8| 4.03| 0.008  | III| 76.4(122.9)
GSB  |38.7590|119.7440|09/12/1994|235709.8|  0.0| 5.40| 0.017  | IV  | 76.7(123.4)
GSB  |38.8380|119.7010|03/07/1994|164912.9|  3.0| 4.00| 0.008  | III| 76.8(123.6)
GSG  |38.7390|119.7510|09/13/1994|061544.5|  0.0| 4.30| 0.009  | III| 76.9(123.8)
DMG  |38.3000|121.9000|05/19/1902|1831  0.0|  0.0| 5.50| 0.018  | IV  | 77.0(123.9)
GSB  |39.0660|119.6240|09/16/2005|150944.4| 10.0| 4.20| 0.009  | III| 77.2(124.3)
GSG  |38.7590|119.7320|09/15/1994|004527.4|  8.0| 4.00| 0.008  | III| 77.3(124.4)
GSG  |38.8050|119.7010|09/12/1994|171402.8|  8.0| 4.00| 0.008  | III| 77.6(124.9)
GSB  |38.7610|119.7230|09/19/1994|140606.5|  0.0| 4.00| 0.008  | III| 77.7(125.0)
GSB  |38.7680|119.7190|01/06/1995|001202.5|  1.0| 4.70| 0.012  | III| 77.7(125.0)
GSB  |38.8570|119.6750|02/17/1984|120356.1| 20.0| 4.50| 0.010  | III| 77.7(125.1)
GSB  |38.7940|119.7030|05/27/1995|054943.2|  0.0| 4.00| 0.008  | III| 77.8(125.2)
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GSB |38.7780|119.7090|02/18/1995|201711.4|  2.0| 4.30| 0.009 | III| 77.9(125.4)
DMG |39.6200|119.7000|10/26/1950| 318 8.0|  0.0| 4.20| 0.009 | III| 77.9(125.4)
GSB |38.7770|119.7050|04/22/1995|143132.4|  6.0| 4.50| 0.010 | III| 78.1(125.7)
DMG |38.7200|119.7300|12/20/1942| 54739.0|  0.0| 4.50| 0.010 | III| 78.5(126.3)
GSB |38.7320|119.7210|12/21/1994|055012.0|  3.0| 4.30| 0.009 | III| 78.6(126.5)
GSB |38.7310|119.7190|12/20/1994|221411.0|  3.0| 4.00| 0.008 | III| 78.7(126.7)
DMG |38.6700|119.7500|04/17/1915| 627 0.0|  0.0| 4.00| 0.008 | III| 79.1(127.3)
MGI |38.6700|119.7500|05/11/1917|223330.0|  0.0| 4.00| 0.008 | III| 79.1(127.3)
DMG |39.6300|119.6800|11/10/1950|172815.0|  0.0| 4.00| 0.008 | III| 79.2(127.4)
DMG |40.3000|120.6000|09/27/1947| 740 0.0|  0.0| 4.40| 0.010 | III| 79.7(128.3)
GSG |38.8190|119.6520|09/12/1994|122343.3| 14.0| 6.10| 0.024 | IV | 79.8(128.3)
GSB |38.8010|122.4510|01/17/1994|144612.1| 11.0| 4.10| 0.008 | III| 79.8(128.4)
GSB |38.8130|119.6520|09/17/1994|025912.0|  5.0| 4.00| 0.008 | II | 79.9(128.6)
DMG |38.6200|122.3500|04/20/1958|21 658.0|  0.0| 4.00| 0.008 | II | 80.2(129.1)
DMG |40.0800|120.0700|12/14/1950| 92951.0|  0.0| 4.00| 0.008 | II | 80.3(129.2)
DMG |40.0800|120.0700|12/14/1950|131038.0|  0.0| 4.00| 0.008 | II | 80.3(129.2)
DMG |40.0800|120.0700|12/11/1950|2229 1.0|  0.0| 4.10| 0.008 | III| 80.3(129.2)
DMG |40.0800|120.0700|12/14/1950|164111.0|  0.0| 4.10| 0.008 | III| 80.3(129.2)
DMG |40.0800|120.0700|12/14/1950|11 230.0|  0.0| 4.00| 0.008 | II | 80.3(129.2)
DMG |40.0800|120.0700|12/14/1950| 91959.0|  0.0| 4.00| 0.008 | II | 80.3(129.2)
DMG |40.0800|120.0700|12/15/1950|18 115.0|  0.0| 4.40| 0.010 | III| 80.3(129.2)
DMG |40.0800|120.0700|12/14/1950| 85934.0|  0.0| 4.50| 0.010 | III| 80.3(129.2)
DMG |40.0800|120.0700|12/17/1950| 11844.0|  0.0| 4.00| 0.008 | II | 80.3(129.2)
DMG |40.0800|120.0700|12/14/1950|132419.0|  0.0| 5.60| 0.018 | IV | 80.3(129.2)
MGI |40.1000|120.1000|12/31/1950|10 0 0.0|  0.0| 5.00| 0.013 | III| 80.3(129.2)
GSB |38.7540|119.6680|09/21/1994|184706.2|  0.0| 4.00| 0.008 | II | 80.6(129.7)
GSB |38.7390|119.6690|09/20/1994|033721.1|  0.0| 4.10| 0.008 | III| 80.9(130.2)
GSB |38.7460|119.6590|10/10/1994|030707.3|  0.0| 4.80| 0.012 | III| 81.2(130.7)
GSB |38.7390|119.6460|09/20/1994|153836.6|  2.0| 4.90| 0.012 | III| 82.1(132.1)
GSG |38.7550|119.6330|09/20/1994|051719.1|  1.0| 4.60| 0.011 | III| 82.3(132.4)
GSB |38.3780|122.1660|05/08/2005|084355.3|  9.0| 4.10| 0.008 | III| 82.4(132.6)
DMG |38.5800|122.3700|12/16/1959| 22842.0|  0.0| 4.10| 0.008 | III| 82.6(132.9)
GSB |38.7840|119.6000|09/17/1994|123617.0|  5.0| 4.10| 0.008 | III| 83.2(133.9)
DMG |38.1000|121.7000|02/14/1909|1555 0.0|  0.0| 4.50| 0.010 | III| 83.5(134.4)
DMG |38.6800|119.6500|02/06/1943| 84719.0|  0.0| 4.30| 0.009 | III| 83.6(134.5)
DMG |38.6000|119.7000|09/17/1868|1655 0.0|  0.0| 5.20| 0.014 | IV | 83.8(134.8)


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                    EARTHQUAKE SEARCH RESULTS
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    |       |        |          |  TIME  |     |     | SITE  |SITE|  APPROX.
FILE| LAT.  | LONG.  |   DATE   | (UTC)  |DEPTH|QUAKE| ACC.  | MM |  DISTANCE
CODE| NORTH | WEST   |          | H M Sec| (km)| MAG.|   g   |INT.|  mi   [km]
----+-------+--------+----------+--------+-----+-----+-------+----+-----------
GSB |38.8260|119.5670|09/19/1994|072526.8|  5.0| 4.00| 0.008 | II | 83.9(135.0)
MGI |40.3500|121.6000|06/30/1936| 630 0.0|  0.0| 4.30| 0.009 | III| 84.5(136.0)
MGI |40.3500|121.6000|07/02/1936|1738 0.0|  0.0| 5.00| 0.013 | III| 84.5(136.0)
DMG |38.7000|119.6000|12/14/1942|121351.0|  0.0| 4.00| 0.007 | II | 85.4(137.5)
GSB |38.7750|119.5580|09/20/1994|031747.8|  0.0| 4.20| 0.008 | III| 85.5(137.7)
DMG |39.5000|119.5000|03/15/1860|19 0 0.0|  0.0| 6.30| 0.025 |  V | 85.6(137.8)
DMG |38.2000|122.0000|05/21/1902| 620 0.0|  0.0| 4.00| 0.007 | II | 85.7(138.0)
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MGI |40.3000|120.3000|01/27/1908| 2 0 0.0|  0.0| 5.70| 0.018 | IV | 85.9(138.3)
GSB |38.7770|119.5490|12/28/1995|182759.5|  5.0| 5.50| 0.016 | IV | 86.0(138.3)
GSG |38.9300|122.6250|02/28/1995|230946.8|  5.0| 4.10| 0.008 | II | 86.2(138.7)
DMG |40.4000|120.6000|01/31/1885| 545 0.0|  0.0| 5.70| 0.018 | IV | 86.3(138.9)
GSB |39.5100|119.4780|05/28/1985|075645.8|  5.0| 4.30| 0.009 | III| 86.9(139.9)
GSB |38.7810|119.5270|12/23/1995|053955.1|  5.0| 5.20| 0.014 | IV | 87.0(140.0)
GSB |38.7840|119.5240|01/02/1996|062641.2|  5.0| 4.10| 0.008 | II | 87.1(140.1)
GSB |38.7530|119.5370|12/22/1995|090033.0|  5.0| 5.20| 0.014 | IV | 87.1(140.2)
GSB |38.5670|119.6520|11/03/1989|190901.6| 11.0| 4.50| 0.010 | III| 87.2(140.3)
GSB |38.8030|119.5110|09/20/1994|154055.4|  5.0| 4.90| 0.012 | III| 87.3(140.5)
MGI |40.4500|121.3000|07/13/1936|1043 0.0|  0.0| 4.30| 0.009 | III| 87.3(140.5)
MGI |40.4500|121.3000|07/02/1936| 720 0.0|  0.0| 4.30| 0.009 | III| 87.3(140.5)
MGI |40.4500|121.3000|07/06/1936|1111 0.0|  0.0| 4.30| 0.009 | III| 87.3(140.5)
MGI |40.4500|121.3000|07/06/1936|1541 0.0|  0.0| 4.30| 0.009 | III| 87.3(140.5)
MGI |40.4500|121.3000|07/06/1936|1735 0.0|  0.0| 4.30| 0.009 | III| 87.3(140.5)
MGI |40.4500|121.3000|07/01/1936|1243 0.0|  0.0| 4.30| 0.009 | III| 87.3(140.5)
MGI |40.4500|121.3000|07/01/1936|1150 0.0|  0.0| 4.30| 0.009 | III| 87.3(140.5)
MGI |40.4500|121.3000|07/06/1936|1016 0.0|  0.0| 4.30| 0.009 | III| 87.3(140.5)
GSB |38.7150|119.5400|11/01/1986|192338.3| 17.0| 4.60| 0.010 | III| 88.0(141.6)
MGI |40.4200|121.5700|08/05/1915|1630 0.0|  0.0| 4.00| 0.007 | II | 88.6(142.5)
DMG |39.3000|119.4000|03/30/1943| 0 047.0|  0.0| 4.20| 0.008 | III| 88.8(142.9)
DMG |40.4500|121.4700|03/20/1950|152217.0|  0.0| 5.50| 0.016 | IV | 89.1(143.4)
GSB |38.6530|119.5390|07/23/1986|073909.8|  5.0| 4.30| 0.008 | III| 89.8(144.5)
GSB |38.7030|119.5020|12/12/1996|183549.3|  5.0| 5.00| 0.012 | III| 90.2(145.1)
GSB |38.6570|119.5260|09/26/2000|072030.0|  9.0| 4.50| 0.009 | III| 90.3(145.3)
DMG |38.5300|122.5200|04/05/1956| 42913.0|  0.0| 4.40| 0.009 | III| 91.3(146.9)
DMG |38.5300|122.5200|04/05/1956| 42932.0|  0.0| 4.20| 0.008 | II | 91.3(146.9)
GSB |38.0370|121.8620|06/22/1989|011325.2| 16.0| 4.30| 0.008 | III| 91.3(146.9)
UNR |40.4070|120.3500|06/20/1976|101525.6|  5.0| 4.50| 0.009 | III| 91.4(147.1)
MGI |38.5000|122.5000|10/13/1948| 023 0.0|  0.0| 4.30| 0.008 | III| 91.5(147.2)
DMG |40.4800|121.5000|11/15/1950| 32242.0|  0.0| 4.10| 0.007 | II | 91.5(147.2)
DMG |40.4800|121.5000|11/14/1950| 63432.0|  0.0| 4.50| 0.009 | III| 91.5(147.2)
DMG |40.4800|121.5000|11/14/1950| 2 440.0|  0.0| 4.10| 0.007 | II | 91.5(147.2)
DMG |40.4800|121.5000|11/14/1950| 23550.0|  0.0| 4.60| 0.010 | III| 91.5(147.2)
DMG |40.4800|121.5000|11/14/1950|215553.0|  0.0| 4.00| 0.007 | II | 91.5(147.2)
DMG |40.5000|120.7000|06/20/1889| 6 0 0.0|  0.0| 5.90| 0.019 | IV | 91.7(147.6)
DMG |38.0100|121.8200|09/10/1965|212834.3| 16.0| 4.90| 0.011 | III| 91.9(147.9)
GSG |38.6680|119.4830|09/26/2000|072728.7| 10.0| 4.20| 0.008 | II | 92.1(148.2)
T-A |40.1700|122.2500|11/24/1877|1430 0.0|  0.0| 4.30| 0.008 | III| 92.3(148.5)
GSB |38.5840|119.5310|07/06/1993|021304.0|  2.0| 4.10| 0.007 | II | 92.3(148.5)
GSB |38.3790|122.4130|09/03/2000|083630.1| 10.0| 5.00| 0.012 | III| 92.4(148.8)
GSB |38.6400|119.4890|06/27/1996|054902.2|  4.0| 4.30| 0.008 | III| 92.6(149.0)
DMG |39.0800|119.3300|06/25/1933|204527.0|  0.0| 6.10| 0.021 | IV | 92.8(149.3)
DMG |40.5000|121.5000|07/07/1946| 65515.0|  0.0| 5.00| 0.012 | III| 92.8(149.4)
MGI |40.5000|121.5000|12/25/1936|16 5 0.0|  0.0| 4.30| 0.008 | III| 92.8(149.4)
MGI |40.5000|121.5000|06/23/1939|1728 0.0|  0.0| 4.30| 0.008 | III| 92.8(149.4)
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                    EARTHQUAKE SEARCH RESULTS
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------------------------------------------------------------------------------------
    |        |         |          |  TIME   |     |     | SITE  |SITE|  APPROX.
FILE|  LAT.  |  LONG.  |   DATE   |  (UTC)  |DEPTH|QUAKE| ACC.  | MM |  DISTANCE
CODE| NORTH  |  WEST   |          | H M Sec | (km)| MAG.|   g   |INT.|  mi   [km]
----+-------+--------+----------+--------+-----+-----+-------+----+-----------
UNR |40.4740|120.4780|06/24/1976|154444.4|  5.0| 4.20| 0.008 | II | 93.2(149.9)
GSB |38.7140|119.4350|12/13/1996|165316.6|  5.0| 4.60| 0.010 | III| 93.2(150.0)
DMG |38.6000|119.5000|04/05/1915|2140 0.0|  0.0| 4.50| 0.009 | III| 93.3(150.1)
T-A |38.0000|120.2500|04/11/1872|12 0 0.0|  0.0| 5.00| 0.012 | III| 93.5(150.5)
DMG |38.5800|119.5000|04/05/1915|2311 0.0|  0.0| 5.00| 0.012 | III| 93.9(151.1)
DMG |38.0000|121.9000|05/19/1889|1110 0.0|  0.0| 6.00| 0.020 | IV | 94.5(152.1)
T-A |38.2500|122.3200|05/21/1864| 257 0.0|  0.0| 4.30| 0.008 | III| 94.5(152.1)
T-A |38.2500|122.3200|03/08/1865| 730 0.0|  0.0| 4.30| 0.008 | III| 94.5(152.1)
T-A |38.2500|122.3200|10/14/1891|1230 0.0|  0.0| 4.30| 0.008 | III| 94.5(152.1)
MGI |38.2500|122.3200|01/20/1919| 925 0.0|  0.0| 4.00| 0.007 | II | 94.5(152.1)
GSB |38.7920|122.7420|11/18/1996|065652.6|  3.0| 4.10| 0.007 | II | 94.8(152.5)
GSB |38.7880|122.7420|01/27/1990|220608.9|  7.0| 4.40| 0.009 | III| 94.8(152.6)
GSB |38.7480|122.7260|12/27/2004|103623.0|  3.0| 4.30| 0.008 | III| 94.9(152.8)
GSB |38.8340|122.7650|02/18/2004|203746.0|  3.0| 4.50| 0.009 | III| 95.1(153.1)
MGI |40.5000|121.6500|06/30/1936|2036 0.0|  0.0| 4.30| 0.008 | III| 95.2(153.1)
MGI |40.5000|121.6500|05/15/1936| 7 4 0.0|  0.0| 4.30| 0.008 | III| 95.2(153.1)
MGI |40.5000|121.6500|06/02/1936|1430 0.0|  0.0| 4.30| 0.008 | III| 95.2(153.1)
MGI |40.5000|121.6500|08/11/1942| 530 0.0|  0.0| 4.30| 0.008 | III| 95.2(153.1)
MGI |40.5000|121.6500|06/30/1936|1027 0.0|  0.0| 4.30| 0.008 | III| 95.2(153.1)
MGI |40.5000|121.6500|06/29/1936|15 5 0.0|  0.0| 4.30| 0.008 | III| 95.2(153.1)
MGI |40.5000|121.6500|03/23/1952|133613.0|  0.0| 4.30| 0.008 | III| 95.2(153.1)
MGI |40.5000|121.6500|06/29/1936|1245 0.0|  0.0| 4.30| 0.008 | III| 95.2(153.1)
MGI |40.5000|121.6500|07/01/1936|1550 0.0|  0.0| 4.30| 0.008 | III| 95.2(153.1)
MGI |40.5000|121.6500|05/09/1936|2021 0.0|  0.0| 4.30| 0.008 | III| 95.2(153.1)
MGI |40.5000|121.6500|05/10/1936| 218 0.0|  0.0| 4.30| 0.008 | III| 95.2(153.1)
MGI |40.5000|121.6500|06/29/1936|1952 0.0|  0.0| 4.30| 0.008 | III| 95.2(153.1)
MGI |40.5000|121.6500|07/05/1948|1014 0.0|  0.0| 4.30| 0.008 | III| 95.2(153.1)
MGI |38.0200|121.9700|10/27/1955|193332.0|  0.0| 4.30| 0.008 | III| 95.2(153.2)
DMG |38.3000|122.4000|10/12/1891| 628 0.0|  0.0| 5.50| 0.015 | IV | 95.4(153.5)
GSB |38.7800|122.7500|03/26/1989|180336.2|  5.0| 4.00| 0.007 | II | 95.4(153.6)
GSB |38.7880|122.7540|05/09/2005|223739.1|  0.0| 4.30| 0.008 | III| 95.5(153.6)
DMG |39.8000|122.6700|04/15/1928|215715.0|  0.0| 4.50| 0.009 | III| 95.5(153.6)
DMG |40.0800|119.6700|09/21/1955| 73728.0|  0.0| 4.10| 0.007 | II | 95.5(153.7)
GSB |38.8100|122.7650|09/19/1989|231936.3|  5.0| 4.00| 0.007 | II | 95.6(153.8)
PDB |38.8670|122.7870|10/20/2006|170008.1|  3.0| 4.60| 0.009 | III| 95.7(153.9)
GSB |38.7930|122.7600|12/04/1996|212115.2|  1.0| 4.40| 0.008 | III| 95.7(153.9)
GSB |38.7980|122.7680|08/03/2003|120052.8|  1.0| 4.20| 0.008 | II | 96.0(154.4)
GSB |38.7930|122.7670|09/19/1989|232104.0|  4.0| 4.10| 0.007 | II | 96.0(154.5)
GSB |38.8630|122.7930|09/19/1992|230447.1|  2.0| 4.90| 0.011 | III| 96.0(154.5)
GSB |38.7910|122.7700|12/25/1998|051951.6|  5.0| 4.00| 0.007 | II | 96.2(154.8)
DMG |37.9000|121.7000|09/20/1940|1859 0.0|  0.0| 4.00| 0.007 | II | 96.2(154.9)
DMG |37.9000|121.7000|09/19/1940| 82018.0|  0.0| 4.00| 0.007 | II | 96.2(154.9)
GSB |38.7820|122.7670|12/08/2000|074111.4|  4.0| 4.40| 0.008 | III| 96.3(154.9)
GSB |38.7900|122.7730|04/18/2002|113540.7|  3.0| 4.00| 0.007 | II | 96.4(155.1)
GSB |38.7850|122.7710|02/18/1999|085836.5|  2.0| 4.10| 0.007 | II | 96.4(155.1)
GSB |38.8480|122.7950|03/15/1990|191952.4|  4.0| 4.10| 0.007 | II | 96.4(155.1)
GSB |38.8350|122.7930|04/03/1990|211214.1|  2.0| 4.10| 0.007 | II | 96.5(155.4)
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GSB |38.8320|122.7930|08/14/1990|190512.9|  3.0| 4.50| 0.009 | III| 96.6(155.4)
GSB |38.7900|122.7820|01/07/1987|121337.7|  2.0| 4.00| 0.007 | II | 96.9(155.9)
GSB |38.8410|122.8100|10/03/2003|165634.9|  2.0| 4.30| 0.008 | II | 97.3(156.6)
GSB |38.6810|122.7430|09/04/1995|141617.7|  7.0| 4.80| 0.010 | III| 97.4(156.8)
PDB |38.7950|122.7960|04/24/2007|210828.5|  2.0| 4.40| 0.008 | III| 97.5(156.9)
GSB |40.0380|119.5810|12/02/1996|233312.0|  5.0| 4.40| 0.008 | III| 97.5(156.9)
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                         EARTHQUAKE SEARCH RESULTS
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    |      |       |          |  TIME  |    |    |  SITE |SITE|  APPROX.
FILE| LAT. | LONG. |   DATE   |  (UTC) |DEPTH|QUAKE| ACC. | MM |  DISTANCE
CODE| NORTH| WEST  |          | H M Sec| (km)| MAG.|   g  |INT.|  mi   [km]
----+------+-------+----------+--------+----+----+-------+---+-----------
GSB |39.8100|122.7090|05/17/1995|022913.7| 12.0| 4.40| 0.008 | III| 97.6(157.1)
MGI |39.6000|119.3000|04/20/1906| 415 0.0|  0.0| 4.30| 0.008 | II | 97.7(157.2)
DMG |40.1300|119.6700|03/19/1956|15 923.0|  0.0| 4.10| 0.007 | II | 97.7(157.3)
DMG |39.3000|122.8800|08/14/1952| 647 7.0|  0.0| 4.00| 0.007 | II | 97.8(157.4)
GSB |38.7970|122.8030|09/22/1984|185203.8|  2.0| 4.00| 0.007 | II | 97.8(157.4)
GSG |38.8020|122.8050|05/20/2003|165041.8|  1.0| 4.00| 0.007 | II | 97.8(157.4)
DMG |38.3700|119.5800|04/09/1960| 43755.0|  0.0| 4.00| 0.007 | II | 97.9(157.6)
GSB |38.8440|122.8260|01/06/2000|213810.9|  2.0| 4.00| 0.007 | II | 98.1(157.8)
PDB |38.8160|122.8160|05/12/2006|103729.3|  2.0| 4.70| 0.010 | III| 98.1(157.8)
DMG |38.3300|122.5000|02/25/1919|2239 0.0|  0.0| 4.50| 0.009 | III| 98.2(158.1)
BRK |38.8000|122.8200|05/29/1982|13 224.0|  0.0| 4.00| 0.007 | II | 98.6(158.7)
MGI |39.2000|122.9000|05/07/1906| 5 0 0.0|  0.0| 5.30| 0.013 | III| 98.7(158.8)
MGI |39.2000|122.9000|05/07/1906| 410 0.0|  0.0| 5.30| 0.013 | III| 98.7(158.8)
MGI |40.5000|121.8300|07/23/1920| 355 0.0|  0.0| 5.70| 0.016 | IV | 98.7(158.9)
DMG |37.9700|122.0000|05/31/1958|22 711.0|  0.0| 4.10| 0.007 | II | 99.0(159.3)
DMG |38.9300|122.8700|05/07/1955|145615.0|  0.0| 4.20| 0.007 | II | 99.0(159.4)
DMG |38.9300|122.8700|05/07/1955|115039.0|  0.0| 4.60| 0.009 | III| 99.0(159.4)
MGI |37.9000|121.8500|11/11/1936| 225 0.0|  0.0| 4.30| 0.008 | II | 99.4(160.0)
PDG |38.8430|122.8530|05/12/2006|103835.9|  2.0| 4.20| 0.007 | II | 99.5(160.1)
DMG |38.4000|122.6000|03/08/1865|1430 0.0|  0.0| 4.70| 0.010 | III| 99.8(160.5)
DMG |38.4000|122.6000|08/09/1893| 915 0.0|  0.0| 5.10| 0.012 | III| 99.8(160.5)
DMG |39.7000|119.3000|12/03/1942| 94442.0|  0.0| 5.50| 0.015 | IV | 99.8(160.6)

*******************************************************************************
-END OF SEARCH-   340 EARTHQUAKES FOUND WITHIN THE SPECIFIED SEARCH AREA.

TIME PERIOD OF SEARCH:   1800  TO  2007

LENGTH OF SEARCH TIME:   208  years

THE EARTHQUAKE CLOSEST TO THE SITE IS ABOUT 2.2 MILES (3.5 km) AWAY.

LARGEST EARTHQUAKE MAGNITUDE FOUND IN THE SEARCH RADIUS: 6.4

LARGEST EARTHQUAKE SITE ACCELERATION FROM THIS SEARCH: 0.107 g

COEFFICIENTS FOR GUTENBERG & RICHTER RECURRENCE RELATION:
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a-value=  3.031
b-value=  0.705
beta-value=  1.624


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TABLE OF MAGNITUDES AND EXCEEDANCES:
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 Earthquake | Number of Times | Cumulative
  Magnitude |    Exceeded     | No. / Year
 -----------+-----------------+-----------
     4.0    |       340       |   1.63462
     4.5    |       138       |   0.66346
     5.0    |        70       |   0.33654
     5.5    |        33       |   0.15865
     6.0    |        12       |   0.05769
```

APPENDIX 3.7-1 FINAL REMOVAL ACTION WORK PLAN

California Regional Water Quality Control Board
Central Valley Region
Robert Schneider, Chair

Terry Tamminen
Secretary for
Environmental
Protection

Sacramento Main Office
Internet Address: http://www.swrcb.ca.gov/rwqcb5
11020 Sun Center Drive #200 Rancho Cordova, CA 95670-6114
Phone (916) 464-3291 Fax (916) 464-4797

Arnold Schwarzenegger
Governor

6 October 2004

Mr. Scott Leiby
Sierra Pacific Industries-Redding Division
P.O. Box 496011
Redding, CA 96049-6011

NO FURTHER ACTION REQUIRED, SIERRA PACIFIC INDUSTRIES, BEAR RIVER MILL, 12270 LA BARR MEADOWS ROAD, GRASS VALLEY, NEVADA COUNTY

In a 17 January 2002 letter, Regional Water Quality Control Board (Regional Board) staff concurred that no further monitoring was required at the Sierra Pacific Industries Bear River Mill in Grass Valley, Nevada County. The letter stated that the Regional Board would issue a No Further Action letter once confirmation had been received from the Nevada County Environmental Health Department that the monitoring wells at the site had been properly destroyed. In a 21 September 2004 letter, your consultant, Carlton Engineering, provided the necessary documentation of the permitted destruction of the wells. Therefore, no further action is required at this time.

Nothing in this determination shall constitute or be construed as a satisfaction or release from liability for any conditions or claims arising as a result of past, current, or future operations at this location. Nothing in this determination is intended or shall be construed to limit the rights of any parties with respect to claims arising out of or relating to deposit or disposal at any other location of substances removed from the site.

If existing, additional, or previously unidentified chemical constituents at the site cause or threaten to cause pollution or nuisance or are found to pose a threat to public health or water quality, then 1) nothing in this determination is intended or shall be construed to limit or preclude the Regional Board or any other agency from taking any further enforcement action, and 2) this letter does not relieve Sierra Pacific Industries of any responsibilities mandated under the California Health and Safety Code and the California Water Code. Changes in land use may require further assessment and mitigation.

If you have questions about this letter, you may call Susan Timm at (916) 464-4657. Please note that staff oversight charges for work associated with this no further action letter will be billed on the fourth quarter 2004 invoice, in the same manner as previously billed.

ANTONIA K. J. VORSTER, P.E.
Groundwater Program Cleanup Manager

cc: Mr. David R. Huff, Nevada County Department of Environmental Health, Nevada City
Mr. Jason Pittman, Carlton Engineering Inc., Shingle Springs

FINAL

REMOVAL ACTION WORK PLAN

BEAR RIVER MILL SITE
GRASS VALLEY, CALIFORNIA

Prepared for:

Bear River Development Company
3735 El Cajon Avenue
Central Valley, CA 96019

Prepared by

Carlton Engineering, Inc,
3883 Ponderosa Road
Shingle Springs, CA 95682

September 23, 2005

APPROVAL FORM
REMOVAL ACTION WORK PLAN
September 2005

Prepared for: Bear River Development Company
3735 El Cajon Avenue
Central Valley, CA 96019

Prepared by: Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Approved by:
Signature: Date: 9/26/05
Name: Robert N. Kull, P.E.
Title: Environmental Department Manager
Carlton Engineering, Inc.

Signature: Mark S. Montgomery Date: 9/26/05
Name: Mark S. Montgomery, Ph.D., R.E.A. II
Title: Project Manager
Carlton Engineering, Inc.

MARK S. MONTGOMERY
REA II - 20252
Exp. 4/30/06

Signature: Date: 9/30/05
Name: Michael A Vander Dussen, R.G., C.E.G.
Title: Project Engineering Geologist
Carlton Engineering, Inc.

Signature: Date: 10/3/05
Name: Scott Leiby
Title: Safety & Environmental Director
Sierra Pacific Industries, Inc.

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LIST OF FIGURES

LIST OF ACRONYMS

ABS	Absorption Fraction
ARARs	Applicable or relevant and Appropriate Requirements
As	Arsenic
Bgs	Below Ground Surface
BMP	Best Management Practice
BTEX	Benzene, Toluene, Ethylbenzene, and Total Xylenes
Cal/EPA	California Environmental Protection Agency
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COPC	Chemical(s) of Potential Concern
COC	Chemical(s) of Concern
CVRWQCB	Central Valley Regional Water Quality Control Board
DI WET	De-ionized Waste Extract Test
DLM	Designated Level Methodology
DTSC	The California Department of Toxic Substances Control
EAF	Environmental Attenuation Factor
EE/CA	Engineering Evaluation/Cost Assessment
HBRA	Health Based Risk Assessment
HI	Hazard Index
HSC	California Health and Safety Code
HSP	Health and Safety Plan
Kg	Kilogram
L	Liter
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MDL	Method Detection Limit
Mg/kg	Milligrams per Kilogram
Mg/l	Milligrams per Liter
MRL	Method Reporting limit
MSL	Mean Sea Level
MWR	Mine Waste Rock

n	Number of Samples
NA	Not Applicable
NCDEH	Nevada County Department of Environmental Health
NCP	National Contingency Plan
ND	Not Detected above Method Detection Limit
PEA	Preliminary Endangerment Assessment
PRG	Preliminary Remediation Goal
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RAO	Remedial Action Objective
RAW	Removal Action Workplan
RCRA	Resource Conservation and Recovery Act
RDIP	Remediation Design and Implementation Plan
RI	Remedial Investigation
SARA	Superfund Amendments and Reauthorization Act of 1986
SDL	Soluble Designated Level
SPI	Sierra Pacific Industries
STLC	Soluble Threshold Limit Concentration
SWPPP	Storm Water Pollution Prevention Plan
TCLP	Toxicity Characteristic Leaching Potential
TDL	Total Designated Level
TPH	Total Petroleum Hydrocarbons
TSD	RCRA Hazardous Waste Treatment, Storage and Disposal Facility
UCL	Upper Confidence Limit
UST	Underground Storage Tank
Ug/l	Microgram per Liter
VCA	Voluntary Cleanup Agreement
VCP	Voluntary Cleanup Program
WET	Waste Extraction Test

1.0 INTRODUCTION

1.1 PROJECT OVERVIEW

Bear River Development Company (BRDC) entered into a Voluntary Cleanup Agreement (VCA, HAS-A 02/03-150) dated April 4, 2003 with the State of California Environmental Protection Agency (CalEPA) Department of Toxic Substance Control (DTSC) for the Bear River Mill Site (CalSite #2924006) in Grass Valley, California (Site) (DTSC project code site #100331). Carlton Engineering, Inc. (Carlton) was contracted by BRDC to prepare this Removal Action Work Plan (RAW) for remediation of mine waste rock (MWR) from historic mining activities at the Site. The conclusion that remediation of MWR is appropriate, is based upon:

- Review of the findings of previous site investigation activities dating from 1988;
- A Remedial Investigation (RI) completed for the VCA; and,
- A Health-Based Risk Assessment (HBRA) of chemicals of potential concern (COPC).

A RAW was selected as the remedy document for the Site pursuant to Health and Safety Code Section 25356.1 because it is a non-emergency action and the recommended remedial action costs are projected to be less than $1,000,000. This RAW is the equivalent of an Engineering Evaluation/Cost Analysis (EE/CA) as required by the National Contingency Plan (NCP: USEPA, 1990).

1.2 PROJECT GOALS AND OBJECTIVES

The overall goal of this RAW is to develop a cleanup strategy for the Site that effectively reduces, to the extent feasible, the human health risks associated with the chemicals and media of concern at the Site. To achieve this goal, six alternative remedial strategies are formally evaluated using the DTSC prescribed criteria of effectiveness, implementability, cost, and overall health protectiveness. The recommended removal action alternative is proposed and its implementation schedule presented.

The purpose of the RAW is to present pertinent information for evaluating removal alternatives and for recommending a removal alternative for the MWR that is protective of human health and the water of the State. The components for the implementation of the selected alternative (the Remedial Design Implementation Plan, RDIP) will be included in a subsequent document.

1.3 DOCUMENT ORGANIZATION

The organization of this RAW is formatted based upon the guidance in the DTSC Memorandum "Removal Action Workplans" dated September 23, 1998.

Section 1 presents a project overview, the regulatory impetus for the document, the document organization, and the project goals and objectives.

Section 2 presents site characterization information on site history, nature and extent of contamination based upon prior and the current VCA investigations, previous response/remedial actions taken, and the identification of chemicals and media of potential concern.

Section 3 presents the health-based risk assessment for the chemicals of potential concern under both residential and commercial use scenarios.

Section 4 presents identification and review of applicable or relevant and appropriate requirements (ARARs), the chemicals and media of concern, the volume and area of the media of concern, and the removal action goals.

Section 5 presents the identification of removal action alternatives. This format differs from the EPA "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (USEPA, 1988) in that the development and screening of technology types and/or process options is bypassed because the breadth of feasible removal action alternatives is well developed for this type of project (i.e., removal, treatment, or containment.

Section 6 presents the alternatives considered with an assessment of each alternative's effectiveness, implementability, and cost. Alternatives are then evaluated in a comparative analysis.

Finally, Section 7 presents the recommended alternative and the schedule to implement that alternative.

2.0 SITE CHARACTERIZATION

2.1 SITE DESCRIPTION AND HISTORY

The Site (approximately 175 acres) is located in a rural area of Nevada County one mile south of the town of Grass Valley and immediately east of State Highway 49. La Barr Meadows Road divides the Site on the north/south axis (Figure 2.1). Portions of the Site have had human activity since the 1800's (Figure 2.2). Initially, the Site was hard rock mined from the mid 1800's to the early 1900's, mainly east of La Barr Meadows Road (Galena and Bullion Mines). In the mid 1900's the Site was used for the production of lumber and wood products west of La Barr Meadows Road (Valley Veneer and Bear River Saw Mill). Environmental concerns for the Site center on operation and waste disposal practices from mining and lumber activities. Environmental investigations and localized remediation activities have been ongoing since the 1980's, mainly at the former lumber and wood products facilities. BRDC has proposed a residential and commercial development, SouthHill Village, on the Site on the west side of La Barr Meadows Road. BRDC will retain ownership of the property to the east of La Barr Meadows Road. The following Nevada County Assessor's Parcel numbers identifies the Site property:

22-250-12
22-282-02
22-282-03
22-282-04
22-282-05
22-14-30
22-20-36
22-20-37
22-23-52
22-23-53
22-16-06
22-16-05
22-16-04
22-13-10
22-292-01

2.2 SITE GEOLOGY AND HYDROGEOLOGY

The Site lies on the western slope of the Sierra Nevada geomorphic province. The Site elevation ranges from 2,340 to 2,800 feet above mean sea level (msl). The property generally slopes to the west, and includes hills on the east and west bordering a gently sloping area in the interior of the property. Mining and lumber activities have altered the topography creating fill and stockpile areas and earthen dam water impoundments. Site vegetation consists of grasses, areas of dense low shrubs, conifers and oaks. Surface water drains to ponds in the interior of the property. Three ponds were originally constructed for the mill operations west of La Barr Meadows Road. Two of these ponds remain at the Site (Ponds 2 and 3). A former Nevada County Irrigation District (NID) storage reservoir is located east of La Barr Meadows Road. Wetlands have been identified in three areas, south of the Valley Veneer area, north of the Bear River Mill area, and the former NID reservoir. The Valley Veneer area wetland is contiguous with Pond 3. The Site's climate is described as mild and receives an average annual precipitation of 55.5 inches. The majority of the precipitation occurs between November and April.

2.2.1 Geology. The site is characterized by granitic and metamorphic rock of Mesozoic age associated with the Sierra Nevada Batholith. Bedrock is typically overlain by soils derived from in-place chemical and physical weathering of the granitic rock. The area west of La Barr Meadows Road has the greatest depth of soil, and east of La Barr Meadows Road the Site has the greatest exposure of bedrock. The eastern area was where hydrothermal alteration zones at granitic and metamorphic rock contacts were found and mined for precious metals.

The "Soil Survey of Nevada County Area, California" (USDA, 1993) depicts three general soil types at the Site: Musick Sandy Loam, Hoda Sandy Loam, and Alluvial Land. Musick and Hoda soil types dominate the higher portions of the Site, comprising most of the western and northern portions of the Site. Both soil types are characterized by well-drained surface soil underlain by weathered granitic rock at depths of 5 to 8 feet below ground surface (bgs) (Figure 2.3). The greatest soil depth in some areas west of La Barr Meadows Road is reported from prior drilling to be 25 feet bgs.

Soils conditions in the central portions of the site west of La Barr Meadows Road have been altered by previous grading and are not specifically classified by the soil survey. The fill in the area consists of native materials, sand, gravel, mine waste rock, and some wood waste.

2.2.2 Hydrogeology. The principal water-bearing zones in the region consist of sands, gravels, and fractured and weathered granitic rocks. Groundwater was reported to be first encountered by drilling at approximately 15 to 25 feet bgs in the area west of La Barr Meadows Road during an investigation in the late 1980's for a diesel spill at the Bear River Mill area. Groundwater generally stabilized in well casings to depths 3 to 10 feet higher than that first encountered. This suggests that the shallow water-bearing zone is partially confined by the overlying lower permeability clays and silts. Groundwater elevations in feet msl were not determined but are estimated from USGS topography maps to be in the range of 2,315 to 2,380 feet above msl. The groundwater gradient on the west side of La Barr Meadows Road has been reported to be toward the north/northwest generally following Site topography, assumed toward Pond 3.

Groundwater flow and gradients east of La Barr Meadows Road are less well defined. There is seasonal stream flow in the northeastern portion of the Site at approximately 2,420 feet above msl. No other seeps or outflows east of La Barr Meadows Road have been reported. The groundwater elevations recorded for the monitoring well installed for the RI (MW1) were 2,459.39, 2,456.75, and 2,453.44 feet above msl for June, July, and September 2004, respectively.

The former NID reservoir in the southeastern part of the site may locally influence flow and gradient. Domestic water supply wells are located on properties around the Site. To the east, residential wells are reported on driller's logs to have a total depth in the range of 500 to 600 feet bgs. North, west and south of the Site the residential wells are typically in the 300 feet bgs range. The difference between the well depths to the east and the other directions is probably due to the ground surface elevations on the east being approximately 400 to 500 feet higher than properties on the west.

2.3 PREVIOUS INVESTIGATIONS

Site investigations, monitoring, and localized remedial activities have been conducted at the Site since 1988. Over 30 environmental documents have been generated and data from and a reference list for these documents were included in the RI Work Plan. This section presents a summary of information pertinent to this RAW. Earlier environmental investigation activities focused on the Area west of La Barr Meadows Road at the former Bear River Mill and the Valley Veneer Plant. These are well summarized in "Remedial Investigation/Alternative Analysis Summary Report: Bear River Sawmill and Valley Veneer Plant" by Kennedy/Jenks/Chilton, June 1991. Recent investigations have focused on the hard rock mining area east of La Barr Meadows Road concentrating on finding and characterizing angular MWR piles and on angular MWR that may have been used as fill at the Bear River Mill and Valley Veneer sites. Two documents present data on MWR at the Site:

- The "Preliminary Abandoned Mine Site Characterization" by Holdrege & Kull, October, 2001; and
- A letter report "Bear River Mill Site" by Carlton, January 2002 presents information on metal and soluble metal concentrations.

In summary, the environmental investigations identified and focused their testing on the following locations and chemicals:

- Wood treating chemicals, primarily pentachlorophenol (PCP) at the Bear River Mill site;
- Fuels and fuel constituents, primarily diesel from a fuel spill at the Bear River Mill site;
- Metals: Arsenic, mercury, lead, and others in the mining waste.

The remainder of this section focuses on the past site investigations, remedial actions, and current environmental conditions for the Site as they pertain to the purpose and goals of this RAW.

Wood Treating Chemicals. Two former wood product facilities, Valley Veneer and Bear River Sawmill were located at the Site (Figure 2.2). Wood treating chemicals were not reported to have been used at the Valley Veneer Plant and none were detected in soil or groundwater samples collected from that area.

A fungicide, pentachlorophenol, was used at the Bear River Sawmill in the Green Chain Area (Figure 2.2). A site investigation in 1988 found PCP concentrations above a California Department of Health Services (DHS) approved cleanup criteria of 3 milligrams per kilogram (mg/kg, or parts per million, ppm) in the dip tank area concrete and soil under the dip tank (maximum concentration 48 mg/kg). No PCP was reported to have been detected below 2 feet bgs. PCP-affected concrete and soil were excavated and disposed Off-Site at a Class I Landfill in 1989 and 1991, respectively. Confirmatory soil sampling and analysis is reported to have not detected PCP above the method detection limit of 0.5 mg/kg, although no confirmatory report could be reviewed. Confirmation of PCP cleanup was a task in the RI Work Plan for this RAW and the results are presented in Section 2.4.4.

Fuel and Fuel Constituents. Fuel contamination, primarily from a diesel spill was the impetus for numerous studies, removal actions, and a groundwater monitoring program at the Bear River Sawmill area since 1990. Diesel contamination in the groundwater has not been detected since 1999. Destruction of the existing monitoring wells to obtain a no further action (NFA) determination from the RWQCB for the Site was a task in the RI Work Plan for this RAW (Section 2.4.6).

Fill Area 1. Fill material (mainly wood chips/sawdust) was removed from the Bear River Mill area in the late 1990's. The removal activities created piles of mainly rock and some wood waste (Figure 2.2). During preparation of the RI Work Plan the origin of the eight piles currently in this area could not be confirmed to have come solely from the removal activities (i.e., some pile could be the result of illegal dumping). These piles had not been fully characterized. Laboratory analysis of samples collected from these piles for chemicals of potential concern is also a task for this RAW (Section 2.4.5).

Metals. The Site is located in a historic mining area and is dotted with former mine sites and mining properties (Figure 2.2). The earlier Site investigations focused on contaminants from the former wood products facilities, but recognized the potential for metals contamination. More recent investigations have focused on metals because of health risk concerns they may pose for the planned development at the site. **The data presented in this section from previous investigations are for information and comparison with the VCA RI data presented in Section 2.4, because in some cases collection procedures and methods, QA/QC results and analytical methods used could not be identified or confirmed. These data are not used in the Health-Based Risk Assessment presented in Section 3.0.** Forty-eight discreet soil samples for metals were collected and analyzed at the site. Their locations are shown on Figure 2.4. The sample collection locations were mainly clustered around the two former wood product facilities, the areas used by these facilities (e.g., water storage ponds), and areas of visible angular rock suspected to be MWR. All samples were analyzed for arsenic and most testing included total chromium, copper, lead, and mercury. Five samples were analyzed for twelve other metals (CAM 17) ranging from antimony to zinc. Table 2.1 presents the metals results for five analytes. Table 2.2 presents the data available for the CAM 17 metals, along with the number of samples and their average and maximum concentrations.

All metals analyzed for were detected. These results are not unexpected because of the natural mineralization in bedrock materials at the Site. The highest metal concentrations were detected in four areas:

1. The former Galena Mine site;
2. The former Bullion Mine site;
3. Fill material at the Valley Veneer site; and
4. Fill material at the Bear River Sawmill site.

These are the areas where angular rock (i.e., MWR) has been identified. Table 2.3 groups the data for these areas. Arsenic concentrations ranged widely from 54 to 1,500 mg/kg. Lead ranged from a 5.7 to 79 mg/kg. Mercury, on the other hand, never exceeded 1 mg/kg in any sample.

The metals data have a significant range of difference between the samples from suspected MWR and those reported or considered background soil. Table 2.4 presents the analysis results for samples that are considered site background. The table lists sample location numbers keyed to their locations on Figure 2.4. The background sample's arsenic concentrations ranged from non-detect to 56 mg/kg. Constituent concentrations for 5 of the 25 background samples exceed the EPA Region 9 residential preliminary remediation goal (PRG) for arsenic of 22 mg/kg. It should be noted that all except for one sample considered background were collected from the west side of La Barr Meadows Road.

Table 2.5 presents DI WET concentration results for CAM metals from areas of both suspected mining waste rock and those considered background. The samples analyzed were collected by Carlton in 2001. Their location can be found on Figure 2.4 by referencing their sample ID number (CE prefix) and figure ID number in Table 2.1. Only arsenic at a maximum concentration of 0.47 mg/l was detected above the method detection limits. Crushing of angular rock for the DI WET was not conducted during the 2001 survey, therefore the results presented are for soil (i.e., fines, less than ¼ inch in dimension).

2.4 VCA REMEDIAL INVESTIGATION

The remedial investigation field work described in the RI Work Plan (Ref. 1) was completed in the spring/summer 2004. The results were reported in a RI Summary Report (August 5, 2004) and presented in a September 9, 2004 meeting attended by DTSC, the RWQCB, a representative of BRDC, and Carlton. At this meeting it was decided to incorporate the remedial investigation results into this RAW rather than produce a separate Remedial Investigation Report. All laboratory data reports, QA/QC reports, and chain of custody records are in Appendix C.

2.4.1 **Remedial Investigation Scope.** The objectives of the remedial investigation were:

- Identify the media of concern (i.e., soil, water, and/or air) for the planned development at the Site;
- Identify the chemicals of potential concern (COPC) for the Site based upon previous environmental investigations and the VCA RI;
- Determine the naturally occurring background concentrations for the COPC;
- Determine the COPC concentrations and areal extent due to human activities (i.e., mining and industrial activities); and
- Collect data to support the Health-Based Risk Assessment (HBRA), and to support development of remedial action objectives and for remedial alternative evaluations.

2.4.2 Background Characterization.

Soil. Background soil samples for arsenic were collected across the Site from nine borings at three depths in each boring (Figure 2.5) and analyzed for arsenic by EPA Method 7060A.. Background arsenic values ranged from non-detect (0.25 mg/kg reporting limit) to 79 mg/kg in a 17-foot bgs sample (BG1B-17) east of La Barr Meadows Road (Table 2.6). The mean arsenic concentration was 13 mg/kg and the 95% upper confidence concentration was 20 mg/kg (n = 26). The mean was calculated including the reporting limit for 6 samples that were reported as non-detect. Some borings were terminated before their planned depths because of encountered groundwater (e.g., BG1C). Background arsenic concentrations above the 22mg/kg PRG were found on both sides of La Barr Meadows Road and at each depth tested. DI WET's were completed on three background samples and the extract arsenic concentrations ranged from non-detect (0.19 ug/l method detection limit) to 47 ug/l (BG2A-7.5, Table 2.7).

Groundwater. A background groundwater monitoring well was installed east of La Barr Meadows Road (GW1, Figure 2.5). The monitoring well was purged and sampled twice and analyzed by EPA Method 200.8. The results (Table 2.8) were non-detect (0.19 ug/l MDL) and 1.2 ug/l (1.0 MRL).

Surface Water. Surface water samples were collected from the two Site ponds, the stream, and the former NID reservoir and were tested for soluble CAM 17 analytes by EPA Method 200.8. The results are shown on Table 2.9. Soluble arsenic concentrations ranged from 0.51 ug/l for the former NID reservoir to 96 ug/l in the stream. The stream flows through the wetland south of the Valley Veneer area and feeds Pond 3.

2.4.3 Mine Waste Rock Characterization. There are four areas at the Site where MWR has been found. These are identified with the "WR" designation on Figure 2.5. WR 2 and WR5 are considered as the Galena Mine waste mine rock in the Tables. WR5 was segregated because of its unique physical characteristics (i.e., the cone-shaped pile near La Barr Meadows Road).

The quantity of MWR found during the RI trench excavations is significantly less than the estimate from surface observations presented in the RI Work Plan (33,000 cu yds). Depths were over estimated for the Galena Mine and Valley Veneer sites where field trenching found mine waste rock limited mainly to the surface (< 1 foot thick). The volumes were estimated using SurvCAD modeling and trench and survey data, and are:

Bullion Mine:	5,000 cu yds
Galena Mine:	200 cu yds
Valley Veneer:	2,500 cu yds
Bear River Mill:	2,500 cu yds
Total:	10,200 cu yds

MWR sample CAM 17 results by EPA Method 6000/7000 series. are presented in Table 2.10. All metals analyzed were detected with the exception of antimony, selenium, and thallium. Arsenic concentrations in the waste mine rock were found over a wide range from 1.6 to 5,800 mg/kg. The field characterized mineralized MWR (mean = 621 mg/kg, n = 18) had, in general, a significantly higher arsenic concentration than the non-mineralized MWR (mean = 12.2 mg/kg, n = 18, Table 2.11). However, the field geologist described the classification as difficult and probably not useful in a large-scale separation activity.

Fines (soil, < 0.25 inch) were separated from the angular mine waste rock to see if this size separation is important. Arsenic concentrations in the fines ranged from 2.6 – 2,000 mg/kg (Table 2.11) with a mean of 603 mg/kg (n = 4).

A portion of the MWR at the Valley Veneer area is in or near the identified wetland (Figure 2.5). Also, what appeared to be suspected mine mill tailings were found at depth

(9 feet bgs) in or near the wetland (sample ID: WR3-2F). This sample had an arsenic concentration of 2,000 mg/kg and the highest concentrations found for other metals (e.g., lead and mercury, Table 2.10). Sample WR3-2F was field classified as a "fines sample", but its slate gray color was markedly different than the other fines samples (whitish-brown).

Arsenic was found in the mine waste rock DI WET leachate (Table 2.7). The amount of arsenic leached appears to be related to the rock arsenic concentration and if the material is weathered (e.g., fines).

The acid generating and neutralization potential of MWR samples were assessed using EPA Method 670. The results are shown in Table 2.12. In general, the Site MWR has a greater neutralizing potential than acid generating potential. The MWR field classified as non-mineralized has a greater neutralizing potential than the MWR field classified as mineralized. The net neutralizing potential (NNP) and net potential ratio (NPR) were calculated for the MWR samples tested. The mean NNP and NPR values for all samples were 26 and 50, respectively. These values categorize the MWR as "indicative of sufficient neutralizing capacity to remain alkaline indefinitely" for the NNP mean, and "indicative of long-term alkaline behavior" for the NPR mean according to Appendix G "Evaluation of Acid Generating Potential" from the DTSC "Abandoned Mine Lands Preliminary Assessment Handbook" (Ref. 10). The DTSC document states that the assessment is qualitative and should be used as an indication of the future performance of mine waste rock materials.

The field separation of angular rock into mineralized and non-mineralized fractions yielded some interesting trends in arsenic concentrations, i.e., 16 of the 18 non-mineralized fractions had arsenic concentrations less than 22 mg/kg and the two that exceeded 22 mg/kg were 28 and 90 mg/kg. Unfortunately it will probably not be practical and economically feasible to separate mineralized from non-mineralized mine waste rock. Carlton had hoped for a more obvious separation of the waste mine rock. Mechanical separation of the fines from the angular rock (estimated at 30% of the mine waste volume) would be feasible.

2.4.4 Wood Treating Chemical Closure Confirmation. A fungicide, Pentachlorophenol (PCP), was used at the Bear River Mill in the Green Chain Area (Figure 2.2). A site investigation by EMCON in the late 1980's found PCP concentrations above a California Department of Health Services (DHS) approved cleanup criteria of 3 mg/kg in the dip tank area concrete and soil under the dip tank (maximum concentration 48 mg/kg). No PCP was reported to have been detected below 2 feet bgs. Concrete and soil were excavated and reportedly disposed offsite at a Class I Landfill in 1989 and 1991, respectively. Confirmatory soil sampling and analysis were reported to have not detected PCP above the method detection limit of 0.5 mg/kg. The confirmatory report could not be found for the preparation of the RI Work Plan and consequently the DTSC requested that the RI include collection of confirmatory samples for cleanup of PCP contaminated soils at the site.

The RI Work Plan included sampling the Green Chain Area at three locations (SB1, SB2, and SB3, see Figure 2.5). Samples from each boring were planned to be collected at 3, 5, and 10 feet bgs and tested for semi-volatile organics by EPA Method 8270C. The laboratory was instructed to test the 3-foot samples first, and if PCP was not detected to archive the remaining samples. In addition, at the request of the DTSC, Carlton instructed the laboratory to include PCP in the test method QA/QC matrix spike and duplicate.

No PCP or other semi-volatile compounds were detected at concentrations above their reporting limit (PCP RL= 0.83 mg/kg) in any of the three 3-foot samples. Sample boring logs, laboratory analytical reports, QA/QC data, and the sample COC are included in Appendix C. Carlton has requested no additional analysis of the deeper archived samples and considers PCP cleanup in the Green Chain Area confirmed.

2.4.5 Waste Pile Characterization. During a site visit in October 2003 attended by representatives from BRDC, DTSC, RWQCB, NCDEH and Carlton, eight piles of apparent waste material, mainly rock, dirt, and wood chips were observed near the Bear River Mill area (Figure 2.5). BRDC was not aware of the origin of each pile (i.e., some could be the result of illegal dumping) but suspected they were over-burden left over from a wood chip removal/reuse operation in the 1990s'. The DTSC in consideration of the widespread illegal trash dumping evident on the site requested inclusion of testing of the waste piles during the RI.

These piles were characterized for metals and arsenic by the EPA Method 6000/7000 series, petroleum hydrocarbons by EPA Method 8015M with silica gel cleanup, and semi-volatile organics (i.e., wood treating chemicals by EPA Method 8270C). The results are presented in Tables 2.13 for metals and 2.14 for organics. For metals, only arsenic had results that exceeded the residential PRG in six of the eight piles (highest 54 mg/kg, mean = 33 mg/kg, n = 12). Petroleum hydrocarbons in the motor oil range were detected in all four samples tested (highest 62 mg/kg, mean = 26 mg/kg). No semi-volatile organics (e.g., PCP) were detected in the waste piles above their detection limits. The total volume of the eight waste piles is estimated at 1,200 cu yds based upon survey data. The stockpiles are described in the trench logs as mainly wood chips and soil with some angular rock and other debris (metal pipes, concrete slab fragments and logs estimated at 200 cu yds).

2.4.6 M&RP 94-824 Monitoring Program Closure. Groundwater monitoring wells were installed in the late 1980's during previous investigations to assess groundwater contamination from diesel fuel spillage at the Bear River Mill site. Based upon the investigation results the RWQCB directed initiation of a monitoring program for fuel contamination, and codified the directive in Monitoring and Reporting Program

(M&RP) 94-824. Monitoring of the wells continued into the early 2000's. In December 2001, based upon no detection of fuel contamination in the groundwater since 1999, Sierra Pacific Industries (SPI) requested closure of the monitoring program. The RWQCB in a letter dated January 17, 2002 stated that the Board would issue a "No Further Action" letter conditional upon certification of destruction of the monitoring wells by NCDEH.

Prior to 1988 ten monitoring wells (MW1-8 and MW10-11) were reported to have been installed at the Site. Each well was constructed with a 2" diameter pvc casing approximately 20-40 feet deep. The wells were completed above their screened interval with 3-4 feet of bentonite, and then cement grout to the surface. Monitoring well MW11 was reportedly destroyed "according to County of Nevada guidelines in June 1990". The other wells were sampled on a semi-annual basis for petroleum hydrocarbons, mainly diesel, from December 1988 to July 2001. No detection of diesel contamination in the groundwater was reported after 1999.

Site activities conducted in the 1990's resulted in covering or otherwise destroying surface evidence of three of the nine remaining monitoring wells. Surface features of monitoring wells MW1 and MW3 were reportedly broken and covered during site construction activities. MW7 (36-foot depth) was reported to have been destroyed/removed when earthmoving activities at its location exposed the well casing to 20 to 25 feet below ground surface.

In October 2003 Carlton completed a field reconnaissance to locate the remaining six monitoring wells at the Site and assess their condition. Five monitoring wells were located at that time; MW2, MW4, MW5, MW6, and MW8. The sixth well, MW10, was located during field activities in February 2004.

On February 4, 2004, with NCDEH and Carlton oversight, a California licensed well driller successfully destroyed five of the six of the existing monitoring wells with the exception of MW8. MW8 was situated in a suspected wetland area that was not accessible by motor vehicle. In a letter dated February 5, 2004 NCDEH confirmed the successful destruction of MW2, MW4, MW5, MW6, and MW10.

On April 14, 2004 Carlton notified NCDEH that the '*Monitoring Well Destruction Work Plan, Bear River Mill Site, Grass Valley, CA, November* 2003' would be amended and that MW8 would be destroyed by hand.

On June 7, 2004 Carlton destroyed MW8 by hand. The monitoring well was tremmied from the bottom to the surface with a neat cement grout. The monument riser and concrete pad were removed. The well was excavated by hand to a depth of two feet and the 2" casing was removed at that depth. The tremmied well was capped with a concrete mixture and the excavation backfilled with native material. Carlton received from NCDEH a letter on June 30, 2004 confirming the successful destruction of monitoring well MW8 and on September 16, 2004 a "No Further Action" letter for the monitoring well destruction permit. The CVRWQCB then prepared the "No Further Action Required" letter dated October 6, 2004. These letters are in Appendix C-5.

2.5 IDENTIFICATION OF CHEMICALS AND MEDIA OF POTENTIAL CONCERN

The VCA RI data and the previous investigation data were used to develop the chemicals and media of potential concern. These data were screened against the EPA Region 9 preliminary remediation goals for metals and organics and typical cleanup goals for petroleum hydrocarbons.

There were no detectable semi-volatile organics (i.e., PCP) and the petroleum hydrocarbon concentrations detected (motor oil at 62 mg/kg) in the Bear River Mill area waste piles typically do not require active remediation unless they are placed in close proximity to water resources. Elevated metals concentrations were found in the Site MWR. Table 2.10 presents the RI MWR CAM 17 metals results compared against the PRG values. In all four areas where MWR was found the arsenic concentration of some samples exceeds the residential PRG hazard concentration of 22 mg/kg, with some samples greater than 500 mg/kg (the Title 22 TTLC limit for consideration as a hazardous waste). All MWR samples except for one (WR3-2F) did not have any metals detected other than arsenic that exceeded their PRG in either the RI or in the previous investigations.

The lead concentration (230 mg/kg, Table 2.10) in sample WR3-2F exceeds the Cal-Modified PRG of 150 mg/kg. Sample WR3-2F was classified as a "fines sample" because of its physical matrix (i.e., small particle size, sand-like). WR3-2F color (gray to dark gray) is strikingly different from the fines found at the other three MWR locations (whitish brown). The geologist who collected the samples describes WR3-2F as suspected mine mill tailings. WR3-2F was collected in an apparent lens at 9 feet below grade on the extreme southern edge of the flat area at the Valley Veneer location. The sample location may be within the area delineated as wetlands in the final wetlands determination being completed by Foothill Environmental. The Galena Mine stamp mill was located on what became the Valley Veneer site. Carlton considers this sample as different than the remaining fines at the site and will consider it separate from the other MWR for risk and remedial alternative assessments.

Arsenic was detected in soil from the eight waste piles in concentrations that exceed the residential PRG (highest 54 mg/kg, Table 2.12).

Soluble arsenic was detected in surface water samples up to 96 ug/l in the Site stream (Fig. 2-5). The stream flows into Pond 3 where the soluble arsenic concentrations were 11 and 14 ug/l from two samples collected on different dates. While the California MCL for arsenic in drinking water is 50 ug/l, none of the surface water bodies are used or planned as drinking water sources. Fish may be present in the ponds, especially Pond 3. The CVRWQCB water quality recommended criteria for freshwater aquatic life protection for arsenic is 150 ug/l for a four-day average (340 ug/l maximum) (Ref. 11). Consequently, the Site surface water bodies are not considered a chemical or media of potential concern.

Background soil borings completed west of La Barr Meadows Road in the area of the proposed SouthHill Village residential development had two samples with arsenic concentrations that exceed the residential PRG. When residential development grades are finalized arsenic concentrations in soil should be assessed at that time for risk.

In conclusion, the VCA RI and the results of previous investigations indicate the following chemicals and media of potential concern:

- Arsenic in MWR at the Galena, Bullion, Valley Veneer, and Bear River Mill areas,
- Arsenic and lead in suspected mine mill tailings at the Valley Veneer area, and
- Arsenic and possibly TPH in the waste piles at the Bear River Mill area.

3.0 HEALTH-BASE RISK ASSESSMENT

3.1 INTRODUCTION

A human health risk assessment for the Site was completed for the purpose of evaluating the nature and extent of potential health risks to people who might come into contact with the chemicals of potential concern, and to provide essential information for risk management decision-making. The risk assessment uses the EPA "Risk Assessment Guidance for Superfund" (USEPA, 1989) and cancer (risk) slope factors and non-cancer (hazard) reference dose factors from the EPA Region 9 PRG Table dated October 2002. Section 2.5 identified MWR, suspected mine mill tailings, and Bear River Mill area waste piles as the media of potential concern for the Site. MWR will be evaluated for arsenic risk and hazard based upon surface exposure in a commercial area using exposure parameters for workers. The suspected mine mill tailings will also be assessed for arsenic and lead risk and hazard in a commercial exposure setting. A residential use risk assessment was not considered for the MWR and the suspected mine mill tailings because the arsenic and lead concentrations for these media are significantly greater than the residential PRG values. The waste piles will be assessed for arsenic risk and hazard in a residential setting.

3.2 MINE WASTE ROCK COMMERCIAL AREA USE RISK/HAZARD ASSESSMENT

The risk assessment for the MWR is based surface exposure to determine if no mitigative measures are required for the material to protect human health. Ingestion, dermal contact, and inhalation pathways were evaluated for arsenic and lead. The exposure parameters used and the risk assessment calculations are presented in Appendix D. Also, ingestion and inhalation pathways were evaluated for arsenic because recent research has shown no measurable dermal absorption of arsenic from solid materials in test subjects. The background for this position is presented in a memorandum in Appendix D.

The MWR risk assessment evaluated three media types; 1) Non-designated Waste MWR, 2) Designated Waste MWR and 3) all MWR. This differentiation was completed for the subsequent remedial alternative assessment. The mean and 95% upper confidence limit arsenic concentrations were used in the risk and hazard calculations (Table D-4) and the values range from 321 to 1,200 mg/kg. All non-cancer hazard quotients were less than one, indicating an acceptable hazard. However, the cancer risk quotients all exceeded 1.0E-04, indicating unacceptable risk (EPA Superfund site acceptable risk range = 1.0E-04 to 1.0E-06), if no mitigative measures are used.

Lead risk was evaluated using the DTSC lead risk assessment model (LeadSpread). Similar to arsenic the 95% upper confidence concentration was used for the risk evaluation. Lead was found at levels of potential concern in one sample of suspected mine mill tailings at depth (9 feet bgs) at the Valley Veneer area. This area is within the proposed commercial area for SouthHill Village. The input to the model reflected exposure pathways appropriate to occupational exposure (e.g., 0% home-grown produce). The lead in water input used NID 2003 water quality data (2.5 ug/l) for water supplied by a local water treatment plant (Lake of the Pines WTP). The lead in air concentration came from the CARB database for the closest reporting area (Roseville). The remaining input parameters were the LeadSpread default values. The spreadsheet is included in Appendix D. The PRG95 calculated by LeadSpread for a commercial exposure scenario was 6,600 mg/kg, more than an order of magnitude greater than the lead concentration found in the suspected mine mill tailings.

3.3 WASTE PILES RESIDENTIAL AREA USE RISK/HAZARD ASSESSMENT

Arsenic was identified as a chemical of potential concern (Sec. 2.5) for the eight waste piles at the Bear River Mill area because some of the samples and the mean arsenic concentrations exceeded the EPA Residential PRG of 22 mg/kg (Table 2.13). The Bear River Mill area is west of La Barr Meadows Road and is within the proposed residential development area for SouthHill Village. Arsenic risk and hazard were assessed for these media using the equations presented in Figure 2.3 of the DTSC PEA Guidance Manual (Ref. 5). These equations are "worst" case exposure scenarios (i.e., exposure duration = child for 6 years and an adult for 24 years, 30 years total exposure). Risk and hazard quotients were calculated for the 95% upper confidence concentration. Arsenic dermal absorption fraction was set at zero per the discussion presented in Appendix D. Arsenic bioavailability was set at 100% to be consistent with the PEA. The cancer slope factor and reference dose values used were taken from the 2002 EPA Region 9 PRG Table. The results are presented below.

Waste Piles:

Number of samples = 12
Arsenic mean = 33 mg/kg
Arsenic 95 % upper confidence concentration = 42 mg/kg
Risk quotient = 9.9E-05
Hazard quotient = 1.8

The US EPA for risk assessment purposes for residential use for CERCLA (Superfund) cites an acceptable risk range is between 1.0E-04 and 1.0E-06 and an acceptable hazard quotient is less than 1.0. For the waste piles the risk is within the acceptable range. However, the non-cancer hazard quotient exceeds 1.0.

The hazard concern for the waste piles can be solved by mitigation, either removal from the Site or incorporation with the remediation measure selected for the MWR.

4.0 REMEDIAL ACTION OBJECTIVES

4.1 OVERVIEW OF RAO DEVELOPMENT PROCESS

Remedial action objectives (RAOs) are medium specific or site specific goals for protecting human health and the environment. RAOs specify the contaminants and media concern, exposure pathways, and remediation goals such that an appropriate range of waste management options can be developed for analysis. This section presents the steps taken in developing and refining the remedial action objectives based on the Site investigation data presented in Section 2.0 and the health-based risk assessment presented in Section 3.0. The RAO refinement process begins with the identification of applicable or relevant and appropriate requirements (ARARs) for the chemicals of potential concern (arsenic, lead, and TPH) and the media of potential concern (MWR, suspected mine mill tailings, and waste piles). The ARARs evaluation is used with the HBRA presented in Section 3.0 to determine the chemical(s) and media(s) of concerns (Section 4.3). Once the chemicals and media of concern have been identified an estimate is made of the area and volume for remediation (Section 4.4). Finally, the removal action objectives are presented (Section 4.5).

4.2 IDENTIFICATION AND SELECTION OF ARARS

ARARs are defined as cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations under Federal or State law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location or other circumstance at a contaminated site. An evaluation of ARARs is required at Federal Superfund sites by Section 121 of CERCLA and amended by SARA, and is recommended for non-Superfund sites. ARARs are used to determine the appropriate extent of site cleanup, and govern the implementation and operation of the selected action. ARARs are necessary to establish remedial action objectives so that subsequent remediation alternative screening can be performed. ARARs are identified by examining Federal, state, and local environmental laws, regulations, and standards relative to three general categories.

Chemical-specific ARARs: Are either health or environmentally based numerical values limiting the amount of a contaminant that may be released to, or allowed to remain in, the environment during and upon successful completion of remediation. For example, drinking water maximum contaminant levels (MCLs) are a chemical-specific ARAR.

Location-specific ARARs: Can restrict or prohibit remedial action because of the site's location, such as a flood plain, wetland, or historic area.

Action-specific ARARs: Are remedial technology or activity-based requirements that may include, for example NPDES permit effluent standards.

4.2.1 Chemical-Specific ARARs. Numerical contaminant criteria applicable and relevant to the Bear River Mill Site include standards that apply to solid materials such as EPA preliminary remediation goals (PRGs) and waste characterization assessments. Water based standards are considered action-specific ARARs because they will impact the remedial actions that are available for the media of concern.

PRGs are not regulatory standards, but are clean-up goals that are generally considered protective of human health under certain site use conditions (i.e., residential, commercial, or industrial). PRGs can be used and were used in this RAW to screen for chemical of potential concern.

Hazard characterization under Federal RCRA Subtitle C and State Title 22 section 66261 regulations are appropriate to be considered ARARs. The material at the Site that has elevated levels of metals is the mine waste rock. The MWR is a material that resulted from "the extraction, beneficiation, and processing of ores and minerals" at the Site. These materials are exempt from consideration as a hazardous waste under both Federal law (40 CFR 261.4(b)(7) and State law (CCR Title 22 section 66261.4(b)(5)(A). Consequently, hazard determination regulations are not appropriate for consideration at the Site.

Chemical-specific concentrations that are appropriate for the Site are health-based concentrations determined for the specific use scenario for the MWR at the Site.

4.2.2 Location-Specific ARARs. Location specific ARARs considered include:

Resource Conservation and Recovery Act (40 CFR 264.18(a) – (c). This regulation governs hazardous waste treatment, storage, or disposal. The MWR is not a hazardous waste (Section 4.2.1). This regulation is not applicable.

Fish and Wildlife Coordination Act (40 CFR 6.302) and Clean Water Act (40 CFR 230) These regulations concern actions within flood-plain or flood prone areas and wetlands. The Site is not within a flood-plan or flood prone area. However, a wetland has been identified On-Site. These regulations are applicable and relevant to any remediation alternative for placement of MWR On-Site.

National Historic Preservation Act (36 CFR 65, 800) This regulation pertains to cultural resources and historic buildings or sites. The Site has had mining activities dating to the 1800's. However, no historic structures or areas have been identified. The presence of cultural resource sites (e.g., a Native American village) is unknown and an assessment of cultural resources will be a component of the Site California Environmental Quality Act (CEQA) review. Consequently, this regulation is potentially applicable.

Endangered Species Act (40 CFR 6.302 et seq.) The presence of endangered flora or fauna on the Site is unknown at this time. An evaluation of endangered species is also a task of the Site CEQA review. Consequently, this regulation is also potentially applicable.

Central Valley Regional Water Quality Control Board Basin Plan This Plan presents water quality goals for surface and groundwater that cannot be exceeded by the placement of waste, unless the background surface or groundwater concentration already exceeds the goal. Then the background concentration value(s) becomes the water quality objective(s). For this RAW only the background groundwater arsenic concentration (1.2 ug/l) exceeded the Basin Plan water quality objectives. Consequently, the CVRWQCB Basin Plan water quality goals are relevant and applicable to this Site and were used screen the surface water bodies for inclusion as media of potential concern.

4.2.3 Action-Specific ARARs. These are regulations that become applicable for removal action alternatives such as those that involve movement or capping of waste.

California Water Code. The California Water Code (CWC) becomes applicable when waste material is disposed to land, in that the CWC requires that the waste be characterized as "designated" or "non-designated". Site remediation alternatives that involve On-Site or Off-Site disposal need this characterization. The RWQCB uses either the water quality objective from the Basin Plan or a background sample as the water quality goal for the Designated Waste determination. The Site background monitoring well arsenic concentration of 0.0012 mg/l (Table 2.8) will be the Site water quality goal. The determination if any Site material would be a Designated Waste is assessed by multiplying the water quality goal by ten to arrive at the soluble designated level (SDL) ("Designated Level Methodology" CRWQCB, June 1989). For the Site the arsenic SDL is 0.012 mg/l. Any waste material with a DI WET extract concentration that exceeds the SDL may be considered a Designated Waste. A comparison of the Site DI WET concentration (Table 2.7) to the SDL shows that MWR from the Bear River Mill and the fines from the Valley Veneer and the Bullion and Galena Mine sites may be considered Designated Waste. It is also interesting to note that one of three DI WETs for the background soil exceeds the SDL.

Title 27, California Code of Regulation. Sections 22470 – 22490 deal with mining waste management with requirements for classification of mining waste and waste management unit siting and construction standards. The Site MWR would be considered a Group C waste based upon waste classification criteria in Section 22480 (c) that considers if the waste has no or low acid-generating potential. The AG/NP testing presented in Section 2.4.3 found that the Site MWR has a significantly greater neutralizing potential than acid generating potential.

4.3 IDENTIFICATION OF CHEMICALS AND MEDIA OF CONCERN

Arsenic, lead, and TPH were identified in Section 2.5 as chemicals of potential concern based upon previous site investigations, the VCA RI and a comparison with EPA residential PRGs. Site MWR, suspected mine mill tailings and waste piles were identified as the potential media of concern. The risk assessments in Section 3.0 determined that arsenic and lead in the suspected mine mill tailings and arsenic in the MWR and waste piles could pose a human health risk and hazard for human exposure at the Site if no mitigative measures are taken. TPH could be a concern dependant upon its' proximity to water resources. Consequently, arsenic, lead, and TPH are the COC for the Site and the MWR, suspected mine mill tailings, and waste piles are the media of concern for the Site.

4.4 ESTIMATE OF AREA AND VOLUME

Area and volume estimates are valuable for the screening of remedial alternatives. It allows for the logical selection of alternatives while eliminating alternatives that would take to long to reach completion or would be too expensive.

MWR, including the suspected mine mill tailings, is identified as a media of concern at the site. There are four areas at the Site where MWR were identified during the RI: the Bear River Mill, the Valley Veneer, the Galena Mine, and the Bullion Mines site. The ARARs evaluation identified that the MWR from the Bear River Mill site and the MWR fines from all four areas could be considered Designated Waste by the CVRWQCB. The quantity of MWR found during the RI trench excavations is significantly less than the estimate from surface observations presented in the Work Plan (33,000 cu yds). Depths presented in the RI Work Plan were over-estimated for the Galena Mine and Valley Veneer sites where field trenching found MWR limited mainly to the surface (< 1 foot thick). The MWR volumes were estimated following the RI using SurvCAD modeling and trench and survey data are:

Bullion Mine:	5,000 cu yds
Galena Mine:	200 cu yds
Valley Veneer:	2,500 cu yds
Bear River Mill:	2,500 cu yds
Total:	10,200 cu yds

The eight Bear River Mill area waste piles are all on the surface and the volume is estimated at 1,200 cu yds. Consequently, the total volume of media of concern at the Site is 11,400 cu yds at four areas.

4.5 REMOVAL ACTION OBJECTIVES

Removal action objectives (RAOs) are established specifying contaminants and media of concern, potential exposure pathways, and remediation goals. RAOs are critical to evaluating the ability of a specific removal alternative to achieve an acceptable risk level. RAOs also provide the basis for developing the general response actions that will satisfy the objectives of protecting human health and the environment. RAOs specified for protecting human receptors express both a contaminant level and an exposure route because protection can be achieved by reducing exposure.

Media of Concern. Media of concern for the site are the MWR, suspected mine mill tailings, and the Bear River Mill area waste piles.

Chemicals of Concern. The chemicals of concern for the Site are arsenic, lead, and TPH.

Potential Exposure Pathways. The current human exposure pathways are ingestion, dermal absorption, and inhalation. However, the current exposure duration is very short because currently no people work or reside on the Site. The only people exposed are site visitors or trespassers. Current exposure is not considered a risk. The future development plans that include residential development expose humans to the same pathways but will greatly increase the exposure duration and concomitant risk as presented in the HBRA.

Removal Action Goals. Based upon knowledge of the affected media, COC, and potential exposure pathways, the following removal action goals were developed.

- Reduction/prevention of direct human contact with media of concern, and
- Reduction/prevention of potential impact on surface and groundwater from the media of concern.

The cleanup goals for the COC arsenic and lead are 20 mg/kg and 150 mg/kg, respectively. The arsenic goal is the 95% upper confidence concentration for arsenic in the 26 background soil samples. The lead goal is the EPA PRG for lead in residential soil. Only one site MWR sample exceeded the 150 mg/kg PRG for lead. For 27 Site samples analyzed for lead during previous investigations and the VCA RI the next highest lead concentration was 79 mg/kg in a Bullion Mine area MWR sample. Most Site sample lead concentrations were less than 20 mg/kg. TPH contaminated soil exposure to water resources will be limited.

5.0 REMOVAL ACTION ALTERNATIVES

5.1 DEVELOPMENT OF REMOVAL ACTION ALTERNATIVES

Potential remedial action alternatives to satisfy the removal action goals are identified and described in this section. Then they are analyzed against evaluation criteria in Section 6.0 and the recommended alternative and its implementation components are presented in Section 7.0. This process differs from the feasibility assessment process required by the NCP in that the technology screening step is not used. This is because there are certain well know general response actions for dealing with mine waste rock (e.g., removal, treatment, On-Site disposal management). These well know general response actions should work well with the chemicals and media of concern, the areas and estimated volumes involved, and the reuse scenarios identified as protective of human health by the HBRA. The removal action alternatives identified in this section include a single response action, or a combination of response actions.

5.2 DESCRIPTION OF REMOVAL ACTION ALTERNATIVES

The remedial actions objectives evaluation summarized in Section 4.5 identified MWR, suspected mine mill tailings and Bear River Mill area waste piles as the media of concern. Arsenic is the COC in the angular MWR and arsenic and lead are the COC in the suspected mine tailings. Arsenic and TPH are the COC is the waste piles. There are approximately 10,200 cu yds of MWR including the suspected mine mill tailings in four areas at the site (Section 4.4). The MWR has approximately 7,100 cu yds of angular rock (70%) and 3,100 cu yds of fines (30%). A cu yd of the MWR is estimated to weigh approximately 2,800 lbs. The weight of a cu yd of the angular rock is estimated at 2,700 lbs. The weight of a cu yd of the fines is estimated at 3,000 lbs. Approximately 5,000 cu yds of Bear River Mill site MWR and site fines may be considered a Designated Waste by the CVRWQCB (Section 4.2.3 Action-specific ARARs), which could influence On-Site reuse of the MWR as fill. Off-Site disposal of designated waste would need to be at a Class II landfill. The MWR is exempt from classification as hazardous waste under both State and Federal regulations (Section 4.2.1 Chemical-specific ARARs). The Bear River Mill area waste piles volume is approximately 1,200 cu yds (including 200 cu yds of debris) and the weight is estimated at 1 ton per cu yd.

5.2.1 Alternative 1 – No Action. This alternative is a response action in which no activities would be initiated or continued at the site. An evaluation of no action is required by the NCP. A no action alternative does not include institutional actions such as deed restrictions or monitoring programs.

5.2.2 Alternative 2 – MWR/Waste Piles Excavation with Off-Site Disposal. This alternative would involve excavation of the 10,200 cu yds of MWR and the 1,200 cu yds from the Bear River Mill area waste piles with Off-Site disposal to a Class II landfill. The work would involve preparation of a Health and Safety Plan (HSP) and a Transportation

Plan as part of the Removal Design and Implementation Plan (RDIP). Dust and noise production would need to be mitigated during Site excavation activities. A construction SWPPP would be required with "Best Management Practices" (BMPs) implemented if construction activities extend into the rainy season. The RDIP would include a cleanup confirmatory sampling and analysis plan for the cleanup goals for arsenic and lead presented in the removal action goals (Section 4.5). The advantage of this alternative is that the media and chemicals of concern would be removed from the Site and no future monitoring or site restrictions would be required.

5.2.3 Alternative 3 – Designated Waste MWR Separation with Off-Site Disposal and Non-designated Waste MWR/Waste Pile Screenings Reuse as Fill under a Parking Lot/Roadway. This alternative would involve excavation and Off-Site disposal to a Class II landfill of the Bear River Mill site MWR and the screening of the waste piles and the fines from the remaining three MWR areas. The volume and weight for disposal as a designated waste is 5,200 cu yds with a weight of 7,200 tons. The remaining 6,200 cu yds of MWR and waste pile screenings would be used as a fill material at the Site. The location of the material placement would be surveyed and a map along with land use controls in the form of deed restrictions would be filed with the Nevada County Recorders office. The reuse site would be located away from surface water drainage courses and above groundwater. The RDIP for this alternative would be similar that the one described for Alternative 2.

5.2.4 Alternative 4 – Designated Waste MWR Separation with Placement On-Site in a Containment Cell and Non-designated Waste MWR/Waste Pile Screenings Reuse as Fill under a Parking Lot/Roadway. This alternative is similar to Alternative 3, with the difference that the excavated and screened designated waste would be placed in an On-Site containment cell (Cell). The waste pile screenings would be disposed off-site at a construction debris disposal facility. The Cell would need to meet the performance standards for landfills as required by Title 27 CFR. The Cell would include a low-permeability liner (e.g., clay or plastic liner) and cap (e.g., asphalt paving) and a monitoring system consisting of a minimum of one up-gradient and two down-gradient monitoring wells. The CVRWQCB would permit the Cell through issuance of WDRs after review and approval of a ROWD. The location of the material placement would be surveyed and a map along with land use controls in the form of deed restrictions would be filed with the Nevada County Recorders office. The reuse site would be located away from surface water drainage courses and above groundwater. The RDIP for this alternative would be similar that the one described for Alternative 2 with a less extensive transportation plan because only La Barr Meadows Road would be impacted.

5.2.5 Alternative 5 – Reclassification of Designated Waste MWR to Mine Waste Group C by Cement Treatment and Reuse with Non-designated Waste/Waste Pile Screenings as On-Site Fill under a Parking Lot/Roadway. This alternative is also similar to Alternative 3, but in the alternative the Designated Waste MWR is treated with a basic material (e.g., cement) to "fix" the waste so that it can be classified as an inert Group C MWR under Title 27 CCR. The waste pile screenings would be disposed off-site at a construction debris disposal facility. Definition of inert would be identified as treatment to the extent that the DI WET arsenic concentration in the material is statistically less than the Site SDL of 0.012 mg/l. A treatability study would be needed to determine the amount of acid neutralizing material required. Once the cement to Designated Waste MWR ratio is determined, treatment can be accomplished by mixing on Site. The treated waste would then be mixed with the Non-designated Waste MWR and waste pile screenings and used as fill on Site. As described in Title 27, the CVRWQCB may require submittal of a ROWD and issuance of WDRs that include monitoring of the treated waste. The location of the material placement would be surveyed and a map along with land use controls in the form of deed restrictions would be filed with the Nevada County Recorders office. The reuse site would be located away from surface water drainage courses and above groundwater. The RDIP for this alternative would be similar that the one described for Alternative 2 with a less extensive transportation plan because only La Barr Meadows Road would be impacted.

5.2.6 Alternative 6 – MWR/Waste Pile Screenings Reuse On-Site as Fill under a Roadway/Parking Lot. This alternative would reuse all MWR/waste pile screenings as fill material under a roadway or parking lot on Site. MWR would be placed as engineered fill under aggregate base rock, and capped by a low-permeability asphalt concrete pavement. Institutional controls (i.e., deed restrictions and cap inspection) would be needed to protect the integrity of the placement and monitor its' effectiveness. Groundwater monitoring wells would be installed. The location of the material placement would be surveyed and a map along with land use controls in the form of deed restrictions would be filed with the Nevada County Recorders office. The reuse site would be located away from surface water drainage courses and above groundwater. The MWR would be classified as a Group C mine waste based upon the neutralization data. The requirements e.g., HSP) for this alternative would be similar to Alternative 2. A RDIP will be prepared following approval of this document detailing design and implementation. The RDIP for this alternative would be similar that the one described for Alternative 2 with a less extensive transportation plan because only La Barr Meadows Road would be impacted.

6.0 ANALYSIS OF REMOVAL ACTION ALTERNATIVES

6.1 EVALUATION CRITERIA

Six alternatives, including No Action were identified in Section 5.0 for remediation of MWR at the Bear River Mill site. The DTSC guidance (DTSC, 1998) requires that this RAW evaluate each remedial action alternative by comparing the ability of each to achieve the remedial action objectives developed in Section 4.0 using three criteria: effectiveness, implementability, and cost. These three criteria are equivalent to the evaluation criteria required by the NCP (40 CFR 300.400).

Effectiveness. This criterion refers to the degree to which an alternative reduces toxicity, mobility, or volume of contamination, minimizes residual risks, and affords long-term protection, complies with ARARs, minimizes short-term impacts, and achieves protection in a timely manner.

Implementability. This criterion refers to the degree to which an alternative is capable of being performed or accomplished. Factors to be considered include the availability of technology, equipment, time, specialists, or facilities required to make an alternative feasible to implement.

Cost. This criterion refers to expenses associated with the planning, design, and implementation of an alternative. These include long-term costs for operation, monitoring, and maintenance.

6.2 ALTERNATVE ANALYSIS

Tables 6.1 through 6.5 present the cost estimates developed for Alternatives 2 through 6. Estimated costs were not developed for Alternative 1: no action. Table 6.6 presents an expanded evaluation of each alternative for effectiveness, implementability, and cost with criteria from the NCP. Summaries of the evaluation of the six alternatives are provided below.

6.2.1 Alternative 1 - No Action. This alternative is evaluated for comparison purposes only. Under this alternative, no media of concern would be remediated.

Effectiveness. The effectiveness of this alternative is poor because the current Site conditions will not be protective of human health under proposed Site development. This alternative would not be compliant with ARARs.

Implementability. This alternative is easy to implement since no actions will be taken.

Cost. There would be no costs associated with this alternative, however no residential or commercial development could take place at the Site.

6.2.2 Alternative 2 - MWR/Waste Piles Excavation with Off-Site Disposal. This alternative would consist of excavating MWR and the Bear River Mill area waste piles and disposing of them at a Class II disposal facility.

Effectiveness. This alternative would be highly effective in reducing the potential health risks associated with the COC at the Site. Excavation and removal of the MWR/waste piles effectively eliminates the exposure pathways to residents, workers, and the community. Short-term effectiveness is poor because of the potential risks to the local community because of the large number of truck trips required (estimated at over 700 trips) and their moving over narrow rural roads. This alternative would be compliant with ARARs.

Implementability. This alternative is considered "moderate " to implement because of off-site transportation and disposal concerns. No specialized equipment is required for the excavation, loading or transport. A specialized hauler would be needed and acceptance from the closest Class II landfill (Ostrum Road, Lincoln, CA) is required. Failure to gain acceptance could double or triple the transportation costs.

Cost. The cost to implement this alternative is estimated at $1,352,000 and the details are presented in Table 6.1. Disposal is the main cost for this alternative, estimated at $566,000 (November 2004 quote Ostrum Road, Class II landfill). Excavation and transportation costs, $128,000 and $388,000 respectively, are based upon a November 2004 quote from Delta Environmental. The Delta quote was the lowest of three quotes received. Management and engineering costs are estimated at 5 %, and a 20 % contingency is included for uncertainties in the actual MWR quantity.

6.2.3 Alternative 3 - Designated Waste MWR Separation with Off-Site Disposal and Non-designated Waste MWR/Waste Pile Screenings Reuse as Fill under a Parking Lot/Roadway. This alternative is similar to Alternative 2 in that approximately 5,200 cu yds of the MWR and waste pile screenings would be disposed Off-Site with the remaining 6,200 cu yds used as fill in a planned commercial area of the SouthHill development.

Effectiveness. This alternative would be effective in the long term because the waste of greatest concern to water quality would be removed from the Site and the health risk to Site residents will be removed by placement of the remaining material in a commercial area. The short-term effectiveness of this alternative is poor because of the movement of waste Off-Site. However, this concern is less than that of Alternative 2.

Implementability. This alternative is also considered "moderate" to implement. Permitting and acceptance at a landfill would be similar to Alternative 2. Separation by screening is a common construction activity. Strict dust control measures during separation will need to be followed. No specialized construction techniques are required for placement of the Non-designated Waste fill in the commercial area. Some form of notification such as a deed restriction would be needed to identify the location of the material so precautions could be taken in the future if the material is disturbed.

Cost. The cost to implement this alternative is estimated at $932,000 and the details are presented in Table 6.2. Excavation, MWR separation, transportation and disposal are the major costs of this alternative ($629,000). Reuse as fill in the proposed commercial area for the Non-designated Waste portion of the MWR is a minor cost (5%) of the overall costs for this alternative. A 10% management and engineering cost and 20% contingency is included in this alternative.

6.2.4 Alternative 4 - Designated Waste MWR Separation with Placement On-Site in a Containment Cell and Non-designated Waste MWR/Waste Pile Screenings Reuse as Fill under a Parking Lot/Roadway. This alternative is similar to Alternative 3, with the exception that the Designated Waste is excavated, separated and placed into an On-Site containment cell (described in Section 5.2.4) instead of disposed Off-Site. The waste pile screenings would be disposed off-site at a construction debris disposal facility.

Effectiveness. This alternative would be effective at both the short- and long-term protectiveness of human health. Chemical and location specific ARARs would be satisfied. The containment cell does not include a leachate collection system (LCRS) and would require a waiver of the waste management unit (WMU) requirements of CCR Title 27.

Implementability. This alternative is considered "moderate to difficult" to implement. Construction, sealing, and placement of plastic liners are a demonstrated technology but would require a specialty contractor to complete. There may be difficulty in obtaining a waiver from the CVRWQCB.

Cost. The cost to implement this alternative is estimated at $633,000 and the details are presented in Table 6.3. The cost for a 60 mil plastic liner is based proportionally upon a liner cost from a similar soil containment cell for a 2004 RAW (MWH, Ref. 6). This alternative includes $15,000 for the installation of three monitoring wells. It is interesting to note that almost half of the costs for this alternative are for MWR excavation and separation. Four-inches of asphalt and 6 inches of aggregate base rock is included to allow for unrestricted vehicle traffic over the containment cell. Management/engineering and a contingency are 15 and 20 percent of the cost, respectively. Quarterly monitoring of the wells is included with an annual cost of $14,000.

6.2.5 Alternative 5 - Reclassification of Designated Waste MWR to Mine Waste Group C by Cement Treatment and Reuse with Non-designated Waste/Waste Pile Screenings as On-Site Fill under a Parking Lot/Roadway. This alternative involves fixing the Designated Waste portion of the MWR with a cement agent essentially rendering the resultant matrix insoluble and then combining it with the Non-designated Waste fraction of the MWR and waste pile screenings for use as fill in the commercial area of the Site.

Effectiveness. Properly designed fixation is a very effective method to render a waste insoluble. Consequently, long-term protectiveness of human health will be good. This alternative would comply with chemical, location, and action specific ARARs. Effectiveness of the alternative is also very good if an appropriate cement/MWR mix can be determined by a treatability study.

Implementability. Implementation of this alternative will require the use of a specialty contractor who is familiar with fixation technologies and is considered "moderate.

Cost. The cost to implement this alternative is estimated at $1,010,000 and the details are presented in Table 6.4. A treatability study ($20,000) is included for this alternative to determine the appropriate cement to waste ratio. A three sack per yard mix is assumed for this estimate. The costs for this alternative include a 15% contingency on the cement treatment costs because of the range of costs for arsenic stabilization reported by the EPA (Ref. 7). Management/engineering and a contingency are 15 and 20 percent of the cost, respectively.

6.2.6 Alternative 6 - MWR/Waste Pile Screenings Reuse On-Site as Fill under a Roadway/Parking Lot. This alternative would take all the MWR and waste pile screenings and consolidate it in one area under an asphalt cap.

Effectiveness. This alternative would be effective for the protection of human health by consolidating all the MWR at one area and capping it to prevent exposure. Long-term effectiveness should also be good because it would be unlikely a roadway or parking lot would be relocated. Groundwater and cap monitoring should provide adequate long-term control. The alternative will provide improved toxicity and mobility reduction over existing conditions at the Site. A detailed look at this alternative is also valuable because demonstration of its' effectiveness would have value for the remediation of future similar sites.

Implementability. This alternative should be easy to implement, roadways and parking lots are planned throughout the proposed development. The capping material can be sloped to minimize pooling on the surface and drainage courses would be away from the MWR to prevent erosion. Adequate "high ground" is available at the Site to keep the MWR above groundwater. Cap inspections will be used to insure the integrity of the cap. Implementation would require the MWR to be classified as a Group C mine waste.

Cost. The cost to implement this alternative is estimated at $406,000 and the details are presented in Table 6.5. This alternative uses a similar asphalt cap as proposed for Alternative 4. Management/engineering and a contingency are 15 and 20 percent of the cost, respectively.

6.3 COMPARATIVE ANALYSIS OF ALTERNATIVES

This section provides a comparative analysis of the removal action alternatives that focuses on the relative performance of each alternative against the three main evaluation criteria. The comparative analysis contrasts with the preceding analysis in which each alternative was analyzed independently without consideration of other alternatives. The purpose of this comparative analysis is to identify the advantages and disadvantages of each alternative relative to one another so that the key tradeoffs can be identified. The comparative analysis is presented in Table 6.6. The comparative analysis includes selected appropriate criteria from the NCP. One factor that is not included in the NCP criteria but could influence an alternative selection is the liability clause in CERCLA. Disposal of the MWR to an Off-Site disposal facility may remove the risk from the Site but it does not relieve BRDC of liability for the waste. A Class II landfill may be the appropriate disposal location for the MWR now, but it may not be considered adequate in the future.

A numerical summary of the analysis is provided in Table 6.7. The ranking is quantified as 1- inadequate, 2- average, and 3 - best in satisfying the evaluation criteria. The ranking indicates alternative 6 as the most desirable. The implementation of Alternative 6 is dependent upon obtaining classification as a Group C mine waste. If approval cannot be obtained the Alternative 4 is the next most favorable option.

Alternative 6 is selected because it reasonably satisfies the evaluation criteria and it is the lowest cost alternative. The reasoning for this selection follows. The HBRA determined that an alternative with no mitigative measures (i.e., capping) is not adequately protective of human health. Therefore, placement under a roadway or parking lot would satisfy the mitigative needs.

The acid generating/neutralizing testing of the MWR and NNP and NPR calculations suggest that there is a net positive intrinsic neutralizing capacity in the MWR which should maintain "long-term alkaline behavior" to preclude leaching of arsenic or other metals, so the MWR should be considered a Group C mine waste. Placement of the MWR under a low-permeability capping material will augment the natural neutralizing capacity of the MWR by reducing contact of the MWR with water. Alternative 6 is anticipated to provide cost-effective and reasonable best management practices for the MWR.

Finally, Alternative 6 should comply with the State Water Resources Control Board antidegradation policy contained in Resolution 68-16. The placement of the MWR under a low-permeability cap will improve on existing conditions at the Site and "will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained."

Consequently, Carlton concludes that Alternative 6 will satisfy the VCA removal action objectives:

- Reduction/prevention of direct human contact with media of concern, and
- Reduction/prevention of media of concern impact on surface and groundwater.

7.0 RECOMMENDED REMOVAL ALTERNATIVE

7.1 SELECTED ALTERNATIVE

Alternative 6 was selected as the removal action in Section 6.3. This alternative consists of consolidation the Site MWR/waste pile screenings in an area of the Site planned for a roadway or parking lot, away from surface water drainage courses, and capping the material with a low permeability material. Infiltration of surface water into the MWR would be significantly reduced by the relatively low permeability of the asphalt pavement (assuming 4-inches of asphalt). In addition, the MWR will be placed approximately 1 foot or greater below finished asphalt grade (dependent upon aggregate base rock requirements for unlimited traffic use). The asphalt would be constructed at a slight grade to promote surface runoff, further minimizing infiltration and further reducing the potential for the MWR to leach. The MWR will not be located in a wetland or cultural easement nor will be located in the vicinity of utilities (gas, electric, water, telephone, cable, sewer or storm drains). In addition, the asphalt surface will be equipped with storm water collection systems consisting of gutters and drop inlets. The location of the material placement would be surveyed and a map along with land use controls in the form of deed restrictions would be filed with the Nevada County Recorders office. The Deed Restriction will be prepared consistent with DTSC policy and finalized and recorded after physical remedial measures are implemented and before the site is certified by DTSC as being remediated. The Deed Restriction will run with the land and stay in effect as long as hazardous substances limit use of the property and until terminated by DTSC. Pursuant to Section 67391.1 of Title 22, Division 4.5, Chapter 39, California Code of Regulations (CCR), the project proponent will pay all costs including for DTSC oversight associated with the administration of the Deed Restriction. DTSC has authority to require modification or removal of any land improvements placed in violation of the restrictions. Also, violation of the Deed Restriction will be grounds for DTSC to file civil or criminal actions as provided by law.

The Sacramento Army Corp of Engineers has been contacted regarding the removal action and the Corp concluded that standard practices to control erosion during site removal action activities will be sufficient to prevent degradation of the site wetlands.

The scope of work for this removal action alternative can be divided into three phases.

Engineering and Permit Approval. This phase involves the selection of the location for placement of the MWR, the preparation of plans and specifications, the preparation of permit application for construction and solicitation of bids for the construction. This phase will include the preparation of a RDIP, and may include public meetings on the removal action at the discretion of DTSC. A construction grading permit will be obtained from Nevada County. This permit application will include a dust control plan. Permits to install monitoring wells will be submitted to and obtained from Nevada County. A Notice of Intent and a construction Storm Water Pollution Prevention Plan

(SWPPP) will be prepared a filed with the State Water Resources Control Board. The Northern Sierra AQMD has also been contacted and an air permit will not be required.

Pre-excavation and Excavation Phase. This phase will include pre-excavation utility clearance and survey staking. Excavation activities will be covered by a site specific Health and Safety Plan. Construction activities will be limited to the hours between 6:00 am and 8:00 pm Monday through Friday, and 8:00 am to 6:00 pm on Saturday and Sunday. Equipment will use internal combustion engines equipped with exhaust and intake mufflers that are in good working order. Site wetlands near the excavations will be identified by fencing. Excavation will include grubbing and clearing, dust control and excavation. Dust generation will be controlled by wetting to keep dust below the level when dust becomes visible (3mg/cubic meter). A dust meter will be used to monitor dust levels during fieldwork. MWR excavation will be directed by a Registered Geologist or his/her designated representative. Mitigation techniques will be employed to minimize/control dust production and noise generation. Excavated MWR may be staged on and covered by plastic or on an existing concrete slab at the Site and covered prior to the relocation/placement phase. Stormwater control BMPs describe in the SWPPP will be implemented during excavation and stockpiling of the MWR.

Relocation/Placement Phase. The anticipated 11,200 cu yds of MWR/waste pile screenings will be placed beneath a section of roadway or parking lot on the Site. Traffic control on La Barr Meadows Road will be required during MWR relocation and a Traffic Plan will be included in the RDIP. Cleanup to the removal action goals presented in Sec. 4.5 will be confirmed through implementation of a confirmatory sampling plan. This sampling plan will be included in the RDIP.

7.2 REMOVAL ACTION SCHEDULE

The removal action schedule will be included with the RDIP. On-site work is expected to be completed within 1 to 3 months.

8.0 REFERENCES

1. Carlton Engineering, Inc. "Draft Final Remedial Investigation Work Plan, Bear River Mill Site", March 2004.

2. Carlton Engineering, Inc. "Monitoring Well Destruction Work Plan, Bear River Mill Site", November 2003.

3. Carlton Engineering, Inc. "Monitoring Well Destruction Letter Report, Bear River Mill Site", July, 2004.

4. "Soil Survey of Nevada County Area, California" (USDA, 1993)

5. "Preliminary Endangerment Assessment Guidance Document." DTSC June 1999.

6. MWH "Final Removal Action Work Plan: Village at Green Hill Placer County, California" May 2004.

7. US EPA "Arsenic Treatment Technologies for Soil, Waste, and Water" EPA-542-R-02-004, September 2002.

8. "The Designated Level Methodology for Waste Classification and Cleanup Level Determination" California RWQCB Central Valley Region, June 1989.

9. US EPA "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA, Interim Final" EPA-540 G-89-004, October 1988.

10. Cal/EPA DTSC "Abandoned Mine Lands Preliminary Assessment Handbook"` January, 1998.

11. Cal/EPA CVRWQCB "A Compilation of Water Quality Goals" August 2003.

TABLES

TABLE 2.1. SOIL/ROCK METALS RESULTS PREVIOUS INVESTIGATIONS

			Metals Concentration (mg/kg)				
Figure ID	Report ID	Depth (feet)	Arsenic	Total Chromium	Copper	Lead	Mercury
1	CE1-1	2.5	110	4.6	85	18	0.36
2	CE2-1	6.5	14				
3	CE3-1	6	38				
4	CE4-1	3.5	190	20	52	17	0.53
	CE4-2	9.5	16	21	40	<5	<0.10
5	CE5-2	1	110				
6	CE6-1	1	83				
	CE6-2	8	<7.5				
7	CE7-1	2	330				
	CE7-2	4	420	5.6	12	26	<0.10
8	CE8-1	1	700	9.1	16	5.7	0.23
9	Dip tank	0.5	5.1	10	8.9		
	Dip tank	2	3.3	14	7.3		
	Sump	0.5	9.7	11	9.7		
	Sump	2	8.7	18	11		
	Sump	2	5.7	20	12		
	Overflow	0.5	56	13	24		
	Overflow	2	26	16	13		
10	Background 1	0.5	53	10	13		
	Background 1	2	3.4	14	16		
11	Background 2	0.5	0.8	8	13		
	Background 2	2	<0.6	8	7.3		
12	Monitoring Well 7	5	2	10	10		
	Monitoring Well 7	10	<1	<2	<2		
	Monitoring Well 7	15	4	16	9		
	Monitoring Well 7	20	4	27	18		
	Monitoring Well 7	25	2	4	3		
13	Monitoring Well 8	5	5	14	11		

TABLE 2.1. SOIL/ROCK METALS RESULTS PREVIOUS INVESTIGATIONS

Metals Concentration (mg/kg)

Figure ID	Report ID	Depth (feet)	Arsenic	Total Chromium	Copper	Lead	Mercury
14	Pond 1 Sediment	0.5	6	10	25		
	Pond 1 Sediment	1	24.4	12.4	10.5	12.8	
	Pond 1 Sediment	2	17.2	12.7	11.1	11.2	
15	Pond 2 Sediment	1	27.5	19.8	7.7	13.8	
	Pond 2 Sediment	2	21.3	10.4	4.7	7.8	
16	Pond 3 sediment	0.5	11	9	14		
	Pond 3 sediment	1	52.8	22	11.6	20	
	Pond 3 sediment	2	21	9.1	8.2	8.7	
17	PB 37-1 Rock Fill	3 to 6	740			50	0.8
	PB 37-1 Native Soil	8 to 11	410			13	<0.1
18	PB 29-1 Stockpile	1	410			13	0.26
19	PB Bullion-1	1	600			9.7	0.14
20	PB Surface-1	0	17			13	<0.1
21	PB 42-1 Fill	1 to 3	17			10	<0.1
22	PB 43-1 Soil Fill	1 to 3	19			18	0.33
23	PB 45-1 Rock Fill	2 to 4	240			21	0.68
24	PB 46-1 Rock Fill	4 to 7	54			14	0.39
25	PB 48-1 Native Soil	4 to 6	34			1.2	<0.1
26	PB Alaska-1 Pile	4 to 6	1,500			74	<0.1
	PB Alaska-2 Pile	2 to 4	630			79	<0.1

TABLE 2.2. SUMMARY METALS CONCENTRATIONS PREVIOUS INVESTIGATIONS

Metal	Number of Data Points	Mean Concentration (mg/kg)	Maximum Concentration (mg/kg)	EPA Region 9 (1) Residential PRGs (mg/kg)
Antimony	5	ND (2)	NA (3)	31
Arsenic	48	147	1,500	22
Barium	5	63	86	5,400
Beryllium	5	0.38	0.52	150
Cadmium	5	0.58	0.86	1.7 (4)
Chromium (Total)	30	13	27	210
Cobalt	5	8.1	9.9	900
Copper	30	16	85	3,100
Lead	23	20	79	150 (4)
Mercury	17	0.3	0.8	23 (5)
Molybdenum	5	1.9	2.7	390
Nickel	5	10	21	1,600
Selenium	5	ND (2)	NA (3)	390
Silver	4	0.56	0.92	390
Thallium	5	ND (2)	NA (3)	52
Vanadium	5	53	110	550
Zinc	5	37	90	3,100

(1) October 2002
(2) ND Not Detected above method limit
(3) NA Not Applicable, no detections to calculate an average
(4) CAL-Modified PRG
(5) Inorganic mercury, listed as mercury chloride in PRG Table

TABLE 2.3. SOIL/ROCK SAMPLES METALS IN MINING/INDUSTRIAL RELATED AREAS PREVIOUS INVESTIGATIONS

			Metals Concentrations					
Figure ID	Report ID	Depth (feet)	Arsenic (mg/kg)	DI WET (mg/l)	Lead (mg/kg)	DI WET (mg/l)	Mercury (mg/kg)	DI WET (mg/l)
Bullion Location								
7	CE7-1	2	330					
	CE7-2	4	420	0.39	26	<0.10	<0.10	<0.01
26	PB Alaska-1 Pile	4 to 6	1,500		74		<0.1	
	PB Alaska-2 Pile	2 to 4	630		79		<0.1	
Galena Location								
6	CE6-1	1	83					
8	CE8-1	1	700	0.47	5.7	<0.10	0.23	<0.01
19	PB Bullion-1	1	600		9.7		0.14	
Valley Veneer								
4	CE4-1	3.5	190	<0.30	17	<0.10	0.53	<0.01
5	CE5-2	1	110					
17	PB 37-1 Rock Fill	3 to 6	740		50		0.8	
	PB 37-1 Native Soil	8 to 11	410		13		<0.1	
18	PB 29-1 Stockpile	1	410		13		0.26	
Bear River Sawmill Location								
1	CE1-1	2.5	110	<0.30	18	<0.10	0.36	<0.01
23	PB 45-1 Rock Fill	2 to 4	240		21		0.68	
24	PB 46-1 Rock Fill	4 to 7	54		14		0.39	

TABLE 2.4. METALS CONCENTRATIONS FOR BACKGROUND AREAS (NATIVE SOIL) PREVIOUS INVESTIGATIONS

			Metals Concentration (mg/kg)		
Figure ID	Report ID	Depth (feet)	Arsenic	Lead	Mercury
La Barr Meadows Road East					
6	CE6-2	8	<7.5		
La Barr Meadows Road West					
2	CE2-1	6.5	14		
3	CE3-1	6	38		
4	CE4-2	9.5	16	<5	<0.10
9	Dip tank	0.5	5.1		
	Dip tank	2	3.3		
	Sump	0.5	9.7		
	Sump	2	8.7		
	Sump	2	5.7		
	Overflow	0.5	56		
	Overflow	2	26		
10	Background 1	0.5	53		
	Background 1	2	3.4		
11	Background 2	0.5	0.8		
	Background 2	2	<0.6		
12	Monitoring Well 7	5	2		
	Monitoring Well 7	10	<1		
	Monitoring Well 7	15	4		
	Monitoring Well 7	20	4		
	Monitoring Well 7	25	2		
13	Monitoring Well 8	5	5		
20	PB Surface-1	0	17	13	<0.1
21	PB 42-1 Fill	1 to 3	17	10	<0.1
22	PB 43-1 Soil Fill	1 to 3	19	18	0.33
25	PB 48-1 Native Soil	4 to 6	34	1.2	<0.1

TABLE 2.5. D.I. WET METALS PREVIOUS INVESTIGATIONS

Metal	Number of Data Points	Average Concentration (mg/l)	Maximum Concentration (mg/l)	Method Detection Limit (mg/l)
Antimony	5	ND	NA	0.1
Arsenic	5	0.43 (3)	0.47	0.3
Barium	5	ND	NA	0.1
Beryllium	5	ND	NA	0.01
Cadmium	5	ND	NA	0.01
Chromium (Total)	5	ND	NA	0.05
Cobalt	5	ND	NA	0.1
Copper	5	ND	NA	0.5
Lead	5	ND	NA	0.1
Mercury	5	ND	NA	0.01
Molybdenum	5	ND	NA	0.1
Nickel	5	ND	NA	0.1
Selenium	5	ND	NA	0.2
Silver	5	ND	NA	0.05
Thallium	5	ND	NA	0.5
Vanadium	5	ND	NA	0.1
Zinc	5	ND	NA	0.1

(1) ND Not Detected above method limit
(2) NA Not Applicable, no detections to calculate an average
(3) Average of two values, remaining three samples = ND

TABLE 2.6. BACKGROUND SOIL SAMPLE ARSENIC CONCENTRATION RESULTS (mg/kg) (1)
VCA REMEDIAL INVESTIGATION

East of La Barr Meadows Road

Sample ID.	BG1A-6	BG1B-6	BG1C-6
Depth (feet)	0.5	0.5	0.5
Arsenic Conc.	11	4.4	9.6

Sample ID.	BG1A-10	BG1B-10	BG1C-8
Depth (feet)	10	10	10
Arsenic Conc.	6.7	18	9.1

Sample ID.	BG1A-20	BG1B-17
Depth (feet)	20	17
Arsenic Conc.	7	79

West of La Barr Meadows Road

Sample ID.	BG2A-6	BG2B-6	BG2C-6	BG3A-6	BG3B-6	BG3C-6
Depth (feet)	0.5	0.5	0.5	0.5	0.5	0.5
Arsenic Conc.	36	14	13	32	ND (2)	ND (2)

Sample ID.	BG2A-7.5	BG2B-7.5	BG2C-7.5	BG3A-7.5	BG3B-7	BG3C-7.5
Depth (feet)	7.5	7.5	7.5	7.5	7.5	7.5
Arsenic Conc.	48	0.85	1.2	16	ND (2)	ND (2)

Sample ID.	BG2A-15	BG2B-15	BG2C-15	BG3A-15	BG3B-14	BG3C-15
Depth (feet)	15	15	15	15	14	15
Arsenic Conc.	7.8	0.82	0.92	10	ND (2)	ND (2)

(1): Analysis by EPA Method 7060A,
reporting limit dependant upon dilition varies from 0.25 - 5.0 mg/kg
(2): Reporting limit = 0.25 mg/kg

TABLE 2.7. MINE WASTE ROCK AND BACKGROUND SOIL ARSENIC DI WET VCA REMEDIAL INVESTIGATION (5/9/05)

Location	Observed Sample Type	Sample ID	Solid (mg/kg)	DI WET (mg/l)
Bullion Mine	mineralized	WR1-5M	220	0.024
	non-mineralized	WR1-5N	12	0.008
	fines	WR1-1F	280	0.30
Galena Mine	non-mineralized	WR5-1N	14	0.012
	min+nonmin+fines	WR2-2ALL	5,800	0.21
Valley Veneer	fines	WR3-2F	2,000	0.57
Bear River Mill	mineralized	WR4-8M	720	0.026
	mineralized	WR4-4M	3,900	0.13
	non-mineralized	WR4-2N	0.87	ND (1)
Background	soil	BG2A-6	36	0.005
	soil	BG2A-7.5	48	0.047
	soil	BG1B-17	79	ND (2)

(1) Not detected above method reporting limit 0.005 mg/l

(2) Not detected above method reporting limit 0.001 mg/l

TABLE 2.8. GROUNDWATER MONITORING WELL (GW1) SAMPLE RESULTS VCA REMEDIAL INVESTIGATION (5/9/05)

Analyte	Sample ID GW1 (6/7/04) (ug/l)	GW1July (7/19/04) (ug/l)	Detection Limit (ug/l) (1)	Reporting Limit (ug/l) (1)	Water Quality Objective (ug/l) (CVRWQCB)
Antimony	ND	NT	0.57	6	6
Arsenic	ND	1.2	0.19	1	0.023
Barium	12	NT	0.37	10	490
Beryllium	ND	NT	0.26	1	4
Cadmium	ND	NT	0.17	0.5	0.07
Chromium (Total)	ND	NT	0.28	1	50
Cobalt	0.17 (2)	NT	0.11	2	50
Copper	1.5 (2)	NT	0.26	2	170
Lead	ND	NT	0.23	2	2
Mercury	0.2 (2)	NT	0.2	0.2	1.2
Molybdenum	ND	NT	0.55	2	10
Nickel	1.6 (2)	NT	0.22	2	12
Selenium	ND	NT	1.1	5	20
Silver	ND	NT	0.15	0.5	35
Thallium	ND	NT	0.11	1	0.1
Vanadium	1.4 (2)	NT	0.44	20	50
Zinc	8.9 (2)	NT	1	20	2,000
pH	6.87	7.01			
Cond. (mhos)	NT	180.8			
D.O. (mg/l)	4.87	5.53			
Water elevation (ft msl)	2459.39	2456.75			

(1) By EPA Method 200.8
(2) Estimated value
(3) General requirement
(4) Secondary MCL

ND: Not detected above method detection limit
NT: Not tested

TABLE 2.9. SURFACE WATER SAMPLE RESULTS (ug/l, unless noted)
VCA REMEDIAL INVESTIGATION (5/9/05)

Sample ID:	SW2A	SW2B	SW3	SW3A	SW4	SW5		Detection	Reporting
Sample Location:	Pond 2	Pond 2	Pond 3	Pond 3	NID		Stream	Limit	Limit
Analyte		Duplicate		Resample	Reservoir	Stream	(7/19/04)	(ug/l) (1)	(ug/l) (1)
pH	7.3		6.8		6.9		7.41		
Conductivity (mhos)	160		190		71		311		
D.O. (mg/l)	7.4		2.4		5		1.88		
Antimony	ND	ND	ND	NT	ND	ND	NT	0.57	6
Arsenic	2.6	2.6	14	11	0.51	3.5	96	0.19	1
Barium	24	24	45	NT	11	16	NT	0.37	10
Beryllium	ND	ND	ND	NT	ND	ND	NT	0.26	1
Cadmium	ND	ND	ND	NT	ND	ND	NT	0.17	0.5
Chromium (Total)	ND	ND	ND	NT	ND	ND	NT	0.28	1
Cobalt	ND	ND	ND	NT	ND	ND	NT	0.11	2
Copper	2.4	2.4	ND	NT	2.6	ND	NT	0.26	2
Lead	ND	ND	ND	NT	2.7	ND	NT	0.23	2
Mercury	ND	ND	ND	NT	ND	ND	NT	0.2	0.2
Molybdenum	ND	ND	ND	NT	ND	ND	NT	0.55	2
Nickel	3.6	3.9	4	NT	ND	9.5	NT	0.22	2
Selenium	ND	ND	ND	NT	ND	ND	NT	1.1	5
Silver	ND	ND	ND	NT	ND	ND	NT	0.15	0.5
Thallium	ND	ND	ND	NT	ND	ND	NT	0.11	1
Vanadium	ND	ND	ND	NT	ND	ND	NT	0.44	20
Zinc	ND	ND	22	NT	22	ND	NT	1	20

(1) By EPA Method 200.8 CLS Laboratory 4/8/04, 4/28/04.
ND = Analyte not detected at or above the method detection limit.
NT = Sample not tested.

Table 2.10. MINE WASTE ROCK SAMPLE METALS RESULTS (mg/kg) VCA REMEDIAL INVESTIGATION (5/9/05)

Analyte	Location: Smpl ID:	Bullion Mine WR1-1I	Valley Veneer WR3-2F	Bear River Mill WR4-5M	Galena Mine WR5-2M	EPA Region 9 Residential (1) PRG (mg/kg)	Method Reporting Limit (mg/kg)
Antimony		ND (2)	ND	ND	ND	31	2.5
Arsenic		190	2,000	39	150	22	0.25-5
Barium		200	10	11	30	5,400	1
Beryllium		0.26	ND	ND	0.29	150	0.25
Cadmium		ND	1.3	0.74	0.72	1.7 ()	0.5
Chromium (Total)		1.4	7.8	3.7	78	210	1
Cobalt		7	8.6	11	12	900	1
Copper		ND	55	64	3.7	3,100	1
Lead		ND	230	ND	4.2	150 (3)	2.5
Mercury		ND	8.3	ND	ND	23 (4)	0.1-1
Molybdenum		ND	1.3	ND	ND	390	1
Nickel		5.1	7.6	6.5	57	1,600	1
Selenium		ND	ND	ND	ND	390	0.25
Silver		8.2	10	13	14	390	0.5
Thallium		ND	ND	ND	ND	52	0.25
Vanadium		13	31	92	34	550	1
Zinc		19	84	29	68	3,100	1

(1) October 2002
(2) Not detected above the method reporting limit
(3) CAL-Modified PRG
(4) Inorganic mercury, listed as mercury chloride in PRG Table

TABLE 2.11. MINE WASTE ROCK (MWR) SAMPLE ARSENIC RESULTS
VCA REMEDIAL INVESTIGATION

Location	Observed Rock Sample Type	Sample ID	Arsenic Conc. (mg/kg)	MWR Depth(1) (ft bgs)	Location	Observed Rock Sample Type	Sample ID	Arsenic Conc. (mg/kg)	MWR Depth(1) (ft bgs)
Bullion Mine	mineralized	WR1-1M	700	15	Galena Mine	min + nonmin + fines	WR2-2ALL	5,800	1
	non-mineralized	WR1-1N	8.7	"		mineralized	WR5-1M	72	2.5
	comb min+nonmin	WR1-1I	190	"		non-mineralized	WR5-1N	14	"
	fines	WR1-1F	280	"		mineralized	WR5-2M	150	5
	fines	WR1-2F	2.6	9		non-mineralized	WR5-2N	28	"
	mineralized	WR1-3M	1,800	14					
	non-mineralized	WR1-3N	4.1	"	Bear River Mill	mineralized	WR4-1M	3.4	7
	fines	WR1-3F	130	"		non-mineralized	WR4-1N	1.7	"
	mineralized	WR1-4M	3,000	9		mineralized	WR4-2M	4.1	1.5
	non-mineralized	WR1-4N	16	"		non-mineralized	WR4-2N	0.87	"
	mineralized	WR1-5M	220	11		mineralized	WR4-3M	46	5.5
	non-mineralized	WR1-5N	12	"		non-mineralized	WR4-3N	2.3	"
						mineralized	WR4-4M	3,900	7.5
Valley Veneer	mineralized	WR3-1M	11	1		non-mineralized	WR4-4N	90	"
	non-mineralized	WR3-1N	1.6	"		mineralized	WR4-5M	39	3
	mineralized	WR3-2M	68	2		non-mineralized	WR4-5N	2.1	"
	non-mineralized	WR3-2N	11	"		mineralized	WR4-6M	52	3
	fines	WR3-2F	2,000	9 (2)		non-mineralized	WR4-6N	2.4	"
	mineralized	WR3-7M	170	1		mineralized	WR4-7M	22	3
	non-mineralized	WR3-7N	9.2	"		non-mineralized	WR4-7N	5.6	"
	min + nonmin + fines	WR3-7ALL	140	"		mineralized	WR4-8M	720	1.5
	mineralized	WR3-10M	260	7		non-mineralized	WR4-8N	6.9	"
	non-mineralized	WR3-10N	3.7	"					
	min + nonmin + fines	WR3-12 ALL	14	1.5					

(1) Samples are composites of the material excavated from a specific trench, unless noted as a depth for a specific lens (2).
Trench depths reported are depths of mine waste rock as recorded by field geologist.

(2) Specific sample depth

TABLE 2.12. MINE WASTE ROCK SAMPLE ACID GENERATING/NEUTRALIZING POTENTIAL RESULTS (EPA Method 670) VCA REMEDIAL INVESTIGATION

Sample ID	Location	Acid Generating Potential (AGP) Tons CaCO3/ 1,000 Tons Waste	Neutralizing Potential (NP) Tons CaCO3/ 1,000 Tons Waste	Net Neutralizing Potential (NNP) (1) Tons CaCO3/ 1,000 Tons Waste	Net Potential Ratio (NPR) (2)	Sample Arsenic Conc. (mg/kg)
WR1-1M	Bullion Mine	16	26	10	1.6	700
WR1-1N	Bullion Mine	0.30	42	42	140	8.7
WR2-2All	Galena Mine	12	20	8	1.7	5,800
WR3-2F	Valley Veneer	7.9	46	38	5.8	2,000
WR3-12All	Valley Veneer	4.9	13	8.1	2.7	14
WR4-2M	Bear River Mill	2.9	19	16	6.6	4.1
WR4-4N	Bear River Mill	3.9	41	37	11	90
WR5-1M	Galena Mine	4.9	Not Tested	Not Determined	Not Determined	72
WR5-2N	Galena Mine	0.20	46	46	230	28
				Mean = 26	Mean = 50	

(1) NNP = NP - AP
NNP = 0 - 20 tons CaCO3/1,000 tons waste "Indicates an uncertain potential for acid drainage"
NNP > 20 tons CaCO3/1,000 tons waste "Indicates sufficient neutralizing capacity to remain alkaline indefinately"

(2) NPR = NP/AP
NPR < 1.0 "Indicates eventual acid drainage
NPR = 1.0 - 2.0 "Uncertain range"
NPR > 2.0 "Indicates long-term alkaline behavior"

Source: "Abandoned Mine Lands Preliminary Assessment Handbook" Cal EPA DTSC January 1998

TABLE 2.13. BEAR RIVER MILL WASTE PILE METALS SAMPLE RESULTS (mg/kg)
VCA REMEDIAL INVESTIGATION

	Sample ID											
Analyte	**WP1A**	**WP1B**	**WP2A**	**WP2B**	**WP3A**	**WP3B**	**WP4A**	**WP5A**	**WP6A**	**WP7A**	**WP8A**	**WP8B**
Antimony			ND				ND					
Arsenic	17	33	54	54	35	40	19	19	24	46	33	19
Barium			57				51					
Beryllium			ND				ND					
Cadmium			ND				ND					
Chromium (Total)			9.3				13					
Cobalt			4				4.7					
Copper			9.8				13					
Lead			11				7					
Mercury			ND				0.16					
Molybdenum			ND				ND					
Nickel			4.4				8.1					
Selenium			ND				ND					
Silver			5.8				6					
Thallium			1.1				ND					
Vanadium			38				38					
Zinc			22				20					

ND: Not detected above method reporting limit
NT: Not tested

TABLE 2.14. BEAR RIVER MILL WASTE PILE SAMPLE RESULTS FOR ORGANICS VCA REMEDIAL INVESTIGATION

Pile Composited	Sample ID	Diesel (1) (mg/kg)	Motor Oil (2) (mg/kg)	PCP (3) (mg/kg)
1 and 2	WP1+2	ND	62	NT
3 and 4	WP3+4	ND	16	NT
5 and 6	WP5+6	ND	16	NT
7 and 8	WP7+8	ND	8.6	NT
1,2,3 and 4	WP1234	NT	NT	ND
5,6,7 and 8	WP5678	NT	NT	ND

ND: Not detected above method reporting limit
NT: Not tested, per RI work plan
(1); EPA Method 8015M, reporting limit = 1.0 mg/kg
(2): EPA Method 8015M, reporting limit = 1.0 mg/kg
(3): EPA Method 8151, reporting limit = 0.05 mg/kg. EPA Method 8270C could not meet required reporting limits for PCP identified in RI work plan PCP included in matrix and duplicate QA/QC spikes

TABLE 6.1 ALTERNATIVE 2: COST ESTIMATE
MWR/Waste Pile Excavation with Off-site Class II Disposal

Capital Costs **Item Description**	**Unit Cost**	**Unit**	**Estimated Cost**
Excavation (1)	$8.25/ton	15,500 tons (2)	$128,000
Transportation (1)	$25/ton	15,500 tons	$388,000
Disposal (1)	$36.50/ton	15,500 tons	$566,000
		Subtotal:	*$1,082,000*
Management/Engineering	5%		$54,000
Contingency (3)	20%		$216,000
		Total:	**$1,352,000**

(1) Delta Environmental quote 11/30/04 excavation, dust control, transportation, disposal to Ostrum Rd Class II landfill Wheatland, CA, Yuba Co.

(2) 1 cu yd MWR = 2,800 lb, 10,200 cu yds = 14,300 tons
1 cu yd waste piles = 2,000 lb, 1,200 cu yds = 1,200 tons
Total material for off-site disposal = 14,300 tons(MWR) + 1,200 tons(Waste Piles) = 15,500 tons

(3) 20% contingency for uncertainties in waste quantities.

TABLE 6.2 ALTERNATIVE 3: COST ESTIMATE
Designated Waste MWR/Waste Piles Separation with Off-Site Disposal and Remaining Material Reuse as Fill under Parking Lot/Roadway

Capital Costs **Item Description**	**Unit Cost**	**Unit**	**Estimated Cost**
Excavation, material separation	$12/ton	15,500 tons	$186,000
Off-site Waste Disposal			
Transportation: (1)	$25/ton	7,200 tons	$180,000
Disposal: (1)	$36.50/ton	7,200 tons	$263,000
Non-Designated Waste			
On-site reuse as fill	$5/ton	8,300 tons (2)	$42,000
Asphalt Cap (3)	$2.73/sq ft	17,000 sq ft (4)	$46,000
		Subtotal:	*$717,000*
Management/Engineering	10%		$72,000
Contingency (5)	20%		$143,000
		Total:	**$932,000**
Annual Costs (to five year review)			
Cap inspection/report	$1,000	annual	$5,000

(1) Off-site disposal = Designated waste component of MWR + waste pile screenings =
BR Mill MWR + MWR Fines + waste pile screenings
= (2,500 cu yd x 2,800 lb/cu yd) + ((10,200 cu yd - 2,500 cu yd) x 0.3) x 3,000 lb/cu yd
= 3,500 tons + 3,500 tons = 7,000 tons + (1,200 tons x 0.2) = 7,200 tons
Delta Environmental quote 11/30/04 excavation, dust control, transportation, disposal to Ostrum Rd Class II landfill Wheatland, CA, Yuba Co

(2) Non Designated waste component (Waste) = Total waste - Off-site disposal waste
= 15,500 tons - 7,200 tons = 8,300 tons

(3) Assumes site waste is not suitable for use as aggregate base (AB) rock, 4" asphalt concrete (AC) 6" AB to meet Nevada County DOT minimum requirements for unrestricted roadway, site waste used as base rock, AC @ $65/ton, AB @ $25/ton

(4) On-site placement fill volume estimate:
(10,200 cu yd - 2,500 cu yd) x 0.3 = 2,300 cu yd Fines
2,300 cu yd + 2,500 cu yd = 4,800 cu yd Designated Waste
10,200 cu yd - 4,800 cu yd = 5,400 cu yd Non Designated waste
5,400 cu yd + 1,000 cu yd(Waste Piles) = 6,400 cu yd for on-site reuse as fill
6,400 cu yd = 170,000 cu ft assuming 10 foot average fill depth = 17,000 sq ft cap

(5) 20% contingency for uncertainties in waste quantities.

TABLE 6.3 ALTERNATIVE 4: COST ESTIMATE
Designated Waste MWR/Waste Piles Separation with On-site Containment Cell and Remaining Material Reuse as Fill under Parking Lot/Roadway

Capital Costs Item Description	Unit Cost	Unit	Estimated Cost
Excavation, material separation	$12/ton	15,500 tons	$186,000
Designated Waste			
Containment Cell - Liner (1)	$57,000	1	$57,000
Containment Cell Construction	$10/ton	7,000 tons(2)	$70,000
Asphalt Cap (3)	$2.73/sq. ft	18,000 sq ft (4)	$49,000
Installation of groundwater wells	$5,000	3	$15,000
Non-Designated Waste			
On-site reuse as fill	$5/ton	8,300 tons	$42,000
Waste pile screening disposal as construction debris	$20/cu yd	200 cu yd	$4,000
Asphalt Cap (2)	$2.73/sq. ft	17,000 sq ft (5)	$46,000
		Subtotal:	*$469,000*
Management/Engineering	15%		$70,000
Contingency (6)	20%		$94,000
		Total:	**$633,000**

Annual Costs (to five year review)

Cap inspection/report	$1,000	annual	$5,000
GW Quarterly monitoring, first year	$3,500	quarterly	$14,000
GW Annual monitoring, next four years	$3,500	annual	$14,000

(1) From MWH GreenHill RAWP 60 mil Liner for 8,000 cu yd = $95,000
For Bear River Designated Waste =
(10,200 cu yd - 2,500 cu yd) x 0.3 = 2,300 cu yd Fines
2,300 cu yd + 2,500 cu yd = 4,800 cu yd Designated Waste
(4,800 cu yd/8,000 cu yd) x $95,000 = $57,000
(2) See Table 6.2 Note (1) for Designated Waste tonnage
(3) See Table 6.2 Note (3)
(4) 10 foot MWR depth, 2:1 cell side slopes for 4,800 cu yd designated waste = 18,000 sq ft
(5) Non-designated MWR + Screened waste piles = 5,400 cu yd + 1,000 cu yd = 6,400 cu yd = 173,000 cu ft assuming 10 foot average fill depth = 17,000 sq ft
(6) 20% contingency for uncertainties in MWR quantities.

TABLE 6.4 ALTERNATIVE 5: COST ESTIMATE

Designated Waste MWR/Waste Piles Separation with Reclassification of Designated Waste MWR to Group C by Cement Treatment and Reuse as Fill under Parking Lot/Roadway

Capital Costs Item Description	Unit Cost	Unit	Estimated Cost
Excavation, material separation	$12/ton	15,500 tons	$186,000
Waste pile screening disposal as construction debris	$20/cu yd	200 cu yd	$4,000
Designated Waste			
Treatability Study and Analytical	$20,000	1	$20,000
Cement Treat Designated Waste (1)	$85/cu yd	4,800 cu yd (2)	$408,000
Material Reuse			
On-site reuse as fill: Treated, Non-designated, and Waste Pile screenings	$5/ton	15,500 tons (3)	$78,000
Installation of groundwater wells	$5,000	3	$15,000
Asphalt Cap (2)	$2.73/sq. ft	30,000 sq ft (4)	$82,000
		Subtotal:	
Management/Engineering	15%		$101,000
Treatment Contingency	15%		$101,000
Contingency (5)	20%		$135,000
		Total:	**$1,010,000**
Annual Costs (to five year review)			
Cap inspection/report	$1,000	annual	$5,000
GW Quarterly monitoring, first year	$3,500	quarterly	$14,000
GW Annual monitoring, next four years	$3,500	annual	$14,000

(1) Aresenic Treatment Technologies for Soil, Waste, and Water (EPA 2002)

(2) See Table 6.2 Note (3)

(3) Cement treated Designated waste estimated at 3,000 lb/cu yd x 4,800 cu yds = 7,200 tons + 7,300 tons (Non-Designated waste) + 1,000 tons (Waste Pile Screenings) = 15,500 tons

(4) 10,200 cu yd (MWR) + 1,000 cu yd (Waste Pile Screenings) = 11,200 cu yd
11,200 cu yd = 302,000 cu ft assuming 10 foot average fill depth = 30,000 sq ft cap

(5) 20% contingency for uncertainties in MWR quantities.

TABLE 6.5 ALTERNATIVE 6: COST ESTIMATE
MWR/Waste Pile Screenings Reuse On-Site as Fill under a Roadway/Parking Lot

Capital Costs **Item Description**	**Unit Cost**	**Unit**	**Estimated Cost**
MWR Excavation (1)	$8.25/ton	14,300 tons	$118,000
Waste Pile Screening	$4.00/ton	1,200 tons	$4,800
Waste pile screening disposal as construction debris	$20/cu yd	200 cu yd	$4,000
Material Reuse			
On-site reuse as fill	$5/ton	15,300 tons	$77,000
Installation of groundwater wells	$5,000	3	$15,000
Asphalt Cap (2)	$2.73/sq ft	30,000 sq ft (3)	$82,000
		Subtotal:	*$301,000*
Management and Engineering	15%		$45,000
Contingency (4)	20%		$60,000
		Total:	**$406,000**
Annual Costs (to five year review)			
Cap inspection/report	$1,000	annual	$5,000
GW Quarterly monitoring, first year	$3,500	quarterly	$14,000
GW Annual monitoring, next four years	$3,500	annual	$14,000

(1) Delta Environmental quote 11/30/04 excavation and dust control.
(2) See Table 6.2 Note (3)
(3) 10,200 cu yd (MWR) + 1,000 cu yd (Waste Pile Screenings) = 11,200 cu yd
11,200 cu yd = 302,000 cu ft assuming 10 foot average fill depth = 30,000 sq ft cap
(4) 20% contingency for uncertainties in MWR quantities.

TABLE 6.6 COMPARISON OF INDIVIDUAL ANALYSIS OF REMOVAL ACTION ALTERNATIVES

Evaluation Criteria	Alternative 1 No Action	Alternative 2 MWR/Waste Pile Excavation w/ Off-Site Disposal	Alternative 3 Designated Waste Separation w/Off-Site Disposal & Remaning Material Reuse as Fill under Roadway/Parking Lot	Alternative 4 Designated Waste Separation w/On-Site Containment Cell Placement & Remaining Material Reuse as Fill under Roadway/Parking Lot	Alternative 5 MWR Treatment for Reclassification to Grp C all Material Reuse as Fill under Roadway/ Parking Lot	Alternative 6 MWR/Waste Pile Screenings Reuse as Fill under Roadway/Parking Lot
Effectiveness						
1. Overall protectiveness of human health						
a. Human health	Existing conditions may not be protective under current or proposed site use	Alternative will be most protective	Protective of human health	Protective of human health	Protective of human health	Protective of human health
b. Environment	Existing conditions may not be protective under current or proposed site use	Will be more protective of the environment than existing conditions	Will be more protective of the environment than existing conditions	Will be more protective of the environment than existing conditions	Will be more protective of the environment than existing conditions	Will be more protective of the environment than existing conditions
2. Compliance with ARARs						
Chemical-specific	Will not meet health-based risk conc. for arsenic or lead	Will satisfy health based risk concerns	Will satisfy health based risk concerns	Will satisfy health based risk concerns	Will satisfy health based risk concerns	Will satisfy health based risk concerns
Location-specific	Not applicable	Need to avoid excavation of MWR in wetlands	Need to avoid excavation or placement MWR in wetlands	Need to avoid excavation or placement MWR in wetlands	Need to avoid excavation or placement MWR in wetlands	Need to avoid excavation or placement MWR in wetlands
Action-specific	Not applicable	Will satisfy Site water quality goal for arsenic	Should satisfy Site water quality goal for arsenic	Should satisfy Site water quality goal for arsenic	May satisfy Site water quality goal for arsenic	May satisfy Site water quality goal for arsenic and achieve antidegration policy
3. Long-term effectiveness & permanence						
a. Magnitude of residual risk	High risk of COC exposure to site residents and workers for proposed development	No residual risk	Low residual risk with adequate institutional controls	Low residual risk with adequate institutional controls	Low residual risk with adequate institutional controls	Low residual risk with adequate institutional controls
b. Adequacy of controls	Institutional or other control will not be implemented	No institutional controls required	Institutional controls will be required to identify location of MWR and control excavation	Institutional controls will be required to identify location of MWR and control excavation	Institutional controls will be required to identify location of MWR and control excavation	Institutional controls will be required to identify location of MWR and control excavation

TABLE 6.6 COMPARISON OF INDIVIDUAL ANALYSIS OF REMOVAL ACTION ALTERNATIVES

	Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**	**Alternative 6**
Evaluation Criteria	**No Action**	**MWR/Waste Pile Excavation w/ Off-Site Disposal**	**Designated Waste Separation w/Off-Site Disposal & Remaning Material Reuse as Fill under Roadway/Parking Lot**	**Designated Waste Separation w/On-Site Containment Cell Placement & Remaining Material Reuse as Fill under Roadway/Parking Lot**	**MWR Treatment for Reclassification to Grp C all Material Reuse as Fill under Roadway/ Parking Lot**	**MWR/Waste Pile Screenings Reuse as Fill under Roadway/Parking Lot**
4. Reduction in toxicity, mobility & Volume						
a. Treatment process & materials treated	No treatment process is used	No treatment process is used	No treatment process is used	No treatment process is used	Treatment with cement reduces MWR acidity and forms a less soluble matrix	No treatment process is used
b. Degree of expected reduction in toxicity, mobility and volume	None	WMR removed from site greatest reduction of any alternative	Approximately 50% reduction in volume, mobility reduced by placement as fill, toxicity not affected.	No volume reduction, mobility reduced by placement in WMU & fill, no change in toxicity	Slight volume increase, potential significant reduction in toxicity & mobility	No volume or toxicity reduction, mobility reduced by placement under low-permeability cap
c. Degree of reversibility	No treatment process is used	Not applicable, WMR removed	Fill MWR can be easily accessed	MWR can be easily removed from WMU	Treated MWR can be easily accessed from fill, removal of MWR from cement matrix would be difficult	Fill MWR can be easily accessed
d. Residuals generated	None	None	None	None	None	None
5. Short-term effectiveness						
a. Community protection	No additional protection provided	Greatest risk to community due to dust generation & potential accidental exposure during transportation	Lower risk than Alternative 2 because approximately 50% of WMR stays onsite	Lowest risk, all WMR stays onsite Short-term dust/runoff risk mitigated by construction BMPs	Lowest risk, all WMR stays onsite Short-term dust/runoff risk mitigated by construction BMPs	Lowest risk, all WMR stays onsite Short-term dust/runoff risk mitigated by construction BMPs
b. Worker protection	No additional protection provided	Risk to workers due to dust & the volume of MWR handled	Risk to workers due to dust & the volume of MWR handled	Risk to workers due to dust & the volume of MWR handled	Higher worker risk due to dust MWR handling & mechanical cement treatment equipment	Risk to workers due to dust & the volume of MWR handled
c. Environmental impacts	No additional protection provided	Greatest risk to environment due to dust generation & potential accidental release exposing a larger or sensitive environmental area	Lower environmental risk due to half WMR stays on site	Lowest environmental risk, all MWR stays on site	Lowest environmental risk, all MWR stays on site	Lowest environmental risk, all MWR stays on site

TABLE 6.6 COMPARISON OF INDIVIDUAL ANALYSIS OF REMOVAL ACTION ALTERNATIVES

Evaluation Criteria	Alternative 1 No Action	Alternative 2 MWR/Waste Pile Excavation w/ Off-Site Disposal	Alternative 3 Designated Waste Separation w/Off-Site Disposal & Remaning Material Reuse as Fill under Roadway/Parking Lot	Alternative 4 Designated Waste Separation w/On-Site Containment Cell Placement & Remaining Material Reuse as Fill under Roadway/Parking Lot	Alternative 5 MWR Treatment for Reclassification to Grp C all Material Reuse as Fill under Roadway/ Parking Lot	Alternative 6 MWR/Waste Pile Screenings Reuse as Fill under Roadway/Parking Lot
Implementability						
1. Ability to construct and operate	No action will be taken	Easy	Easy, activities are standard to the construction field	Moderate, activities are unique to the local construction field	Moderate, activities are unique to the local construction field	Easy, activities are standard to the construction field
2. Reliability	No action will be taken	Highly reliable	Highly reliable	Highly reliable	Moderately reliable, dependant upon obtaining correct acid/base ratio	Highly reliable
2. Ease of additional remediation	No action will be taken	Not applicable, MWR removed from Site	Easy	Hard, additional remediation would require construction of new cell	Hard once MWR is fixed	Easy to recover placed material
3. Ability to monitor effectivenes	No action will be taken	No monitoring required	Cap inspection, considered easy	Effectiveness dependent upon monitoring system/cap design, considered easy	Effectiveness dependent upon monitoring system/cap design, considered easy	Effectiveness dependent upon monitoring system/cap design, considered easy
4. Ability to obtain approval from agencies	No action will be taken	Easy	Moderate, dependant upon agency acceptance as fill	Moderate, dependant upon agency acceptance as fill	Moderate, dependant upon agency acceptance as fill	Moderate, dependant upon agency acceptance as fill
5. Availability of off-site disposal facilities	No action will be taken	Hard, one Class II landfill within reasonable distance	Hard, one Class II landfill within reasonable distance	None required	None required	None required
6. Availablility of equipment & specialists	No action will be taken	Moderate, no specialized equipment required, HAZWOPER trained personnel required	Moderate, no specialized equipment required, HAZWOPER trained personnel required	Moderate, no specialized equipment required, HAZWOPER trained personnel required	Hard, specialized equipment and HAZWOPER trained personnel required	Moderate, no specialized equipment required, HAZWOPER trained personnel required
7. Availability of technologies	No action will be taken	Easy, no specialized technologies required	Easy, no specialized technologies required	Moderate specialized contractor required to build cell	Moderate, specialized but available technology required	Easy, no specialized technologies required
Cost						
Implementation	$0	$1,352,000	$932,000	$633,000	$1,010,000	$406,000
Monitoring/Inspection (five years)	$0	$0	$5,000	$37,000	$37,000	$37,000
For detailed cost breakdown see		Table 6.1	Table 6.2	Table 6.3	Table 6.4	Table 6.5

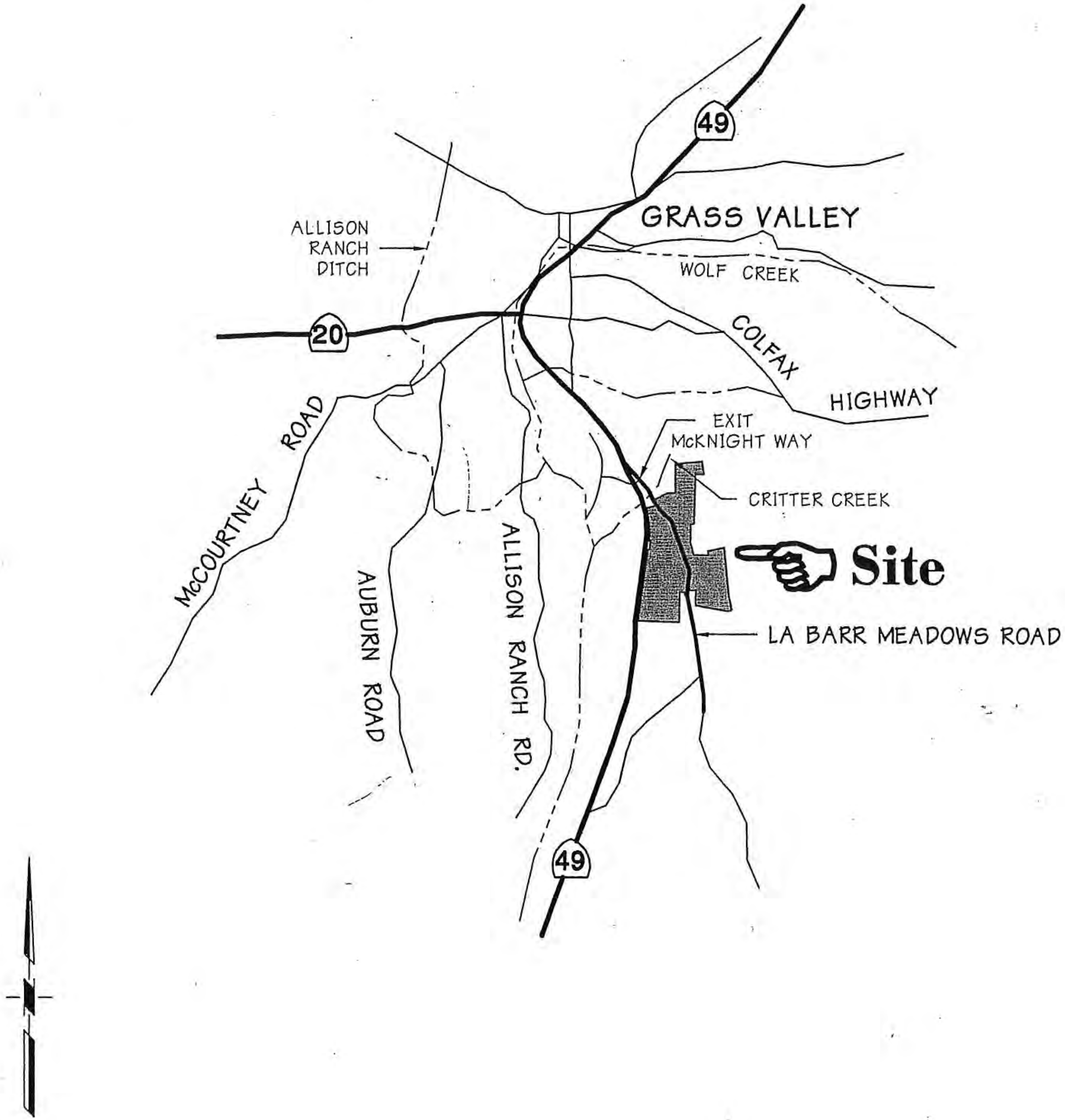
TABLE 6.7 RATING OF REMOVAL ACTION ALTERNATIVES

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
Evaluation Criteria	No Action	MWR/Waste Pile Excavation w/ Off-Site Disposal	Designated Waste Separation w/Off-Site Disposal & Remaining material Reuse as Fill under Roadway/Parking Lot	Designated Waste Separation w/On-Site Containment Cell & Remaining Material Reuse as Fill under Roadway/Parking Lot	MWR Treatment for Reclass. to Group C all Material Reuse as Fill under Roadway/ Parking Lot	MWR/Waste Pile Screenings Reuse as Fill underRoadway/ Parking Lot
1. Overall Protectiveness	1	3	3	3	3	3
2. Compliance with ARARs	1	3	3	3	3	2
3. Long-term effectiveness & permanence	1	3	3	3	2	3
4. Reduction in toxicity, mobility, & volume	1	3	3	3	2	3
5. Short-term effectiveness	1	1	1	2	2	2
6. Implementability	3	2	2	2	2	3
7. Cost	3	1	1	2	1	3
Total	11	17	16	18	15	19
Overall Ranking	**6**	**3**	**4**	**2**	**5**	**1**

Rating Scale: 1 = least favorable
3 = most favorable

FIGURES

FIGURES



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3076-01-01 **12-6-04**

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BEAR RIVER DEVELOPMENT CORP.
Highway 49 & La Barr Meadows Road
Grass Valley, California
LOCATION MAP

FIGURE
2.1

Legend

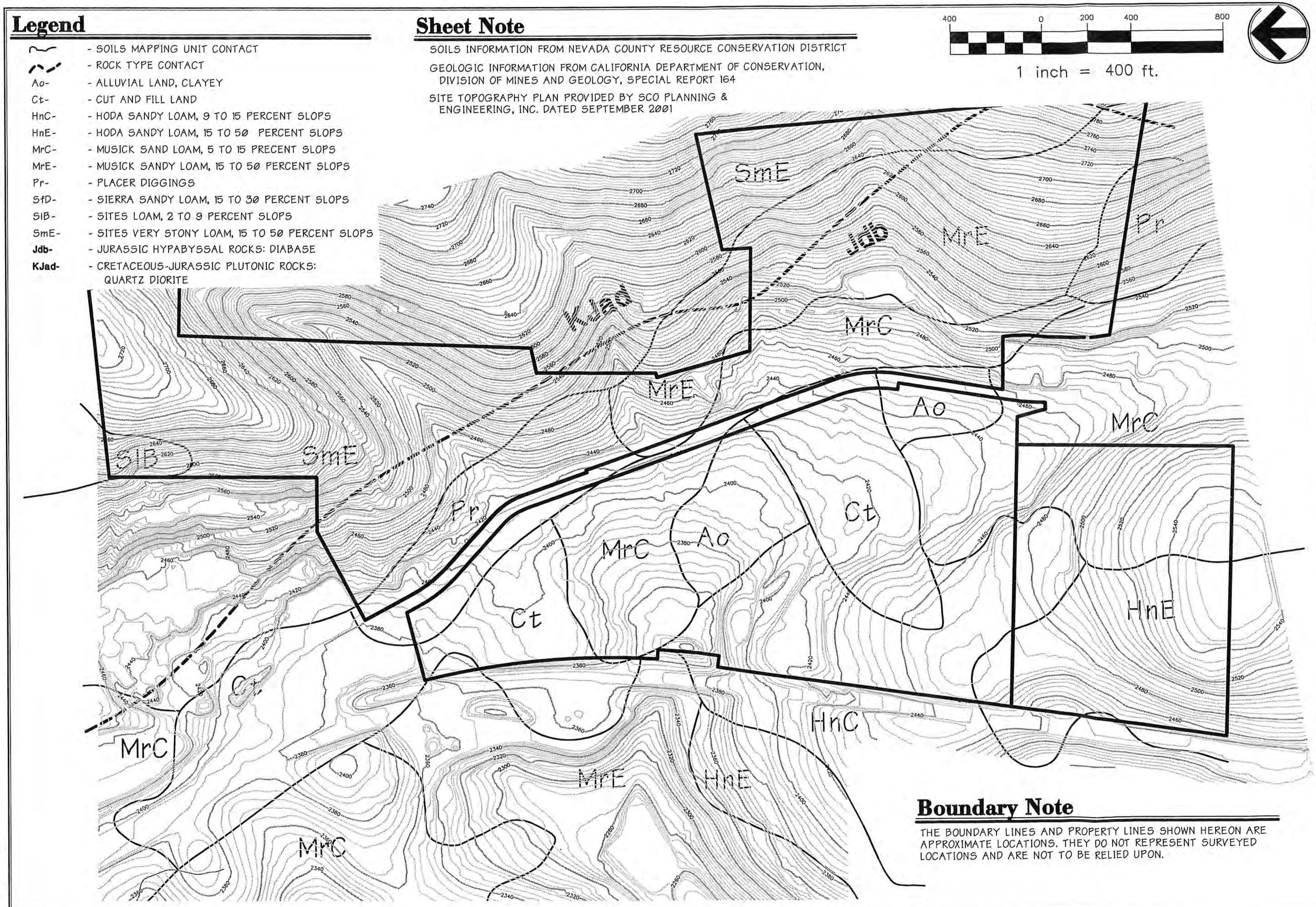
∼	- SOILS MAPPING UNIT CONTACT
╌	- ROCK TYPE CONTACT
Ao-	- ALLUVIAL LAND, CLAYEY
Ct-	- CUT AND FILL LAND
HnC-	- HODA SANDY LOAM, 9 TO 15 PERCENT SLOPS
HnE-	- HODA SANDY LOAM, 15 TO 50 PERCENT SLOPS
MrC-	- MUSICK SAND LOAM, 5 TO 15 PRECENT SLOPS
MrE-	- MUSICK SANDY LOAM, 15 TO 50 PERCENT SLOPS
Pr-	- PLACER DIGGINGS
SfD-	- SIERRA SANDY LOAM, 15 TO 30 PERCENT SLOPS
SlB-	- SITES LOAM, 2 TO 9 PERCENT SLOPS
SmE-	- SITES VERY STONY LOAM, 15 TO 50 PERCENT SLOPS
Jdb-	- JURASSIC HYPABYSSAL ROCKS: DIABASE
KJad-	- CRETACEOUS-JURASSIC PLUTONIC ROCKS: QUARTZ DIORITE

Sheet Note

SOILS INFORMATION FROM NEVADA COUNTY RESOURCE CONSERVATION DISTRICT

GEOLOGIC INFORMATION FROM CALIFORNIA DEPARTMENT OF CONSERVATION, DIVISION OF MINES AND GEOLOGY, SPECIAL REPORT 164

SITE TOPOGRAPHY PLAN PROVIDED BY SCO PLANNING & ENGINEERING, INC. DATED SEPTEMBER 2001



Boundary Note

THE BOUNDARY LINES AND PROPERTY LINES SHOWN HEREON ARE APPROXIMATE LOCATIONS. THEY DO NOT REPRESENT SURVEYED LOCATIONS AND ARE NOT TO BE RELIED UPON.

TEAM DRIVEN SOLUTIONS FOR THE BUILT ENVIRONMENT

CARLTON
Engineering Inc.
3883 Ponderosa Road, Shingle Springs, CA 95682
Voice 530.677.5515 Fax 530.677.6645

BEAR RIVER DEVELOPMENT CORP

BEAR RIVER MILL SITE

GEOLOGIC & SOILS MAP

Project Location:
Bear River Mill
La Barr Meadows Rd. & Hwy 49
Grass Valley
Nevada County, California

DESIGNED MSM	DATE 12-6-04
DRAWN BA	Horz. SCALE 1"=400'
PROJECT 3076-01-01	Vert. SCALE NA

FIGURE
2.3

SPI Bear River\2001-528\01528_G4

01528_G4

012306:906

Legend

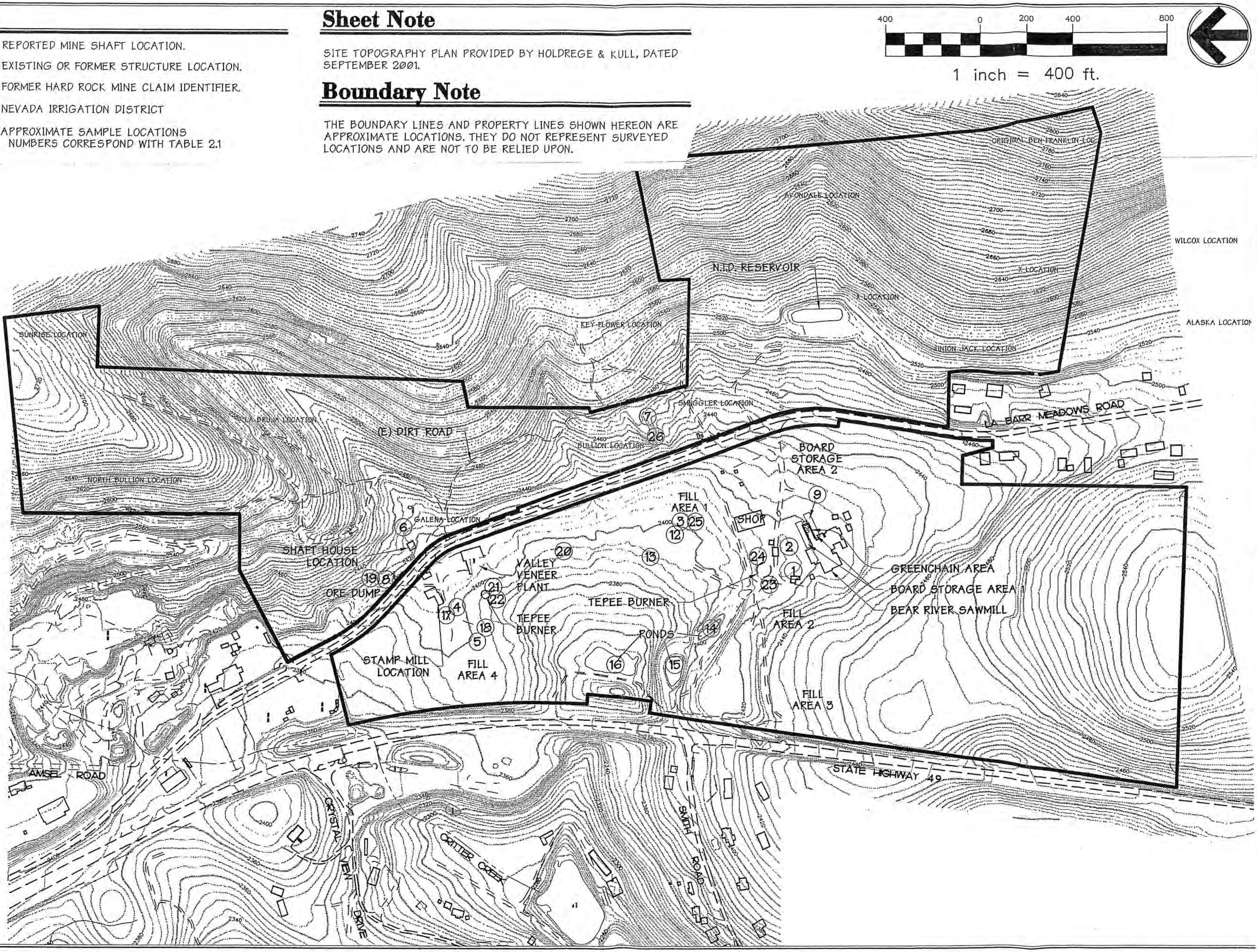
◪	- REPORTED MINE SHAFT LOCATION.
⏢	- EXISTING OR FORMER STRUCTURE LOCATION.
GALENA LOCATION	- FORMER HARD ROCK MINE CLAIM IDENTIFIER.
N.I.D.	- NEVADA IRRIGATION DISTRICT
①	- APPROXIMATE SAMPLE LOCATIONS NUMBERS CORRESPOND WITH TABLE 2.1

Sheet Note

SITE TOPOGRAPHY PLAN PROVIDED BY HOLDREGE & KULL, DATED SEPTEMBER 2001.

Boundary Note

THE BOUNDARY LINES AND PROPERTY LINES SHOWN HEREON ARE APPROXIMATE LOCATIONS. THEY DO NOT REPRESENT SURVEYED LOCATIONS AND ARE NOT TO BE RELIED UPON.



TEAM DRIVEN SOLUTIONS FOR THE BUILT ENVIRONMENT

CARLTON
Engineering Inc.
3883 Ponderosa Road, Shingle Springs, CA 95682
Voice 530.677.5515 Fax 530.677.6645

BEAR RIVER DEVELOPMENT CORP
BEAR RIVER MILL SITE

PREVIOUS INVESTIGATION
SAMPLE LOCATION MAP

Project Location:
Bear River Mill
La Barr Meadows Rd. & Hwy 49
Grass Valley
Nevada County, California

DESIGNED MSM	DATE 12-6-04
DRAWN BA	Horz. SCALE 1"=400'
PROJECT 3076-01-01	Vert. SCALE NA

FIGURE
2.4

01528_G5
120604:1226

Legend

- EXISTING OR FORMER STRUCTURE LOCATION.

GALENA LOCATION - FORMER HARD ROCK MINE CLAIM IDENTIFIER.

-BACKGROUND GROUND WATER MONITORING WELL.

● -BACKGROUND SURFACE WATER.

△ -BACKGROUND SOIL SAMPLES.

☒ -PCP CLEAN UP CONFIRMATION.

-MINING WASTE ROCK.

-WASTE PILES (DUMPED MATERIAL).

-PAVED ROADS.

-UNIMPROVED ROADS.

-TOPOGRAPHY, 4' CONTOUR INTERVAL.

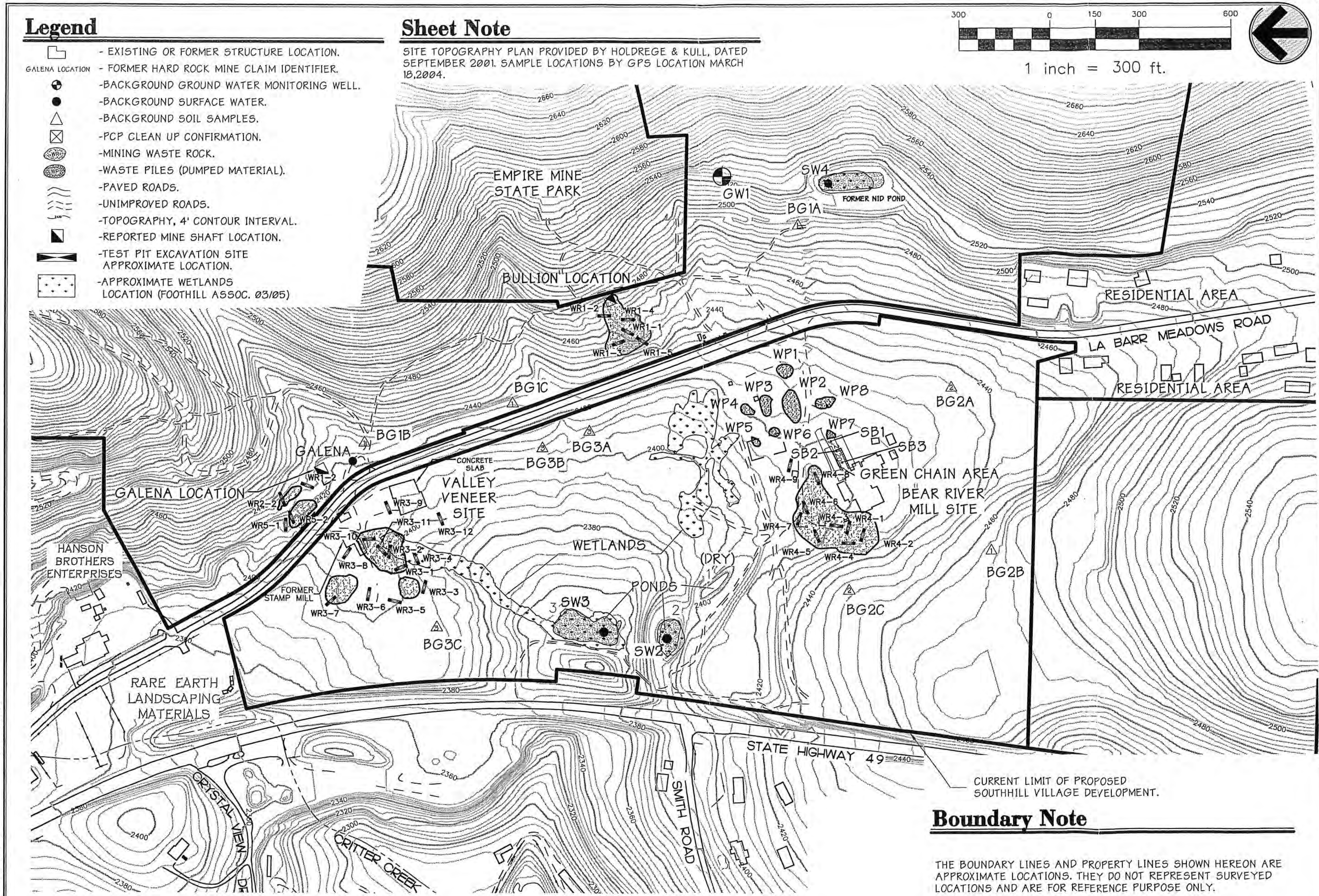
-REPORTED MINE SHAFT LOCATION.

-TEST PIT EXCAVATION SITE APPROXIMATE LOCATION.

-APPROXIMATE WETLANDS LOCATION (FOOTHILL ASSOC. 03/05)

Sheet Note

SITE TOPOGRAPHY PLAN PROVIDED BY HOLDREGE & KULL, DATED SEPTEMBER 2001. SAMPLE LOCATIONS BY GPS LOCATION MARCH 18,2004.



Boundary Note

THE BOUNDARY LINES AND PROPERTY LINES SHOWN HEREON ARE APPROXIMATE LOCATIONS. THEY DO NOT REPRESENT SURVEYED LOCATIONS AND ARE FOR REFERENCE PURPOSE ONLY.

TEAM DRIVEN SOLUTIONS FOR THE BUILT ENVIRONMENT

CARLTON
Engineering Inc.
3883 Ponderosa Road, Shingle Springs, CA 95682
Voice 530.677.5515 Fax 530.677.6645

BEAR RIVER DEVELOPMENT CORP
BEAR RIVER MILL SITE

REMEDIAL INVESTIGATION
SAMPLE LOCATIONS

Project Location:
Bear River Mill
La Barr Meadows Rd. & Hwy 49
Grass Valley
Nevada County, California

DESIGNED JP	DATE 03-24-05
DRAWN TW2	Horz. SCALE 1"=300'
PROJECT 3076-01-01	Vert. SCALE NA

FIGURE
2.5

G11-307901

041504:1214

APPENDIX B: RESPONSIVENESS SUMMARY

Department of Toxic Substances Control

Alan C. Lloyd, Ph.D.
Agency Secretary
Cal/EPA

8800 Cal Center Drive
Sacramento, California 95826-3200

Arnold Schwarzenegger
Governor

RESPONSE SUMMARY
Draft Removal Action Work plan
Bear River Mill Site
Grass Valley, California

State and Federal environmental statutes and regulations require that public participation activities be conducted at hazardous waste sites. This document summarizes activities conducted by the Department of Toxic Substances Control (DTSC) for the subject project in satisfying these regulations.

DTSC provided a public comment period to receive written and oral comments on the August 2005 Draft Removal Action Work Plan (RAW) for the Bear River Mill Site located near Grass Valley, California. The public comment period was open for 30 days beginning August 19, 2005 and ending on September 19, 2005. Concurrent with release of the RAW for public review, a display ad was published in the Grass Valley Union on August 19, 2005 identifying the comment period. The RAW was available for public review at DTSC's Region 1 office and at the Grass Valley Public Library. A fact sheet was prepared and distributed to the project mailing list including local agencies and residents.

One written comment was received by DTSC during the public comment period. The comment and DTSC's response are listed below.

1. Comment: Who is going to watch to be positive toxic material is under roads? There will be pipes, water, sewer, power, etc. that workers will be exposed to toxins.

   Response: DTSC is providing active oversight of the remediation efforts at the Bear River Mill Site to ensure all work is done according to applicable or relevant and appropriate requirements; this includes site inspections by DTSC staff. Deed Restrictions for the area where media of concern is placed will be recorded with the Nevada County Recorder Office. The Deed Restrictions will limit the land use of the affected area to commercial use and will protect the integrity of the cap. The exact location will be memorialized on a surveyed location map which will also be filed with the Nevada County Recorder Office. The deed restrictions will require DTSC notification and approval prior to performing any excavation. In addition to the Deed Restrictions an Operations and Maintenance Agreement, which among other things will require periodic inspections, will ensure the cap is properly maintained to prevent exposures from occurring.

Attached are copies of the fact sheet mailed to the site mailing list and the display ad published in the local newspaper. A copy of the Final RAW and other site related documents are available for review by appointment at the following information repository:

Department of Toxic Substances Control
8800 Cal Center Drive
Sacramento, California 95826
File Room: (916) 255-3758

APPENDIX C: REMEDIAL INVESTIGATION DATA

C-1. Background Lab Reports, COC's and Boring Logs

C-1.1 Soil
C-1.2 Groundwater
C-1.3 Pond Water

C- 1.1 SOIL

06/21/04 09:59

Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project: Bear River R1
Project Number: 3076-01-01
Project Manager: Mark Montgomery

CLS Work Order #: CNF0330

Metals by EPA 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
BG1A-6" (CNF0330-01) Soil Sampled: 06/01/04 14:40 Received: 06/09/04 08:40									
Arsenic	**11**	1.0	mg/kg	4	CN04623	06/14/04	06/15/04	EPA 7060A	
BG1A-10' (CNF0330-02) Soil Sampled: 06/01/04 14:50 Received: 06/09/04 08:40									
Arsenic	**6.7**	1.0	mg/kg	4	CN04623	06/14/04	06/15/04	EPA 7060A	
BG1A-20' (CNF0330-03) Soil Sampled: 06/01/04 15:20 Received: 06/09/04 08:40									
Arsenic	**7.0**	1.0	mg/kg	4	CN04623	06/14/04	06/15/04	EPA 7060A	
BG1B-6" (CNF0330-04) Soil Sampled: 06/01/04 12:30 Received: 06/09/04 08:40									
Arsenic	**4.4**	1.0	mg/kg	4	CN04623	06/14/04	06/15/04	EPA 7060A	
BG1B-10' (CNF0330-05) Soil Sampled: 06/01/04 12:45 Received: 06/09/04 08:40									
Arsenic	**18**	1.0	mg/kg	4	CN04623	06/14/04	06/15/04	EPA 7060A	
B-17' (CNF0330-06) Soil Sampled: 06/01/04 13:15 Received: 06/09/04 08:40									
ic	**79**	5.0	mg/kg	20	CN04623	06/14/04	06/15/04	EPA 7060A	
BG1C-6" (CNF0330-07) Soil Sampled: 06/01/04 13:30 Received: 06/09/04 08:40									
Arsenic	**9.6**	1.0	mg/kg	4	CN04623	06/14/04	06/15/04	EPA 7060A	
BG1C-8' (CNF0330-08) Soil Sampled: 06/01/04 13:50 Received: 06/09/04 08:40									
Arsenic	**9.1**	1.0	mg/kg	4	CN04623	06/14/04	06/15/04	EPA 7060A	
BG2A-6" (CNF0330-09) Soil Sampled: 06/01/04 14:15 Received: 06/09/04 08:40									
Arsenic	**36**	5.0	mg/kg	20	CN04623	06/14/04	06/15/04	EPA 7060A	
BG2A-7.5' (CNF0330-10) Soil Sampled: 06/01/04 14:45 Received: 06/09/04 08:40									
Arsenic	**48**	5.0	mg/kg	20	CN04623	06/14/04	06/15/04	EPA 7060A	
BG2A-15' (CNF0330-11) Soil Sampled: 06/01/04 15:10 Received: 06/09/04 08:40									
Arsenic	**7.8**	1.0	mg/kg	4	CN04623	06/14/04	06/15/04	EPA 7060A	
BG2B-6" (CNF0330-12) Soil Sampled: 06/01/04 13:00 Received: 06/09/04 08:40									
Arsenic	**14**	1.0	mg/kg	4	CN04623	06/14/04	06/15/04	EPA 7060A	
BG2B-7.5' (CNF0330-13) Soil Sampled: 06/01/04 13:30 Received: 06/09/04 08:40									
Arsenic	**0.85**	0.50	mg/kg	2	CN04623	06/14/04	06/15/04	EPA 7060A	
BG2B-15' (CNF0330-14) Soil Sampled: 06/01/04 14:00 Received: 06/09/04 08:40									
Arsenic	**0.82**	0.25	mg/kg	1	CN04623	06/14/04	06/15/04	EPA 7060A	
BG2C-6" (CNF0330-15) Soil Sampled: 06/01/04 13:00 Received: 06/09/04 08:40									
Arsenic	**13**	1.0	mg/kg	4	CN04623	06/14/04	06/15/04	EPA 7060A	
B[illegible]C-7.5' (CNF0330-16) Soil Sampled: 06/01/04 12:10 Received: 06/09/04 08:40									

Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project: Bear River R1
Project Number: 3076-01-01
Project Manager: Mark Montgomery

CLS Work Order #: CNF0330

Metals by EPA 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
BG2C-7.5' (CNF0330-16) Soil Sampled: 06/01/04 12:10 Received: 06/09/04 08:40									
Arsenic	**1.2**	1.0	mg/kg	4	CN04623	06/14/04	06/15/04	EPA 7060A	
BG2C-15' (CNF0330-17) Soil Sampled: 06/01/04 12:30 Received: 06/09/04 08:40									
Arsenic	**0.92**	0.25	mg/kg	1	CN04623	06/14/04	06/15/04	EPA 7060A	
BG3A-6" (CNF0330-18) Soil Sampled: 06/01/04 08:20 Received: 06/09/04 08:40									
Arsenic	**32**	5.0	mg/kg	20	CN04623	06/14/04	06/15/04	EPA 7060A	
BG3A-7.5' (CNF0330-19) Soil Sampled: 06/01/04 08:50 Received: 06/09/04 08:40									
Arsenic	**16**	1.0	mg/kg	4	CN04623	06/14/04	06/15/04	EPA 7060A	
BG3A-15' (CNF0330-20) Soil Sampled: 06/01/04 09:10 Received: 06/09/04 08:40									
Arsenic	**10**	1.0	mg/kg	4	CN04623	06/14/04	06/15/04	EPA 7060A	
B-6" (CNF0330-21) Soil Sampled: 06/01/04 09:25 Received: 06/09/04 08:40									
ic	ND	0.25	mg/kg	1	CN04635	06/14/04	06/15/04	EPA 7060A	
BG3B-7' (CNF0330-22) Soil Sampled: 06/01/04 10:00 Received: 06/09/04 08:40									
Arsenic	ND	0.25	mg/kg	1	CN04635	06/14/04	06/15/04	EPA 7060A	
BG3B-14' (CNF0330-23) Soil Sampled: 06/01/04 09:10 Received: 06/09/04 08:40									
Arsenic	ND	0.25	mg/kg	1	CN04635	06/14/04	06/15/04	EPA 7060A	
BG3C-6" (CNF0330-24) Soil Sampled: 06/01/04 10:40 Received: 06/09/04 08:40									
Arsenic	ND	0.25	mg/kg	1	CN04635	06/14/04	06/15/04	EPA 7060A	
BG3C-7.5' (CNF0330-25) Soil Sampled: 06/01/04 00:00 Received: 06/09/04 08:40									
Arsenic	ND	0.25	mg/kg	1	CN04635	06/14/04	06/15/04	EPA 7060A	
BG3C-15' (CNF0330-26) Soil Sampled: 06/01/04 11:20 Received: 06/09/04 08:40									
Arsenic	ND	0.25	mg/kg	1	CN04635	06/14/04	06/15/04	EPA 7060A	

Carlton Engineering, Inc. 3883 Ponderosa Road Shingle Springs, CA 95682	Project: Bear River R1 Project Number: 3076-01-01 Project Manager: Mark Montgomery	**CLS Work Order #: CNF0330**

Notes and Definitions

QM-05	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CALIFORNIA LABORATORY SERVICES **CHAIN OF CUSTODY** **CLS ID. NO.** 1/3

Report To:

Carlton Engineering Inc.
3932 Ponderosa Road
Shingle Springs, CA 95682

Project Manager
Mark Montgomery

Project Name
Bear River RI

Sampled By
JWP

Job Description
Background Sampling: Metals

Site Location
Grass Valley

Client Job Numb
3076-01-01

Destination Laboratory

X **CLS** (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova,
CA 95742
www.californialab.com

OTHER

FIELD CONDITIONS:
Clear sunny

NOTE:
Must meet attached Table 10 reporting limits.
J-Flag if between reporting limit and detection limit.

COMPOSITE:

ANALYSIS REQUESTED

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	Preservatives	As by EPA Method 7060							TURNAROUND TIME IN DAYS 1	2	5	10	SPECIAL INSTRUCTIONS
6/1	1440	BG1A-6"	Soil	1	6"x 2" Brass Tube	3										X		
6/1	1450	BG1A-10'	"	"	"	3	X									X		
6/1	1520	BG1A-20'	"	"	"	3	X									X		
6/1	1230	BG1B-6"	"	"	"	3	X									X		
6/1	1245	BG1B-10'	"	"	"	3	X									X		
6/1	1315	BG1B-17'	"	"	"	3	X									X		
6/1	1330	BG1C-6"	"	"	"	3	X									X		
6/1	1350	BG1C-8'	"	"	"	3	X									X		

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
Jason W. Pittman	Jason W. Pittman/ Carlton	6-8-04 0730	Ray Orlowski Jr	CLS

RECEIVED AT LAB BY:
DATE/TIME:
CONDITIONS/COMMENTS:

SHIPPED BY: FED EX UPS OTHER AIR BILL #

CALIFORNIA LABORATORY SERVICES **CHAIN OF CUSTODY** **CLS ID. NO.** 2/3

Report To:

Carlton Engineering Inc.
3932 Ponderosa Road
Shingle Springs, CA 95682

Project Manager
Mark Montgomery

Project Name
Bear River RI

Sampled By
JWP

Job Description
Background Sampling: Metals

Site Location
Grass Valley

Client Job Numb
3076-01-01

Destination Laboratory

X CLS (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova,
CA 95742
www.californialab.com

OTHER

FIELD CONDITIONS:
Clear sunny

NOTE:
Must meet attached Table 10 reporting limits.
J-Flag if between reporting limit and detection limit.

COMPOSITE:

DATE	TIME	SAMPLE		CONTAINER		Preservatives	ANALYSIS REQUESTED							TURNAROUND TIME IN DAYS				SPECIAL INSTRUCTIONS
		IDENTIFICATION	MATRIX	NO.	TYPE		As by EPA Method 7060							1	2	5	10	
6/1	1415	BG2A-6”	Soil	1	6”x 2” Brass Tube	3										X		
6/1	1445	BG2A-7.5’	“	“	“	3	X									X		
6/1	1510	BG2A-15’	“	“	“	3	X									X		
6/1	1300	BG2B-6”	“	“	“	3	X									X		
6/1	1330	BG2B-7.5’	“	“	“	3	X									X		
6/1	1400	BG2B-15’	“	“	“	3	X									X		
6/1	1120	BG2C-6”	“	“	“	3	X									X		
6/1	1210	BG2C-7.5’	“	“	“	3	X									X		
6/1	1230	BG2C-15’	“	“	“	3	X									X		

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
Jason W. Pittman	Jason W. Pittman/ Carlton	6/3/04 0730	[illegible]	CLS

RECEIVED AT LAB BY:

DATE/TIME:

CONDITIONS/COMMENTS:

SHIPPED BY: FED EX UPS OTHER

AIR BILL #

CHAIN OF CUSTODY

CLS ID. NO. 3/3

Report To:

Carlton Engineering Inc.

3932 Ponderosa Road

Shingle Springs, CA 95682

Project Manager
Mark Montgomery

Project Name
Bear River RI

Sampled By
JWP

Job Description
Background Sampling: Metals

Site Location
Grass Valley

Client Job Numb.
3076-01-01

Destination Laboratory

☒ **CLS** (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova,
CA 95742
www.californialab.com

OTHER

FIELD CONDITIONS:
Clear sunny

NOTE:
Must meet attached Table 10 reporting limits.
J-Flag if between reporting limit and detection limit.

COMPOSITE:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	Preservatives	ANALYSIS REQUESTED: As by EPA Method 7060	TURNAROUND TIME IN DAYS: 1	2	5	10	SPECIAL INSTRUCTIONS
6/1	0820	**BG3A-6”**	**Soil**	**1**	**6”x 2” Brass Tube**	**3**				X		
6/1	0850	**BG3A-7.5’**	“	“	“	3	X			X		
6/1	0910	**BG3A-15’**	“	“	“	3	X			X		
6/1	0925	**BG3B-6”**	“	“	“	3	X			X		
6/1	1000	**BG3B-7’**	“	“	“	3	X			X		
6/1	0910	**BG3B-14’**	“	“	“	3	X			X		
6/1	1040	**BG3C-6”**	“	“	“	3	X			X		
6/1		**BG3C-7.5’**	“	“	“	3	X			X		
6/1	1120	**BG3C-15’**	“	“	“	3	X			X		

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
Jason W. Pittman	Jason W. Pittman/ Carlton	6-8-09 0730	Ray Orlowski Jr	CLS

RECEIVED AT LAB BY:

DATE/TIME:

CONDITIONS/COMMENTS:

SHIPPED BY: FED EX UPS OTHER

AIR BILL #

		MATERIALS DESCRIPTION			GEOTECHNICAL			GEOMECHANI			
DEPTH			Field qu (Tons/SqFt)	SAMPLE No	SPT COUNT	DRY DENSITY	MOISTURE CONTENT	WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
0 ☒	0	Light brown clay (CL) w/ subangula coarse sand, moist, some brown organics.		BG1A	6"						
	1										
	2										
	3										
	4										
10 ■	5	Orange black - white, weathered, weak moist (SM)		BG1A	10'						
	6										
	7										
	8										
	9										
20 ■	10	Orange black white, weathered, moist (SM) Boring terminated		BG1A	20'						

CARLTON
Engineering Inc.

3932 Ponderosa Road, Shingle Springs, CA 95682
Voice 530.677.5515 Fax 530.677.6645

TRENCH # BG1A	PROJECT NAME & NUMBER SPI BEAR RIVER 3076-01-01
DATE 6-1-04	EQUIPMENT A400 - Air Rotary
BY J	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

DEPTH		MATERIALS DESCRIPTION	Field qu (Tons/SqFt)	SAMPLE No	GEOTECHNICAL SPT COUNT	DRY DENSITY	MOISTURE CONTENT	GEOMECHANI WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
☒ 0	0	Brown (CL) with organic material, moist		BG1B	6"						
	1										
	2										
	3										
	4										
▲ 10	5	Light brown (ML) w/ gray subangular coarse sands moist.		BG1B	10'						
	6										
	7										
15											
	8										
▲ 17		GRAY Brown (ML) moist, becomes wet Boring terminated.		BG1B	17'						
	9										
20	10										

CARLTON
Engineering Inc.

3932 Ponderosa Road, Shingle Springs, CA 95682
Voice 530.677.5515 Fax 530.677.6645

TRENCH # BG1B	PROJECT NAME & NUMBER SPI BEAR RIVER 3076-01-01
DATE 6-1-04	EQUIPMENT A400 Air Rotary
BY P	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

		MATERIALS DESCRIPTION			GEOTECHNICAL			GEOMECHANI			
	DEPTH		Field qu (Tons/SqFt)	SAMPLE No	SPT COUNT	DRY DENSITY	MOISTURE CONTENT	WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
☒ 0	0	Light Brown - yellowish orange (CL) with brown organics, moist.	BGIC	6"							
	1										
	2										
	3										
▲ 8	4	Yellowish -orange (CL) very moist Boring terminated	BGIC	8'							
10	5										
	6										
	7										
	8										
	9										
20	10										

CARLTON
Engineering Inc.
3932 Ponderosa Road, Shingle Springs, CA 95682
Voice 530.677.5515 Fax 530.677.6645

TRENCH # BGIC	PROJECT NAME & NUMBER SPI BEAR RIVER 3076-01-01
DATE 6-1-04	EQUIPMENT A400 Air Rotary
BY P	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

DEPTH		MATERIALS DESCRIPTION			GEOTECHNICAL			GEOMECHANIC			
			Field qu (Tons/SqFt)	SAMPLE No	SPT COUNT	DRY DENSITY	MOISTURE CONTENT	WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
☒ 0'	0	Clayey Sand (SC), light brown, moist, loose,		BGZA	6"						
		contains some brown organics									
	1										
	2										
	3										
▲ 7.5	4	Sandy clay (CL), brown, moist, stiff		BGZA	7.5'						
10	5										
	6										
	7										
▲ 15		Sandy clay (CL), brown-gray, moist, Highly weathered		BGZA	15						
	8	Boring terminated									
		50 hits / 5.5"									
	9										
20	10										

CARLTON
Engineering Inc

3932 Ponderosa Road, Shingle Springs, CA 95682
Voice 530.677.5515 Fax 530.677.6645

TRENCH # BGZA
PROJECT NAME & NUMBER SPI BEAR RIVER 3076-01-01
DATE 6-1-04
EQUIPMENT A400 Air Rotary
BY P
PIT ORIENTATION
ELEVATION
NATURAL SLOPE
HOR. SCALE
VERT. SCALE

MATERIALS DESCRIPTION				GEOTECHNICAL				GEOMECHANI			
DEPTH			Field qu (Tons/SqFt)	SAMPLE No.	SPT COUNT	DRY DENSITY	MOISTURE CONTENT	WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
☒ 0	0										
		Clayey Sand (SC), Brown, moist, loose, mixed		BG2B	6"						
	1	With brown organics and gray angular gravels									
	2										
	3										
▲ 7.5		Clayey Sand (SC), brown, moist, weathered, weak		BG2B	7.5'						
	4										
10	5										
	6										
	7	A									
▲		As above. Boring terminated at 15' bgs.		BG2B	15'						
	8										
	9										
20	10										

CARLTON
Engineering Inc.
3932 Ponderosa Road, Shingle Springs, CA 95682
Voice 530.677.5515 Fax 530.677.6645

TRENCH #	PROJECT NAME & NUMBER
BG2B	SPI BEAR RIVER 3076-01-01
DATE	EQUIPMENT
6-1-04	A400 Air Rotary
BY	PIT ORIENTATION
P	
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

		MATERIALS DESCRIPTION			GEOTECHNICAL			GEOMECHANI											
								WEATHERING					JOINTING Joints/ft					DISCONTINUITIES	
DEPTH			Field qu (Tons/SqFt)	SAMPLE No	~~SPT~~ COUNT	DRY DENSITY	MOISTURE CONTENT	F	SW	MW	W	C	0	2	4	6	8	TYPE	DIP
☒ 0	0																		
		Sandy Clay (CL), brown, +yellow-orange ~~moist,~~ moist, soft		BGZC	6"														
	1																		
		Gray cobbles																	
	2																		
		Becomes brown.																	
	3																		
▲ 7.5		Silty Clay (CL), brown, moist, with gray subangula		BGZC	7.5'														
	4	coarse ~~fin~~ sands																	
10	5																		
	6																		
	7																		
▲ 15		Becomes brown-gray-white-orange, moist, highly		BGZC	15'														
	8	weathered. Boring terminated																	
		60 hits / 6"																	
	9																		
20	10																		

CARLTON
Engineering Inc.

3932 Ponderosa Road, Shingle Springs, CA 95682
Voice 530.677.5515 Fax 530.677.6645

TRENCH # BGZC	PROJECT NAME & NUMBER SPI BEAR RIVER 3076-01-01
DATE 6-1-05	EQUIPMENT A400 Air Rotary
BY JP	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

DEPTH		MATERIALS DESCRIPTION	Field qu (Tons/SqFt)	SAMPLE No	GEOTECHNICAL			GEOMECHANI			
					SPT COUNT	DRY DENSITY	MOISTURE CONTENT	WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DISCONTINUITIES DIP
☒ 0	0	Sandy Clay (CL), light brown - brown-orange, dry		BG3A	6"						
	1										
	2										
	3										
▲ 7.5		~~Br~~Sandy Clay (CL), brown, moist, weak w/ts ~~weather~~ subangular coarse sands		BG3A	7.5'						
	4										
10	5										
	6										
	7										
▲ 15		~~Broo~~ Sandy clay (CL), brown-white, moist, soft Boring terminated 15 hits /6".		BG3A	15'						
	8										
	9										
20	10										

CARLTON
Engineering Inc

3932 Ponderosa Road, Shingle Springs, CA 95682
Voice 530.677.5515 Fax 530.677.6645

TRENCH # BG3A	PROJECT NAME & NUMBER SPI BEAR RIVER 3076-01-01	
DATE 6-1-04	EQUIPMENT A400 Air Rotary	
BY JP	PIT ORIENTATION	
ELEVATION	NATURAL SLOPE	
HOR. SCALE	VERT. SCALE	

DEPTH		MATERIALS DESCRIPTION	Field qu (Tons/SqFt)	SAMPLE No	GEOTECHNICAL SPT COUNT	DRY DENSITY	MOISTURE CONTENT	GEOMECHANI WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
☒ 0	0										
		Clayey Sand (SC), tan - light brown, dry with sub angular gravels and sands.	BG3B	6'							
	1										
	2										
	3										
▲ 7		Clayey Sand (SC), brown - gray - black, moist with coarse gravels.	BG3B	7'							
	4										
10	5										
	6										
▲ 14	7	As above. Boring collapsing. Boring terminated	BG3B	14'							
	8										
	9										
20	10										

CARLTON
Engineering Inc.

3932 Ponderosa Road, Shingle Springs, CA 95682
Voice 530.677.5515 Fax 530.677.6645

TRENCH # BG3B	PROJECT NAME & NUMBER SPI BEAR RIVER 3076-01-01
DATE 6-1-04	EQUIPMENT A400 AIR ROTARY
BY JP	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

		MATERIALS DESCRIPTION	GEOTECHNICAL					GEOMECHANI			
DEPTH			Field qu (Tons/SqFt)	SAMPLE No	~~SPT~~ COUNT	DRY DENSITY	MOISTURE CONTENT	WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
☒ 0'	0										
		Silty Clay (OL), tan, dry		BG3C	6"						
	1										
	2										
	3										
▲ 7.5		Sandy Clay (SC), light-brown, moist		BG3C	7.5'						
	4										
10	5										
	6										
	7										
▲ 15		Sandy Clay (SC), light brown - brown, moist		BG3C	15'						
		Boring terminated									
	8										
	9										
20	10										

CARLTON
Engineering Inc.

3932 Ponderosa Road, Shingle Springs, CA 95682
Voice 530.677.5515 Fax 530.677.6645

TRENCH #	PROJECT NAME & NUMBER
BG3C	SPI BEAR RIVER 3076-01-01
DATE 6-1-04	EQUIPMENT A400 AIR ROTARY
BY JP	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

July 30, 2004

CLS Work Order #: CNG0666
COC #: None

Mark Montgomery
Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project Name: Bear River RI

Enclosed are the results of analyses for samples received by the laboratory on 07/20/04 09:10. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

07/30/04 11:02

Carlton Engineering, Inc. 3883 Ponderosa Road Shingle Springs, CA 95682	Project: Bear River RI Project Number: 3076-01-01 Project Manager: Mark Montgomery	**CLS Work Order #: CNG0666** COC #: None

DI STLC (DI WET) Metals by 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
BG2A-6 (CNG0666-01) Soil Sampled: 04/23/04 00:00 Received: 07/20/04 09:10									
Arsenic	**5.0**	1.0	µg/L	1	CN05831	07/27/04	07/27/04	EPA 200.8	
BG2A-7.5 (CNG0666-02) Soil Sampled: 04/23/04 00:00 Received: 07/20/04 09:10									
Arsenic	**47**	1.0	µg/L	1	CN05831	07/27/04	07/27/04	EPA 200.8	
BG1B-17 (CNG0666-03) Soil Sampled: 04/23/04 00:00 Received: 07/20/04 09:10									
Arsenic	ND	1.0	µg/L	1	CN05831	07/27/04	07/27/04	EPA 200.8	

Carlton Engineering, Inc. 3883 Ponderosa Road Shingle Springs, CA 95682	Project: Bear River RI Project Number: 3076-01-01 Project Manager: Mark Montgomery	**CLS Work Order #: CNG0666** COC #: None

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CALIFOR A LABORATORY SERVICES **CHAI F CUSTODY** **CLS ID. NO.** CNG0666

Report To:

Carlton Engineering Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project Manager: Mark Montgomery
Project Name: Bear River RI
Sampled By: MV
Job Description: Background soil DI WET
Site Location: Grass Valley

Client Job Number: 3076-01-01

Destination Laboratory:
☒ CLS (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova,
CA 95742
www.californialab.com
☐ OTHER

FIELD CONDITIONS:
NOTE: must meet 1.0 ug/l reporting limit
j-flag estimate if between reporting and detection limits

COMPOSITE:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	Preservatives	DI WET Arsenic	TURNAROUND TIME IN DAYS 1	2	5	10	SPECIAL INSTRUCTIONS
4/23		BG2A-6	Soil	1	1-gal baggie	3	X				X	
4/23		BG2A-7.5	"	"	"	"	X				X	
4/23		BG1B-17	"	"	"	"	X				X	

SUSPECTED CONSTITUENTS:

SAMPLE RETENTION TIME:

PRESERVATIVES (1) HCL (2) HNO3 (3) = COLD (4)

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
Mark Montgomery	CEI	7/20/04 0800	Ray Oslowski	CLS.
Ray Oslowski	CLS.	7/20/04 0910		

RECEIVED AT LAB BY:
DATE/TIME: 7/20/04 910
CONDITIONS/COMMENTS: 21

SHIPPED BY: ☐ FED EX ☐ UPS ☐ OTHER

AIR BILL #

C -1.2 GROUNDWATER

06/18/04 10:14

Carlton Engineering, Inc. 3883 Ponderosa Road Shingle Springs, CA 95682	Project: Bear River R1 Project Number: 3076-01-01 Project Manager: Mark Montgomery	CLS Work Order #: CNF0263

CAM 17 Metals (Dissolved Metals), Low Level

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
GW1 (CNF0263-01) Water	**Sampled: 06/07/04 14:00**	**Received: 06/08/04 08:50**							
Antimony	ND	6.0	µg/L	1	CN04658	06/15/04	06/15/04	EPA 200.8	
Arsenic	ND	1.0	"	"	"	"	"	"	
Barium	**12**	10	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	ND	0.50	"	"	"	"	"	"	
Chromium	ND	1.0	"	"	"	"	"	"	
Cobalt	**0.17**	2.0	"	"	"	"	"	"	J
Copper	**1.5**	2.0	"	"	"	"	"	"	J
Lead	ND	2.0	"	"	"	"	"	"	
Molybdenum	ND	2.0	"	"	"	"	"	"	
Nickel	**1.6**	2.0	"	"	"	"	"	"	J
Selenium	ND	5.0	"	"	"	"	"	"	
Silver	ND	0.50	"	"	"	"	"	"	
[illegible]lium	ND	1.0	"	"	"	"	"	"	
[illegible]adium	**1.4**	20	"	"	"	"	"	"	J
Zinc	**8.9**	20	"	"	"	"	"	"	J
Mercury	**0.20**	0.20	"	"	CN04629	06/14/04	06/14/04	EPA 245.1	

Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project: Bear River R1
Project Number: 3076-01-01
Project Manager: Mark Montgomery

CLS Work Order #: CNF0263

Notes and Definitions

J	Detected but below the Reporting Limit; therefore, result is an estimated concentration.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS/LCSD recovery.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CALIFORNIA LABORATORY SERVICES **CHAIN OF CUSTODY** **CLS ID. NO.** CNF0203

Report To:

Carlton Engineering Inc.
3932 Ponderosa Road
Shingle Springs, CA 95682

Project Manager
Mark Montgomery

Project Name
Bear River RI

Sampled By
JWP/BA

Job Description
Monitoring well sampling

Site Location
Grass Valley

Client Job Numb.
3076-01-01

Destination Laboratory

X CLS (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova,
CA 95742
www.californialab.com

OTHER

FIELD CONDITIONS:
Clear sunny

NOTE: Filter samples before analysis. Must meet attached Table 11 reporting limits for CAM 17 analytes.
J-Flag if Arsenic is less than RL.

COMPOSITE:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	Preservatives	ANALYSIS REQUESTED CAM 17							TURNAROUND TIME IN DAYS 1	2	5	10	SPECIAL INSTRUCTIONS
6/7	1400	GW1	Water	1	500ml Poly	3	X									X	~~X~~	

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
J W Pittman Ray Oslowski	JWPITTMAN / CARLTON ENG. INC. CLS	6/8/04 0730 6/8/04 0850	Ray Oslowski	CLS

RECEIVED AT LAB BY:

DATE/TIME: 6/8/04 850

CONDITIONS/COMMENTS: 7'

SHIPPED BY: **FED EX** **UPS** **OTHER** **AIR BILL #**

Table 11. DATA QUALITY OBJECTIVES FOR AQUEOUS SAMPLES (1)
BEAR RIVER MILL SITE REMEDIAL INVESTIGATION

Metal	Water Quality Objective (ug/l) (CVRWQCB)	Method Detection Limit (ug/l) (2)	Reporting Limit (ug/l) (2)	Data Quality Objective (ug/l)
Antimony	6	0.57	6	6
Arsenic	0.023	0.19	1	1
Barium	490	0.37	10	10
Beryllium	4	0.26	1	1
Cadmium	0.07	0.17	0.5	0.5
Chromium (Total)	50	0.28	1	1
Cobalt	50	0.11	2	2
Copper	170	0.26	2	2
Lead	2	0.23	5	5
Mercury	1.2	0.2	0.2	0.2
Molybdenum	10	0.55	2	2
Nickel	12	0.22	2	2
Selenium	20	1.1	5	5
Silver	35	0.15	0.5	0.5
Thallium	0.1	0.11	1	1
Vanadium	50	0.44	20	20
Zinc	2,000	1	20	20

(1) For DI WET Test leachate, groundwater, and Surface Water Samples
(2) By EPA Method 200.8 CLS Laboratory 3/1/04

07/30/04 11:03

Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project: Bear River RI
Project Number: 3076-01-01
Project Manager: Mark Montgomery

CLS Work Order #: CNG0663
COC #: None

Metals (Dissolved) by EPA 200 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
GalenaJuly (CNG0663-01) Water	**Sampled: 07/19/04 14:30**	**Received: 07/20/04 09:10**							
Arsenic	**96**	1.0	µg/L	1	CN05803	07/26/04	07/26/04	EPA 200.8	
GW1July (CNG0663-02) Water	**Sampled: 07/19/04 16:00**	**Received: 07/20/04 09:10**							
Arsenic	**1.2**	1.0	µg/L	1	CN05803	07/26/04	07/26/04	EPA 200.8	

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CALIFORNIA LABORATORY SERVICES

CHAIN OF CUSTODY **CLS ID. NO.** ____

Report To:

Carlton Engineering Inc.

3932 Ponderosa Road

Shingle Springs, CA 95682

Project Manager
Mark Montgomery

Project Name
Bear River RI

Sampled By
JWP/MSM

Job Description
Surface and groundwater sampling

Site Location
Grass Valley

Client Job Number
3076-01-01

Destination Laboratory

☒ **CLS** (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova,
CA 95742
www.californialab.com

☐ **OTHER**

FIELD CONDITIONS:
Clear sunny

NOTE: Filter samples before analysis, soluble arsenic only
Must meet 1 ppb reporting limit

COMPOSITE:

DATE	TIME	SAMPLE IDENTIFICATION	SAMPLE MATRIX	CONTAINER NO.	CONTAINER TYPE	Preservatives	ANALYSIS REQUESTED 200.8 Arsenic						TURNAROUND TIME IN DAYS 1	2	5	10	SPECIAL INSTRUCTIONS
7/19	1430	GalenaJuly	Water	1	500ml Poly	3	X								X	~~X~~	
7/19	1600	GW1July	"	"	"	3	X								X	~~X~~	

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
Mark Montgomery	CEI	7/20/04 0730	Ray Orlowski Jr.	CLS.

RECEIVED AT LAB BY: DATE/TIME: CONDITIONS/COMMENTS:

SHIPPED BY: ☐ FED EX ☐ UPS ☐ OTHER ____ AIR BILL # ____

Metals (Dissolved) by EPA 200 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW1Sept (CNI0385-01) Water	**Sampled: 09/09/04 00:00**	**Received: 09/10/04 17:20**							
Arsenic	ND	1.0	µg/L	1	CN07212	09/17/04	09/17/04	EPA 200.8	

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CALIFORNIA LABORATORY SERVICES **CHAIN OF CUSTODY** **CLS ID. NO.**

Report To:

Carlton Engineering Inc.

3932 Ponderosa Road

Shingle Springs, CA 95682

Project Manager
Mark Montgomery

Project Name
Bear River RI

Sampled By
BEA

Job Description
Groundwater sampling-September

Site Location
Grass Valley

Client Job Number
3076-01-01

Destination Laboratory

X **CLS** (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova,
CA 95742
www.californialab.com

☐ **OTHER**

FIELD CONDITIONS:
Clear sunny

NOTE: Filter samples before analysis, soluble arsenic only Must meet 1 ppb reporting limit

COMPOSITE:

							ANALYSIS REQUESTED						
DATE	**TIME**	**SAMPLE IDENTIFICATION**	**MATRIX**	**CONTAINER NO.**	**CONTAINER TYPE**	**Preservatives**	**200.8 Arsenic**	**TURNAROUND TIME IN DAYS 1**	**2**	**5**	**10**	**SPECIAL INSTRUCTIONS**
9/9		MW1Sept	Water	1	500ml Poly	3	X				X	

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
		9/10/14 1445		Conrado [illegible]

RECEIVED AT LAB BY:

DATE/TIME:

CONDITIONS/COMMENTS:

SHIPPED BY: ☐ FED EX ☐ UPS ☐ OTHER

AIR BILL #

PURGE CHARACTERIZATION AND SAMPLE LOG

CARLTON
Engineering Inc.

Project Name: SPI Bear River

Project No.: 3076-01-01

Date: 9/9/04

Sampler: Brett Arenas

Weather Conditions:

Top of Casing, Elev. 2517.45

Well ID: MW1

Casing Diameter, in. 4

Total Depth, ft. 69.75

PURGE INFORMATION

Spring?

Time			11:00	11:37	12:17				1:00 pm	
pH	▨	▨	9.89	10.48	11.51				7.1	
Temperature	▨	▨	15.0	14.9	15.1				Cold	
Conductivity, umho	▨	▨	132.9	128.9	220				188.5	
DO	▨	▨	—	—	—				/	
Depth To Water, ft.		▨							/	
Volume Purged, gal.	▨	▨	1	2.5	3.5				/	
Comments		**Purge Start**	light Gray	TAN	TAN				Clear	**Purge End**

(Total Depth of Well: 67.03 - Depth to Water: 64.01 x Casing Factor: 0.653

1 Well Vol.,gal 1.9 gal/well Vol. Gal. Per Foot of Casing: (4") 0.653 (2") 0.17

3 Well Volumes, gal. = 5.7

5 Well Volumes, gal. = 9.5

Purge Method: Bailer

Total Volume Purged, gal. : 6

No. of Well Volumes Purged:

Purge Rate, gal./min. :

SAMPLE INFORMATION

Sample No.	Time	Well ID.	Analysis To Be Run	Preservation	Container	No. of Containers
GW1 Sept		GW1	Sol. As 200.8	Cold	500 ml poly	1

Sample Method: Bailer

Chain of Custody No. :

INSTRUMENT CALIBRATION

	Meter ID.	Date	Time
pH	Hach		
Conductivity	Hach		

Comments: Portland Cement found in well, monument lock & locking cap missing

Signature: Brett Arenas

Date:

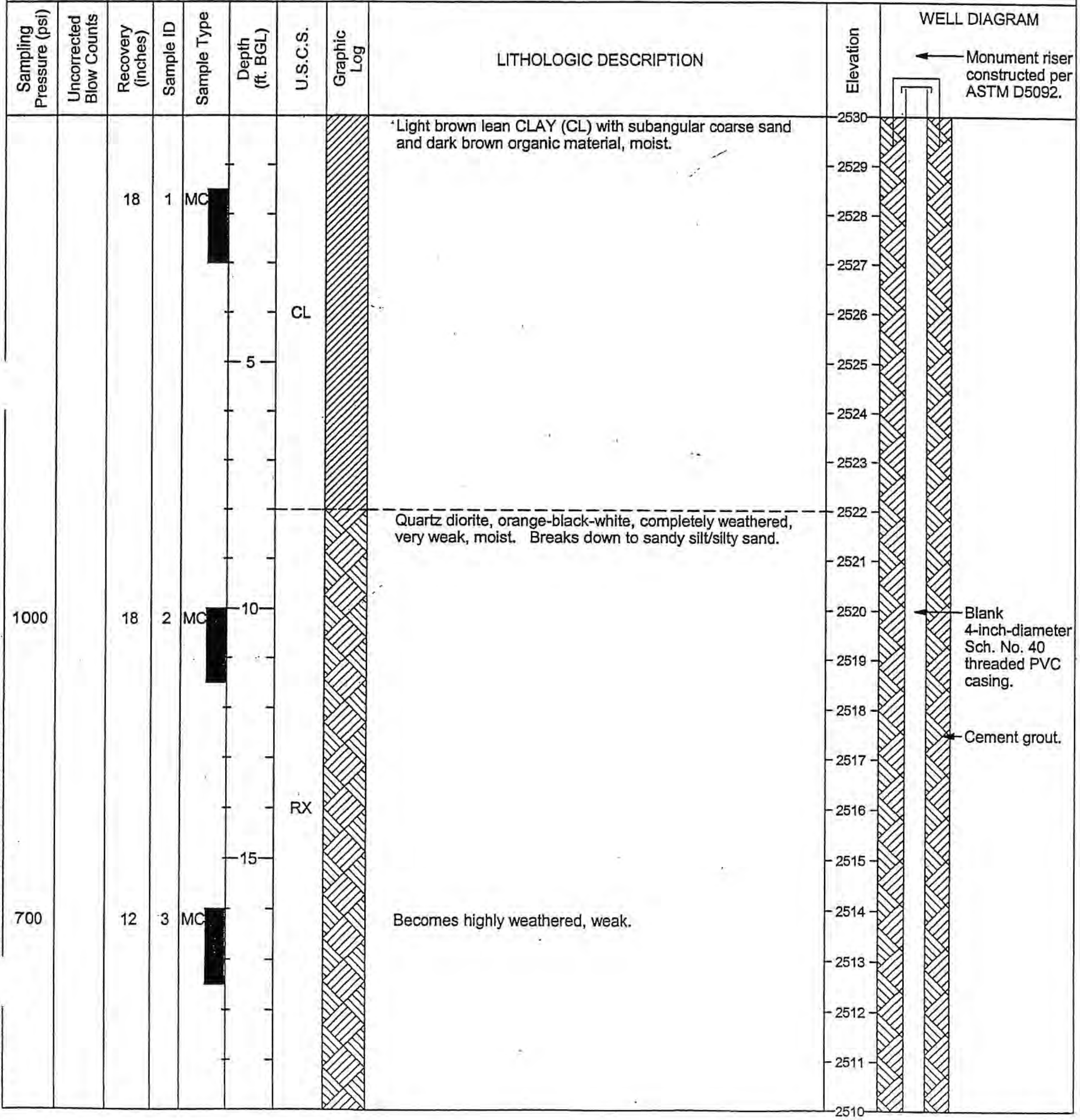
CARLTON
Engineering

Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682
Telephone: 530-677-5515
Fax: 530-677-6645

WELL NUMBER MW1

ROJECT NUMBER 3076-01-01
ROJECT NAME SPI Bear River
LOCATION Grass Valley, CA
DRILLING METHOD Air Rotary
SAMPLING METHOD Split Spoon, 2-inch I.D.
GROUND ELEVATION 2530.0
TOP OF CASING 2532.50
LOGGED BY Jason Pittman
REMARKS Sampler pushed using hydraulic pressure.

DATE STARTED 5/27/04
DATE COMPLETED 5/28/04
CASING TYPE/DIAMETER Sch. No. 40 Threaded PVC / 4-inch
SCREEN TYPE/SLOT Sch. No. 40 PVC / 0.010
GRAVEL PACK TYPE #3 Monterey Sand
GROUT TYPE/QUANTITY Lean Cement / 7 bags
DEPTH TO WATER 55.56 from Ground Surface
GROUND WATER ELEVATION 2474.44



Sampling Pressure (psi)	Uncorrected Blow Counts	Recovery (inches)	Sample ID	Sample Type	Depth (ft. BGL)	U.S.C.S.	LITHOLOGIC DESCRIPTION
					0	CL	Light brown lean CLAY (CL) with subangular coarse sand and dark brown organic material, moist.
		18	1	MC			
					8	RX	Quartz diorite, orange-black-white, completely weathered, very weak, moist. Breaks down to sandy silt/silty sand.
1000		18	2	MC	10		
700		12	3	MC			Becomes highly weathered, weak.

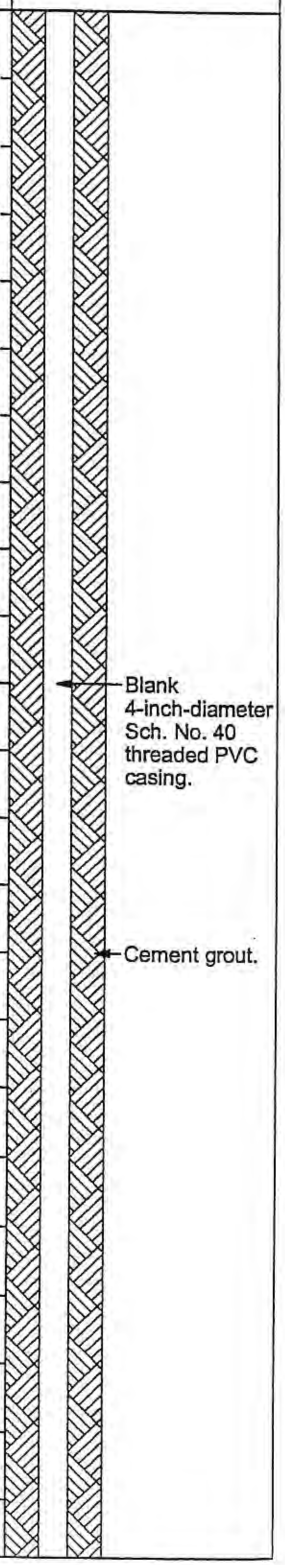
ROJECT NUMBER 3076-01-01 **DATE STARTED** 5/27/04
PROJECT NAME SPI Bear River **DATE COMPLETED** 5/28/04

Continued from Previous Page

Sampling Pressure (psi)	Uncorrected Blow Counts	Recovery (inches)	Sample ID	Sample Type	Depth (ft. BGL)	U.S.C.S.	LITHOLOGIC DESCRIPTION	Elevation
		10	4	MC			Quartz diorite, orange-black-white, completely weathered, very weak, moist. Breaks down to sandy silt/silty sand. As above. Cuttings becoming sandy.	2510
								2509
								2508
								2507
							Cuttings become finer.	2506
1100		12	5	MC	25		As above.	2505
								2504
								2503
								2502
								2501
800		12	6	MC	30		As above.	2500
						RX		2499
								2498
								2497
								2496
500		12	7	MC	35		As above.	2495
								2494
								2493
								2492
								2491
00		12	8	MC	40		Becomes light gray-white-brown.	2490
								2489
								2488

Graphic Log

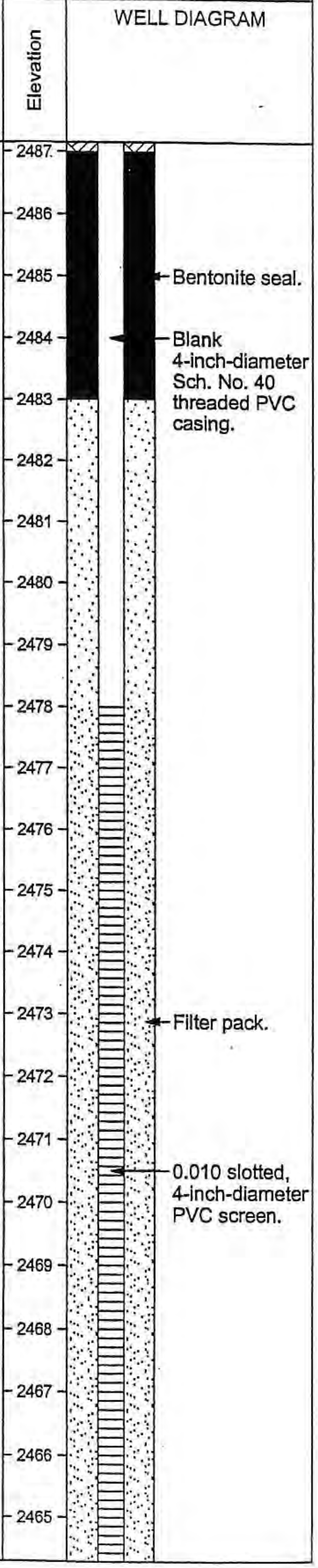
WELL DIAGRAM



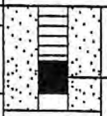
ROJECT NUMBER 3076-01-01 **DATE STARTED** 5/27/04
PROJECT NAME SPI Bear River **DATE COMPLETED** 5/28/04

Continued from Previous Page

Sampling Pressure (psi)	Uncorrected Blow Counts	Recovery (inches)	Sample ID	Sample Type	Depth (ft. BGL)	U.S.C.S.	Graphic Log	LITHOLOGIC DESCRIPTION
								Quartz diorite, orange-black-white, completely weathered, very weak, moist. Breaks down to sandy silt/silty sand.
200		18	9	MC	45			Cuttings become more moist.
		12	10	MC	50			Moist, gray-white-brown.
						RX		
500		12	11	MC	55			As above.
								▼
2000		12	12	MC	60			Free water on sampler.
								Rate of penetration decreases.
					65			



Continued from Previous Page

Sampling Pressure (psi)	Uncorrected Blow Counts	Recovery (inches)	Sample ID	Sample Type	Depth (ft. BGL)	U.S.C.S.	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation	WELL DIAGRAM
						RX	▨	Quartz diorite, orange-black-white, completely weathered, very weak, moist. Breaks down to sandy silt/silty sand.	2464 2463	 4-inch-diameter threaded pipe cap.
								Boring Terminated.	2462 2461 2460 2459 2458 2457 2456 2455 2454 2453 2452 2451 2450 2449 2448 2447 2446 2445 2444 2443 2442	

C 1.3 POND WATER

04/08/04 13:49

Carlton Engineering, Inc. 3883 Ponderosa Road Shingle Springs, CA 95682	Project: Bear River R1 Project Number: 3076-01-01 Project Manager: Mark Montgomery	**CLS Work Order #: CND0078** COC #: None

CAM 17 Metals (Dissolved Metals), Low Level

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SW3 (CND0078-03) Water Sampled: 04/01/04 14:10 Received: 04/02/04 14:50									
Barium	**45**	10	µg/L	1	CN02731	04/06/04	06/04/04	EPA 200.8	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	ND	0.50	"	"	"	"	"	"	
Chromium	ND	1.0	"	"	"	"	"	"	
Cobalt	ND	2.0	"	"	"	"	"	"	
Copper	ND	2.0	"	"	"	"	"	"	
Lead	ND	2.0	"	"	"	"	"	"	
Molybdenum	ND	2.0	"	"	"	"	"	"	
Nickel	**4.0**	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Silver	ND	0.50	"	"	"	"	"	"	
Thallium	ND	1.0	"	"	"	"	"	"	
Vanadium	ND	20	"	"	"	"	"	"	
[illegible]	**22**	20	"	"	"	"	"	"	
Mercury	ND	0.20	"	"	CN02723	04/05/04	04/07/04	EPA 245.1	
SW4 (CND0078-04) Water Sampled: 04/01/04 14:15 Received: 04/02/04 14:50									
Antimony	ND	6.0	µg/L	1	CN02731	04/06/04	06/04/04	EPA 200.8	
Arsenic	**0.51**	1.0	"	"	"	"	"	"	J
Barium	**11**	10	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	ND	0.50	"	"	"	"	"	"	
Chromium	ND	1.0	"	"	"	"	"	"	
Cobalt	ND	2.0	"	"	"	"	"	"	
Copper	**2.6**	2.0	"	"	"	"	"	"	
Lead	**2.7**	2.0	"	"	"	"	"	"	
Molybdenum	ND	2.0	"	"	"	"	"	"	
Nickel	ND	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Silver	ND	0.50	"	"	"	"	"	"	
Thallium	ND	1.0	"	"	"	"	"	"	
Vanadium	ND	20	"	"	"	"	"	"	
Zinc	**22**	20	"	"	"	"	"	"	
Mercury	ND	0.20	"	"	CN02723	04/05/04	04/07/04	EPA 245.1	
SW5 (CND0078-05) Water Sampled: 04/01/04 15:45 Received: 04/02/04 14:50									
Antimony	ND	6.0	µg/L	1	CN02731	04/06/04	06/04/04	EPA 200.8	
Arsenic	**3.5**	1.0	"	"	"	"	"	"	
Barium	**16**	10	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	

04/08/04 13:49

Carlton Engineering, Inc. 3883 Ponderosa Road Shingle Springs, CA 95682	Project: Bear River R1 Project Number: 3076-01-01 Project Manager: Mark Montgomery	**CLS Work Order #: CND0078** COC #: None

CAM 17 Metals (Dissolved Metals), Low Level

SW5 (CND0078-05) Water Sampled: 04/01/04 15:45 Received: 04/02/04 14:50

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Cadmium	ND	0.50	µg/L	1	CN02731	04/06/04	06/04/04	EPA 200.8	
Chromium	ND	1.0	"	"	"	"	"	"	
Cobalt	ND	2.0	"	"	"	"	"	"	
Copper	ND	2.0	"	"	"	"	"	"	
Lead	ND	2.0	"	"	"	"	"	"	
Molybdenum	ND	2.0	"	"	"	"	"	"	
Nickel	**9.5**	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Silver	ND	0.50	"	"	"	"	"	"	
Thallium	ND	1.0	"	"	"	"	"	"	
Vanadium	ND	20	"	"	"	"	"	"	
Zinc	ND	20	"	"	"	"	"	"	
Mercury	ND	0.20	"	"	CN02723	04/05/04	04/07/04	EPA 245.1	

Notes and Definitions

J	Detected but below the Reporting Limit; therefore, result is an estimated concentration.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

04/30/04 10:36

Carlton Engineering, Inc. 3883 Ponderosa Road Shingle Springs, CA 95682	Project: Bear River R1 Project Number: 3076-01-01 Project Manager: Mark Montgomery	**CLS Work Order #: CND0762**

Metals (Dissolved) by EPA 200 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SW3A (CND0762-01) Water	**Sampled: 04/20/04 16:15**	**Received: 04/21/04 15:00**							
Arsenic	11	2.0	μg/L	1	CN03348	04/27/04	04/28/04	EPA 200.8	

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY CLS ID. NO. [illegible]

Report To:

Carlton Engineering Inc.
3932 Ponderosa Road
Shingle Springs, CA 95682

Project Manager: Mark Montgomery
Project Name: Bear River RI
Sampled By: JWP/MSM
Job Description: Surface water sampling
Site Location: Grass Valley

Client Job Numb: 3076-01-01

Destination Laboratory

☒ CLS (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova,
CA 95742
www.californialab.com

☐ OTHER

FIELD CONDITIONS:
Clear sunny

NOTE: Filter samples before analysis, soluble arsenic only Must meet attached Table 11 reporting limits

COMPOSITE:

ANALYSIS REQUESTED

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	Preservatives	200.8 Arsenic						TURNAROUND TIME IN DAYS 1	2	5	10	SPECIAL INSTRUCTIONS
4/20	4:15P	SW3A	Water	1	500ml Poly	3	X									X	

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
Mark Montgomery		4-21-04 1025 4-21-04 1025		

RECEIVED AT LAB BY:

DATE/TIME: 4-21-1520 CONDITIONS/COMMENTS: 3

SHIPPED BY: ☐ FED EX ☐ UPS ☐ OTHER

AIR BILL #

Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project: Bear River R1
Project Number: 3076-01-01
Project Manager: Mark Montgomery

CLS Work Order #: CND0762

Notes and Definitions

QM-05	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

Table 11. DATA QUALITY OBJECTIVES FOR AQUEOUS SAMPLES (1)
BEAR RIVER MILL SITE REMEDIAL INVESTIGATION

Metal	Water Quality Objective (ug/l) (CVRWQCB)	Method Detection Limit (ug/l) (2)	Reporting Limit (ug/l) (2)	Data Quality Objective (ug/l)
Antimony	6	0.57	6	6
Arsenic	0.023	0.19	1	1
Barium	490	0.37	10	10
Beryllium	4	0.26	1	1
Cadmium	0.07	0.17	0.5	0.5
Chromium (Total)	50	0.28	1	1
Cobalt	50	0.11	2	2
Copper	170	0.26	2	2
Lead	2	0.23	5	5
Mercury	1.2	0.2	0.2	0.2
Molybdenum	10	0.55	2	2
Nickel	12	0.22	2	2
Selenium	20	1.1	5	5
Silver	35	0.15	0.5	0.5
Thallium	0.1	0.11	1	1
Vanadium	50	0.44	20	20
Zinc	2,000	1	20	20

(1) For DI WET Test leachate, groundwater, and Surface Water Samples
(2) By EPA Method 200.8 CLS Laboratory 3/1/04

CALIFORNIA LABORATORY SERVICES **CHAIN OF CUSTODY** **CLS ID. NO.** CNVU018

Report To:
Carlton Engineering Inc.
3932 Ponderosa Road
Shingle Springs, CA 95682

Project Manager
Mark Montgomery

Project Name
Bear River RI

Sampled By
IWP/MSM

Job Description
Surface water sampling

Site Location
Grass Valley

Client Job Number
3076-01-01

Destination Laboratory

☒ CLS (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova,
CA 95742
www.californialab.com

☐ OTHER

ANALYSIS REQUESTED

FIELD CONDITIONS:
Clear sunny

NOTE: Filter samples before analysis, soluble metals only Must meet attached Table 11 reporting limits

COMPOSITE:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	Preservatives	200.8 CAM 17	TURNAROUND TIME IN DAYS 1	2	5	10	SPECIAL INSTRUCTIONS
4/1	1400	SW2A	Water	1	500ml Poly	3	X				X	
4/1	1405	SW2B	"	"	"	3	X				X	
4/1	1410	SW3	"	"	"	3	X				X	
4/1	1415	SW4	"	"	"	3	X				X	
4/1	1545	SW5	"	"	"	3	X				X	

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
Mark Montgomery		4/1/02 1410 4/1/02 1420		Conrad [illegible]/CLS

RECEIVED AT LAB BY:

DATE/TIME:

CONDITIONS/COMMENTS:

SHIPPED BY: ☐ FED EX ☐ UPS ☐ OTHER

AIR BILL #

C-1.2
GROUNDWATER

C -1.2 GROUNDWATER

06/18/04 10:14

Carlton Engineering, Inc. 3883 Ponderosa Road Shingle Springs, CA 95682	Project: Bear River R1 Project Number: 3076-01-01 Project Manager: Mark Montgomery	**CLS Work Order #: CNF0263**

CAM 17 Metals (Dissolved Metals), Low Level

GW1 (CNF0263-01) Water Sampled: 06/07/04 14:00 Received: 06/08/04 08:50

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Antimony	ND	6.0	µg/L	1	CN04658	06/15/04	06/15/04	EPA 200.8	
Arsenic	ND	1.0	"	"	"	"	"	"	
Barium	**12**	10	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	ND	0.50	"	"	"	"	"	"	
Chromium	ND	1.0	"	"	"	"	"	"	
Cobalt	**0.17**	2.0	"	"	"	"	"	"	J
Copper	**1.5**	2.0	"	"	"	"	"	"	J
Lead	ND	2.0	"	"	"	"	"	"	
Molybdenum	ND	2.0	"	"	"	"	"	"	
Nickel	**1.6**	2.0	"	"	"	"	"	"	J
Selenium	ND	5.0	"	"	"	"	"	"	
Silver	ND	0.50	"	"	"	"	"	"	
lium	ND	1.0	"	"	"	"	"	"	
adium	**1.4**	20	"	"	"	"	"	"	J
Zinc	**8.9**	20	"	"	"	"	"	"	J
Mercury	**0.20**	0.20	"	"	CN04629	06/14/04	06/14/04	EPA 245.1	

Notes and Definitions

J	Detected but below the Reporting Limit; therefore, result is an estimated concentration.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS/LCSD recovery.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CALIFORNIA LABORATORY SERVICES **CHAIN OF CUSTODY** **CLS ID. NO.** U1F0203

Report To:

Carlton Engineering Inc.

3932 Ponderosa Road

Shingle Springs, CA 95682

Project Manager
Mark Montgomery

Project Name
Bear River RI

Sampled By
JWP/BA

Job Description
Monitoring well sampling

Site Location
Grass Valley

Client Job Numb
3076-01-01

Destination Laboratory

X CLS (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova,
CA 95742
www.californialab.com

OTHER

FIELD CONDITIONS:
Clear sunny

NOTE: Filter samples before analysis. Must meet attached Table 11 reporting limits for CAM 17 analytes.
J-Flag if Arsenic is less than RL.

COMPOSITE:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	Preservatives	ANALYSIS REQUESTED: CAM 17							TURNAROUND TIME IN DAYS: 1	2	5	10	SPECIAL INSTRUCTIONS
6/7	1400	GW1	Water	1	500ml Poly	3	X									X		

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO$_3$ (3) = COLD (4)

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
J W Pittman Ray Oslowski	JWPITTMAN / CARLTON ENG. INC. CLS	6/8/04 0730 6/8/04 0850	Ray Oslowski	CLS

RECEIVED AT LAB BY:

DATE/TIME: 6/8/04 850

CONDITIONS/COMMENTS: 7'

SHIPPED BY: FED EX UPS OTHER

AIR BILL #

Table 11. DATA QUALITY OBJECTIVES FOR AQUEOUS SAMPLES (1) BEAR RIVER MILL SITE REMEDIAL INVESTIGATION

Metal	Water Quality Objective (ug/l) (CVRWQCB)	Method Detection Limit (ug/l) (2)	Reporting Limit (ug/l) (2)	Data Quality Objective (ug/l)
Antimony	6	0.57	6	6
Arsenic	0.023	0.19	1	1
Barium	490	0.37	10	10
Beryllium	4	0.26	1	1
Cadmium	0.07	0.17	0.5	0.5
Chromium (Total)	50	0.28	1	1
Cobalt	50	0.11	2	2
Copper	170	0.26	2	2
Lead	2	0.23	5	5
Mercury	1.2	0.2	0.2	0.2
Molybdenum	10	0.55	2	2
Nickel	12	0.22	2	2
Selenium	20	1.1	5	5
Silver	35	0.15	0.5	0.5
Thallium	0.1	0.11	1	1
Vanadium	50	0.44	20	20
Zinc	2,000	1	20	20

(1) For DI WET Test leachate, groundwater, and Surface Water Samples
(2) By EPA Method 200.8 CLS Laboratory 3/1/04

CALIFORNIA LABORATORY SERVICES

07/30/04 11:03

Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project: Bear River RI
Project Number: 3076-01-01
Project Manager: Mark Montgomery

CLS Work Order #: CNG0663
COC #: None

Metals (Dissolved) by EPA 200 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
GalenaJuly (CNG0663-01) Water Sampled: 07/19/04 14:30 Received: 07/20/04 09:10									
Arsenic	**96**	1.0	µg/L	1	CN05803	07/26/04	07/26/04	EPA 200.8	
GW1July (CNG0663-02) Water Sampled: 07/19/04 16:00 Received: 07/20/04 09:10									
Arsenic	**1.2**	1.0	µg/L	1	CN05803	07/26/04	07/26/04	EPA 200.8	

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CALIFORNIA LABORATORY SERVICES

CHAIN OF CUSTODY

CLS ID. NO. ____________

Report To:

Carlton Engineering Inc.
3932 Ponderosa Road
Shingle Springs, CA 95682

Project Manager
Mark Montgomery

Project Name
Bear River RI

Sampled By
JWP/MSM

Job Description
Surface and groundwater sampling

Site Location
Grass Valley

Client Job Numb.
3076-01-01

Destination Laboratory

☒ **CLS** (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova,
CA 95742
www.californialab.com

☐ **OTHER**

ANALYSIS REQUESTED

FIELD CONDITIONS:
Clear sunny

NOTE: Filter samples before analysis, soluble arsenic only
Must meet 1 ppb reporting limit

COMPOSITE:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	Preservatives	200.8 Arsenic							TURNAROUND TIME IN DAYS 1	2	5	10	SPECIAL INSTRUCTIONS
7/19	1430	**GalenaJuly**	**Water**	**1**	**500ml Poly**	**3**	**X**									X	~~X~~	
7/19	1600	**GW1July**	"	"	"	**3**	**X**									X	~~X~~	

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
Mark Montgomery	CEI	7/20/04 0230	Ray Orlowski Jr.	CLS.

RECEIVED AT LAB BY:

DATE/TIME:

CONDITIONS/COMMENTS:

SHIPPED BY: ☐ **FED EX** ☐ **UPS** ☐ **OTHER** ____________ **AIR BILL #** ____________

09/24/04 11:26

Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project: Bear River RI
Project Number: 3076-01-01
Project Manager: Mark Montgomery

CLS Work Order #: CNI0385

Metals (Dissolved) by EPA 200 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW1Sept (CNI0385-01) Water	**Sampled: 09/09/04 00:00**	**Received: 09/10/04 17:20**							
Arsenic	ND	1.0	µg/L	1	CN07212	09/17/04	09/17/04	EPA 200.8	

Carlton Engineering, Inc. 3883 Ponderosa Road Shingle Springs, CA 95682	Project: Bear River RI Project Number: 3076-01-01 Project Manager: Mark Montgomery	**CLS Work Order #: CNI0385**

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CALIFORNIA LABORATORY SERVICES

CHAIN OF CUSTODY

CLS ID. NO.

Report To:

Carlton Engineering Inc.
3932 Ponderosa Road
Shingle Springs, CA 95682

Project Manager: Mark Montgomery
Project Name: Bear River RI
Sampled By: BEA
Job Description: Groundwater sampling-September
Site Location: Grass Valley

Client Job Numb: 3076-01-01

Destination Laboratory

☒ CLS (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova,
CA 95742
www.californialab.com

☐ OTHER

FIELD CONDITIONS: Clear sunny

NOTE: Filter samples before analysis, soluble arsenic only Must meet 1 ppb reporting limit

COMPOSITE:

ANALYSIS REQUESTED

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	Presevatives	200.8 Arsenic							TURNAROUND TIME IN DAYS 1	2	5	10	SPECIAL INSTRUCTIONS
9/9		MW1Sept	Water	1	500ml Poly	3	X										X	

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
		9/10/09 1445		

RECEIVED AT LAB BY:
DATE/TIME:
CONDITIONS/COMMENTS:

SHIPPED BY: ☐ FED EX ☐ UPS ☐ OTHER AIR BILL #

PURGE CHARACTERIZATION AND SAMPLE LOG

CARLTON
Engineering Inc.

Project Name: SPI Bear River
Project No.: 3076-01-01
Date: 9/9/04
Sampler: Brett Arenas
Weather Conditions:
Top of Casing, Elev. 2517.45
Well ID: MW1
Casing Diameter, in. 4
Total Depth, ft. 69.75

PURGE INFORMATION

Spring

Time			11:00	11:37	12:17				1:00 pm	
pH	▨	▨	9.89	10.48	11.51				7.1	
Temperature	▨	▨	15.0	14.9	15.1				cold	
Conductivity, umho	▨	▨	132.9	128.9	220				188.5	
DO	▨	▨	—	—	—				/	
Depth To Water, ft.		▨							/	
Volume Purged, gal.	▨	▨	1	2.5	3.5				/	
Comments		**Purge Start**	light Gray	TAN	TAN				Clear	**Purge End**

(Total Depth of Well: 67.03 - Depth to Water: 64.01 x Casing Factor: 0.653 1 Well Vol.,gal 1.9 gal/well Vol. Gal. Per Foot of Casing: (4") 0.653 (2") 0.17

3 Well Volumes, gal. = 5.7
5 Well Volumes, gal. = 9.5
Purge Method: Bailer

Total Volume Purged, gal. : 6
No. of Well Volumes Purged:
Purge Rate, gal./min. :

SAMPLE INFORMATION

Sample No.	Time	Well ID.	Analysis To Be Run	Preservation	Container	No. of Containers
GW1 Sept		GW1	Sol. As 200.8	Cold	500 ml poly	1

Sample Method: Bailer
Chain of Custody No. :

INSTRUMENT CALIBRATION

	Meter ID.	Date	Time
pH	Hach		
Conductivity	Hach		

Comments: Portland Cement found in well, monument lock locking cap missing

Signature: Brett Arenas
Date:

CARLTON
Engineering

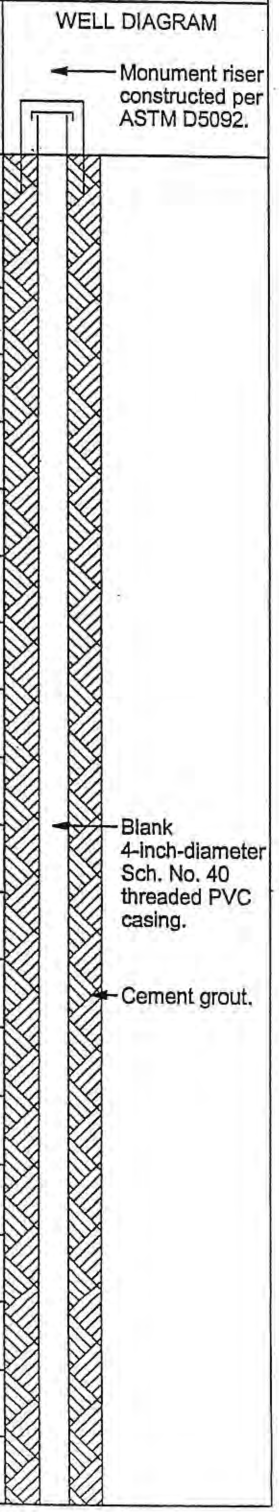
Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682
Telephone: 530-677-5515
Fax: 530-677-6645

WELL NUMBER MW1

ROJECT NUMBER 3076-01-01
ROJECT NAME SPI Bear River
LOCATION Grass Valley, CA
DRILLING METHOD Air Rotary
SAMPLING METHOD Split Spoon, 2-inch I.D.
GROUND ELEVATION 2530.0
TOP OF CASING 2532.50
LOGGED BY Jason Pittman
REMARKS Sampler pushed using hydraulic pressure.

DATE STARTED 5/27/04
DATE COMPLETED 5/28/04
CASING TYPE/DIAMETER Sch. No. 40 Threaded PVC / 4-inch
SCREEN TYPE/SLOT Sch. No. 40 PVC / 0.010
GRAVEL PACK TYPE #3 Monterey Sand
GROUT TYPE/QUANTITY Lean Cement / 7 bags
DEPTH TO WATER 55.56 from Ground Surface
GROUND WATER ELEVATION 2474.44

Sampling Pressure (psi)	Uncorrected Blow Counts	Recovery (inches)	Sample ID	Sample Type	Depth (ft. BGL)	U.S.C.S.	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation
								Light brown lean CLAY (CL) with subangular coarse sand and dark brown organic material, moist.	2530
									2529
		18	1	MC					2528
									2527
						CL			2526
					5				2525
									2524
									2523
								Quartz diorite, orange-black-white, completely weathered, very weak, moist. Breaks down to sandy silt/silty sand.	2522
									2521
1000		18	2	MC	10				2520
									2519
									2518
									2517
						RX			2516
					15				2515
700		12	3	MC				Becomes highly weathered, weak.	2514
									2513
									2512
									2511
									2510



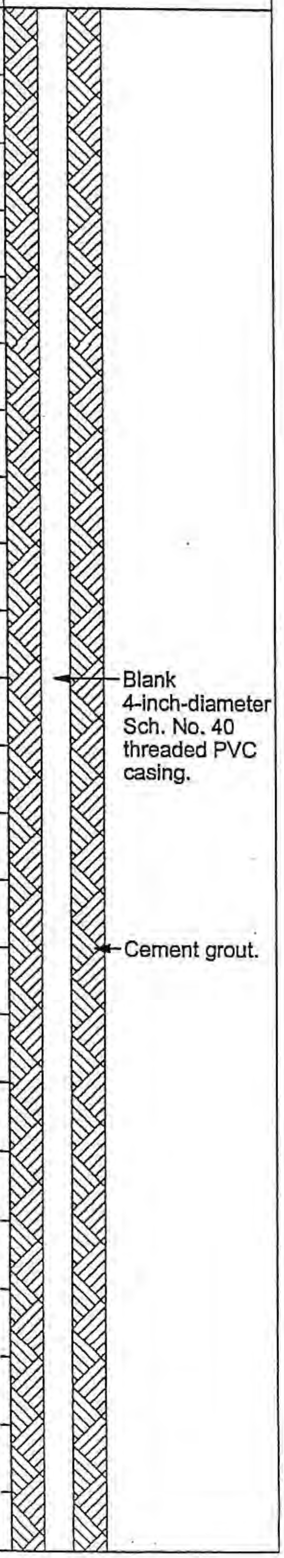
'ROJECT NUMBER 3076-01-01 **DATE STARTED** 5/27/04

ROJECT NAME SPI Bear River **DATE COMPLETED** 5/28/04

Continued from Previous Page

Sampling Pressure (psi)	Uncorrected Blow Counts	Recovery (inches)	Sample ID	Sample Type	Depth (ft. BGL)	U.S.C.S.	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation
		10	4	MC				Quartz diorite, orange-black-white, completely weathered, very weak, moist. Breaks down to sandy silt/silty sand. As above. Cuttings becoming sandy.	2510
									2509
									2508
									2507
								Cuttings become finer.	2506
1100		12	5	MC	25			As above.	2505
									2504
									2503
									2502
									2501
800		12	6	MC	30			As above.	2500
						RX			2499
									2498
									2497
									2496
500		12	7	MC	35			As above.	2495
									2494
									2493
									2492
									2491
700		12	8	MC	40			Becomes light gray-white-brown.	2490
									2489
									2488

WELL DIAGRAM



CARLTON Engineering

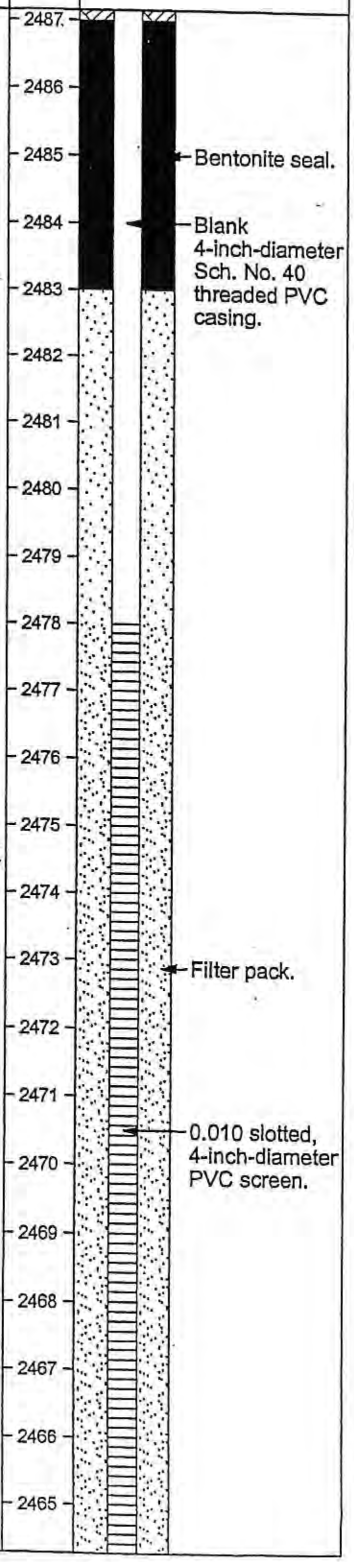
Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682
Telephone: 530-677-5515
Fax: 530-677-6645

WELL NUMBER MW1

ROJECT NUMBER 3076-01-01
ROJECT NAME SPI Bear River
DATE STARTED 5/27/04
DATE COMPLETED 5/28/04

Continued from Previous Page

Sampling Pressure (psi)	Uncorrected Blow Counts	Recovery (inches)	Sample ID	Sample Type	Depth (ft. BGL)	U.S.C.S.	Graphic Log	LITHOLOGIC DESCRIPTION
								Quartz diorite, orange-black-white, completely weathered, very weak, moist. Breaks down to sandy silt/silty sand.
200		18	9	MC	45			Cuttings become more moist.
		12	10	MC	50			Moist, gray-white-brown.
						RX		
500		12	11	MC	55			As above.
2000		12	12	MC	60			Free water on sampler.
								Rate of penetration decreases.
					65			



CARLTON
Engineering

Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682
Telephone: 530-677-5515
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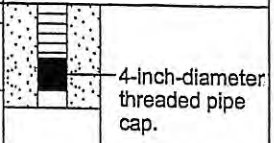
WELL NUMBER MW1

PAGE 4 OF 4

ROJECT NUMBER 3076-01-01
DATE STARTED 5/27/04
ROJECT NAME SPI Bear River
DATE COMPLETED 5/28/04

Continued from Previous Page

Sampling Pressure (psi)	Uncorrected Blow Counts	Recovery (inches)	Sample ID	Sample Type	Depth (ft. BGL)	U.S.C.S.	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation	WELL DIAGRAM
						RX	▨	Quartz diorite, orange-black-white, completely weathered, very weak, moist. Breaks down to sandy silt/silty sand.	2464 2463	
								Boring Terminated.	2462 2461 2460 2459 2458 2457 2456 2455 2454 2453 2452 2451 2450 2449 2448 2447 2446 2445 2444 2443 2442	


4-inch-diameter threaded pipe cap.

C 1.3 POND WATER

04/08/04 13:49

Carlton Engineering, Inc. 3883 Ponderosa Road Shingle Springs, CA 95682	Project: Bear River R1 Project Number: 3076-01-01 Project Manager: Mark Montgomery	CLS Work Order #: CND0078 COC #: None

CAM 17 Metals (Dissolved Metals), Low Level

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SW3 (CND0078-03) Water	**Sampled: 04/01/04 14:10**	**Received: 04/02/04 14:50**							
Barium	**45**	10	µg/L	1	CN02731	04/06/04	06/04/04	EPA 200.8	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	ND	0.50	"	"	"	"	"	"	
Chromium	ND	1.0	"	"	"	"	"	"	
Cobalt	ND	2.0	"	"	"	"	"	"	
Copper	ND	2.0	"	"	"	"	"	"	
Lead	ND	2.0	"	"	"	"	"	"	
Molybdenum	ND	2.0	"	"	"	"	"	"	
Nickel	**4.0**	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Silver	ND	0.50	"	"	"	"	"	"	
Thallium	ND	1.0	"	"	"	"	"	"	
Vanadium	ND	20	"	"	"	"	"	"	
	22	20	"	"	"	"	"	"	
Mercury	ND	0.20	"	"	CN02723	04/05/04	04/07/04	EPA 245.1	
SW4 (CND0078-04) Water	**Sampled: 04/01/04 14:15**	**Received: 04/02/04 14:50**							
Antimony	ND	6.0	µg/L	1	CN02731	04/06/04	06/04/04	EPA 200.8	
Arsenic	**0.51**	1.0	"	"	"	"	"	"	J
Barium	**11**	10	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	ND	0.50	"	"	"	"	"	"	
Chromium	ND	1.0	"	"	"	"	"	"	
Cobalt	ND	2.0	"	"	"	"	"	"	
Copper	**2.6**	2.0	"	"	"	"	"	"	
Lead	**2.7**	2.0	"	"	"	"	"	"	
Molybdenum	ND	2.0	"	"	"	"	"	"	
Nickel	ND	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Silver	ND	0.50	"	"	"	"	"	"	
Thallium	ND	1.0	"	"	"	"	"	"	
Vanadium	ND	20	"	"	"	"	"	"	
Zinc	**22**	20	"	"	"	"	"	"	
Mercury	ND	0.20	"	"	CN02723	04/05/04	04/07/04	EPA 245.1	
SW5 (CND0078-05) Water	**Sampled: 04/01/04 15:45**	**Received: 04/02/04 14:50**							
Antimony	ND	6.0	µg/L	1	CN02731	04/06/04	06/04/04	EPA 200.8	
Arsenic	**3.5**	1.0	"	"	"	"	"	"	
Barium	**16**	10	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	

04/08/04 13:49

Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project: Bear River R1
Project Number: 3076-01-01
Project Manager: Mark Montgomery

CLS Work Order #: CND0078
COC #: None

CAM 17 Metals (Dissolved Metals), Low Level

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SW5 (CND0078-05) Water	**Sampled: 04/01/04 15:45**	**Received: 04/02/04 14:50**							
Cadmium	ND	0.50	µg/L	1	CN02731	04/06/04	06/04/04	EPA 200.8	
Chromium	ND	1.0	"	"	"	"	"	"	
Cobalt	ND	2.0	"	"	"	"	"	"	
Copper	ND	2.0	"	"	"	"	"	"	
Lead	ND	2.0	"	"	"	"	"	"	
Molybdenum	ND	2.0	"	"	"	"	"	"	
Nickel	**9.5**	2.0	"	"	"	"	"	"	
Selenium	ND	5.0	"	"	"	"	"	"	
Silver	ND	0.50	"	"	"	"	"	"	
Thallium	ND	1.0	"	"	"	"	"	"	
Vanadium	ND	20	"	"	"	"	"	"	
Zinc	ND	20	"	"	"	"	"	"	
Mercury	ND	0.20	"	"	CN02723	04/05/04	04/07/04	EPA 245.1	

Notes and Definitions

J	Detected but below the Reporting Limit; therefore, result is an estimated concentration.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

Carlton Engineering, Inc. 3883 Ponderosa Road Shingle Springs, CA 95682	Project: Bear River R1 Project Number: 3076-01-01 Project Manager: Mark Montgomery	CLS Work Order #: CND0762

Metals (Dissolved) by EPA 200 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SW3A (CND0762-01) Water	**Sampled: 04/20/04 16:15**	**Received: 04/21/04 15:00**							
Arsenic	11	2.0	µg/L	1	CN03348	04/27/04	04/28/04	EPA 200.8	

CALIFORNIA LABORATORY SERVICES CHAIN OF CUSTODY

CLS ID. NO. [illegible]

Report To:

Carlton Engineering Inc.

3932 Ponderosa Road

Shingle Springs, CA 95682

Project Manager
Mark Montgomery

Project Name
Bear River RI

Sampled By
JWP/MSM

Job Description
Surface water sampling

Site Location
Grass Valley

Client Job Numt
3076-01-01

Destination Laboratory

☒ CLS (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova,
CA 95742
www.californialab.com

☐ OTHER

FIELD CONDITIONS:
Clear sunny

NOTE: Filter samples before analysis, soluble arsenic only
Must meet attached Table 11 reporting limits

COMPOSITE:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	Preservatives	ANALYSIS REQUESTED 200.8 Arsenic							TURNAROUND TIME IN DAYS 1	2	5	10	SPECIAL INSTRUCTIONS
4/20	4:15P	SW3A	Water	1	500ml Poly	3	X										X	

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
Mark Montgomery		4-21-4 1405 4-21-4 1505		

RECEIVED AT LAB BY:

DATE/TIME: 4-21-1505

CONDITIONS/COMMENTS: 3

SHIPPED BY: ☐ FED EX ☐ UPS ☐ OTHER

AIR BILL #

Carlton Engineering, Inc. 3883 Ponderosa Road Shingle Springs, CA 95682	Project: Bear River R1 Project Number: 3076-01-01 Project Manager: Mark Montgomery	**CLS Work Order #: CND0762**

Notes and Definitions

QM-05	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

Table 11. DATA QUALITY OBJECTIVES FOR AQUEOUS SAMPLES (1)
BEAR RIVER MILL SITE REMEDIAL INVESTIGATION

Metal	Water Quality Objective (ug/l) (CVRWQCB)	Method Detection Limit (ug/l) (2)	Reporting Limit (ug/l) (2)	Data Quality Objective (ug/l)
Antimony	6	0.57	6	6
Arsenic	0.023	0.19	1	1
Barium	490	0.37	10	10
Beryllium	4	0.26	1	1
Cadmium	0.07	0.17	0.5	0.5
Chromium (Total)	50	0.28	1	1
Cobalt	50	0.11	2	2
Copper	170	0.26	2	2
Lead	2	0.23	5	5
Mercury	1.2	0.2	0.2	0.2
Molybdenum	10	0.55	2	2
Nickel	12	0.22	2	2
Selenium	20	1.1	5	5
Silver	35	0.15	0.5	0.5
Thallium	0.1	0.11	1	1
Vanadium	50	0.44	20	20
Zinc	2,000	1	20	20

(1) For DI WET Test leachate, groundwater, and Surface Water Samples
(2) By EPA Method 200.8 CLS Laboratory 3/1/04

CALIFORNIA LABORATORY SERVICES **CHAIN OF CUSTODY** **CLS ID. NO.** L1V1J0018

Report To:

Carlton Engineering Inc.

3932 Ponderosa Road

Shingle Springs, CA 95682

Project Manager
Mark Montgomery

Project Name
Bear River RI

Sampled By
IWP/MSM

Job Description
Surface water sampling

Site Location
Grass Valley

Client Job Number
3076-01-01

Destination Laboratory

X CLS (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova,
CA 95742
www.californialab.com

☐ **OTHER**

FIELD CONDITIONS:
Clear sunny

NOTE: Filter samples before analysis, soluble metals only Must meet attached Table 11 reporting limits

COMPOSITE:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	Preservatives	200.8 CAM 17	ANALYSIS REQUESTED						TURNAROUND TIME IN DAYS 1	2	5	10	SPECIAL INSTRUCTIONS
4/1	1400	SW2A	Water	1	500ml Poly	3	X										X	
4/1	1405	SW2B	"	"	"	3	X										X	
4/1	1410	SW3	"	"	"	3	X										X	
4/1	1415	SW4	"	"	"	3	X										X	
4/1	1545	SW5	"	"	"	3	X										X	

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
Mark Montgomery		4/1/10 1410 4/1/10 1420		[illegible] /CLS

RECEIVED AT LAB BY:

DATE/TIME:

CONDITIONS/COMMENTS:

SHIPPED BY: ☐ **FED EX** ☐ **UPS** ☐ **OTHER** **AIR BILL #**

C-2. MINE WASTE ROCK LAB REPORTS, COCS, AND BORING LOGS

**Laboratory reports and COCs contain data from multiple areas on each page. To locate laboratory data from a particular area use it's corresponding sample identification.*

		Sample ID.
C-2.1	Area 1:Bullion Mine	WR1
C-2.2	Area 2: Galena Mine	WR2, WR5
C-2.3	Area 3: Valley Veneer	WR3
C-2.4	Area 4: Bear River Mill Site	WR4

CALIFORNIA LABORATORY SERVICES

07/12/04 10:46

Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project: Bear River R1
Project Number: 3076-01-01
Project Manager: Mark Montgomery

CLS Work Order #: CNG0045
COC #: 6 cocs

DI STLC (DI WET) Metals by 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
WR5-1N (CNG0045-03) Rock Sampled: 04/23/04 00:00 Received: 07/01/04 13:35									
Arsenic	**12**	5.0	µg/L	1	CN05387	07/09/04	09/07/04	EPA 200.8	
WR4-2N (CNG0045-09) Rock Sampled: 04/23/04 00:00 Received: 07/01/04 13:35									
Arsenic	ND	5.0	µg/L	1	CN05387	07/09/04	09/07/04	EPA 200.8	
WR4-4M (CNG0045-12) Rock Sampled: 04/23/04 00:00 Received: 07/01/04 13:35									
Arsenic	**130**	5.0	µg/L	1	CN05387	07/09/04	09/07/04	EPA 200.8	
WR4-8M (CNG0045-20) Rock Sampled: 04/22/04 00:00 Received: 07/01/04 13:35									
Arsenic	**26**	5.0	µg/L	1	CN05387	07/09/04	09/07/04	EPA 200.8	
WR3-2F (CNG0045-26) Rock Sampled: 04/22/04 00:00 Received: 07/01/04 13:35									
Arsenic	**570**	25	µg/L	5	CN05387	07/09/04	09/07/04	EPA 200.8	
WR1-1F (CNG0045-36) Rock Sampled: 04/19/04 00:00 Received: 07/01/04 13:35									
Arsenic	**300**	25	µg/L	5	CN05387	07/09/04	09/07/04	EPA 200.8	
WR1-5M (CNG0045-43) Rock Sampled: 04/19/04 00:00 Received: 07/01/04 13:35									
Arsenic	**24**	5.0	µg/L	1	CN05387	07/09/04	09/07/04	EPA 200.8	
WR1-5N (CNG0045-44) Rock Sampled: 04/19/04 00:00 Received: 07/01/04 13:35									
Arsenic	**8.1**	5.0	µg/L	1	CN05387	07/09/04	09/07/04	EPA 200.8	

07/12/04 10:46

Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project: Bear River R1
Project Number: 3076-01-01
Project Manager: Mark Montgomery

CLS Work Order #: CNG0045
COC #: 6 cocs

Metals by EPA 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
WR2-2 All (CNG0045-01) Rock Sampled: 04/23/04 00:00 Received: 07/01/04 13:35									
Arsenic	**5800**	50	mg/kg	5	CN05227	07/02/04	07/06/04	EPA 7060A	A-01
WR5-1M (CNG0045-02) Rock Sampled: 04/23/04 00:00 Received: 07/01/04 13:35									
Arsenic	**72**	10	mg/kg	1	CN05227	07/02/04	07/06/04	EPA 7060A	A-01
WR5-1N (CNG0045-03) Rock Sampled: 04/23/04 00:00 Received: 07/01/04 13:35									
Arsenic	**14**	1.0	mg/kg	4	CN05227	07/02/04	07/06/04	EPA 7060A	
WR5-2N (CNG0045-05) Rock Sampled: 04/23/04 00:00 Received: 07/01/04 13:35									
Arsenic	**28**	5.0	mg/kg	20	CN05227	07/02/04	07/06/04	EPA 7060A	
WR4-1M (CNG0045-06) Rock Sampled: 04/19/04 00:00 Received: 07/01/04 13:35									
Arsenic	**3.4**	1.0	mg/kg	4	CN05227	07/02/04	07/06/04	EPA 7060A	
WR4-1N (CNG0045-07) Rock Sampled: 04/19/04 00:00 Received: 07/01/04 13:35									
Arsenic	**1.7**	0.25	mg/kg	1	CN05227	07/02/04	07/06/04	EPA 7060A	
WR4-2M (CNG0045-08) Rock Sampled: 04/23/04 00:00 Received: 07/01/04 13:35									
Arsenic	**4.1**	0.25	mg/kg	1	CN05227	07/02/04	07/06/04	EPA 7060A	
WR4-2N (CNG0045-09) Rock Sampled: 04/23/04 00:00 Received: 07/01/04 13:35									
Arsenic	**0.87**	0.25	mg/kg	1	CN05227	07/02/04	07/06/04	EPA 7060A	
WR4-3M (CNG0045-10) Rock Sampled: 04/23/04 00:00 Received: 07/01/04 13:35									
Arsenic	**46**	5.0	mg/kg	20	CN05227	07/02/04	07/06/04	EPA 7060A	

07/12/04 10:46

Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project: Bear River R1
Project Number: 3076-01-01
Project Manager: Mark Montgomery

CLS Work Order #: CNG0045
COC #: 6 cocs

Metals by EPA 6000/7000 Series Methods.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
WR4-3N (CNG0045-11) Rock Sampled: 04/23/04 00:00 Received: 07/01/04 13:35									
Arsenic	**2.3**	0.25	mg/kg	1	CN05227	07/02/04	07/06/04	EPA 7060A	
WR4-4M (CNG0045-12) Rock Sampled: 04/23/04 00:00 Received: 07/01/04 13:35									
Arsenic	**3900**	10	mg/kg	1	CN05227	07/02/04	07/06/04	EPA 7060A	A-01
WR4-4N (CNG0045-13) Rock Sampled: 04/21/04 00:00 Received: 07/01/04 13:35									
Arsenic	**90**	10	mg/kg	1	CN05227	07/02/04	07/06/04	EPA 7060A	A-01
WR4-5N (CNG0045-15) Rock Sampled: 04/21/04 00:00 Received: 07/01/04 13:35									
Arsenic	**2.1**	1.0	mg/kg	4	CN05227	07/02/04	07/06/04	EPA 7060A	
WR4-6M (CNG0045-16) Rock Sampled: 04/21/04 00:00 Received: 07/01/04 13:35									
Arsenic	**52**	10	mg/kg	1	CN05227	07/02/04	07/06/04	EPA 7060A	A-01
WR4-6N (CNG0045-17) Rock Sampled: 04/21/04 00:00 Received: 07/01/04 13:35									
Arsenic	**2.4**	2.0	mg/kg	1	CN05227	07/02/04	07/06/04	EPA 7060A	A-01
WR4-7M (CNG0045-18) Rock Sampled: 04/21/04 00:00 Received: 07/01/04 13:35									
Arsenic	**22**	10	mg/kg	1	CN05227	07/02/04	07/06/04	EPA 7060A	A-01
WR4-7N (CNG0045-19) Rock Sampled: 04/21/04 00:00 Received: 07/01/04 13:35									
Arsenic	**5.6**	2.0	mg/kg	1	CN05227	07/02/04	07/06/04	EPA 7060A	A-01
WR4-8M (CNG0045-20) Rock Sampled: 04/22/04 00:00 Received: 07/01/04 13:35									
Arsenic	**720**	10	mg/kg	1	CN05227	07/02/04	07/06/04	EPA 7060A	A-01

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Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project: Bear River R1
Project Number: 3076-01-01
Project Manager: Mark Montgomery

CLS Work Order #: CNG0045
COC #: 6 cocs

Metals by EPA 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
WR4-8N (CNG0045-21) Rock Sampled: 04/22/04 00:00 Received: 07/01/04 13:35									
Arsenic	**6.9**	1.0	mg/kg	4	CN05228	07/02/04	07/07/04	EPA 7060A	
WR3-1M (CNG0045-22) Rock Sampled: 04/22/04 00:00 Received: 07/01/04 13:35									
Arsenic	**11**	1.0	mg/kg	4	CN05228	07/02/04	07/07/04	EPA 7060A	
WR3-1N (CNG0045-23) Rock Sampled: 04/22/04 00:00 Received: 07/01/04 13:35									
Arsenic	**1.6**	1.0	mg/kg	4	CN05228	07/02/04	07/07/04	EPA 7060A	
WR3-2M (CNG0045-24) Rock Sampled: 04/22/04 00:00 Received: 07/01/04 13:35									
Arsenic	**68**	10	mg/kg	1	CN05228	07/02/04	07/07/04	EPA 7060A	A-01
WR3-2N (CNG0045-25) Rock Sampled: 04/22/04 00:00 Received: 07/01/04 13:35									
Arsenic	**11**	1.0	mg/kg	4	CN05228	07/02/04	07/07/04	EPA 7060A	
WR3-7M (CNG0045-27) Rock Sampled: 04/22/04 00:00 Received: 07/01/04 13:35									
Arsenic	**170**	10	mg/kg	1	CN05228	07/02/04	07/07/04	EPA 7060A	A-01
WR3-7N (CNG0045-28) Rock Sampled: 04/22/04 00:00 Received: 07/01/04 13:35									
Arsenic	**9.2**	1.0	mg/kg	4	CN05228	07/02/04	07/07/04	EPA 7060A	
WR3-7 All (CNG0045-29) Rock Sampled: 04/22/04 00:00 Received: 07/01/04 13:35									
Arsenic	**140**	10	mg/kg	1	CN05228	07/02/04	07/07/04	EPA 7060A	A-01
WR3-10M (CNG0045-30) Rock Sampled: 04/23/04 00:00 Received: 07/01/04 13:35									
Arsenic	**260**	10	mg/kg	1	CN05228	07/02/04	07/07/04	EPA 7060A	A-01

Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project: Bear River R1
Project Number: 3076-01-01
Project Manager: Mark Montgomery

CLS Work Order #: CNG0045
COC #: 6 cocs

Metals by EPA 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
WR3-10N (CNG0045-31) Rock Sampled: 04/23/04 00:00 Received: 07/01/04 13:35									
Arsenic	**3.7**	1.0	mg/kg	4	CN05228	07/02/04	07/07/04	EPA 7060A	
WR3-12All (CNG0045-32) Rock Sampled: 04/23/04 00:00 Received: 07/01/04 13:35									
Arsenic	**14**	1.0	mg/kg	4	CN05228	07/02/04	07/07/04	EPA 7060A	
WR1-1M (CNG0045-33) Rock Sampled: 04/19/04 00:00 Received: 07/01/04 13:35									
Arsenic	**700**	10	mg/kg	1	CN05228	07/02/04	07/07/04	EPA 7060A	A-01
WR1-1N (CNG0045-34) Rock Sampled: 04/19/04 00:00 Received: 07/01/04 13:35									
Arsenic	**8.7**	1.0	mg/kg	4	CN05228	07/02/04	07/07/04	EPA 7060A	
WR1-1F (CNG0045-36) Rock Sampled: 04/19/04 00:00 Received: 07/01/04 13:35									
Arsenic	**280**	10	mg/kg	1	CN05228	07/02/04	07/07/04	EPA 7060A	A-01
VR1-2F (CNG0045-37) Rock Sampled: 04/19/04 00:00 Received: 07/01/04 13:35									
Arsenic	**2.6**	1.0	mg/kg	4	CN05228	07/02/04	07/07/04	EPA 7060A	
WR1-3M (CNG0045-38) Rock Sampled: 04/19/04 00:00 Received: 07/01/04 13:35									
Arsenic	**1800**	10	mg/kg	1	CN05228	07/02/04	07/07/04	EPA 7060A	A-01
WR1-3N (CNG0045-39) Rock Sampled: 04/19/04 00:00 Received: 07/01/04 13:35									
Arsenic	**4.1**	1.0	mg/kg	4	CN05228	07/02/04	07/07/04	EPA 7060A	
WR1-3F (CNG0045-40) Rock Sampled: 04/19/04 00:00 Received: 07/01/04 13:35									
Arsenic	**130**	10	mg/kg	1	CN05228	07/02/04	07/07/04	EPA 7060A	A-01

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Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project: Bear River R1
Project Number: 3076-01-01
Project Manager: Mark Montgomery

CLS Work Order #: CNG0045
COC #: 6 cocs

Metals by EPA 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
WR1-4M (CNG0045-41) Rock	**Sampled: 04/19/04 00:00**	**Received: 07/01/04 13:35**							
Arsenic	**3000**	10	mg/kg	1	CN05228	07/02/04	07/07/04	EPA 7060A	A-01
WR1-4N (CNG0045-42) Rock	**Sampled: 04/19/04 00:00**	**Received: 07/01/04 13:35**							
Arsenic	**16**	1.0	mg/kg	4	CN05274	07/06/04	07/07/04	EPA 7060A	
WR1-5M (CNG0045-43) Rock	**Sampled: 04/19/04 00:00**	**Received: 07/01/04 13:35**							
Arsenic	**220**	10	mg/kg	1	CN05274	07/06/04	07/07/04	EPA 7060A	A-01
WR1-5N (CNG0045-44) Rock	**Sampled: 04/19/04 00:00**	**Received: 07/01/04 13:35**							
Arsenic	**12**	1.0	mg/kg	4	CN05274	07/06/04	07/07/04	EPA 7060A	

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Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project: Bear River R1
Project Number: 3076-01-01
Project Manager: Mark Montgomery

CLS Work Order #: CNG0045
COC #: 6 cocs

CAM 17 Metals

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
WR5-2M (CNG0045-04) Rock	**Sampled: 04/23/04 00:00**	**Received: 07/01/04 13:35**							
Arsenic	**150**	0.25	mg/kg	1	CN05227	07/02/04	07/07/04	EPA 7000	A-01
Selenium	ND	0.25	"	"	"	"	"	"	
Thallium	ND	0.25	"	"	"	"	"	"	
Antimony	ND	2.5	"	"	CN05276	07/06/04	07/07/04	EPA 6010B	
Barium	**30**	1.0	"	"	"	"	"	"	
Beryllium	**0.29**	0.25	"	"	"	"	"	"	
Cadmium	**0.72**	0.50	"	"	"	"	"	"	
Cobalt	**12**	1.0	"	"	"	"	"	"	
Chromium	**78**	1.0	"	"	"	"	"	"	
Copper	**3.7**	1.0	"	"	"	"	"	"	
Lead	**4.2**	2.5	"	"	"	"	"	"	
Molybdenum	ND	1.0	"	"	"	"	"	"	
Nickel	**57**	1.0	"	"	"	"	"	"	
Silver	**14**	0.50	"	"	"	"	"	"	
Vanadium	**34**	1.0	"	"	"	"	"	"	
Zinc	**68**	1.0	"	"	"	"	"	"	
Mercury	ND	0.10	"	"	CN05222	07/02/04	07/02/04	EPA 7471A	HT-1
WR4-5M (CNG0045-14) Rock	**Sampled: 04/21/04 00:00**	**Received: 07/01/04 13:35**							
Arsenic	**39**	5.0	mg/kg	20	CN05227	07/02/04	07/07/04	EPA 7000	
Selenium	ND	0.25	"	1	"	"	"	"	
Thallium	ND	0.25	"	"	"	"	"	"	
Antimony	ND	2.5	"	"	CN05276	07/06/04	07/07/04	EPA 6010B	
Barium	**11**	1.0	"	"	"	"	"	"	
Beryllium	ND	0.25	"	"	"	"	"	"	
Cadmium	**0.74**	0.50	"	"	"	"	"	"	
Cobalt	**11**	1.0	"	"	"	"	"	"	
Chromium	**3.7**	1.0	"	"	"	"	"	"	
Copper	**64**	1.0	"	"	"	"	"	"	
Lead	ND	2.5	"	"	"	"	"	"	
Molybdenum	ND	1.0	"	"	"	"	"	"	
Nickel	**6.5**	1.0	"	"	"	"	"	"	
Silver	**13**	0.50	"	"	"	"	"	"	
Vanadium	**92**	1.0	"	"	"	"	"	"	
Zinc	**29**	1.0	"	"	"	"	"	"	

Carlton Engineering, Inc. 3883 Ponderosa Road Shingle Springs, CA 95682	Project: Bear River R1 Project Number: 3076-01-01 Project Manager: Mark Montgomery	**CLS Work Order #: CNG0045** COC #: 6 cocs

CAM 17 Metals

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
WR4-5M (CNG0045-14) Rock	**Sampled: 04/21/04 00:00**	**Received: 07/01/04 13:35**							
Mercury	ND	0.10	mg/kg	1	CN05222	07/02/04	07/02/04	EPA 7471A	HT-1
WR3-2F (CNG0045-26) Rock	**Sampled: 04/22/04 00:00**	**Received: 07/01/04 13:35**							
Arsenic	**2000**	0.25	mg/kg	1	CN05228	07/02/04	07/08/04	EPA 7000	A-01
Selenium	ND	0.25	"	"	"	"	"	"	
Thallium	ND	0.25	"	"	"	"	"	"	
Antimony	ND	2.5	"	"	CN05276	07/06/04	07/07/04	EPA 6010B	
Barium	**10**	1.0	"	"	"	"	"	"	
Beryllium	ND	0.25	"	"	"	"	"	"	
Cadmium	**1.3**	0.50	"	"	"	"	"	"	
Cobalt	**8.6**	1.0	"	"	"	"	"	"	
Chromium	**7.8**	1.0	"	"	"	"	"	"	
Copper	**55**	1.0	"	"	"	"	"	"	
Lead	**230**	2.5	"	"	"	"	"	"	
Molybdenum	**1.3**	1.0	"	"	"	"	"	"	
Nickel	**7.6**	1.0	"	"	"	"	"	"	
Silver	**10**	0.50	"	"	"	"	"	"	
Vanadium	**31**	1.0	"	"	"	"	"	"	
Zinc	**84**	1.0	"	"	"	"	"	"	
Mercury	**8.3**	1.0	"	10	CN05222	07/02/04	07/02/04	EPA 7471A	HT-1
WR1-1I (CNG0045-35) Rock	**Sampled: 04/19/04 00:00**	**Received: 07/01/04 13:35**							
Arsenic	**190**	0.25	mg/kg	1	CN05228	07/02/04	07/08/04	EPA 7000	A-01
Selenium	ND	0.25	"	"	"	"	"	"	
Thallium	ND	0.25	"	"	"	"	"	"	
Antimony	ND	2.5	"	"	CN05276	07/06/04	07/07/04	EPA 6010B	
Barium	**200**	1.0	"	"	"	"	"	"	
Beryllium	**0.26**	0.25	"	"	"	"	"	"	
Cadmium	ND	0.50	"	"	"	"	"	"	
Cobalt	**7.0**	1.0	"	"	"	"	"	"	
Chromium	**1.4**	1.0	"	"	"	"	"	"	
Copper	ND	1.0	"	"	"	"	"	"	
Lead	ND	2.5	"	"	"	"	"	"	
Molybdenum	ND	1.0	"	"	"	"	"	"	
Nickel	**5.1**	1.0	"	"	"	"	"	"	

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Carlton Engineering, Inc. 3883 Ponderosa Road Shingle Springs, CA 95682	Project: Bear River R1 Project Number: 3076-01-01 Project Manager: Mark Montgomery	**CLS Work Order #: CNG0045** COC #: 6 cocs

CAM 17 Metals

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
WR1-1I (CNG0045-35) Rock	**Sampled: 04/19/04 00:00**	**Received: 07/01/04 13:35**							
Silver	**8.2**	0.50	mg/kg	1	CN05276	07/06/04	07/07/04	EPA 6010B	
Vanadium	**13**	1.0	"	"	"	"	"	"	
Zinc	**19**	1.0	"	"	"	"	"	"	
Mercury	ND	0.10	"	"	CN05222	07/02/04	07/02/04	EPA 7471A	HT-1

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CAM 17 Metals - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CN05222 - EPA 7471A										
Blank (CN05222-BLK1)				Prepared & Analyzed: 07/02/04						
Mercury	ND	0.10	mg/kg							
LCS (CN05222-BS1)				Prepared & Analyzed: 07/02/04						
Mercury	0.534	0.10	mg/kg	0.625		85.4	75-125			
LCS Dup (CN05222-BSD1)				Prepared & Analyzed: 07/02/04						
Mercury	0.520	0.10	mg/kg	0.625		83.2	75-125	2.66	25	
Matrix Spike (CN05222-MS1)		**Source: CNG0045-04**		Prepared & Analyzed: 07/02/04						
Mercury	0.544	0.10	mg/kg	0.625	0.0	87.0	75-125			
Matrix Spike Dup (CN05222-MSD1)		**Source: CNG0045-04**		Prepared & Analyzed: 07/02/04						
Mercury	0.532	0.10	mg/kg	0.625	0.0	85.1	75-125	2.23	25	
Batch CN05227 - EPA 3050B										
Blank (CN05227-BLK1)				Prepared: 07/02/04 Analyzed: 07/07/04						
Arsenic	ND	0.25	mg/kg							
Selenium	ND	0.25	"							
Thallium	ND	0.25	"							
LCS (CN05227-BS1)				Prepared: 07/02/04 Analyzed: 07/07/04						
Arsenic	5.37	0.25	mg/kg	5.00		107	75-125			
Selenium	4.04	0.25	"	5.00		80.8	75-125			
Thallium	3.86	0.25	"	5.00		77.2	75-125			
LCS Dup (CN05227-BSD1)				Prepared: 07/02/04 Analyzed: 07/07/04						
Arsenic	5.44	0.25	mg/kg	5.00		109	75-125	1.30	25	
Selenium	4.30	0.25	"	5.00		86.0	75-125	6.24	25	
Thallium	4.44	0.25	"	5.00		88.8	75-125	14.0	25	

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Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project: Bear River R1
Project Number: 3076-01-01
Project Manager: Mark Montgomery

CLS Work Order #: CNG0045
COC #: 6 cocs

CAM 17 Metals - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CN05227 - EPA 3050B										
Matrix Spike (CN05227-MS1)	**Source: CNG0045-01**			Prepared: 07/02/04 Analyzed: 07/07/04						
Arsenic	5200	0.25	mg/kg	5.00	5800	NR	75-125			QM-05
Selenium	2.65	0.25	"	5.00	ND	53.0	75-125			QM-05
Thallium	3.78	0.25	"	5.00	ND	75.6	75-125			
Matrix Spike Dup (CN05227-MSD1)	**Source: CNG0045-01**			Prepared: 07/02/04 Analyzed: 07/07/04						
Arsenic	4420	0.25	mg/kg	5.00	5800	NR	75-125	16.2	25	QM-05
Selenium	2.40	0.25	"	5.00	ND	48.0	75-125	9.90	25	QM-05
Thallium	3.83	0.25	"	5.00	ND	76.6	75-125	1.31	25	
Batch CN05228 - EPA 3050B										
Blank (CN05228-BLK1)				Prepared: 07/02/04 Analyzed: 07/08/04						
Arsenic	ND	0.25	mg/kg							
Selenium	ND	0.25	"							
Thallium	ND	0.25	"							
LCS (CN05228-BS1)				Prepared: 07/02/04 Analyzed: 07/08/04						
Arsenic	4.96	0.25	mg/kg	5.00		99.2	75-125			
Selenium	4.10	0.25	"	5.00		82.0	75-125			
Thallium	4.26	0.25	"	5.00		85.2	75-125			
LCS Dup (CN05228-BSD1)				Prepared: 07/02/04 Analyzed: 07/08/04						
Arsenic	5.14	0.25	mg/kg	5.00		103	75-125	3.56	25	
Selenium	4.09	0.25	"	5.00		81.8	75-125	0.244	25	
Thallium	4.23	0.25	"	5.00		84.6	75-125	0.707	25	
Matrix Spike (CN05228-MS1)	**Source: CNG0045-21**			Prepared: 07/02/04 Analyzed: 07/08/04						
Arsenic	8.93	0.25	mg/kg	5.00	6.9	40.6	75-125			QM-05
Selenium	1.94	0.25	"	5.00	ND	38.8	75-125			QM-05
Thallium	3.98	0.25	"	5.00	ND	79.6	75-125			

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Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project: Bear River R1
Project Number: 3076-01-01
Project Manager: Mark Montgomery

CLS Work Order #: CNG0045
COC #: 6 cocs

CAM 17 Metals - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CN05228 - EPA 3050B										
Matrix Spike Dup (CN05228-MSD1)	**Source: CNG0045-21**			Prepared: 07/02/04 Analyzed: 07/08/04						
Arsenic	9.14	0.25	mg/kg	5.00	6.9	44.8	75-125	2.32	25	QM-05
Selenium	2.06	0.25	"	5.00	ND	41.2	75-125	6.00	25	QM-05
Thallium	4.28	0.25	"	5.00	ND	85.6	75-125	7.26	25	
Batch CN05276 - EPA 3050B										
Blank (CN05276-BLK1)				Prepared: 07/06/04 Analyzed: 07/07/04						
Antimony	ND	2.5	mg/kg							
Barium	ND	1.0	"							
Beryllium	ND	0.25	"							
Cadmium	ND	0.50	"							
Cobalt	ND	1.0	"							
Chromium	ND	1.0	"							
Copper	ND	1.0	"							
Lead	ND	2.5	"							
Molybdenum	ND	1.0	"							
Nickel	ND	1.0	"							
Silver	ND	0.50	"							
Vanadium	ND	1.0	"							
Zinc	ND	1.0	"							
LCS (CN05276-BS1)				Prepared: 07/06/04 Analyzed: 07/07/04						
Antimony	23.6	2.5	mg/kg	25.0		94.4	75-125			
Barium	112	1.0	"	100		112	75-125			
Beryllium	2.75	0.25	"	2.50		110	75-125			
Cadmium	2.10	0.50	"	2.50		84.0	75-125			
Cobalt	27.6	1.0	"	25.0		110	75-125			
Chromium	11.3	1.0	"	10.0		113	75-125			
Copper	13.5	1.0	"	12.5		108	75-125			
Lead	23.0	2.5	"	25.0		92.0	75-125			
Molybdenum	24.4	1.0	"	25.0		97.6	75-125			
Nickel	27.8	1.0	"	25.0		111	75-125			

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Carlton Engineering, Inc. 3883 Ponderosa Road Shingle Springs, CA 95682	Project: Bear River R1 Project Number: 3076-01-01 Project Manager: Mark Montgomery	**CLS Work Order #: CNG0045** COC #: 6 cocs

CAM 17 Metals - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CN05276 - EPA 3050B										
LCS (CN05276-BS1)				Prepared: 07/06/04 Analyzed: 07/07/04						
Silver	2.21	0.50	mg/kg	2.50		88.4	75-125			
Vanadium	28.2	1.0	"	25.0		113	75-125			
Zinc	26.5	1.0	"	25.0		106	75-125			
LCS Dup (CN05276-BSD1)				Prepared: 07/06/04 Analyzed: 07/07/04						
Antimony	23.0	2.5	mg/kg	25.0		92.0	75-125	2.58	25	
Barium	111	1.0	"	100		111	75-125	0.897	25	
Beryllium	2.74	0.25	"	2.50		110	75-125	0.364	25	
Cadmium	2.23	0.50	"	2.50		89.2	75-125	6.00	25	
Cobalt	27.6	1.0	"	25.0		110	75-125	0.00	25	
Chromium	11.4	1.0	"	10.0		114	75-125	0.881	25	
Copper	13.4	1.0	"	12.5		107	75-125	0.743	25	
Lead	23.4	2.5	"	25.0		93.6	75-125	1.72	25	
Molybdenum	24.4	1.0	"	25.0		97.6	75-125	0.00	25	
Nickel	27.8	1.0	"	25.0		111	75-125	0.00	25	
Silver	2.18	0.50	"	2.50		87.2	75-125	1.37	25	
Vanadium	28.1	1.0	"	25.0		112	75-125	0.355	25	
Zinc	26.6	1.0	"	25.0		106	75-125	0.377	25	
Matrix Spike (CN05276-MS1)		**Source: CNG0071-01**		Prepared: 07/06/04 Analyzed: 07/07/04						
Antimony	8.08	2.5	mg/kg	25.0	ND	32.3	75-125			QM-05
Barium	193	1.0	"	100	78	115	75-125			
Beryllium	2.94	0.25	"	2.50	0.19	110	75-125			
Cadmium	2.64	0.50	"	2.50	0.34	92.0	75-125			
Cobalt	31.9	1.0	"	25.0	5.5	106	75-125			
Chromium	53.4	1.0	"	10.0	31	224	75-125			QM-05
Copper	27.2	1.0	"	12.5	12	122	75-125			
Lead	58.2	2.5	"	25.0	33	101	75-125			
Molybdenum	21.7	1.0	"	25.0	0.92	83.1	75-125			
Nickel	64.8	1.0	"	25.0	31	135	75-125			QM-05
Silver	7.76	0.50	"	2.50	3.7	162	75-125			QM-05
Vanadium	52.4	1.0	"	25.0	18	138	75-125			QM-05

CALIFORNIA LABORATORY SERVICES

07/12/04 10:46

Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project: Bear River R1
Project Number: 3076-01-01
Project Manager: Mark Montgomery

CLS Work Order #: CNG0045
COC #: 6 cocs

CAM 17 Metals - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CN05276 - EPA 3050B										
Matrix Spike (CN05276-MS1)		**Source: CNG0071-01**		Prepared: 07/06/04		Analyzed: 07/07/04				
Zinc	77.2	1.0	mg/kg	25.0	47	121	75-125			
Matrix Spike Dup (CN05276-MSD1)		**Source: CNG0071-01**		Prepared: 07/06/04		Analyzed: 07/07/04				
Antimony	7.96	2.5	mg/kg	25.0	ND	31.8	75-125	1.50	25	QM-05
Barium	183	1.0	"	100	78	105	75-125	5.32	25	
Beryllium	2.90	0.25	"	2.50	0.19	108	75-125	1.37	25	
Cadmium	2.44	0.50	"	2.50	0.34	84.0	75-125	7.87	25	
Cobalt	31.0	1.0	"	25.0	5.5	102	75-125	2.86	25	
Chromium	46.7	1.0	"	10.0	31	157	75-125	13.4	25	QM-05
Copper	24.6	1.0	"	12.5	12	101	75-125	10.0	25	
Lead	54.1	2.5	"	25.0	33	84.4	75-125	7.30	25	
Molybdenum	21.9	1.0	"	25.0	0.92	83.9	75-125	0.917	25	
Nickel	59.6	1.0	"	25.0	31	114	75-125	8.36	25	
Silver	5.97	0.50	"	2.50	3.7	90.8	75-125	26.1	25	QM-05
Vanadium	45.9	1.0	"	25.0	18	112	75-125	13.2	25	
Zinc	71.8	1.0	"	25.0	47	99.2	75-125	7.25	25	

07/12/04 10:46

Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project: Bear River R1
Project Number: 3076-01-01
Project Manager: Mark Montgomery

CLS Work Order #: CNG0045
COC #: 6 cocs

DI STLC (DI WET) Metals by 6000/7000 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CN05387 - EPA 3050B										
Blank (CN05387-BLK1)				Prepared: 07/09/04 Analyzed: 09/07/04						
Arsenic	ND	5.0	µg/L							
LCS (CN05387-BS1)				Prepared: 07/09/04 Analyzed: 09/07/04						
Arsenic	86.6	5.0	µg/L	100		86.6	80-120			
LCS Dup (CN05387-BSD1)				Prepared: 07/09/04 Analyzed: 09/07/04						
Arsenic	86.0	5.0	µg/L	100		86.0	80-120	0.695	20	
Matrix Spike (CN05387-MS1)	**Source: CNG0045-03**			Prepared: 07/09/04 Analyzed: 09/07/04						
Arsenic	103	5.0	µg/L	100	12	91.0	75-125			
Matrix Spike Dup (CN05387-MSD1)	**Source: CNG0045-03**			Prepared: 07/09/04 Analyzed: 09/07/04						
rsenic	99.7	5.0	µg/L	100	12	87.7	75-125	3.26	25	

Metals by EPA 6000/7000 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CN05227 - EPA 3050B										
Blank (CN05227-BLK1)				Prepared: 07/02/04 Analyzed: 07/06/04						
Arsenic	ND	0.25	mg/kg							
LCS (CN05227-BS1)				Prepared: 07/02/04 Analyzed: 07/06/04						
Arsenic	5.37	0.25	mg/kg	5.00		107	75-125			
LCS Dup (CN05227-BSD1)				Prepared: 07/02/04 Analyzed: 07/06/04						
Arsenic	5.44	0.25	mg/kg	5.00		109	75-125	1.30	25	
Matrix Spike (CN05227-MS1)	**Source: CNG0045-01**			Prepared: 07/02/04 Analyzed: 07/06/04						
Arsenic	5200	0.25	mg/kg	5.00	5800	NR	75-125			QM-4X
Matrix Spike Dup (CN05227-MSD1)	**Source: CNG0045-01**			Prepared: 07/02/04 Analyzed: 07/06/04						
rsenic	4420	0.25	mg/kg	5.00	5800	NR	75-125	16.2	30	QM-4X
Batch CN05228 - EPA 3050B										
Blank (CN05228-BLK1)				Prepared: 07/02/04 Analyzed: 07/07/04						
Arsenic	ND	0.25	mg/kg							
LCS (CN05228-BS1)				Prepared: 07/02/04 Analyzed: 07/07/04						
Arsenic	4.96	0.25	mg/kg	5.00		99.2	75-125			
LCS Dup (CN05228-BSD1)				Prepared: 07/02/04 Analyzed: 07/07/04						
Arsenic	5.14	0.25	mg/kg	5.00		103	75-125	3.56	25	
Matrix Spike (CN05228-MS1)	**Source: CNG0045-21**			Prepared: 07/02/04 Analyzed: 07/07/04						
Arsenic	8.93	0.25	mg/kg	5.00	6.9	40.6	75-125			QM-05

Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project: Bear River R1
Project Number: 3076-01-01
Project Manager: Mark Montgomery

CLS Work Order #: CNG0045
COC #: 6 cocs

Metals by EPA 6000/7000 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CN05228 - EPA 3050B										
Matrix Spike Dup (CN05228-MSD1)		**Source: CNG0045-21**		Prepared: 07/02/04		Analyzed: 07/07/04				
Arsenic	9.14	0.25	mg/kg	5.00	6.9	44.8	75-125	2.32	30	QM-05
Batch CN05274 - EPA 3050B										
Blank (CN05274-BLK1)				Prepared: 07/06/04		Analyzed: 07/07/04				
Arsenic	ND	0.25	mg/kg							
LCS (CN05274-BS1)				Prepared: 07/06/04		Analyzed: 07/07/04				
Arsenic	4.85	0.25	mg/kg	5.00		97.0	75-125			
LCS Dup (CN05274-BSD1)				Prepared: 07/06/04		Analyzed: 07/07/04				
Arsenic	4.80	0.25	mg/kg	5.00		96.0	75-125	1.04	25	
Iatrix Spike (CN05274-MS1)		**Source: CNG0045-42**		Prepared: 07/06/04		Analyzed: 07/07/04				
Arsenic	50.6	0.25	mg/kg	5.00	16	692	75-125			QM-05
Matrix Spike Dup (CN05274-MSD1)		**Source: CNG0045-42**		Prepared: 07/06/04		Analyzed: 07/07/04				
Arsenic	40.9	0.25	mg/kg	5.00	16	498	75-125	21.2	30	QM-05

Carlton Engineering, Inc. 3883 Ponderosa Road Shingle Springs, CA 95682	Project: Bear River R1 Project Number: 3076-01-01 Project Manager: Mark Montgomery	**CLS Work Order #: CNG0045** COC #: 6 cocs

Notes and Definitions

A-01	High concentration of As it was ran by ICP
HT-1	The sample was received outside of the EPA recommended holding time.
QM-05	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
QM-4X	The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

07/12/04 10:46

Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project: Bear River R1
Project Number: 3076-01-01
Project Manager: Mark Montgomery

CLS Work Order #: CNG0045
COC #: 6 cocs

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
WR2-2 All (CNG0045-01) Rock Sampled: 04/23/04 00:00 Received: 07/01/04 13:35									
Acid Producing Potential	**0.12**	0.02	lb.CaCO3 equ/1000 lb	1	CN05354	07/02/04	07/08/04	EPA 670	HT-1
WR5-1M (CNG0045-02) Rock Sampled: 04/23/04 00:00 Received: 07/01/04 13:35									
Acid Producing Potential	**0.05**	0.02	lb CaCO3 equ/1000 lb	1	CN05354	07/02/04	07/08/04	EPA 670	HT-1
WR5-2N (CNG0045-05) Rock Sampled: 04/23/04 00:00 Received: 07/01/04 13:35									
Acid Producing Potential	ND	0.02	lb CaCO3 equ/1000 lb	1	CN05354	07/02/04	07/08/04	EPA 670	HT-1
WR4-2M (CNG0045-08) Rock Sampled: 04/23/04 00:00 Received: 07/01/04 13:35									
Acid Producing Potential	**0.03**	0.02	lb CaCO3 equ/1000 lb	1	CN05354	07/02/04	07/08/04	EPA 670	HT-1
/R4-4N (CNG0045-13) Rock Sampled: 04/21/04 00:00 Received: 07/01/04 13:35									
Acid Producing Potential	**0.04**	0.02	lb CaCO3 equ/1000 lb	1	CN05354	07/02/04	07/08/04	EPA 670	HT-1
WR3-2F (CNG0045-26) Rock Sampled: 04/22/04 00:00 Received: 07/01/04 13:35									
Acid Producing Potential	**0.08**	0.02	lb CaCO3 equ/1000 lb	1	CN05354	07/02/04	07/08/04	EPA 670	HT-1
WR3-12All (CNG0045-32) Rock Sampled: 04/23/04 00:00 Received: 07/01/04 13:35									
Acid Producing Potential	**0.05**	0.02	lb CaCO3 equ/1000 lb	1	CN05354	07/02/04	07/08/04	EPA 670	HT-1
WR1-1M (CNG0045-33) Rock Sampled: 04/19/04 00:00 Received: 07/01/04 13:35									
Acid Producing Potential	**0.16**	0.02	lb CaCO3 equ/1000 lb	1	CN05354	07/02/04	07/08/04	EPA 670	HT-1
WR1-1N (CNG0045-34) Rock Sampled: 04/19/04 00:00 Received: 07/01/04 13:35									
Acid Producing Potential	ND	0.02	lb CaCO3 equ/1000 lb	1	CN05354	07/02/04	07/08/04	EPA 670	HT-1

02/28/05 13:26

Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project: Bear River RI
Project Number: 3076-01-01
Project Manager: Mark Montgomery

CLS Work Order #: COB0625

COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
WR2-2 All (COB0625-01) Soil Sampled: 04/23/04 00:00 Received: 02/18/05 10:15									
Neutralization Potential	**20**	2.0	lb CaCO3 equ/1000 lb	1	CO01506	02/25/05	02/25/05	EPA 670	HT-1
WR3-12 All (COB0625-02) Soil Sampled: 04/23/04 00:00 Received: 02/18/05 10:15									
Neutralization Potential	**13**	2.0	lb CaCO3 equ/1000 lb	1	CO01506	02/25/05	02/25/05	EPA 670	HT-1
WR4-2 M (COB0625-03) Soil Sampled: 04/19/04 00:00 Received: 02/18/05 10:15									
Neutralization Potential	**19**	2.0	lb CaCO3 equ/1000 lb	1	CO01506	02/25/05	02/25/05	EPA 670	HT-1
WR3-2 F (COB0625-04) Soil Sampled: 04/22/04 00:00 Received: 02/18/05 10:15									
Neutralization Potential	**46**	2.0	lb CaCO3 equ/1000 lb	1	CO01506	02/25/05	02/25/05	EPA 670	HT-1
[illegible]-4N (COB0625-05) Soil Sampled: 04/21/04 00:00 Received: 02/18/05 10:15									
Neutralization Potential	**41**	2.0	lb CaCO3 equ/1000 lb	1	CO01506	02/25/05	02/25/05	EPA 670	HT-1
WR1-1N (COB0625-06) Soil Sampled: 04/19/04 00:00 Received: 02/18/05 10:15									
Neutralization Potential	**42**	2.0	lb CaCO3 equ/1000 lb	1	CO01506	02/25/05	02/25/05	EPA 670	HT-1
WR1-1M (COB0625-07) Soil Sampled: 04/19/04 00:00 Received: 02/18/05 10:15									
Neutralization Potential	**26**	2.0	lb CaCO3 equ/1000 lb	1	CO01506	02/25/05	02/25/05	EPA 670	HT-1
WR5-2N (COB0625-08) Soil Sampled: 04/23/04 00:00 Received: 02/18/05 10:15									
Neutralization Potential	**46**	2.0	lb CaCO3 equ/1000 lb	1	CO01506	02/25/05	02/25/05	EPA 670	HT-1

Notes and Definitions

HT-1	The sample was received outside of the EPA recommended holding time.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CNG0045

CA RNIA LABORATORY SERVICES CH OF CUSTODY

CLS ID. NO. 1/7

Report To:	Client Job Number 3076-01-01
Carlton Engineering Inc.	
3932 Ponderosa Road	Destination Laboratory
Shingle Springs, CA 95682	X CLS (916) 638-7301 3249 Fitzgerald Road Rancho Cordova, CA 95742 www.californialab.com
Project Manager Mark Montgomery	
Project Name Bear River RI	
Sampled By MV	
Job Description Waste Rock Sampling: Metals	OTHER
Site Location Grass Valley	

FIELD CONDITIONS:
Clear sunny

NOTE:
1. Must meet attached Table 10 reporting limits.
J-Flag if between reporting limit and detection limit.
2. Crush sample if necessary.

COMPOSITE:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	Preservatives	As by EPA Method 7060	Acid Generation Potential	Crush #10	TURNAROUND TIME IN DAYS 1	2	5	10	SPECIAL INSTRUCTIONS
														See Notes:
4/23/04		WR2-2 All	Soil	1	1-gal baggie	4	X	X				X		1,2

ANALYSIS REQUESTED

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4) = NONE

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
Jason W. Pittman Ray Oslowski Jr.	Jason W. Pittman/ Carlton CLS.	6-16-04 0810 6-16-04 0900	Ray Oslowski Jr.	CLS. STL

RECEIVED AT LAB BY: DATE/TIME: CONDITIONS/COMMENTS:

SHIPPED BY: FED EX UPS OTHER AIR BILL #

CA RNIA LABORATORY SERVICES CH. OF CUSTODY CLS ID. NO. 2/7

Report To:	Client Job Number 3076-01-01
Carlton Engineering Inc.	
3932 Ponderosa Road	Destination Laboratory
Shingle Springs, CA 95682	X CLS (916) 638-7301 3249 Fitzgerald Road Rancho Cordova, CA 95742 www.californialab.com
Project Manager Mark Montgomery	
Project Name Bear River RI	
Sampled By MV	
Job Description Waste Rock Sampling: Metals	OTHER
Site Location Grass Valley	

FIELD CONDITIONS:
Clear sunny

NOTE:
1. Must meet attached Table 10 and Table 11 reporting limits.
J-Flag if between reporting limit and detection limit.
2. Crush sample if necessary.

COMPOSITE:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	Preservatives	As by EPA Method 7060	Acid Generation Potential	Cam 17	DI Wet Arsenic	Crush #18			TURNAROUND TIME IN DAYS 1	2	5	10	SPECIAL INSTRUCTIONS See Notes:
4-23		WR5-1 M	Soil	1	1-gal baggie	4	X	X			X					X		1,2
4-23		WR5-1 N	"	"	"	4	X			X						X		1,2
4-23		WR5-2 M	"	"	"	4			X							X		1,2
4-23		WR5-2 N	"	"	"	4	X	X								X		1,2

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4) = NONE

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
Jason W. Pittman	Jason W. Pittman/ Carlton	6-16-04 0810	Ray Dalowski Jr	
Ray Dalowski Jr	CLS.	6-16-04 0900		CLS. STL

RECEIVED AT LAB BY:

DATE/TIME:

CONDITIONS/COMMENTS:

SHIPPED BY: FED EX UPS OTHER ______ AIR BILL # ______

NG0045

Jul. 01 2004 04:02PM P5
FAX NO. : 9169393507

CH)F CUSTODY   CLS ID. NO. 3/7

Report To:	Client Job Number 3076-01-01
Carlton Engineering Inc.	
3932 Ponderosa Road	Destination Laboratory
Shingle Springs, CA 95682	X CLS (916) 638-7301 3249 Fitzgerald Road Rancho Cordova, CA 95742 www.californialab.com OTHER
Project Manager **Mark Montgomery**	
Project Name **Bear River RI**	
Sampled By MV	
Job Description **Waste Rock Sampling: Metals**	
Site Location **Grass Valley**	

FIELD CONDITIONS: Clear sunny

NOTE:
1. Must meet attached Table 10 and Table 11 reporting limits.
J-Flag if between reporting limit and detection limit.
2. Crush sample if necessary.

COMPOSITE:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	Preservatives	As by EPA Method 7060	Acid Generation Potential	CAM 17	DI Wet Arsenic	Crushing #10	TURNAROUND TIME IN DAYS 1	2	5	10	SPECIAL INSTRUCTIONS See Notes:
4-19		WR4-1 M	Soil	1	1-gal baggie	4	X				X			X		1,2
4-19		WR4-1 N	"	"	"	4	X							X		1,2
4-23		WR4-2 M	"	"	"	4	X	X						X		1,2
4-23		WR4-2 N	"	"	"	4	X			X				X		1,2
4-23		WR4-3 M	"	"	"	4	X							X		1,2
4-23		WR4-3 N	"	"	"	4	X							X		1,2
4-23		WR4-4 M	"	"	"	4	X			X				X		1,2
4-21		WR4-4 N	"	"	"	4	X	X						X		1,2
4-21		WR4-5 M	"	"	"	4			X					X		1,2
4-21		WR4-5 N	"	"	"	4	X							X		1,2
4-21		WR4-6 M	"	"	"	4	X							X		1,2
4-21		WR4-6 N	"	"	"	4	X							X		1,2

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4) = NONE

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
Jason W. Pittman Ray Ostrowski	Jason W. Pittman/ Carlton CLS	6-16-04 0810 6-16-04 0900	Ray Ostrowski	CLS, STL

RECEIVED AT LAB BY: DATE/TIME: CONDITIONS/COMMENTS:

SHIPPED BY: FED EX UPS OTHER   AIR BILL #

FROM :

CNG 0045

CLS ID. NO. 4/1

Report To:

Carlton Engineering Inc.
3932 Ponderosa Road
Shingle Springs, CA 95682

Project Manager: **Mark Montgomery**
Project Name: **Bear River RI**
Sampled By: JWP
Job Description: **Waste Rock Sampling: Metals**
Site Location: **Grass Valley**

Client Job Number: 3076-01-01

Destination Laboratory

X CLS (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova,
CA 95742
www.californialab.com

OTHER

FIELD CONDITIONS: Clear sunny

NOTE:
1. Must meet attached Table 10 and Table 11 reporting limits.
J-Flag if between reporting limit and detection limit.
2. Crush sample if necessary.

COMPOSITE:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	Preservatives	As by EPA Method 7060	DI WET Arsenic	Crushing #10					TURNAROUND TIME IN DAYS 1	2	5	10	SPECIAL INSTRUCTIONS See Notes:
4-21		WR4-7 M	Soil	1	1-gal baggie	4	X		X							X		1,2
4-21		WR4-7 N	"	"	"	4	X									X		1,2
4-22		WR4-8 M	"	"	"	4	X	X								X		1,2
4-22		WR4-8 N	"	"	"	4	X									X		1,2

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO₃ (3) = COLD (4) = NONE

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
Ray Oslowski Jr.	Jason W. Pittman/ Carlton CLS.	6-16-04 0810 6-16-04 0900	Ray Oslowski Jr.	CLS. STL

RECEIVED AT LAB BY:

DATE/TIME:

CONDITIONS/COMMENTS:

SHIPPED BY: FED EX UPS OTHER ______ AIR BILL # ______

ANG0045

CLS ID. NO. 5/7

Report To:
Carlton Engineering Inc.
3932 Ponderosa Road
Shingle Springs, CA 95682

Project Manager: **Mark Montgomery**
Project Name: **Bear River RI**
Sampled By: **MV**
Job Description: **Waste Rock Sampling: Metals**
Site Location: **Grass Valley**

Client Job Number: 3076-01-01

Destination Laboratory

☒ **CLS** (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova,
CA 95742
www.californialab.com

OTHER

FIELD CONDITIONS: Clear sunny

NOTE:
1. Must meet attached Table 10 and Table 11 reporting limits.
J-Flag if between reporting limit and detection limit.
2. Crush sample if necessary.

COMPOSITE:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	Preservatives	As by EPA Method 7060	Acid Generation Potential	CAM 17	DI Wet	Crush #10	TURNAROUND TIME IN DAYS 1	2	5	10	SPECIAL INSTRUCTIONS See Notes:
4-22		WR3-1 M	Soil	1	1-gal baggie	4	X				X			X		1,2
		WR3-1 N	"	"	"	4	X							X		1,2
4-22		WR3-2 M	"	"	"	4	X							X		1,2
4-22		WR3-2 N	"	"	"	4	X							X		1,2
4-22		WR3-2 F	"	"	"	4		X	X	X				X		1,2
4-22		WR3-7M	"	"	"	4	X							X		1,2
4-22		WR3-7N	"	"	"	4	X							X		1,2
4-22		WR3-7 All	"	"	"	4	X							X		1,2
4-23		WR3-10 M	"	"	"	4	X							X		1,2
4-23		WR3-10 N	"	"	"	4	X							X		1,2
4-23		WR3-12 All	"	"	"	4	X	X						X		1,2

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4) = NONE

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
Jason W. Pittman Ray Oalowski	Jason W. Pittman/ Carlton CLS.	6/16/04 0810 6/16/04 0900	Ray Oalowski	CLS STL

RECEIVED AT LAB BY:

DATE/TIME:

CONDITIONS/COMMENTS:

SHIPPED BY: FED EX UPS OTHER

AIR BILL #

CNG0045

CLS ID. NO. 7/7

Report To:

Carlton Engineering Inc.

3932 Ponderosa Road

Shingle Springs, CA 95682

Project Manager
Mark Montgomery

Project Name
Bear River RI

Sampled By
JWP

Job Description
Waste Rock Sampling: Metals

Site Location
Grass Valley

Client Job Number
3076-01-01

Destination Laboratory

☒ CLS (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova,
CA 95742
www.californialab.com

OTHER

FIELD CONDITIONS:
Clear sunny

NOTE:
1. Must meet attached Table 10 and Table 11 reporting limits.
J-Flag if between reporting limit and detection limit.
2. Crush sample if necessary.

COMPOSITE:

ANALYSIS REQUESTED

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	Preservatives	As by EPA Method 7060	Acid Generation Potential	DI Wet Arsenic	Cam 17				TURNAROUND TIME IN DAYS 1	2	5	10	SPECIAL INSTRUCTIONS See Notes:
4/19		WR1-1 M	Soil	1	1-gal baggie	4	X	X								X		1,2
4-19		WR1-1 N	"	"	"	4	X	X								X		1,2
4-19		WR1-1 I	"	"	"	4				X						X		1,2
4-19		WR1-1 Ffines	"	"	"	4	X		X							X		1,2
4-19		WR1-2 F	"	"	"	4	X									X		1,2
4-19		WR1-3 M	"	"	"	4	X									X		1,2
4-19		WR1-3 N	"	"	"	4	X									X		1,2
4/19		WR1-3 F	"	"	"	4	X									X		1,2
4-19		WR1-4 M	"	"	"	4	X									X		1,2
4-19		WR1-4 N	"	"	"	4	X									X		1,2
4-19		WR1-5 M	"	"	"	4	X		X							X		1,2
4-19		WR1-5 N	"	"	"	4	X		X							X		1,2

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4) = NONE

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
Jason W. Pittman Ray Oslowski Jr.	Jason W. Pittman/ Carlton CLS.	6/16/04 0810 6/16/04 0900	Ray Oslowski Jr. M. W	CLS. STL

RECEIVED AT LAB BY:

DATE/TIME:

CONDITIONS/COMMENTS:

SHIPPED BY: FED EX UPS OTHER

AIR BILL #

CALIFORNIA LABORATORY SERVICES **CHAIN OF CUSTODY** **CLS ID. NO.** C8B0625

Report To:

Carlton Engineering Inc.
3932 Ponderosa Road
Shingle Springs, CA 95682

Project Manager
Mark Montgomery

Project Name
Bear River RI

Sampled By
MV JP BA

Job Description
Waste Rock Sampling: Metals

Site Location
Grass Valley

Client Job Number
3076-01-01

Destination Laboratory

☒ **CLS** (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova,
CA 95742
www.californialab.com

☐ **OTHER**

FIELD CONDITIONS:
Clear sunny

NOTE:
1. Hold samples until notified

COMPOSITE:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	Preservatives	ANALYSIS REQUESTED: Neutralization Potential	TURNAROUND TIME IN DAYS: 1	2	5	10	SPECIAL INSTRUCTIONS
4/23/04		**WR2-2 All**	**Soil**	1	8 oz Jar	4	X			X		
4/23/04		**WR3-12 All**	**Soil**	1	8 oz Jar	4	X			X		
4/19/04		**WR4-2 M**	**Soil**	1	8 oz Jar	4	X			X		
4/22/04		**WR3-2 F**	**Soil**	1	8 oz Jar	4	X			X		
4/21/04		**WR4-4N**	**Soil**	1	8 oz Jar	4	X			X		
4/19/04		**WR1-1N**	**Soil**	1	8 oz Jar	4	X			X		
4/19/04		**WR1-1M**	**Soil**	1	8 oz Jar	4	X			X		
4/23/04		**WR5-2 N**	**Soil**	1	8 oz Jar	4	X			X		

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4) = NONE

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
Ray Oslowski Jr	Jason W. Pittman/ Carlton CLS	2/18/05 0730 2/18/05 1015	Ray Oslowski Jr	CLS

RECEIVED AT LAB BY: DATE/TIME: 2-18-05 1015 CONDITIONS/COMMENTS:

SHIPPED BY: ☐ FED EX ☐ UPS ☐ OTHER AIR BILL #

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

August 09, 2004

CLS Work Order #: CNG1050
COC #: 6 cocs

Mark Montgomery
Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project Name: Bear River RI

Enclosed are the results of analyses for samples received by the laboratory on 07/29/04 15:00. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

Environmental
Chemistry

This final report package for Work Order #CNG1050 is an extension of the original Work Order # CNG0045. The original Chain of Custody was returned with the previous report package.

08/09/04 15:39

Carlton Engineering, Inc. 3883 Ponderosa Road Shingle Springs, CA 95682	Project: Bear River RI Project Number: 3076-01-01 Project Manager: Mark Montgomery	**CLS Work Order #: CNG1050** COC #: 6 cocs

DI STLC (DI WET) Metals by 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
WR2-2 All (CNG1050-01) Rock	**Sampled: 04/23/04 00:00**	**Received: 07/29/04 15:00**							
Arsenic	**210**	20	µg/L	4	CN06020	08/04/04	08/04/04	EPA 200.8	

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

MATERIALS DESCRIPTION | GEOTECHNICAL | GEOMECHAI AL

DEPTH		Field qu (Tons/SqFt)	SAMPLE No	SPT COUNT	DRY DENSITY	MOISTURE CONTENT	WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DISCONTINUITIES DIP
0	POORLY GRADED GRAVELS WITH SAND & SILT, (GP), GRAY BROWN, MOIST & VERY LOOSE									
	ANGULAR MINE WASTE ROCK DUMP									
1										
	3 SAMPLES COLLECTED:									
2	WR1-1 M (MINERALIZED ROCK)									
	WR1-1 N (NON-MINERALIZED ROCK)									
3	WR1-1 I (POSSIBLY MINERALIZED ROCK)									
	WR1-1 F COMPOSITE 0'-15' (COMPOSITE OF FINES FROM SPOILS)									
4										
5										
14										
15	TRENCH TERMINATED AT 15' (NO BACK HOE REFUSAL), BACK FILLED									
	WITH SPOILS									
16										

CARLTON
Engineering Inc.

3932 Ponderosa Road, Shingle Springs, CA 95682
Voice 530.677.5515 Fax 530.677.6645

TRENCH # WR1-1	PROJECT NAME & NUMBER BEAR RIVER MILL 3076-01-01
DATE 4-19-04	EQUIPMENT CASE 580 EXTENDAHOE
BY MV	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

DEPTH	MATERIALS DESCRIPTION	Field qu (Tons/SqFt)	SAMPLE No	GEOTECHNICAL SPT COUNT	DRY DENSITY	MOISTURE CONTENT	GEOMECHA[illegible]AL WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
0	CLAYEY SAND/SANDY CLAY (SC/CL), RED BROWN, MOIST, LOOSE,									
1	GRANODIORITE, BROWN COMPLETELY WEATHERED, ANGULAR MINE WASTE ROCK, WITH COBBLES AND BOULDERS.									
2										
3	SAMPLE WR1-2 F COLLECTED FROM SIDE WALL BETWEEN 1FT AND 6FT BELOW SURFACE									
4										
8										
9	CLAYEY SAND/SANDY CLAY (SC/CL), RED BROWN, MOIST. LOOSE-MEDIUM DENSE.									
10	TRENCH TERMINATED AT 10' (NO BACK HOE REFUSAL), BACK FILLED WITH SPOILS									
11										

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TRENCH # WR1-2	PROJECT NAME & NUMBER BEAR RIVER MILL 3076-01-01
DATE 4-19-04	EQUIPMENT CASE 580 EXTENDAHOE
BY MV	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

3

DEPTH	MATERIALS DESCRIPTION	Field qu (Tons/SqFt)	SAMPLE No	GEOTECHNICAL SPT COUNT	DRY DENSITY	MOISTURE CONTENT	GEOMECHAI AL WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
0										
	CLAYEY SAND (SC), BROWN, MOIST, LOOSE MIXED WITH									
1	ANGULAR MINE WASTE ROCK, BROWN, HIGHLY WEATHERED.									
2										
	3 SAMPLES COLLECTED:									
3	WR1-3M (MINERALIZED ROCK)									
	WR1-3N (NON-MINERALIZED ROCK)									
4	WR1-3F FINES (COMPOSITE OF FINES FROM SPOILS)									
13										
14	SANDY CLAY (CL), BROWN MOIST SOFT TO MEDIUM STIFF-NATIVE SOIL.									
15	TRENCH TERMINATED AT 14.5 (NO BACK HOE REFUSAL), BACK FILLED									
	WITH SPOILS									
16										

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TRENCH # WR1-3	PROJECT NAME & NUMBER BEAR RIVER MILL 3076-01-01
DATE 4-19-04	EQUIPMENT CASE 580 EXTENDAHOE
BY MV	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

	MATERIALS DESCRIPTION			GEOTECHNICAL			GEOMECHAN .L			
DEPTH		Field qu (Tons/SqFt)	SAMPLE No	SPT COUNT	DRY DENSITY	MOISTURE CONTENT	WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
0	POORLY GRADED GRAVELS WITH SAND AND SILT (GP),									
1	GRAY BROWN, MOIST, VERY LOOSE-ANGULAR MINE									
	WASTE ROCK DUMP									
2										
3	2 SAMPLES COLLECTED:									
	WR1-4M (MINERALIZED ROCK)									
4	WR1-4N (NON-MINERALIZED ROCK)									
5										
6										
7										
8										
9	CLAYEY SAND (SC), YELLOW BROWN, MOIST, LOOSE-MEDIUM DENSE.									
	TRENCH TERMINATED AT 9.5' (NO BACK HOE REFUSAL), BACK FILLED									
10	WITH SPOILS									

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3932 Ponderosa Road, Shingle Springs, CA 95682
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TRENCH # WR1-4	PROJECT NAME & NUMBER BEAR RIVER MILL 3076-01-01
DATE 4-19-04	EQUIPMENT CASE 580 EXTENDAHOE
BY MV	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

DEPTH	MATERIALS DESCRIPTION	Field qu (Tons/SqFt)	SAMPLE No	GEOTECHNICAL SPT COUNT	DRY DENSITY	MOISTURE CONTENT	GEOMECHAI. \L WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
0	POORLY GRADED GRAVELS WITH SAND AND SILT (GP),									
1	GRAY BROWN, MOIST, VERY LOOSE-ANGULAR MINE									
	WASTE ROCK DUMP									
2										
	2 SAMPLES COLLECTED:									
3	WR1-5M (MINERALIZED ROCK)									
	WR1-5N (NON-MINERALIZED ROCK)									
4										
5										
10										
11	CLAYEY SAND (SC), YELLOW BROWN, MOIST, LOOSE. DENSE									
	TRENCH TERMINATED AT 11.5' (NO BACK HOE REFUSAL), BACK FILLED									
12	WITH SPOILS									

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TRENCH # WR1-5	PROJECT NAME & NUMBER BEAR RIVER MILL 3076-01-01
DATE 4-19-04	EQUIPMENT CASE 580 EXTENDAHOE
BY MV	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

				GEOTECHNICAL			GEOMECHAI \L			
DEPTH	MATERIALS DESCRIPTION	Field qu (Tons/SqFt)	SAMPLE No	SPT COUNT	DRY DENSITY	MOISTURE CONTENT	WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
0	CLAYEY SAND (SC), LIGHT YELLOW BROWN, MOIST, LOOSE									
	TO MEDIUM DENSE									
3	GRADES TO YELLOW RED BROWN									
4										
5	GRADES TO YELLOW BROWN									
6	ALL LIKELY FILL									
8										
	GRANODIORITE, LT. YELLOW BROWN, COMPLETELY WEATHERED,									
9	FRIABLE-LIKELY NATIVE (IN PLACE) MATERIAL									
10	TRENCH TERMINATED AT 10' (NO BACK HOE REFUSAL), BACK FILLED									
	WITH SPOILS, NO EVIDENCE OF ANGULAR MINE WASTE ROCK.									

CARLTON
Engineering Inc.

3932 Ponderosa Road, Shingle Springs, CA 95682
Voice 530.677.5515 Fax 530.677.6645

TRENCH # WR2-1	PROJECT NAME & NUMBER BEAR RIVER MILL 3076-01-01	
DATE 4-23-04	EQUIPMENT CASE 580 EXTENDAHOE	
BY MV	PIT ORIENTATION	
ELEVATION	NATURAL SLOPE	
HOR. SCALE	VERT. SCALE	

7

DEPTH	MATERIALS DESCRIPTION	Field qu (Tons/SqFt)	SAMPLE No	GEOTECHNICAL SPT COUNT	DRY DENSITY	MOISTURE CONTENT	GEOMECHAI L WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
0										
	CLAYEY SAND (SC), BROWN, MOIST, VERY LOOSE TO LOOSE,									
	MIXED WITH ANGULAR MINE WASTE ROCK.									
1	SAMPLE WR 2-2 ALL, COLLECTED FROM 0' TO 1'.									
	(FILL BERM)									
2										
3	SANDY CLAY (CL) RED BROWN, MOIST, SOFT TO MEDIUM									
	STIFF-NATIVE SOIL									
4										
	GRANODIORITE, RED BROWN, COMPLETELY WEATHERED									
5	(WITH CLAY)									
6	TRENCH TERMINATED AT 6' (NO BACK HOE REFUSAL), BACK FILLED									
	WITH SPOILS									
7										
8										
9										
10										

CARLTON
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3932 Ponderosa Road, Shingle Springs, CA 95682
Voice 530.677.5515 Fax 530.677.6645

TRENCH # WR2-2	PROJECT NAME & NUMBER BEAR RIVER MILL 3076-01-01
DATE 4-23-04	EQUIPMENT CASE 580 EXTENDAHOE
BY MV	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

8

MATERIALS DESCRIPTION				GEOTECHNICAL			GEOMECHAN AL			
DEPTH		Field qu (Tons/SqFt)	SAMPLE No	SPT COUNT	DRY DENSITY	MOISTURE CONTENT	WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
0	ANGULAR-SUBANGULAR MINE WASTE ROCK MIXED									
	WITH SAND AND SILT, BROWN TO GRAY BROWN.									
1	SANDY CLAY (CL) WITH ROCK, YELLOW BROWN TO GRAY BROWN, MOIST, MEDIUM STIFF									
	GRANODIORITE YELLOWISH RED BROWN, COMPLETELY WEATHERED									
2										
	TRENCH TERMINATED AT 2.5' (NO BACK HOE REFUSAL), BACK FILLED									
3	WITH SPOILS									
4										
5	2 SAMPLES COLLECTED BETWEEN SURFACE & 1':									
	WR 3-1M (MINERALIZED ROCK)									
6	WR 3-1N (NON-MINERALIZED ROCK)									
7										
8										
9										
10										

CARLTON
Engineering Inc.

3932 Ponderosa Road, Shingle Springs, CA 95682
Voice 530.677.5515 Fax 530.677.6645

TRENCH # WR3-1	PROJECT NAME & NUMBER BEAR RIVER MILL 3076-01-01
DATE 4-22-04	EQUIPMENT CASE 580 EXTENDAHOE
BY MV	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

DEPTH	MATERIALS DESCRIPTION	Field qu (Tons/SqFt)	SAMPLE No	GEOTECHNICAL SPT COUNT	GEOTECHNICAL DRY DENSITY	GEOTECHNICAL MOISTURE CONTENT	GEOMECHAI AL WEATHERING F SW MW W C	GEOMECHAI AL JOINTING Joints/ft 0 2 4 6 8	GEOMECHAI AL DISCONTINUITIES TYPE	GEOMECHAI AL DISCONTINUITIES DIP
0	ANGLUR MINE WASTE ROCK IN MATRIX OF SANDY CLAY (CL),									
	YELLOW TO GRAY, MOIST, STIFF.									
1	2 SAMPLES COLLECTED: WR 3-2M (MINERALIZED ROCK)									
	WR 3-2N (NON-MINERALIZED ROCK)									
2	SANDY CLAY (CL), YELLOW BROWN, MOIST, STIFF, WITH MINE									
	WASTE ROCK, BARK, AND CHARCOAL AT UPPER BOUNDARY.									
3										
4										
5										
	ANGULAR-SUBANGULAR ROCK MIXED WITH SILTY SAND (SM),									
6	MOIST, LOOSE TO MEDIUM DENSE.									
8										
	DARK ORGANIC LAYER OVER POORLY GRADED MEDIUM TO FINE									
▼ 9	GRAINED SAND (SP), BLUE GRAY, MOIST TO WET,									
	LOOSE-SUSPECT MILL TAILINGS. 1 SAMPLE COLLECTED: WR3-2 AT 9FT.									
10	TRENCH TERMINATED AT 10' SIDE WALL CAVING IN (NO BACK HOE REFUSAL),									
	BACK FILLED WITH SPOILS									

CARLTON
Engineering Inc.

3932 Ponderosa Road, Shingle Springs, CA 95682
Voice 530.677.5515 Fax 530.677.6645

TRENCH # WR3-2	PROJECT NAME & NUMBER BEAR RIVER MILL 3076-01-01
DATE 4-22-04	EQUIPMENT CASE 580 EXTENDAHOE
BY MV	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

10

	MATERIALS DESCRIPTION			GEOTECHNICAL			GEOMECHAI \L			
DEPTH		Field qu (Tons/SqFt)	SAMPLE No	SPT COUNT	DRY DENSITY	MOISTURE CONTENT	WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
0	SILTY SAND (SM), GRAY-BROWN, MOIST, MEDIUM DENSE-DENSE, WITH ORGANICS, INCREASING CLAY CONTENT WITH DEPTH (SC).									
1										
2	SANDY CLAY (CL) WITH SILT, YELLOWISH-REDDISH BROWN, MOIST, MEDIUM STIFF TO STIFF.									
3	GRADES TO GRANODIORITE, YELLOWISH TO REDDISH BROWN, COMPLETELY WEATHERED.									
4										
5	TRENCH TERMINATED AT 5' (NO BACK HOE REFUSAL), BACK FILLED WITH SPOILS									
6										
7										
8										
9										
10										

CARLTON
Engineering Inc.

3932 Ponderosa Road, Shingle Springs, CA 95682
Voice 530.677.5515 Fax 530.677.6645

TRENCH # WR3-3	PROJECT NAME & NUMBER BEAR RIVER MILL 3076-01-01
DATE 4-22-04	EQUIPMENT CASE 580 EXTENDAHOE
BY MV	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

307601_TL1

11

DEPTH	MATERIALS DESCRIPTION	Field qu (Tons/SqFt)	SAMPLE No	GEOTECHNICAL SPT COUNT	DRY DENSITY	MOISTURE CONTENT	GEOMECHAN AL WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
	GRAVEL SCATTERED AT SURFACE									
0	BROWN ORGANICS-SAWDUST									
1	SANDY CLAY (CL), YELLOW BROWN, MOIST, SOFT TO MEDIUM STIFF, WITH SCATTERED									
	ANGULAR ROCK									
5										
6	GRADES TO SANDY CLAY (CL), BLUE GRAY, MOIST, SOFT TO MEDIUM STIFF									
7										
8	LOG, GRANITIC BOULDERS									
9										
	GRADES TO CLAY (CL), YELLOW BROWN, MOIST, SOFT TO MEDIUM STIFF									
12	TRENCH TERMINATED AT 12' ON A GRANITIC BOULDER									
	BACK FILLED WITH SPOILS									

CARLTON
Engineering Inc.

3932 Ponderosa Road, Shingle Springs, CA 95682
Voice 530.677.5515 Fax 530.677.6645

TRENCH # WR3-4	PROJECT NAME & NUMBER BEAR RIVER MILL 3076-01-01
DATE 4-22-04	EQUIPMENT CASE 580 EXTENDAHOE
BY MV	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

DEPTH	MATERIALS DESCRIPTION	Field qu (Tons/SqFt)	SAMPLE No	GEOTECHNICAL SPT COUNT	DRY DENSITY	MOISTURE CONTENT	GEOMECHAI \L WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
0	1/4"-1/2" LIGHT YELLOW BROWN QUARTZ SAND (SP) AT SURFACE, POORLY GRADED, FINE TO MEDIUM GRAINED									
	SILTY SAND, (SM), BROWN, MOIST, LOOSE TO MEDIUM DENSE.									
1	SANDY CLAY (CL), RED YELLOW BROWN, MOIST, MEDIUM DENSE TO DENSE.									
2										
3	1' PVC CONDUIT WITH WIRE									
	GRADES TO GRANODIORITE, YELLOW BROWN, COMPLETELY WEATHERED, WITH CLAY									
4										
5										
	TRENCH TERMINATED AT 5.5' (NO BACK HOE REFUSAL),									
6	BACK FILLED WITH SPOILS									
7										
8										
9										
10										

CARLTON
Engineering Inc.

3932 Ponderosa Road, Shingle Springs, CA 95682
Voice 530.677.5515 Fax 530.677.6645

TRENCH # WR3-6	PROJECT NAME & NUMBER BEAR RIVER MILL 3076-01-01
DATE 4-22-04	EQUIPMENT CASE 580 EXTENDAHOE
BY MV	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

DEPTH	MATERIALS DESCRIPTION	Field qu (Tons/SqFt)	SAMPLE No	GEOTECHNICAL SPT COUNT	DRY DENSITY	MOISTURE CONTENT	GEOMECHAI AL WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
0	POORLY GRADED GRAVELS (GP), WITH SAND & SILT, GRAY BROWN,									
	MOIST, VERY LOOSE - ANGULAR MINE WASTE ROCK									
1	CLAYEY SAND (SC), YELLOW BROWN, MOIST, MEDIUM DENSE TO DENSE-FILL									
2	1/2" SAWDUST LAYER OVER SANDY CLAY (CL), YELLOW BROWN, MOIST, MEDIUM STIFF TO STIFF									
3										
4	TRENCH TERMINATED AT 4' (NO BACK HOE REFUSAL),									
	BACK FILLED WITH SPOILS									
5										
6										
	3 SAMPLES COLLECTED FROM TOP 1':									
7	WR3-7M (MINERALIZED ROCK)									
	WR3-7N (NON-MINERALIZED ROCK)									
8	WR3-7ALL (COMPOSITE OF ALL ROCK AND FINES)									
9										
10										

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TRENCH # WR3-7	PROJECT NAME & NUMBER BEAR RIVER MILL 3076-01-01
DATE 4-22-04	EQUIPMENT CASE 580 EXTENDAHOE
BY MV	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

DEPTH	MATERIALS DESCRIPTION	Field qu (Tons/SqFt)	SAMPLE No	GEOTECHNICAL			GEOMECHAN \L			
				SPT COUNT	DRY DENSITY	MOISTURE CONTENT	WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
0	SILTYSAND (SM) BROWN, MOIST, LOOSE TO MEDIUM DENSE, WITH SCATTERED SUB ANGULAR-SUB ROUNDED 2"-4" GRANODIORITE AND METAVOLCANIC ROCK									
1										
2	SANDY CLAY (CL), YELLOW BROWN ,MOIST, MEDIUM STIFF TO STIFF (UNDISTURBED NATIVE MATERIAL)									
3	TRENCH TERMINATED AT 3.5' (NO BACK HOE REFUSAL), BACK FILLED WITH SPOILS									
4										
5										
6										
7										
8										
9										
10										

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TRENCH # WR3-8	PROJECT NAME & NUMBER BEAR RIVER MILL 3076-01-01
DATE 4-22-04	EQUIPMENT CASE 580 EXTENDAHOE
BY MV	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

DEPTH	MATERIALS DESCRIPTION	Field qu (Tons/SqFt)	SAMPLE No	GEOTECHNICAL SPT COUNT	DRY DENSITY	MOISTURE CONTENT	GEOMECHAN AL WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
0	SILTY SAND (SM) WITH CLAY, BROWN TO YELLOW BROWN, MOIST,									
	MEDIUM DENSE TO DENSE, WITH SCATTERED WEATHERED GRANODIORITE ROCK FRAGMENTS-FILL									
1	GRADES TO YELLOW BROWN									
	TERRA COTTA DRAIN TILES IN PEA GRAVEL / SAND BED EAST END OF PIT									
2										
3										
7	SANDY CLAY (CL), DARK YELLOW BROWN, MOIST, MEDIUM STIFF TO STIFF,									
10	POSSIBLE FILL/NATIVE SOIL BOUNDARY									
11	GRANODIORITE, YELLOW BROWN, COMPLETELY WEATHERED, WITH CLAY									
12										
	TRENCH TERMINATED AT 12.5' (NO BACK HOE REFUSAL),									
	BACK FILLED WITH SPOILS									

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TRENCH # WR3-9	PROJECT NAME & NUMBER BEAR RIVER MILL 3076-01-01
DATE 4-23-04	EQUIPMENT CASE 580 EXTENDAHOE
BY MV	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

DEPTH	MATERIALS DESCRIPTION	Field qu (Tons/SqFt)	SAMPLE No	GEOTECHNICAL SPT COUNT	DRY DENSITY	MOISTURE CONTENT	GEOMECHAN AL WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
0	SANDY CLAY (CL), YELLOW BROWN, MOIST, MEDIUM STIFF TO STIFF-FILL									
1										
2	3"-4" LAYER OF CHARCOAL/SAWDUST OVER POORLY GRADED GRAVELS (GP) WITH SOME SAND, GRAY BROWN, MOIST, VERY LOOSE, ANGULAR MINE WASTE ROCK									
3										
4	3 SAMPLES COLLECTED: WR3-10M (MINERALIZED ROCK) WR3-10N (NON-MINERALIZED ROCK)									
5	WR3-10 BULK (COMPOSITE OF ROCK AND FINES)									
7	SANDY CLAY (CL), YELLOW BROWN, MOIST, STIFF TO VERY STIFF									
	GRADES TO GRANODIORITE, YELLOW BROWN, COMPLETELY WEATHERED									
11										
12	TRENCH TERMINATED AT 12' (NO BACK HOE REFUSAL), BACK FILLED WITH SPOILS									

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TRENCH # WR3-10	PROJECT NAME & NUMBER BEAR RIVER MILL 3076-01-01
DATE 4-23-04	EQUIPMENT CASE 580 EXTENDAHOE
BY MV	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

	MATERIALS DESCRIPTION			GEOTECHNICAL			GEOMECHA[illegible]L			
DEPTH		Field qu (Tons/SqFt)	SAMPLE No	SPT COUNT	DRY DENSITY	MOISTURE CONTENT	WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
0	DARK BROWN ORGANICS-SAWDUST-MIXED WITH SAND									
1										
2	ORGANICS MIXED WITH SANDY, GRAVELY CLAY (CL), YELLOW BROWN,									
	MOIST, MEDIUM STIFF TO STIFF									
	SHEET METAL									
3	RAIL STEEL									
4	POORLY GRADED GRAVELS (GP), WITH COBBLE SIZED, ANGULAR ROCK,									
	GRAY BROWN, MOIST, DENSE - ANGULAR MINE WASTE ROCK									
5	BECOMES LOOSE									
6	SANDY CLAY (CL), LIGHT GRAY BROWN, MOIST, SOFT TO MEDIUM STIFF,									
	MIXED WITH POORLY GRADED MEDIUM TO FINE GRAINED SAND (SP) BLUE GRAY,									
	MOIST TO WET, LOOSE - SUSPECT MILL TAILINGS									
9	SANDY CLAY (CL), OLIVE BROWN, MOIST, MEDIUM STIFF TO STIFF, LIKELY NATIVE SOIL									
10										
11	TRENCH TERMINATED AT 11' (NO BACK HOE REFUSAL),									
	BACK FILLED WITH SPOILS									

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TRENCH # WR3-11	PROJECT NAME & NUMBER BEAR RIVER MILL 3076-01-01
DATE 4-23-04	EQUIPMENT CASE 580 EXTENDAHOE
BY MV	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

DEPTH	MATERIALS DESCRIPTION	Field qu (Tons/SqFt)	SAMPLE No	GEOTECHNICAL SPT COUNT	GEOTECHNICAL DRY DENSITY	GEOTECHNICAL MOISTURE CONTENT	GEOMECHA[illegible]AL WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DISCONTINUITIES DIP
	CRUSHED AND SCREENED AGGREGATE SCATTERED AT SURFACE									
0	SILTY SAND (SM), BROWN, MIXED WITH GRAVEL, ANGULAR-SUB ANGULAR									
	WR3-12ALL (MINERALIZED + NONMINERALIZED + FINES)									
1										
	SANDY CLAY (CL), YELLOW BROWN, MOIST, MEDIUM STIFF TO STIFF									
2	FILL WITH SCATTERED BOULDERS UP TO 24"									
3										
7	BLACK-DARK GRAY ORGANICS, ROOTS, LIMBS ON SANDY CLAY (CL),									
	YELLOW-GREEN BROWN, MOIST, MEDIUM STIFF TO STIFF, LIKELY NATIVE SOIL									
8										
9										
10										
	TRENCH TERMINATED AT 10.5' (NO BACK HOE REFUSAL),									
11	BACK FILLED WITH SPOILS									
12										

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TRENCH # WR3-12	PROJECT NAME & NUMBER BEAR RIVER MILL 3076-01-01
DATE 4-23-04	EQUIPMENT CASE 580 EXTENDAHOE
BY MV	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

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MATERIALS DESCRIPTION				GEOTECHNICAL			GEOMECHANICAL			
DEPTH		Field qu (Tons/SqFt)	SAMPLE No	SPT COUNT	DRY DENSITY	MOISTURE CONTENT	WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
0										
	ORGANICS MIXED WITH SAND AND SILT, (PT)/(SM), BROWN,									
1	MOIST, VERY LOOSE-LOOSE									
2										
	POORLY GRADED GRAVELS (GP) WITH SAND AND SILT, GRAY BROWN,									
3	MOIST, VERY LOOSE-ANGULAR MINE WASTE ROCK.									
4										
	2 SAMPLES COLLECTED:									
	WR4-1M (MINERALIZED ROCK)									
5	WR4-1N (NON-MINERALIZED ROCK)									
6										
7										
	TRENCH TERMINATED AT 7' ON CLAY (CL), YELLOW BROWN TO GRAY,									
	MOIST, MEDIUM STIFF TO STIFF, LIKELY NATIVE SOIL.									
8	(NO BACK HOE REFUSAL), BACK FILLED WITH SPOILS									
9										
10										

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TRENCH # WR4-1	PROJECT NAME & NUMBER BEAR RIVER MILL 3076-01-01
DATE 4-19-04	EQUIPMENT CASE 580 EXTENDAHOE
BY MV	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

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	MATERIALS DESCRIPTION			GEOTECHNICAL			GEOMECHAI L			
DEPTH		Field qu (Tons/SqFt)	SAMPLE No	SPT COUNT	DRY DENSITY	MOISTURE CONTENT	WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
0	POORLY GRADED GRAVELS (GP) WITH SAND AND SILT, GRAY BROWN,									
	MOIST, VERY LOOSE-ANGULAR MINE WASTE ROCK									
1										
	CLAY (CL), YELLOW BROWN, MOIST, MEDIUM STIFF TO STIFF, LIKELY NATIVE SOIL									
2										
	TRENCH TERMINATED AT 2.5' (NO BACK HOE REFUSAL)									
3	BACKFILLED WITH SPOILS									
4										
	2 SAMPLES COLLECTED FROM TOP 1.5':									
5	WR4-2M (MINERALIZED ROCK)									
	WR4-2N (NON-MINERALIZED ROCK)									
6										
7										
8										
9										
10										

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TRENCH # WR4-2	PROJECT NAME & NUMBER BEAR RIVER MILL 3076-01-01	
DATE 4-19-04	EQUIPMENT CASE 580 EXTENDAHOE	
BY MV	PIT ORIENTATION	
ELEVATION	NATURAL SLOPE	
HOR. SCALE	VERT. SCALE	

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MATERIALS DESCRIPTION				GEOTECHNICAL			GEOMECHAN \L			
DEPTH		Field qu (Tons/SqFt)	SAMPLE No	SPT COUNT	DRY DENSITY	MOISTURE CONTENT	WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
0										
	SILTY SAND (SM) WITH CLAY, BROWN, MOIST, LOOSE TO MEDIUM DENSE,									
	MIXED WITH 10"-12" ANGULAR-ROUNDED COBBLES/BOULDERS									
1										
	CLAYEY SILT (ML), BROWN, MOIST, SOFT TO MEDIUM STIFF, MIXED WITH									
	ROUNDED TO ANGULAR GRAVEL, OCCASIONAL BOULDERS, AND BARK/ORGANICS									
2										
▼	WATER SEEP AT 2.5'									
	GRAY ANGULAR ROCK & CLAYEY SAND/FINES WITH BARK - ORGANICS									
3										
	2 COMPOSITE SAMPLES COLLECTED:									
	WR4-3M (MINERALIZED ROCK)									
4										
	WR4-3N (NON-MINERALIZED ROCK)									
5										
	SILTY SAND (SM), WITH CLAY, DARK RED BROWN, MOIST, MEDIUM DENSE TO DENSE, NATIVE SOIL									
6										
	TRENCH TERMINATED AT 6'									
	(NO BACK HOE REFUSAL), BACK FILLED WITH SPOILS									
7										
8										
9										
10										

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TRENCH # WR4-3	PROJECT NAME & NUMBER BEAR RIVER MILL 3076-01-01
DATE 4-21-04	EQUIPMENT CASE 580 EXTENDAHOE
BY MV	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

DEPTH	MATERIALS DESCRIPTION	Field qu (Tons/SqFt)	SAMPLE No	GEOTECHNICAL SPT COUNT	DRY DENSITY	MOISTURE CONTENT	GEOMECHAN .L WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
0	SILTY SAND (SM), MIXED WITH ORGANICS (BARK), RED BROWN, MOIST, LOOSE									
	TO MEDIUM DENSE,									
1	POORLY GRADED GRAVEL (GP), ANGULAR, WITH SAND, SILT AND ORGANICS,									
	GRAY BROWN, MOIST, VERY LOOSE, SCATTERED ANGULAR COBBLE AND									
2	BOULDER SIZED ROCK									
3										
4	MIXTURE OF BARK AND SILTY SAND (SM), DARK BROWN TO BLACK,									
	MOIST, LOOSE TO MEDIUM DENSE, WITH SCATTERED COBBLE AND BOULDER									
5	SIZED ANGULAR GRANITIC ROCK									
6										
7	SANDY CLAY (CL), YELLOW TO REDDISH YELLOW, MOIST, MEDIUM STIFF TO STIFF									
	TRENCH TERMINATED AT 7.5'									
8	(NO BACK HOE REFUSAL), BACK FILLED WITH SPOILS									
	2 COMPOSITE SAMPLES COLLECTED:									
9	WR4-4M (MINERALIZED ROCK)									
	WR4-4N (NON-MINERALIZED ROCK)									
10										

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TRENCH # WR4-4	PROJECT NAME & NUMBER BEAR RIVER MILL 3076-01-01
DATE 4-21-04	EQUIPMENT CASE 580 EXTENDAHOE
BY MV	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

DEPTH	MATERIALS DESCRIPTION	Field qu (Tons/SqFt)	SAMPLE No	GEOTECHNICAL SPT COUNT	DRY DENSITY	MOISTURE CONTENT	GEOMECHAN[illegible]L WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
0	POORLY GRADED GRAVELS (GP) WITH SAND AND SILT, GRAY BROWN,									
	MOIST, VERY LOOSE-ANGULAR MINE WASTE ROCK									
1	2 SAMPLES COLLECTED:									
	WR4-5M (MINERALIZED ROCK)									
2	WR4-5N (NON-MINERALIZED ROCK)									
3	SILTY SAND (SM), RED BROWN, MOIST, MEDIUM DENSE TO DENSE									
▼	WATER SEEPING INTO TRENCH									
4	TRENCH TERMINATED AT 4' IN O.G.									
	(NO BACK HOE REFUSAL), BACK FILLED WITH SPOILS									
5										
6										
7										
8										
9										
10										

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TRENCH # WR4-5	PROJECT NAME & NUMBER BEAR RIVER MILL 3076-01-01
DATE 4-21-04	EQUIPMENT CASE 580 EXTENDAHOE
BY MV	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

DEPTH	MATERIALS DESCRIPTION	Field qu (Tons/SqFt)	SAMPLE No	GEOTECHNICAL SPT COUNT	DRY DENSITY	MOISTURE CONTENT	GEOMECHAN L WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
0	POORLY GRADED GRAVELS (GP), WITH SILTY SAND, GRAY BROWN,									
1	MOIST, VERY LOOSE, ANGULAR, LIKELY MINE WASTE ROCK									
2										
3	POORLY GRADED GRAVELS (1 1/2" DIAMETER ±) (GP), GRAY BROWN, MOIST, VERY LOOSE,									
4	SUB ANGULAR. CSP PERFORATED SECTION PULLED OUT - LIKELY A SUB DRAIN									
5										
6										
7	SANDY CLAY (CL), RED BROWN, MOIST, MEDIUM STIFF TO STIFF, LIKELY NATIVE SOIL									
8	TRENCH TERMINATED AT 7.5' (NO BACK HOE REFUSAL), BACK FILLED WITH SPOILS									
9	2 COMPOSITE SAMPLES COLLECTED: WR4-6M (MINERALIZED ROCK)									
10	WR4-6N (NON-MINERALIZED ROCK)									

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TRENCH # WR4-6	PROJECT NAME & NUMBER BEAR RIVER MILL 3076-01-01	
DATE 4-21-04	EQUIPMENT CASE 580 EXTENDAHOE	
BY MV	PIT ORIENTATION	
ELEVATION	NATURAL SLOPE	
HOR. SCALE	VERT. SCALE	

DEPTH	MATERIALS DESCRIPTION	Field qu (Tons/SqFt)	SAMPLE No	GEOTECHNICAL SPT COUNT	DRY DENSITY	MOISTURE CONTENT	GEOMECHAN L WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
0										
	CLAYEY SAND (SC), YELLOW BROWN, MOIST, MEDIUM DENSE TO DENSE,									
	DECOMPOSED GRANITIC FILL									
1										
	ORGANICS, BARK, WOOD, DARK BROWN-BLACK, MOIST, LOOSE TO MEDIUM DENSE,									
2	WITH SCATTERED SUB ANGULAR BOULDERS: WEDGE OF POORLY GRADED GRAVELS (GP),									
	GRAY BROWN, MOIST, LOOSE, ANGULAR-LIKELY MINE WASTE ROCK AT SOUTH EAST END OF TRENCH									
3	ORGANICS MIXED WITH SILTY SAND, DARK BROWN-BLACK, MOIST, MEDIUM DENSE TO DENSE									
4	2 SAMPLES COLLECTED FROM 2.5' TO 3':									
	WR4-7M (MINERALIZED ROCK)									
5	WR4-7N (NON-MINERALIZED ROCK)									
6										
7										
	TRENCH TERMINATED AT 7.5'									
8	(NO BACK HOE REFUSAL), BACK FILLED WITH SPOILS									
9										
10										

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TRENCH # WR4-7	PROJECT NAME & NUMBER BEAR RIVER MILL 3076-01-01
DATE 4-21-04	EQUIPMENT CASE 580 EXTENDAHOE
BY MV	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

DEPTH	MATERIALS DESCRIPTION	Field qu (Tons/SqFt)	SAMPLE No	GEOTECHNICAL SPT COUNT	DRY DENSITY	MOISTURE CONTENT	GEOMECHAI \L WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
0	POORLY GRADED GRAVELS (GP), GRAY BROWN, MOIST, DENSE ANGULAR TO SUB ANGULAR, LIKELY MINE WASTE ROCK WITH SILTY SAND									
	POORLY GRADED GRAVELS (GP), GRAY, MOIST, DENSE, ANGULAR TO ROUNDED (RIVER AGGREGATE) ROCK WITH SILTY SAND									
1										
	CLAYEY SILT (ML), WITH GRAVEL, DARK GRAY, MOIST, STIFF, ANGULAR AND ROUNDED GRAVEL									
2										
3	SANDY CLAY (CL), DARK TO LIGHT GRAY, MOIST, MEDIUM STIFF TO STIFF, LIKELY NATIVE SOIL									
4										
▼	TRENCH TERMINATED AT 4.5'									
5	(NO BACK HOE REFUSAL), BACK FILLED WITH SPOILS									
6	2 SAMPLES COLLECTED FROM SURFACE TO 1.5:									
	WR4-8M (MINERALIZED ROCK)									
7	WR4-8N (NON-MINERALIZED ROCK)									
8										
9										
10										

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TRENCH # WR4-8	PROJECT NAME & NUMBER BEAR RIVER MILL 3076-01-01
DATE 4-22-04	EQUIPMENT CASE 580 EXTENDAHOE
BY MV	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

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	MATERIALS DESCRIPTION			GEOTECHNICAL			GEOMECHAN .L			
DEPTH		Field qu (Tons/SqFt)	SAMPLE No	SPT COUNT	DRY DENSITY	MOISTURE CONTENT	WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
0	POORLY GRADED GRAVELS (GP), WITH SILTY SAND, BROWN, MOIST, MEDIUM									
	DENSE TO DENSE, SUB ANGULAR, MOSTLY 1 1/2" DIAMETER									
1										
	CLAYEY SILT (ML), WITH GRAVEL (ROUNDED TO SUB ROUNDED), BROWN, MOIST, STIFF									
2	2" DIAMETER IRON PIPE									
	SANDY CLAY (CL), GRAY, MOIST, STIFF TO VERY STIFF, NATIVE SOIL									
3	TRENCH TERMINATED AT 3'									
	(NO BACK HOE REFUSAL), BACK FILLED WITH SPOILS									
4										
5										
6										
7										
8										
9										
10										

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TRENCH # WR4-9	PROJECT NAME & NUMBER BEAR RIVER MILL 3076-01-01
DATE 4-22-04	EQUIPMENT CASE 580 EXTENDAHOE
BY MV	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

DEPTH	MATERIALS DESCRIPTION	Field qu (Tons/SqFt)	SAMPLE No	GEOTECHNICAL SPT COUNT	DRY DENSITY	MOISTURE CONTENT	GEOMECHAN L WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
0	POORLY GRADED GRAVELS (GP) AND COBBLES WITH SCATTERED									
	BOULDERS, GRAY, BROWN, VERY LOOSE, ANGULAR MINE WASTE ROCK									
1										
2										
	SANDY CLAY (CL), WITH GRAVEL, BROWNISH YELLOW, MOIST, MEDIUM STIFF TO STIFF-NATIVE SOIL									
3										
	SANDY CLAY (CL), YELLOW RED, MOIST, MEDIUM STIFF TO STIFF									
4										
	GRANODIORITE, REDDISH YELLOW, COMPLETELY WEATHERED, MASSIVE, FRIABLE									
5	TRENCH TERMINATED AT 5'									
	(NO BACK HOE REFUSAL), BACK FILLED WITH SPOILS									
6										
	2 SAMPLES COLLECTED FROM SURFACE TO 2.5':									
7	WR5-1M (MINERALIZED ROCK)									
	WR5-1N (NON-MINERALIZED ROCK)									
8										
9										
10										

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TRENCH # WR5-1	PROJECT NAME & NUMBER BEAR RIVER MILL 3076-01-01
DATE 4-23-04	EQUIPMENT CASE 580 EXTENDAHOE
BY MV	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

DEPTH	MATERIALS DESCRIPTION	Field qu (Tons/SqFt)	SAMPLE No	GEOTECHNICAL SPT COUNT	DRY DENSITY	MOISTURE CONTENT	GEOMECHA L WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
0	POORLY GRADED GRAVELS (GP), GRAY BROWN, DRY, LOOSE,									
	ANGULAR MINE WASTE ROCK DUMP PILE									
1										
	3 SAMPLES COLLECTED:									
2	WR5-2M (MINERALIZED ROCK)									
	WR5-2N (NON-MINERALIZED ROCK)									
3	WR5-2 ALL (BULK SAMPLE OF DUMP MATERIAL FROM									
	6' SECTION OF TRENCH WALL)									
4										
5	TRENCH TERMINATED AT APPROXIMATELY 5' BELOW DUMP PILE SURFACE									
	AT NATIVE SOIL SURFACE, TRENCH SIDES CAVING IN LOOSE ROCK									
6	(NO BACK HOE REFUSAL), BACK FILLED WITH SPOILS									
7										
8										
9										
10										

CARLTON
Engineering Inc.

3932 Ponderosa Road, Shingle Springs, CA 95682
Voice 530.677.5515 Fax 530.677.6645

TRENCH # WR5-2	PROJECT NAME & NUMBER BEAR RIVER MILL 3076-01-01
DATE 4-23-04	EQUIPMENT CASE 580 EXTENDAHOE
BY MV	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

C-3. PCP CLOSURE CONFIRMATION LAB REPORTS, COCS, AND BORING LOGS

06/08/04 13:19

Carlton Engineering, Inc. 3883 Ponderosa Road Shingle Springs, CA 95682	Project: Bear River R1 Project Number: 3076-01-01 Project Manager: Mark Montgomery	CLS Work Order #: CNF0106

Semivolatile Organic Compounds by EPA Method 8270C

SB1-3 (CNF0106-01) Soil Sampled: 06/02/04 09:00 Received: 06/03/04 09:05

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
2,3,4,6-Tetrachlorophenol	ND	330	µg/kg	1	CN04413	06/07/04	06/07/04	EPA 8270C	
Acenaphthene	ND	330	"	"	"	"	"	"	
Acenaphthylene	ND	330	"	"	"	"	"	"	
Anthracene	ND	330	"	"	"	"	"	"	
Benzo (a) anthracene	ND	330	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	330	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	330	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	330	"	"	"	"	"	"	
Benzo (a) pyrene	ND	330	"	"	"	"	"	"	
Benzyl alcohol	ND	330	"	"	"	"	"	"	
Bis(2-chloroethoxy)methane	ND	330	"	"	"	"	"	"	
Bis(2-chloroethyl)ether	ND	330	"	"	"	"	"	"	
[illegible]-chloroisopropyl)ether	ND	330	"	"	"	"	"	"	
[illegible]-ethylhexyl)phthalate	ND	330	"	"	"	"	"	"	
4-Bromophenyl phenyl ether	ND	330	"	"	"	"	"	"	
Butyl benzyl phthalate	ND	330	"	"	"	"	"	"	
4-Chloroaniline	ND	330	"	"	"	"	"	"	
2-Chloronaphthalene	ND	330	"	"	"	"	"	"	
4-Chlorophenyl phenyl ether	ND	330	"	"	"	"	"	"	
Chrysene	ND	330	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	330	"	"	"	"	"	"	
Dibenzofuran	ND	330	"	"	"	"	"	"	
Di-n-butyl phthalate	ND	330	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	330	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	330	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	330	"	"	"	"	"	"	
3,3'-Dichlorobenzidine	ND	670	"	"	"	"	"	"	
Diethyl phthalate	ND	330	"	"	"	"	"	"	
Dimethyl phthalate	ND	330	"	"	"	"	"	"	
2,4-Dinitrotoluene (2,4-DNT)	ND	330	"	"	"	"	"	"	
2,6-Dinitrotoluene (2,6-DNT)	ND	330	"	"	"	"	"	"	
Di-n-octyl phthalate	ND	330	"	"	"	"	"	"	
Fluoranthene	ND	330	"	"	"	"	"	"	
Fluorene	ND	330	"	"	"	"	"	"	
Hexachlorobenzene	ND	330	"	"	"	"	"	"	
Hexachlorobutadiene	ND	330	"	"	"	"	"	"	
Hexachlorocyclopentadiene	ND	330	"	"	"	"	"	"	
Hexachloroethane	ND	330	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	330	"	"	"	"	"	"	

Carlton Engineering, Inc. 3883 Ponderosa Road Shingle Springs, CA 95682	Project: Bear River R1 Project Number: 3076-01-01 Project Manager: Mark Montgomery	**CLS Work Order #: CNF0106**

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SB1-3 (CNF0106-01) Soil	**Sampled: 06/02/04 09:00**	**Received: 06/03/04 09:05**							
Isophorone	ND	330	µg/kg	1	CN04413	06/07/04	06/07/04	EPA 8270C	
2-Methylnaphthalene	ND	330	"	"	"	"	"	"	
Naphthalene	ND	330	"	"	"	"	"	"	
2-Nitroaniline	ND	830	"	"	"	"	"	"	
3-Nitroaniline	ND	830	"	"	"	"	"	"	
4-Nitroaniline	ND	830	"	"	"	"	"	"	
Nitrobenzene (NB)	ND	330	"	"	"	"	"	"	
N-Nitrosodiphenylamine	ND	330	"	"	"	"	"	"	
N-Nitrosodi-n-propylamine	ND	330	"	"	"	"	"	"	
Phenanthrene	ND	330	"	"	"	"	"	"	
Pyrene	ND	330	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	330	"	"	"	"	"	"	
oic acid	ND	830	"	"	"	"	"	"	
4- hloro-3-methylphenol	ND	330	"	"	"	"	"	"	
2-Chlorophenol	ND	330	"	"	"	"	"	"	
2,4-Dichlorophenol	ND	330	"	"	"	"	"	"	
2,4-Dimethylphenol	ND	330	"	"	"	"	"	"	
4,6-Dinitro-2-methylphenol	ND	830	"	"	"	"	"	"	
2,4-Dinitrophenol	ND	830	"	"	"	"	"	"	
2-Methylphenol	ND	330	"	"	"	"	"	"	
3 & 4-Methylphenol	ND	330	"	"	"	"	"	"	
2-Nitrophenol	ND	330	"	"	"	"	"	"	
4-Nitrophenol	ND	830	"	"	"	"	"	"	
Pentachlorophenol	ND	830	"	"	"	"	"	"	
Phenol	ND	330	"	"	"	"	"	"	
2,4,5-Trichlorophenol	ND	330	"	"	"	"	"	"	
2,4,6-Trichlorophenol	ND	330	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*50.8 %*	*25-121*		"	"	"	"	
Surrogate: Phenol-d6		*72.0 %*	*10-110*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*92.2 %*	*23-120*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*82.6 %*	*30-115*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*47.2 %*	*19-122*		"	"	"	"	
Surrogate: Terphenyl-dl4		*67.7 %*	*18-137*		"	"	"	"	
SB2-3 (CNF0106-04) Soil	**Sampled: 06/02/04 10:30**	**Received: 06/03/04 09:05**							
2,3,4,6-Tetrachlorophenol	ND	330	µg/kg	1	CN04413	06/07/04	06/07/04	EPA 8270C	
Acenaphthene	ND	330	"	"	"	"	"	"	
Acenaphthylene	ND	330	"	"	"	"	"	"	
Anthracene	ND	330	"	"	"	"	"	"	
zo (a) anthracene	ND	330	"	"	"	"	"	"	

Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project: Bear River R1
Project Number: 3076-01-01
Project Manager: Mark Montgomery

CLS Work Order #: CNF0106

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SB2-3 (CNF0106-04) Soil Sampled: 06/02/04 10:30 Received: 06/03/04 09:05									
Benzo (b) fluoranthene	ND	330	µg/kg	1	CN04413	06/07/04	06/07/04	EPA 8270C	
Benzo (k) fluoranthene	ND	330	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	330	"	"	"	"	"	"	
Benzo (a) pyrene	ND	330	"	"	"	"	"	"	
Benzyl alcohol	ND	330	"	"	"	"	"	"	
Bis(2-chloroethoxy)methane	ND	330	"	"	"	"	"	"	
Bis(2-chloroethyl)ether	ND	330	"	"	"	"	"	"	
Bis(2-chloroisopropyl)ether	ND	330	"	"	"	"	"	"	
Bis(2-ethylhexyl)phthalate	ND	330	"	"	"	"	"	"	
4-Bromophenyl phenyl ether	ND	330	"	"	"	"	"	"	
Butyl benzyl phthalate	ND	330	"	"	"	"	"	"	
4-Chloroaniline	ND	330	"	"	"	"	"	"	
loronaphthalene	ND	330	"	"	"	"	"	"	
4-Chlorophenyl phenyl ether	ND	330	"	"	"	"	"	"	
Chrysene	ND	330	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	330	"	"	"	"	"	"	
Dibenzofuran	ND	330	"	"	"	"	"	"	
Di-n-butyl phthalate	ND	330	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	330	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	330	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	330	"	"	"	"	"	"	
3,3'-Dichlorobenzidine	ND	670	"	"	"	"	"	"	
Diethyl phthalate	ND	330	"	"	"	"	"	"	
Dimethyl phthalate	ND	330	"	"	"	"	"	"	
2,4-Dinitrotoluene (2,4-DNT)	ND	330	"	"	"	"	"	"	
2,6-Dinitrotoluene (2,6-DNT)	ND	330	"	"	"	"	"	"	
Di-n-octyl phthalate	ND	330	"	"	"	"	"	"	
Fluoranthene	ND	330	"	"	"	"	"	"	
Fluorene	ND	330	"	"	"	"	"	"	
Hexachlorobenzene	ND	330	"	"	"	"	"	"	
Hexachlorobutadiene	ND	330	"	"	"	"	"	"	
Hexachlorocyclopentadiene	ND	330	"	"	"	"	"	"	
Hexachloroethane	ND	330	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	330	"	"	"	"	"	"	
Isophorone	ND	330	"	"	"	"	"	"	
2-Methylnaphthalene	ND	330	"	"	"	"	"	"	
Naphthalene	ND	330	"	"	"	"	"	"	
2-Nitroaniline	ND	830	"	"	"	"	"	"	
3-Nitroaniline	ND	830	"	"	"	"	"	"	
roaniline	ND	830	"	"	"	"	"	"	

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SB2-3 (CNF0106-04) Soil Sampled: 06/02/04 10:30 Received: 06/03/04 09:05									
Nitrobenzene (NB)	ND	330	µg/kg	1	CN04413	06/07/04	06/07/04	EPA 8270C	
N-Nitrosodiphenylamine	ND	330	"	"	"	"	"	"	
N-Nitrosodi-n-propylamine	ND	330	"	"	"	"	"	"	
Phenanthrene	ND	330	"	"	"	"	"	"	
Pyrene	ND	330	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	330	"	"	"	"	"	"	
Benzoic acid	ND	830	"	"	"	"	"	"	
4-Chloro-3-methylphenol	ND	330	"	"	"	"	"	"	
2-Chlorophenol	ND	330	"	"	"	"	"	"	
2,4-Dichlorophenol	ND	330	"	"	"	"	"	"	
2,4-Dimethylphenol	ND	330	"	"	"	"	"	"	
4,[illegible]-Dinitro-2-methylphenol	ND	830	"	"	"	"	"	"	
[illegible] Dinitrophenol	ND	830	"	"	"	"	"	"	
2-Methylphenol	ND	330	"	"	"	"	"	"	
3 & 4-Methylphenol	ND	330	"	"	"	"	"	"	
2-Nitrophenol	ND	330	"	"	"	"	"	"	
4-Nitrophenol	ND	830	"	"	"	"	"	"	
Pentachlorophenol	ND	830	"	"	"	"	"	"	
Phenol	ND	330	"	"	"	"	"	"	
2,4,5-Trichlorophenol	ND	330	"	"	"	"	"	"	
2,4,6-Trichlorophenol	ND	330	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*35.2 %*	*25-121*		"	"	"	"	
Surrogate: Phenol-d6		*57.6 %*	*10-110*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*89.8 %*	*23-120*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*80.2 %*	*30-115*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*28.5 %*	*19-122*		"	"	"	"	
Surrogate: Terphenyl-dl4		*67.7 %*	*18-137*		"	"	"	"	
SB3-3 (CNF0106-07) Soil Sampled: 06/02/04 11:15 Received: 06/03/04 09:05									
2,3,4,6-Tetrachlorophenol	ND	330	µg/kg	1	CN04413	06/07/04	06/07/04	EPA 8270C	
Acenaphthene	ND	330	"	"	"	"	"	"	
Acenaphthylene	ND	330	"	"	"	"	"	"	
Anthracene	ND	330	"	"	"	"	"	"	
Benzo (a) anthracene	ND	330	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	330	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	330	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	330	"	"	"	"	"	"	
Benzo (a) pyrene	ND	330	"	"	"	"	"	"	
Benzyl alcohol	ND	330	"	"	"	"	"	"	
[illegible]-chloroethoxy)methane	ND	330	"	"	"	"	"	"	

Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project: Bear River R1
Project Number: 3076-01-01
Project Manager: Mark Montgomery

CLS Work Order #: CNF0106

Semivolatile Organic Compounds by EPA Method 8270C

SB3-3 (CNF0106-07) Soil Sampled: 06/02/04 11:15 Received: 06/03/04 09:05

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Bis(2-chloroethyl)ether	ND	330	µg/kg	1	CN04413	06/07/04	06/07/04	EPA 8270C	
Bis(2-chloroisopropyl)ether	ND	330	"	"	"	"	"	"	
Bis(2-ethylhexyl)phthalate	ND	330	"	"	"	"	"	"	
4-Bromophenyl phenyl ether	ND	330	"	"	"	"	"	"	
Butyl benzyl phthalate	ND	330	"	"	"	"	"	"	
4-Chloroaniline	ND	330	"	"	"	"	"	"	
2-Chloronaphthalene	ND	330	"	"	"	"	"	"	
4-Chlorophenyl phenyl ether	ND	330	"	"	"	"	"	"	
Chrysene	ND	330	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	330	"	"	"	"	"	"	
Dibenzofuran	ND	330	"	"	"	"	"	"	
n-butyl phthalate	ND	330	"	"	"	"	"	"	
Dichlorobenzene	ND	330	"	"	"	"	"	"	
1,-Dichlorobenzene	ND	330	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	330	"	"	"	"	"	"	
3,3′-Dichlorobenzidine	ND	670	"	"	"	"	"	"	
Diethyl phthalate	ND	330	"	"	"	"	"	"	
Dimethyl phthalate	ND	330	"	"	"	"	"	"	
2,4-Dinitrotoluene (2,4-DNT)	ND	330	"	"	"	"	"	"	
2,6-Dinitrotoluene (2,6-DNT)	ND	330	"	"	"	"	"	"	
Di-n-octyl phthalate	ND	330	"	"	"	"	"	"	
Fluoranthene	ND	330	"	"	"	"	"	"	
Fluorene	ND	330	"	"	"	"	"	"	
Hexachlorobenzene	ND	330	"	"	"	"	"	"	
Hexachlorobutadiene	ND	330	"	"	"	"	"	"	
Hexachlorocyclopentadiene	ND	330	"	"	"	"	"	"	
Hexachloroethane	ND	330	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	330	"	"	"	"	"	"	
Isophorone	ND	330	"	"	"	"	"	"	
2-Methylnaphthalene	ND	330	"	"	"	"	"	"	
Naphthalene	ND	330	"	"	"	"	"	"	
2-Nitroaniline	ND	830	"	"	"	"	"	"	
3-Nitroaniline	ND	830	"	"	"	"	"	"	
4-Nitroaniline	ND	830	"	"	"	"	"	"	
Nitrobenzene (NB)	ND	330	"	"	"	"	"	"	
N-Nitrosodiphenylamine	ND	330	"	"	"	"	"	"	
N-Nitrosodi-n-propylamine	ND	330	"	"	"	"	"	"	
Phenanthrene	ND	330	"	"	"	"	"	"	
-ene	ND	330	"	"	"	"	"	"	
-Trichlorobenzene	ND	330	"	"	"	"	"	"	

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Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project: Bear River R1
Project Number: 3076-01-01
Project Manager: Mark Montgomery

CLS Work Order #: CNF0106

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SB3-3 (CNF0106-07) Soil	**Sampled: 06/02/04 11:15**	**Received: 06/03/04 09:05**							
Benzoic acid	ND	830	µg/kg	1	CN04413	06/07/04	06/07/04	EPA 8270C	
4-Chloro-3-methylphenol	ND	330	"	"	"	"	"	"	
2-Chlorophenol	ND	330	"	"	"	"	"	"	
2,4-Dichlorophenol	ND	330	"	"	"	"	"	"	
2,4-Dimethylphenol	ND	330	"	"	"	"	"	"	
4,6-Dinitro-2-methylphenol	ND	830	"	"	"	"	"	"	
2,4-Dinitrophenol	ND	830	"	"	"	"	"	"	
2-Methylphenol	ND	330	"	"	"	"	"	"	
3 & 4-Methylphenol	ND	330	"	"	"	"	"	"	
2-Nitrophenol	ND	330	"	"	"	"	"	"	
4-Nitrophenol	ND	830	"	"	"	"	"	"	
Pentachlorophenol	ND	830	"	"	"	"	"	"	
Phenol	ND	330	"	"	"	"	"	"	
2,4,5-Trichlorophenol	ND	330	"	"	"	"	"	"	
2,4,6-Trichlorophenol	ND	330	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*48.4 %*	*25-121*		"	"	"	"	
Surrogate: Phenol-d6		*73.6 %*	*10-110*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*93.4 %*	*23-120*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*85.6 %*	*30-115*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*36.5 %*	*19-122*		"	"	"	"	
Surrogate: Terphenyl-dl4		*75.4 %*	*18-137*		"	"	"	"	

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

06/08/04 13:00

Carlton Engineering, Inc. 3883 Ponderosa Road Shingle Springs, CA 95682	Project: Bear River RI Project Number: 3076-01-01 Project Manager: Mark Montgomery	**CLS Work Order#: CNF0106**

DRAFT: Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
DRAFT: SB1-3 (CNF0106-01) Soil Sampled: 06/02/04 09:00 Received: 06/03/04 09:05									
2,3,4,6-Tetrachlorophenol	ND	330	µg/kg	1	CN04413	06/07/04	06/07/04	EPA 8270C	
Acenaphthene	ND	330	"	"	"	"	"	"	
Acenaphthylene	ND	330	"	"	"	"	"	"	
Anthracene	ND	330	"	"	"	"	"	"	
Benzo (a) anthracene	ND	330	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	330	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	330	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	330	"	"	"	"	"	"	
Benzo (a) pyrene	ND	330	"	"	"	"	"	"	
Benzyl alcohol	ND	330	"	"	"	"	"	"	
Bis(2-chloroethoxy)methane	ND	330	"	"	"	"	"	"	
Bis(2-chloroethyl)ether	ND	330	"	"	"	"	"	"	
Bis(2-chloroisopropyl)ether	ND	330	"	"	"	"	"	"	
Bis(2-ethylhexyl)phthalate	ND	330	"	"	"	"	"	"	
4-Bromophenyl phenyl ether	ND	330	"	"	"	"	"	"	
Butyl benzyl phthalate	ND	330	"	"	"	"	"	"	
4-Chloroaniline	ND	330	"	"	"	"	"	"	
2-Chloronaphthalene	ND	330	"	"	"	"	"	"	
4-Chlorophenyl phenyl ether	ND	330	"	"	"	"	"	"	
Chrysene	ND	330	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	330	"	"	"	"	"	"	
Dibenzofuran	ND	330	"	"	"	"	"	"	
Di-n-butyl phthalate	ND	330	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	330	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	330	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	330	"	"	"	"	"	"	
Diethyl phthalate	ND	330	"	"	"	"	"	"	
Dimethyl phthalate	ND	330	"	"	"	"	"	"	
2,4-Dinitrotoluene (2,4-DNT)	ND	330	"	"	"	"	"	"	
2,6-Dinitrotoluene (2,6-DNT)	ND	330	"	"	"	"	"	"	
Di-n-octyl phthalate	ND	330	"	"	"	"	"	"	
Fluoranthene	ND	330	"	"	"	"	"	"	
Fluorene	ND	330	"	"	"	"	"	"	
Hexachlorobenzene	ND	330	"	"	"	"	"	"	
Hexachlorobutadiene	ND	330	"	"	"	"	"	"	
Hexachlorocyclopentadiene	ND	330	"	"	"	"	"	"	
Hexachloroethane	ND	330	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	330	"	"	"	"	"	"	
Isophorone	ND	330	"	"	"	"	"	"	
2-Methylnaphthalene	ND	330	"	"	"	"	"	"	
Naphthalene	ND	330	"	"	"	"	"	"	
2-Nitroaniline	ND	830	"	"	"	"	"	"	
3-Nitroaniline	ND	830	"	"	"	"	"	"	
4-Nitroaniline	ND	830	"	"	"	"	"	"	
Nitrobenzene (NB)	ND	330	"	"	"	"	"	"	

DRAFT: Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
DRAFT: SB1-3 (CNF0106-01) Soil	**Sampled: 06/02/04 09:00**	**Received: 06/03/04 09:05**							
N-Nitrosodiphenylamine	ND	330	µg/kg	1	CN04413	06/07/04	06/07/04	EPA 8270C	
N-Nitrosodi-n-propylamine	ND	330	"	"	"	"	"	"	
Phenanthrene	ND	330	"	"	"	"	"	"	
Pyrene	ND	330	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	330	"	"	"	"	"	"	
Benzoic acid	ND	830	"	"	"	"	"	"	
4-Chloro-3-methylphenol	ND	330	"	"	"	"	"	"	
2-Chlorophenol	ND	330	"	"	"	"	"	"	
2,4-Dichlorophenol	ND	330	"	"	"	"	"	"	
2,4-Dimethylphenol	ND	330	"	"	"	"	"	"	
4,6-Dinitro-2-methylphenol	ND	830	"	"	"	"	"	"	
2,4-Dinitrophenol	ND	830	"	"	"	"	"	"	
2-Methylphenol	ND	330	"	"	"	"	"	"	
3 & 4-Methylphenol	ND	330	"	"	"	"	"	"	
2-Nitrophenol	ND	330	"	"	"	"	"	"	
4-Nitrophenol	ND	830	"	"	"	"	"	"	
Pentachlorophenol	ND	830	"	"	"	"	"	"	
Phenol	ND	330	"	"	"	"	"	"	
2,4,5-Trichlorophenol	ND	330	"	"	"	"	"	"	
2,4,6-Trichlorophenol	ND	330	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*50.8 %*	*25-121*		"	"	"	"	
Surrogate: Phenol-d6		*72.0 %*	*10-110*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*92.2 %*	*23-120*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*82.6 %*	*30-115*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*47.2 %*	*19-122*		"	"	"	"	
Surrogate: Terphenyl-dl4		*67.7 %*	*18-137*		"	"	"	"	
DRAFT: SB2-3 (CNF0106-04) Soil	**Sampled: 06/02/04 10:30**	**Received: 06/03/04 09:05**							
2,3,4,6-Tetrachlorophenol	ND	330	µg/kg	1	CN04413	06/07/04	06/07/04	EPA 8270C	
Acenaphthene	ND	330	"	"	"	"	"	"	
Acenaphthylene	ND	330	"	"	"	"	"	"	
Anthracene	ND	330	"	"	"	"	"	"	
Benzo (a) anthracene	ND	330	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	330	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	330	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	330	"	"	"	"	"	"	
Benzo (a) pyrene	ND	330	"	"	"	"	"	"	
Benzyl alcohol	ND	330	"	"	"	"	"	"	
Bis(2-chloroethoxy)methane	ND	330	"	"	"	"	"	"	
Bis(2-chloroethyl)ether	ND	330	"	"	"	"	"	"	
Bis(2-chloroisopropyl)ether	ND	330	"	"	"	"	"	"	
Bis(2-ethylhexyl)phthalate	ND	330	"	"	"	"	"	"	
4-Bromophenyl phenyl ether	ND	330	"	"	"	"	"	"	
Butyl benzyl phthalate	ND	330	"	"	"	"	"	"	
4-Chloroaniline	ND	330	"	"	"	"	"	"	
2-Chloronaphthalene	ND	330	"	"	"	"	"	"	
4-Chlorophenyl phenyl ether	ND	330	"	"	"	"	"	"	

Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project: Bear River R1
Project Number: 3076-01-01
Project Manager: Mark Montgomery

CLS Work Order#: CNF0106

DRAFT: Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
DRAFT: SB2-3 (CNF0106-04) Soil Sampled: 06/02/04 10:30 Received: 06/03/04 09:05									
Chrysene	ND	330	µg/kg	1	CN04413	06/07/04	06/07/04	EPA 8270C	
Dibenz (a,h) anthracene	ND	330	"	"	"	"	"	"	
Dibenzofuran	ND	330	"	"	"	"	"	"	
Di-n-butyl phthalate	ND	330	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	330	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	330	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	330	"	"	"	"	"	"	
3,3′-Dichlorobenzidine	ND	670	"	"	"	"	"	"	
Diethyl phthalate	ND	330	"	"	"	"	"	"	
Dimethyl phthalate	ND	330	"	"	"	"	"	"	
2,4-Dinitrotoluene (2,4-DNT)	ND	330	"	"	"	"	"	"	
2,6-Dinitrotoluene (2,6-DNT)	ND	330	"	"	"	"	"	"	
Di-n-octyl phthalate	ND	330	"	"	"	"	"	"	
Fluoranthene	ND	330	"	"	"	"	"	"	
Fluorene	ND	330	"	"	"	"	"	"	
Hexachlorobenzene	ND	330	"	"	"	"	"	"	
Hexachlorobutadiene	ND	330	"	"	"	"	"	"	
Hexachlorocyclopentadiene	ND	330	"	"	"	"	"	"	
Hexachloroethane	ND	330	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	330	"	"	"	"	"	"	
Isophorone	ND	330	"	"	"	"	"	"	
2-Methylnaphthalene	ND	330	"	"	"	"	"	"	
Naphthalene	ND	330	"	"	"	"	"	"	
2-Nitroaniline	ND	830	"	"	"	"	"	"	
3-Nitroaniline	ND	830	"	"	"	"	"	"	
4-Nitroaniline	ND	830	"	"	"	"	"	"	
Nitrobenzene (NB)	ND	330	"	"	"	"	"	"	
N-Nitrosodiphenylamine	ND	330	"	"	"	"	"	"	
N-Nitrosodi-n-propylamine	ND	330	"	"	"	"	"	"	
Phenanthrene	ND	330	"	"	"	"	"	"	
Pyrene	ND	330	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	330	"	"	"	"	"	"	
Benzoic acid	ND	830	"	"	"	"	"	"	
4-Chloro-3-methylphenol	ND	330	"	"	"	"	"	"	
2-Chlorophenol	ND	330	"	"	"	"	"	"	
2,4-Dichlorophenol	ND	330	"	"	"	"	"	"	
2,4-Dimethylphenol	ND	330	"	"	"	"	"	"	
4,6-Dinitro-2-methylphenol	ND	830	"	"	"	"	"	"	
2,4-Dinitrophenol	ND	830	"	"	"	"	"	"	
2-Methylphenol	ND	330	"	"	"	"	"	"	
3 & 4-Methylphenol	ND	330	"	"	"	"	"	"	
2-Nitrophenol	ND	330	"	"	"	"	"	"	
4-Nitrophenol	ND	830	"	"	"	"	"	"	
Pentachlorophenol	ND	830	"	"	"	"	"	"	
Phenol	ND	330	"	"	"	"	"	"	
2,4,5-Trichlorophenol	ND	330	"	"	"	"	"	"	
2,4,6-Trichlorophenol	ND	330	"	"	"	"	"	"	

06/08/04 13:00

Carlton Engineering, Inc. 3883 Ponderosa Road Shingle Springs, CA 95682	Project: Bear River R1 Project Number: 3076-01-01 Project Manager: Mark Montgomery	**CLS Work Order#: CNF0106**

DRAFT: Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
DRAFT: SB2-3 (CNF0106-04) Soil Sampled: 06/02/04 10:30 Received: 06/03/04 09:05									
Surrogate: 2-Fluorophenol		*35.2 %*	*25-121*		*CN04413*	*06/07/04*	*06/07/04*	*EPA 8270C*	
Surrogate: Phenol-d6		*57.6 %*	*10-110*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*89.8 %*	*23-120*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*80.2 %*	*30-115*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*28.5 %*	*19-122*		"	"	"	"	
Surrogate: Terphenyl-dl4		*67.7 %*	*18-137*		"	"	"	"	
DRAFT: SB3-3 (CNF0106-07) Soil Sampled: 06/02/04 11:15 Received: 06/03/04 09:05									
2,3,4,6-Tetrachlorophenol	ND	330	µg/kg	1	CN04413	06/07/04	06/07/04	EPA 8270C	
Acenaphthene	ND	330	"	"	"	"	"	"	
Acenaphthylene	ND	330	"	"	"	"	"	"	
Anthracene	ND	330	"	"	"	"	"	"	
Benzo (a) anthracene	ND	330	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	330	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	330	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	330	"	"	"	"	"	"	
Benzo (a) pyrene	ND	330	"	"	"	"	"	"	
Benzyl alcohol	ND	330	"	"	"	"	"	"	
Bis(2-chloroethoxy)methane	ND	330	"	"	"	"	"	"	
Bis(2-chloroethyl)ether	ND	330	"	"	"	"	"	"	
Bis(2-chloroisopropyl)ether	ND	330	"	"	"	"	"	"	
Bis(2-ethylhexyl)phthalate	ND	330	"	"	"	"	"	"	
4-Bromophenyl phenyl ether	ND	330	"	"	"	"	"	"	
Butyl benzyl phthalate	ND	330	"	"	"	"	"	"	
4-Chloroaniline	ND	330	"	"	"	"	"	"	
2-Chloronaphthalene	ND	330	"	"	"	"	"	"	
4-Chlorophenyl phenyl ether	ND	330	"	"	"	"	"	"	
Chrysene	ND	330	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	330	"	"	"	"	"	"	
Dibenzofuran	ND	330	"	"	"	"	"	"	
Di-n-butyl phthalate	ND	330	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	330	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	330	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	330	"	"	"	"	"	"	
3,3'-Dichlorobenzidine	ND	670	"	"	"	"	"	"	
Diethyl phthalate	ND	330	"	"	"	"	"	"	
Dimethyl phthalate	ND	330	"	"	"	"	"	"	
2,4-Dinitrotoluene (2,4-DNT)	ND	330	"	"	"	"	"	"	
2,6-Dinitrotoluene (2,6-DNT)	ND	330	"	"	"	"	"	"	
Di-n-octyl phthalate	ND	330	"	"	"	"	"	"	
Fluoranthene	ND	330	"	"	"	"	"	"	
Fluorene	ND	330	"	"	"	"	"	"	
Hexachlorobenzene	ND	330	"	"	"	"	"	"	
Hexachlorobutadiene	ND	330	"	"	"	"	"	"	
Hexachlorocyclopentadiene	ND	330	"	"	"	"	"	"	
Hexachloroethane	ND	330	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	330	"	"	"	"	"	"	

DRAFT: Semivolatile Organic Compounds by EPA Method 8270C

DRAFT: SB3-3 (CNF0106-07) Soil Sampled: 06/02/04 11:15 Received: 06/03/04 09:05

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Isophorone	ND	330	µg/kg	1	CN04413	06/07/04	06/07/04	EPA 8270C	
2-Methylnaphthalene	ND	330	"	"	"	"	"	"	
Naphthalene	ND	330	"	"	"	"	"	"	
2-Nitroaniline	ND	830	"	"	"	"	"	"	
3-Nitroaniline	ND	830	"	"	"	"	"	"	
4-Nitroaniline	ND	830	"	"	"	"	"	"	
Nitrobenzene (NB)	ND	330	"	"	"	"	"	"	
N-Nitrosodiphenylamine	ND	330	"	"	"	"	"	"	
N-Nitrosodi-n-propylamine	ND	330	"	"	"	"	"	"	
Phenanthrene	ND	330	"	"	"	"	"	"	
Pyrene	ND	330	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	330	"	"	"	"	"	"	
Benzoic acid	ND	830	"	"	"	"	"	"	
4-Chloro-3-methylphenol	ND	330	"	"	"	"	"	"	
2-Chlorophenol	ND	330	"	"	"	"	"	"	
2,4-Dichlorophenol	ND	330	"	"	"	"	"	"	
2,4-Dimethylphenol	ND	330	"	"	"	"	"	"	
4,6-Dinitro-2-methylphenol	ND	830	"	"	"	"	"	"	
2,4-Dinitrophenol	ND	830	"	"	"	"	"	"	
2-Methylphenol	ND	330	"	"	"	"	"	"	
3 & 4-Methylphenol	ND	330	"	"	"	"	"	"	
2-Nitrophenol	ND	330	"	"	"	"	"	"	
4-Nitrophenol	ND	830	"	"	"	"	"	"	
Pentachlorophenol	ND	830	"	"	"	"	"	"	
Phenol	ND	330	"	"	"	"	"	"	
2,4,5-Trichlorophenol	ND	330	"	"	"	"	"	"	
2,4,6-Trichlorophenol	ND	330	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*48.4 %*		*25-121*	"	"	"	"	
Surrogate: Phenol-d6		*73.6 %*		*10-110*	"	"	"	"	
Surrogate: Nitrobenzene-d5		*93.4 %*		*23-120*	"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*85.6 %*		*30-115*	"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*36.5 %*		*19-122*	"	"	"	"	
Surrogate: Terphenyl-dl4		*75.4 %*		*18-137*	"	"	"	"	

06/08/04 13:00

Carlton Engineering, Inc. 3883 Ponderosa Road Shingle Springs, CA 95682	Project: Bear River R1 Project Number: 3076-01-01 Project Manager: Mark Montgomery	**CLS Work Order#: CNF0106**

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CALIFORN LABORATORY SERVICES **CHAIN USTODY** **CLS ID. NO.** CNF0106

Report To:

Carlton Engineering Inc.

3932 Ponderosa Road

Shingle Springs, CA 95682

Project Manager
Mark Montgomery

Project Name
Bear River RI

Sampled By
JWP

Job Description
PCP Cleanup Confirmation

Site Location
Grass Valley

Client Job Number
3076-01-01

Destination Laboratory

☒ **CLS** (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova,
CA 95742
www.californialab.com

☐ **OTHER**

FIELD CONDITIONS:
Clear sunny

NOTE:
Must meet attached Table 10 reporting limits
Include Pentachlorophenol in 8270 Matrix spike & Dup

COMPOSITE:
Analyze SB1-7 if SB1-3 has detectable PCP, analyze SB1-10 if SB-7 has detectable PCP

Similar progression for SB2 and SB3 samples.

DATE	TIME	SAMPLE IDENTIFICATION	SAMPLE MATRIX	CONTAINER NO.	CONTAINER TYPE	Preservatives	ANALYSIS REQUESTED Semivol 8270 see note						TURNAROUND TIME IN DAYS 1	2	5	10	SPECIAL INSTRUCTIONS
6/2	0900	**SB1-3**	**Soil**	**1**	**Brass Tube**	3	X									X	
6/2	0915	**SB1-7**	"	"	"	3	X									X	HOLD See Above
6/2	0930	**SB1-10**	"	"	"	3	X									X	HOLD " "
6/2	1030	**SB2-3**	"	"	"	3	X									X	
6/2	1010	**SB2-5**	"	"	"	3	X									X	HOLD " "
6/2	1045	**SB2-10**	"	"	"	3	X									X	HOLD " "
6/2	1115	**SB3-3**	"	"	"	3	X									X	
6/2	1125	**SB3-5**	"	"	"	3	X									X	HOLD " "
6/2	1140	**SB3-10**	"	"	"	3	X									X	HOLD " "

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO₃ (3) = COLD (4)

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
Mark Montgomery Raymond Orlowski	CLS	6/3/04 0800 6/3/04 0900	Raymond Orlowski Jr	CLS

RECEIVED AT LAB BY:

DATE/TIME: 6/3/04 905

CONDITIONS/COMMENTS: 12

SHIPPED BY: ☐ FED EX ☐ UPS ☐ OTHER

AIR BILL #

CALIFOR LABORATORY SERVICES CHAIN CUSTODY CLS ID. NO.

Report To:

Carlton Engineering Inc.
3932 Ponderosa Road
Shingle Springs, CA 95682

Project Manager
Mark Montgomery

Project Name
Bear River RI

Sampled By
JWP

Job Description
PCP Cleanup Confirmation

Site Location
Grass Valley

Client Job Number
3076-01-01

Destination Laboratory

☒ CLS (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova,
CA 95742
www.californialab.com

☐ OTHER

FIELD CONDITIONS:
Clear sunny

NOTE:
Must meet attached Table 10 reporting limits
Include Pentachlorophenol in 8270 Matrix spike & Dup

COMPOSITE:
Analyze SB1-7 if SB1-3 has detectable PCP, analyze SB1-10 if SB-7 has detectable PCP

Similar progression for SB2 and SB3 samples

ANALYSIS REQUESTED

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	Preservatives	Semivol 8270 see note	TURNAROUND TIME IN DAYS 1	2	5	10	SPECIAL INSTRUCTIONS
6/2	0900	SB1-3	Soil	1	Brass Tube	3	X				X	
6/2	0915	SB1-7	"	"	"	3	X				X	HOLD See Above
6/2	0930	SB1-10	"	"	"	3	X				X	HOLD " "
6/2	1030	SB2-3	"	"	"	3	X				X	
6/2	1010	SB2-5	"	"	"	3	X				X	HOLD " "
6/2	1045	SB2-10	"	"	"	3	X				X	HOLD " "
6/2	1115	SB3-3	"	"	"	3	X				X	
6/2	1125	SB3-5	"	"	"	3	X				X	HOLD " "
6/2	1140	SB3-10	"	"	"	3	X				X	HOLD " "

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
Mark Montgomery		6/3/04 0800	Raymond Ostrowski	CLS

RECEIVED AT LAB BY:

DATE/TIME:

CONDITIONS/COMMENTS:

SHIPPED BY: ☑ FED EX ☐ UPS ☐ OTHER

AIR BILL #

MATERIALS DESCRIPTION					GEOTECHNICAL			GEOMECHANIC											
DEPTH			Field qu (Tons/SqFt)	SAMPLE No	SPT COUNT	DRY DENSITY	MOISTURE CONTENT	WEATHERING					JOINTING Joints/ft					DISCONTINUITIES	
								F	SW	MW	W	C	0	2	4	6	8	TYPE	DIP
0																			
1																			
2																			
3	☒	Silty Clay (CL), light brown, moist		SB1-3															
4																			
5																			
6																			
7	◢	As above		SB1-7															
8																			
9																			
10	◢	As above. Boring terminated		SB1-10															

CARLTON
Engineering Inc

3932 Ponderosa Road, Shingle Springs, CA 95682
Voice 530.677.5515 Fax 530.677.6645

TRENCH # SB1	PROJECT NAME & NUMBER SPI BEAR RIVER 3076-01-01
DATE 6-2-04	EQUIPMENT A400 Air RotARY
BY JP	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

DEPTH	MATERIALS DESCRIPTION	Field qu (Tons/SqFt)	SAMPLE No	GEOTECHNICAL SPT COUNT	DRY DENSITY	MOISTURE CONTENT	GEOMECHANICAL WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
0										
1										
2										
☒ 3	Silty Clay (CL), light brown, moist, weak Poor recovery		SB2-3							
4										
■ 5	As above		SB2-5							
6										
7										
8										
9										
■ 10	Silty Clay (CL) brown, moist. Boring terminated.		SB2-10							

CARLTON
Engineering Inc

3932 Ponderosa Road, Shingle Springs, CA 95682
Voice 530.677.5515 Fax 530.677.6645

TRENCH # SB2-3	PROJECT NAME & NUMBER SPI BEAR RIVER 3076-01-01
DATE 6-2-04	EQUIPMENT A400 AIR ROTARY
BY JP	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

		MATERIALS DESCRIPTION			GEOTECHNICAL			GEOMECHANICAL			
	DEPTH		Field qu (Tons/SqFt)	SAMPLE No	SPT COUNT	DRY DENSITY	MOISTURE CONTENT	WEATHERING F SW MW W C	JOINTING Joints/ft 0 2 4 6 8	DISCONTINUITIES TYPE	DIP
	0										
	1										
	2										
☒	3	Sandy Clay (CL), brown, moist		SB3-3							
	4										
☒	5	As above. Poor recovery in sampler.		SB3-5							
	6										
	7										
	8										
	9										
◢	10	As above. Boring terminated.		SB3-10							

CARLTON
Engineering Inc

3932 Ponderosa Road, Shingle Springs, CA 95682
Voice 530.677.5515 Fax 530.677.6645

TRENCH # SB3-3	PROJECT NAME & NUMBER SPI BEAR RIVER 3076-01-01
DATE 6-2-04	EQUIPMENT A400 AIR ROTARY
BY P	PIT ORIENTATION
ELEVATION	NATURAL SLOPE
HOR. SCALE	VERT. SCALE

Change of Status
CND0468

Per your request, samples “05 WP1234 and 06 Wp5678” were analyzed for PCP’s by EPA Method 8151.

This final report package for Work Order # CND0468 is an extension of the original Work Order # CND0076. The original Chain of Custody was returned with the previous report package.

04/21/04 14:11

Carlton Engineering, Inc. 3883 Ponderosa Road Shingle Springs, CA 95682	Project: Bear River R1 Project Number: 3076-01-01 Project Manager: Mark Montgomery	**CLS Work Order #: CND0468** COC #: None

Chlorinated Herbicides by EPA Method 8151A

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
WP1234 (CND0468-05) Soil	**Sampled: 04/01/04 17:00**	**Received: 04/13/04 13:32**							**R-01**
Pentachlorophenol	ND	0.050	mg/kg	10	CN03071	04/15/04	04/17/04	EPA 8150A	
Surrogate: 2,4-DCAA		*%*	*50-150*		"	"	"	"	*S-01*
WP5678 (CND0468-06) Soil	**Sampled: 04/01/04 17:00**	**Received: 04/13/04 13:32**							**R-01**
Pentachlorophenol	ND	0.050	mg/kg	10	CN03071	04/15/04	04/17/04	EPA 8150A	
Surrogate: 2,4-DCAA		*%*	*50-150*		"	"	"	"	*S-01*

Notes and Definitions

QM-10	LCS/LCSD were analyzed in place of MS/MSD.
R-01	The Reporting Limits for this sample have been raised to account for matrix interference.
S-01	The surrogate recovery for this sample is not available due to sample dilution required from high analyte concentration and/or matrix interferences.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

C-4. WASTE PILE LAB REPORTS, COCS, AND TRENCHING LOGS

04/08/04 08:55

Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project: Bear River R1
Project Number: 3076-01-01
Project Manager: Mark Montgomery

CLS Work Order #: CND0076

COC #: None

Extractable Petroleum Hydrocarbons by EPA Method 8015M

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
WP1+2 (CND0076-01) Soil	**Sampled: 04/01/04 17:00**	**Received: 04/02/04 14:50**							
Diesel	ND	1.0	mg/kg	1	CN02664	04/02/04	04/05/04	EPA 8015M	
Motor Oil	**62**	1.0	"	"	"	"	"	"	
WP3+4 (CND0076-02) Soil	**Sampled: 04/01/04 17:00**	**Received: 04/02/04 14:50**							
Diesel	ND	1.0	mg/kg	1	CN02664	04/02/04	04/05/04	EPA 8015M	
Motor Oil	**16**	1.0	"	"	"	"	"	"	DSL-3
WP5+6 (CND0076-03) Soil	**Sampled: 04/01/04 17:00**	**Received: 04/02/04 14:50**							
Diesel	ND	1.0	mg/kg	1	CN02664	04/02/04	04/05/04	EPA 8015M	
Motor Oil	**16**	1.0	"	"	"	"	"	"	DSL-3
WP7+8 (CND0076-04) Soil	**Sampled: 04/01/04 17:00**	**Received: 04/02/04 14:50**							
Diesel	ND	1.0	mg/kg	1	CN02664	04/02/04	04/05/04	EPA 8015M	
Motor Oil	**8.6**	1.0	"	"	"	"	"	"	DSL-3

04/08/04 08:55

Carlton Engineering, Inc. 3883 Ponderosa Road Shingle Springs, CA 95682	Project: Bear River R1 Project Number: 3076-01-01 Project Manager: Mark Montgomery	CLS Work Order #: CND0076 COC #: None

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
WP1234 (CND0076-05) Soil	**Sampled: 04/01/04 17:00**	**Received: 04/02/04 14:50**							**R-05**
2,3,4,6-Tetrachlorophenol	ND	1600	µg/kg	5	CN02698	04/05/04	04/06/04	EPA 8270C	
Acenaphthene	ND	1600	"	"	"	"	"	"	
Acenaphthylene	ND	1600	"	"	"	"	"	"	
Anthracene	ND	1600	"	"	"	"	"	"	
Benzo (a) anthracene	ND	1600	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	1600	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	1600	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	1600	"	"	"	"	"	"	
Benzo (a) pyrene	ND	1600	"	"	"	"	"	"	
Benzyl alcohol	ND	1600	"	"	"	"	"	"	
Bis(2-chloroethoxy)methane	ND	1600	"	"	"	"	"	"	
Bis(2-chloroethyl)ether	ND	1600	"	"	"	"	"	"	
Bis(2-chloroisopropyl)ether	ND	1600	"	"	"	"	"	"	
[illegible]ethylhexyl)phthalate	ND	1600	"	"	"	"	"	"	
4-Bromophenyl phenyl ether	ND	1600	"	"	"	"	"	"	
Butyl benzyl phthalate	ND	1600	"	"	"	"	"	"	
4-Chloroaniline	ND	1600	"	"	"	"	"	"	
2-Chloronaphthalene	ND	1600	"	"	"	"	"	"	
4-Chlorophenyl phenyl ether	ND	1600	"	"	"	"	"	"	
Chrysene	ND	1600	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	1600	"	"	"	"	"	"	
Dibenzofuran	ND	1600	"	"	"	"	"	"	
Di-n-butyl phthalate	ND	1600	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1600	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1600	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1600	"	"	"	"	"	"	
3,3′-Dichlorobenzidine	ND	3400	"	"	"	"	"	"	
Diethyl phthalate	ND	1600	"	"	"	"	"	"	
Dimethyl phthalate	ND	1600	"	"	"	"	"	"	
2,4-Dinitrotoluene (2,4-DNT)	ND	1600	"	"	"	"	"	"	
2,6-Dinitrotoluene (2,6-DNT)	ND	1600	"	"	"	"	"	"	
Di-n-octyl phthalate	ND	1600	"	"	"	"	"	"	
Fluoranthene	ND	1600	"	"	"	"	"	"	
Fluorene	ND	1600	"	"	"	"	"	"	
Hexachlorobenzene	ND	1600	"	"	"	"	"	"	
Hexachlorobutadiene	ND	1600	"	"	"	"	"	"	
Hexachlorocyclopentadiene	ND	1600	"	"	"	"	"	"	
Hexachloroethane	ND	1600	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	1600	"	"	"	"	"	"	
Isophorone	ND	1600	"	"	"	"	"	"	

Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project: Bear River R1
Project Number: 3076-01-01
Project Manager: Mark Montgomery

CLS Work Order #: CND0076

COC #: None

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
WP1234 (CND0076-05) Soil Sampled: 04/01/04 17:00 Received: 04/02/04 14:50									**R-05**
2-Methylnaphthalene	ND	1600	µg/kg	5	CN02698	04/05/04	04/06/04	EPA 8270C	
Naphthalene	ND	1600	"	"	"	"	"	"	
2-Nitroaniline	ND	4200	"	"	"	"	"	"	
3-Nitroaniline	ND	4200	"	"	"	"	"	"	
4-Nitroaniline	ND	4200	"	"	"	"	"	"	
Nitrobenzene (NB)	ND	1600	"	"	"	"	"	"	
N-Nitrosodiphenylamine	ND	1600	"	"	"	"	"	"	
N-Nitrosodi-n-propylamine	ND	1600	"	"	"	"	"	"	
Phenanthrene	ND	1600	"	"	"	"	"	"	
Pyrene	ND	1600	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1600	"	"	"	"	"	"	
Benzoic acid	ND	4200	"	"	"	"	"	"	
4-Chloro-3-methylphenol	ND	1600	"	"	"	"	"	"	
orophenol	ND	1600	"	"	"	"	"	"	
2, Dichlorophenol	ND	1600	"	"	"	"	"	"	
2,4-Dimethylphenol	ND	1600	"	"	"	"	"	"	
4,6-Dinitro-2-methylphenol	ND	4200	"	"	"	"	"	"	
2,4-Dinitrophenol	ND	4200	"	"	"	"	"	"	
2-Methylphenol	ND	1600	"	"	"	"	"	"	
3 & 4-Methylphenol	ND	1600	"	"	"	"	"	"	
2-Nitrophenol	ND	1600	"	"	"	"	"	"	
4-Nitrophenol	ND	4200	"	"	"	"	"	"	
Pentachlorophenol	ND	4200	"	"	"	"	"	"	
Phenol	ND	1600	"	"	"	"	"	"	
2,4,5-Trichlorophenol	ND	1600	"	"	"	"	"	"	
2,4,6-Trichlorophenol	ND	1600	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*67.2 %*	*25-121*		"	"	"	"	
Surrogate: Phenol-d6		*71.2 %*	*10-110*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*87.4 %*	*23-120*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*87.4 %*	*30-115*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*55.2 %*	*19-122*		"	"	"	"	
Surrogate: Terphenyl-dl4		*83.2 %*	*18-137*		"	"	"	"	
WP5678 (CND0076-06) Soil Sampled: 04/01/04 17:00 Received: 04/02/04 14:50									**R-05**
2,3,4,6-Tetrachlorophenol	ND	1600	µg/kg	5	CN02698	04/05/04	04/06/04	EPA 8270C	
Acenaphthene	ND	1600	"	"	"	"	"	"	
Acenaphthylene	ND	1600	"	"	"	"	"	"	
Anthracene	ND	1600	"	"	"	"	"	"	
Benzo (a) anthracene	ND	1600	"	"	"	"	"	"	
B o (b) fluoranthene	ND	1600	"	"	"	"	"	"	

04/08/04 08:55

Carlton Engineering, Inc. 3883 Ponderosa Road Shingle Springs, CA 95682	Project: Bear River R1 Project Number: 3076-01-01 Project Manager: Mark Montgomery	**CLS Work Order #: CND0076** COC #: None

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
WP5678 (CND0076-06) Soil	**Sampled: 04/01/04 17:00**	**Received: 04/02/04 14:50**							**R-05**
Benzo (k) fluoranthene	ND	1600	µg/kg	5	CN02698	04/05/04	04/06/04	EPA 8270C	
Benzo (g,h,i) perylene	ND	1600	"	"	"	"	"	"	
Benzo (a) pyrene	ND	1600	"	"	"	"	"	"	
Benzyl alcohol	ND	1600	"	"	"	"	"	"	
Bis(2-chloroethoxy)methane	ND	1600	"	"	"	"	"	"	
Bis(2-chloroethyl)ether	ND	1600	"	"	"	"	"	"	
Bis(2-chloroisopropyl)ether	ND	1600	"	"	"	"	"	"	
Bis(2-ethylhexyl)phthalate	ND	1600	"	"	"	"	"	"	
4-Bromophenyl phenyl ether	ND	1600	"	"	"	"	"	"	
Butyl benzyl phthalate	ND	1600	"	"	"	"	"	"	
4-Chloroaniline	ND	1600	"	"	"	"	"	"	
2-Chloronaphthalene	ND	1600	"	"	"	"	"	"	
4-Chlorophenyl phenyl ether	ND	1600	"	"	"	"	"	"	
[illegible]sene	ND	1600	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	1600	"	"	"	"	"	"	
Dibenzofuran	ND	1600	"	"	"	"	"	"	
Di-n-butyl phthalate	ND	1600	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1600	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1600	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1600	"	"	"	"	"	"	
3,3′-Dichlorobenzidine	ND	3400	"	"	"	"	"	"	
Diethyl phthalate	ND	1600	"	"	"	"	"	"	
Dimethyl phthalate	ND	1600	"	"	"	"	"	"	
2,4-Dinitrotoluene (2,4-DNT)	ND	1600	"	"	"	"	"	"	
2,6-Dinitrotoluene (2,6-DNT)	ND	1600	"	"	"	"	"	"	
Di-n-octyl phthalate	ND	1600	"	"	"	"	"	"	
Fluoranthene	ND	1600	"	"	"	"	"	"	
Fluorene	ND	1600	"	"	"	"	"	"	
Hexachlorobenzene	ND	1600	"	"	"	"	"	"	
Hexachlorobutadiene	ND	1600	"	"	"	"	"	"	
Hexachlorocyclopentadiene	ND	1600	"	"	"	"	"	"	
Hexachloroethane	ND	1600	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	1600	"	"	"	"	"	"	
Isophorone	ND	1600	"	"	"	"	"	"	
2-Methylnaphthalene	ND	1600	"	"	"	"	"	"	
Naphthalene	ND	1600	"	"	"	"	"	"	
2-Nitroaniline	ND	4200	"	"	"	"	"	"	
3-Nitroaniline	ND	4200	"	"	"	"	"	"	
4-Nitroaniline	ND	4200	"	"	"	"	"	"	
[illegible]benzene (NB)	ND	1600	"	"	"	"	"	"	

04/08/04 08:55

Carlton Engineering, Inc. 3883 Ponderosa Road Shingle Springs, CA 95682	Project: Bear River R1 Project Number: 3076-01-01 Project Manager: Mark Montgomery	CLS Work Order #: CND0076 COC #: None

Semivolatile Organic Compounds by EPA Method 8270C

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
WP5678 (CND0076-06) Soil	**Sampled: 04/01/04 17:00**	**Received: 04/02/04 14:50**							**R-05**
N-Nitrosodiphenylamine	ND	1600	µg/kg	5	CN02698	04/05/04	04/06/04	EPA 8270C	
N-Nitrosodi-n-propylamine	ND	1600	"	"	"	"	"	"	
Phenanthrene	ND	1600	"	"	"	"	"	"	
Pyrene	ND	1600	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1600	"	"	"	"	"	"	
Benzoic acid	ND	4200	"	"	"	"	"	"	
4-Chloro-3-methylphenol	ND	1600	"	"	"	"	"	"	
2-Chlorophenol	ND	1600	"	"	"	"	"	"	
2,4-Dichlorophenol	ND	1600	"	"	"	"	"	"	
2,4-Dimethylphenol	ND	1600	"	"	"	"	"	"	
4,6-Dinitro-2-methylphenol	ND	4200	"	"	"	"	"	"	
2,4-Dinitrophenol	ND	4200	"	"	"	"	"	"	
2-Methylphenol	ND	1600	"	"	"	"	"	"	
[illegible]-Methylphenol	ND	1600	"	"	"	"	"	"	
2-Nitrophenol	ND	1600	"	"	"	"	"	"	
4-Nitrophenol	ND	4200	"	"	"	"	"	"	
Pentachlorophenol	ND	4200	"	"	"	"	"	"	
Phenol	ND	1600	"	"	"	"	"	"	
2,4,5-Trichlorophenol	ND	1600	"	"	"	"	"	"	
2,4,6-Trichlorophenol	ND	1600	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*74.0 %*	*25-121*		"	"	"	"	
Surrogate: Phenol-d6		*79.6 %*	*10-110*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*93.4 %*	*23-120*		"	"	"	"	
Surrogate: 2-Fluorobiphenyl		*93.4 %*	*30-115*		"	"	"	"	
Surrogate: 2,4,6-Tribromophenol		*62.8 %*	*19-122*		"	"	"	"	
Surrogate: Terphenyl-dl4		*85.6 %*	*18-137*		"	"	"	"	

Carlton Engineering, Inc. 3883 Ponderosa Road Shingle Springs, CA 95682	Project: Bear River R1 Project Number: 3076-01-01 Project Manager: Mark Montgomery	**CLS Work Order #: CND0076** COC #: None

Notes and Definitions

DSL-3	Although sample contains compounds in the retention time range associated with motor oil, the chromatogram was not consistent with the expected chromatographic pattern or "fingerprint". However, the reported concentration is based on motor oil.
R-05	The sample was diluted due to the presence of high levels of non-target analytes resulting in elevated reporting limits.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CALIFORNIA LABORATORY SERVICES **CHAIN OF CUSTODY** **CLS ID. NO.** CND 0076

Report To:

Carlton Engineering Inc.
3932 Ponderosa Road
Shingle Springs, CA 95682

Project Manager: **Mark Montgomery**

Project Name: **Bear River RI**

Sampled By: JWP/MSM

Job Description: **Waste Pile Sampling: Organics**

Site Location: **Grass Valley**

Client Job Number: 3076-01-01

Destination Laboratory

☒ **CLS** (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova,
CA 95742
www.californialab.com

☐ **OTHER**

FIELD CONDITIONS: Clear sunny

NOTE:
Must meet attached Table 10 reporting limits
Include Pentachlorophenol in 8270 Matrix spike & Dup

COMPOSITE:

DATE	TIME	SAMPLE IDENTIFICATION	SAMPLE MATRIX	CONTAINER NO.	CONTAINER TYPE	Preservatives	ANALYSIS REQUESTED: TPH-Diesel 8015M w/silica gel cleanup	ANALYSIS REQUESTED: Semivol 8270 see note	TURNAROUND TIME IN DAYS: 1	2	5	10	SPECIAL INSTRUCTIONS
4/1	1700	WP1+2	Soil	1	8oz Jar	3	X					X	
4/1	1700	WP3+4	"	"	"	3	X					X	
4/1	1700	WP5+6	"	"	"	3	X					X	
4/1	1700	WP7+8	"	"	"	3	X					X	
4/1	1700	WP1234	"	"	"	3		X				X	
4/1	1700	WP5678	"	"	"	3		X				X	

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
Mark Montgomery		4/2/10 1410		[illegible]
RECEIVED AT LAB BY:		DATE/TIME: 4/2/10 1450	CONDITIONS/COMMENTS:	

SHIPPED BY: ☐ FED EX ☐ UPS ☐ OTHER ________ AIR BILL # ________

Table 10. DATA QUALITY OBJECTIVES FOR SOIL/ROCK SAMPLES
BEAR RIVER MILL SITE REMEDIAL INVESTIGATION

Metal (1)	EPA Region IX Residential PRG (mg/kg)	Method Detection Limit (mg/kg)	Reporting Limit (mg/kg)	Data Quality Objective (mg/kg)
Antimony	31	2	2.5	2.5
Arsenic	22	0.25	1	1
Barium	5,400	0.57	1	1
Beryllium	150	0.05	0.25	0.25
Cadmium	37	0.15	0.5	0.5
Chromium (Total)	210	0.31	1	1
Cobalt	4,700	0.08	1	1
Copper	2,900	0.3	1	1
Lead	400	0.87	2.5	2.5
Mercury	None	0.1	0.1	0.1
Molybdenum	390	0.24	1	1
Nickel	150	0.21	1	1
Selenium	390	3.2	5	5
Silver	390	0.18	0.5	0.5
Thallium	5.2	12	25	25
Vanadium	550	0.09	1	1
Zinc	2,300	0.27	1	1
Semi-volatile Organics (2)				
Pentachlorophenol	3	0.08	0.83	0.83
Tetrachlorophenol		0.03	0.33	0.33
Petroleum Hydrocarbons(3)				
TPH-Diesel		0.045	1	1

(1) By EPA Method 6010A/7000 Series CLS Laboratory 3/1/04
(2) By EPA Method 8270 CLS Laboratory 3/1/04
(3) By 8015M with silica gel cleanup

04/12/04 14:05

Carlton Engineering, Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

Project: Bear River R1
Project Number: 3076-01-01
Project Manager: Mark Montgomery

CLS Work Order #: CND0075
COC #: None

CAM 17 Metals

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
WP2A (CND0075-03) Soil	**Sampled: 04/01/04 09:15**	**Received: 04/02/04 14:50**							
Arsenic	**54**	5.0	mg/kg	20	CN02740	04/06/04	04/08/04	EPA 7000	
Selenium	ND	1.0	"	4	"	"	"	"	
Thallium	**1.1**	1.0	"	"	"	"	"	"	
Antimony	ND	2.5	"	1	CN02742	04/06/04	04/07/04	EPA 6010B	
Barium	**57**	1.0	"	"	"	"	"	"	
Beryllium	ND	0.50	"	"	"	"	"	"	
Cadmium	ND	0.50	"	"	"	"	"	"	
Cobalt	**4.0**	1.0	"	"	"	"	"	"	
Chromium	**9.3**	1.0	"	"	"	"	"	"	
Copper	**9.8**	1.0	"	"	"	"	"	"	
Lead	**11**	2.5	"	"	"	"	"	"	
Molybdenum	ND	1.0	"	"	"	"	"	"	
Nickel	**4.4**	1.0	"	"	"	"	"	"	
[illegible]r	**5.8**	0.50	"	"	"	"	"	"	
Vanadium	**38**	1.0	"	"	"	"	"	"	
Zinc	**22**	1.0	"	"	"	"	"	"	
Mercury	ND	0.10	"	"	CN02722	04/05/04	04/07/04	EPA 7471	
WP4A (CND0075-07) Soil	**Sampled: 04/01/04 10:00**	**Received: 04/02/04 14:50**							
Arsenic	**19**	2.0	mg/kg	8	CN02740	04/06/04	04/08/04	EPA 7000	
Selenium	ND	1.0	"	4	"	"	"	"	
Thallium	ND	1.0	"	"	"	"	"	"	
Antimony	ND	2.5	"	1	CN02742	04/06/04	04/07/04	EPA 6010B	
Barium	**51**	1.0	"	"	"	"	"	"	
Beryllium	ND	0.50	"	"	"	"	"	"	
Cadmium	ND	0.50	"	"	"	"	"	"	
Cobalt	**4.7**	1.0	"	"	"	"	"	"	
Chromium	**13**	1.0	"	"	"	"	"	"	
Copper	**13**	1.0	"	"	"	"	"	"	
Lead	**7.0**	2.5	"	"	"	"	"	"	
Molybdenum	ND	1.0	"	"	"	"	"	"	
Nickel	**8.1**	1.0	"	"	"	"	"	"	
Silver	**6.0**	0.50	"	"	"	"	"	"	
Vanadium	**38**	1.0	"	"	"	"	"	"	
Zinc	**20**	1.0	"	"	"	"	"	"	
Mercury	**0.16**	0.10	"	"	CN02722	04/05/04	04/07/04	EPA 7471	

04/12/04 14:05

Carlton Engineering, Inc. 3883 Ponderosa Road Shingle Springs, CA 95682	Project: Bear River R1 Project Number: 3076-01-01 Project Manager: Mark Montgomery	**CLS Work Order #: CND0075** COC #: None

Metals by EPA 6000/7000 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
WP1A (CND0075-01) Soil Sampled: 04/01/04 08:45 Received: 04/02/04 14:50									
Arsenic	17	1.0	mg/kg	4	CN02740	04/06/04	04/08/04	EPA 7060	
WP1B (CND0075-02) Soil Sampled: 04/01/04 09:03 Received: 04/02/04 14:50									
Arsenic	33	5.0	mg/kg	20	CN02740	04/06/04	04/08/04	EPA 7060	
WP2B (CND0075-04) Soil Sampled: 04/01/04 09:20 Received: 04/02/04 14:50									
Arsenic	54	5.0	mg/kg	20	CN02740	04/06/04	04/08/04	EPA 7060	
WP3A (CND0075-05) Soil Sampled: 04/01/04 09:40 Received: 04/02/04 14:50									
Arsenic	35	5.0	mg/kg	20	CN02740	04/06/04	04/08/04	EPA 7060	
WP3B (CND0075-06) Soil Sampled: 04/01/04 09:35 Received: 04/02/04 14:50									
Arsenic	40	5.0	mg/kg	20	CN02740	04/06/04	04/08/04	EPA 7060	
WP5A (CND0075-08) Soil Sampled: 04/01/04 10:15 Received: 04/02/04 14:50									
[illegible]ic	19	2.0	mg/kg	8	CN02740	04/06/04	04/08/04	EPA 7060	
W[illegible]A (CND0075-09) Soil Sampled: 04/01/04 10:30 Received: 04/02/04 14:50									
Arsenic	24	2.0	mg/kg	8	CN02740	04/06/04	04/08/04	EPA 7060	
WP7A (CND0075-10) Soil Sampled: 04/01/04 10:40 Received: 04/02/04 14:50									
Arsenic	46	4.0	mg/kg	16	CN02740	04/06/04	04/08/04	EPA 7060	
WP8A (CND0075-11) Soil Sampled: 04/01/04 10:48 Received: 04/02/04 14:50									
Arsenic	33	4.0	mg/kg	16	CN02740	04/06/04	04/08/04	EPA 7060	
WP8B (CND0075-12) Soil Sampled: 04/01/04 11:00 Received: 04/02/04 14:50									
Arsenic	19	2.0	mg/kg	8	CN02740	04/06/04	04/08/04	EPA 7060	

Notes and Definitions

QM-05	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS/LCSD recovery.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CALIFORNIA LABORATORY SERVICES **CHAIN OF CUSTODY** **CLS ID. NO.** CNDOO75

Report To:

Carlton Engineering Inc.

3932 Ponderosa Road

Shingle Springs, CA 95682

Project Manager
Mark Montgomery

Project Name
Bear River RI

Sampled By
JWP/MSM

Job Description
Waste Pile Sampling: Metals

Site Location
Grass Valley

Client Job Number
3076-01-01

Destination Laboratory

X CLS (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova,
CA 95742
www.californialab.com

☐ **OTHER**

ANALYSIS REQUESTED

FIELD CONDITIONS:
Clear sunny

NOTE:
Must meet attached Table 10 reporting limits

COMPOSITE:

		SAMPLE		CONTAINER										TURNAROUND TIME IN DAYS				SPECIAL INSTRUCTIONS
DATE	**TIME**	**IDENTIFICATION**	**MATRIX**	**NO.**	**TYPE**	**Preservatives**	**Arsenic**	**CAM 17**						**1**	**2**	**5**	**10**	
4/1	0845	**WP1A**	**Soil**	**1**	**1 gal baggie**	3	X										X	
4/1	0903	**WP1B**	"	"	"	3	X										X	
4/1	0915	**WP2A**	"	"	"	3		X									X	
4/1	0920	**WP2B**	"	"	"	3	X										X	
4/1	0940	**WP3A**	"	"	"	3	X										X	
4/1	0935	**WP3B**	"	"	"	3	X										X	
4/1	1000	**WP4A**	"	"	"	3		X									X	
4/1	1015	**WP5A**	"	"	"	3	X										X	
4/1	1030	**WP6A**	"	"	"	3	X										X	
4/1	1040	**WP7A**	"	"	"	3	X										X	
4/1	~~1100~~ 1018	**WP8A**	"	"	"	3	X										X	
4/1	1100	**WP8B**	"	"	"	3	X										X	

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
Mark Montgomery		4/1/4 1440 4/2/4 1450		[illegible] / CLS

RECEIVED AT LAB BY: **DATE/TIME:** 4-2-04 1430 **CONDITIONS/COMMENTS:**

SHIPPED BY: ☐ **FED EX** ☐ **UPS** ☐ **OTHER** **AIR BILL #**

CALIFORNIA LABORATORY SERVICES **CHAIN OF CUSTODY** **CLS ID. NO.**__________

Report To:

Carlton Engineering Inc.

3932 Ponderosa Road

Shingle Springs, CA 95682

Project Manager
Mark Montgomery

Project Name
Bear River RI

Sampled By
JWP/MSM

Job Description
Waste Pile Sampling: Organics

Site Location
Grass Valley

Client Job Numbe.
3076-01-01

Destination Laboratory

☒ **CLS** (916) 638-7301
3249 Fitzgerald Road
Rancho Cordova,
CA 95742
www.californialab.com

☐ **OTHER**

FIELD CONDITIONS:
Clear sunny

NOTE:
Must meet attached Table 10 reporting limits
Include Pentachlorophenol in 8270 Matrix spike & Dup

COMPOSITE:

DATE	**TIME**	**SAMPLE IDENTIFICATION**	**MATRIX**	**CONTAINER NO.**	**CONTAINER TYPE**	**Preservatives**	**TPH-Diesel 8015M w/silica gel cleanup**	**Semivol 8270 see note**						**TURNAROUND TIME IN DAYS 1**	**2**	**5**	**10**	**SPECIAL INSTRUCTIONS**
4/1	1700	**WP1+2**	**Soil**	**1**	**8oz Jar**	3	X										X	
4/1		**WP3+4**	"	"	"	3	X										X	
4/1		**WP5+6**	"	"	"	3	X										X	
4/1		**WP7+8**	"	"	"	3	X										X	
4/1		**WP1234**	"	"	"	3		X									X	
4/1		**WP5678**	"	"	"	3		X									X	

SUSPECTED CONSTITUENTS

SAMPLE RETENTION TIME

PRESERVATIVES (1) HCL (2) HNO_3 (3) = COLD (4)

RELINQUISHED BY (Signature)	PRINT NAME/COMPANY	DATE/TIME	RECEIVED BY (Signature)	PRINT NAME/COMPANY
Mark Montgomery		4/2/10 1010		[illegible]

RECEIVED AT LAB BY:

DATE/TIME:

CONDITIONS/COMMENTS:

SHIPPED BY: ☐ **FED EX** ☐ **UPS** ☐ **OTHER** __________ **AIR BILL #** __________

ELEV.(FT)	DEPTH(FT)	MATERIALS DESCRIPTION COLOR & TYPE	Field qu TSF	SAMPLE No	ROCK CHARACTERISTICS STRENGTH	WEATHERING F S M H C	FRACTURING VW W M C VC	DISCONTINUITIES TYPE	DIP
	0	CONCRETE RUBBLE SCATTERED ON TOP, SMALL AMT OF RUBBISH							
		DK BROWN SILTY SAND, HIGH ORGANIC CONTENT, GRAVEL &							
	1	CABLE COBBLE SIZED							
		RK MIXED IN							
	2	MOIST SOME APPEARS							
		TO BE WASTE RK		WP1A MID					
	3								
		BURIED LOG - PART OF PREVIOUS LOADING RAMP							
	4								
	5	TERM. ON ASPHALT		WP1A BOT					
	6								
	7								
		2ND TRENCH							
	8	WP1B ~1'							
	9								
	10								
	11	CK TO MAKE SURE SGT IN INCLUDED IN ALL TPH ANAL.							

CARLTON
Engineering Inc.
3932 Ponderosa Road, Shingle Springs, CA 95682
Voice 530.677.5515 Fax 530.677.6645

PROJECT NAME & NUMBER: BEAR RIVER
TRENCH #: WP1A&B
DATE: 4-1-04
BY: MV & JP
EQUIPMENT: CASE 580 EXTENDAHOE ED
ELEVATION: /
NATURAL SLOPE: /
PIT ORIENTATION: E-W

MATERIALS DESCRIPTION

ROCK CHARACT .ISTICS

ELEV.(FT)	DEPTH(FT)	COLOR & TYPE	Field qu TSF	SAMPLE No	STRENGTH	WEATHERING F S M H C	FRACTURING VW W M C VC	DISCONTINUITIES TYPE	DIP
	0	DK BR SILTY SAND, GRAVELS & COBBLES, ORGANICS - WOOD CHIPS, BARK 10-20%? MINE WASTE GRAVEL							
	1								
	2								
	3								
	4			WP 2A MID					
	5								
	6	TRENCH TERM @ PAD SURFACE - CLAY		WP 2A BOT					
	7								
	8								
	9								
	10								
	11								

CARLTON
Engineering Inc.

3932 Ponderosa Road, Shingle Springs, CA 95682
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PROJECT NAME & NUMBER: BEAR RIVER

TRENCH #: WP2A

DATE: 4-1-04

BY: MV & JP

EQUIPMENT: CASE 580 K

ELEVATION:

NATURAL SLOPE:

PIT ORIENTATION:

ELEV. (FT.)	DEPTH (FT.)	MATERIALS DESCRIPTION COLOR & TYPE	Field qu TSF	SAMPLE No	STRENGTH	WEATHERING F S M H C	FRACTURING VW W M C VC	DISCONTINUITIES TYPE	DIP
	0								
		DK BR SILTY SAND W/ GRAVEL & COBBLES, HIGH ORGANICS AS WP2A							
	1								
	2								
	3								
				WP2B	MID				
	4								
	5								
	6			WP 2B	BOT.				
	7								
	8								
	9								
	10								
	11								

CARLTON
Engineering Inc.

3932 Ponderosa Road, Shingle Springs, CA 95682
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PROJECT NAME & NUMBER: BEAR RIVER MILL

TRENCH #: WP2B

DATE: 4-1-04

BY: MV & JP

EQUIPMENT: CASE 580 EH..

ELEVATION: /

NATURAL SLOPE: /

PIT ORIENTATION: N<

ELEV.(FT)	DEPTH(FT)	MATERIALS DESCRIPTION COLOR & TYPE	Field qu TSF	SAMPLE No	STRENGTH	WEATHERING	FRACTURING	ROCK CHARACT ISTICS DISCONTINUITIES	
						F S M H C	VW W M C VC	TYPE	DIP
	0	DARK BROWN SILTY SAND & ORGANICS - CHIPS & BARK							
	1	SOME GRAVEL & COBBLE, GRANITIC AGG. & SOME MINE WASTE RK							
	2								
	3			WP3A	M10				
	4								
	5								
	6	FEW ROCKS MOSTLY FINE ORGANICS TERM @ PAD SURF IN SOIL		WP3A	B07				
	7								
	8								
	9								
	10								
	11								

CARLTON
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3932 Ponderosa Road, Shingle Springs, CA 95682
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PROJECT NAME & NUMBER: BEAR RIVER MILL
TRENCH #: WP3A
DATE: 4-1-04
BY: MV & JP
EQUIPMENT: CASE 580
ELEVATION: —
NATURAL SLOPE: —
PIT ORIENTATION: N-S

ELEV.(FT)	DEPTH(FT)	MATERIALS DESCRIPTION COLOR & TYPE	Field qu TSF	SAMPLE No	ROCK CHARACTERISTICS STRENGTH	WEATHERING F S M H C	FRACTURING VW W M C VC	DISCONTINUITIES TYPE	DIP
	0	BR SILTY SAND W/ORGANICS – FINE CHIPS, SLIGHTLY MORE GRAVEL THAN 3A							
	1								
	2			WP3B	MID				
	3								
	4	TERM @ PAD SURFACE IN SOIL		WP3B	BOT				
	5								
	6								
	7								
	8								
	9								
	10								
	11								

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Engineering Inc.
3932 Ponderosa Road, Shingle Springs, CA 95682
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PROJECT NAME & NUMBER: BEAR RIVER MILL

TRENCH #: WP3B

DATE: 4-1-04

BY: MV & JP

EQUIPMENT: CASE 580

ELEVATION: /

NATURAL SLOPE: /

PIT ORIENTATION: N-S

ELEV.(FT)	DEPTH(FT)	MATERIALS DESCRIPTION COLOR & TYPE	Field qu TSF	SAMPLE No	ROCK CHARACT ISTICS STRENGTH	WEATHERING F S M H C	FRACTURING VW W M C VC	DISCONTINUITIES TYPE	DIP
	0	BR SILTY SAND, HIGH ORGANICS, FEW ROCKS							
		MOIST							
	1								
	2	CRUSHED METAL PIPE, CABLE, METAL STRAP							
	3								
	4			WP 4.	MD				
	5								
	6	DRY							
				WP 4	BOT				
	7	TERM ON PAD SURF IN SOIL							
	8								
	9								
	10								
	11								

CARLTON
Engineering Inc.
3932 Ponderosa Road, Shingle Springs, CA 95682
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PROJECT NAME & NUMBER: BEAR RIVER MILL

TRENCH #: WP 4

DATE: 4-1-04

BY: MV & JP

EQUIPMENT: CASE ..

ELEVATION: /

NATURAL SLOPE: /

PIT ORIENTATION:

ELEV. (FT)	DEPTH (FT)	MATERIALS DESCRIPTION COLOR & TYPE	Field qu TSF	SAMPLE No	ROCK CHARACTERISTICS STRENGTH	WEATHERING F	S	M	H	C	FRACTURING VW	W	M	C	VC	DISCONTINUITIES TYPE	DIP
	0	DK BR SILTY SAND W/ SOME RK; MOIST HIGLY ORGANIC,															
	1	SOME LIMB/ROOT CHUNKS															
	2																
	3			WP5	MID												
	4			WP5	BOT												
	5																
	6																
	7																
	8																
	9																
	10																
	11																

CARLTON
Engineering Inc.

3932 Ponderosa Road, Shingle Springs, CA 95682
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PROJECT NAME & NUMBER: BEAR RIVER MILL

TRENCH #: WP 5

DATE: 4-1-04

BY: MV + JP

EQUIPMENT: CASE

ELEVATION: —

NATURAL SLOPE: —

PIT ORIENTATION: NW

ELEV.(F	DEPTH(F	MATERIALS DESCRIPTION COLOR & TYPE	Field qu TSF	SAMPLE No	ROCK CHARACTERISTICS STRENGTH	WEATHERING F S M H C	FRACTURING VW W M C VC	DISCONTINUITIES TYPE	DIP
	0								
		BROWN SILTY SAND W/ORGANICS, GRAVEL, COBBLE, BOULDERS							
	1	30-50% RK							
		LIMBS, CHUNKS OF LOGS							
	2								
	3								
	4								
				WP6A	MID				
	5								
	6								
	7			WP6B	BOT.				
	8								
	9								
	10								
	11								

CARLTON
Engineering Inc.

3932 Ponderosa Road, Shingle Springs, CA 95682
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PROJECT NAME & NUMBER: BEAR RIVER MILL

TRENCH #	DATE	BY
WP6	4-1-04	MW&JP

EQUIPMENT: CASE

ELEVATION	NATURAL SLOPE	PIT ORIENTATION
		E-W

ELEV.(FT)	DEPTH(FT)	MATERIALS DESCRIPTION COLOR & TYPE	Field qu TSF	SAMPLE No	ROCK CHARACT ISTICS STRENGTH	WEATHERING F S M H C	FRACTURING VW W M C VC	DISCONTINUITIES TYPE	DIP
	0	BROWN SILTY SAND W/ ORGANICS & COBBLES & BOULDERS, A.C. SLAB CHUNK							
	1	SOME MINE WASTE RK.							
	2								
	3			WP7	MID				
	4								
	5								
	6	TERM ON AC PAD		WP7	BOT				
	7								
	8								
	9								
	10								
	11								

CARLTON
Engineering Inc.
3932 Ponderosa Road, Shingle Springs, CA 95682
Voice 530.677.5515 Fax 530.677.6645

PROJECT NAME & NUMBER: BEAR RIVER MILL
TRENCH #: WP7
DATE: 4-1-04
BY: MV & JP
EQUIPMENT: CASE ..
ELEVATION: /
NATURAL SLOPE: /
PIT ORIENTATION: n/a

ELEV.(FT)	DEPTH(FT)	MATERIALS DESCRIPTION COLOR & TYPE	Field qu TSF	SAMPLE No	ROCK CHARACTERISTICS STRENGTH	WEATHERING F S M H C	FRACTURING VW W M C VC	DISCONTINUITIES TYPE	DIP
	0	BROWN SILTY SAND W/ GRAVEL & ORGANICS							
	1	SOME MINE WASTE RK SCATTERED THROUGHOUT							
	2	WOOD CHUNKS							
	3			WP 8A	MID				
	4								
	5	TERM ON PAD IN SOIL		WP 8A	BOT				
	6								
	7								
	8								
	9								
	10								
	11								

CARLTON
Engineering Inc.

3932 Ponderosa Road, Shingle Springs, CA 95682
Voice 530.677.5515 Fax 530.677.6645

PROJECT NAME & NUMBER: BEAR RIVER MW

TRENCH #: WP 8A

DATE: 4-1-04

BY: MV & JP

EQUIPMENT: CASE ...

ELEVATION: —

NATURAL SLOPE: —

PIT ORIENTATION: NS

ELEV. (FT)	DEPTH (FT)	MATERIALS DESCRIPTIO COLOR & TYPE	Field qu TSF	SAMPLE No	STRENGTH	WEATHERING F S M H C	FRACTURING VW W M C VC	DISCONTINUITIES TYPE	DIP
	0	AC SLABS SCATTERED @ SURFACE, MISC. METAL PARTS							
		DK BR SILTY SAND W/ ORGANICS, GRAVEL, COBBLES & BOULDERS							
	1	WOOD CHUNKS, CABLE PIPE							
	2	B:							
				WP8B	MID				
	3								
	4								
	5			WP8B	BOT				
		TERM ON PAD IN SOIL							
	6								
	7								
	8								
	9								
	10								
	11								

CARLTON
Engineering Inc.
3932 Ponderosa Road, Shingle Springs, CA 95682
Voice 530.677.5515 Fax 530.677.6645

PROJECT NAME & NUMBER: BEAR RIVER MILL

TRENCH #: WP 8B

DATE: 4-1-04

BY: MU & JP

EQUIPMENT: CASE ...

ELEVATION: /

NATURAL SLOPE: /

PIT ORIENTATION: E-W

C-5. M&RP 94-824
CLOSURE

C-5. M&RP 94-824 CLOSURE CONFIRMATION LETTERS

California Regional Water Quality Control Board
Central Valley Region
Robert Schneider, Chair

W[illegible]n H. Hickox
Secretary for
Environmental
Protection

Gray Davis
Governor

Sacramento Main Office
Internet Address: http://www.swrcb.ca.gov/rwqcb5
3443 Routier Road, Suite A, Sacramento, California 95827-3003
Phone (916) 255-3000 • FAX (916) 255-3015

RECEIVED
JAN 21 2002
SIERRA PAC[illegible] [illegible]USTRIES
HUMA[illegible] [illegible]URCES

17 January 2002

Mr. Scott Leiby
Sierra Pacific Industries
P.O. Box 496011
Redding, California 96049-6011

REQUEST FOR CLOSURE, SIERRA PACIFIC INDUSTRIES BEAR RIVER SITE, NEVADA COUNTY

We have reviewed the 12 December 2001 *Request for Closure* for the Sierra Pacific Industries (SPI) Bear River site. In our 16 August 2001 letter, we expressed concerns that SPI had not monitored the groundwater directly downgradient of monitoring well MW-1. Monitoring well MW-1 was destroyed sometime after September 1995. After a site visit in September 2001 by Board Staff, we were satisfied that the existing monitoring wells are located closely enough to the source area to determine that total petroleum hydrocarbons as diesel (TPHd) is not migrating.

In the 16 August 2001 letter, we also asked if any monitoring for gasoline downgradient of the former gasoline aboveground storage tank (AGT) had occurred. SPI monitored groundwater from monitoring well MW-5, about 20 feet down and cross gradient of the former gasoline AGT, for TPH as gasoline, benzene, toluene, ethylbenzene and xylene for four consecutive quarters and all results were non-detect.

Board staff have reviewed the available information for this site and determined that no further remedial actions are required. Before monitoring of MW-1 was discontinued, groundwater samples from this well showed decreasing levels of TPHd. Groundwater samples from MW-4 and MW-5 have shown non-detectable concentrations of TPHd since 1999. SPI may proceed to arrange with Nevada County Department of Environmental Health (NCDEH) for the permitted destruction of all monitoring wells at the site. In the *Request for Closure*, you state that monitoring wells MW-1 and MW-3 were destroyed and cannot be located and that you will request a variance for these wells. All monitoring wells should have been surveyed to a common data point. You will need to resurvey the area and locate MW-1 and MW-3 so that they can be properly destroyed.

We may wish to be present to observe the monitoring well destruction, so please notify us at least **one week** in advance of this field work. Once we receive confirmation from the NCDEH that these monitoring wells have been properly destroyed, we will proceed with issuing a "No Further Action" letter for the site.

If you have any questions, you may contact me at (916) 255-3057.

Susan Timm

SUSAN TIMM
Associate Engineering Geologist

cc: Tim Snellings, Nevada County Department of Environmental Health, Nevada City

COUNTY OF NEVADA
COMMUNITY DEVELOPMENT AGENCY
950 MAIDU AVENUE, NEVADA CITY, CA 95959-8617
(530) 265-1222 FAX (530) 265-1272 www.co.nevada.ca.us/cda

PLANNING DEPARTMENT	ENVIRONMENTAL HEALTH	BUILDING DEPARTMENT	CODE COMPLIANCE
PHONE (530) 265-1440	PHONE (530) 265-1452	PHONE (530) 265-1444	PHONE (530) 265-1362
FAX (530) 265-1798	FAX (530) 265-7056	FAX (530) 265-1272	FAX (530) 265-1625

February 5, 2004

Mr. Jason Pittman
Carlton Engineering
3883 Ponderosa Road
Shingle Springs, CA 95682

SUBJECT: Monitoring Well Destruction; 12270 LaBarr Meadows Road, Grass Valley, California; Job# 21-525; AP# 09-680-22; Permit #8225

Dear Mr. Pittman:

This letter confirms our inspection conducted February 4, 2004 at the referenced site for the well destruction operations performed for Sierra Pacific Industries at the former Brunswick Mill facility. Nevada County Department of Environmental Health witnessed the pressure grouting of four wells, MW-2, MW-4, MW-5, and MW-6. Subsequent to our survey and on-site discussion, MW-8 still exists and will be addressed at a future date when access to the well location is provided. MW-1 and MW-10 cannot be located and it is assumed at this time they may have been damaged and buried during some past grading activities. MW-3 and MW-7 were destroyed in the late 1990's.

This Job # 21-525 will be kept open until such time as the current work plan is completed, i.e., the pending destruction of MW-8 and, addressing MW-1 that was identified in the November 2003 work plan however, was not subsequently located during the well destruction operations on February 4, 2004. If you have any questions, please call me.

Sincerely,

David R. Huff, REHS, REA
Hazardous Materials Division

Cc: Mike Smith, Central Valley RWQCB

COUNTY OF NEVADA
COMMUNITY DEVELOPMENT AGENCY
950 MAIDU AVENUE, NEVADA CITY, CA 95959-8617
(530) 265-1222 FAX (530) 265-1272 www.co.nevada.ca.us/cda

PLANNING DEPARTMENT
PHONE (530) 265-1440
FAX (530) 265-1798

ENVIRONMENTAL HEALTH
PHONE (530) 265-1452
FAX (530) 265-7056

BUILDING DEPARTMENT
PHONE (530) 265-1444
FAX (530) 265-1272

CODE COMPLIANCE
PHONE (530) 265-1362
FAX (530) 265-1625

June 30, 2004

Mr. Jason Pittman
Carlton Engineering
3883 Ponderosa Road
Shingle Springs, CA 95682

SUBJECT: Monitoring Well Destruction, MW-8; 12270 LaBarr Meadows Road, Grass Valley, California; Job# 21-525; AP# 09-680-22; Permit #8225

Dear Mr. Pittman:

This letter confirms the well destruction operations for MW-8 performed for Sierra Pacific Industries at the former Brunswick Mill facility. Subsequent to our discussion, MW-8 was destroyed in accordance with the work plan addendum dated April 4, 2004. A "No Further Action" letter with regards to Job # 21-525 will be issued upon this division's review of your final report. If you have any questions, please call me.

Sincerely,

David R. Huff, REHS, REA
Hazardous Materials Division

COUNTY OF NEVADA
COMMUNITY DEVELOPMENT AGENCY
950 MAIDU AVENUE, NEVADA CITY, CA 95959-8617
(530) 265-1222 FAX (530) 265-1272 www.co.nevada.ca.us/cda

PLANNING DEPARTMENT PHONE (530) 265-1440 FAX (530) 265-1798	**ENVIRONMENTAL HEALTH** **PHONE (530) 265-1452** **FAX (530) 265-7056**	BUILDING DEPARTMENT PHONE (530) 265-1444 FAX (530) 265-1272	CODE COMPLIANCE PHONE (530) 265-1362 FAX (530) 265-1625

September 16, 2004

Mr. Jason Pittman
CARLTON Engineering Inc.
3883 Ponderosa Road
Shingle Springs, CA 95682

RE: Monitoring Well Destruction Permit for 12270 La Barr Meadows Road, Grass Valley, California; NCDEH Job# 21-572; APN 22-160-06

Dear Mr. Pittman:

This department has completed its review of the "Monitoring Well Destruction, Summary Report" by *Carlton Engineering* dated July 21, 2004 for the referenced site. Work was completed under the purview of Nevada County Department of Environmental Health (NCDEH) and the permit issued January 6, 2004, and performed in accordance with the approved workplan dated November 2003. No further action with regards to this permit for this project phase is required. Should you have any questions, please contact me at 530.265.1767.

Sincerely,

David R. Huff, REHS
Environmental Specialist

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APPENDIX D: HEALTH BASED RISK ASSESSMENT CALCULATIONS

HUMAN HEALTH RISK ASSESSMENT
BEAR RIVER MILL SITE MINE WASTE ROCK (May 19, 2005)

ASSUMPTIONS, EQUATIONS, PARAMETERS, AND CALCULATIONS

Chemicals of Potential Concern

Arsenic in mine waste rock (MWR)
Arsenic, Lead, and Mercury in Valley Veneer Area "Blue Sand"

Exposure Scenario

MWR reuse as fill in commercial area
Adult commercial and construction workers exposed 10 hours/work day in outdoor commercial/industrial setting

Default Exposure Parameters: Commercial Land Use (DTSC, Exhibit 1-2, Summary of Default Exposure Factors for Simple Site-Specific Soil Screening Evaluations)

Body weight = 70 kg
Soil/Dust Ingestion = 100mg/day, 250 days/year, for 25 years (commercial worker)
Soil/Dust Ingestion = 330mg/day, 22 days/month, for 3 months (construction worker)
Dust Inhalation = 20 cu m/day, 250 days/year, for 25 years (commercial worker)
Dust Inhalation = 20 cu m/day, 22 days/month, for 3 months (construction worker)

Toxicity Parameters (US EPA Region 9 PRGs Table, 10/01/02)

		Arsenic	Lead*	Inorganic Mercury
Cancer Slope Factors:	Oral:	1.5E+00		None
(SF (mg/kg-day)$^{-1}$)	Inhalation:	1.5E+01		None
Non-cancer Reference Dose:	Oral:	3.0E-04		3.0E-04
(RfD (mg/kg/day))	Inhalation	None		None

See attached DTSC lead risk assessment spreadsheets for residential and commercial exposures (LeadSpread 7), input data:

Lead in air: 0.0036 ug/m^3 (CARB 2002 mean for Roseville CA)
Lead in soil: 230 ug/g (VCA RI sample WR3-2F)
Lead in water: 2.5 ug/l (NID 2003 Water Quality Report for Lake of the Pines WTP)
% home-grown product: 0% commercial exposure
7% residential exposure (LeadSpread 7 default value)
Dust: 1.5 ug/m^3 (LeadSpread 7 default value)

Risk (Cancer) Equations: (Modified from DTSC, Preliminary Endangerment Assessment Guidance Manual, June 1999, Figures 5 and 7)

$$\text{Oral Ingestion Risk} = SF_O \times CS \times \frac{CF \times IR_O \times EF \times ED \times ABS_O}{BW \times AT}$$

$$\text{Dermal Absorption Risk} = SF_O \times CS \times \frac{CF \times SA \times AF \times EF \times ED \times ABS_D}{BW \times AT}$$

$$\text{Inhalation Risk} = SF_I \times C_A \times \frac{IR_I \times EF \times ED}{BW \times AT}$$

Total Risk = Oral Risk + Dermal Risk + Inhalation Risk

Hazard (Non-cancer) Equations: (Modified from DTSC, Preliminary Endangerment Assessment Guidance Manual, June 1999, Figures 6 and 8)

$$\text{Oral Ingestion Hazard} = (1/RfD_O) \times CS \times \frac{CF \times IR_O \times EF \times ED \times ABS_O}{BW \times AT}$$

$$\text{Dermal Absorption Hazard} = (1/RfD_O) \times CS \times \frac{CF \times SA \times AF \times EF \times ED \times ABS_D}{BW \times AT}$$

$$\text{Inhalation Hazard} = (1/RfD_I) \times C_A \times \frac{IR_I \times EF \times ED}{BW \times AT}$$

Total Hazard = Oral Hazard + Dermal Hazard + Inhalation Hazard

CS = Contaminant concentration in soil (mg/kg), arsenic concentrations that will be used in the risk assessment are the mean and 95% upper confidence limit for all mine waste rock (Table D-1), mine waste rock considered Designated Waste by the RWQCB (Table D-2) and Non-designated Waste (Table D-3). For the Valley Veneer "Blue Sand": arsenic = 2,000 mg/kg, lead = 230 mg/kg, and mercury = 8.3 mg/kg (Table 2.10)

C_A = Contaminant concentration in air = CS x (5E-08 kg/cu m) (DTSC, Preliminary Endangerment Assessment Guidance Manual, June 1999, Figure 2.8)

CF = Conversion factor = 10^{-6} kg/mg

IR_O = Soil ingestion = 100 mg/day

IR_I = Dust inhalation rate = 20 cu m/day

SA = Skin surface area exposed = 2,290 cm^2/day (DTSC, OSA Guidance, Pg. 42, July, 1992)

AF = Soil to skin adherence factor = 0.5 mg/cm^2 (DTSC, OSA Guidance, Pg. 42, July, 1992)

EF = Exposure Frequency = 10 hr/day x 250 days/yr = 2,500 hr/yr = 104 days/yr (commercial worker)
EF = Exposure Frequency = 10 hr/day x (22 x 3) days/yr = 660 hr/yr = 28 days/yr (construction worker)

ED = Exposure Duration = 25 years (commercial worker)
ED = Exposure Duration = 0.25 year (construction worker)

ABS = Absorbed fraction
  Ingestion = ABS_O = Assumed at 100% = 1 for both arsenic and mercury
  Dermal = ABS_D = 0.03 for arsenic and 0.01 for mercury (DTSC, Preliminary Endangerment Assessment Guidance Manual, June 1999, Table 2), and also calculated for arsenic where ABS_D = 0 (See attached memorandum on arsenic dermal absorption).

BW = Body weight = 70 kg

AT = Averaging time period = 365 days/year x 70 years = 25,550 days

Inorganic Mercury Hazard Assessment

No cancer slope factors available for risk evaluation

Ingestion Hazard = 4.00E-03

Dermal Hazard = 1.35E-03

Total Hazard = 5.35E-03

Construction Worker Arsenic Risk and Hazard Assessment
(All mine waste rock using 95% upper confidence concentration = 806 mg/kg)

	Risk	Hazard
Ingestion:	1.56E-06	3.44E-03
Dermal:	1.63E-07	3.58E-04
Inhalation:	4.73E=08	0
Total:	1.77E-06	3.80E-03

RESIDENTIAL
EXPOSURE

LEAD RISK ASSESSMENT SPREADSHEET
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL

U[illegible]'S GUIDE to version 7

INPUT	
MEDIUM	LEVEL
Lead in Air (ug/m^3)	0.0036
(ug/g)	230.0
Lead in Water (ug/l)	2.5
% Home-grown Produ	7%
(ug/m^3)	1.5

OUTPUT							
	Percentile Estimate of Blood Pb (ug/dl)					PRG-99	PRG-95
	50th	90th	95th	98th	99th	(ug/g)	(ug/g)
BLOOD Pb, ADULT	1.1	2.1	2.4	3.0	3.4	900	1286
BLOOD Pb, CHILD	3.6	6.5	7.7	9.4	10.7	212	313
BLOOD Pb, PICA CHILD	5.2	9.5	11.2	13.6	15.5	136	201
BLOOD Pb, OCCUPATIC	0.5	1.0	1.1	1.4	1.6	4606	6595

EXPOSURE PARAMETERS			
	units	adults	children
Days per week	days/wk	7	
Days per week, occupational		5	
Geometric Standard Deviation		1.6	
Blood lead level of concern (ug/		10	
Skin area, residential	cm^2	####	####
Skin area occupationa	cm^2	####	
Soil adherence	ug/cm^2	70	200
Dermal uptake consta	(ug/dl)/(ug/	0.0001	
S[illegible]jestion	mg/day	50	100
Soil ingestion, pica	mg/day		200
Ingestion constant	(ug/dl)/(ug/	0	0.2
Bioavailability	unitless	0.44	
Breathing rate	m^3/day	20	6.8
Inhalation constant	(ug/dl)/(ug/	0.1	0.2
Water ingestion	l/day	1.4	0.4
Food ingestion	kg/day	1.9	1.1
Lead in market basket	ug/kg	3.1	
Lead in home-grown produ	ug/kg	103.5	

Click here for REFERENCES

PATHWAYS						
ADULTS	Residential			Occupational		
	Pathway contribution			Pathway contribution		
Pathway	PEF	ug/dl	percent	PEF	ug/dl	percent
Soil Contact	3.8E-5	0.01	1%	1.4E-5	0.00	1%
Soil Ingestion	8.8E-4	0.20	18%	6.3E-4	0.14	27%
Inhalation, bkgrnd		0.01	1%		0.00	1%
Inhalation	2.5E-6	0.00	0%	1.8E-6	0.00	0%
Water Ingestion		0.14	12%		0.14	27%
Food Ingestion, bkgrnd		0.22	19%		0.23	44%
Food Ingestion	2.4E-3	0.55	49%			0%

CHILDREN	typical			with pica		
	Pathway contribution			Pathway contribution		
Pathway	PEF	ug/dl	percent	PEF	ug/dl	percent
Soil Contact	5.6E-5	0.01	0%		0.01	0%
Soil Ingestion	7.0E-3	1.62	45%	1.4E-2	3.24	62%
Inhalation	2.0E-6	0.00	0%		0.00	0%
Inhalation, bkgrnd		0.00	0%		0.00	0%
Water Ingestion		0.16	4%		0.16	3%
Food Ingestion, bkgrnd		0.50	14%		0.50	10%
Food Ingestion	5.5E-3	1.28	36%		1.28	25%

COMMERCIAL
EXPOSURE

LEAD RISK ASSESSMENT SPREADSHEET

CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL

U 'S GUIDE to version 7

INPUT	
MEDIUM	LEVEL
Lead in Air (ug/m^3)	0.0036
(ug/g)	230.0
Lead in Water (ug/l)	2.5
% Home-grown Produ	0%
(ug/m^3)	1.5

OUTPUT							
	Percentile Estimate of Blood Pb (ug/dl)					PRG-99	PRG-95
	50th	90th	95th	98th	99th	(ug/g)	(ug/g)
BLOOD Pb, ADULT	0.6	1.1	1.3	1.6	1.8	3221	4613
BLOOD Pb, CHILD	2.3	4.3	5.1	6.1	7.0	372	552
BLOOD Pb, PICA CHILD	4.0	7.2	8.6	10.4	11.8	187	277
BLOOD Pb, OCCUPATIC	0.5	1.0	1.1	1.4	1.6	4606	6595

EXPOSURE PARAMETERS			
	units	adults	children
Days per week	days/wk	7	
Days per week, occupational		5	
Geometric Standard Deviation		1.6	
Blood lead level of concern (ug/		10	
Skin area, residential	cm^2	####	####
Skin area occupationa	cm^2	####	
Soil adherence	ug/cm^2	70	200
Dermal uptake consta	(ug/dl)/(ug/	0.0001	
S[illegible]gestion	mg/day	50	100
Soil ingestion, pica	mg/day		200
Ingestion constant	(ug/dl)/(ug/	0	0.2
Bioavailability	unitless	0.44	
Breathing rate	m^3/day	20	6.8
Inhalation constant	(ug/dl)/(ug/	0.1	0.2
Water ingestion	l/day	1.4	0.4
Food ingestion	kg/day	1.9	1.1
Lead in market basket	ug/kg	3.1	
Lead in home-grown produc	ug/kg	103.5	

Click here for REFERENCES

PATHWAYS						
ADULTS	Residential			Occupational		
	Pathway contribution			Pathway contribution		
Pathway	PEF	ug/dl	percent	PEF	ug/dl	percent
Soil Contact	3.8E-5	0.01	1%	1.4E-5	0.00	1%
Soil Ingestion	8.8E-4	0.20	34%	6.3E-4	0.14	27%
Inhalation, bkgrnd		0.01	1%		0.00	1%
Inhalation	2.5E-6	0.00	0%	1.8E-6	0.00	0%
Water Ingestion		0.14	24%		0.14	27%
Food Ingestion, bkgrnd		0.23	39%		0.23	44%
Food Ingestion	0.0E+0	0.00	0%			0%

CHILDREN	typical			with pica		
	Pathway contribution			Pathway contribution		
Pathway	PEF	ug/dl	percent	PEF	ug/dl	percent
Soil Contact	5.6E-5	0.01	1%		0.01	0%
Soil Ingestion	7.0E-3	1.62	69%	1.4E-2	3.24	82%
Inhalation	2.0E-6	0.00	0%		0.00	0%
Inhalation, bkgrnd		0.00	0%		0.00	0%
Water Ingestion		0.16	7%		0.16	4%
Food Ingestion, bkgrnd		0.54	23%		0.54	14%
Food Ingestion	0.0E+0	0.00	0%		0.00	0%

TABLE D.1. MINE WASTE ROCK SAMPLE ARSENIC DATA AND STATISTICS

Location	Sample ID	Arsenic Conc. (mg/kg)
Bullion Mine	WR1-1M	700
	WR1-1N	8.7
	WR1-1I	190
	WR1-1F	280
	WR1-2F	2.6
	WR1-3M	1,800
	WR1-3N	4.1
	WR1-3F	130
	WR1-4M	3,000
	WR1-4N	16
	WR1-5M	220
	WR1-5N	12
Galena Mine	WR2-2ALL	5,800
	WR5-1M	72
	WR5-1N	14
	WR5-2M	150
	WR5-2N	28
Valley Veneer	WR3-1M	11
	WR3-1N	1.6
	WR3-2M	68
	WR3-2N	11
	WR3-2F	2,000
	WR3-7M	170
	WR3-7N	9.2
	WR3-7ALL	140
	WR3-10M	260
	WR3-10N	3.7
	WR3-12 ALL	14
Bear River Mill	WR4-1M	3.4
	WR4-1N	1.7
	WR4-2M	4.1
	WR4-2N	0.87
	WR4-3M	46
	WR4-3N	2.3
	WR4-4M	3,900
	WR4-4N	90
	WR4-5M	39
	WR4-5N	2.1
	WR4-6M	52
	WR4-6N	2.4
	WR4-7M	22
	WR4-7N	5.6
	WR4-8M	720
	WR4-8N	6.9

Statistical Evaluation	
Mean	454.8697727
Standard Error	174.0874594
Median	25
Mode	4.1
Standard Deviation	1154.765567
Sample Variance	1333483.515
Kurtosis	11.95491752
Skewness	3.380526607
Range	5799.13
Minimum	0.87
Maximum	5800
Sum	20014.27
Count	44
Confidence Level(95.0%)	351.0805803

95% Upper Confidence Limit =
455 + 351 = 806 mg/kg

TABLE D.2. DESIGNATED WASTE MINE WASTE ROCK SAMPLE ARSENIC DATA AND STATISTICS

Location	Sample ID	Arsenic Concentration (mg/kg)
Bullion Mine	WR1-1F	280
	WR1-2F	2.6
	WR1-3F	130
Galena Mine	WR2-2ALL	5,800
Valley Veneer	WR3-2F	2,000
	WR3-7ALL	140
	WR3-12 ALL	14
Bear River Mill	WR4-1M	3.4
	WR4-1N	1.7
	WR4-2M	4.1
	WR4-2N	0.87
	WR4-3M	46
	WR4-3N	2.3
	WR4-4M	3,900
	WR4-4N	90
	WR4-5M	39
	WR4-5N	2.1
	WR4-6M	52
	WR4-6N	2.4
	WR4-7M	22
	WR4-7N	5.6
	WR4-8M	720
	WR4-8N	6.9

Statistical Evaluation	
Mean	576.7378261
Standard Error	301.0132567
Median	22
Mode	#N/A
Standard Deviation	1443.608866
Sample Variance	2084006.557
Kurtosis	8.538332641
Skewness	2.963571585
Range	5799.13
Minimum	0.87
Maximum	5800
Sum	13264.97
Count	23
Confidence Level(95.0%)	624.2639562

95% Upper Confidence Limit =
577 + 624 = 1,201 mg/kg

TABLE D.3. NONDESIGNATED WASTE MINE WASTE ROCK SAMPLE ARSENIC DATA AND STATISTICS

Location	Sample ID	Arsenic Concentration (mg/kg)
Bullion Mine	WR1-1M	700
	WR1-1N	8.7
	WR1-3M	1,800
	WR1-3N	4.1
	WR1-4M	3,000
	WR1-4N	16
	WR1-5M	220
	WR1-5N	12
	WR1-1I	190
Galena Mine	WR5-1M	72
	WR5-1N	14
	WR5-2M	150
	WR5-2N	28
Valley Veneer	WR3-1M	11
	WR3-1N	1.6
	WR3-2M	68
	WR3-2N	11
	WR3-7M	170
	WR3-7N	9.2
	WR3-10M	260
	WR3-10N	3.7

Statisical Evaluation	
Mean	321.3952381
Standard Error	160.1779554
Median	28
Mode	11
Standard Deviation	734.0276054
Sample Variance	538796.5255
Kurtosis	9.611892574
Skewness	3.092557233
Range	2998.4
Minimum	1.6
Maximum	3000
Sum	6749.3
Count	21
Confidence Level(95.0%)	334.1252049

95% Upper Confidence Limit =
322 + 334 = 656 mg/kg

TABLE D.4. MINE WASTE ROCK ARSENIC RISK AND HAZARD CALCULATIONS (5/19/05)

	All Mine Waste Rock		Designated Waste Mine Waste Rock		Non-Designated Waste Mine Waste Rock	
	Mean Conc.	95% Upper Confidence Conc.	Mean Conc.	95% Upper Confidence Conc.	Mean Conc.	95% Upper Confidence Conc.
Arsenic Conc (mg/kg)	455	806	577	1,201	321	656
Air Conc (mg/cu m)	2.28E-05	4.03E-05	2.89E-05	6.01E-05	1.61E-05	3.28E-05
Number of Samples	44	44	23	23	21	21
Ingestion Absorption Fraction (%)	100	100	100	100	100	100
Dermal Absorption Fraction (%)	3 (0)	3 (0)	3 (0)	3 (0)	3 (0)	3 (0)
Risk						
Ingestion	9.92E-05	1.76E-04	1.26E-04	2.62E-04	7.00E-05	1.43E-04
Dermal	3.41E-05 (0)	6.05E-05 (0)	4.33E-05 (0)	9.01E-05 (0)	2.40E-05 (0)	4.92E-05 (0)
Inhalation	1.00E-05	1.77E-05	1.27E-05	2.64E-05	7.10E-06	1.44E-05
Total	1.43E-04 (1.09E-04)	2.54E-04 (1.94E-04)	1.82E-04 (1.39E-04)	3.79E-04 (2.89E-04)	1.01E-04 (7.71E-05)	2.07E-04 (1.58E-04)
Hazard						
Ingestion	0.21	0.39	0.28	0.58	0.15	0.31
Dermal	0.08 (0)	0.13 (0)	0.1 (0)	0.2 (0)	0.05 (0)	0.11 (0)
Inhalation	0	0	0	0	0	0
Total	0.29 (0.21)	0.52 (0.39)	0.38 (0.28)	0.78 (0.58)	0.20 (0.15)	0.42 (0.31)

Memorandum

11-Nov-04

CARLTON
Engineering Inc.

For: Perry Myers
Department of Toxic Substances Control
8800 Cal Center Drive
Sacramento, CA 95826

Direct 916.255.3708

From: Mark Montgomery
Subject: Dermal Absorption Fraction for Arsenic
Project: 3076-01-01 SPI Bear River Div: DEVELOPMENT

Comments:

Total pages: 1

Perry,

I've found some interesting information regarding the dermal absorption fraction for arsenic for a solid material such as found in the mine waste rock (MWR) we are dealing with at the Bear River site. DTSC, along with the EPA use a three percent (0.03) absorption fraction (ABS) for arsenic for risk and hazard assessments. For the Argonaut Heights arsenic in soil hazard assessment I applied the bioavailability fraction determined to the concentration component of the dermal hazard equation. A DTSC toxicologist questioned and suggested removal of a corrected arsenic concentration in the dermal hazard equation. Deletion of the correction then made the dermal hazard value much larger than the ingestion hazard value. That did not seem right, in that a person could get a higher dose of arsenic through the skin than in the human digestive tract that's designed to absorb chemicals. I then researched for reports where hazard assessments for arsenic in MWR were completed. One reported by Dennis Stainken for a New Jersey site (Alternative Attainment Procedures for Arsenic in Soils, December 2002) has a statement that is generally shared by the reports I reviewed, "A dermal pathway was not calculated based on the insolubility and non-bioavailability and dermal absorption of the arsenic forms."

The DTSC Preliminary Endangerment Assessment Guidance Manual, June 1999 in Table 2 references the 0.03 dermal absorption fraction to a 1993 study by Ronald Wester (Fundamentals of Applied Toxicology, April 1993). I obtained the abstract for the paper and found that the dermal absorption fraction cited was for soluble arsenic applied to the skin of test monkeys. A subsequent paper by Wester published on line in March 2004 by ToxSci Advance Access reported on skin absorption by monkeys of arsenic from a solid matrix, chromated copper arsenate (CCA) treated wood residual. Wester found "the results show that arsenic is poorly absorbed from CCA-treated wood residues (i.e., does not result in urinary arsenic excretion above background levels)."

Consequently, I do not plan to include a dermal hazard calculation for the risk assessment for MWR at the Bear River site.

APPENDIX E: CEQA/PUBLIC INVOLVEMENT

NOTICE OF PUBLIC COMMENT PERIOD

Bear River Mill Site
Draft Removal Action Workplan

Grass Valley, California

PUBLIC COMMENT PERIOD: August 19, 2005 through September 19, 2005

WHAT'S BEING PROPOSED?

The Bear River Development Company is proposing containment of Mine Waste Rock (MWR) at the site which was left in place by mining practices in the 1800's through the early 1900's. During the site investigation, samples of MWR were collected and analyzed for metals. Arsenic was the main constituent found in the MWR; one sample taken found lead to exceed the residential threshold. Because Arsenic levels were higher than background for the area the levels were deemed to present a potential safety hazard if not properly contained.

The BRDC has proposed a cleanup plan to contain the MWR at the site. We encourage you to review the proposed cleanup plan, called a Draft Removal Action Workplan (Draft RAW). DTSC has also prepared a draft California Environmental Quality Act Notice of Exemption (NOE) for this project. The Draft RAW is considered exempt from CEQA because the cleanup activity will not impact the environment. Both of these documents are available for your review at the information repositories listed below.

WHY THIS NOTICE?

The purpose of this notice is to provide you with the opportunity to learn more about the project and to provide comments to DTSC concerning the proposed draft RAW and the NOE **by Monday, September 19, 2005.**

HOW DO I PARTICIPATE?

Your participation is encouraged. Comments concerning the cleanup activities and NOE may be submitted in writing to Mr. Perry Myers, DTSC Project Manager, 8800 Cal Center Drive, Sacramento, California 95826 or email: pmyers@dtsc.ca.gov . All mail must be postmarked by **5 p.m. on Monday, September 19, 2005**. Emailed comments must be received by DTSC no later than 5 p.m. on the same date.

WHERE DO I GET MORE INFORMATION?

A copy of the Draft RAW (cleanup activities) and NOE are available for review in the information repositories located at the Grass Valley Public Library, 207 Mill Street, Grass Valley, California 95945 (530) 273-6829 and the Department of Toxic Substances Control, File Room by appointment only (916) 255-3758.

CONTACT:

If you have any questions or wish to discuss the project, please contact Mr. Perry Myers, DTSC Project Manager, at (916) 255-3708 pmyers@dtsc.ca.gov . For public participation activities, please contact Ms. Michelle Trotter, DTSC Public Participation Specialist, at (916) 255-6441 or mtrotter@dtsc.ca.gov. Members of the media should contact Mr. Ron Baker, DTSC Public Information Office, at (916) 324-3142 or rbaker@dtsc.ca.gov.

Laws, Regulations &

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Cleanup

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State of California

Department of Toxic Substances Control

Public Involvement

FACT SHEET, August 2005

Public to Comment on Draft Removal Action Workplan for Bear River Mill Site

Why am I receiving this fact sheet?

The California Department of Toxics Substances Control (DTSC) is providing this fact sheet to inform nearby residences and the public of the public comment period for the Draft Removal Action Workplan (RAW) proposing a cleanup alternative for the Bear River Mill Site in Grass Valley, California. The 175 acre site is located in a rural area of Nevada County one mile south of the town of Grass Valley and immediately east of State Highway 49. La Barr Meadows Road divides the site on the north/south axis.

Bear River Mill Site

What this fact sheet tells you:

- Overall site history and background
- What was found at the site, What is the draft RAW
- Proposed cleanup remedy
- California Environmental Quality Act – Notice of Exemption
- Future activities

Public Review and Comment Period

DTSC encourages the public to review and comment on the Draft RAW being proposed. DTSC will conduct a 30-day Public Comment Period which begins on Friday, August 19, 2005 and ends on Monday, September 19, 2005. DTSC will accept written comments on the RAW until 5:00 p.m. on the last day of the comment period, Monday, September 19, 2005.

Mail written comments to: DTSC, Attn: Mr. Perry Myers, Project Manager, 8800 Cal Center Drive, Sacramento, CA 95826 or via e-mail at pmyers@dtsc.ca.gov . All mail must be postmarked by 5:00 p.m. on Monday, September 19, 2005. E-mailed comments must be sent to the Department no later than 5:00 p.m. on the same date. DTSC may hold a public meeting for this project if there is significant public interest and if a meeting is requested.

Overall site history and background

Initially the site was hard rock mined from the mid 1800's to the early 1900's. In the mid 1900's the site was used for the production of lumber and wood products west of La Barr Meadows Road. Environmental concerns for the site center on waste disposal practices from mining activities. Mine Waste Rock (MWR) was identified by visual observation at four site locations: the former Galena, and Bullion Mine areas, fill material at the former Valley Veneer Plant, and at the former Bear River Sawmill areas.

On April 4, 2003, the Bear River Development Company (BRDC) entered into a Voluntary Cleanup Agreement with the California Department of Toxic Substances Control (DTSC) in order to remediate MWR from historic mining activities at the site.

The BRDC contracted with Carlton Engineering, Inc., to prepare the Draft Removal Action Workplan (RAW) to address the removal of the MWR. As a result of the previous investigations, BRDC is proposing a site cleanup known as a removal action. DTSC found that a removal action should be conducted to reduce the risk posed by the potentially harmful substances.

What was found at the site?

As indicated above, samples of the MWR were collected and analyzed for metals. Arsenic was the main constituent found in the MWR; one sample taken found lead exceeding the screening threshold. Because arsenic levels were higher than screening and background for that area the levels were deemed to present a potential health hazard if not properly contained. BRDC determined, and DTSC agreed, that the elevated levels of arsenic and lead should be removed or contained and any impacted subsoil be removed as well.

What is the Removal Action Workplan? (Proposed Cleanup Alternatives)

The Draft RAW presents the cleanup alternatives considered and recommends the most feasible alternative. The proposed cleanup methods considered for the four site locations include:

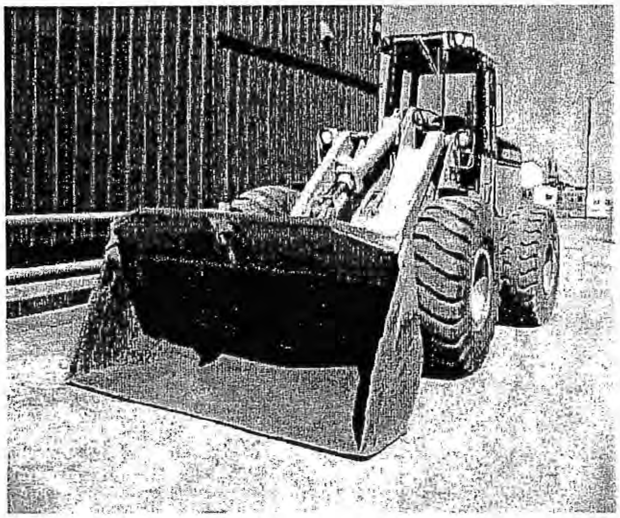
- **Alternative 1 – No Action** Under this alternative no remedial actions would be considered at the Bear River Saw Mill site. Future property use would be restricted.
- **Alternative 2 – Excavation and Disposal** Mine Waste Rock and waste piles would be completely excavated and transported off site to an off-site disposal facility.
- **Alternative 3 – Reuse of MWR** Mine Waste Rock would be used under roadway and parking lot areas only.

The alternatives were evaluated based on effectiveness, ease of implementation and cost. The Draft RAW recommends **Alternative 3** because it is most protective of public health and the environment and most cost effective. Once the removal action takes place and the waste is contained, the potential risk associated with this material will be reduced and the site will meet environmental and safety standards for unrestricted development with exception of the containment area which will have land use restrictions.

What will I see during the excavation?

You will see personnel on the site using standard construction machinery as well as safety gear. As the MWR is dug up, it will be stockpiled on plastic and covered to prevent wind erosion or contact with direct precipitation.

Dust control measures such as water spray would be implemented as necessary to minimize dust. All work will be performed in accordance with a site-specific health and safety plan that complies with both state and federal regulations designed to protect the health and safety of onsite workers and the public.



Future Activities

After the public comment period has ended, DTSC will review all comments received and make any relevant changes to the cleanup plan. At the same time DTSC announces the acceptance or denial of the Draft RAW, anyone who submitted comments will receive DTSC's Response to Comments document. This document provides all of the comments submitted during the comment period and DTSC's response to those comments. A copy of The Response to Comments will be placed in the repositories below which have been established for the site. If the Draft RAW is approved, the MWR containment will be put into action.

For more Information

If you would like more information or have questions on the Draft Removal Action Workplan, please contact Mr. Perry Myers, DTSC's Project Manager at (916) 255-3708. For questions about the public participation process, contact Ms. Michelle Trotter, DTSC's Public Participation Specialist, at (916) 255-6441. For media questions, please contact Mr. Ron Baker, DTSC's Public Information Office at (916) 324-3142.

California Environmental Quality Act

In compliance with the California Environmental Quality Act (CEQA), DTSC has reviewed the proposed activities, and determined that they will not have an adverse effect on public health and the environment. Therefore, DTSC has exempted this project from CEQA requirements and has prepared a Notice of Exemption (NOE). The NOE is part of the administrative record for this project and a copy will be placed in the information repositories listed in this fact sheet.

Notice to Hearing Impaired Individuals

TDD users can use the California Relay Service at (1-888-877-5378) and ask to speak to Ms. Trotter at (916) 255-6441.

Where can I find the documents?

The draft RAW and all related documents can be reviewed at these locations:

California Environmental Protection Agency
Department of Toxic Substances Control
8800 Cal Center Drive
Sacramento, CA 95826-3200
Mr. Perry Myers, DTSC Project Manager
(916) 255-3708

File Room: Monday - Friday 8:00 a.m. -5:00 p.m.
By appointment only (916) 255-3758

Grass Valley Public Library
207 Mill Street
Grass Valley, California 95945
Telephone (530)273-6829

Anuncio

Si prefiere hablar con alguien en español acerca de ésta información, favor de llamar a ..., Departamento de Control de Substancias Tóxicas. El número de teléfono es (818) 551-3842.

ARE YOU ON DTSC's MAILING LIST?

If you would like to be on the mailing list, fill out the information below and mail back to:

Please print name and address clearly.

Name: ______________________________

Address: ______________________________

____

City/State/Zip: ______________________________

Phone: ____________ Fax : ____________ E-mail: ____________

Comment: ______________________________

____

☐ Please take me off the mailing list.

Note: While the mailing list is solely for DTSC use, the list is considered a public record.

Ms. Michelle A. Trotter
Public Participation Specialist
California Environmental Protection Agency
Department of Toxic Substances Control
8800 Cal Centr Drive
Sacramento, California 95826-3200

DTSC WEBSITE **- For more information about DTSC please visit: www.dtsc.ca.gov**

ADMINISTRATIVE RECORD

BEAR RIVER DEVELOPMENT COMPANY

BEAR RIVER MILL SITE

REMOVAL ACTION WORKPLAN

This Administrative Record List is provided in accordance with Subpart I of the National Contingency Plan to identify all documents that were relied on or considered when approving the subject removal action. An information repository has been established at the Depart of Toxic Substances Control file room to contain the documents constituting the Administrative Record. The information is available for review by appointment at:

Department of Toxic Substances Control, Region 1

8800 Cal Center Drive

Sacramento, CA 95826

(916) 255-3758

Administrative Record List:

- Carlton Engineering, Inc. "Draft Final Remedial Investigation Work Plan, Bear River Mill Site", March 2004.
- Carlton Engineering, Inc. "Monitoring Well Destruction Work Plan, Bear River Mill Site", November 2003.
- Carlton Engineering, Inc. "Monitoring Well Destruction Letter Report, Bear River Mill Site", July, 2004.
- USDA "Soil Survey of Nevada County Area, California", 1993.
- MWH "Final Removal Action Work Plan: Village at Green Hill Placer County, California", May 2004.
- US EPA "Arsenic Treatment Technologies for Soil, Waste, and Water" EPA-542-R-02-004, September 2002.
- California RWQCB Central Valley Region "The Designated Level Methodology for Waste Classification and Cleanup Level Determination", June 1989.

- California RWQCB Central Valley Region "A Compilation of Water Quality Goals", August 2003.
- US EPA "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA, Interim Final" EPA-540 G-89-004, October 1988.
- DTSC "Preliminary Endangerment Assessment Guidance Document", June 1999.
- DTSC "Abandoned Mine Lands Preliminary Assessment Handbook", January 1998.
- DTSC "Memorandum: Removal Action Workplans (RAWs)", September 1998.
- DTSC "Notice of Exemption" August 2005.

Department of Toxic Substances Control

Alan C. Lloyd, Ph.D.
Agency Secretary
Cal/EPA

8800 Cal Center Drive
Sacramento, California 95826-3200

Arnold Schwarzenegger
Governor

September 28, 2005

Mr. Scott Leiby
Sierra Pacific Industries
P.O. Box 496011
Redding, California 96049-6011

APPROVAL OF FINAL REMOVAL ACTION WORK PLAN, BEAR RIVER MILL SITE, GRASS VALLEY, CALIFORNIA

Dear Mr. Leiby:

The draft Removal Action Work Plan (draft RAW) for the Bear River Mill Site, Grass Valley, California 95959, Nevada County, underwent a 30-day public comment period from August 19, 2005 to September 19, 2005. The comment period allowed the general public to review the draft RAW and the California Environmental Quality Act (CEQA) Notice of Exemption (NOE), and to call or write to the Department of Toxic Substances Control (DTSC) if they had any questions or comments. DTSC received one comment letter from a member of the community. DTSC did not receive any other comments from the local community, the City of Grass Valley, or County officials prior to the close of the comment period. The comment and DTSC's response are provided in the attached Response Summary.

The comment has been adequately addressed in DTSC's response summary and will not result in the need for changes to the draft RAW.

Please finalize the draft RAW and incorporate a copy of the Response Summary and the final NOE in an appropriate appendix in the final RAW. The RAW is approved upon DTSC's receipt of two copies of the final RAW and one additional copy being sent directly to the information repository.

Prior to the start of any construction activities a Remedial Design and Implementation Plan (RDIP) will need to be approved by DTSC. Please submit a draft RDIP for DTSC review within 45 days of receipt of this correspondence.

If you have any questions, please contact Mr. Perry Myers at (916) 255-3708.

Sincerely,

James L. Tjosvold, P.E., Chief
Northern California-Central Cleanup Operations Branch

Enclosures

cc: Mr. Tracey Gidel, R.E.H.S.
Nevada County Environmental Health Department
950 Maidu Avenue
Nevada City, California 95959

Mr. Mark Montgomery
Carlton Engineering
3883 Ponderosa Road
Shingle Springs, California 95682

Mr. Bill Brattain, P.E.
California Regional Water Quality Control Board
Central Valley Region
11020 Sun Center Drive, # 200
Rancho Cordova, California 95670

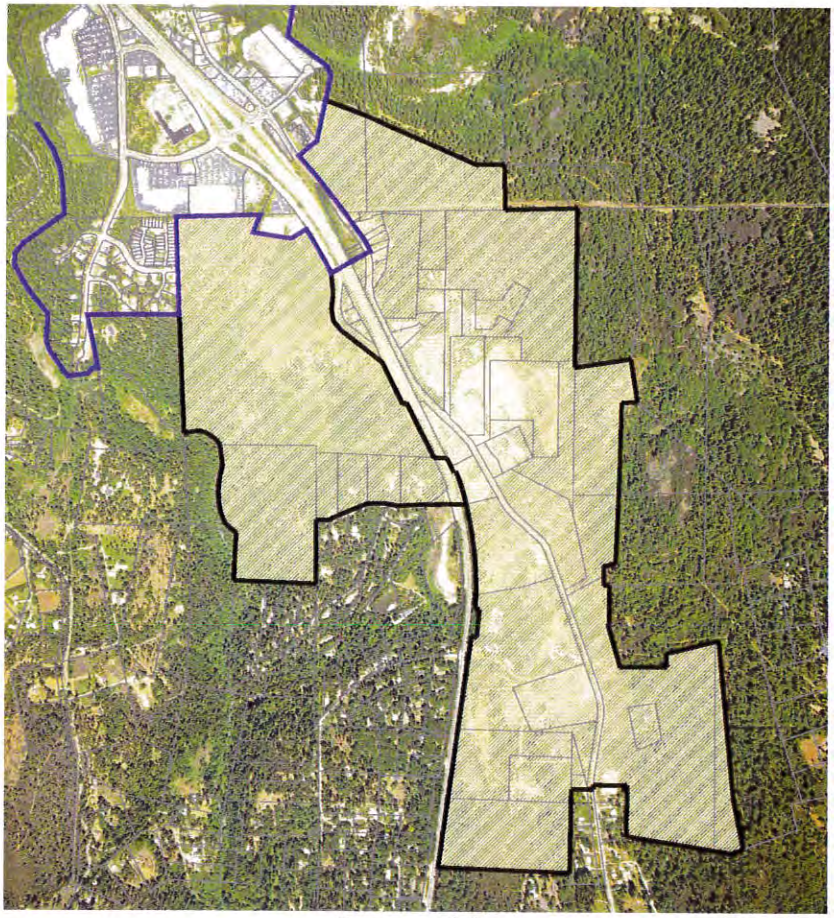
Mr. Perry Myers, P.E.
Hazardous Substance Engineer
Northern California-Central Cleanup Operations Branch
Department of Toxic Substances Control
8800 Cal Center Drive
Sacramento, California 95826-3200

APPENDIX 3.12-1

WASTEWATER FEASIBILITY ANALYSIS

WASTEWATER FEASIBILITY ANALYSIS

LA BARR MEADOWS ROAD & TAYLORVILLE ROAD
CITY OF GRASS VALLEY



Prepared for:

CITY OF GRASS VALLEY
125 East Main Street
Grass Valley, CA 95945
(530) 274-4330

Prepared by:

SCO PLANNING & ENGINEERING, INC.
140 Litton Drive, Suite 240
Grass Valley, CA 95945
T (530) 272-5841 / F (530) 272-5880

**This planning study was funded by the Community Development Block Grant program*

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SECTION 1

Executive Summary

SECTION 1: EXECUTIVE SUMMARY

A. PURPOSE

The purpose of this wastewater feasibility study is to identify the economic & technical feasibility to extend wastewater services to the Study Area located south of the City limits along La Barr Meadows Road & Taylorville Road (***Figure 1***). In determining the economic feasibility, multiple wastewater alignment options were identified and analyzed to compare advantages, disadvantages and costs associated with each alternative. Existing land uses, current zoning and potential alternative land uses were also analyzed to estimate the future wastewater capacity needs of the area.

This report has been prepared as a planning level document and is not intended to replace existing engineering documents related to City Sanitary Sewer.

Figure 1 - Location Map

B. FEASIBILITY ANALYSIS SUMMARY

In summary, this study concludes that extension of wastewater services to the overall Study Area is technically feasible. The financial feasibility to extend wastewater services is dependent upon multiple factors, including but not limited to: (1) future land uses; (2) economic factors; (3) other infrastructure such as treated water & adequate roadways; and (4) availability of financing options.

This planning study should be considered an initial first step in the planning process for extension of wastewater services to the area. Key elements to be further addressed include: (1) consideration of recommendations of this study; (2) jurisdictional & property owner commitment; (3) future land use needs and applicable zoning within the Study Area; and (4) financing options.

As part of this feasibility analysis, the following tasks were performed:

- Analyze existing County zoning within the Study Area.
- Analyze existing City General Plan Land Use Designations within the Study Area.
- Analyze existing land uses within the Study Area.
- Conduct public outreach meeting with property owners to determine potential future development plans.
- Assess existing wastewater infrastructure between Study Area and Wastewater Treatment Plant.
- Determine feasible lift station locations and highway crossing locations based on topography, service area and other physical & environmental constraints.
- Identify and evaluate various alternative alignments. Determine costs and evaluate advantages & disadvantages associated with each alternative alignment.
- Evaluate existing and potential land use scenarios.
- Evaluate potential funding sources & financing options.

Four alternatives were ultimately analyzed: ***Alternative 1*** evaluated "no project" and ***Alternatives 2 – 4*** evaulated three separate alignments to extend wastewater services to the Study Area.

Alternative 2 evaluated an alignment from Study Area A to the north, connecting to the existing wastewater infrastructure and through the existing Joyce Drive lift station. ***Alternative 3*** evaluated an alignment from Study Area A to the west, across Highway 49 and ultimately connecting to existing trunk main at Freeman Lane.

Due to the topography, ***Alternatives 2 & 3*** each required multiple lift stations to serve the

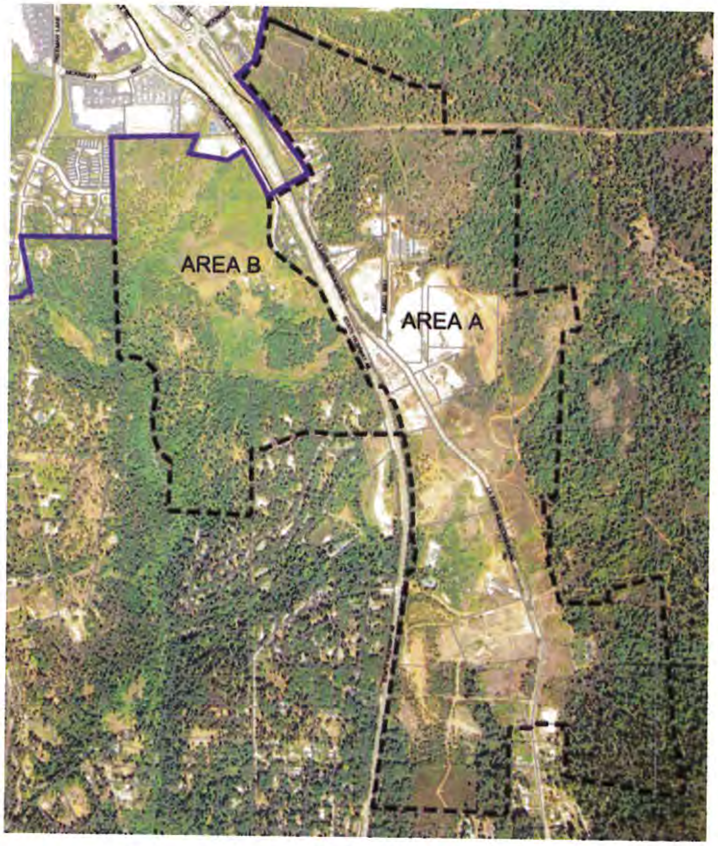


Figure 2 - Study Area

Study Area. A key objective of this analysis was to determine optimization and potential for expansion of sewer facilities while reducing the overall number of lift stations and/or individual systems. Optimal use of Regional Facility was evaluated in ***Alternative 4***. This alternative consists of a single lift station facility that provides service to properties within the Study Area and adjacent properties surrounding the Study Area. A location west of Taylorville Road, identified in ***Figure 2*** as "Area B", was found to be low enough in elevation to allow gravity flow from the entire study area to a single regional lift station. Evaluation of this alternative, identified in this report as ***Alternative 4,*** concluded that a single lift station located within Area B could serve a larger geographic area and also eliminate the need for an existing lift station located at Taylorville Road, further reducing long-term maintenance costs.

Upon evaluating each of the four (4) alternatives by analyzing cost comparative data with consideration of long-term operations & maintenance, it was determined the Study Area might be best served by one regional lift station because it could potentially:

1) Reduce long-term operation & maintenance costs;
2) Reserve capacity of the existing Joyce Drive lift station;
3) Eliminate the need for the existing Taylorville Road lift station;
4) Avoid "piecemeal" construction to meet future wastewater demands; and
5) Provide wastewater services to a larger geographical area, including additional areas within the City's Sphere of Influence (***Area B***).

Advantages and disadvantages of each of the four (4) alternatives are identified and analyzed in Section 3.B. A summary of those alternatives are as follows:

- **Alternative 1 - No Project**

  If wastewater is not extended into the study area, future growth opportunities will be severely limited. New business opportunities and expansion of existing businesses would need to comply with County Environmental Health Department and Regional Water Quality Control Board (RWQCB) requirements for privately maintained septic systems. Requirements for septic systems include avoidance of steep slopes, setbacks from water courses, drainage ways, property boundaries, and cut-banks; and setting aside large areas of land for Minimum Useable Sewage Disposal Areas (MUSDA's), which limit the amount of land available to expand economic development in the area.

- **Alternative 2 – Connect to existing Joyce Drive Lift Station**

  This alternative requires two new lift stations, routing all wastewater flows east of Highway 49 through the existing pipe system to the Joyce Drive lift station. This existing system has capacity limitations and would require substantial improvements to the entire pipe system and Joyce Drive lift station. This alternative requires the two new lift stations to be utilized in series with existing Joyce Drive lift station, which creates maintenance and operation challenges. Additional wastewater improvements such as ejector pumps and/or upgrades to the existing Taylorville Road lift station would also be required to serve the 3 commercial parcels west of Highway 49, at the end of Taylorville Road.

- **Alternative 3 – Connect to existing sewer at Freeman Lane**

  This alternative requires two new lift stations, routing all wastewater flows across to the west side of Highway 49. A force main would extend along Taylorville Road to McKnight Way and connect to the existing 18" sewer main at Freeman Lane. Additional wastewater improvements such as ejector pumps and/or upgrades to the existing Taylorville Road lift station would also be required to serve the 3 commercial parcels west of Highway 49, at the end of Taylorville Road.

- **Alternative 4 – One regional Sewer Lift Station located on west side of Highway 49**

  Based on a comparative analysis of the 4 alternatives, the "apparent best" alternative in the long-term is Alternative 4. This alternative requires only one regional lift station located on the west side of Highway 49, and could also replace the existing Taylorville Road lift station. Fewer lift stations would significantly reduce long-term costs associated with operation and maintenance and is more consistent with the City of Grass Valley Sewer System Master Plan. This alternative would also have the potential to serve a larger geographic area within the City's near-term annexation horizon, providing more opportunity for additional revenue and future growth.

C. RECOMMENDATIONS

In order to implement a process that provides flexibility and the ability for the City to annex and extend sewer services to the Study Area described in this report, we recommend the following next steps to be considered:

- Consider each of the four (4) alternatives based on the advantages & disadvantages summarized above and further described in Section 3.B.
- Upon identification of an apparent best project alternative, environmental review of potential impacts and effects of the project should be further evaluated.
- Consider alternative land uses discussed in Section 2.C. Recommended land uses were based on several factors including existing land uses, input from property

owners, discussions with City Engineering & Planning Staff, environmental constraints, etc.

- This study analyzed current impact fees for the purposes of comparing potential revenue to anticipated costs, and does not intend to imply those fees would be used as a source of funding. Currently, these impact fees are intended for very specific improvements identified in an impact fee study for existing infrastructure. City Impact Fees, or a portion thereof, could be considered as a potential source of revenue to help offset the costs of the overall sewer infrastructure.
- Assess the funding & financing options described in Section 4 of this report. Consideration should be given to initiate an administration process to select and apply for grants and/or loans as funding sources.
- Consideration should be given to expand the geographic area to include "Area B" (See ***Figure 2***) for extension of wastewater facilities and evaluation of land uses for the following reasons:
    - **Loss of Southill Village SDA** - The loss of a potential commercial center at "Southill Village" creates an unmet demand for additional commercial land area which may not be able to be accommodated within Area A.

      The City's General Plan Circulation Element includes future plans for an upgraded Crestview Drive / Highway 49 intersection. Discussions with City Staff have also indicated a potential for a Crestview Drive connection to Taylorville Road. In anticipation of this intersection and potential connection to Taylorville Drive, commercial zoning within Area B warrants consideration.
    - **Reduces the need for multiple lift stations** - A regional lift station located within Area B would reduce the need for multiple lift stations to serve Area A. Reducing the number of lift stations overall greatly reduces the cost associated with long-term operation & maintenance.

      Discussions with City Engineering Department also indicated that the existing Taylorville Drive lift station will require future upgrades. A new regional lift station in that vicinity could provide a cost savings to the City by eliminating the existing lift station and avoiding costly upgrades.
    - **Future Need for Wastewater Expansion** - Area B is within the City's Sphere of Influence. This area will need wastewater services prior to annexation. Cumulative consideration of a larger geographic area within the SOI (Areas A & B) would reduce overall long-term construction costs, and reduce future operation & maintenance costs by reducing the need for multiple lift stations.

SECTION 2

Land Use

SECTION 2: LAND USE

A. EXISTING LAND USES & STUDY AREA CHARACTERISTICS

The Study Area for this wastewater feasibility study includes 54 parcels consisting of an area approximately 311 acres, south of the existing City Limits along La Barr Meadows Road and Taylorville Road. Except for 19 acres in the southernmost portion of the study area, all parcels are within the City's Sphere of Influence (SOI).

The majority of the land area is vacant and undeveloped. About 30% of the land area, mostly along the eastern portion of the study area, consists of steep slopes which are unbuildable. A substantial portion of the existing development is accessed directly off of La Barr Meadows Road and is presently devoted to industrial uses. Lesser portions of existing development include commercial and residential uses. All developed parcels within the study area are currently served by individual onsite systems (i.e., septic systems) for treatment and disposal of sanitary wastes. Future development and/or expansion of existing businesses are limited due to individual sewage disposal systems generally involving septic tanks, leach fields and large repair areas.

During evaluation of potential alternative alignments to serve the Study Area, several factors were considered, including but not limited to:

- General conformance with City's Sewer System Master Plan (2005-2020);
- Location of proposed & existing wastewater transmission line(s);
- Condition & capacity of existing wastewater infrastructure;
- Topography & options for gravity flow to existing infrastructure and/or proposed lift stations;
- Location of potential wastewater crossing to the west side of Highway 49;
- Limit the number of lift stations;
- Easy accessibility to lift station(s);
- Facility improvement costs vs. potential for future economic opportunities;
- Input from property owners & existing businesses within Study Area.

As the factors above were considered and potential alignments were evaluated, it became apparent that any alternative to serve the Study Area would likely require multiple lift stations due to the topography.

With the goal of reducing the number of lift stations to reduce long-term operation & maintenance costs, properties adjacent to the Study Area were analyzed and considered. Land area west of Taylorville Road, identified in ***Figure 2*** as "Area B", was found to be easily accessible, within close proximity to the study area, and low enough in elevation to allow gravity flow to a single lift station. It was determined that a new regional lift station located within Area B could limit the number of lift stations to one, serve a larger geographic area, and also has the potential to replace the existing Taylorville lift station.

B. GENERAL PLAN AND ZONING

The Study Area is comprised of approximately 311 acres, located within Nevada County, outside of the City of Grass Valley limits. Approximately 292 acres are located within the City's SOI. The SOI is considered a likely candidate for annexation in the future and is reasonably expected to receive city services. As such, the SOI has established joint city/county land use regulations.

Figure 3 represents the anticipated Land Use Designations per the City's 2020 General Plan and ***Figure 4*** represents the current Nevada County zoning. Many of the land uses anticipated in the City's General Plan do not reflect the existing land uses. For example, existing industrial uses such as Rare Earth Landscape Materials and Kilroy's Towing Service & Auto Dismantling are both shown as future "Commercial" sites. Other industrial uses on the east side of La Barr Meadows Road such as Hansen Bros. Enterprises are shown as future "Business Park" sites.

Although the General Plan Land Use Element functions as a guide to future development, certain assumptions & expectations have changed over time and should be given consideration in order to help create economic opportunities in the near- and long-term.

In order to assess existing land uses versus recommended zoning, all parcels within the Study Area were analyzed (***Appendix A – Parcel Reports***). Some of the factors that were used as a guide to assess future economic opportunities and land uses are as follows:

- City's General Plan Land Use Designations
- County's Zoning Designations
- Existing Land Uses & Development Patterns
- Recent Changes to SDA Ownership
- Property Owner's Plans & Expectations
- Physical Site Constraints

The following assessment of the City's General Plan and County's Zoning explains how the factors listed above affect the anticipated future uses within the Study Area:

City of Grass Valley 2020 General Plan Land Use Designations (*Figure 3*)

Urban Estate Density (UED) ~ 136.4 acres

UED is the lowest density residential category in the City's General Plan; allowing up to one unit/acre. This designation is used to encourage low density, large lots where there are infrastructure limitations and/or environmental constraints which limit urban densities.

Land within the Study Area designated as UED consists of 8 vacant parcels totaling approximately 136 acres which would allow for a maximum density of 136 residential units. Due to steep slopes exceeding 30% and other visible site constraints such as drainage swales and ponds, the actual "buildable" area is approximately 55 acres.

The City's Zoning Ordinance does not allow multi-family units within the UED residential category. Given the limited buildable area and restrictions on attached units, it is unlikely that allowable maximum density could be achieved.

Business Park (BP) ~ 83.4 acres

BP land use designation is intended to accommodate a variety of employment generating land uses in a master-planned, campus-type setting. This land use designation is intended to provide opportunities for corporate administrative offices and research & development firms.

Many existing land uses within the Study Area would become nonconforming upon establishment of a BP land use designation. Although 83 acres within the Study Area are designated BP, approximately 41 acres are actually buildable due to steep slopes and other site constraints. In addition, a report commissioned by the City in 2006 titled "*Economic and Fiscal Conditions Study for the City of Grass Valley*" (aka ***SDA Study***) concluded there is an overabundance of anticipated Corporate Business Park (CBP) within the overall SOI.

Commercial (C) ~ 6.4 acres

Commercial land use designation is intended to encompass all types of retail commercial, including convenience shopping & services to heavier auto-oriented land uses.

Under the City's 2020 General Plan, there are 5 parcels within the Study Area designated as Commercial. The total commercial land area is approximately 6 acres, most of which is located on 2 parcels located east of Highway 49. Existing businesses on the 2 parcels, Rare Earth Landscaping Materials and Kilroy's Towing Service & Auto Dismantling, are compatible with industrial type land uses. The other 3 parcels, consisting of approximately 1.3 acres, are located west of Highway 49 and have a single-family residence on each parcel.

Special Development Area (SDA) ~ 65.9 acres

SDA's are reserved for areas to be master planned or subject to a specific plan. These areas serve as a temporary "holding" classification pending approval of a specific plan or master plan.

A Master Plan was prepared for the 66 acres of SDA, formerly known as "Southill Village". The property was intended to include a "mixed-use" development with a commercial retail/shopping complex and business park. The property has since been bifurcated, the southern 20 acres of which are intended for a County corporation yard.

The loss of the SDA represents the loss of zoning intended for a commercial center and a community business park.

Other ~ 18.9 acres

Owned by Nevada County, this parcel is currently outside of the City SOI. This area is included in the Study Area at the request of Nevada County. A recent Initial Study prepared for the property indicates that Nevada County intends to rezone this portion of land to "Public" for a future County Corporation Yard.

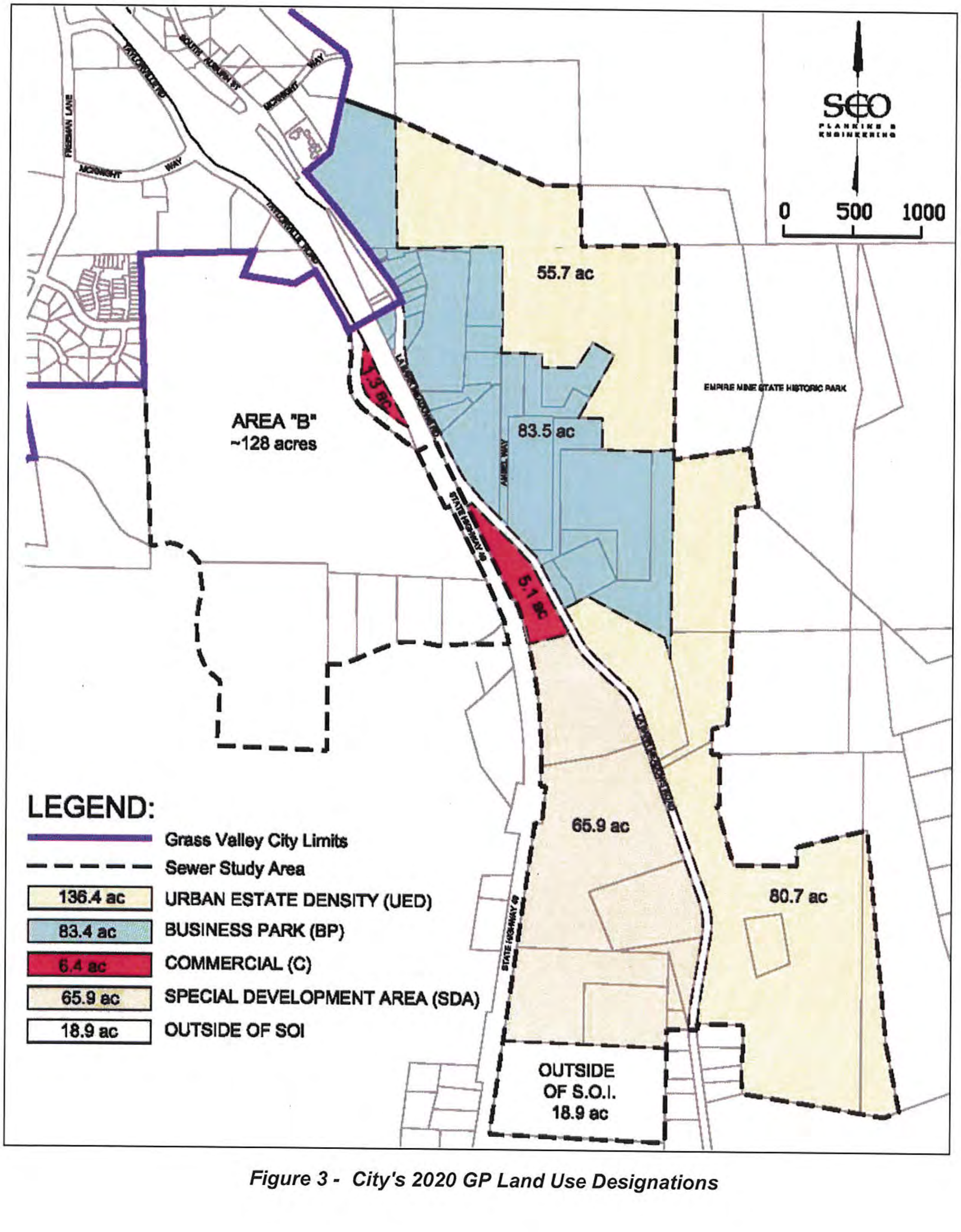


Figure 3 - City's 2020 GP Land Use Designations

Nevada County Zoning (*Figure 4*)

Residential Agriculture (RA-1.5) ~ 151.0 acres

RA-1.5 zoning within Nevada County is intended for low density single-family dwellings, at densities equivalent to 1.5 acre minimum parcel size. County zoning would allow up to 100 single-family residences.

Due to steep slopes and other site constraints, the buildable area within the RA-1.5 zoning district is approximately 55 acres. Achieving the allowable maximum density of 100 single-family homes is unlikely due to the limited buildable area.

Business Park (BP) ~ 101.3 acres

BP zoning within Nevada County is intended to encourage a variety of employment-oriented uses related to manufacturing, distribution, processing, service, research & development and other related light industries.

Due to steep slopes and other site constraints, the buildable area within the BP zoning district is approximately 66 acres.

Commercial (C2) ~ 1.3 acres

C2 zoning within Nevada County is intended to provide a wide range of retail services to serve a variety of needs over a large geographic area. The total area of commercial zoning within the Study Area is approximately 1.3 acres, consisting of 3 developed parcels located west of Highway 49, at the end of Taylorville Road. Existing development on each parcel consists of a single-family residence.

Light Industrial (M1) ~ 57.5 acres

M1 zoning within Nevada County is intended for the production, repairing, distribution, and warehousing of goods and equipment.

Due to steep slopes and other site constraints, the buildable area within the M1 zoning district is approximately 33 acres.

In general, of the 311 acres of land within the Study Area, approximately 155 acres (or 50%) has a realistic development opportunity.

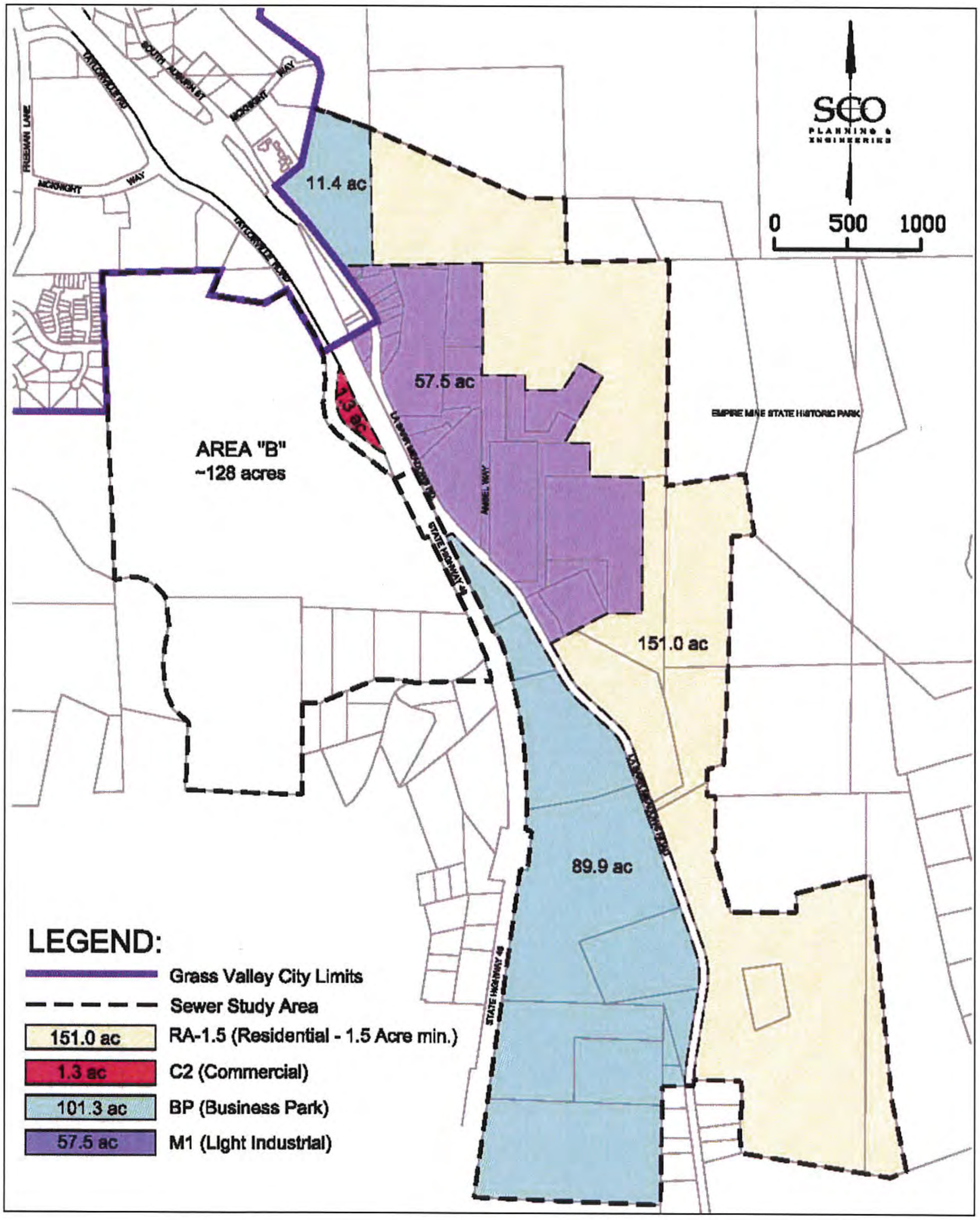


Figure 4 - County Zoning

C. RECOMMENDED FUTURE LAND USES *(FIGURE 5)*

In order to assess potential future land uses within the Study Area, information was compiled on each parcel including existing land uses, zoning, steep slopes & other site constraints, and reasonable assumptions for development potential. This information was used to create individual Parcel Reports (***Appendix A***) which were further used to estimate potential wastewater demands and impact fees based on the current City Impact Fee Schedule.

In addition to studying the physical characteristics and constraints of each parcel, two (2) public outreach meetings were conducted with existing property owners to solicit feedback regarding existing uses and potential future plans. After considering the land area constraints, existing uses and input from property owners, suggested zoning change recommendations were developed.

These recommendations are intended only to be a guide in determining a mix of land uses within the Study Area that may be better suited for future economic opportunities than the current GP Land Use Designations. The recommended City zoning for the properties within the Study Area, as shown on ***Figure 5***, are as follows:

Residential and Open Space Zoning

Residential Estate (RE)

There is one small parcel (0.5 acres) with an existing single-family home along La Barr Meadows Road near the southern end of the Study Area, currently designated on the City's 2020 General Plan map as SDA (Special Development Area). Changing that zoning to RE (Residential-Low Density) would better reflect the existing use and be consistent with the County Zoning to the south.

Residential (R-2)

The existing County zoning and City's GP map show a large area of Residential –Estate type zoning (**see *Figures 3 & 4***). However, much of this land is constrained by to steep slopes, utility restrictions and access issues.

R-2 (Multi-Family) zoning may be a better use. If the R-2 zoning with a GP Land Use Designation of ULD were permitted it would allow for a density of up to 4 units per acre. The R-2 zoning allows both single-family and multi-family dwellings units to be considered with a density up to 4 units per building per Table 2-7 of City's Development Code. If the R-2 zoning is concentrated to areas with less constraints and the areas that are more constrained were zoned OS (Open Space), the opportunity for clustered development designs that are more efficient and less costly could result in a better use of the land area and still provide housing opportunities close to employment centers.

Commercial, Industrial, and Business Park Zoning

Currently there is only 6.4 acres of commercial zoning and excess amount of Business Park zoning and limited Industrial zoning in the Study Area. It was anticipated that additional commercial would occur on the 66 acre SDA (Special Development Area) parcel as explained earlier in this report. However, due to the change of ownership with half of the SDA property purchased by the County of Nevada and the other half by the owners of Rare Earth Landscaping Materials, the potential for developing that site with a Master Planned Commercial and Business Park Center is unlikely. The City's GP map shows 2 parcels which total 5.1 acres as Commercial and approximately 66 acres as SDA. The County zoning shows these properties as BP. All three of these zones conflict with the exiting land uses and the future land uses envisioned by the land owners. The business owners of Kilroy's Towing and Auto Dismantling, and Rare Earth Landscaping Materials have expressed their intentions to continue their existing uses. The owners of the SDA lands, which include the County of Nevada and the owners of Rare Earth Landscaping Materials, have expressed their interest in having Public (P) and Light Manufacturing (M-1) on their respective lands.

A similar condition exists on the properties that support the businesses operated by Hansen Brothers Enterprises and Sierra Plumbing Supply. The City's GP map shows these properties as BP (Business Park) and County zoning shows these parcels as M1 (Light Industrial). Both business owners stated that they have no intentions of discontinuing their uses. Implementing the zoning consistent with the land uses shown on the City's GP map would conflict with these long time established operations.

Recognizing these existing conditions and to avoid potential future zoning conflicts, the following zoning changes, as shown on ***Figure 5,*** may better serve the area:

Community Business District (C-1) ~ 15.4 acres

Consider C-1 zoning on the land area around Sierra Plumbing Supply. C-1 zoning would better reflect the existing uses in the area that are, for the most part, more commercially oriented.

Light Industrial (M-1) - 49.4 acres

Consider M-1 zoning on portion of those lands shown as SDA on the City's GP map and those lands shown as BP (Business Park) on the County zoning maps. Some additional M-1 Zoning for the 10 acre parcel on the east side of La Barr Meadows Road, currently shown as Residential by both the City and County, should also be considered. This will provide better transition from the high intensity industrial uses to north and those uses across the La Barr Meadows Road.

General Industrial (M-2) - 41.2 acres

Consider M-2 zoning for existing industrial businesses such as Kilroy's Towing and Auto Dismantling, Rare Earth Landscaping Materials and Hansen Brothers Enterprises. The M-2 Zoning District is intended to accommodate heavier industrial uses such as manufacturing, assembly & processing, storage & distribution of raw materials, aggregate plants, and other related uses. Existing industrial businesses listed are consistent with the uses allowed in the M-2 Zoning District. The area recommended for M-2 zoning is currently zoned M1 (Light Industrial) in the County and is shown as BP on the City's GP map. Establishing M-2 zoning would reflect the existing uses and avoid future zoning and use

Corporate Business Park (CBP) ~ 19.7 acres

The *Economic and Fiscal Conditions Study for the City of Grass Valley* (aka ***SDA Study***) concluded that there was an overabundance of CBP within the City's SOI. Based on the excess of CBP zoning per the SDA Study and input from various property owners within the Study Area, City Staff recommended reducing the amount of CBP shown on the City's GP map and those lands shown as BP (Business Park) on the County zoning maps to a smaller area of 11 acres in the northern portion of the Study Area and 8 acres in the southern portion of the Study Area. This would still for allow for some corporate office space but at a more appropriate scale in relationship the existing and projected uses for the area.

Public (P) ~ 39.2 acres

Public zoning is intended for government uses and non-profit community service uses. County Staff has requested that the lands within the ownership of the County of Nevada, in the southern portion of the Study Area, currently shown as SDA on the City's GP map, be designated as Public (P). This zoning designation is appropriate for lands owned by and intended to be used by Public Agencies for public uses.

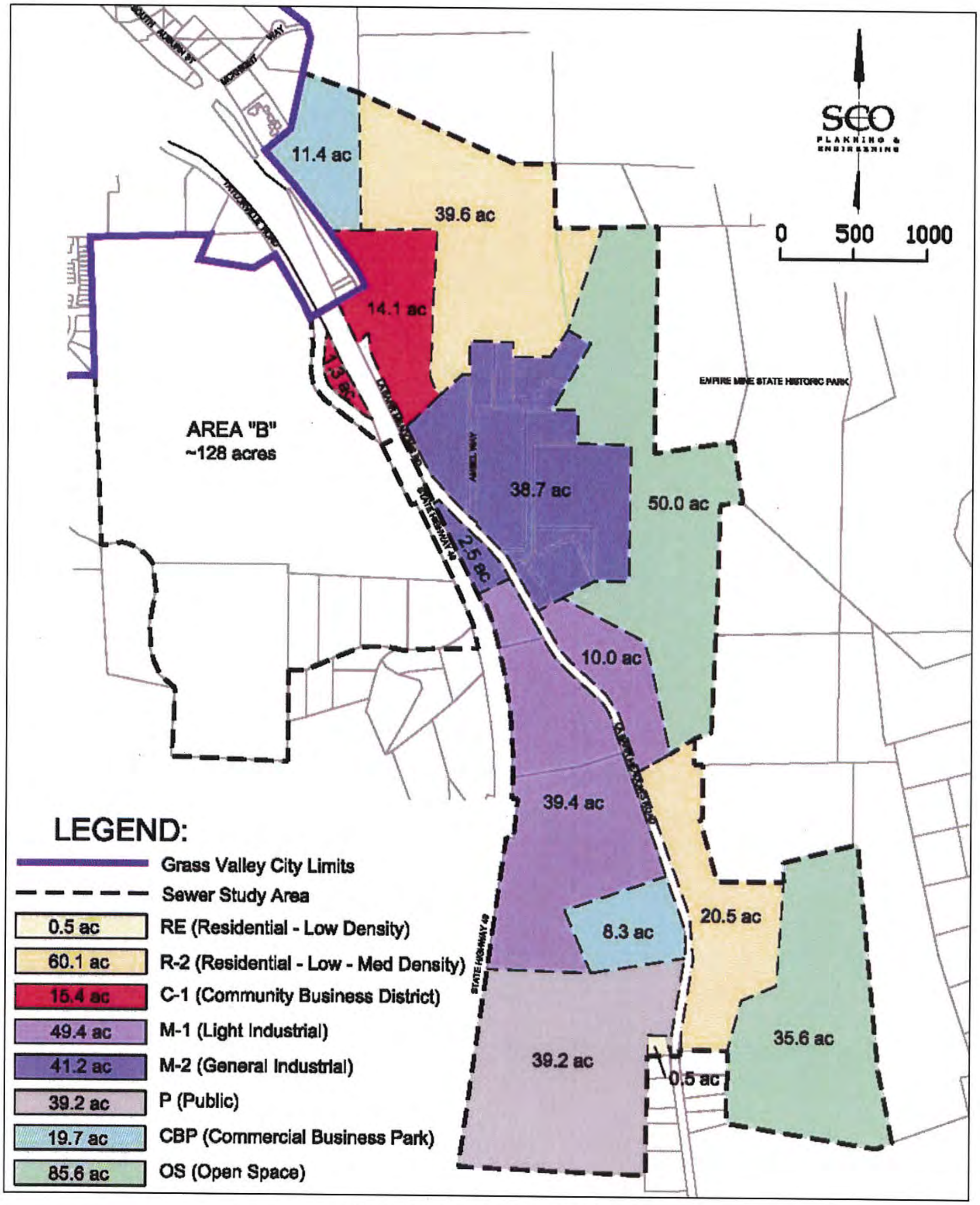


Figure 5 - Recommended Zoning

SECTION 3

Wastewater Facility Alternatives

SECTION 3: WASTEWATER FACILITY ALTERNATIVES

A. EXISTING FACILITIES

Currently, there are no public wastewater facilities within the Study Area. All developed parcels in the study area are currently served by individual onsite systems (i.e., septic systems) for treatment and disposal of sanitary wastes. Onsite systems typically include a septic tank for collection and settling of solids, with some type of leaching system for disposal (percolation) of the liquid into the soil. Continued use of onsite sewage disposal can occur as regulated by Nevada County Environmental Health Department. However, use of private systems for future development will limit the amount and type of development that can occur due to space limitations, setbacks and limited capacities of soils for absorption and filtration. The following is a description of existing public sewer facilities within City limits, north of the study area, as shown on ***Figure 6***.

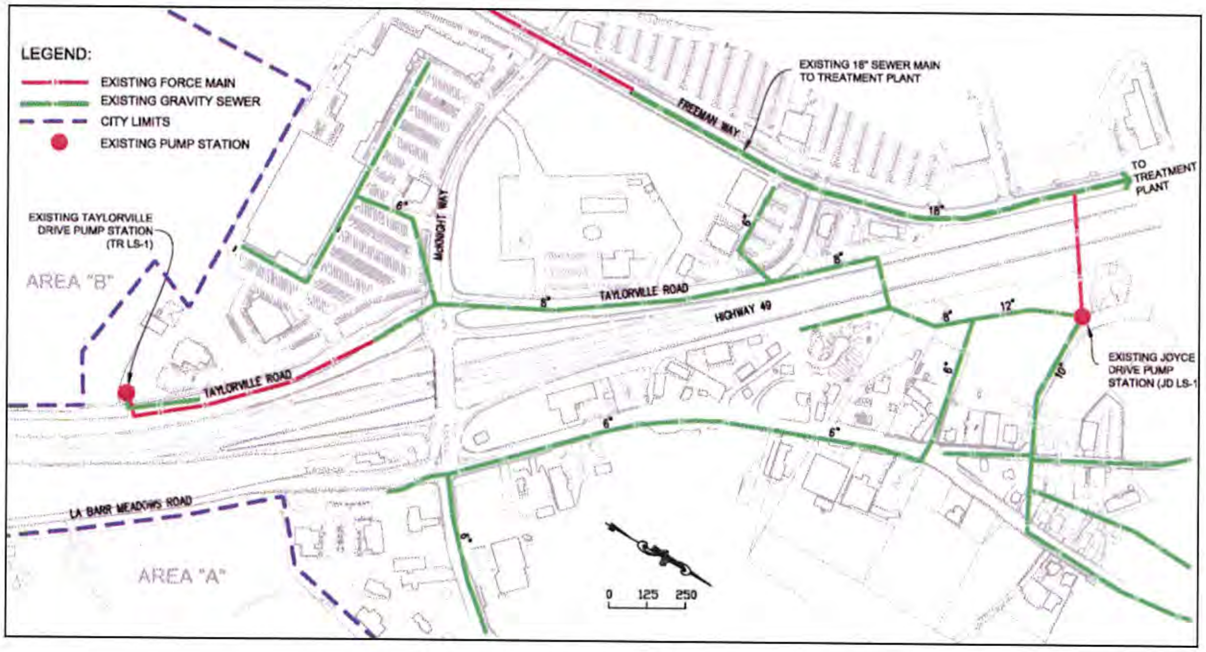


Figure 6 - Existing Facilities

McKnight Way / S. Auburn Street / Joyce Drive

This existing wastewater system consists of 6"-12" gravity sewer lines which convey flow to the Joyce Drive Sewer Lift Station. Plans showing existing wastewater lines in this area are somewhat limited, however the available data shows antiquated pipe (mostly 6") and manholes that would likely need to be replaced to improve capacity and reduce infiltration during winter events.

- Existing flow comprises of 83% of available Joyce Drive Lift Station total capacity (based on sewer model: 600gpm capacity and 500gpm winter flow)
- Available capacity is approx. 50 gpm = 0.07 MGD, assuming that all pipe and manholes are replaced from McKnight to Joyce Drive. (this assumes 50% of available capacity is for future projects within the existing service area)

Taylorville Road

This sewer system consists of 8" gravity sewer serving K-Mart and other commercial properties along Taylorville Road. There is a small sewer lift station located on Taylorville Road south of McKnight (north of study area). All sewer flow is conveyed under Highway 49 to the Joyce Drive sewer lift station, where it is then pumped back across Highway 49 to the point of discharge into the 18" sewer trunk main on Freeman Lane. There is opportunity for improvement to this system by extending gravity sewer with a direct connection to Freeman Lane, bypassing the Joyce Drive lift station. Even with this proposed improvement, this system has limited capacity for additional flow due to pipe size (8") and the amount of existing commercial connections.

- Capacity at 0.7 depth is approx. 0.46 MGD (8" flattest slope = 0.0050).
- Existing flow from approx. 34.5 acres commercial is approx. 29,325 gpd ADWF; and 0.28 MGD PWWF
- Available Capacity is approx. 0.46 – 0.28 = 0.18 MGD, assuming that gravity line is extended to Freeman Lane.

Freeman Lane

This sewer system consists of 18" sewer trunk main beginning at approx. 300' north of the intersection of W. McKnight and Freeman Lane and ending at the City Wastewater Treatment Plant. This system conveys flow from the Carriage House Subdivision (via force main), Wolf Creek co-housing and the Pine Creek shopping center. This system has capacity for additional conveyance of wastewater flow to the treatment plant, estimated as follows:

- Capacity at 0.7 depth is approx. 3.11 MGD (18" flattest slope = 0.0030).
- Existing flow from approx. 28.5 acre commercial and 189 residential units is approx. 60,324 gpd ADWF; and 0.49 MGD PWWF
- Available capacity is approx. 3.11 – 0.49 = 2.62 MGD

Our evaluation of the existing wastewater facilities indicates that the available capacity of the Joyce Drive lift station and Taylorville Road sewer system is minimal. Although the Joyce

Drive and Taylorville Road facilities could be improved and extended, the capacity is still limited and these facilities could only serve a portion of the future development within the Study Area. The Freeman Lane sewer trunk main is identified as having the best available capacity for extension of service to properties within the Study Area.

B. ALTERNATIVES FOR EXTENSION OF WASTEWATER FACILITIES

New development under the General Plan will result in increased demand for extension of wastewater collection systems and expanded wastewater treatment systems. The following wastewater project alternatives were considered in developing this feasibility analysis:

Alternative 1 - No Project

If wastewater is not extended into the study area, future growth opportunities will be severely limited due to space limitations and setbacks for septic systems, and limited capacities of soils for absorption and filtration. New business opportunities and expansion of existing businesses would need to comply with County Environmental Health Department and Regional Water Quality Control Board (RWQCB) requirements for privately maintained septic systems. Requirements for septic systems include avoidance of steep slopes, setbacks from water courses, drainage ways, property boundaries, and cut-banks; and setting aside large areas of land for Minimum Useable Sewage Disposal Areas (MUSDA's), which limit the amount of land available to expand economic development in the area.

Alternative #1		
Advantages	**Disadvantages**	**Initial Cost**
▪ No cost to City	▪ Limited growth opportunities ▪ Long-term loss of new revenue	None

Alternative 2 – Connect to existing Joyce Drive Lift Station *(Figure 7)*

This alternative shown on ***Figure 7*** requires two new lift stations, routing all wastewater flows east of Highway 49 through the existing pipe system at McKnight Way and S. Auburn Street to the Joyce Drive lift station. This existing system has capacity limitations and would require substantial improvements to the entire pipe system and Joyce Drive lift station. It is estimated that approx. 10 additional EDU's could be discharged through the existing pipe/manhole and lift station system.

This alternative requires the two new lift stations to be utilized in series with existing Joyce Drive lift station (ie. Wastewater would be pumped to McKnight Way and then be pumped again at Joyce Drive), which creates maintenance and operation challenges because the optimization of the overall system would be dependent on both sewer lift station facilities.

Additional wastewater improvements such as ejector pumps and/or upgrades to the existing Taylorville Road lift station would also be required to serve the 3 commercial parcels west of Highway 49, at the end of Taylorville Road.

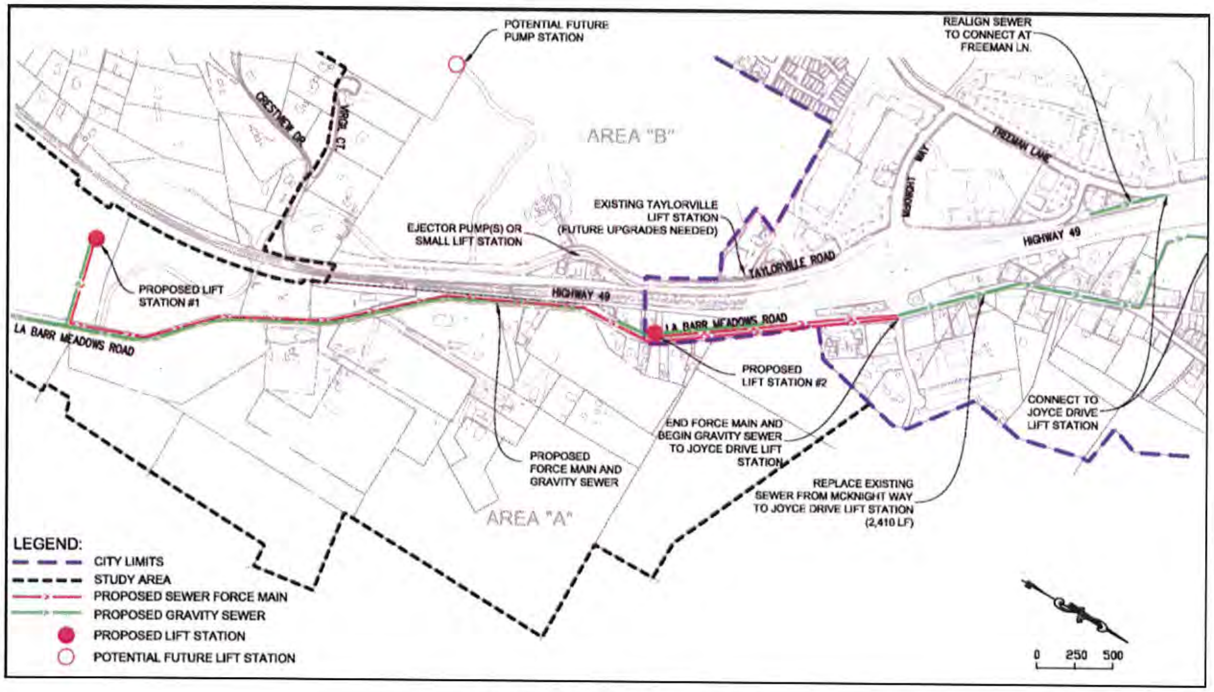


Figure 7 - Alternative 2

Alternative #2		
Advantages	**Disadvantages**	**Initial Cost**
▪ Needed improvements to existing wastewater system & Joyce Drive lift station	▪ Requires substantial upgrades to existing Joyce Drive wastewater system ▪ Potential operation & maintenance challenges ▪ Requires 2 lift stations to serve Study Area A ONLY ▪ A future 3rd lift station would be required to serve development within Area B ▪ Long term operational & maintenance costs associated with multiple lift stations ▪ Future upgrades required for existing Taylorville Road lift station	$4.5 million

Alternative 3 – Connect to existing sewer main at Freeman Lane (*Figure 8*)

This alternative shown on ***Figure 8*** requires two new lift stations, routing all wastewater flows to Lift Station #1 and pumped across Highway 49 to Freeman Lane.

Lift Station #2, located in a low area along La Barr Meadows Road would pump over the hill to the south and then gravity flow to Lift Station #1. New force main would extend from Lift Station #1 along La Barr Meadows Road, under Highway 49 to Taylorville Road, continue to McKnight Way and connect to the existing 18" gravity sewer main at Freeman Lane.

Additional wastewater improvements such as ejector pumps and/or upgrades to the existing Taylorville Road lift station would also be required to serve the 3 commercial parcels west of Highway 49, at the end of Taylorville Road.

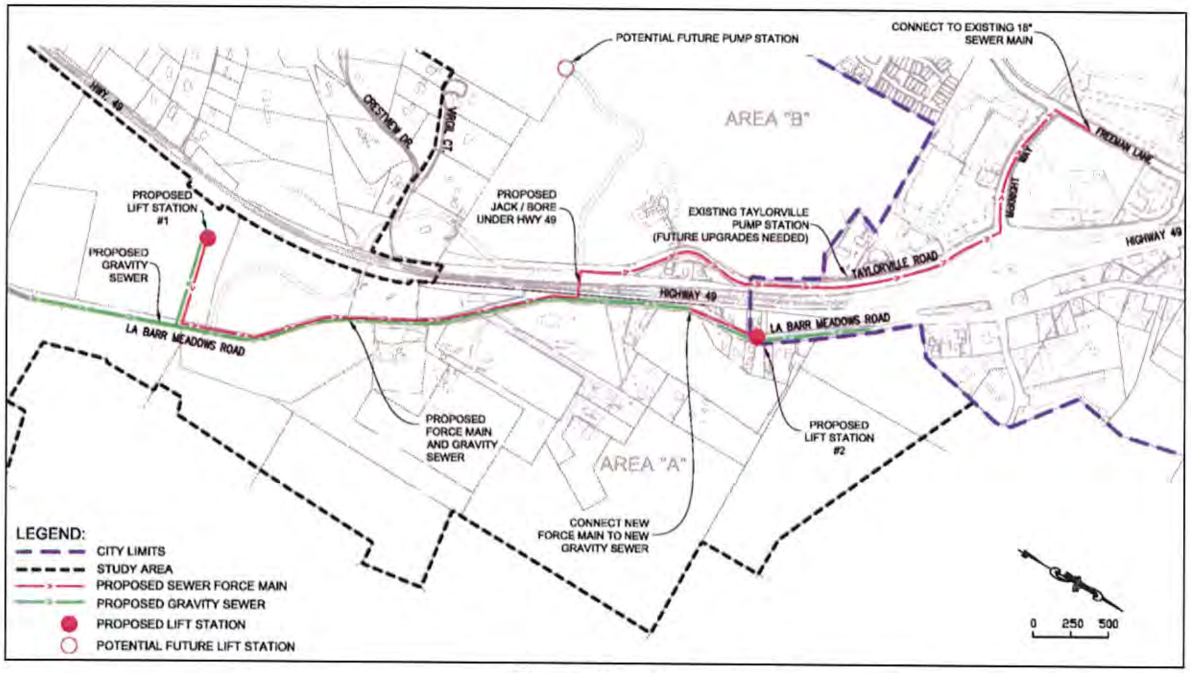


Figure 8 - Alternative 3

Alternative #3		
Advantages	**Disadvantages**	**Initial Cost**
▪ Retains capacity of Joyce Drive lift station ▪ Less up front costs than Alternative 2 & 4	▪ Requires 2 lift stations to serve Study Area A ONLY ▪ A future 3rd lift station would be required to serve development within Area B ▪ Long term operational & maintenance costs associated with multiple lift stations ▪ Future upgrades required for existing Taylorville Road lift station	$4.0 million

Alternative 4 – One regional Sewer Lift Station located on west side of Highway 49

This alternative shown on ***Figure 9*** requires only one regional lift station located on the west side of Highway 49, and could also replace the existing Taylorville Road lift station. The entire study area would gravity flow to two low spots and cross Highway 49 at two locations; one near the Crestview Drive intersection and the other just south of the existing Taylorville Road lift station. The gravity flow would terminate at a single lift station and pump up to Taylorville Road to McKnight Way and tie in to the existing gravity sewer main at Freeman Lane.

Fewer lift stations would significantly reduce long-term costs associated with operation and maintenance and is more consistent with the City of Grass Valley Sewer System Master Plan. This alternative would also have the potential to serve a larger geographic area (Area B), providing more opportunity for additional revenue.

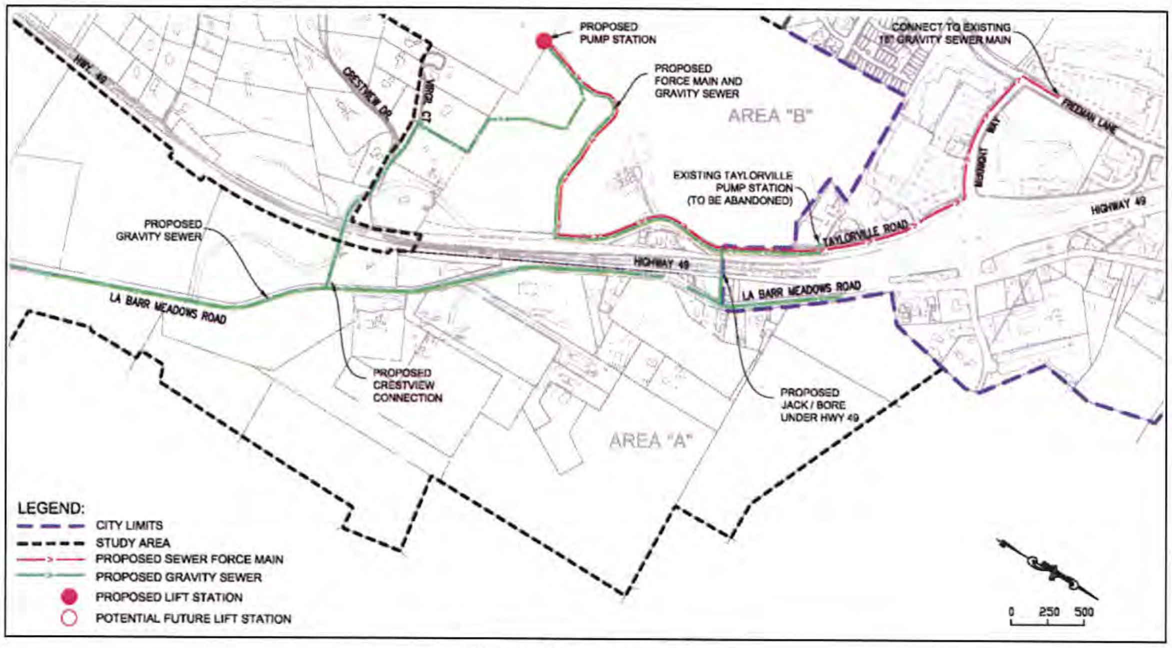


Figure 9 - Alternative 4

Alternative #4 – "Apparent Best" Alternative		
Advantages	**Disadvantages**	**Initial Cost**
▪ Retains capacity of Joyce Drive lift station ▪ Serves a larger geographic area, providing more economic opportunity ▪ 1 "regional" lift station reduces long-term operational & maintenance costs ▪ More consistent with City's Sewer Master Plan ▪ Could replace existing Taylorville Road lift station	▪ Larger initial investment ▪ Requires right-of-way and/or easements from at least 4 property owners	$4.6 million

C. COMPARATIVE ANALYSIS & ESTIMATED COSTS

A comparative analysis was made of the various alternatives for extension of wastewater facilities considering such factors as initial cost, operation cost, long-term maintenance (i.e. minimizing the number of lift station facilities), feasibility for future expansion, reliability and flexibility, and consistency with the City's Sewer Master Plan. Based on the comparative analysis, the "apparent best" alternative is ***Alternative 4***. This alternative ranks the highest (best) in terms of accommodating future growth over a larger geographic area and reducing operation & maintenance costs by limiting the number of lift stations and replacing the existing lift station at Taylorville Road.

Other alternatives were considered (***Alternatives 2 & 3***), however these would require multiple lift stations that would incur higher operations / maintenance (O&M) costs, create operational challenges, and would serve a smaller geographic area.

Cost estimates for the project alternatives are included in ***Appendix C***. The estimated costs include capital costs for facilities construction, as well as the necessary engineering, survey, inspection and construction administration. A 15% contingency allowance is also included. Costs that are not included in the estimates include environmental studies, project administration, annexation, financing, and operations /maintenance (O&M) costs.

COMPARATIVE ANALYSIS TABLE				
	Alternative 1	***Alternative 2***	***Alternative 3***	***Alternative 4***
Description	▪ No Project ▪ Continue use of private septic systems	▪ Requires two new lift stations on east side of Highway 49 ▪ All wastewater flows east of Highway 49 routed north through the existing pipe system to the Joyce Drive Lift Station	▪ Requires two new lift stations on east side of Highway 49 ▪ All wastewater flows routed to a lift station and pumped across Highway 49 to Freeman Lane	▪ Requires only one regional lift station located on the west side of Highway 49 ▪ All wastewater flows routed to a lift station on west side of Highway 49 and pumped to Freeman Lane
Initial Cost	No Initial Cost	$4.5 million	$4.0 million	$4.6 million
Advantages	▪ No Cost	▪ Needed improvements to existing wastewater system & Joyce Drive lift station	▪ Retains existing capacity of Joyce Drive lift station ▪ Less up-front costs than Alternative 2 & 4	▪ Retains existing capacity of Joyce Drive lift station ▪ Serves a larger geographic area, providing more economic opportunity ▪ Reduces long-term operational & maintenance costs ▪ More consistent with City's Sewer Master Plan ▪ Replaces existing Taylorville Road lift station
Disadvantages	▪ Limited growth opportunities for the area ▪ Long-term loss of new revenue ▪ Future annexation unlikely without wastewater extension	▪ Requires substantial upgrades to existing Joyce Drive wastewater system ▪ Requires 2 lift stations to serve Study Area ONLY ▪ Potential operational challenges created with utilizing 2 or more lift stations in series ▪ Increased operational & maintenance costs associated with multiple lift stations ▪ Future upgrades required for existing Taylorville Road lift station	▪ Requires 2 lift stations to serve Study Area A ONLY ▪ Increased operational & maintenance costs associated with multiple lift stations ▪ Future upgrades required for existing Taylorville Road lift station ▪ A future 3rd lift station would be required to serve development within Area B	▪ Larger initial investment ▪ Requires right-of-way and/or easements from at least 4 property owners

D. ESTIMATED WASTEWATER FLOWS

Wastewater flows for the Study Area were calculated as part of this wastewater feasibility analysis, using the following procedure:

1. Compiled data for individual parcels within the Study Area. This includes an assessment of acreage, existing land uses, site constraints and a reasonable assumption of developable potential. (see Appendix A – Individual Parcel Exhibits)
2. Determined *Maximum Build-out* based on the following land use designations:
    a. Existing County Zoning
    b. City's General Plan Land Use Designations(based on 2020 General Plan)
    c. Recommended Zoning (described in Section 2C of this report)
3. Tabulated Wastewater Demand Ratios (***Appendix B***) for each of the above referenced land use designations. Using the following City of Grass Valley Design Standards, we calculated the average dry weather flows for Maximum Buildout:
    a. Residential Wastewater Demand = 191 gpd/unit (1 EDU per unit)
    b. Commercial / Industrial / Business Park = 850 gpd per acre for Commercial and Industrial land use.
4. Quantified buildable land area (excluding known site constraints such as 30% slope, ponds, creeks, wetlands, etc.), and the resultant maximum residential density or maximum commercial / industrial building square footage.
5. Formulated an opinion of *Anticipated Build-out* using the data obtained from individual parcel report (i.e. site constraints, existing use, buildable area). It is unlikely that maximum build-out would occur on each parcel, therefore we estimated a more likely building coverage for each parcel to be high (100% coverage), medium (50% coverage) or low (20% coverage) depending on site constraints and development potential.
6. Calculated Wastewater Flow for Maximum Build-out for each of the land use designations. Calculations were made using the design criteria outlined in Section 8 of the City of Grass Valley Design Standards. Average Dry Weather Flow was determined using the City flow factor of 191 GPD / unit for Residential and 850 GPD / acre for Commercial, Business Park and Industrial land uses. Peak Flow was determined using the City design standards (table 8-1 along with safety factor of 2.0). Wastewater Flow Calculations for Maximum Build-out are provided in Appendix B.
7. Calculated the estimated wastewater flow for Anticipated Build-out based on the approximation of likely building coverage. For this calculation we used the above described anticipated building coverage area square footage. This calculation is intended to be a more specific and more realistic depiction of average flows, therefore it was necessary to assign an appropriate wastewater flow factor based on square footage. For purposes of this estimate, wastewater discharge is estimated at 125 gpd per 1000 sf of "anticipated bldg coverage". This is based on fixture counts from existing/ comparable developed projects.

Estimated Total Wastewater Flow

- **Existing**

  There are a total of 12 developed residential parcels and approx. 64,164 sf of developed commercial buildings within the Study Area. As shown on the Wastewater Flow Calculations in Appendix B, the total estimated peak flow is ***0.11 MGD from existing properties***. If wastewater facilities were extended to serve these existing customers, it is likely that the required lift station would have insufficient flows to operate efficiently. Low flowrates are of concern, particularly during the initial years of operation when the lift station facility is operating well below the design capacity. New development of approximately 20% of the Study Area would need to occur in order to generate sufficient flows for the lift station(s) to operate efficiently.

  Included in this analysis is a calculation of wastewater flows for anticipated buildout based on County zoning. If land use were to occur ***with current County zoning*** (i.e. the City extends sewer service but does not annex the Study Area into the City) the estimated peak wastewater flow would be ***1.06 MGD***.

- **City Land Use Designations** (based on City's 2020 General Plan)

  The Estimated Peak Wastewater Flow ***with City Zoning is 1.19 MGD*** for Maximum Build-out and 0.45 MGD for Anticipated Build-out.

- **Recommended Zoning** (described in Section 2C of this report)

  The Estimated Peak Wastewater Flow ***with Recommended Zoning is 1.61 MGD*** for Maximum Buildout and 0.54 MGD for Anticipated Buildout.

As noted in this report, a Regional Facility using **Alternative 4** could serve a larger geographic area. This facility could potentially receive 0.25 MGD peak flow (128 DU) in addition to the maximum determined flow of 1.61 MGD from the Study Area. ***The total estimated peak flow for the regional lift station facility is 1.86 MGD***.

For comparison, the City Sewer Master Plan report, prepared in 2006 by Sauers Engineering, provides an estimated flow for a future collection area that closely resembles Study Areas A and B. Figure A-1 of this report shows an estimated average flow of 155,800 gpd, which would equate to a peak flow of 1.1 MGD. (note, this is based on a prior land use plan for Southhill SDA).

The calculated peak discharge using the highest, best use (maximum recommended zoning) for a regional lift station facility was determined to be 1.86 MGD. This is less than the available capacity (2.62 MGD) of the 18" sewer trunk main on Freeman Lane, which would indicate that the proposed point of connection at Freeman Lane is adequate to serve the Study Area.

SECTION 4

Management & Financing

SECTION 4: MANAGEMENT AND FINANCING

A. POTENTIAL FINANCING OPTIONS

Implementation of the wastewater extension project, as described in this report, will entail securing funding and/or financing. The following funding sources are available for wastewater projects and could be considered:

PROGRAM	PROGRAM DESCRIPTION & KEY FEATURES	ADMINISTERING AGENCY / INTERNET ADDRESS
Clean Water State Revolving Fund (CWSRF)	✓ Eligible projects include construction of publicly owned facilities (including sewer) ✓ Low interest rates (2.2% Avg) ✓ Flexible repayment terms up to 20 yrs ✓ Can fund up to 100% of project costs ✓ Repayment begins 1 yr after construction ✓ Maximum $50 million per project ✓ Principal forgiveness up to 50% of loan for qualifying communities (depending on median income)	EPA & State Water Resources Control Board http://www.waterboards.ca.gov/water_issues/programs/grants_loans/srf **Meghan Brown** Division of Financial Assistance State Water Resources Control Board Phone: 916-341-5729
Infrastructure State Revolving Fund (ISRF) Program	✓ Low cost, long-term infrastructure financing for local governments ✓ Flexible repayment terms up to 30 yrs ✓ Can fund up to 100% of project costs ✓ No matching funds required ✓ Several repayment options ✓ Maximum $10 million per project	California Infrastructure & Economic Development Bank (I-Bank) http://www.ibank.ca.gov/infrastructure_loans **Carlos Nakata, Manager** E-mail: ibank@ibank.ca.gov Phone: (916) 322-1399
Community Facilities District (CFD) or Special Assessment District	✓ May be set by the City as a "special property tax" to help fund public improvements ✓ Taxes raised by the CFD are used to pay back the principal and interest on the bonds ✓ A special assessment may only be levied against properties which have been identified as having received a direct and unique "benefit" from the public project.	City of Grass Valley
City's Current Impact Fee Program	✓ Current Impact Fee Program is specifically for existing infrastructure. To use this fee or a portion of this fee as a funding mechanism for new infrastructure would likely require a new Impact Fee Study	City of Grass Valley

Table 4a – Financing Options

Clean Water State Revolving Fund (CWSRF)

The Clean Water State Revolving Fund (CWSRF) provides loans for the construction of water quality improvement projects. The fund is administered by the Environmental Protection Agency and state agencies. The CWSRF replaced the Clean Water Act Construction Grants program. Congress established the fund in the Water Quality Act of 1987.

Clean Water Act sections 212, 319, and 320 provide the statutory authority for programs funded by the CWSRF. The CWSRF is authorized to provide financial assistance for the construction of publicly owned treatment works, the development and execution of state's comprehensive conservation management plans, and the development and execution of an estuary conservation and management plan.

Eligible projects under CWA section 212 include the capital costs for the construction and maintenance of publicly owned treatment works including **wastewater collection and treatment**, publicly owned municipal storm water projects, sewer overflow, water treatment systems & storage, green infrastructure, water quality portions of municipal landfill projects, water conservation and reuse, and Energy Conservation and Efficiency.

Federal and state laws historically have prohibited the CWSRF from offering grants, and have required complete repayment of all financial assistance. However, beginning in 2009, federal appropriations authorized grants, negative interest rates, and principal forgiveness on a limited basis. California law has been modified to accommodate these additional types of subsidy.

Based on 2010 census criteria related to median income and population, it appears Grass Valley may qualify as a "small, disadvantaged community" (SDAC) which could potentially allow principal forgiveness (PF) up to 50% of the loan, not to exceed $4 million. For assistance in applying and questions regarding qualifications for SDAC, the point of contact at the State Water Resources Control Board is Meghan Brown, Division of Financial Assistance at 916-341-5729.

Infrastructure State Revolving Fund (ISRF) Program

The Infrastructure State Revolving Fund (ISRF) Program provides low-cost financing to public agencies for a wide variety of infrastructure projects. ISRF Program funding is available in amounts ranging from $250,000 to $10,000,000, with loan terms of up to 30 years. Loans are categorized into two tiers: Tier 1 loans are available up to $10 million and Tier 2 loans are available up to $2.5 million.

Eligible applicants include any subdivision of a local government, including cities, counties, redevelopment agencies, special districts, assessment districts, joint powers authorities and non-profit corporations formed on behalf of a local government.

Eligible project categories include city streets, county highways, state highways, drainage, water supply and flood control, educational facilities, environmental mitigation measures, parks and recreational facilities, port facilities, public transit, **sewage collection and treatment**, solid waste collection and disposal, water treatment and distribution, defense conversion, public safety facilities, and power and communications facilities. Sewage Collection and Treatment is defined as "pipes, pumps, and conduits that collect wastewater from residential, manufacturing, and commercial establishments, the equipment, structures, and facilities used in treating wastewater to reduce or eliminate impurities or contaminants, and the facilities used in disposing of, or transporting, remaining sludge, as well as all equipment used in the maintenance and operation of the foregoing.

Community Facilities District (CFD)

California Proposition 13 restricts the ability of local governments to raise property taxes by more than the rise in inflation. As a result, new ways to fund public improvements in local jurisdictions were considered. CFD's (also known as "Mello-Roos" fees) are generally considered an option to fund public improvements since Proposition 13 limits property taxes.

A CFD is an area where a special property tax on real estate, in addition to the normal property tax, is imposed on those real properties within a Community Facilities District. These districts seek public financing through the sale of bonds for the purpose of financing public improvements and services. These services may include streets, water, sewage and drainage, electricity, infrastructure, schools, parks and police protection to newly developing areas. The tax paid is used to make the payments of principal and interest on the bonds.

City's Current Impact Fee Program

The City's current impact fee represents the customer's share of capital costs associated with the City's wastewater system. Cost components included are for the treatment plant and collection system and are based on the demand ratios of a wastewater service.

Currently, these impact fees are identified in an impact fee study for existing infrastructure. Consideration of these fees should be given as a potential source of revenue to help offset the costs of the extension of wastewater infrastructure into new development areas.

B. TIMING AND PROCEDURE FOR IMPLEMENTATION

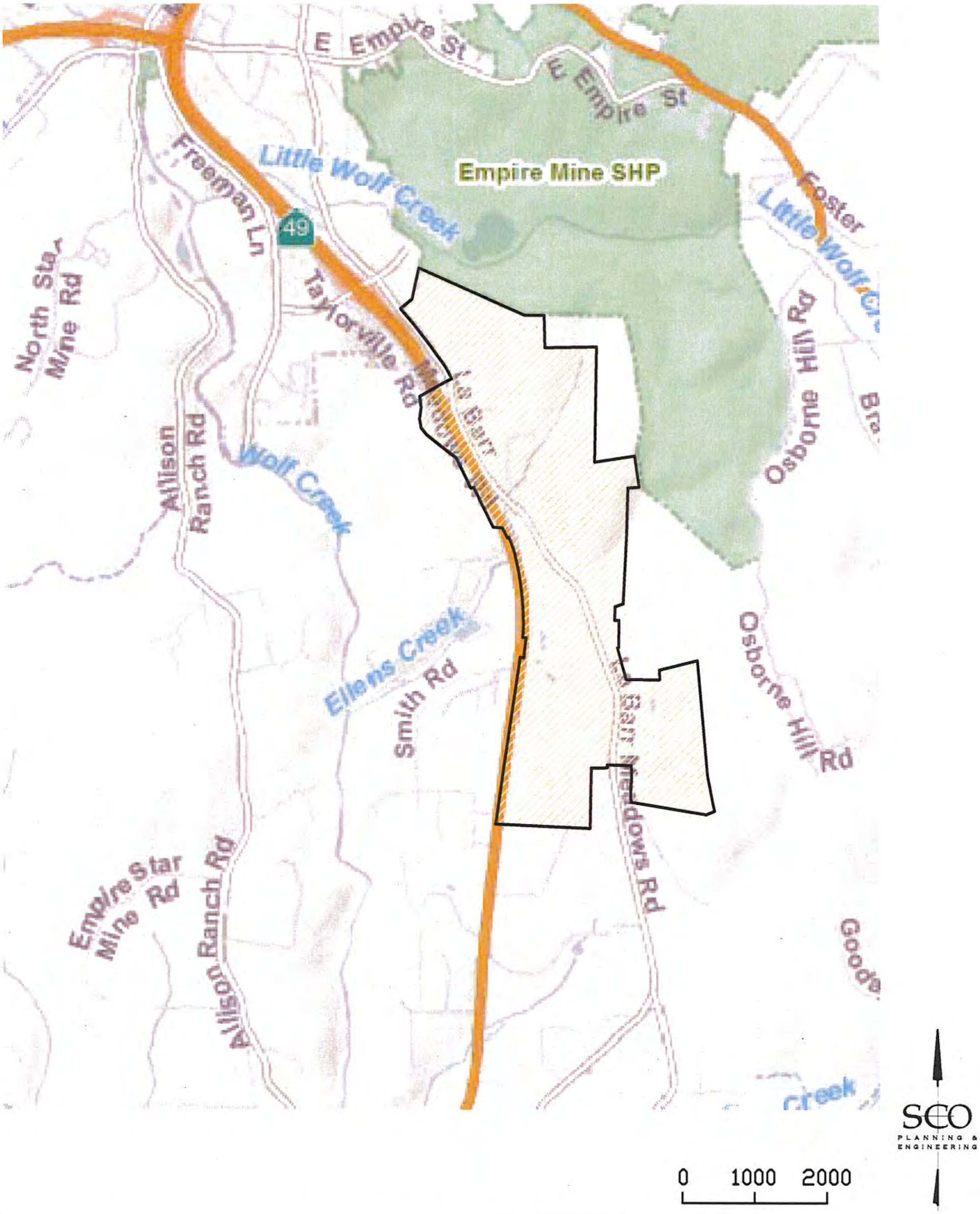
Timing for implementation to extend wastewater facilities to the Study Area is dependent upon several factors and involves multiple steps. The following initial steps should be taken in regard to facilities management and project financing:

- Initial Study Environmental Review for the overall project
- General Plan Amendment
- Pre-zoning of the Study Area
- Annexation to the City of Grass Valley
- Revise or amend the existing wastewater ordinance and City sewer system capital improvement program (CIP) to include the extension of wastewater facilities required for service to existing and future customers within the annexation area, provided funding mechanisms are determined.
- Acquire grants and/or loan financing (see Table 4a for financing options)
- Assess sewer impact fees to individual properties at time of development

C. OPERATION, MAINTENANCE AND MANAGEMENT

Once constructed, the project facilities will require ongoing operation and maintenance, the costs for which will be paid through the collection of fees or user charges from all properties served by the project. Wastewater collection, treatment and disposal facilities would be owned and operated by the City of Grass Valley. Operation and maintenance (O&M) activities include facility inspections, maintenance of collection system pipelines and valves, lift station and piping, electrical/mechanical control equipment, and maintenance & monitoring of the wastewater treatment plant. For the purposes of this Feasibility Analysis, it is estimated that O&M costs would be paid by standard City sewer billing rates. O&M costs are spread equally among all properties served jointly by City wastewater facilities.

Figures 1-9



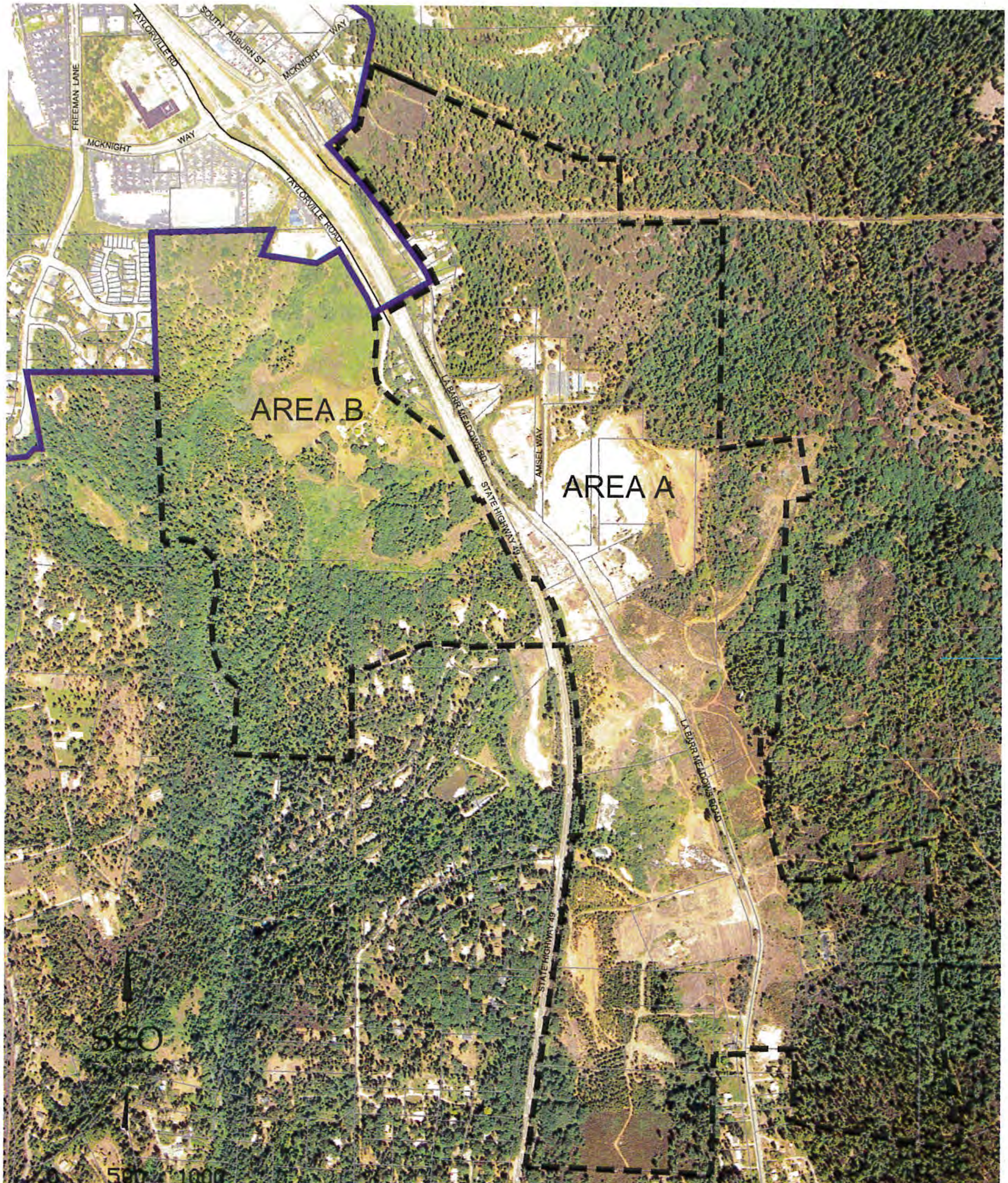
SCO PLANNING ENGINEERING & SURVEYING

LOCATION MAP

WASTEWATER FEASIBILITY ANALYSIS
CITY OF GRASS VALLEY

FIGURE
1

S:\Job_Projects\201212-Grass Valley Sewer Study\dwg\201212_Zoning Exhibit.dwg, 8/13/2012 3:02:35 PM, Adobe



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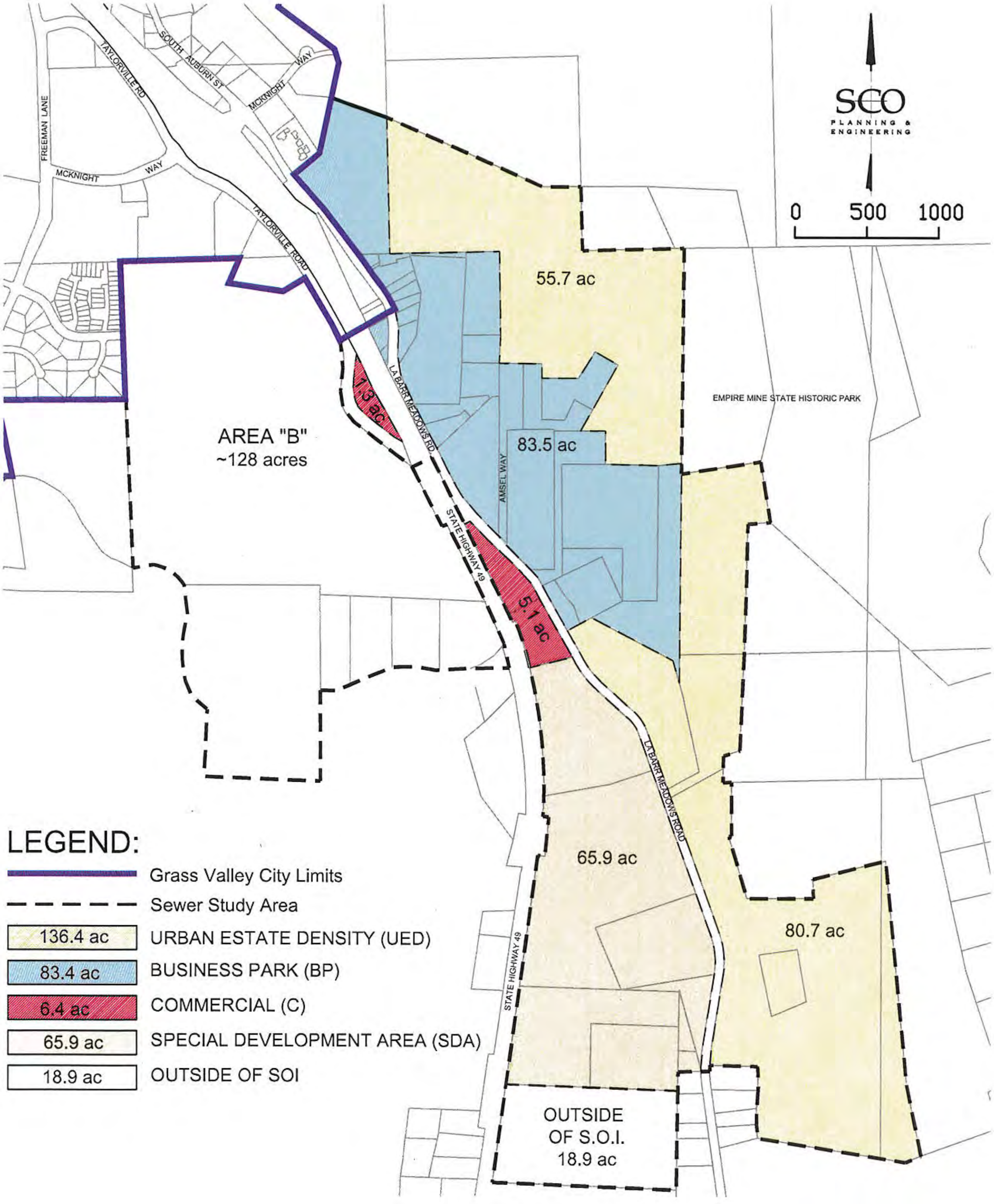
STUDY AREA

WASTEWATER FEASIBILITY ANALYSIS
CITY OF GRASS VALLEY

FIGURE
2



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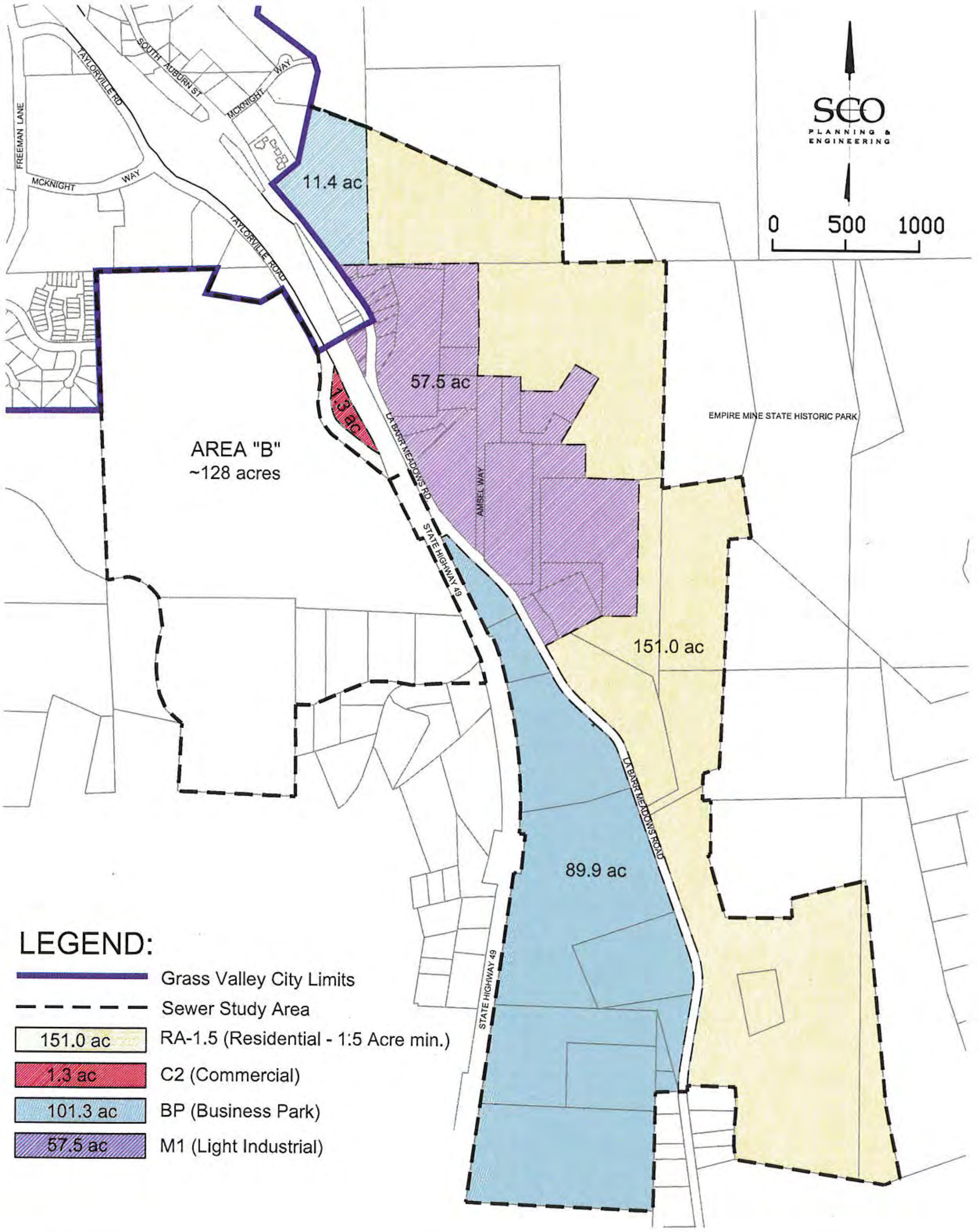
CITY 2020 GP - LAND USE

WASTEWATER FEASIBILITY ANALYSIS
CITY OF GRASS VALLEY

FIGURE
3



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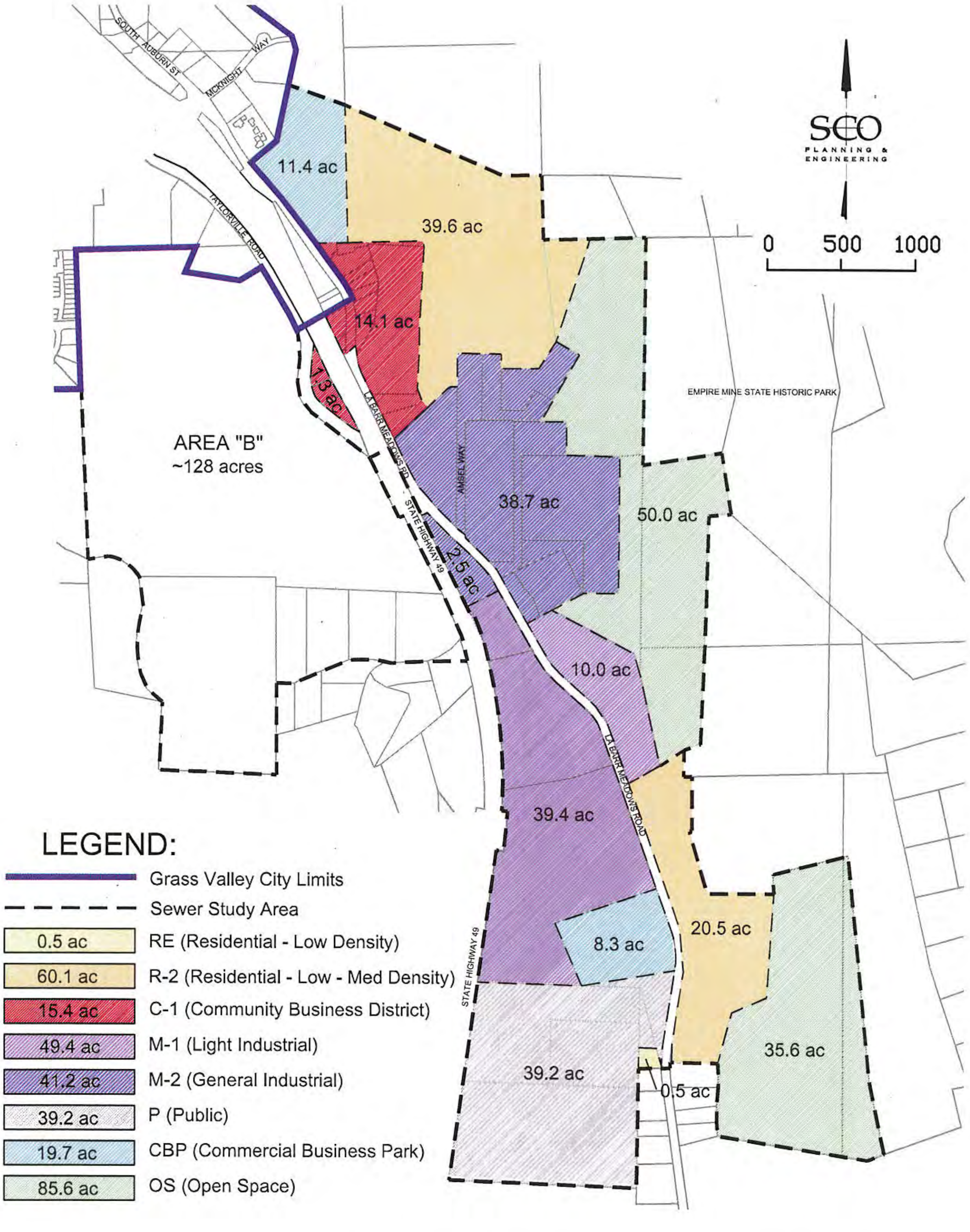
COUNTY ZONING

WASTEWATER FEASIBILITY ANALYSIS
CITY OF GRASS VALLEY

FIGURE
4



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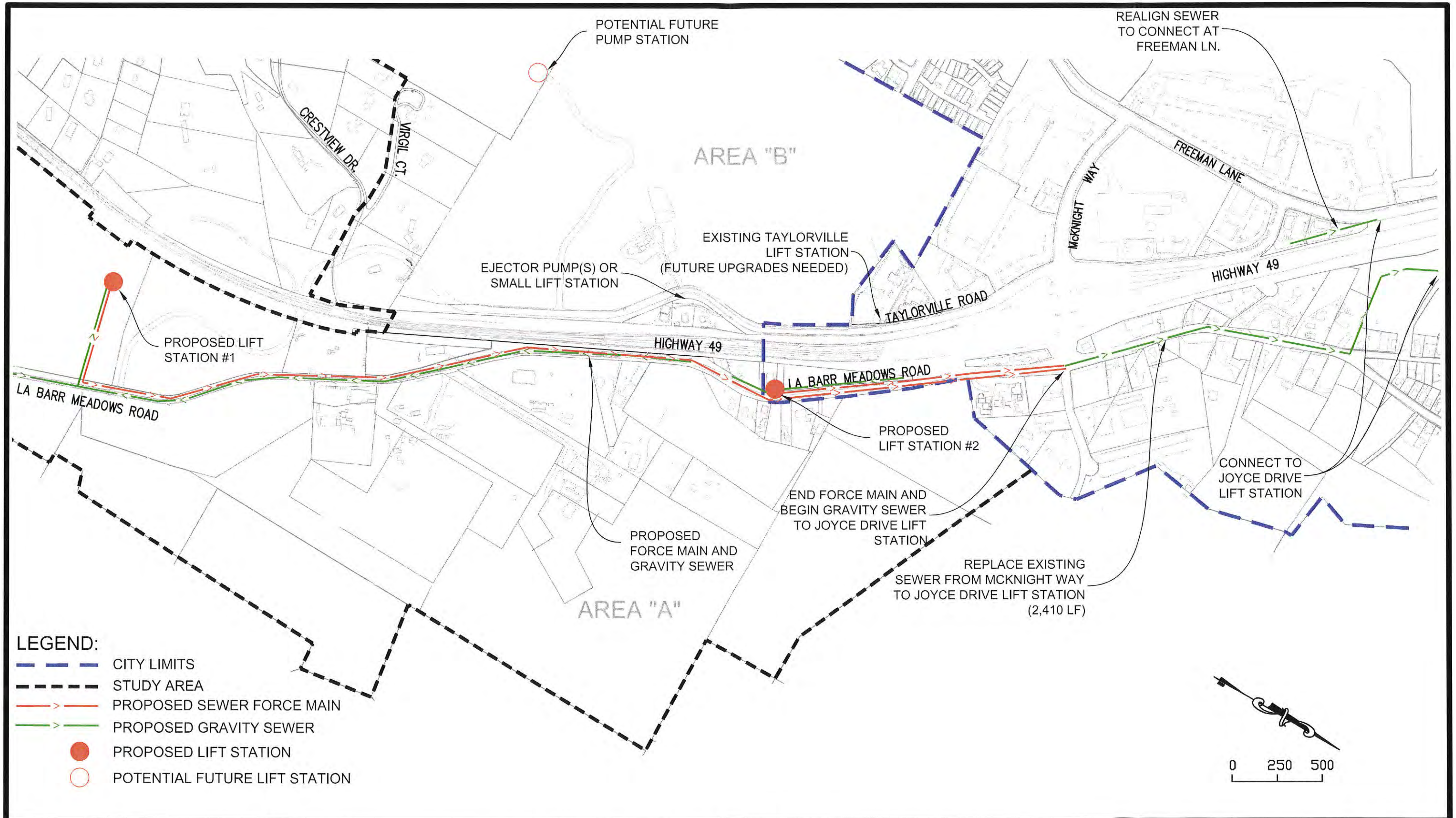
RECOMMENDED ZONING

WASTEWATER FEASIBILITY ANALYSIS
CITY OF GRASS VALLEY

FIGURE
5



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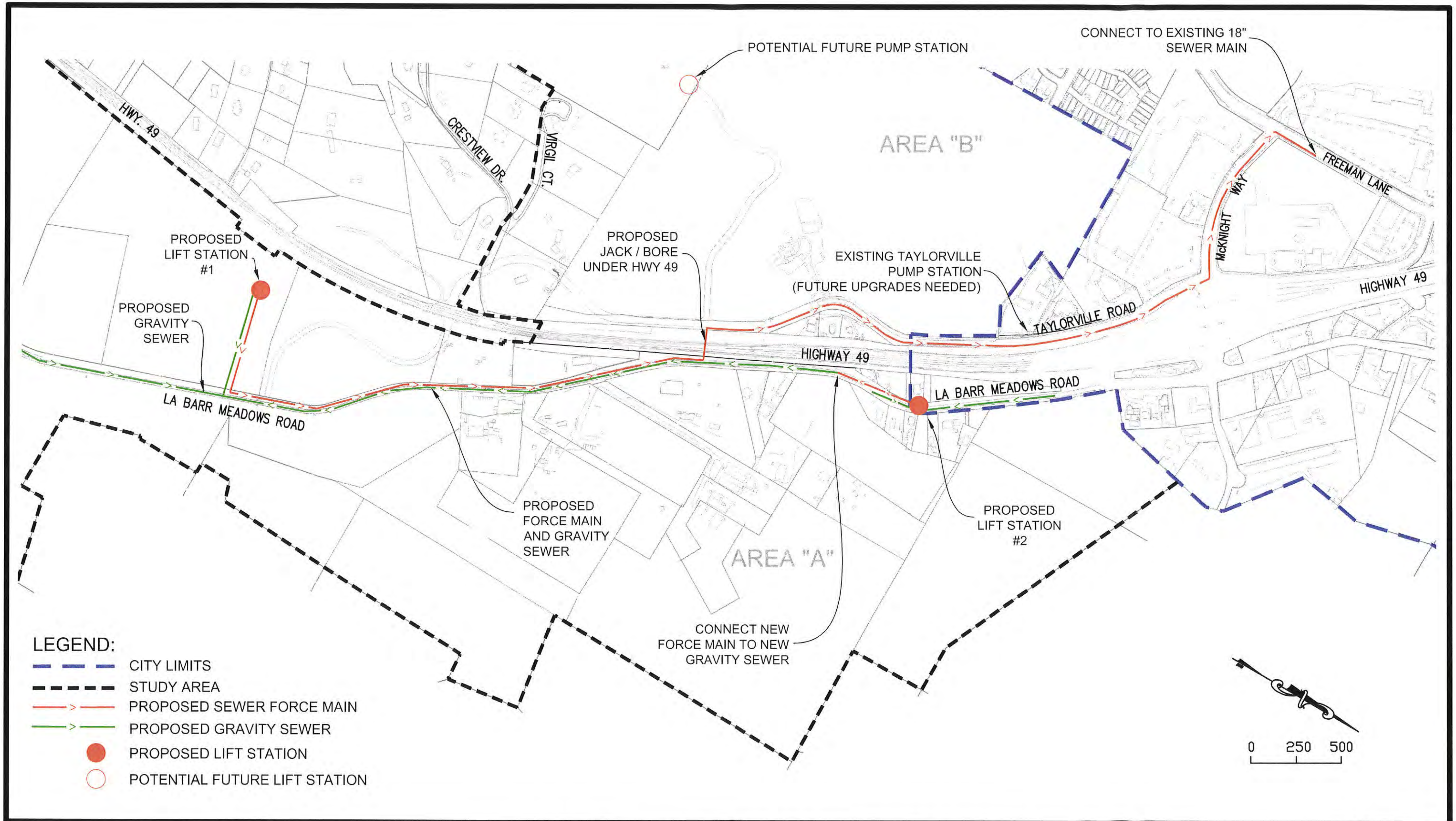
PROPOSED WASTEWATER FACILITIES - ALTERNATIVE #2

WASTEWATER FEASIBILITY ANALYSIS
CITY OF GRASS VALLEY

FIGURE
7



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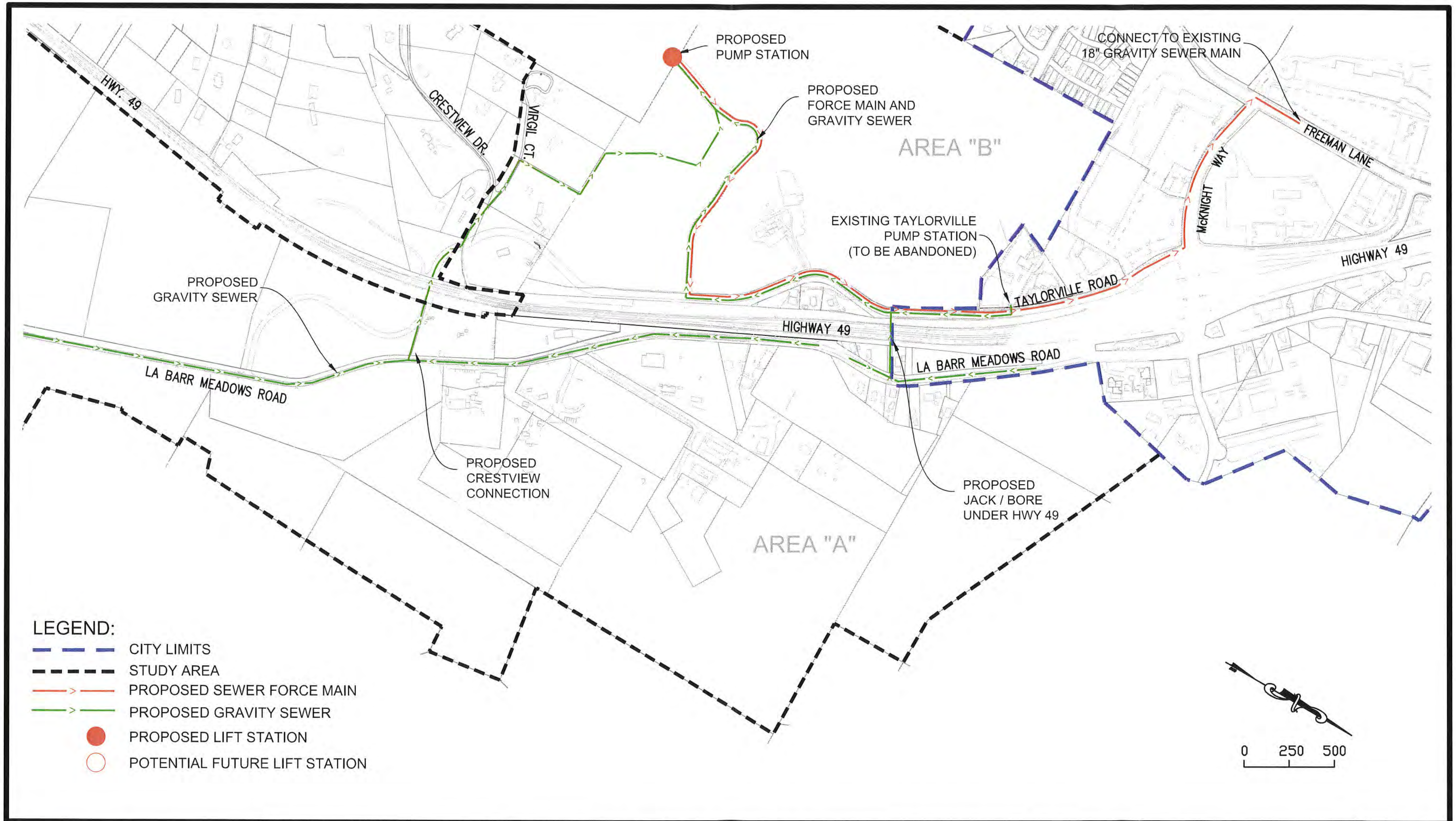
PROPOSED WASTEWATER FACILITIES - ALTERNATIVE #3

WASTEWATER FEASIBILITY ANALYSIS
CITY OF GRASS VALLEY

FIGURE
8



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PROPOSED WASTEWATER FACILITIES - ALTERNATIVE #4

WASTEWATER FEASIBILITY ANALYSIS
CITY OF GRASS VALLEY

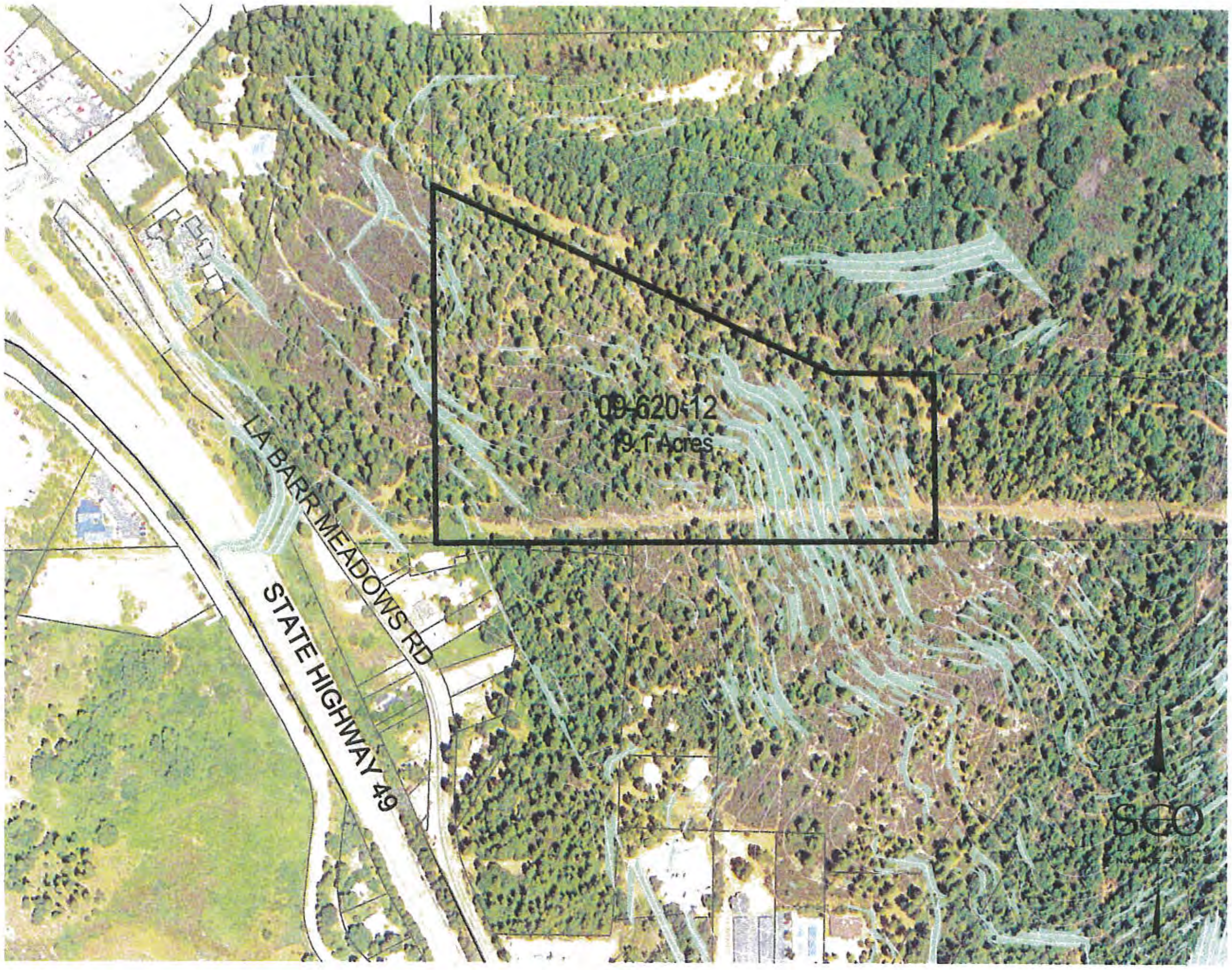
FIGURE
9

APPENDIX A

PARCEL REPORTS

PARCEL REPORT #1

APN 09-620-12



SITE INFORMATION	
APN	09-620-12
Parcel Area (Gross)	19.1 Acres
Nevada County Zoning	RA-1.5
City Land Use Designation	UED
Existing Site Condition	Undeveloped

SITE CONSTRAINTS & DEVELOPABILITY	
Slopes in excess of 30%	~25%
Other Site Constraints	Unknown
Developable Area (Net)	~14.3 acres

Notes:

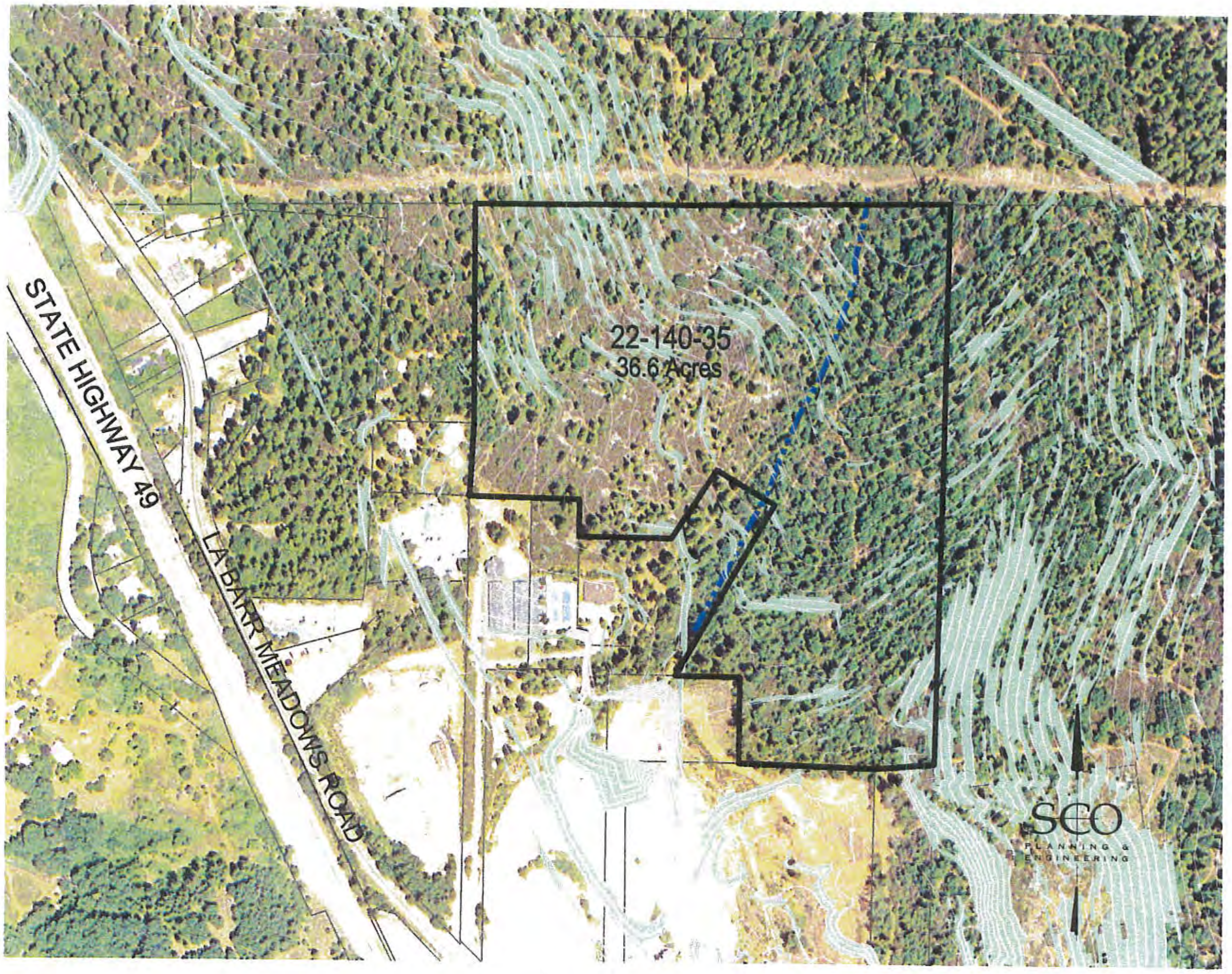
1. Assumes clustering at an overall density of 1 residential unit per acre of "gross parcel area".
2. Assumes clustering at on overall density of 1 residential unit per 1.5 acres (requires the availability of treated water).

SUMMARY:

Existing Land Use	Vacant
Additional Development Potential	High
Existing Building Coverage	None
Estimated Density (Grass Valley)	19 Units (1)
Estimated Density (Nevada County)	12 Units (2)

PARCEL REPORT #2

APN 22-140-35



SITE INFORMATION	
APN	22-140-35
Parcel Area (Gross)	36.6 Acres
Nevada County Zoning	RA-1.5
City Land Use Designation	UED
Existing Site Condition	Undeveloped

SITE CONSTRAINTS & DEVELOPABILITY	
Slopes in excess of 30%	~50%
Other Site Constraints	Drainage (Ellens Creek)
Developable Area (Net)	~18.3 acres

Notes:

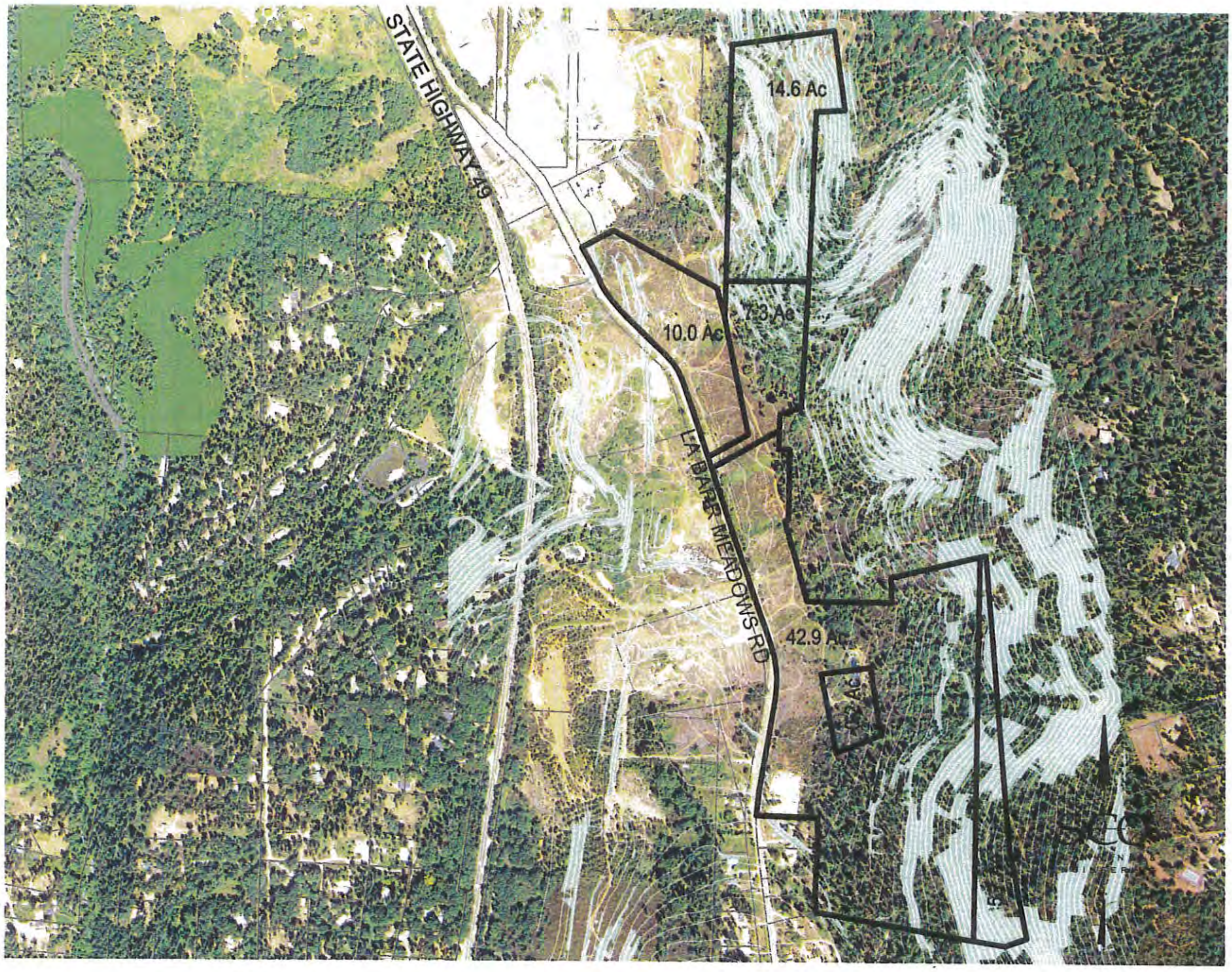
1. Assumes clustering at an overall density of 1 residential unit per acre of "gross parcel area".
2. Assumes clustering at on overall density of 1 residential unit per 1.5 acres (requires the availability of treated water).
3. Secondary access is questionable.

SUMMARY:

Existing Land Use	Vacant
Additional Development Potential	Medium (3)
Existing Building Coverage	None
Estimated Density (Grass Valley)	36 Units (1)
Estimated Density (Nevada County)	24 Units (2)

PARCEL REPORT #3

APN's 22-160-05, 22-230-10, 22-230-52, 22-230-53, 22-200-36 & 22-200-37



SITE INFORMATION	
APN's	22-160-05, 22-230-10, 22-230-52, 22-230-53, 22-200-36 & 22-200-37
Parcel Area (Gross)	80.7 Acres
Nevada County Zoning	RA-1.5
City Land Use Designation	UED
Existing Site Condition	Undeveloped

SITE CONSTRAINTS & DEVELOPABILITY	
Slopes in excess of 30%	~70%
Other Site Constraints	Unknown
Developable Area (Net)	~ 25 acres

Notes:

1. Assumes clustering at an overall density of 1 residential unit per acre of "gross parcel area".
2. Assumes clustering at on overall density of 1 residential unit per 1.5 acres (requires the availability of treated water).

SUMMARY:

Existing Land Use	Vacant
Additional Development Potential	High
Existing Building Coverage	None
Estimated Density (Grass Valley)	80 Units (1)
Estimated Density (Nevada County)	53 Units (2)

PARCEL REPORT #4

APN 22-140-05

SITE INFORMATION	
APN	22-140-05
Parcel Area (Gross)	1.5 Acres
Nevada County Zoning	M-1 (Industrial)
City Land Use Designation	BP (Business Park)
Existing Site Condition	~65% Developed (Grange Hall)

SITE CONSTRAINTS & DEVELOPABILITY	
Slopes in excess of 30%	10%
Other Site Constraints	~ 65% Developed
Developable Area (Net)	~1.35 acres

Notes:

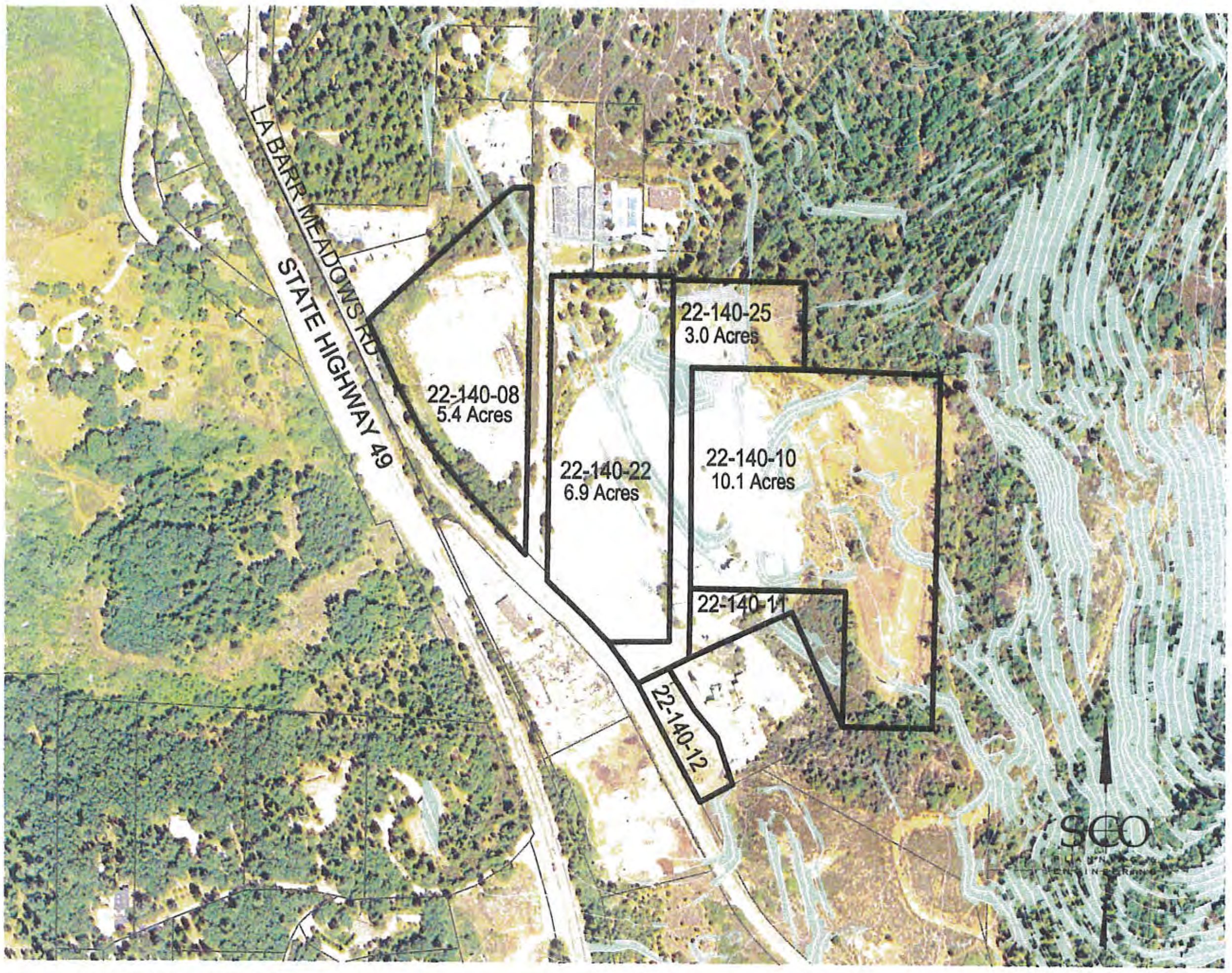
1. Developable area is reduced due to existing development on the site, however potential exists for increased use and/or redevelopment.
2. Maximum Building Coverage = 25%, per Table 3-2 (2020 General Plan).
3. Maximum Building Coverage is based on a maximum impervious surface of 85% for Industrial land use per Policy 1.23 (Nevada County General Plan).

SUMMARY:

Existing Land Use	Grange Hall
Additional Developement Potential	Medium (1)
Existing Building Coverage	3,200 sf
Max. Building Coverage (Grass Valley)	14,700 sf (2)
Max. Building Coverage (County)	26,000 sf (3)

PARCEL REPORT #5

APN's 22-140-08, 22-140-10, 22-140-11, 22-140-12, 22-140-22 & 22-140-25



SITE INFORMATION

APN	22-140-08, 22-140-10, 22-140-11, 22-140-12, 22-140-22 & 22-140-25
Parcel Area (Gross)	27.9 Acres
Nevada County Zoning	M-1 (Industrial)
City Land Use Designation	BP (Business Park)
Existing Site Condition	Developed (Hansen Bros.)

SITE CONSTRAINTS & DEVELOPABILITY

Slopes in excess of 30%	~50%
Other Site Constraints	~ 50% Developed
Developable Area (Net)	~ 14 acres

Notes:

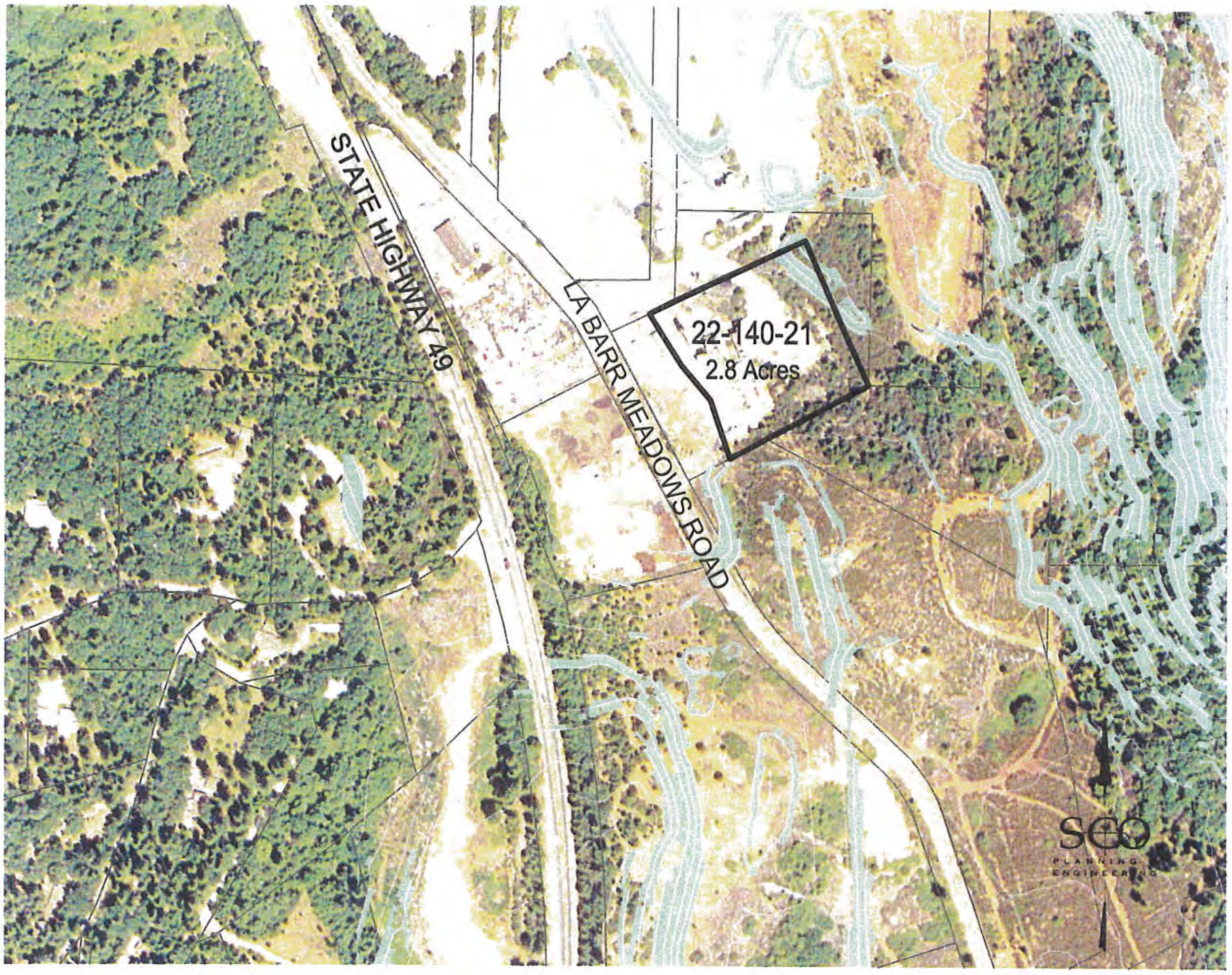
1. Existing development on the site unlikely to change. Majority of undeveloped portion of property includes steep slopes.
2. Maximum Building Coverage = 25%, per Table 3-2 (2020 General Plan)
3. Maximum Building Coverage is based on a maximum impervious surface of 85% for Industrial land use per Policy 1.23 (Nevada County General Plan).

SUMMARY:

Existing Land Use	Industrial
Additional Developement Potential	Low (1)
Existing Building Coverage	15,684 sf
Max. Building Coverage (Grass Valley)	152,000 sf (2)
Max. Building Coverage (County)	298,000 sf (3)

PARCEL REPORT #6

APN 22-140-21



SITE INFORMATION	
APN	22-140-21
Parcel Area (Gross)	2.8 Acres
Nevada County Zoning	M-1 (Industrial)
City Land Use Designation	BP (Business Park)
Existing Site Condition	Partially Developed

SITE CONSTRAINTS & DEVELOPABILITY	
Slopes in excess of 30%	~50%
Other Site Constraints	Partially Developed
Developable Area (Net)	~1.4 acres

Notes:

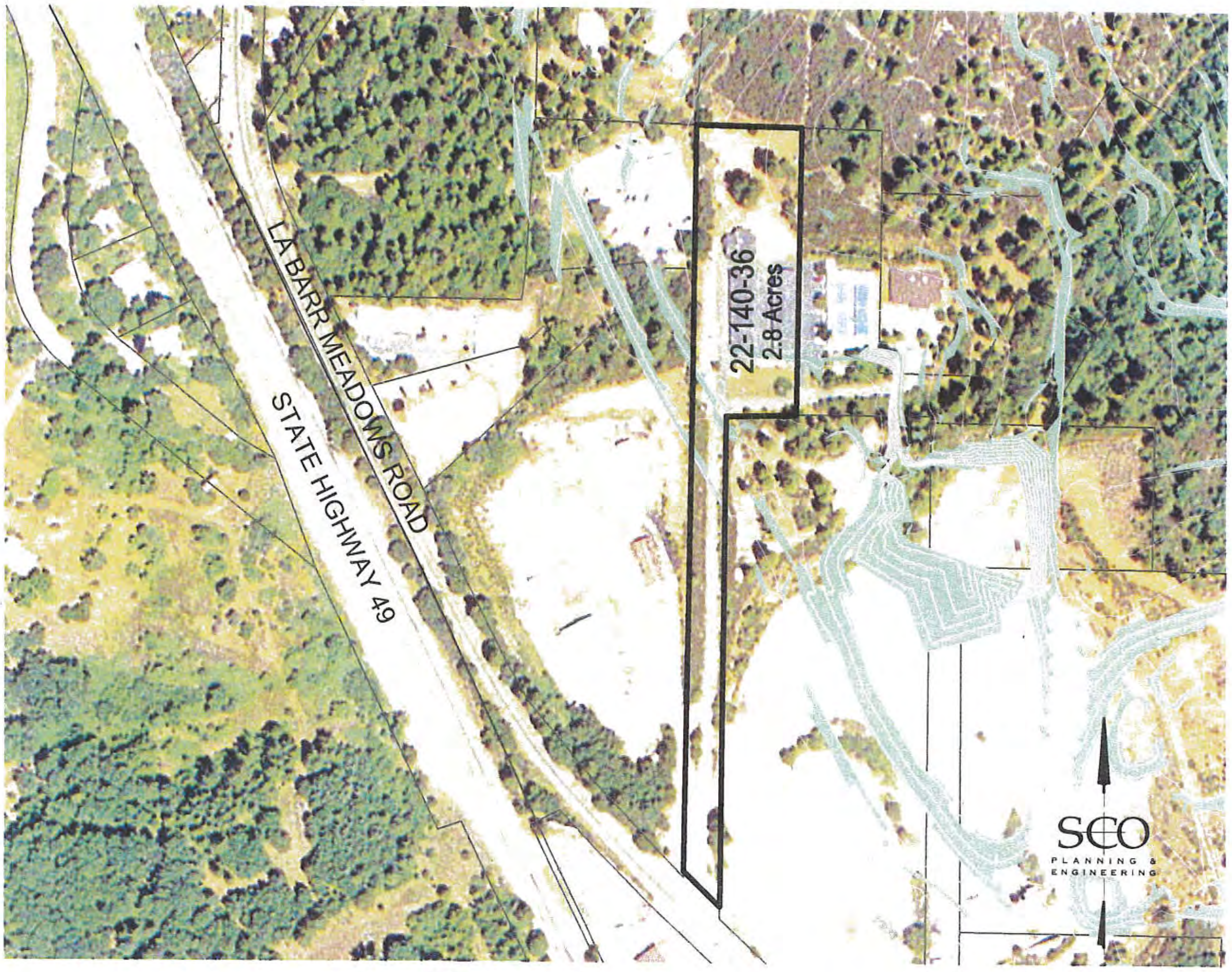
1. Maximum Building Coverage = 25%, per Table 3-2 (2020 General Plan)
2. Maximum Building Coverage is based on a maximum impervious surface of 85% for Industrial land use per Policy 1.23 (Nevada County General Plan).

SUMMARY:

Existing Land Use	Vacant
Additional Developement Potential	Medium
Existing Building Coverage	0 sf
Max. Building Coverage (Grass Valley)	15,200 sf (1)
Max. Building Coverage (County)	30,000 sf (2)

PARCEL REPORT #7

APN 22-140-36



SITE INFORMATION	
APN	22-140-36
Parcel Area (Gross)	2.8 Acres
Nevada County Zoning	M-1 (Industrial)
City Land Use Designation	BP (Business Park)
Existing Site Condition	Mostly Developed

SITE CONSTRAINTS & DEVELOPABILITY	
Slopes in excess of 30%	~30%
Other Site Constraints	Mostly Developed Flagpole Lot
Developable Area (Net)	~1.4 acres

Notes:

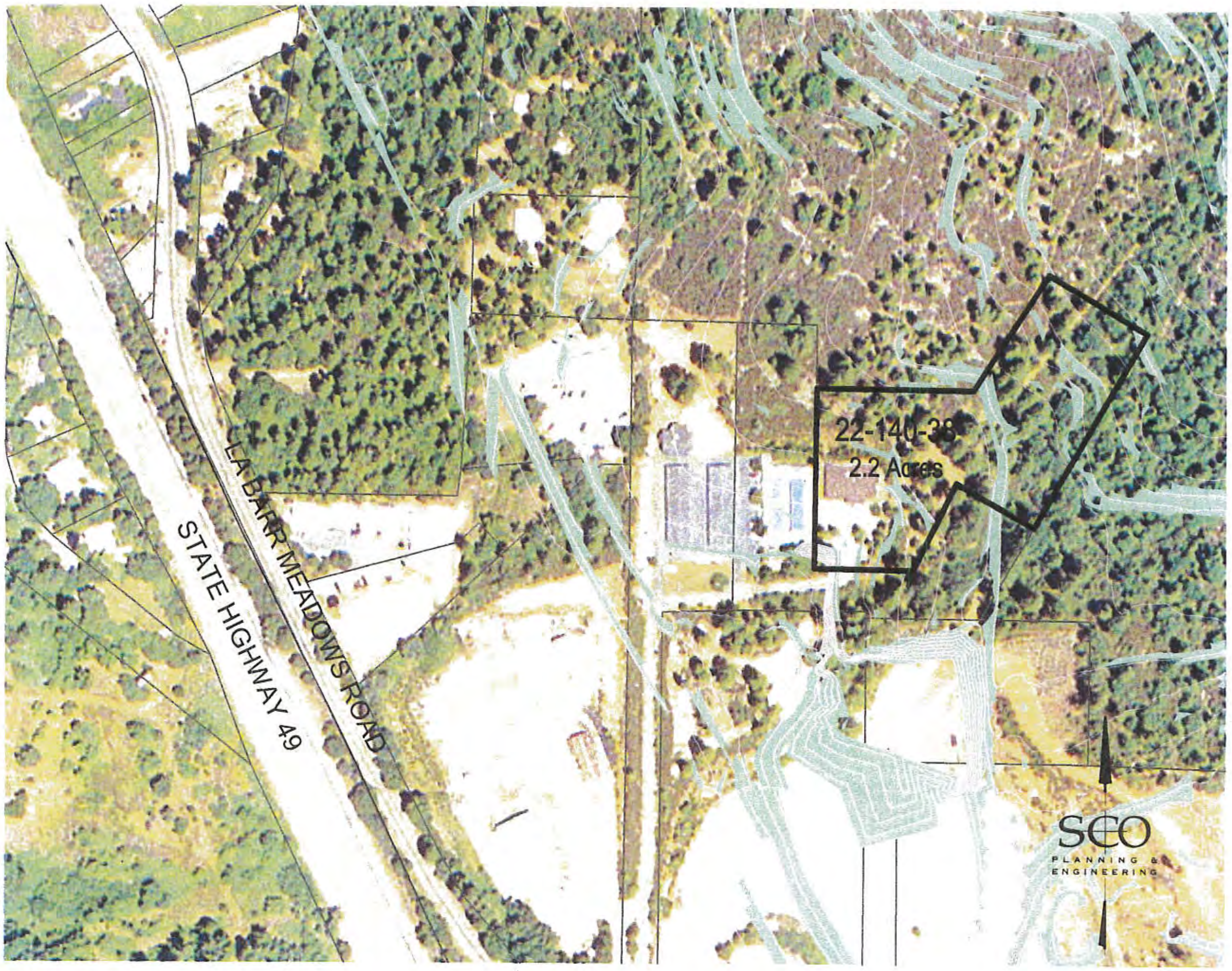
1. Existing development on the site unlikely to change.
2. Maximum Building Coverage = 25%, per Table 3-2 (2020 General Plan)
3. Maximum Building Coverage is based on a maximum impervious surface of 85% for Industrial land use per Policy 1.23 (Nevada County General Plan). Building coverage is reduced due to site constraints.

SUMMARY:

Existing Land Use	Industrial
Additional Developement Potential	Low (1)
Existing Building Coverage	8,540 sf
Max. Building Coverage (Grass Valley)	15,200 sf (2)
Max. Building Coverage (County)	22,000 sf (3)

PARCEL REPORT #8

APN 22-140-38



SITE INFORMATION

APN	22-140-38
Parcel Area (Gross)	2.2 Acres
Nevada County Zoning	M-1 (Industrial)
City Land Use Designation	BP (Business Park)
Existing Site Condition	Partially Developed

SITE CONSTRAINTS & DEVELOPABILITY

Slopes in excess of 30%	~30%
Other Site Constraints	Seasonal Swale
Developable Area (Net)	~1.2 acres

Notes:

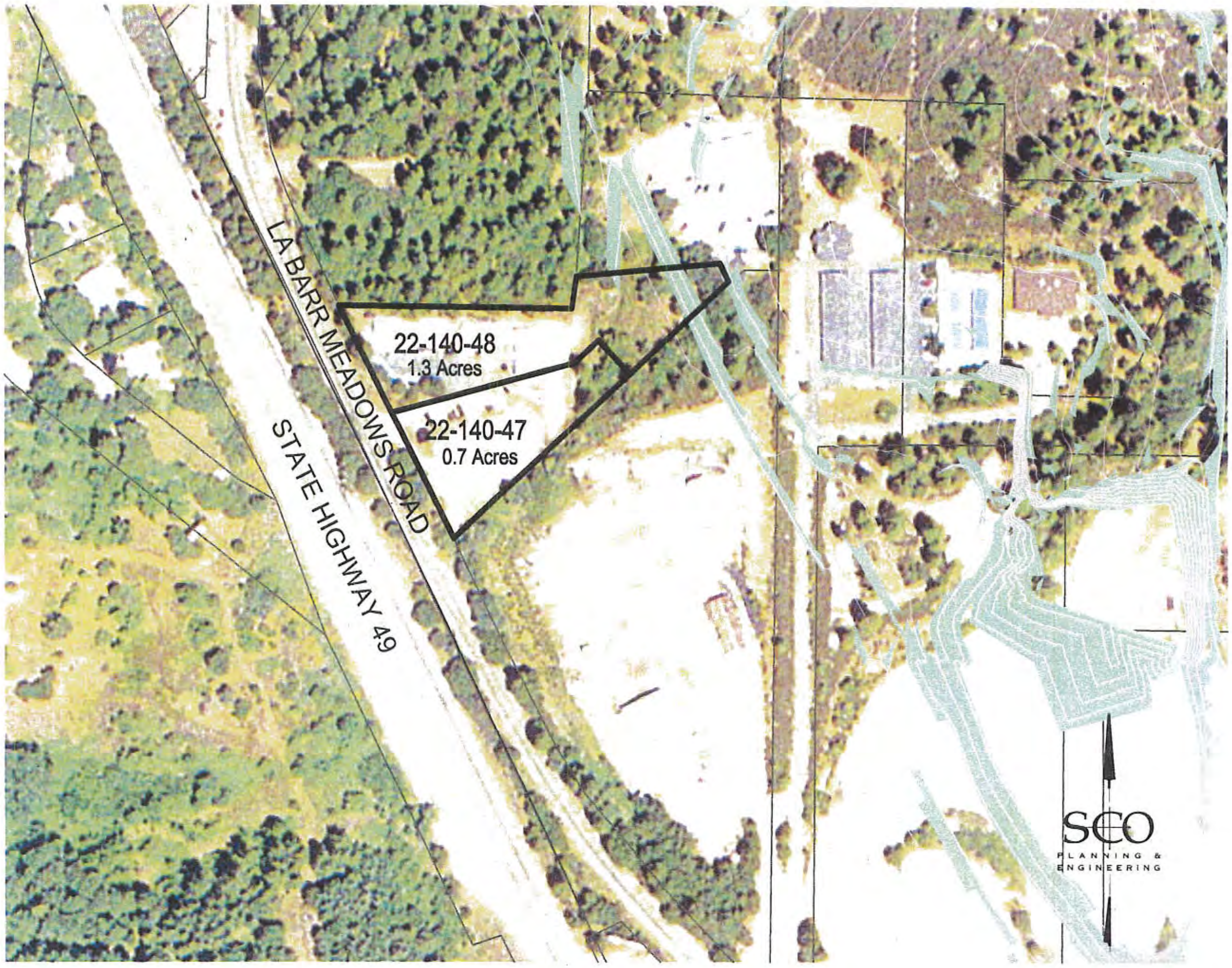
1. Maximum Building Coverage = 25%, per Table 3-2 (2020 General Plan)
2. Maximum Building Coverage is based on a maximum impervious surface of 85% for Industrial land use per Policy 1.23 (Nevada County General Plan).

SUMMARY:

Existing Land Use	Office
Additional Developement Potential	Medium
Existing Building Coverage	3,440 sf
Max. Building Coverage (Grass Valley)	13,000 sf (1)
Max. Building Coverage (County)	24,000 sf (2)

PARCEL REPORT #9

APN 22-140-47 & 22-140-48



SITE INFORMATION	
APN	22-140-47 & 22-140-48
Parcel Area (Gross)	2.0 Acres
Nevada County Zoning	M-1 (Industrial)
City Land Use Designation	BP (Business Park)
Existing Site Condition	Mostly Developed

SITE CONSTRAINTS & DEVELOPABILITY	
Slopes in excess of 30%	~25%
Other Site Constraints	Mostly Developed
Developable Area (Net)	~ 1.5 acres

Notes:

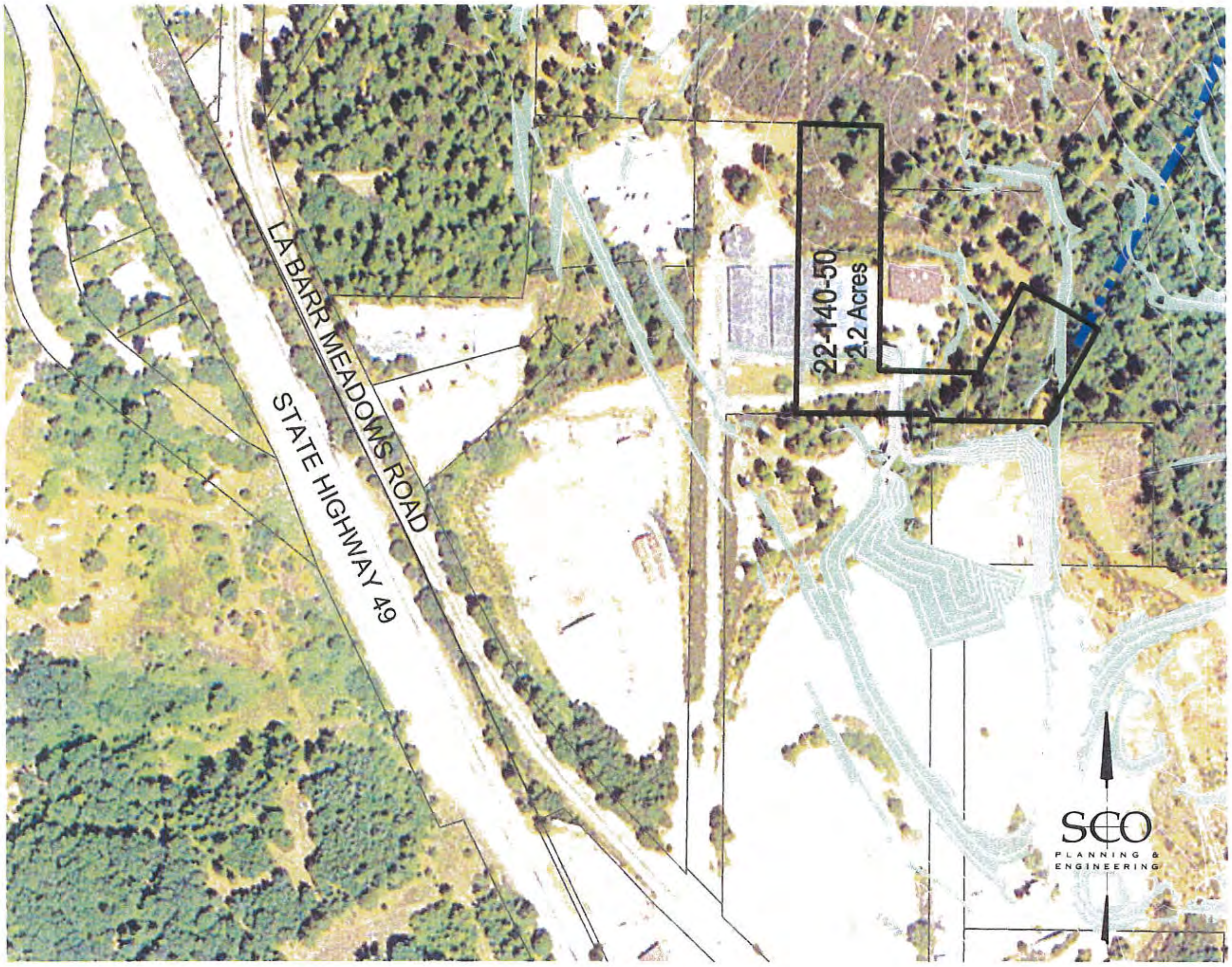
1. Existing development on the site unlikely to change.
2. Maximum Building Coverage = 25%, per Table 3-2 (2020 General Plan)
3. Maximum Building Coverage is based on a maximum impervious surface of 85% for Industrial land use per Policy 1.23 (Nevada County General Plan).

SUMMARY:

Existing Land Use	Industrial
Additional Developement Potential	Low (1)
Existing Building Coverage	3,626 sf
Max. Building Coverage (Grass Valley)	16,000 sf (2)
Max. Building Coverage (County)	26,000 sf (3)

PARCEL REPORT #10

APN 22-140-50



SITE INFORMATION	
APN	22-140-50
Parcel Area (Gross)	2.2 Acres
Nevada County Zoning	M-1 (Industrial)
City Land Use Designation	BP (Business Park)
Existing Site Condition	Mostly Developed

SITE CONSTRAINTS & DEVELOPABILITY	
Slopes in excess of 30%	~ 40%
Other Site Constraints	Mostly Developed
Developable Area (Net)	~1.3 Acres

Notes:

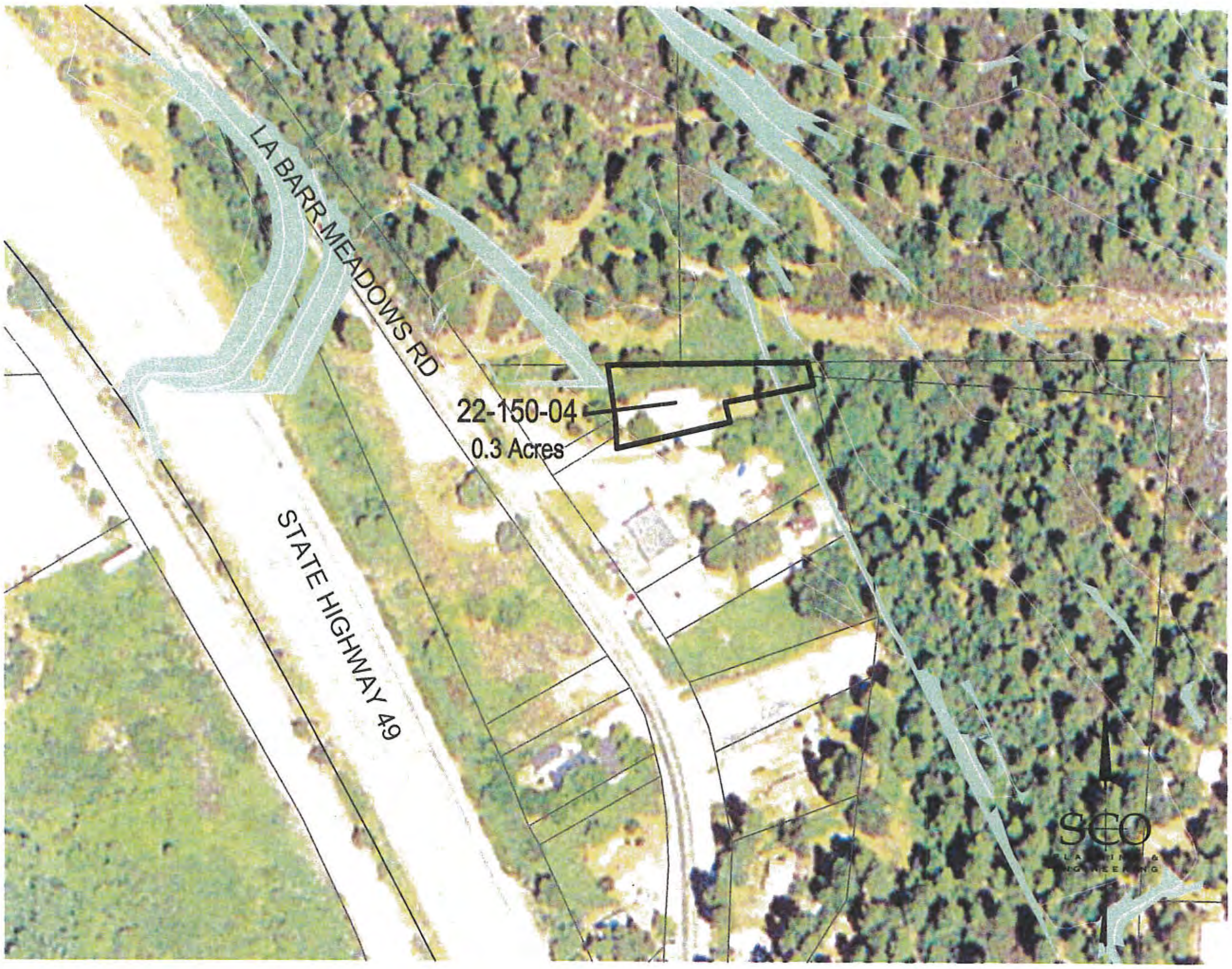
1. Existing development on the site unlikely to change. Majority of undeveloped portion of property includes steep slopes.
2. Maximum Building Coverage = 25%, per Table 3-2 (2020 General Plan)
3. Maximum Building Coverage is based on a maximum impervious surface of 85% for Industrial land use per Policy 1.23 (Nevada County General Plan).

SUMMARY:

Existing Land Use	Office
Additional Developement Potential	Low (1)
Existing Building Coverage	8,398 sf
Max. Building Coverage (Grass Valley)	14,400 sf (2)
Max. Building Coverage (County)	26,000 sf (3)

PARCEL REPORT #11

APN 22-150-04



SITE INFORMATION	
APN	22-150-04
Parcel Area (Gross)	0.3 Acres
Nevada County Zoning	M-1 (Industrial)
City Land Use Designation	BP (Business Park)
Existing Site Condition	Single family residence

SITE CONSTRAINTS & DEVELOPABILITY	
Slopes in excess of 30%	None
Other Site Constraints	Existing Home
Developable Area (Net)	~0.25 acres

Notes:

1. Maximum Building Coverage = 25%, per Table 3-2 (2020 General Plan)
2. Maximum Building Coverage is based on a maximum impervious surface of 85% for Industrial land use per Policy 1.23 (Nevada County General Plan).

SUMMARY:

Existing Land Use	Residental
Additional Developement Potential	Medium
Existing Building Coverage	1,344 sf
Max. Building Coverage (Grass Valley)	2700 sf (1)
Max. Building Coverage (County)	3,800 sf (2)

PARCEL REPORT #12

APN 22-150-08

SITE INFORMATION	
APN	22-150-08
Parcel Area (Gross)	0.02 Acres
Nevada County Zoning	M-1 (Industrial)
City Land Use Designation	BP (Business Park)
Existing Site Condition	Undeveloped

SITE CONSTRAINTS & DEVELOPABILITY	
Slopes in excess of 30%	~50%
Other Site Constraints	Narrow & Small
Developable Area (Net)	0.01 acres

Notes:

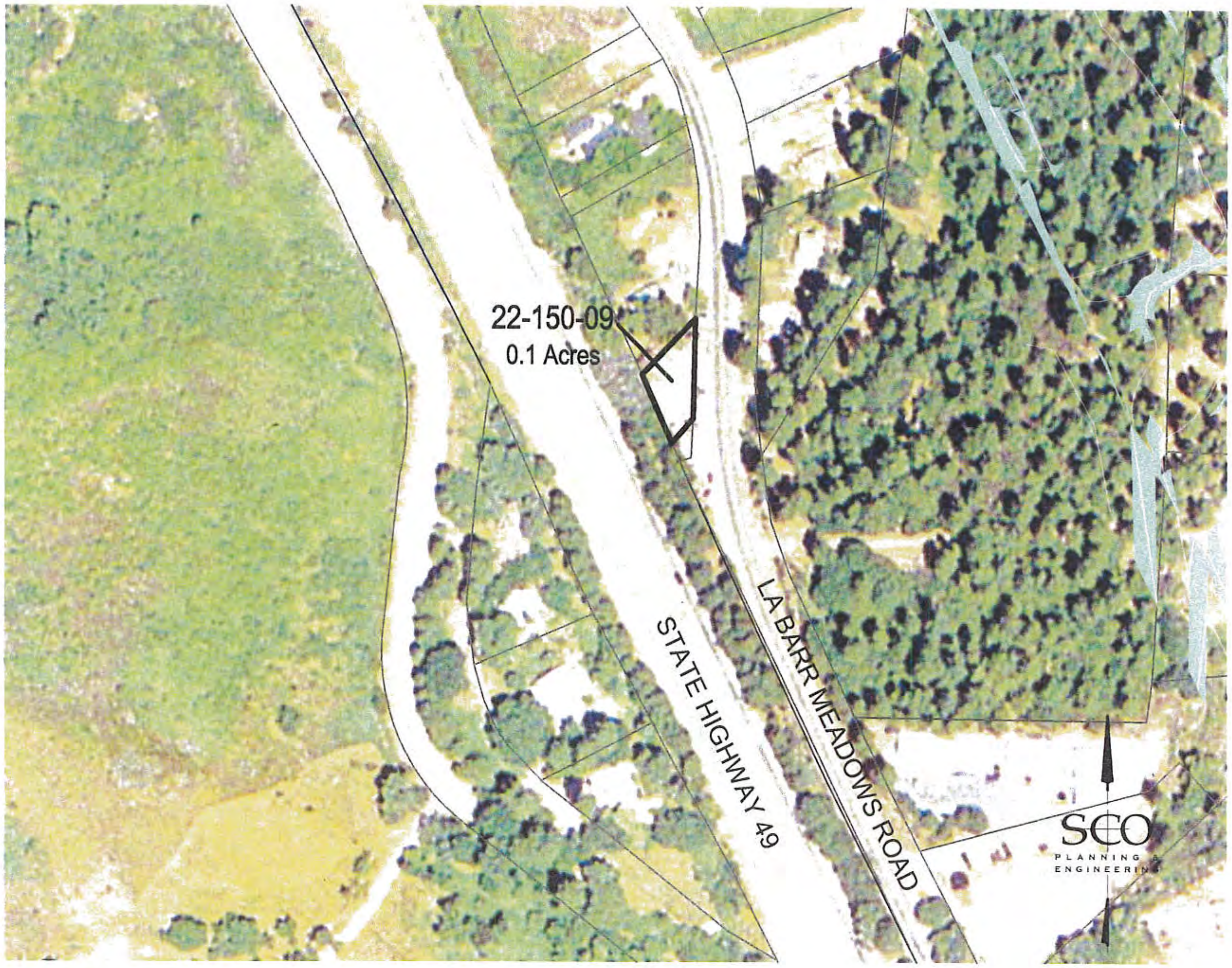
1. Future development on the site unlikely to shape & size of parcel. Potential to merge with adjacent parcel or dedicated as right-of-way.

SUMMARY:

Existing Land Use	Government
Additional Developement Potential	None
Existing Building Coverage	0 sf
Max. Building Coverage (Grass Valley)	0 sf (1)
Max. Building Coverage (County)	0 sf (1)

PARCEL REPORT #13

APN 22-150-09



SITE INFORMATION	
APN	22-150-09
Parcel Area (Gross)	0.1 Acres
Nevada County Zoning	M-1 (Industrial)
City Land Use Designation	BP (Business Park)
Existing Site Condition	Automotive Use

SITE CONSTRAINTS & DEVELOPABILITY	
Slopes in excess of 30%	None
Other Site Constraints	Mostly Developed
Developable Area (Net)	0.1 acres

Notes:

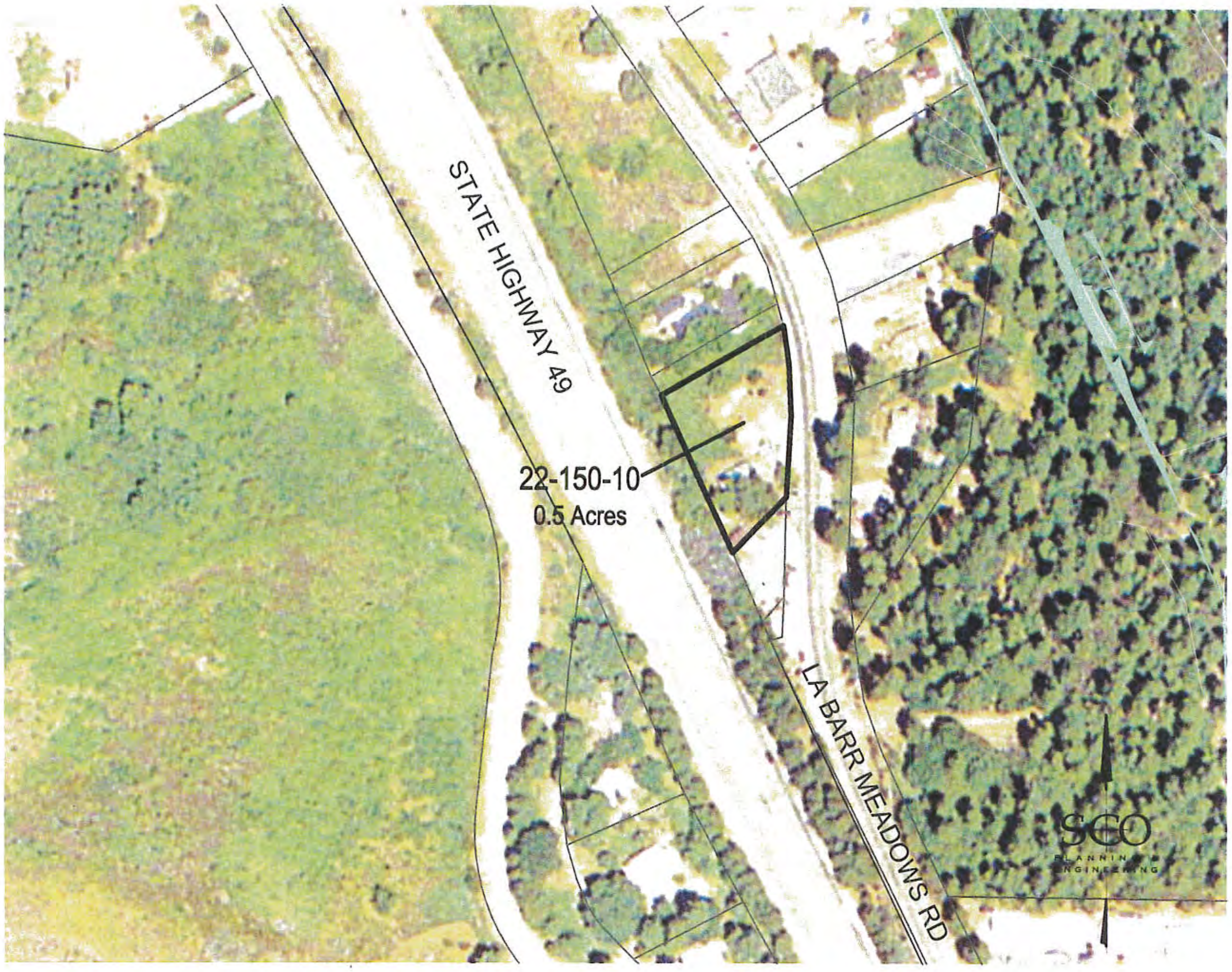
1. Existing development on the site unlikely to change.
2. Maximum Building Coverage = 25%, per Table 3-2 (2020 General Plan)
3. Maximum Building Coverage is based on a maximum impervious surface of 85% for Industrial land use per Policy 1.23 (Nevada County General Plan).

SUMMARY:

Existing Land Use	Automotive
Additional Developement Potential	Low (1)
Existing Building Coverage	735 sf
Max. Building Coverage (Grass Valley)	1,100 sf (2)
Max. Building Coverage (County)	2,000 sf (3)

PARCEL REPORT #14

APN 22-150-10



SITE INFORMATION	
APN	22-150-10
Parcel Area (Gross)	0.5 Acres
Nevada County Zoning	M-1 (Industrial)
City Land Use Designation	BP (Business Park)
Existing Site Condition	Single family residence

SITE CONSTRAINTS & DEVELOPABILITY	
Slopes in excess of 30%	~15%
Other Site Constraints	Mostly Developed
Developable Area (Net)	0.43 Acres

Notes:

1. Existing development on the site unlikely to change.
2. Maximum Building Coverage = 25%, per Table 3-2 (2020 General Plan)
3. Maximum Building Coverage is based on a maximum impervious surface of 85% for Industrial land use per Policy 1.23 (Nevada County General Plan).

SUMMARY:

Existing Land Use	Residential
Additional Developement Potential	Low (1)
Existing Building Coverage	930 sf
Max. Building Coverage (Grass Valley)	4,600 sf (2)
Max. Building Coverage (County)	7,600 sf (3)

PARCEL REPORT #15

APN 22-150-11

SITE INFORMATION	
APN	22-150-11
Parcel Area (Gross)	0.1 Acres
Nevada County Zoning	M-1 (Industrial)
City Land Use Designation	BP (Business Park)
Existing Site Condition	Undeveloped

SITE CONSTRAINTS & DEVELOPABILITY	
Slopes in excess of 30%	~10%
Other Site Constraints	Very Narrow
Developable Area (Net)	0.05 acres

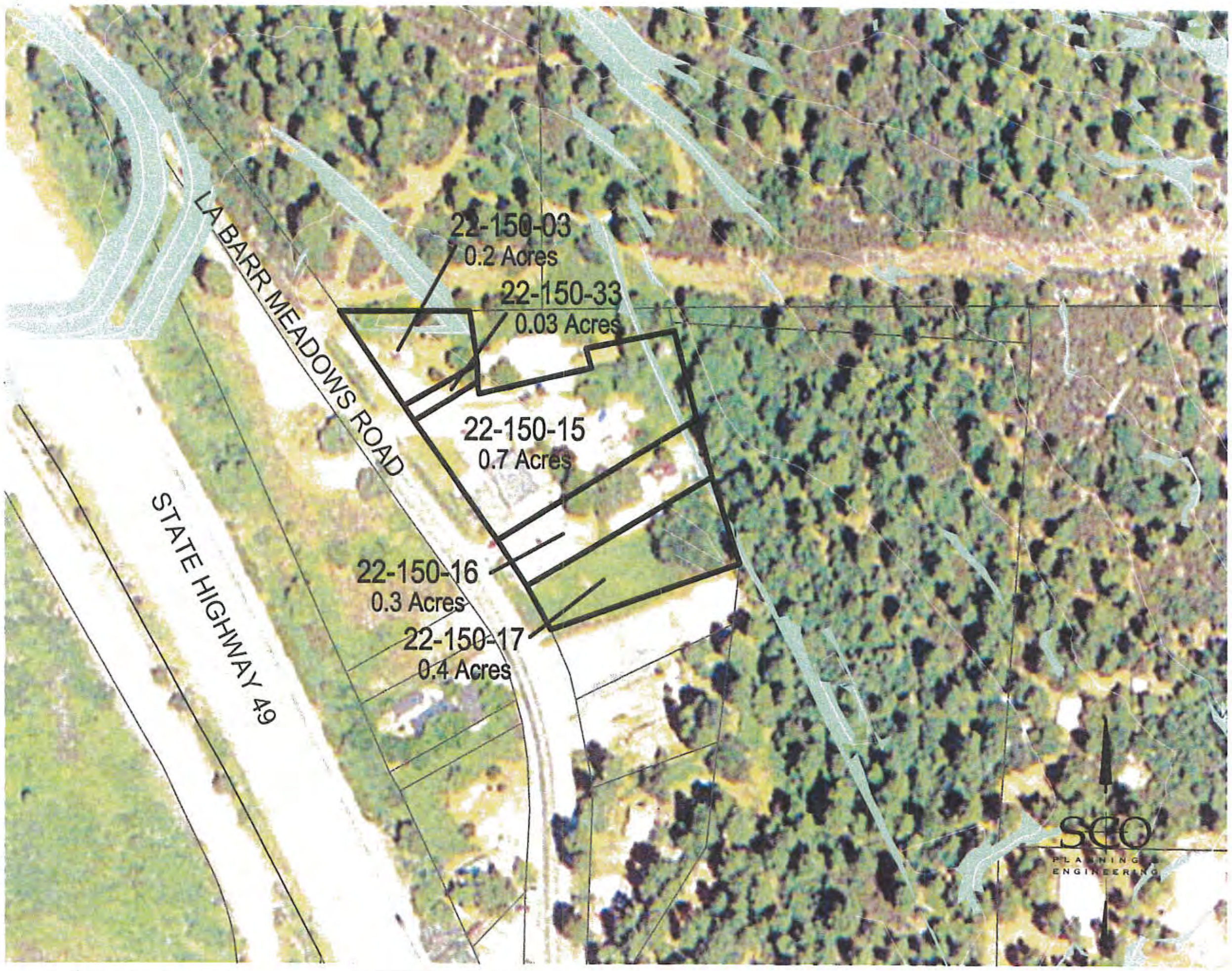
Notes:

1. Potential location for sewer crossing under Highway 49.

SUMMARY:	
Existing Land Use	Vacant
Additional Developement Potential	None
Existing Building Coverage	0 sf
Max. Building Coverage (Grass Valley)	None
Max. Building Coverage (County)	None

PARCEL REPORT #16

APN's 22-150-03, 22-150-15, 22-150-16, 22-150-17 & 22-150-33



SITE INFORMATION	
APN	22-150-03, 22-150-15, 22-150-16, 22-150-17 & 22-150-33
Parcel Area (Gross)	1.6 Acres
Nevada County Zoning	M-1 (Industrial)
City Land Use Designation	BP (Business Park)
Existing Site Condition	Mixed Uses

SITE CONSTRAINTS & DEVELOPABILITY	
Slopes in excess of 30%	~10%
Other Site Constraints	Partially Developed
Developable Area (Net)	~ 1.4 acres

Notes:

1. Additional development opportunities exist on portions of the property (ies). on the site unlikely to change.
2. Maximum Building Coverage = 25%, per Table 3-2 (2020 General Plan)
3. Maximum Building Coverage is based on a maximum impervious surface of 85% for Industrial land use per Policy 1.23 (Nevada County General Plan).

SUMMARY:

Existing Land Use	Mixed Uses
Additional Developement Potential	High (1)
Existing Building Coverage	2,700 sf
Max. Building Coverage (Grass Valley)	16,200 sf (2)
Max. Building Coverage (County)	30,000 sf (3)

PARCEL REPORT #17

APN 22-150-18

SITE INFORMATION	
APN	22-150-18
Parcel Area (Gross)	0.4 Acres
Nevada County Zoning	M-1 (Industrial)
City Land Use Designation	BP (Business Park)
Existing Site Condition	Single family residence

SITE CONSTRAINTS & DEVELOPABILITY	
Slopes in excess of 30%	None
Other Site Constraints	Existing Home
Developable Area (Net)	~ 0.4 Acres

Notes:

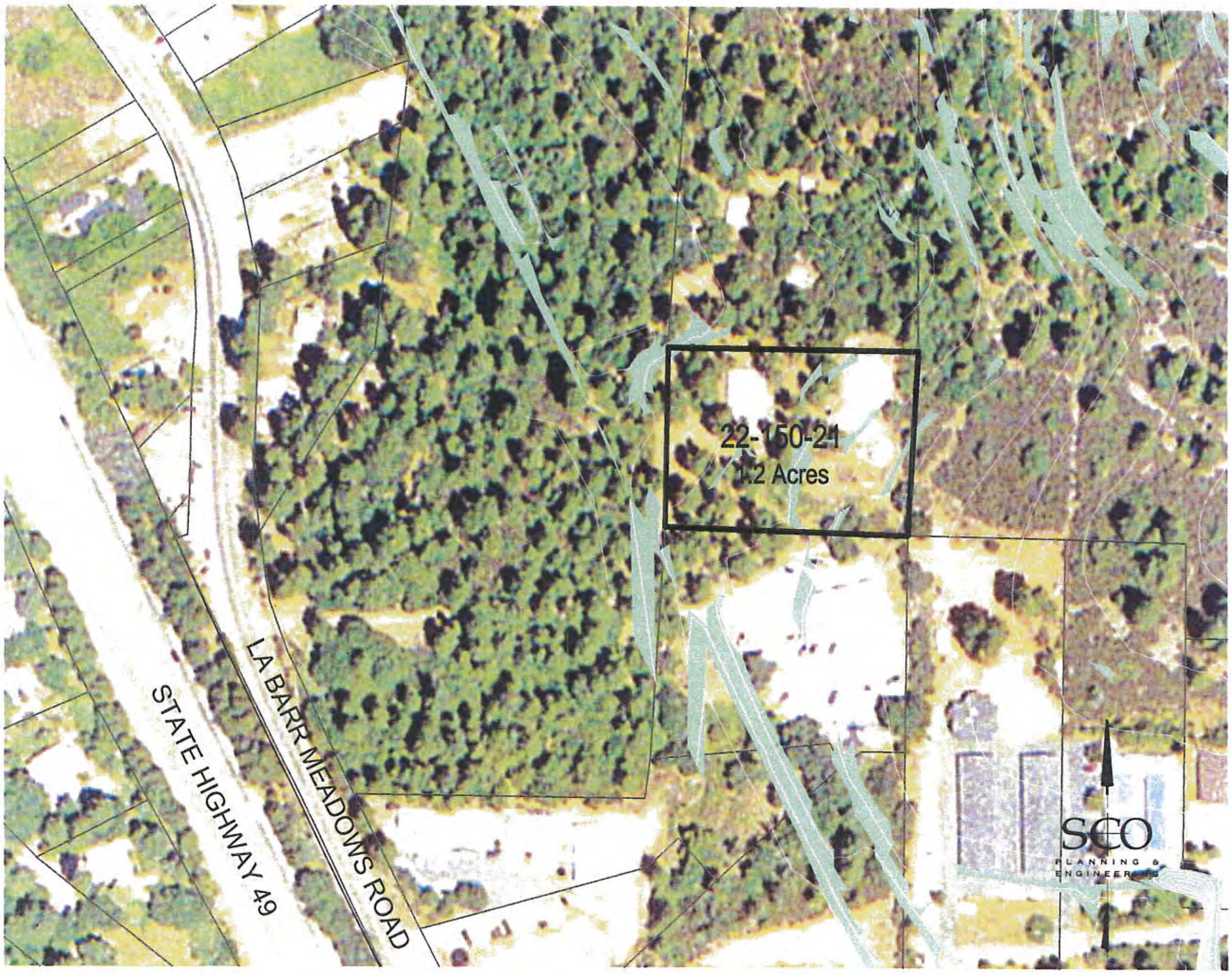
1. Maximum Building Coverage = 25%, per Table 3-2 (2020 General Plan)
2. Maximum Building Coverage is based on a maximum impervious surface of 85% for Industrial land use per Policy 1.23 (Nevada County General Plan).

SUMMARY:

Existing Land Use	Residential
Additional Developement Potential	Low
Existing Building Coverage	936 sf
Max. Building Coverage (Grass Valley)	4,300 sf (1)
Max. Building Coverage (County)	7,800 sf (2)

PARCEL REPORT #18

APN 22-150-21



SITE INFORMATION	
APN	22-150-21
Parcel Area (Gross)	1.2 Acres
Nevada County Zoning	M-1 (Industrial)
City Land Use Designation	BP (Business Park)
Existing Site Condition	Single family residence

SITE CONSTRAINTS & DEVELOPABILITY	
Slopes in excess of 30%	~20%
Other Site Constraints	Existing Residence
Developable Area (Net)	~0.96 acres

Notes:

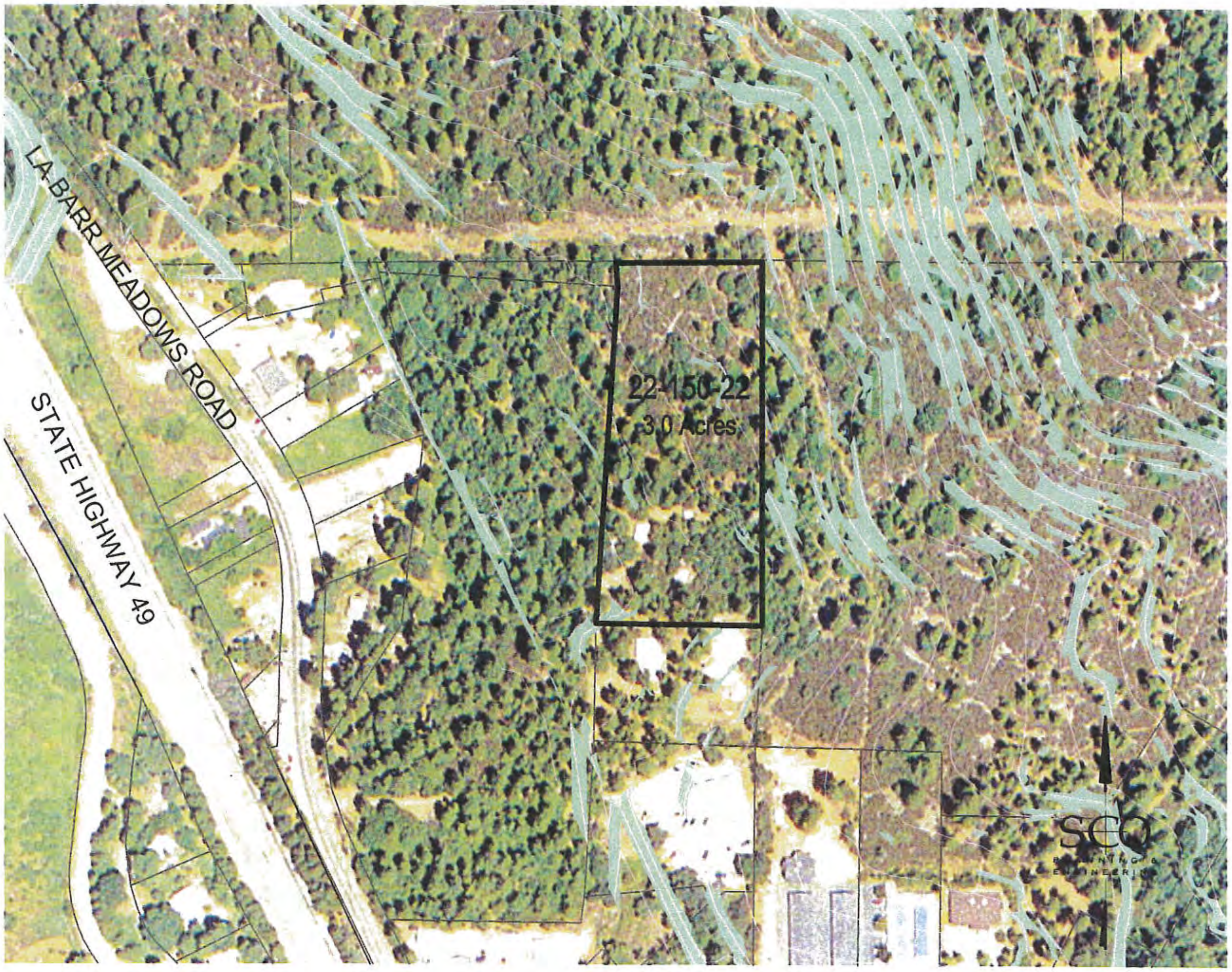
1. Maximum Building Coverage = 25%, per Table 3-2 (2020 General Plan)
2. Maximum Building Coverage is based on a maximum impervious surface of 85% for Industrial land use per Policy 1.23 (Nevada County General Plan).

SUMMARY:

Existing Land Use	Residential
Additional Developement Potential	Medium
Existing Building Coverage	1,128 sf
Max. Building Coverage (Grass Valley)	10,500 sf (1)
Max. Building Coverage (County)	18,000 sf (2)

PARCEL REPORT #19

APN 22-150-22



SITE INFORMATION	
APN	22-150-22
Parcel Area (Gross)	3.0 Acres
Nevada County Zoning	M-1 (Industrial)
City Land Use Designation	BP (Business Park)
Existing Site Condition	Single family residence

SITE CONSTRAINTS & DEVELOPABILITY	
Slopes in excess of 30%	~75%
Other Site Constraints	Partially Developed
Developable Area (Net)	~ 0.75 acres

Notes:

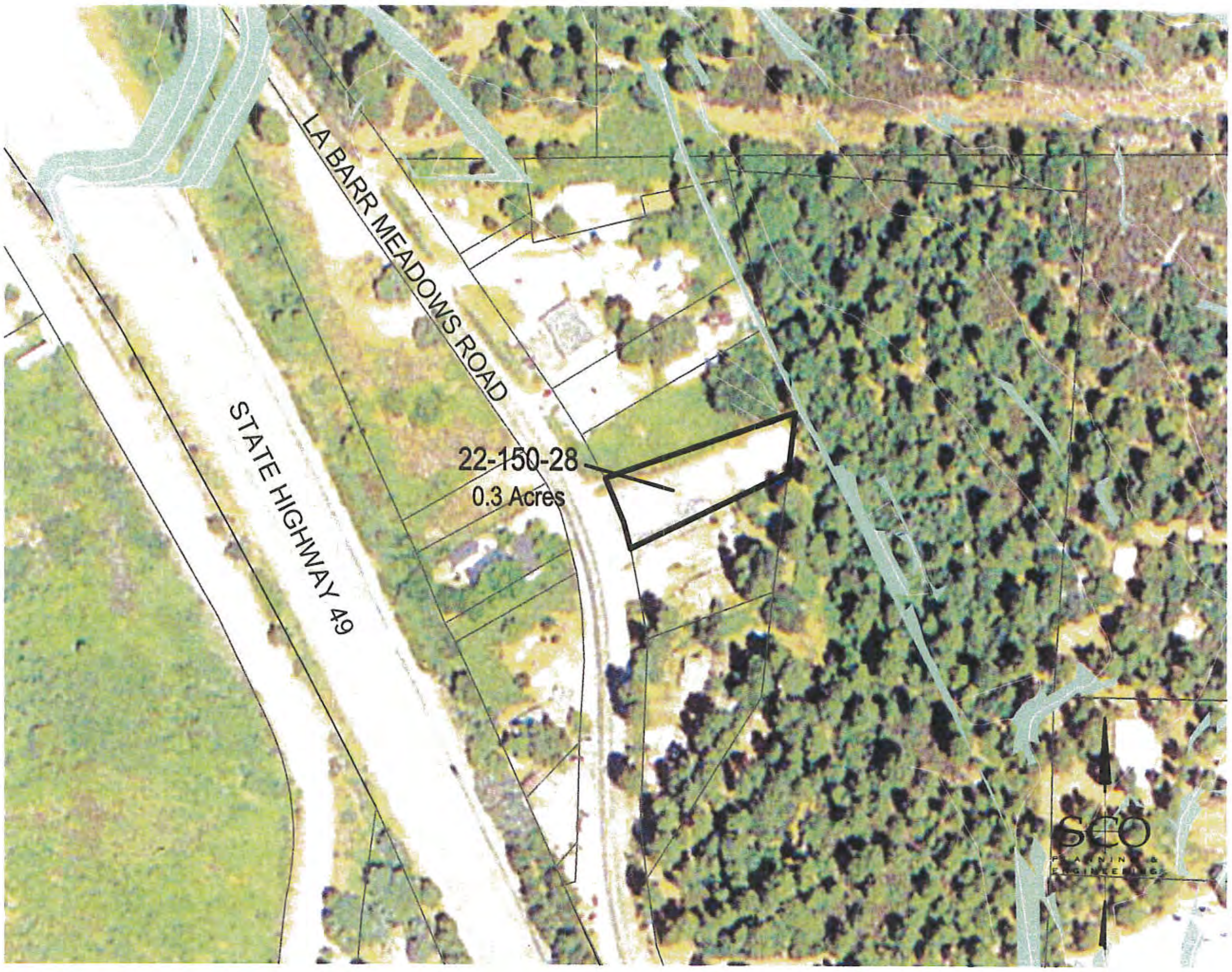
1. Existing single family residence. Majority of undeveloped portion of property includes steep slopes.
2. Maximum Building Coverage = 25%, per Table 3-2 (2020 General Plan). *Max. Building Coverage reduced due to site constraints.*
3. Maximum Building Coverage is based on a maximum impervious surface of 85% for Industrial land use per Policy 1.23 (Nevada County General Plan).

SUMMARY:

Existing Land Use	Residential
Additional Developement Potential	Low (1)
Existing Building Coverage	992 sf
Max. Building Coverage (Grass Valley)	8,200 sf (2)
Max. Building Coverage (County)	13,000 sf (3)

PARCEL REPORT #20

APN 22-150-28



SITE INFORMATION	
APN	22-150-28
Parcel Area (Gross)	0.3 Acres
Nevada County Zoning	M-1 (Industrial)
City Land Use Designation	BP (Business Park)
Existing Site Condition	Multi-family

SITE CONSTRAINTS & DEVELOPABILITY	
Slopes in excess of 30%	~10%
Other Site Constraints	Partially Developed
Developable Area (Net)	0.27 Acres

Notes:

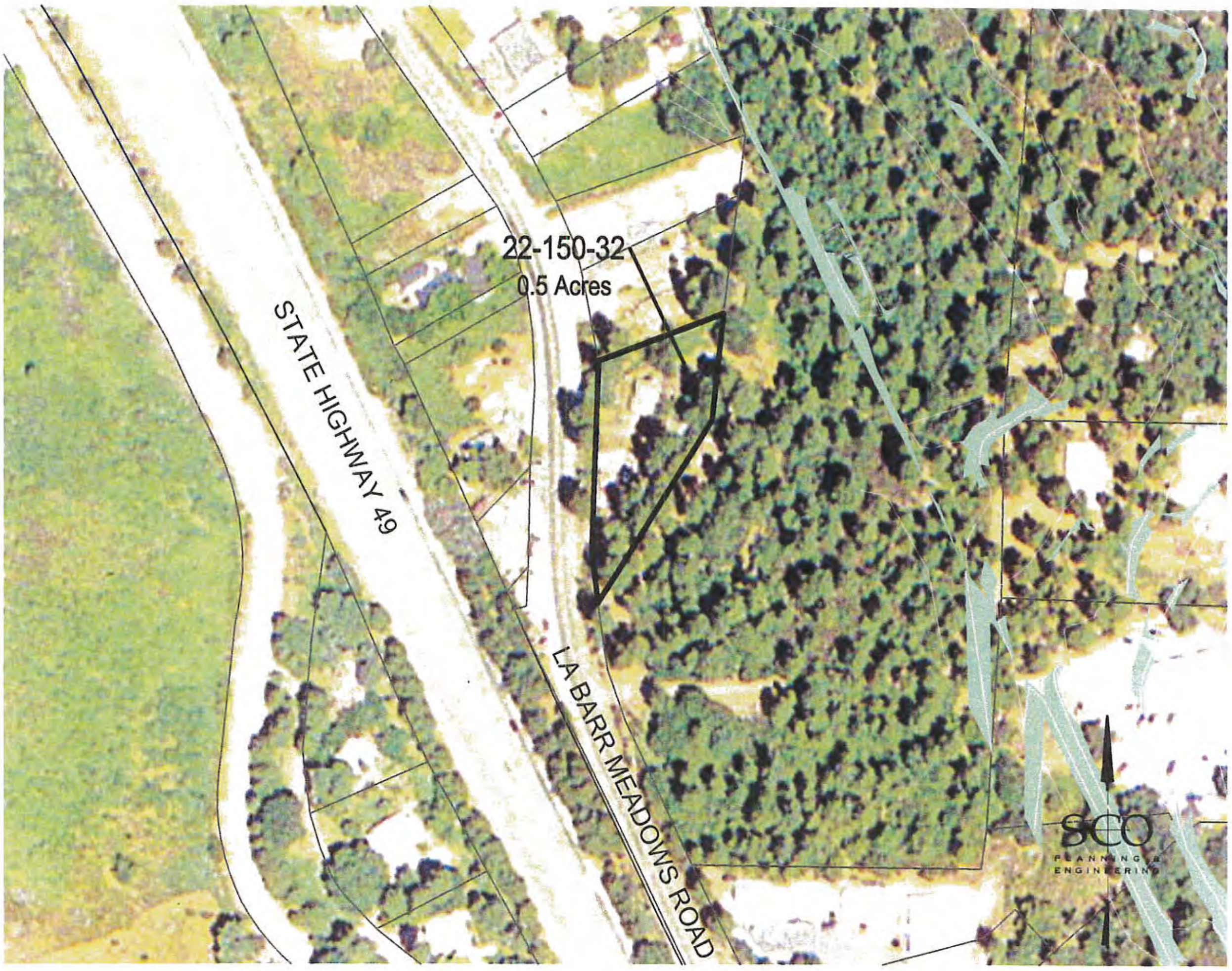
1. Existing development on the site unlikely to change. Majority of undeveloped portion of property includes steep slopes.
2. Maximum Building Coverage = 25%, per Table 3-2 (2020 General Plan)
3. Maximum Building Coverage is based on a maximum impervious surface of 85% for Industrial land use per Policy 1.23 (Nevada County General Plan).

SUMMARY:

Existing Land Use	Residential
Additional Developement Potential	Low (1)
Existing Building Coverage	628 sf
Max. Building Coverage (Grass Valley)	2,900 sf (2)
Max. Building Coverage (County)	5,000 sf (3)

PARCEL REPORT #21

APN 22-150-32



SITE INFORMATION	
APN	22-150-32
Parcel Area (Gross)	0.5 Acres
Nevada County Zoning	M-1 (Industrial)
City Land Use Designation	BP (Business Park)
Existing Site Condition	Single family residence

SITE CONSTRAINTS & DEVELOPABILITY	
Slopes in excess of 30%	~25%
Other Site Constraints	Partially Developed
Developable Area (Net)	~0.4 acres

Notes:

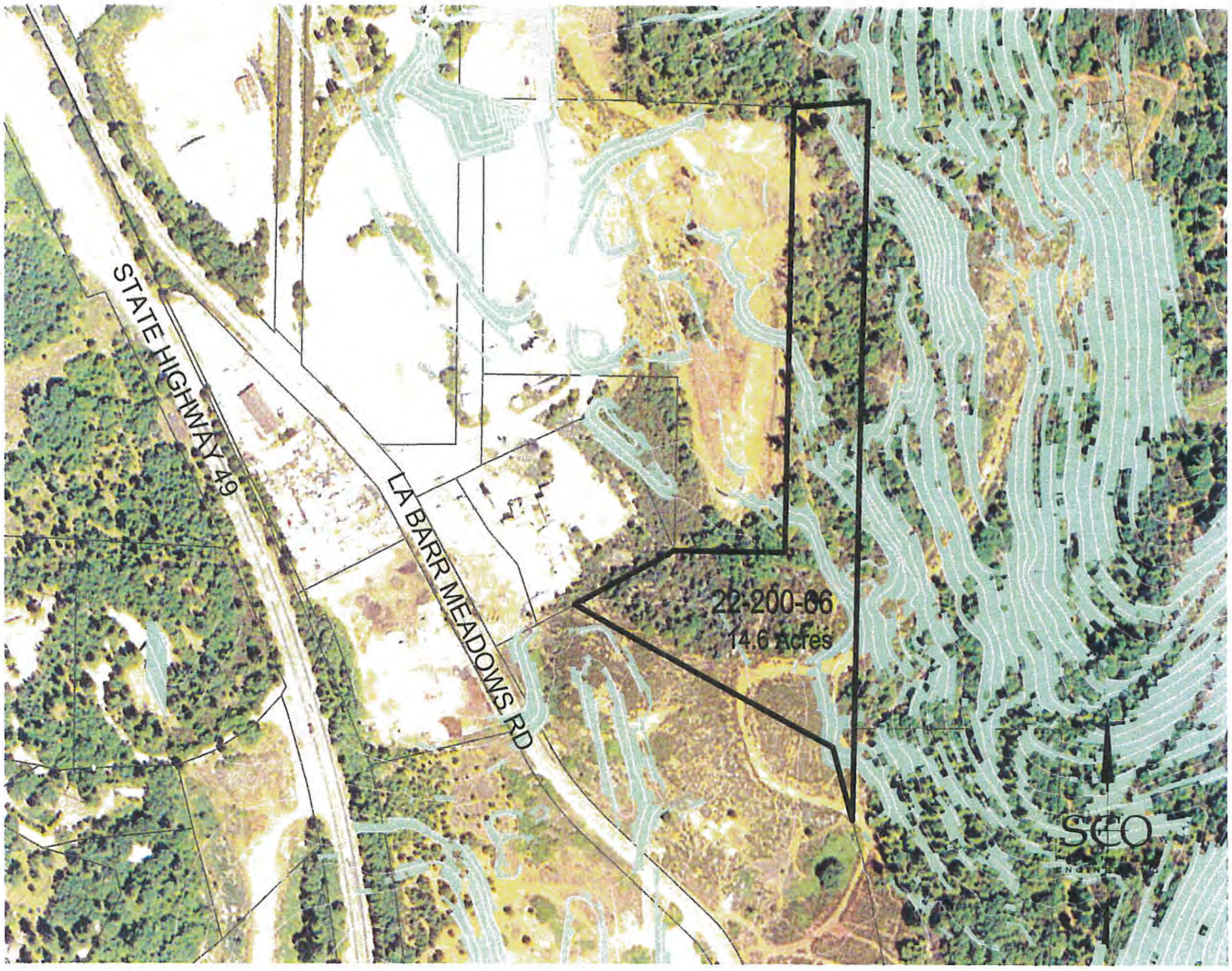
1. Existing development on the site unlikely to change.
2. Maximum Building Coverage = 25%, per Table 3-2 (2020 General Plan)
3. Maximum Building Coverage is based on a maximum impervious surface of 85% for Industrial land use per Policy 1.23 (Nevada County General Plan).

SUMMARY:

Existing Land Use	Residential
Additional Developement Potential	Low (1)
Existing Building Coverage	1,164 sf
Max. Building Coverage (Grass Valley)	4,100 sf (2)
Max. Building Coverage (County)	7,000 sf (3)

PARCEL REPORT #22

APN 22-200-66



SITE INFORMATION	
APN	22-200-66
Parcel Area (Gross)	14.6 Acres
Nevada County Zoning	RA-1.5
City Land Use Designation	BP (Business Park)
Existing Site Condition	Undeveloped

SITE CONSTRAINTS & DEVELOPABILITY	
Slopes in excess of 30%	~96%
Other Site Constraints	Unknown
Developable Area (Net)	0.58 acres

Notes:

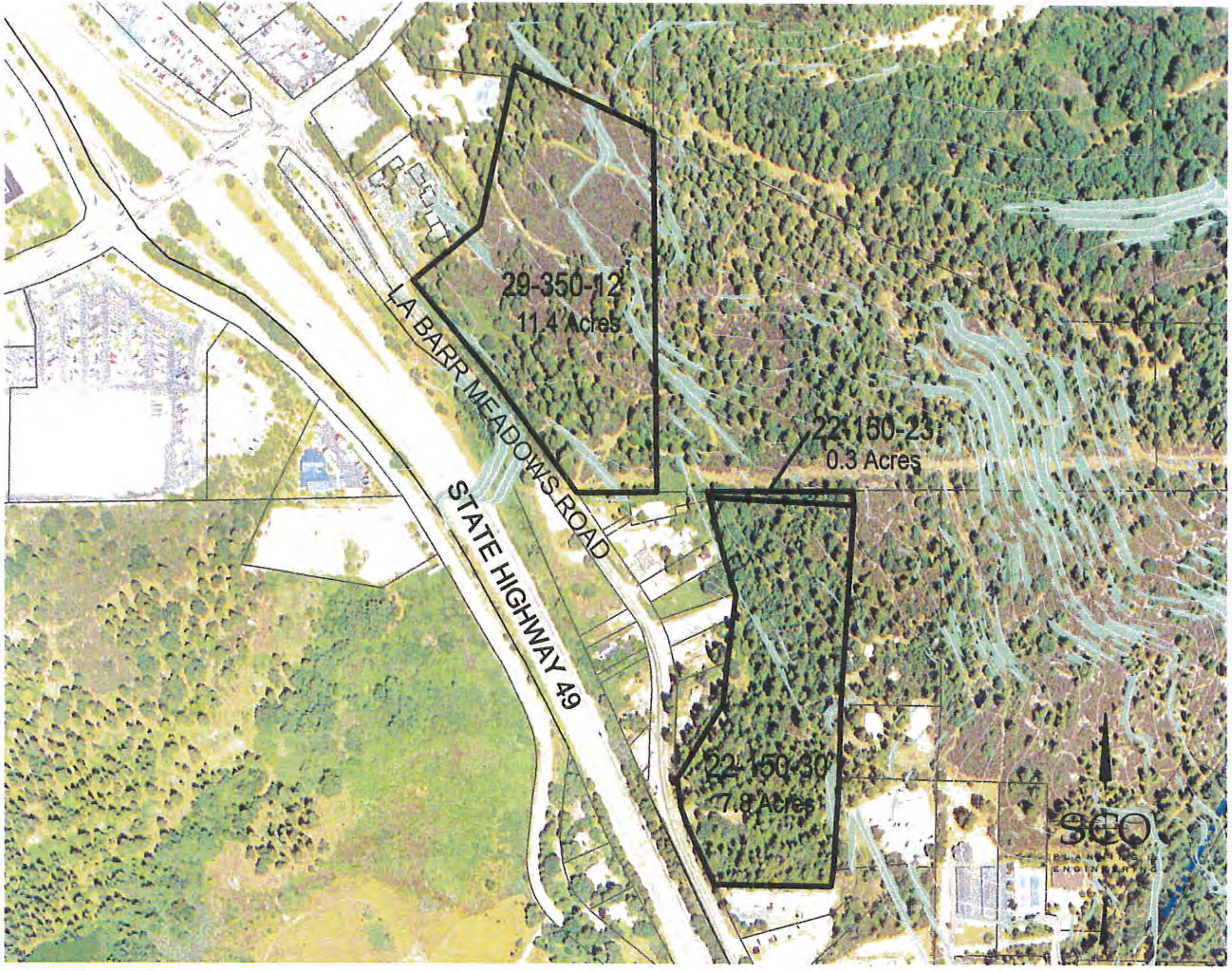
1. Commercial development on the site unlikely due to steep slopes. Opportunity exists to combine acreage with adjacent SPI properties.
2. Maximum Building Coverage = 25%, per Table 3-2 (2020 General Plan). *Max. Building Coverage reduced due to site constraints.*
3. Site unbuildable due to steep slopes, however density could be transferred to adjacent SPI properties.

SUMMARY:

Existing Land Use	Vacant
Additional Developement Potential	Low (1)
Existing Building Coverage	None
Max. Building Coverage (Grass Valley)	6,400 sf (1)
Estimated Density (County)	9 units (3)

PARCEL REPORT #23

APN 22-150-23, 22-150-30 & 29-350-12



SITE INFORMATION	
APN	22-150-23, 22-150-30, & 29-350-12
Parcel Area (Gross)	19.5 Acres
Nevada County Zoning	M-1 (Industrial)
City Land Use Designation	BP (Business Park)
Existing Site Condition	Undeveloped

SITE CONSTRAINTS & DEVELOPABILITY	
Slopes in excess of 30%	~30%
Other Site Constraints	Unknown
Developable Area (Net)	~ 13.5 acres

Notes:

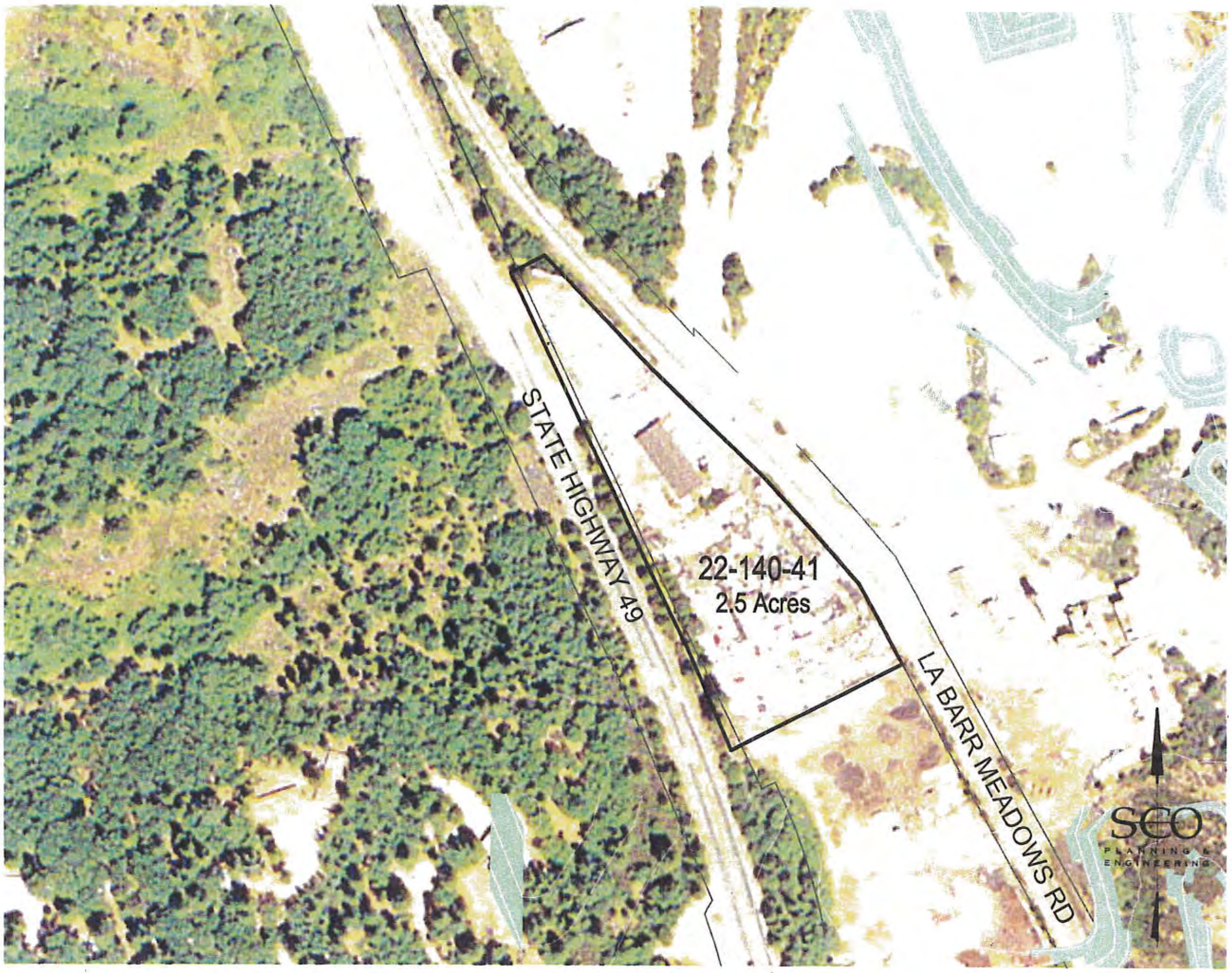
1. Maximum Building Coverage = 25%, per Table 3-2 (2020 General Plan)
2. Maximum Building Coverage is based on a maximum impervious surface of 85% for Industrial land use per Policy 1.23 (Nevada County General Plan).

SUMMARY:

Existing Land Use	Vacant
Additional Developement Potential	High
Existing Building Coverage	None
Max. Building Coverage (Grass Valley)	146,000 sf (1)
Max. Building Coverage (County)	170,000 sf (2)

PARCEL REPORT #24

APN 22-140-41



SITE INFORMATION	
APN	22-140-41
Parcel Area (Gross)	2.5 Acres
Nevada County Zoning	BP (Business Park)
City Land Use Designation	C (Commercial)
Existing Site Condition	Automotive (Kilroys)

SITE CONSTRAINTS & DEVELOPABILITY	
Slopes in excess of 30%	~5%
Other Site Constraints	Mostly Developed
Developable Area (Net)	~2.3 acres

Notes:

1. Existing development on the site unlikely to change.
2. Maximum Building Coverage (Commercial) = 50%, per Table 3-2 (Grass Valley 2020 General Plan).
3. Maximum Building Coverage (Business Park) is based on a maximum impervious surface of 50% for per Policy 1.23 (Nevada County General Plan).

SUMMARY:

Existing Land Use	Industrial
Additional Development Potential	Low (1)
Existing Building Coverage	5,760 sf
Max. Building Coverage (Grass Valley)	51,700 sf (2)
Max. Building Coverage (County)	20,000 sf (3)

PARCEL REPORT #25

APN 22-140-43

SITE INFORMATION	
APN	22-140-43
Parcel Area (Gross)	2.6 Acres
Nevada County Zoning	BP (Business Park)
City Land Use Designation	C (Commercial)
Existing Site Condition	Industrial (Rare Earth)

SITE CONSTRAINTS & DEVELOPABILITY	
Slopes in excess of 30%	~ 20%
Other Site Constraints	Mostly Developed
Developable Area (Net)	~2.1 acres

Notes:

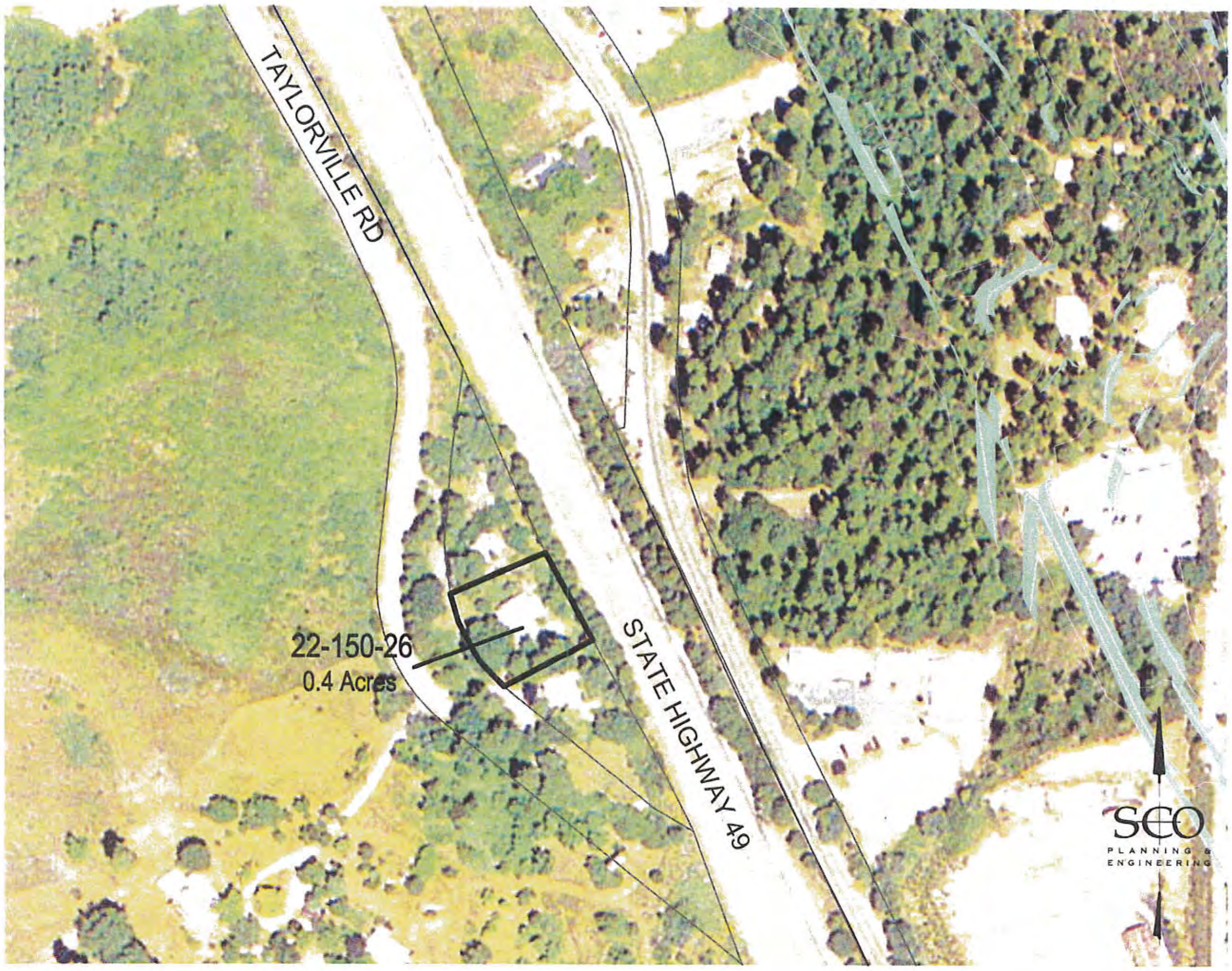
1. Existing development on the site unlikely to change.
2. Maximum Building Coverage (Commercial) = 50%, per Table 3-2 (Grass Valley 2020 General Plan).
3. Maximum Building Coverage (Business Park) is based on a maximum impervious surface of 50% for per Policy 1.23 (Nevada County General Plan).

SUMMARY:

Existing Land Use	Industrial
Additional Development Potential	Low (1)
Existing Building Coverage	Temporary
Max. Building Coverage (Grass Valley)	45,300 sf (2)
Max. Building Coverage (County)	20,000 sf (3)

PARCEL REPORT #26

APN 22-150-26



SITE INFORMATION	
APN	22-150-26
Parcel Area (Gross)	0.4 Acres
Nevada County Zoning	C2 (Community Comm)
City Land Use Designation	C (Commercial)
Existing Site Condition	Single family residence

SITE CONSTRAINTS & DEVELOPABILITY	
Slopes in excess of 30%	~20%
Other Site Constraints	Existing Home
Developable Area (Net)	0.32 Acres

Notes:

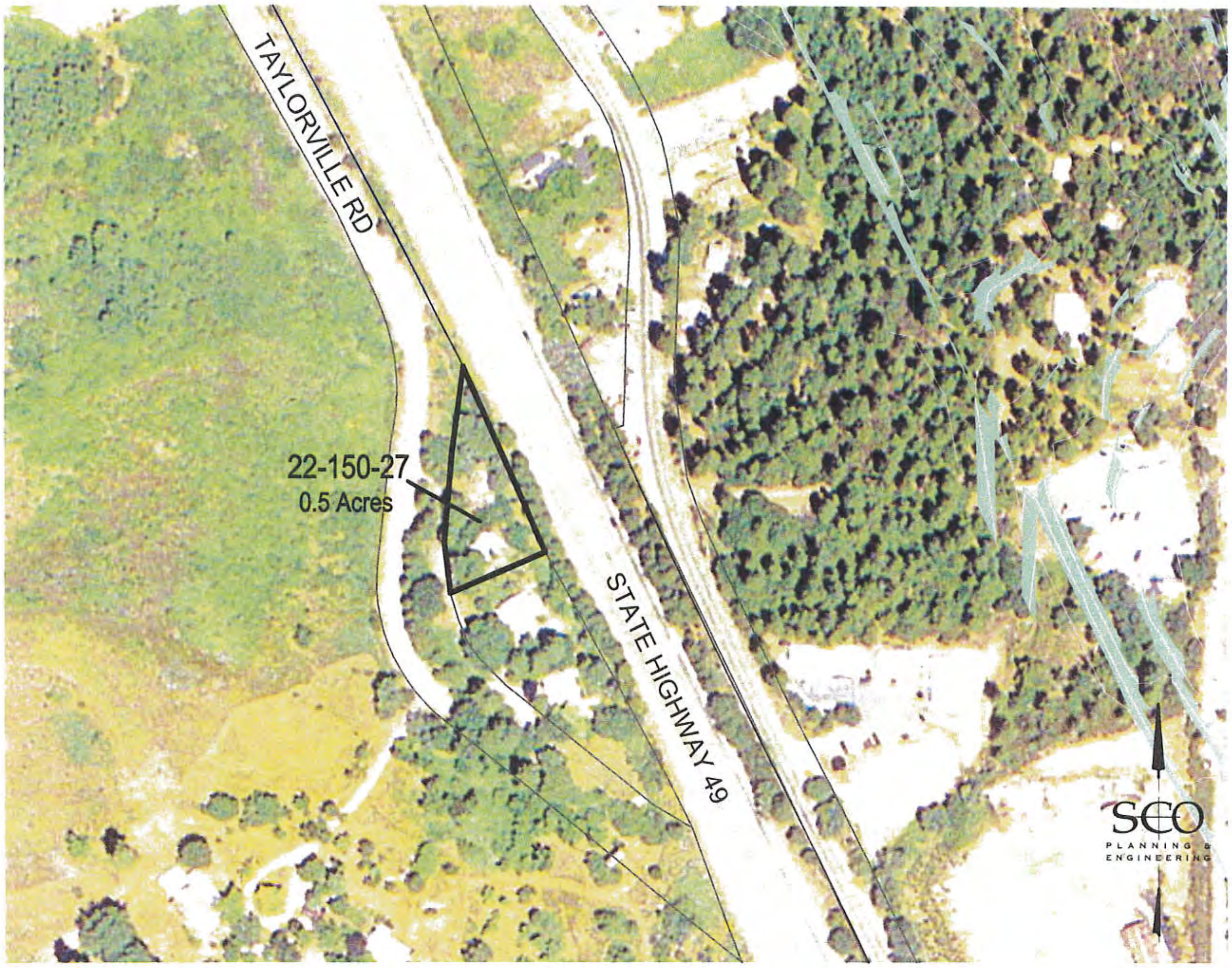
1. Existing development on the site unlikely to change.
2. Maximum Building Coverage (Commercial) = 50%, per Table 3-2 (Grass Valley 2020 General Plan).
3. Maximum Building Coverage (Community Commercial) is based on a maximum impervious surface of 85% for per Policy 1.23 (Nevada County General Plan).

SUMMARY:

Existing Land Use	Residential
Additional Development Potential	Low (1)
Existing Building Coverage	1,386 sf
Max. Building Coverage (Grass Valley)	7,000 sf (2)
Max. Building Coverage (County)	7,000 sf (3)

PARCEL REPORT #27

APN 22-150-27



SITE INFORMATION	
APN	22-150-27
Parcel Area (Gross)	0.5 Acres
Nevada County Zoning	C2 (Community Comm)
City Land Use Designation	C (Commercial)
Existing Site Condition	Single family residence

SITE CONSTRAINTS & DEVELOPABILITY	
Slopes in excess of 30%	~30%
Other Site Constraints	Existing Home
Developable Area (Net)	0.35 acres

Notes:

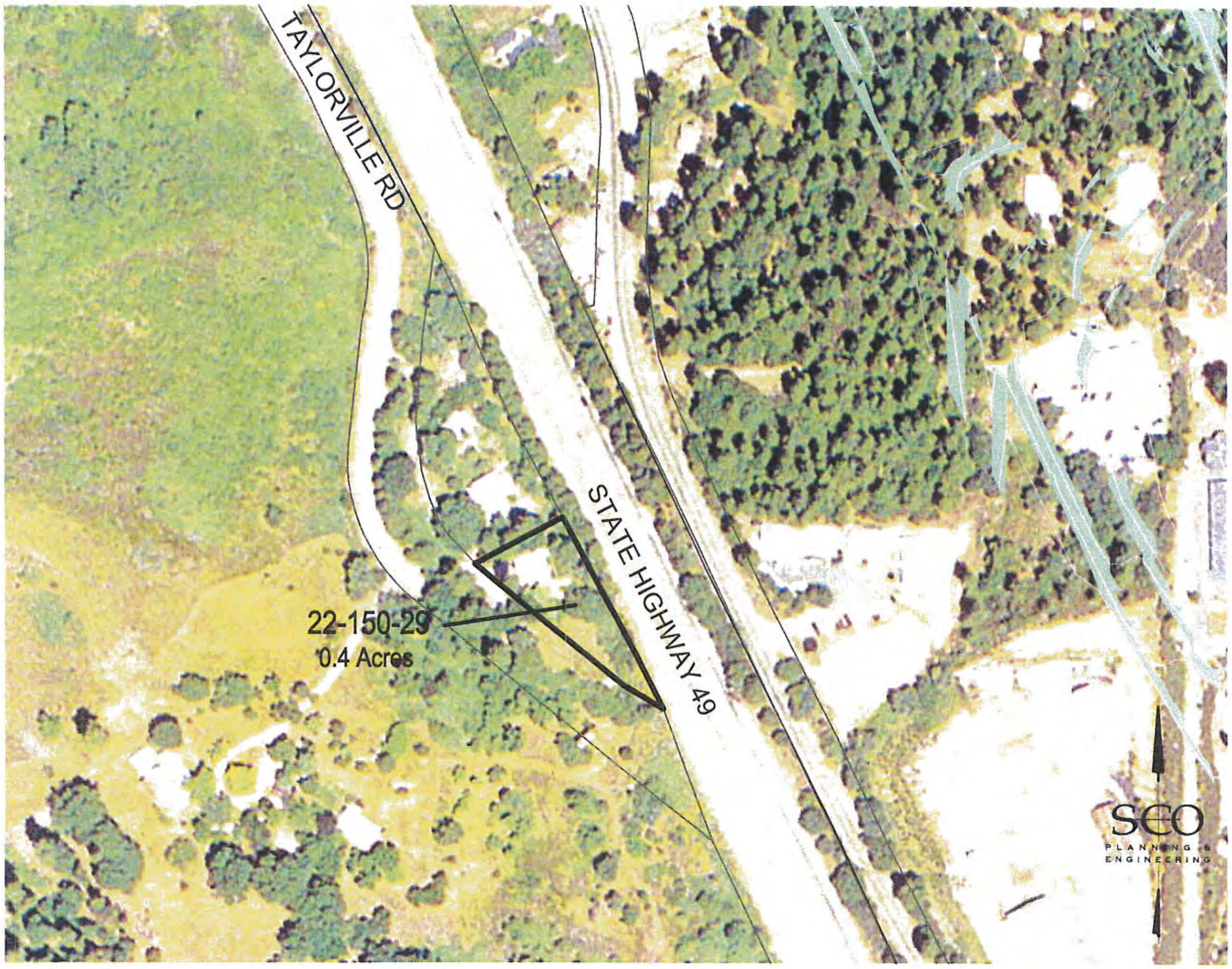
1. Existing development on the site unlikely to change.
2. Maximum Building Coverage (Commercial) = 50%, per Table 3-2 (Grass Valley 2020 General Plan).
3. Maximum Building Coverage (Community Commercial) is based on a maximum impervious surface of 85% for per Policy 1.23 (Nevada County General Plan).

SUMMARY:

Existing Land Use	Residential
Additional Development Potential	Low (1)
Existing Building Coverage	857 sf
Max. Building Coverage (Grass Valley)	7,600 sf (2)
Max. Building Coverage (County)	8,500 sf (3)

PARCEL REPORT #28

APN 22-150-29



SITE INFORMATION	
APN	22-150-29
Parcel Area (Gross)	0.4 Acres
Nevada County Zoning	C2 (Community Comm)
City Land Use Designation	C (Commercial)
Existing Site Condition	Single family residence

SITE CONSTRAINTS & DEVELOPABILITY	
Slopes in excess of 30%	~30%
Other Site Constraints	Existing Home
Developable Area (Net)	0.28 acres

Notes:

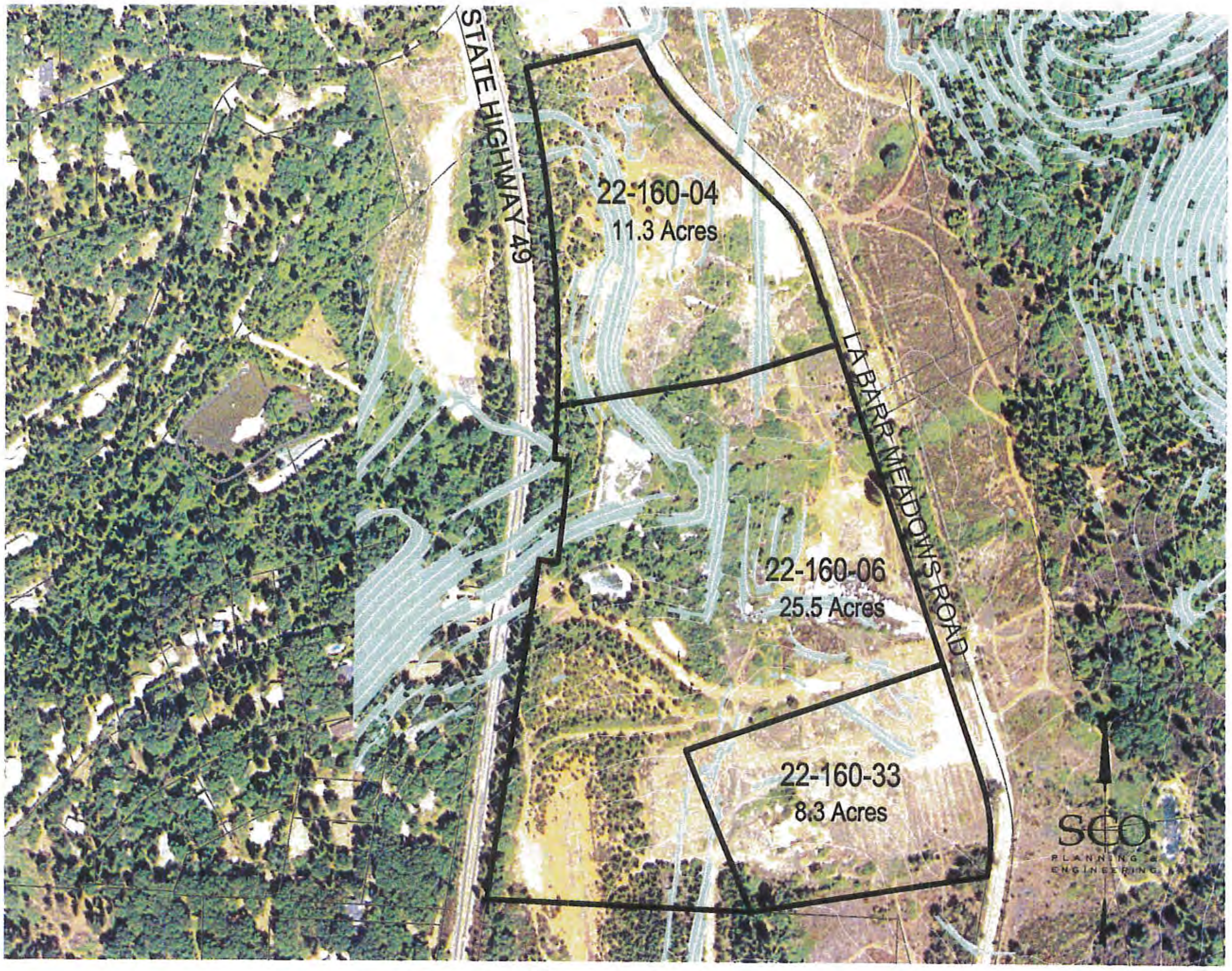
1. Existing development on the site unlikely to change.
2. Maximum Building Coverage (Commercial) = 50%, per Table 3-2 (Grass Valley 2020 General Plan).
3. Maximum Building Coverage (Community Commercial) is based on a maximum impervious surface of 85% for per Policy 1.23 (Nevada County General Plan).

SUMMARY:

Existing Land Use	Residential
Additional Development Potential	Low (1)
Existing Building Coverage	1,152 sf
Max. Building Coverage (Grass Valley)	6,100 sf (2)
Max. Building Coverage (County)	5,600 sf (3)

PARCEL REPORT #29

APN's 22-160-04, 22-160-06 & 22-160-33



SITE INFORMATION	
APN	22-160-04, 22-160-06 & 22-160-33
Parcel Area (Gross)	45.1 Acres
Nevada County Zoning	BP (Business Park)
City Land Use Designation	SDA (Special Dev Area)
Existing Site Condition	Undeveloped

SITE CONSTRAINTS & DEVELOPABILITY	
Slopes in excess of 30%	~15%
Other Site Constraints	Wetlands & Pond
Developable Area (Net)	~ 26 acres

Notes:

1. Environmental Review previously conducted under "Southhill Village" project.
2. Assume 50% business park & 50% industrial development potential. Maximum Building Coverage (Business Park & Commercial) = 37.5% (average), per Table 3-2 (Grass Valley 2020 General Plan).
3. Maximum Building Coverage (Business Park) is based on a maximum impervious surface of 50% for per Policy 1.23 (Nevada County General Plan).

SUMMARY:

Existing Land Use	Vacant
Additional Development Potential	High (1)
Existing Building Coverage	None
Max. Building Coverage (Grass Valley)	416,000 sf (2)
Max. Building Coverage (County)	325,000 sf (3)

PARCEL REPORT #30

APN's 22-331-05, 22-331-06, 22-331-07, 22-331-09 & 22-331-12

SITE INFORMATION	
APN	22-331-05, 22-331-06, 22-331-07, 22-331-09, & 22-331-12
Parcel Area (Gross)	39.2 Acres
Nevada County Zoning	BP (Business Park)
City Land Use Designation	SDA (except 22-331-12)
Existing Site Condition	Undeveloped

SITE CONSTRAINTS & DEVELOPABILITY	
Slopes in excess of 30%	~ 15%
Other Site Constraints	Unknown
Developable Area (Net)	~ 27 acres

Notes:

1. Environmental Review previously conducted under "Southhill Village" project.
2. Assume 50% business park & 50% industrial development potential. Maximum Building Coverage (Business Park & Commercial) = 37.5% (average), per Table 3-2 (Grass Valley 2020 General Plan).
3. Maximum Building Coverage (Business Park) is based on a maximum impervious surface of 50% for per Policy 1.23 (Nevada County General Plan).

SUMMARY:

Existing Land Use	Vacant
Additional Development Potential	High
Existing Building Coverage	None
Max. Building Coverage (Grass Valley)	443,000 sf (2)
Max. Building Coverage (County)	350,000 sf (3)

PARCEL REPORT #31

APN 22-331-08

SITE INFORMATION	
APN	22-331-08
Parcel Area (Gross)	0.5 Acres
Nevada County Zoning	BP (Business Park)
City Land Use Designation	SDA (Special Dev Area)
Existing Site Condition	Single family residence

SITE CONSTRAINTS & DEVELOPABILITY	
Slopes in excess of 30%	None
Other Site Constraints	Existing Home
Developable Area (Net)	~ 0.3 acres

Notes:

1. Existing single family residence.
2. Assume 50% commercial & 50% industrial development potential. Maximum Building Coverage (Commercial & Industrial) = 50%, per Table 3-2 (Grass Valley 2020 General Plan).
3. Maximum Building Coverage (Business Park) is based on a maximum impervious surface of 50% for per Policy 1.23 (Nevada County General Plan).

SUMMARY:

Existing Land Use	Vacant
Additional Development Potential	Low (1)
Existing Building Coverage	1,564 sf
Max. Building Coverage (Grass Valley)	6,500 sf (2)
Max. Building Coverage (County)	4,500 sf (3)

APPENDIX B
WASTEWATER CALCULATIONS

WASTEWATER FLOW CALCULATIONS FOR:

EXISTING DEVELOPED PROPERTIES

Land Use Designation	TOTAL AVERAGE GPD		AVERAGE DRY WEATHER FLOW		FACTORED FLOW	PEAK FACTOR	TOTAL PEAK FLOW	
	Land Use Description	Units	(gpd/unit)	GPD			GPD	MGD
					(ADWF x 2.0)	(City Std. Fig. 1)		
varies	Residential Single Family	12 ea	191	2,292	4,584	5.1	23,378	0.02
varies	Commercial/ Industrial	64,164 sf	0.125	8,021	16,041	5.1	81,809	0.08
				10,313	20,625	5.1	105,188	0.11

Note:
For purposes of this estimate, wastewater discharge is estimated at 125 gpd per 1000 sf of "existing bldg coverage". This is based on fixture counts from existing/ comparable developed projects.

WASTEWATER FLOW CALCULATIONS FOR:

MAXIMUM BUILDOUT BASED ON EXISTING COUNTY ZONING

Land Use Designation	TOTAL AVERAGE GPD		AVERAGE DRY WEATHER FLOW		FACTORED FLOW	PEAK FACTOR	TOTAL PEAK FLOW	
	Land Use Description	Units	(gpd/unit)	GPD			GPD	MGD
					(ADWF x 2.0)	(City Std. Fig. 1)		
RA	Residential Single Family	101 ea	191	19,291	38,582	5.1	196,768	0.20
C-2, M-1, BP	Commercial / Industrial	160.1 ac	850	136,085	272,170	3.6	979,812	0.98
				155,376	310,752	3.4	1,056,557	1.06

Note:
Based on City Design Standard, wastewater generation factor is 191 gpd per unit for Residential and 850 gpd per acre for Commercial and Industrial land use.

WASTEWATER FLOW CALCULATIONS FOR:

MAXIMUM BUILDOUT BASED ON CITY GENERAL PLAN

Land Use Designation	TOTAL AVERAGE GPD		AVERAGE DRY WEATHER FLOW		FACTORED FLOW	PEAK FACTOR	TOTAL PEAK FLOW	
	Land Use Description	Units	(gpd/unit)	GPD	(ADWF x 2.0)	(City Std. Fig. 1)	GPD	MGD
UED	Residential Single Family	136 ea	191	25,976	51,952	4.8	249,370	0.25
BP	Business Park	83.4 ac	850	70,890	141,780	4.1	581,298	0.58
C	Commercial	6.4 ac	850	5,440	10,880	5.1	55,488	0.06
SDA	Special Development Area	84.8 ac	850	72,080	144,160	4.1	591,056	0.59
				174,386	348,772	3.4	1,185,825	1.19

Note: Based on City Design Standard, wastewater generation factor is 191 gpd per unit for Residential and 850 gpd per acre for Commercial and Industrial land use.

WASTEWATER FLOW CALCULATIONS FOR:

ANTICIPATED BUILDOUT BASED ON CITY GENERAL PLAN

Land Use Designation	TOTAL AVERAGE GPD		AVERAGE DRY WEATHER FLOW		FACTORED FLOW	PEAK FACTOR	TOTAL PEAK FLOW	
	Land Use Description	Units	(gpd/unit)	GPD	(ADWF x 2.0)	(City Std. Fig. 1)	GPD	MGD
UED	Residential Single Family	68 ea	191	12,988	25,976	5.1	132,478	0.13
BP	Business Park	201,527 sf	0.125	25,191	50,382	4.8	241,832	0.24
C	Commercial	12,359 sf	0.125	1,545	3,090	5.1	15,758	0.02
SDA	Special Development Area	115,499 sf	0.125	14,437	28,875	5.1	147,261	0.15
				54,161	108,322	4.2	454,953	0.45

Note:

For purposes of this estimate, wastewater discharge is estimated at 125 gpd per 1000 sf of "anticipated bldg coverage". This is based on fixture counts from existing/ comparable developed projects.

Wastewater Feasibility Analysis - La Barr Meadows Road and Taylorville Road
City of Grass Valley

WASTEWATER FLOW CALCULATIONS FOR:

MAXIMUM BUILDOUT BASED ON RECOMMENDED ZONING

Land Use Designation	TOTAL AVERAGE GPD		AVERAGE DRY WEATHER FLOW		FACTORED FLOW	PEAK FACTOR	TOTAL PEAK FLOW	
	Land Use Description	Units	(gpd/unit)	GPD	(ADWF x 2.0)	(City Std. Fig. 1)	GPD	MGD
R-1, RE	Residential Single Family	241 ea	191	46,031	92,062	4.4	405,073	0.41
C, M, BP, P	Commercial / Industrial	250.5 ac	850	212,925	425,850	3.2	1,362,720	1.36
				258,956	517,912	3.1	1,605,527	1.61

Note: Based on City Design Standard, wastewater generation factor is 191 gpd per unit for Residential and 850 gpd per acre for Commercial and Industrial land use.

WASTEWATER FLOW CALCULATIONS FOR:

ANTICIPATED BUILDOUT BASED ON RECOMMENDED ZONING

Land Use Designation	TOTAL AVERAGE GPD		AVERAGE DRY WEATHER FLOW		FACTORED FLOW	PEAK FACTOR	TOTAL PEAK FLOW	
	Land Use Description	Units	(gpd/unit)	GPD	(ADWF x 2.0)	(City Std. Fig. 1)	GPD	MGD
R-1, RE	Residential Single Family	121 ea	191	23,111	46,222	4.9	226,488	0.23
C, M, BP, P	Commercial / Industrial	345,082 sf	0.125	43,135	86,271	4.4	379,590	0.38
				66,246	132,493	4.1	543,219	0.54

Note:
For purposes of this estimate, wastewater discharge is estimated at 125 gpd per 1000 sf of "anticipated bldg coverage". This is based on fixture counts from existing/ comparable developed projects.

WASTEWATER DEMAND RATIOS

(BASED ON CITY'S GENERAL PLAN LAND USE DESIGNATIONS)

MAXIMUM BUILDOUT											ANTICIPATED BUILDOUT			
APN	CITY LAND USE	TOTAL ACRES (1)	EXISTING LAND USE	EXISTING BLDG COVERAGE (sf) (1)	30%+ Slopes *(Estimated)*	BUILDABLE AREA (ac) (2)	MAX DENSITY (# of Units)	DEMAND RATIO (3)	CITY'S IMPACT FEE (per meter)	IMPACT FEE (8)	DEVELOPMENT POTENTIAL (4)	ANTICIPATED DENSITY (# of Units)	DEMAND RATIO (3)	IMPACT FEE (9)
09-620-12	UED	19.1	Vacant	0	25%	14.3	19	19	$9,624	$182,856	Medium	10	10	$91,428
22-140-35	UED	36.6	Vacant	0	50%	18.3	36	36	$9,624	$346,464	Medium	18	18	$173,232
22-160-05	UED	10.0	Vacant	0	40%	6.0	10	10	$9,624	$96,240	Medium	5	5	$48,120
22-230-10	UED	0.2	Vacant	0	90%	0.0	0	0	$9,624	$0	Medium	0	0	$0
22-230-52	UED	42.9	Vacant	0	75%	10.7	43	43	$9,624	$413,832	Medium	22	22	$206,916
22-230-53	UED	5.7	Vacant	0	90%	0.6	6	6	$9,624	$57,744	Medium	3	3	$28,872
22-200-36	UED	14.6	Vacant	0	70%	4.4	15	15	$9,624	$144,360	Medium	8	8	$72,180
22-200-37	UED	7.3	Vacant	0	95%	0.4	7	7	$9,624	$67,368	Medium	4	4	$33,684
		136.4		**0**		**54.7**	**136**	**136**		**$1,308,864**		**68**	**68**	**$654,432**

APN	CITY LAND USE	TOTAL ACRES (1)	EXISTING LAND USE	EXISTING BLDG COVERAGE (sf) (1)	30%+ Slopes *(Estimated)*	BUILDABLE AREA (ac) (2)	MAXIMUM BLDG COVERAGE (sf)(7)	DEMAND RATIO (5)	CITY'S IMPACT FEE (6)	IMPACT FEE (8)	DEVELOPMENT POTENTIAL (4)	ANTICIPATED BLDG COVERAGE (sf) (9)	DEMAND RATIO (10)	IMPACT FEE (9)
22-140-05	BP	1.5	Grange Hall	3,200	10%	1.35	14,702	12.8	$4,810	$61,328	Low	3,200	4.0	$19,240
22-140-08	BP	5.4	Industrial	8,880	50%	2.70	29,403	45.9	$4,810	$220,779	Low	8,880	11.1	$53,391
22-140-10	BP	10.1	Vacant	0	70%	3.03	32,997	85.9	$4,810	$412,939	Low	6,599	8.2	$39,679
22-140-11	BP	1.5	Vacant	0	80%	0.30	3,267	12.8	$4,810	$61,328	Low	653	0.8	$3,929
22-140-12	BP	1.0	Industrial	6,804	0%	1.00	10,890	8.5	$4,810	$40,885	Low	6,804	8.5	$40,909
22-140-21	BP	2.8	Vacant	0	50%	1.40	15,246	23.8	$4,810	$114,478	Low	3,049	3.8	$18,333
22-140-22	BP	6.9	Vacant	0	20%	5.52	60,113	58.7	$4,810	$282,107	Low	12,023	15.0	$72,286
22-140-25	BP	3.0	Vacant	0	20%	2.42	26,397	25.8	$4,810	$123,882	Low	5,279	6.6	$31,743
22-140-36	BP	2.8	Industrial	8,540	30%	1.40	15,246	23.8	$4,810	$114,478	Low	8,540	10.7	$51,347
22-140-38	BP	2.2	Office	3,440	30%	1.20	13,068	18.7	$4,810	$89,947	Low	3,440	4.3	$20,683
22-140-47	BP	0.7	Industrial	0	20%	0.56	6,098	6.0	$4,810	$28,620	Medium	3,049	3.8	$18,333
22-140-48	BP	1.3	Retail Sales	3,626	30%	0.91	9,910	11.1	$4,810	$53,151	Medium	4,955	6.2	$29,792
22-140-50	BP	2.2	Office	8,398	40%	1.32	14,375	18.7	$4,810	$89,947	Low	8,398	10.5	$50,493
22-150-03	BP	0.2	Vacant	0	0%	0.20	2,178	1.7	$4,810	$8,177	High	2,178	2.7	$13,095
22-150-04	BP	0.3	Residential	1,344	0%	0.25	2,723	2.6	$4,810	$12,266	Medium	1,361	1.7	$8,185
22-150-08	BP	0.02	Government	0	50%	0.01	0	0.2	$4,810	$818	None	0	0.0	$0
22-150-09	BP	0.1	Automotive	735	0%	0.10	1,089	0.9	$4,810	$4,089	Low	735	0.9	$4,419
22-150-10	BP	0.5	Residential	930	15%	0.43	4,628	4.3	$4,810	$20,443	Medium	2,314	2.9	$13,914
22-150-11	BP	0.1	Vacant	0	10%	0.05	0	0.4	$4,810	$2,044	None	0	0.0	$0
22-150-15	BP	0.7	Automotive	1,650	10%	0.63	6,861	6.0	$4,810	$28,620	Low	1,650	2.1	$9,921
22-150-16	BP	0.3	Residential	1,050	0%	0.30	3,267	2.6	$4,810	$12,266	Medium	1,634	2.0	$9,821
22-150-17	BP	0.4	Industrial	0	10%	0.32	3,528	3.1	$4,810	$14,719	High	3,528	4.4	$21,214
22-150-18	BP	0.4	Residential	936	0%	0.36	3,920	3.1	$4,810	$14,719	Medium	1,960	2.5	$11,786
22-150-21	BP	1.2	Residential	1,128	20%	0.96	10,454	10.2	$4,810	$49,062	Medium	5,227	6.5	$31,429
22-150-22	BP	3.0	Residential	992	75%	0.75	8,168	25.5	$4,810	$122,655	Medium	4,084	5.1	$24,554
22-150-23	BP	0.3	Vacant	0	90%	0.03	0	2.6	$4,810	$12,266	None	0	0.0	$0
22-150-28	BP	0.3	Residential	628	10%	0.27	2,940	2.6	$4,810	$12,266	Medium	1,470	1.8	$8,839
22-150-30	BP	7.8	Vacant	0	40%	4.68	50,965	66.3	$4,810	$318,903	High	50,965	63.7	$306,428
22-150-32	BP	0.5	Residential	1,164	25%	0.38	4,084	4.3	$4,810	$20,443	Medium	2,042	2.6	$12,277
22-150-33	BP	0.03	Miscellaneous	0	0%	0.03	0	0.2	$4,810	$1,063	None	0	0.0	$0
22-200-66	BP	14.6	Vacant	0	97%	0.44	4,770	124.1	$4,810	$596,921	Low	954	1.2	$5,736
29-350-12	BP	11.4	Vacant	0	25%	8.55	93,110	96.9	$4,810	$466,089	Medium	46,555	58.2	$279,910
		83.4		**53,445**		**41.8**	**454,396**	**709.3**		**$3,411,690**		**201,527**	**251.9**	**$1,211,684**

WASTEWATER DEMAND RATIOS

(BASED ON CITY'S GENERAL PLAN LAND USE DESIGNATIONS)

MAXIMUM BUILDOUT										ANTICIPATED BUILDOUT			
APN	CITY LAND USE	TOTAL ACRES (1)	EXISTING LAND USE	EXISTING BLDG COVERAGE (sf) (1)	30%+ Slopes *(Estimated)*	BUILDABLE AREA (ac) (2)	MAXIMUM BLDG COVERAGE (sf)(7)	DEMAND RATIO (5)	CITY'S IMPACT FEE (6)	IMPACT FEE (8)	DEVELOPMENT POTENTIAL (4)	ANTICIPATED BLDG COVERAGE (sf) (9)	DEMAND RATIO (10)	IMPACT FEE (9)
22-140-41	C	2.5	Automotive	5,760	5%	2.38	51,728	21.3	$4,810	$102,213	Low	5,760	7.2	$34,632
22-140-43	C	2.6	Industrial	0	20%	2.08	45,302	22.1	$4,810	$106,301	Low	4,530	5.7	$27,238
22-150-26	C	0.4	Residential	1,386	20%	0.32	6,970	3.4	$4,810	$16,354	Low	697	0.9	$4,190
22-150-27	C	0.5	Residential	857	30%	0.35	7,623	4.3	$4,810	$20,443	Low	762	1.0	$4,583
22-150-29	C	0.4	Residential	1,152	30%	0.28	6,098	3.4	$4,810	$16,354	Low	610	0.8	$3,667
		6.4		**9,155**		**5.4**	**117,721**	**54.4**		**$261,664**		**12,359**	**15.4**	**$74,311**
22-160-04	SDA	11.3	Vacant	0	10%	8.00	130,680	96.1	$4,810	$462,001	Low	17,424	21.8	$104,762
22-160-06	SDA	25.5	Vacant	0	15%	10.00	163,350	216.8	$4,810	$1,042,568	Low	21,780	27.2	$130,952
22-160-33	SDA	8.3	Vacant	0	0%	7.50	122,513	70.6	$4,810	$339,346	Low	16,335	20.4	$98,214
22-331-05	SDA	11.6	Vacant	0	5%	8.00	130,680	98.6	$4,810	$474,266	Low	17,424	21.8	$104,762
22-331-06	SDA	2.1	Vacant	0	5%	1.50	24,503	17.9	$4,810	$85,859	Low	3,267	4.1	$19,643
22-331-07	SDA	0.6	Vacant	0	0%	0.40	6,534	5.1	$4,810	$24,531	Low	871	1.1	$5,238
22-331-08	SDA	0.5	Residential	1,564	0%	0.40	6,534	4.3	$4,810	$20,443	Low	871	1.1	$5,238
22-331-09	SDA	6.0	Vacant	0	10%	4.00	65,340	51.0	$4,810	$245,310	Low	8,712	10.9	$52,381
22-331-12	Not in SOI	18.9	Vacant	0	30%	13.23	216,112	160.7	$4,810	$772,727	Low	28,815	36.0	$173,250
		84.8		**1,564**		**53.0**	**866,245**	**720.8**		**$3,467,048**		**115,499**	**144.4**	**$694,440**
TOTAL		**311.1**		**64,164**		**155.0**	**1,438,362**	**1620.5**		**$8,449,266**		**329,386**	**479.7**	**$2,634,866**

(1) Based on County GIS data.

(2) Estimated buildable land area - EXCLUDING known site constraints such as 30%+ slopes, ponds, creeks, wetlands, etc.

(3) Demand ratio is based on City's Fee Schedule. Residential fee of $9,624 is based on a demand ratio of 1.00 (for residential development up to and including 3/4" water meter size).

(4) "High" = Max. Bldg Coverage (per Table 3-2 of City's 2020 General Plan) X Buildable Area; "Medium" = 50% of Max. Bldg Coverage X Buildable Area; "Low" = 20% of Max. Bldg Coverage X Buildable Area (or "existing bldg coverage", whichever is greater)

(5) Based on City Design Standard, wastewater generation factor is 850 gpd per acre for Commercial and Industrial land use. Demand ratio is 100 gpd for the purposes of fee calculation.

(6) Non-residential impact fee of $4810 is based on 100 gpd of estimated wastewater discharge.

(7) Maximum Building Coverage is based on Table 3-2 of City's 2020 General Plan and multiplied by the "buildable area".

(8) Based on Maximum Density or Maximum Building Coverage.

(9) "Anticipated Building Coverage" is based on the anticipated future land use, considering factors such as site constraints & existing land uses (See Note 4)

(10) For purposes of this estimate, wastewater discharge is estimated at 125 gpd per 1000 sf of "max bldg coverage" OR "anticipated bldg coverage". This is based on fixture counts from existing/ comparable developed projects.

WASTEWATER DEMAND RATIOS

(BASED ON COUNTY ZONING DESIGNATIONS)

MAXIMUM BUILDOUT											ANTICIPATED BUILDOUT			
APN	COUNTY ZONING	TOTAL ACRES (1)	EXISTING LAND USE	EXISTING BLDG COVERAGE (sf) (1)	30%+ Slopes *(Estimated)*	BUILDABLE AREA (ac) (2)	MAX DENSITY (# of Units)	DEMAND RATIO (3)	CITY'S IMPACT FEE (per meter)	IMPACT FEE (8)	DEVELOPMENT POTENTIAL (4)	ANTICIPATED DENSITY (# of Units)	DEMAND RATIO (3)	IMPACT FEE (9)
09-620-12	RA-1.5	19.1	Vacant	0	25%	14.3	13	13	$9,624	$122,546	Medium	6	6	$61,273
22-140-35	RA-1.5	36.6	Vacant	0	50%	18.3	24	24	$9,624	$234,826	Medium	12	12	$117,413
22-160-05	RA-1.5	10.0	Vacant	0	40%	6.0	7	7	$9,624	$64,160	Medium	3	3	$32,080
22-230-10	RA-1.5	0.2	Vacant	0	90%	0.0	0	0	$9,624	$0	Medium	0	0	$0
22-230-52	RA-1.5	42.9	Vacant	0	75%	10.7	29	29	$9,624	$275,246	Medium	14	14	$137,623
22-230-53	RA-1.5	5.7	Vacant	0	90%	0.6	4	4	$9,624	$36,571	Medium	2	2	$18,286
22-200-36	RA-1.5	14.6	Vacant	0	70%	4.4	10	10	$9,624	$93,674	Medium	5	5	$46,837
22-200-37	RA-1.5	7.3	Vacant	0	95%	0.4	5	5	$9,624	$46,837	Medium	2	2	$23,418
22-200-66	RA-1.5	14.6	Vacant	0	97%	0.44	10	10	$9,624	$93,674	Medium	5	5	$46,837
		151.0		**0**		**55.1**	**101**	**101**		**$967,533**		**50**	**50**	**$483,766**
APN	COUNTY ZONING	TOTAL ACRES (1)	EXISTING LAND USE	EXISTING BLDG COVERAGE (sf) (1)	30%+ Slopes *(Estimated)*	BUILDABLE AREA (ac) (2)	MAXIMUM BLDG COVERAGE (sf)(7)	DEMAND RATIO (5)	CITY'S IMPACT FEE (6)	IMPACT FEE (8)	DEVELOPMENT POTENTIAL (4)	ANTICIPATED BLDG COVERAGE (sf) (9)	DEMAND RATIO (10)	IMPACT FEE (9)
22-140-05	M1	1.5	Grange Hall	3,200	10%	1.35	26,000	12.8	$4,810	$61,328	Low	5,200	6.5	$31,265
22-140-08	M1	5.4	Industrial	8,880	50%	2.70	58,000	45.9	$4,810	$220,779	Low	11,600	14.5	$69,745
22-140-10	M1	10.1	Vacant	0	70%	3.03	107,000	85.9	$4,810	$412,939	Low	21,400	26.8	$128,668
22-140-11	M1	1.5	Vacant	0	80%	0.30	16,000	12.8	$4,810	$61,328	Low	3,200	4.0	$19,240
22-140-12	M1	1.0	Industrial	6,804	0%	1.00	11,000	8.5	$4,810	$40,885	Low	6,804	8.5	$40,909
22-140-21	M1	2.8	Vacant	0	50%	1.40	30,000	23.8	$4,810	$114,478	Low	6,000	7.5	$36,075
22-140-22	M1	6.9	Vacant	0	20%	5.52	74,000	58.7	$4,810	$282,107	Low	14,800	18.5	$88,985
22-140-25	M1	3.0	Vacant	0	20%	2.42	32,000	25.8	$4,810	$123,882	Low	6,400	8.0	$38,480
22-140-36	M1	2.8	Industrial	8,540	30%	1.40	22,000	23.8	$4,810	$114,478	Low	4,400	5.5	$26,455
22-140-38	M1	2.2	Office	3,440	30%	1.20	24,000	18.7	$4,810	$89,947	Low	4,800	6.0	$28,860
22-140-47	M1	0.7	Industrial	0	20%	0.56	9,900	6.0	$4,810	$28,620	Medium	4,950	6.2	$29,762
22-140-48	M1	1.3	Retail Sales	3,626	30%	0.91	16,100	11.1	$4,810	$53,151	Medium	8,050	10.1	$48,401
22-140-50	M1	2.2	Office	8,398	40%	1.32	26,000	18.7	$4,810	$89,947	Low	8,398	10.5	$50,493
22-150-03	M1	0.2	Vacant	0	0%	0.20	4,000	1.7	$4,810	$8,177	High	4,000	5.0	$24,050
22-150-04	M1	0.3	Residential	1,344	0%	0.25	3,800	2.2	$4,810	$10,630	Medium	1,900	2.4	$11,424
22-150-08	M1	0.02	Government	0	50%	0.01	0	0.2	$4,810	$818	None	0	0.0	$0
22-150-09	M1	0.1	Automotive	735	0%	0.10	2,000	0.9	$4,810	$4,089	Low	400	0.5	$2,405
22-150-10	M1	0.5	Residential	930	15%	0.43	7,600	4.3	$4,810	$20,443	Medium	3,800	4.8	$22,848
22-150-11	M1	0.1	Vacant	0	10%	0.05	0	0.4	$4,810	$2,044	None	0	0.0	$0
22-150-15	M1	0.7	Automotive	1,650	10%	0.63	13,000	6.0	$4,810	$28,620	Low	2,600	3.3	$15,633
22-150-16	M1	0.3	Residential	1,050	0%	0.30	6,000	2.6	$4,810	$12,266	Medium	3,000	3.8	$18,038
22-150-17	M1	0.4	Industrial	0	10%	0.36	7,000	3.4	$4,810	$16,354	High	7,000	8.8	$42,088
22-150-18	M1	0.4	Residential	936	0%	0.40	7,800	3.4	$4,810	$16,354	Medium	3,900	4.9	$23,449
22-150-21	M1	1.2	Residential	1,128	20%	0.96	18,000	10.2	$4,810	$49,062	Medium	9,000	11.3	$54,113
22-150-22	M1	3.0	Residential	992	75%	0.75	13,000	25.5	$4,810	$122,655	Medium	6,500	8.1	$39,081
22-150-23	M1	0.3	Vacant	0	90%	0.03	0	2.6	$4,810	$12,266	None	0	0.0	$0
22-150-28	M1	0.3	Residential	628	10%	0.27	5,000	2.6	$4,810	$12,266	Medium	2,500	3.1	$15,031
22-150-30	M1	7.8	Vacant	0	40%	4.68	80,000	66.3	$4,810	$318,903	High	80,000	100.0	$481,000
22-150-32	M1	0.5	Residential	1,164	25%	0.38	7,000	4.3	$4,810	$20,443	Medium	3,500	4.4	$21,044
22-150-33	M1	0.03	Miscellaneous	0	0%	0.03	0	0.3	$4,810	$1,227	None	0	0.0	$0
		57.5		**53,445**		**32.9**	**626,200**	**488.7**		**$2,350,479**		**234,102**	**292.6**	**$1,407,538**

WASTEWATER DEMAND RATIOS

(BASED ON COUNTY ZONING DESIGNATIONS)

MAXIMUM BUILDOUT											ANTICIPATED BUILDOUT			
APN	COUNTY ZONING	TOTAL ACRES (1)	EXISTING LAND USE	EXISTING BLDG COVERAGE (sf) (1)	30%+ Slopes *(Estimated)*	BUILDABLE AREA (ac) (2)	MAXIMUM BLDG COVERAGE (sf)(7)	DEMAND RATIO (5)	CITY'S IMPACT FEE (6)	IMPACT FEE (8)	DEVELOPMENT POTENTIAL (4)	ANTICIPATED BLDG COVERAGE (sf) (9)	DEMAND RATIO (10)	IMPACT FEE (9)
22-150-26	C2	0.4	Residential	1,386	20%	0.32	7,000	3.4	$4,810	$16,354	Low	1,400	1.8	$8,418
22-150-27	C2	0.5	Residential	857	30%	0.35	8,500	4.3	$4,810	$20,443	Low	1,700	2.1	$10,221
22-150-29	C2	0.4	Residential	1,152	30%	0.28	5,600	3.4	$4,810	$16,354	Low	1,120	1.4	$6,734
		1.3		**3,395**		**0.95**	**21,100**	**11.1**		**$53,151**		**4,220**	**5.3**	**$25,373**
22-140-41	BP	2.5	Automotive	5,760	5%	2.38	20,000	21.3	$4,810	$102,213	Low	4,000	5.0	$24,050
22-140-43	BP	2.6	Industrial	0	20%	2.08	20,000	22.1	$4,810	$106,301	Low	4,000	5.0	$24,050
22-160-04	BP	11.3	Vacant	0	10%	8.00	90,000	96.1	$4,810	$462,001	Low	18,000	22.5	$108,225
22-160-06	BP	25.5	Vacant	0	15%	10.00	135,000	216.8	$4,810	$1,042,568	Low	27,000	33.8	$162,338
22-160-33	BP	8.3	Vacant	0	0%	7.50	85,000	70.6	$4,810	$339,346	Low	17,000	21.3	$102,213
22-331-05	BP	11.6	Vacant	0	5%	8.00	90,000	98.6	$4,810	$474,266	Low	18,000	22.5	$108,225
22-331-06	BP	2.1	Vacant	0	5%	1.50	20,000	17.9	$4,810	$85,859	Low	4,000	5.0	$24,050
22-331-07	BP	0.6	Vacant	0	0%	0.40	5,000	5.1	$4,810	$24,531	Low	1,000	1.3	$6,013
22-331-08	BP	0.5	Residential	1,564	0%	0.40	5,000	4.3	$4,810	$20,443	Low	1,000	1.3	$6,013
22-331-09	BP	6.0	Vacant	0	10%	4.00	50,000	51.0	$4,810	$245,310	Low	10,000	12.5	$60,125
22-331-12	BP	18.9	Vacant	0	30%	13.23	140,000	160.7	$4,810	$772,727	Low	28,000	35.0	$168,350
29-350-12	BP	11.4	Vacant	0	25%	8.55	90,000	96.9	$4,810	$466,089	Medium	45,000	56.3	$270,563
		101.3		**7,324**		**66.0**	**750,000**	**861.1**		**$4,141,651**		**177,000**	**221.3**	**$1,064,213**
TOTAL		**311.1**		**64,164**		**155.0**	**1,397,300**	**1461.3**		**$7,512,812**		**415,322**	**569.4**	**$2,980,890**

(1) Based on County GIS data.

(2) Estimated buildable land area - EXCLUDING known site constraints such as 30%+ slopes, ponds, creeks, wetlands, etc.

(3) Demand ratio is based on City's Fee Schedule. Residential fee of $9,624 is based on a demand ratio of 1.00 (for residential development up to and including 3/4" water meter size).

(4) "High" = Max. Bldg Coverage (per Table 3-2 of City's 2020 General Plan) X Buildable Area; "Medium" = 50% of Max. Bldg Coverage X Buildable Area; "Low" = 20% of Max. Bldg Coverage X Buildable Area (or "existing bldg coverage", whichever is greater)

(5) Based on City Design Standard, wastewater generation factor is 850 gpd per acre for Commercial and Industrial land use. Demand ratio is 100 gpd for the purposes of fee calculation.

(6) Non-residential impact fee of $4810 is based on 100 gpd of estimated wastewater discharge.

(7) Maximum Building Coverage is based on Table 3-2 of City's 2020 General Plan and multiplied by the "buildable area".

(8) Based on Maximum Density or Maximum Building Coverage.

(9) "Anticipated Building Coverage" is based on the anticipated future land use, considering factors such as site constraints & existing land uses (See Note 4)

(10) For purposes of this estimate, wastewater discharge is estimated at 125 gpd per 1000 sf of "max bldg coverage" OR "anticipated bldg coverage". This is based on fixture counts from existing/ comparable developed projects.

WASTEWATER DEMAND RATIO

(BASED ON RECOMMENDED ZONING ALTERNATIVES)

MAXIMUM BUILDOUT								ANTICIPATED BUILDOUT			
RECOMMENDED ZONING	TOTAL ACRES (1)	30%+ Slopes & Site Constraints *(Estimated)*	BUILDABLE AREA (ac) (2)	MAX DENSITY (# of Units)	DEMAND RATIO (3)	CITY'S IMPACT FEE (per meter)	IMPACT FEE (8)	DEVELOPMENT POTENTIAL (4)	ANTICIPATED DENSITY (# of Units)	DEMAND RATIO (3)	IMPACT FEE (9)
R-2	60.1	10%	54.1	240	240	$9,624	$2,313,610	Medium	120	120	$1,156,805
RE	0.5	0%	0.5	1	1	$9,624	$9,624	Medium	1	1	$9,624
	60.6		**54.6**	**241**	**241**		**$2,323,234**		**121**	**121**	**$1,166,429**
RECOMMENDED ZONING	TOTAL ACRES (1)	30%+ Slopes *(Estimated)*	BUILDABLE AREA (ac) (2)	MAXIMUM BLDG COVERAGE (sf)(7)	DEMAND RATIO (5)	CITY'S IMPACT FEE (6)	IMPACT FEE (8)	DEVELOPMENT POTENTIAL (4)	ANTICIPATED BLDG COVERAGE (sf) (9)	DEMAND RATIO (10)	IMPACT FEE (9)
C-1	15.4	20%	12.3	268,330	130.9	$4,810	$629,629	Low	53,666	67.1	$322,666
M-1	49.4	50%	24.7	537,966	419.9	$4,810	$2,019,719	Low	107,593	134.5	$646,904
M-2	41.2	50%	20.6	448,668	350.2	$4,810	$1,684,462	Low	89,734	112.2	$539,523
CBP	19.7	20%	15.8	171,626	167.5	$4,810	$805,435	Low	34,325	42.9	$206,381
P	39.2	30%	27.4	298,822	333.2	$4,810	$1,602,692	Low	59,764	74.7	$359,333
OS	85.6	90%	0.0	0	0.0	$0	$0	None	0	0.0	$0
	250.5		**100.8**	**1,725,412**	**1401.7**		**$6,741,937**		**345,082**	**431.4**	**$2,074,807**
OVERALL TOTAL	***311.1***		***155.4***	***1,725,412***	***1643.1***		***$9,065,170***		***345,082***	***552.6***	***$3,241,236***

(1) Based on County GIS data.

(2) Estimated buildable land area - EXCLUDING known site constraints such as 30%+ slopes, ponds, creeks, wetlands, etc.

(3) Demand ratio is based on City's Fee Schedule. Residential fee of $9,624 is based on a demand ratio of 1.00 (for residential development up to and including 3/4" water meter size).

(4) "High" = Max. Bldg Coverage (per Table 3-2 of City's 2020 General Plan) X Buildable Area; "Medium" = 50% of Max. Bldg Coverage X Buildable Area; "Low" = 20% of Max. Bldg Coverage X Buildable Area (or "existing bldg coverage", whichever is greater)

(5) Based on City Design Standard, wastewater generation factor is 850 gpd per acre for Commercial and Industrial land use. Demand ratio is 100 gpd for the purposes of fee calculation.

(6) Non-residential impact fee of $4810 is based on 100 gpd of estimated wastewater discharge.

(7) Maximum Building Coverage is based on Table 3-2 of City's 2020 General Plan and multiplied by the "buildable area".

(8) Based on Maximum Density or Maximum Building Coverage.

(9) "Anticipated Building Coverage" is based on the anticipated future land use, considering factors such as site constraints & existing land uses (See Note 4)

(10) For purposes of this estimate, wastewater discharge is estimated at 125 gpd per 1000 sf of "max bldg coverage" OR "anticipated bldg coverage". This is based on fixture counts from existing/ comparable developed projects.

APPENDIX C
COST ESTIMATES

SCO PLANNING & ENGINEERING, INC.
140 Litton Drive, Suite 240
Grass Valley, CA 95945
T (530) 272-5841 / F (530) 272-5880

Date Created: September 17, 2012
Revised:
Revised:
Revised:

WASTEWATER FEASIBILITY ANALYSIS
ESTIMATE OF SEWER INFRASTRUCTURE
Alternative #2
PRELIMINARY OPINION OF PROBABLE CONSTRUCTION COSTS

ITEM	*ITEM DESCRIPTION*	*QTY.*	*UNIT*	*ITEM PRICE*	*TOTAL PRICE*
LA BARR MEADOWS ROAD					
1.	**LA BARR MEADOWS ROAD - LOW POINT AREA**				
a.	Sewer - 6" SDR-35	1,040	lf	$60.00	$62,400.00
b.	48" Sewer Manhole	3	ea	$5,000.00	$15,000.00
c.	Lift Station (small package plant)	1	ls	$180,000.00	$180,000.00
d.	4" Force Main	1,600	lf	$45.00	$72,000.00
e.	Trench Resurfacing	8,000	sf	$6.00	$48,000.00
					$377,400.00
2.	**LA BARR MEADOWS ROAD - MAINLINE**				
a.	Sewer - 6" SDR-35	2,340	lf	$60.00	$140,400.00
b.	Sewer - 8" SDR-35	3,600	lf	$70.00	$252,000.00
c.	48" Sewer Manhole	22	ea	$5,000.00	$110,000.00
d.	6" Force Main	3,220	lf	$50.00	$161,000.00
e.	Sewer Lift Station Facility (Complete w/ bldg. & Gen. backup)	1	ls	$800,000.00	$800,000.00
f.	Trench Resurfacing	27,980	sf	$6.00	$167,880.00
					$1,631,280.00
3.	**ROAD TO SEWER LIFT STATION #1**				
a.	Clear, Grub and Stump Removal	1	ac	$3,000.00	$3,000.00
b.	Excavation and Embankment	3,000	cy	$5.00	$15,000.00
c.	Fine Grading	18,000	sf	$0.50	$9,000.00
d.	Paved Road Section (3" AC on 8" Class 2 A.B.)	14,000	sf	$3.50	$49,000.00
e.	Hydroseed	10,000	sf	$0.10	$1,000.00
f.	Drainage 18" HDPE	60	lf	$50.00	$3,000.00
g.	Drainage 36" Drop Inlets	1	ea	$3,000.00	$3,000.00
h.	Drainage "V" Ditch	600	lf	$7.00	$4,200.00
i.	Bio-Swale / Retention / Infiltration	1,200	cf	$10.00	$12,000.00
j.	Water - 8" PVC C900 CL200	600	lf	$60.00	$36,000.00
k.	Fire Hydrant Assembly	2	ea	$4,500.00	$9,000.00
l.	Joint Utility Trench	600	lf	$80.00	$48,000.00
					$192,200.00
JOYCE DRIVE / SOUTH AUBURN					
4.	**LIFT STATION REHABILITATION**				
a.	Sewer Lift Station Facility (Complete w/ bldg. & Gen. backup)	1	ls	$500,000.00	$500,000.00
					$500,000.00
5.	**REPLACE PIPE AND MANHOLES**				
a.	Sewer - 10" SDR-35	2,410	lf	$85.00	$204,850.00
b.	48" Sewer Manhole	10	ea	$5,000.00	$50,000.00
c.	Trench Resurfacing	14,460	sf	$6.00	$86,760.00
					$341,610.00

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WASTEWATER FEASIBILITY ANALYSIS
ESTIMATE OF SEWER INFRASTRUCTURE
Alternative #2
PRELIMINARY OPINION OF PROBABLE CONSTRUCTION COSTS

ITEM	*ITEM DESCRIPTION*	*QTY.*	*UNIT*	*ITEM PRICE*	*TOTAL PRICE*
TAYLORVILLE ROAD					
6.					
a.	Sewer - 10" SDR-35	500	lf	$85.00	$42,500.00
b.	48" Sewer Manhole	3	ea	$5,000.00	$15,000.00
c.	Trench Resurfacing	2,500	sf	$6.00	$15,000.00
d.	Upgrade Existing Taylorville Road Lift Station	1	ls	$300,000.00	$300,000.00
e.	Ejector Pumps (from 3 commercial lots)	3	ea	$10,000.00	$30,000.00
					$402,500.00
				Subtotal - All Infrastructure Improvements:	**$3,444,990.00**
				15% Omissions and Contingencies:	**$516,748.50**
				Total Probable Construction Costs:	**$3,961,738.50**
	PROFESSIONAL SERVICES				
	Engineering and Design (6%)				$237,704.31
	Construction Management (3%)				$118,852.16
	Construction Surveying (2%)				$79,234.77
	Testing and Inspection (2%)				$79,234.77
					$515,026.01
				Total Probable Construction & Professional Costs	**$4,476,764.51**

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WASTEWATER FEASIBILITY ANALYSIS
ESTIMATE OF SEWER INFRASTRUCTURE
Alternative #3
PRELIMINARY OPINION OF PROBABLE CONSTRUCTION COSTS

ITEM	ITEM DESCRIPTION	QTY.	UNIT	ITEM PRICE	TOTAL PRICE
LA BARR MEADOWS ROAD					
1.	**LA BARR MEADOWS ROAD - LOW POINT AREA**				
a.	Sewer - 6" SDR-35	1,040	lf	$60.00	$62,400.00
b.	48" Sewer Manhole	3	ea	$5,000.00	$15,000.00
c.	Lift Station (small package plant)	1	ls	$180,000.00	$180,000.00
d.	4" Force Main	440	lf	$45.00	$19,800.00
e.	Trench Resurfacing	7,400	sf	$6.00	$44,400.00
					$321,600.00
2.	**LA BARR MEADOWS ROAD - MAINLINE**				
a.	Sewer - 6" SDR-35	2,340	lf	$60.00	$140,400.00
b.	Sewer - 8" SDR-35	3,600	lf	$70.00	$252,000.00
c.	48" Sewer Manhole	22	ea	$5,000.00	$110,000.00
d.	6" Force Main	3,220	lf	$50.00	$161,000.00
e.	Sewer Lift Station Facility (Complete w/ bldg. & Gen. backup)	1	ls	$800,000.00	$800,000.00
f.	Trench Resurfacing	27,980	sf	$6.00	$167,880.00
g.	Jack/Bore Casing across Highway 49	180	lf	$1,000.00	$180,000.00
					$1,811,280.00
3.	**ROAD TO SEWER LIFT STATION #1**				
a.	Clear, Grub and Stump Removal	1	ac	$3,000.00	$3,000.00
b.	Excavation and Embankment	3,000	cy	$5.00	$15,000.00
c.	Fine Grading	18,000	sf	$0.50	$9,000.00
d.	Paved Road Section (3" AC on 8" Class 2 A.B.)	14,000	sf	$3.50	$49,000.00
e.	Hydroseed	10,000	sf	$0.10	$1,000.00
f.	Drainage 18" HDPE	60	lf	$50.00	$3,000.00
g.	Drainage 36" Drop Inlets	1	ea	$3,000.00	$3,000.00
h.	Drainage "V" Ditch	600	lf	$7.00	$4,200.00
i.	Bio-Swale / Retention / Infiltration	1,200	cf	$10.00	$12,000.00
j.	Water - 8" PVC C900 CL200	600	lf	$60.00	$36,000.00
k.	Fire Hydrant Assembly	2	ea	$4,500.00	$9,000.00
l.	Joint Utility Trench	600	lf	$80.00	$48,000.00
					$192,200.00
TAYLORVILLE ROAD					
4.					
a.	6" Force Main	4,138	lf	$50.00	$206,900.00
b.	Bypass Port	130	lf	$1,000.00	$130,000.00
c.	Connect to existing sewer manhole	1	ea	$2,000.00	$2,000.00
d.	Jet/Vac clean existing sewer trunk main	1	ls	$15,000.00	$15,000.00
e.	Trench Resurfacing	20,690	sf	$4.00	$82,760.00
f.	Upgrade Existing Taylorville Road Lift Station	1	ls	$300,000.00	$300,000.00
g.	Ejector Pumps (from 3 commercial lots)	3	ea	$10,000.00	$30,000.00
					$766,660.00

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Revised:
Revised:

WASTEWATER FEASIBILITY ANALYSIS
ESTIMATE OF SEWER INFRASTRUCTURE
Alternative #3
PRELIMINARY OPINION OF PROBABLE CONSTRUCTION COSTS

ITEM	*ITEM DESCRIPTION*	*QTY.*	*UNIT*	*ITEM PRICE*	*TOTAL PRICE*
	Subtotal - All Infrastructure Improvements:				**$3,091,740.00**
	15% Omissions and Contingencies:				**$463,761.00**
	Total Probable Construction Costs:				**$3,555,501.00**
	PROFESSIONAL SERVICES				
	Engineering and Design (6%)				$213,330.06
	Construction Management (3%)				$106,665.03
	Construction Surveying (2%)				$71,110.02
	Testing and Inspection (2%)				$71,110.02
					$462,215.13
	Total Probable Construction & Professional Costs				**$4,017,716.13**

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WASTEWATER FEASIBILITY ANALYSIS
ESTIMATE OF SEWER INFRASTRUCTURE COSTS
Alternative #4
PRELIMINARY OPINION OF PROBABLE CONSTRUCTION COSTS

ITEM	*ITEM DESCRIPTION*	*QTY.*	*UNIT*	*ITEM PRICE*	*TOTAL PRICE*
LA BARR MEADOWS ROAD					
1.	**LA BARR MEADOWS ROAD - LOW POINT AREA**				
a.	Sewer - 6" SDR-35	200	lf	$60.00	$12,000.00
b.	48" Sewer Manhole	2	ea	$5,000.00	$10,000.00
c.	Jack/Bore Casing across Highway 49	160	lf	$1,000.00	$160,000.00
d.	Trench Resurfacing	300	sf	$6.00	$1,800.00
					$183,800.00
2.	**LA BARR MEADOWS ROAD - MAINLINE**				
a.	Sewer - 6" SDR-35	2,675	lf	$60.00	$160,500.00
b.	Sewer - 8" SDR-35	3,600	lf	$70.00	$252,000.00
c.	48" Sewer Manhole	22	ea	$5,000.00	$110,000.00
d.	Jack/Bore Casing across Highway 49	160	lf	$1,000.00	$160,000.00
e.	Trench Resurfacing	37,700	sf	$6.00	$226,200.00
					$908,700.00
CRESTVIEW DRIVE					
3.	**CRESTVIEW (From La Barr to Proposed Lift Station)**				
a.	Sewer - 8" SDR-35	3,185	lf	$70.00	$222,950.00
b.	48" Sewer Manhole	10	ea	$5,000.00	$50,000.00
c.	Trench Resurfacing	4,500	sf	$6.00	$27,000.00
					$299,950.00
TAYLORVILLE ROAD					
4.	**GRAVITY SEWER (Incl. Abandonment of Taylorville Lift Station)**				
a.	Sewer - 6" SDR-35	3,200	lf	$60.00	$192,000.00
b.	Sewer - 8" SDR-35	350	lf	$70.00	$24,500.00
c.	48" Sewer Manhole	12	ea	$5,000.00	$60,000.00
d.	Abandon Existing Lift Station	1	ls	$20,000.00	$20,000.00
e.	Trench Resurfacing	8,700	sf	$6.00	$52,200.00
					$348,700.00
5.	**SEWER LIFT STATION AND FORCE MAIN**				
a.	Sewer Lift Station Facility (Complete w/ bldg. & Gen. backup)	1	ea	$800,000.00	$800,000.00
b.	6" Force Main	5,830	lf	$50.00	$291,500.00
c.	Bypass Port	130	lf	$1,000.00	$130,000.00
d.	Connect to existing sewer manhole	1	ea	$2,000.00	$2,000.00
e.	Jet/Vac clean existing sewer trunk main	1	ls	$15,000.00	$15,000.00
f.	Trench Resurfacing	20,800	sf	$4.00	$83,200.00
					$1,321,700.00

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Date Created: September 17, 2012
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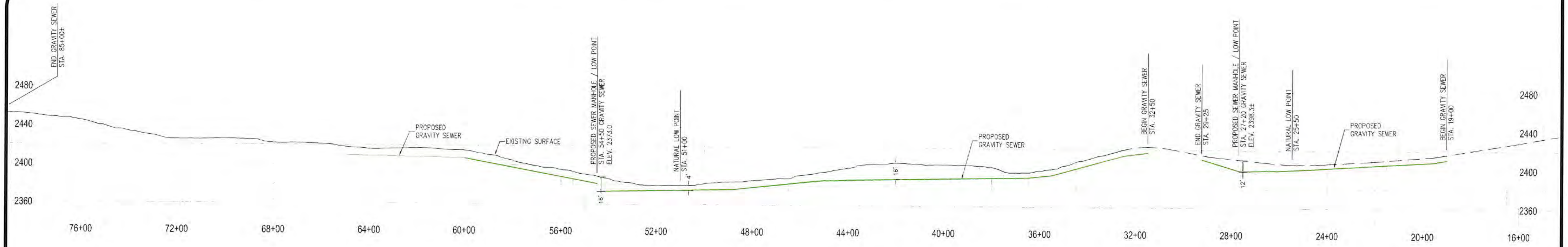
Revised:
Revised:

WASTEWATER FEASIBILITY ANALYSIS
ESTIMATE OF SEWER INFRASTRUCTURE COSTS
Alternative #4
PRELIMINARY OPINION OF PROBABLE CONSTRUCTION COSTS

ITEM	*ITEM DESCRIPTION*	*QTY.*	*UNIT*	*ITEM PRICE*	*TOTAL PRICE*
6.	**ROAD TO SEWER LIFT STATION**				
a.	Clear, Grub and Stump Removal	1	ac	$3,000.00	$3,000.00
b.	Excavation and Embankment	8,000	cy	$5.00	$40,000.00
c.	Fine Grading	45,000	sf	$0.50	$22,500.00
d.	Paved Road Section (3" AC on 8" Class 2 A.B.)	38,000	sf	$3.50	$133,000.00
e.	Hydroseed	33,000	sf	$0.10	$3,300.00
f.	Drainage 18" HDPE	120	lf	$50.00	$6,000.00
g.	Drainage 36" Drop Inlets	2	ea	$3,000.00	$6,000.00
h.	Drainage "V" Ditch	1,200	lf	$7.00	$8,400.00
i.	Bio-Swale / Retention / Infiltration	2,600	cf	$10.00	$26,000.00
j.	Water - 8" PVC C900 CL200	1,650	lf	$60.00	$99,000.00
k.	Fire Hydrant Assembly	4	ea	$4,500.00	$18,000.00
l.	Joint Utility Trench	1,650	lf	$80.00	$132,000.00
					$497,200.00
	Subtotal - All Infrastructure Improvements:				**$3,560,050.00**
	15% Omissions and Contingencies:				**$534,007.50**
	Total Probable Construction Costs:				**$4,094,057.50**
	PROFESSIONAL SERVICES				
	Engineering and Design (6%)				$245,643.45
	Construction Management (3%)				$122,821.73
	Construction Surveying (2%)				$81,881.15
	Testing and Inspection (2%)				$81,881.15
					$532,227.48
	Total Probable Construction & Professional Costs				**$4,626,284.98**

APPENDIX D

PRELIMINARY PLAN & PROFILES



LA BARR MEADOWS ROAD PROFILE

SCALE:
1" = 200' HORIZONTAL
1" = 50' VERTICAL

LA BARR MEADOWS ROAD PLAN

NO.	REVISIONS	DATE

DESIGNED: bkm
DRAWN: BKM
PROJ. NO: 201212
DWG: Sewer Study Alignments
DATE: July 30, 2012

WASTEWATER FEASIBILITY
LA BARR MEADOWS ROAD

CITY OF GRASS VALLEY
CALIFORNIA

SCO
PLANNING
ENGINEERING
& SURVEYING

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(530) 582-4043
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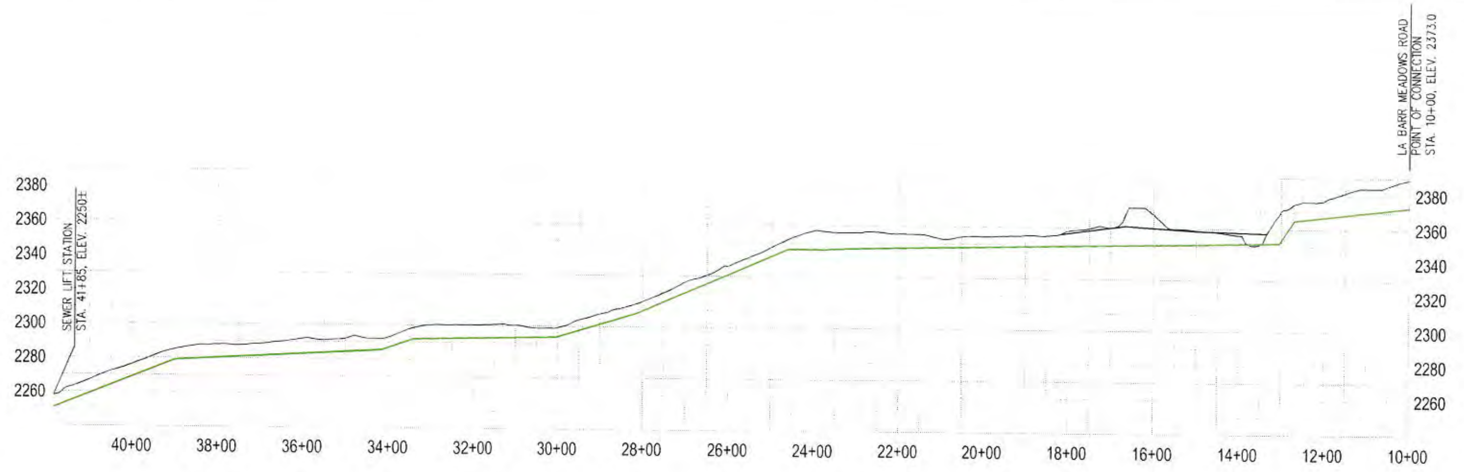
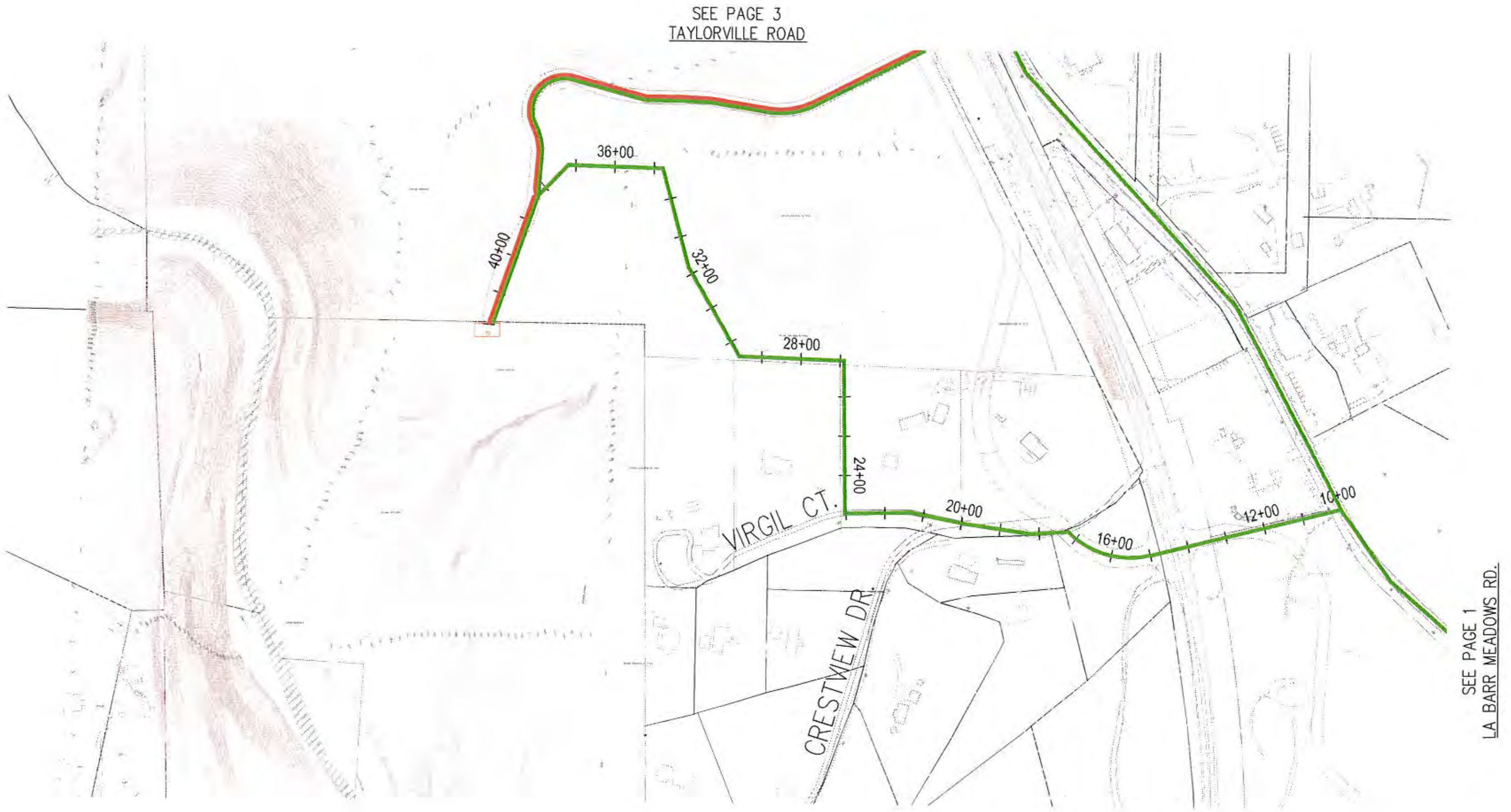


CRESTVIEW CONNECTION
PROFILE

SCALE:
1" = 200' HORIZONTAL
1" = 50' VERTICAL



CRESTVIEW CONNECTION
PLAN

0 100 200

NO.	REVISIONS	DATE	
			DESIGNED: bkm
			DRAWN: BKM
			PROJ. NO: 201212
			DWG: Sewer Study Alignments
			DATE: July 30, 2012

WASTEWATER FEASIBILITY
CRESTVIEW

CITY OF GRASS VALLEY
CALIFORNIA

SCO
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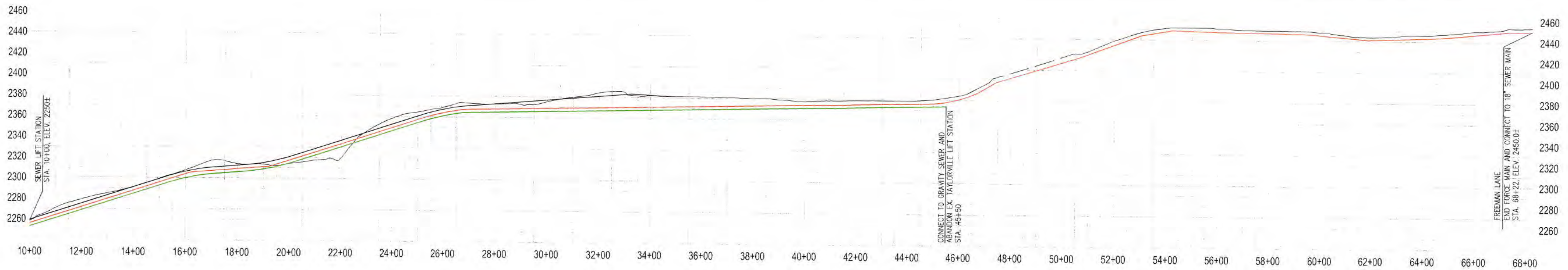
2 OF 3



TAYLORVILLE / FORCE MAIN
PROFILE

SCALE:
1" = 200' HORIZONTAL
1" = 50' VERTICAL

TAYLORVILLE / FORCE MAIN
PLAN

NO.	REVISIONS	DATE

DESIGNED: bkm
DRAWN: BKM
PROJ. NO: 201212
DWG: Sewer Study Alignments
DATE: July 30, 2012

WASTEWATER FEASIBILITY
TAYLORVILLE / FORCE MAIN

CITY OF GRASS VALLEY
CALIFORNIA

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ENGINEERING
& SURVEYING

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APPENDIX3.13-1 SOUTHERN SPHERE OF INFLUENCE EIR TRAFFIC IMPACT ANALYSIS

Traffic Impact Analysis

Southern Sphere of Influence EIR
Grass Valley, California

September 6, 2013

Prepared for:

City of Grass Valley

Prepared by:

Kimley-Horn
and Associates, Inc.

11919 Foundation Place, Suite 200
Gold River, California 95670

Phone: (916) 858-5800
Fax: (916) 608-0885

REGISTERED PROFESSIONAL ENGINEER
MATTHEW D. WEIR
No. TR2424
06/30/15
TRAFFIC
STATE OF CALIFORNIA

EXECUTIVE SUMMARY

This report documents the results of a traffic impact analysis completed for Southern Sphere of Influence Planning and Annexation Project in Nevada County, California (the "proposed project" or "project"). The purpose of this impact analysis is to identify potential environmental impacts to transportation facilities as required by the California Environmental Quality Act (CEQA). This study was performed in accordance with the City's traffic study standards and the agreed upon Scope of Services.

The proposed project is located along State Route 49 (SR-49) adjacent to the southern City of Grass Valley boundary lines beginning in the vicinity of McKnight Way and extending south along SR-49 and La Barr Meadows Road. The proposed project includes an amendment to the General Plan land use designations on 423 acres, a pre-zone of 423 acres of land to various zone districts consistent with the proposed General Plan amendments, and the annexation of approximately 120 acres. No development is proposed as part of this project, although several of the properties involved are either fully developed, or capable of additional development.

The project is generally described as having two development components, the East Development Area and the West Development Area with SR-49 separating and establishing the demarcation of the areas. While the East Development Area will primarily gain access from La Barr Meadows Road, the West Development Area is assumed to gain primary access from a new, at-grade intersection in the vicinity of SR-49 at Crestview Drive. The following facilities (intersections and roadway segments) are included in this evaluation:

Intersections:

1. McKnight Way @ Taylorville Road
2. McKnight Way @ SR-49 SB Ramps
3. McKnight Way @ SR-49 NB Ramps
4. McKnight Way @ South Auburn Street/La Barr Meadows Road
5. SR-49 @ La Barr Meadows Road

Roadway Segments:

1. SR-49 between McKnight Way and Crestview Drive
2. SR-49 south of Crestview Drive
3. La Barr Meadows Road south of McKnight Way
4. La Barr Meadows Road south of project limits

A weekday, PM peak-hour Level of Service (LOS) analysis was conducted for the study facilities for the following scenarios:

A. Existing (2013) Conditions
B. Existing (2013) plus Proposed Project Conditions⁺
C. Cumulative (2035) Conditions
D. Cumulative (2035) plus Proposed Project Conditions⁺⁺

⁺ *Includes two scenarios: East Development Area only, and East and West Development Areas*
⁺⁺ *East and West Development Areas*

Significant findings of this study include:

- The proposed project is anticipated to generate a total of 21,738 new daily trips and 2,411 new PM peak-hour trips. When compared to the City's originally projected trips for the project area, the proposed project results in a net increase of 1,962 PM peak-hour trips.
- The addition of the proposed project results in four significant impacts under Existing (2013) plus Proposed Project conditions. All four of these impacts are considered to be unavoidable and therefore will require ***overriding consideration*** from the City.
- The addition of the proposed project results in one significant impact under Cumulative (2035) conditions. This impact is considered to be unavoidable and therefore will require ***overriding consideration*** from the City.

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INTRODUCTION

This report documents the results of a traffic impact analysis completed for Southern Sphere of Influence Planning and Annexation Project in Nevada County, California (the "proposed project" or "project"). The purpose of this impact analysis is to identify potential environmental impacts to transportation facilities as required by the California Environmental Quality Act (CEQA). This study was performed in accordance with the City's traffic study standards[1] and the agreed upon Scope of Services.

The remaining sections of this report document the proposed project, analysis methodologies, impacts and mitigation, and general study conclusions.

PROJECT DESCRIPTION

The proposed project is located along State Route 49 (SR-49) adjacent to the southern City of Grass Valley boundary lines beginning in the vicinity of McKnight Way and extending south along SR-49 and La Barr Meadows Road. The proposed project includes an amendment to the General Plan land use designations on 423 acres, a pre-zone of 423 acres of land to various zone districts consistent with the proposed General Plan amendments, and the annexation of approximately 120 acres. No development is proposed as part of this project, although there are properties involved that are either fully developed, or capable of additional development. The project's regional location is depicted in **Figure 1**, and the proposed General Plan, Prezoning, and Annexation maps are shown in **Figure 2**, **Figure 3**, and **Figure 4**, respectively.

The project is generally described as having two development components, the East Development Area and the West Development Area with SR-49 separating and establishing the demarcation of the areas. While the East Development Area will primarily gain access from La Barr Meadows Road, the West Development Area is assumed to gain primary access from a new, at-grade intersection in the vicinity of SR-49 at Crestview Drive.

The following facilities (intersections and roadway segments) are included in this evaluation:

Intersections:

1. McKnight Way @ Taylorville Road
2. McKnight Way @ SR-49 SB Ramps
3. McKnight Way @ SR-49 NB Ramps
4. McKnight Way @ South Auburn Street/La Barr Meadows Road
5. SR-49 @ La Bar Meadows Road

Roadway Segments:

1. SR-49 between McKnight Way and Crestview Drive
2. SR-49 south of Crestview Drive
3. La Barr Meadows Road south of McKnight Way
4. La Barr Meadows Road south of project limits

Figure 5 illustrates the study facilities, existing traffic control, and existing lane configurations.

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[1] Section 4 of the *City of Grass Valley Design Standards,* City of Grass Valley, February 2012.

REGIONAL LOCATION MAP

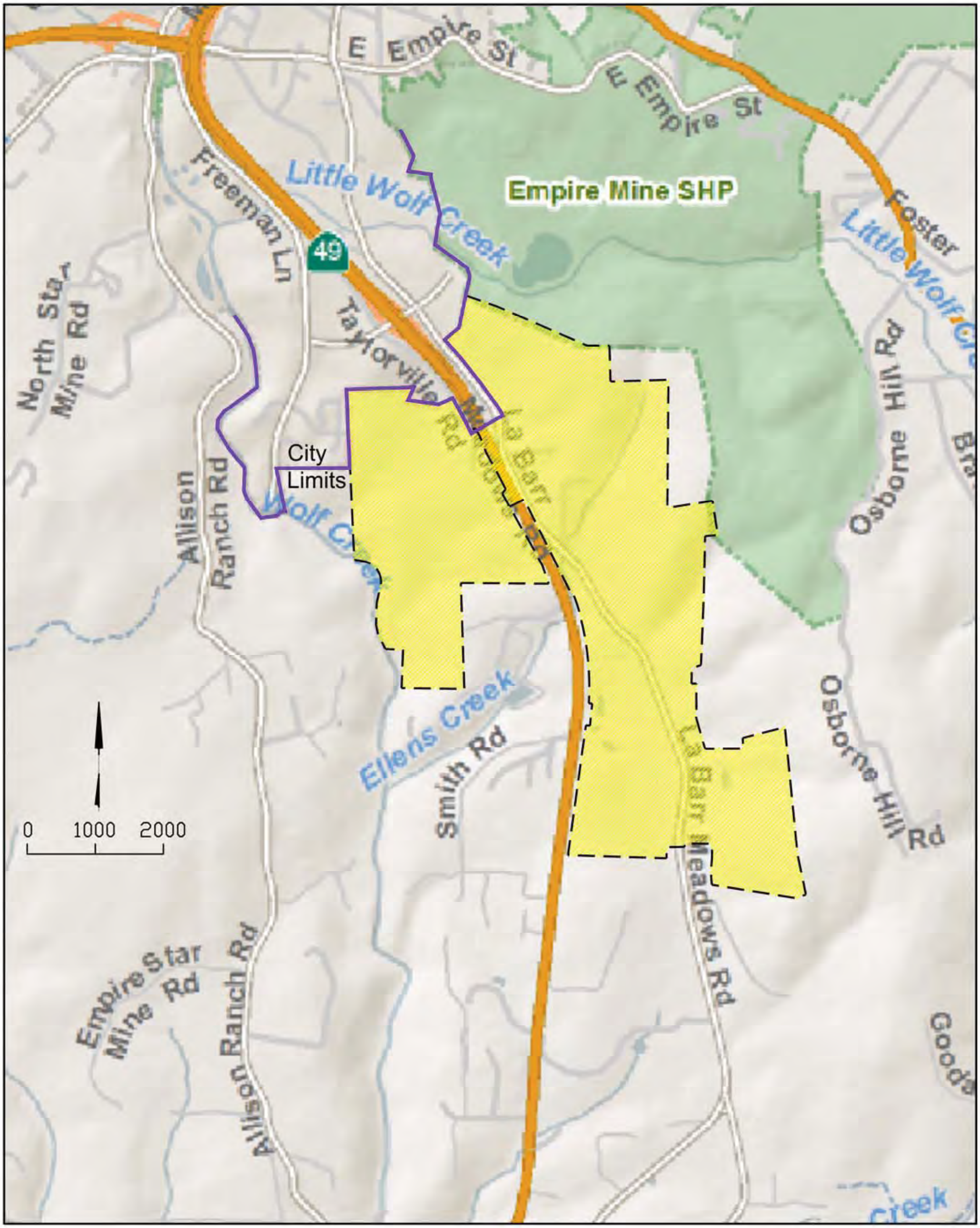


Figure 1

CITY OF GRASS VALLEY

Preliminary General Plan Map

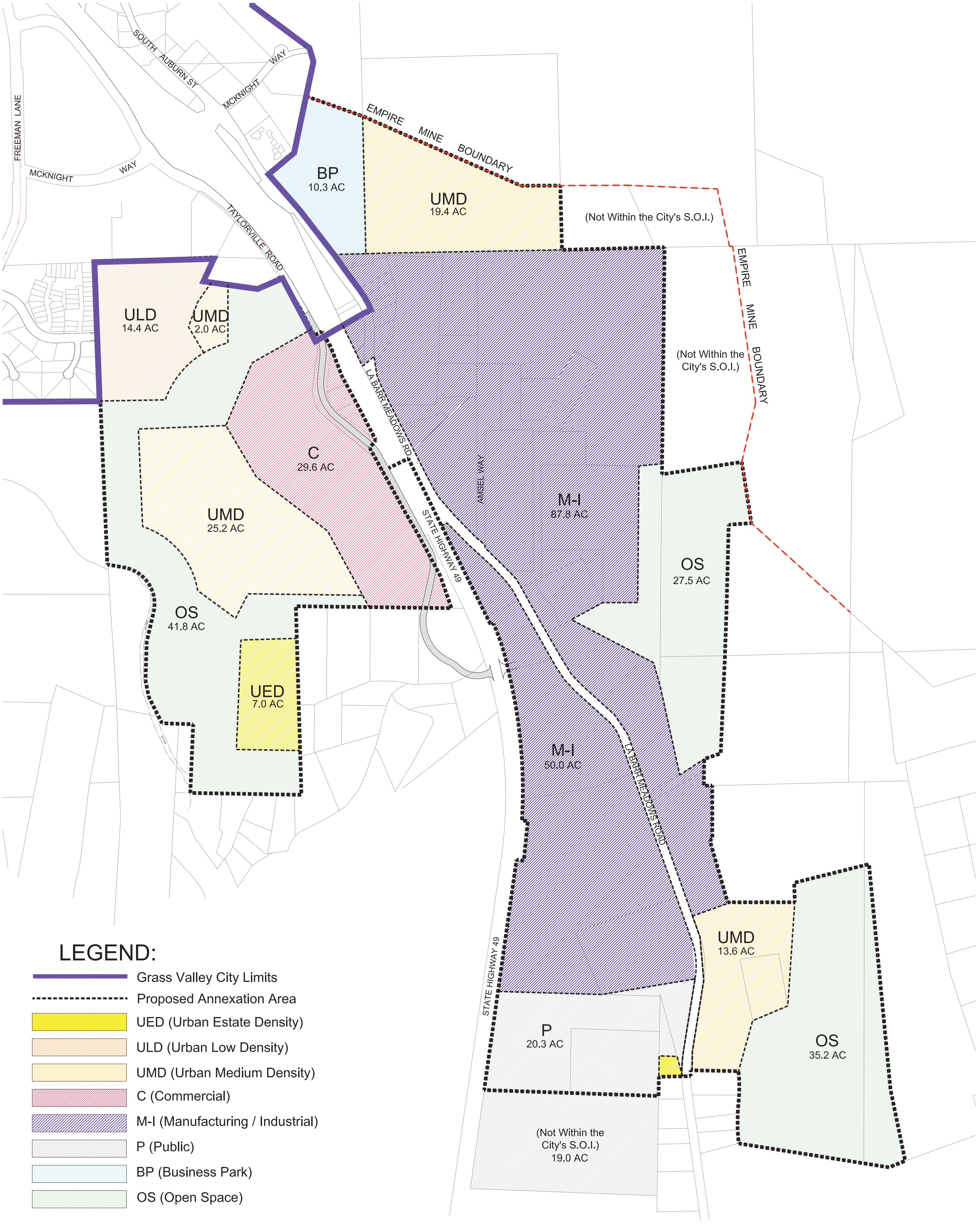


Figure 2

CITY OF GRASS VALLEY

Preliminary Zoning Map

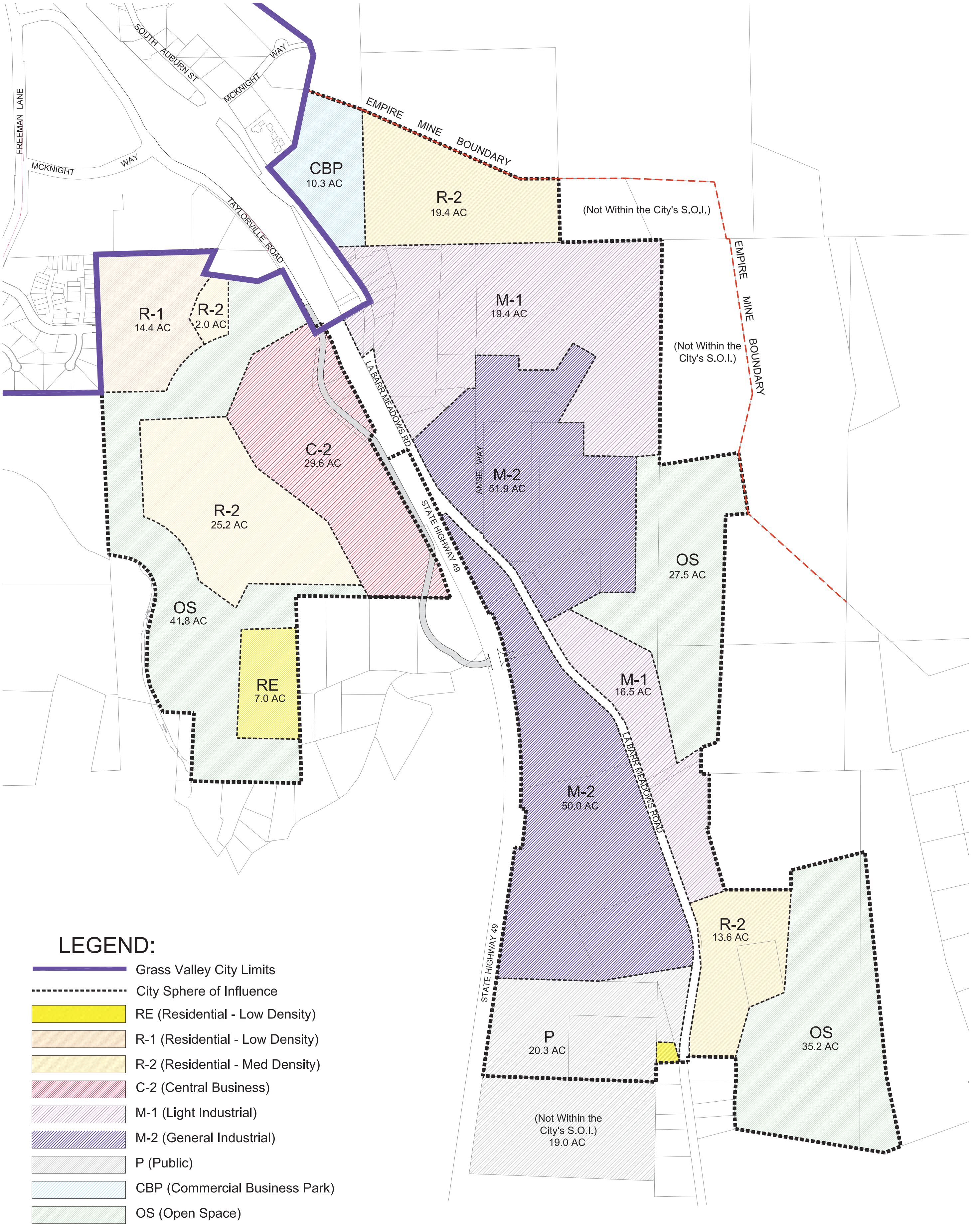


Figure 3

City of Grass Valley - Annexation

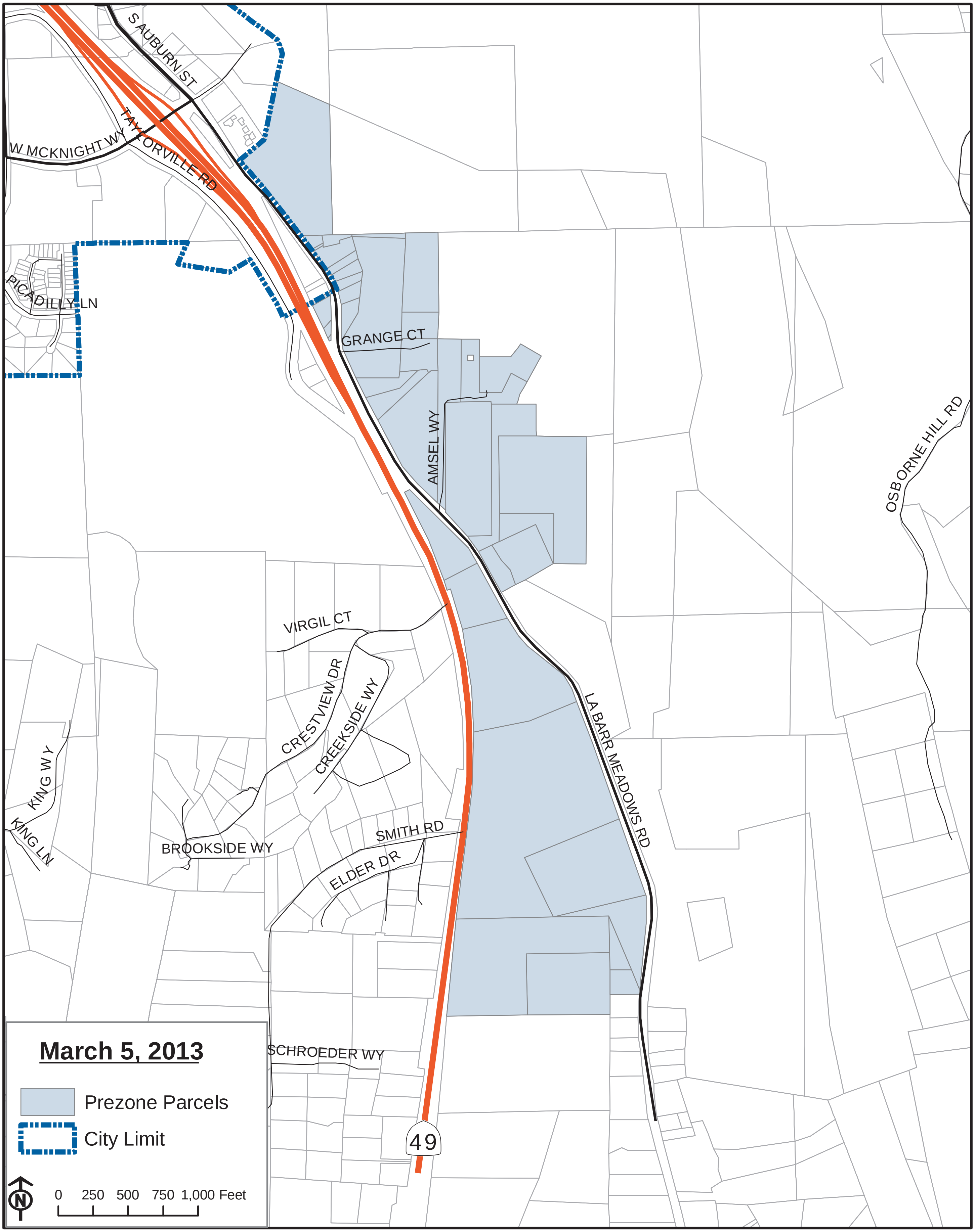
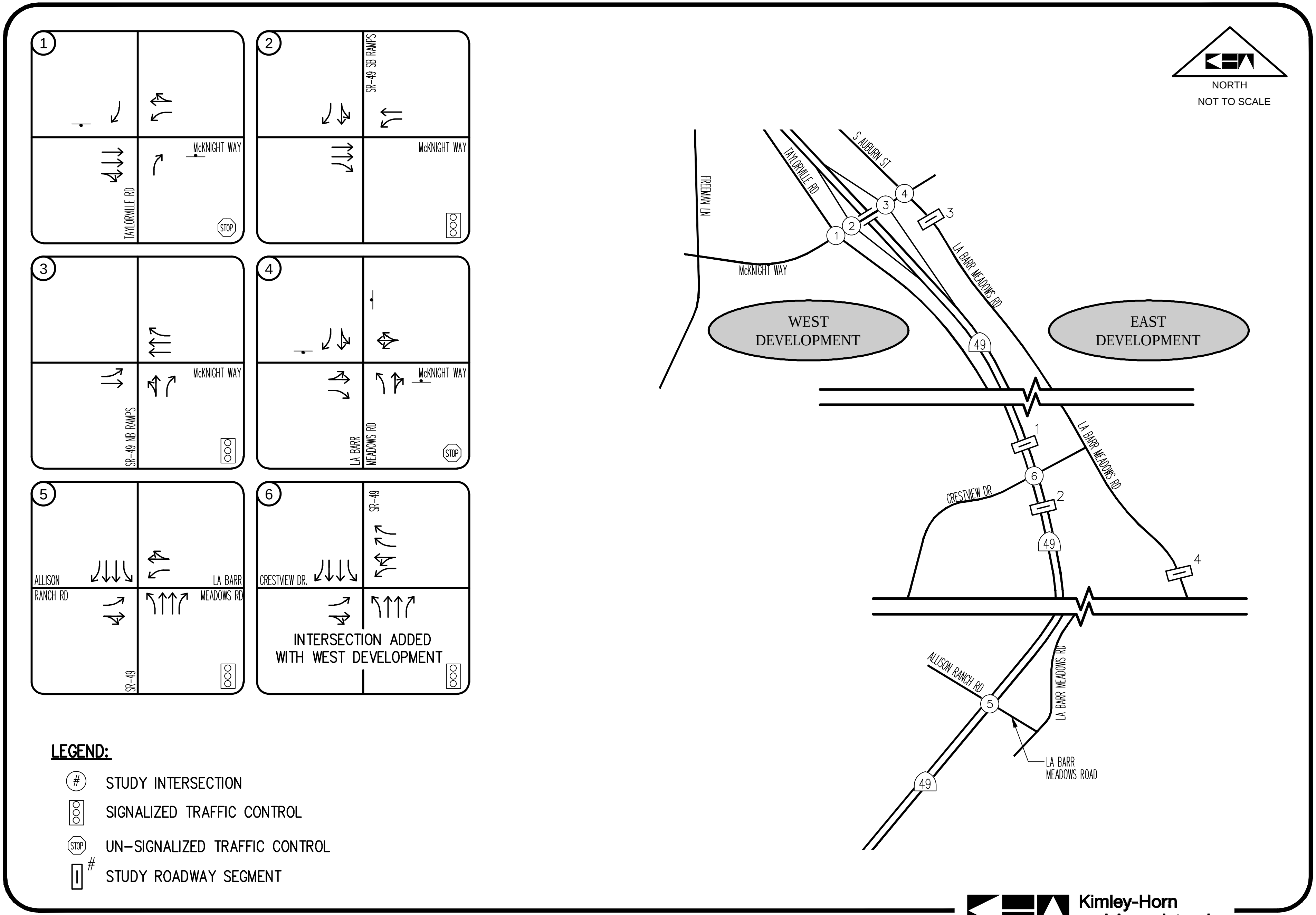


Figure 4



Kimley-Horn and Associates, Inc.

FIGURE 5

STUDY INTERSECTIONS, TRAFFIC CONTROL, AND LANE GEOMETRIES

SOUTHERN SOI EIR
GRASS VALLEY, CA

PROJECT AREA ROADWAYS

The following are descriptions of the primary roadways in the vicinity of the project.

State Route 49 (SR-49) is a north-south state highway that bisects the proposed project. SR-49 connects the City of Grass Valley to Placer County (Auburn and Placerville) to the south, and to portions of Nevada County (Nevada City) to the north. In the vicinity of the project, SR-49 is a two-lane highway with a grade separated interchange ate McKnight Way. Within the immediate project area, SR-49 currently serves approximately 25,000[2] vehicles per day (vpd) with one travel lane in each direction. Under the scenarios in which a new at grade intersection is assumed along SR-49 in the vicinity of Crestview Drive, SR-49 would serve as the primary access location for both the West and East Development Areas.

McKnight Way is a short east-west arterial roadway that primarily serves as an interchange with SR-49. This roadway is the primary access route to the commercial uses in the vicinity of the interchange. McKnight Way is four lanes wide on the bridge over SR-49, and has numerous auxiliary lanes serving driveways and minor cross streets between Freeman Lane on the west and South Auburn Street/La Barr Meadows Road on the east. This roadway via its interchange with SR-49 will serve as the primary access location for the proposed project for vehicles originating from and destined to the north.

La Barr Meadows Road is a north-south, two-lane arterial roadway that generally parallels SR-49 to the east. North of McKnight Way, this roadway becomes **South Auburn Street**. La Barr Meadows Road provides primary access to the project’s East Development Area as it provides connectivity to McKnight Way to the north, and SR-49 to the south. In addition, this roadway essentially bisects the East Development Area establishing it as the primary transportation facility on the east side of SR-49.

Crestview Drive is a new east-west arterial roadway this is assumed to be in place when the project’s West Development Area is added to Existing (2013) conditions, and under Cumulative (2035) conditions with the addition of the proposed project. This short roadway will provide access to the proposed project, primarily the commercial uses on the west side of SR-49, by way of a new at-grade intersection with SR-49, as well as provide a connection to La Barr Meadows Road to the east.

ASSESSMENT OF PROPOSED PROJECT

The proposed project was determined to be included in eight traffic analysis zones (TAZs) as established in the City’s travel demand model. As depicted in **Figure 6**, TAZ 407 is the only zone on the west side of SR-49, and the remaining TAZs (350, 351, 352, 353, 366, 374, and 375) are east of SR-49. Only TAZs 374 and 350 are entirely encompassed within the project boundary.

Proposed Project Trip Generation

The number of trips anticipated to be generated by the proposed project were approximated using *Trip Generation, 9th Edition*, and the *Trip Generation Handbook, Second Edition*, both published by the Institute of Transportation Engineers (ITE). The project’s trip generation characteristics were documented by TAZ and by proposed zoning. As a result, it is possible to isolate the project trips anticipated to be generated by the East and West Development Areas. As appropriate, reasonable trip reductions were included to account for internal trip sharing and pass-by trips in a manner consistent with industry standard methodologies. **Table 1** presents the trip generation data for the proposed project.

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[2] Caltrans Traffic and Vehicle Data Systems Unit, http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/2011all/index.html

CITY OF GRASS VALLEY

Traffic Analysis Zones (TAZ)

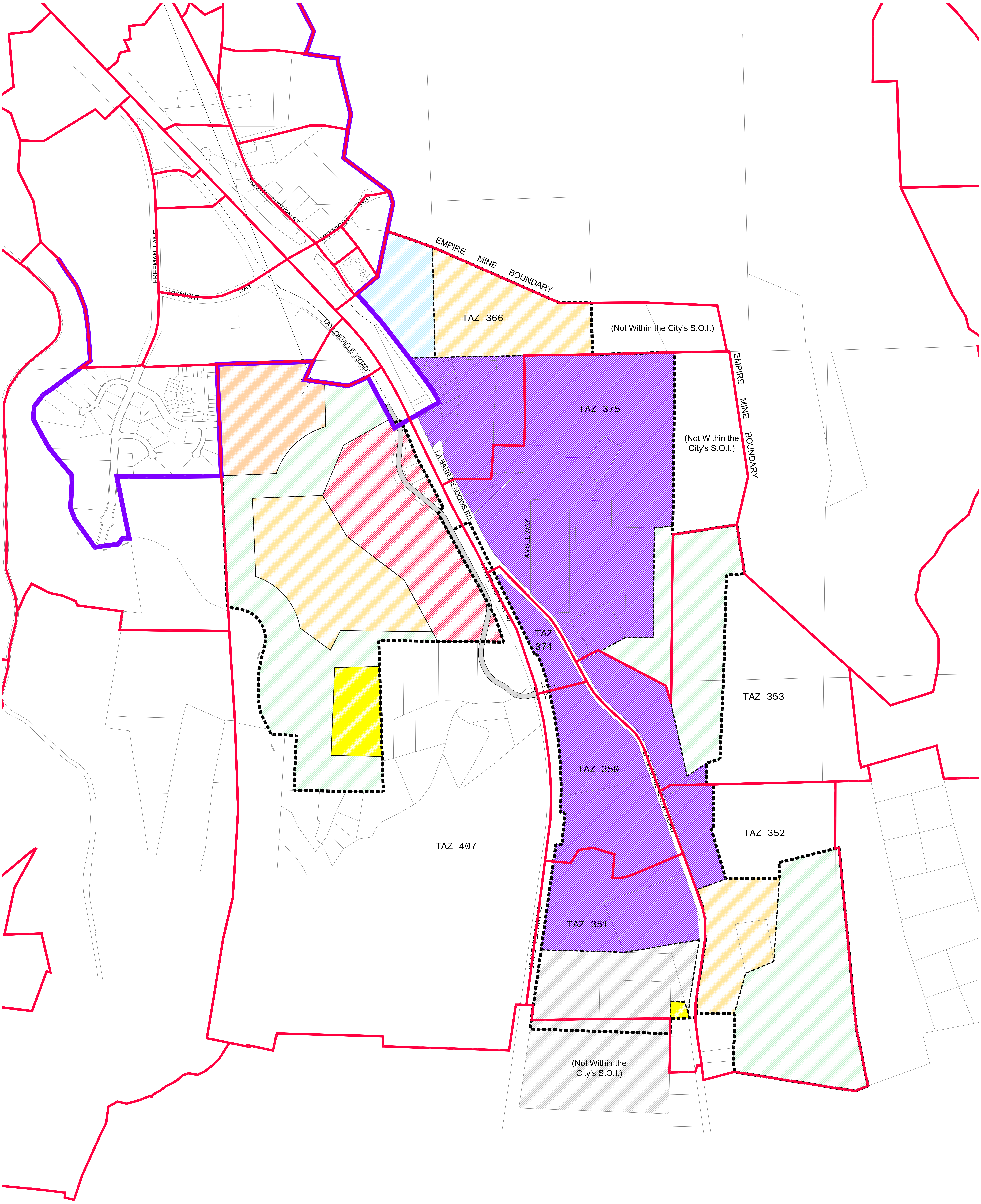

Figure 6

Table 1 – Proposed Project Trip Generation

	TAZ	Proposed Zoning	Total Acres	Building Square Feet[1]	Dwelling Units[2]	ITE Land Use Code	Daily Trip Rate	Daily Trips	Subtotal Daily Trips	PM Peak-Hour Trip Rate[3]	PM Peak-Hour Trips	Subtotal PM Peak-Hour Trips
East of SR-49	**350**	M-2	26.8	175,111	-	130	6.83	1,196	**1,196**	0.85	149	**149**
	351	M-2	18.3	119,572	-	130	6.83	817		0.85	102	
		Public	20.3	-	-	-	-	352*		-	36*	
		RE	0.5	-	1	210	9.52	10	**1,178**	1.00	1	**138**
	352	R-2	13.3	-	106	210	9.52	1,013		1.00	106	
		OS	33.6	-	-	-	-	-	-	-	-	
		M-1	4	26,136	-	110	6.97	182	**1,195**	0.97	25	**132**
	353	M-1	10	65,340	-	110	6.97	455		0.97	63	
		OS	21.9	-	-	-	-	-	**455**	-	-	**63**
	366	R-2	19.1	-	153	210	9.52	1,455		1.00	153	
		M-1	16.1	105,197	-	110	6.97	733		0.97	102	
		CBP	11.4	124,146	-	750	11.42	1,418	**3,606**	1.48	184	**439**
	374	M-2	5.1	33,323	-	120	1.50	50	**50**	0.68	23	**23**
	375	M-1	40.13	262,209	-	110	6.97	1,828		0.97	254	
		M-2	37.97	248,096	-	120	1.50	372		0.68	169	
		OS	7.53	-	-	-	-	-	**2,200**	-	-	**423**
West of SR-49	**407**	R-1	16.4	-	66	210	9.52	625		1.00	66	
		R-2	25.2	-	202	210	9.52	1,919		1.00	202	
		C2	27.71	301,762	-	820	42.7	12,885		3.71	1120	
		OS	53.96	-	-	-	-	-		-	-	
		RE	7	-	7	210	9.52	67	15,496	1.00	7	1,394
		Internal Trip Reduction (11% Daily, 13% PM)[3] :							-1,705			-181
		Subtotal External Trips (TAZ 407):							13,791			1,213
		Pass-By Trip Reduction (15%)[4] :							-1,933			-168
		Net New External Trips (TAZ 407):							**11,858**			**1,045**

[1] Floor Area Ratio (FAR): 0.15 for M-1 and M-2, 0.25 for C-2 and CBP

[2] RE=1 unit/acre, R-1=4 units/acre, and R-2=8 units/acre

[3] Per *ITE Trip Generation Manual, 9th Edition*

[4] Per *ITE Trip Generation Manual, 9th Edition* , applied to retail (C2) only, limited to along SR-49

* *Proposed Negative Declaration, Nevada County, California* , May 2, 2013, 10% of Daily Trips for PM peak-hour

The proposed project is anticipated to generate a total of 21,738 new daily trips and 2,411 new PM peak-hour trips. These totals can be further broken down to 9,880 new daily and 1,366 new PM peak-hour trips for the East Development Area, and 11,858 new daily and 1,045 new PM peak-hour trips for the West Development Area.

Proposed Project Trip Distribution and Assignment

The near-term and long-term (Cumulative) distribution and assignment of project traffic was developed primarily based on existing and projected traffic volumes, the location of households, and the existing and planned transportation network conditions. As discussed later in this document, for existing conditions evaluation of the proposed project, two scenarios were considered. One scenario with only the East Development Area, and one with both the East and West Development Areas. Both development areas were considered under cumulative conditions. Project trips were globally distributed as follows:

- 50 percent to/from north using SR-49
- 40 percent to/from south using SR-49
- 10 percent to/from north using South Auburn Street

Figure 7, **Figure 8**, and **Figure 9** show the resultant project assignment for the Existing (2013) and Cumulative (2035) conditions. It is important to note that the SR-49 intersection with Crestview Drive (Intersection #6) is a future intersection that is included in this analysis only with the addition of the project's West Development Area under Existing (2013) conditions, and with the addition of the proposed project to Cumulative (2035) conditions.

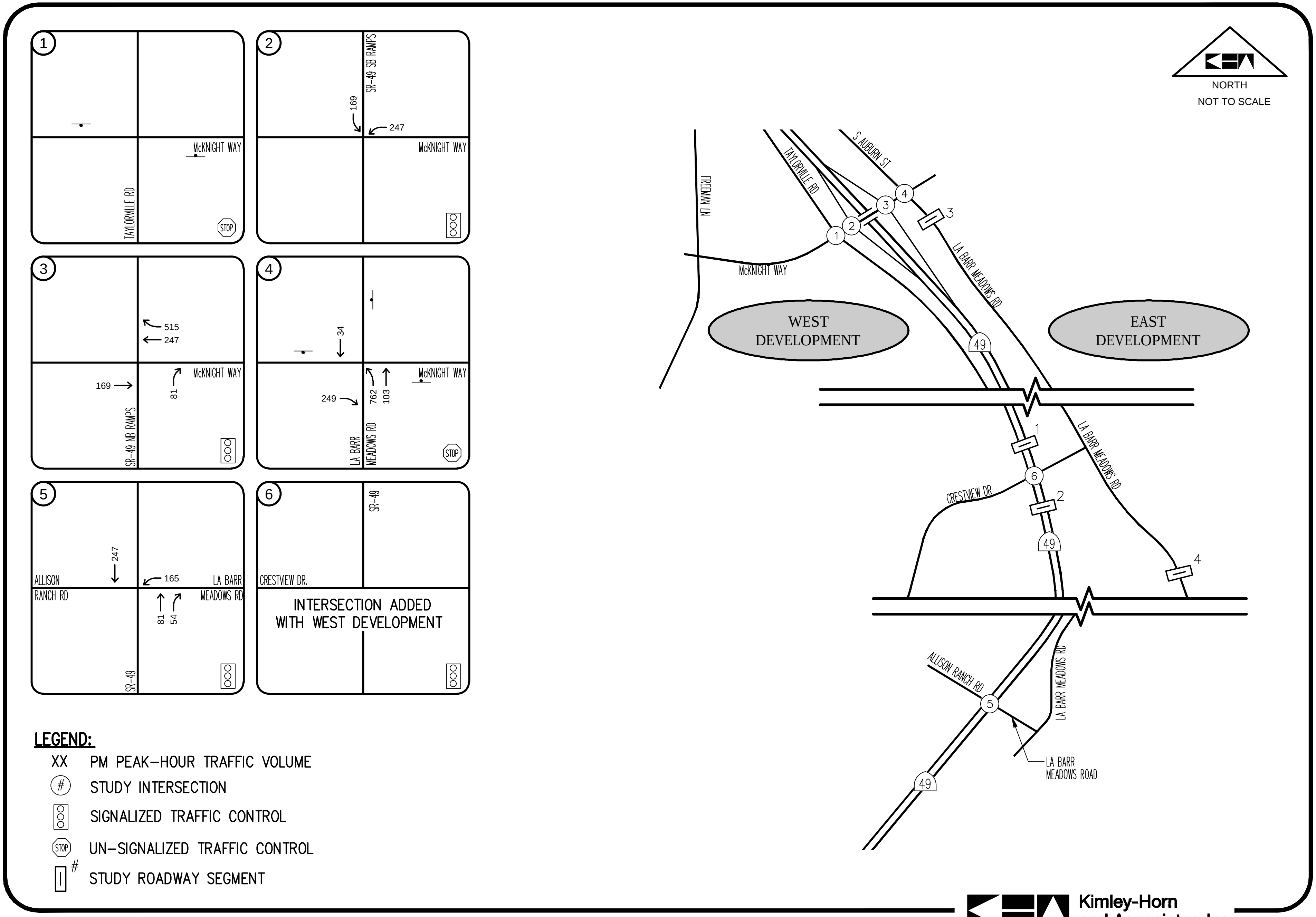

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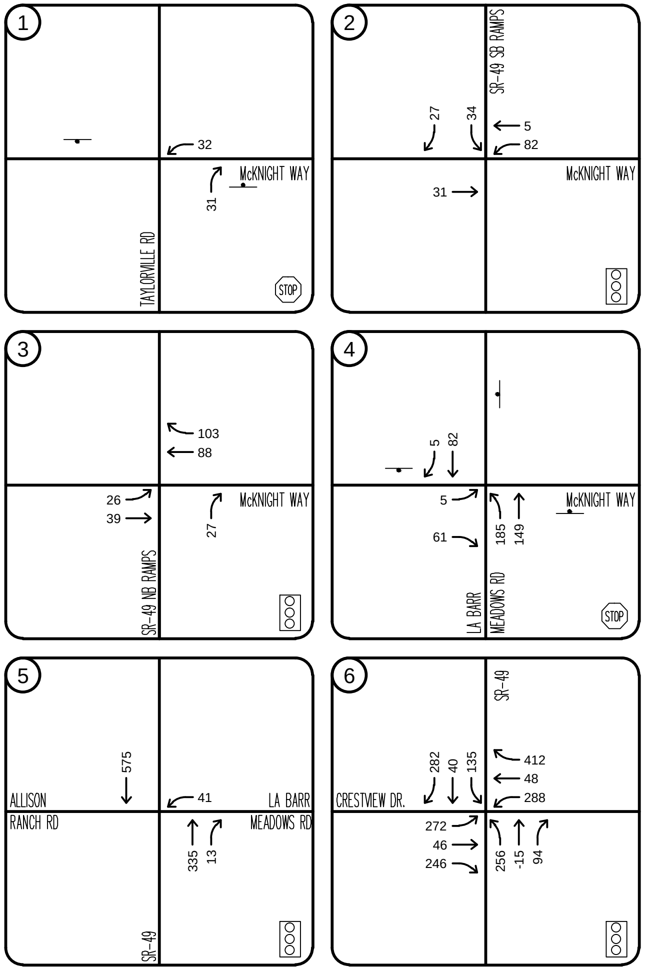
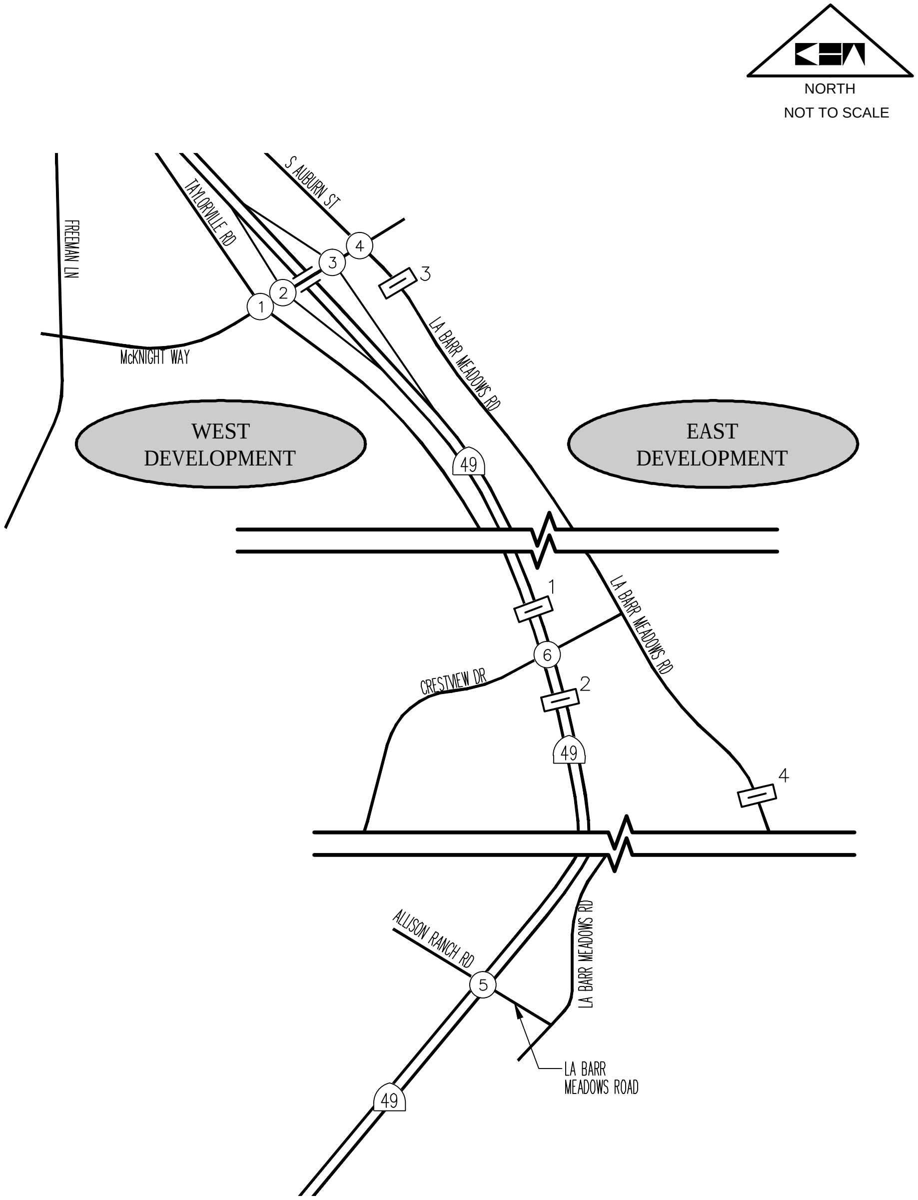
FIGURE 7

EAST DEVELOPMENT AREA PROJECT TRIP ASSIGNMENT (EXISTING CONDITIONS)

SOUTHERN SOI EIR
GRASS VALLEY, CA





LEGEND:

XX	PM PEAK-HOUR TRAFFIC VOLUME
(#)	STUDY INTERSECTION
▯	SIGNALIZED TRAFFIC CONTROL
STOP	UN-SIGNALIZED TRAFFIC CONTROL
▯#	STUDY ROADWAY SEGMENT

Kimley-Horn and Associates, Inc.

FIGURE 8

EAST AND WEST DEVELOPMENT AREAS PROJECT TRIP ASSIGNMENT (EXISTING CONDITIONS)

SOUTHERN SOI EIR
GRASS VALLEY, CA

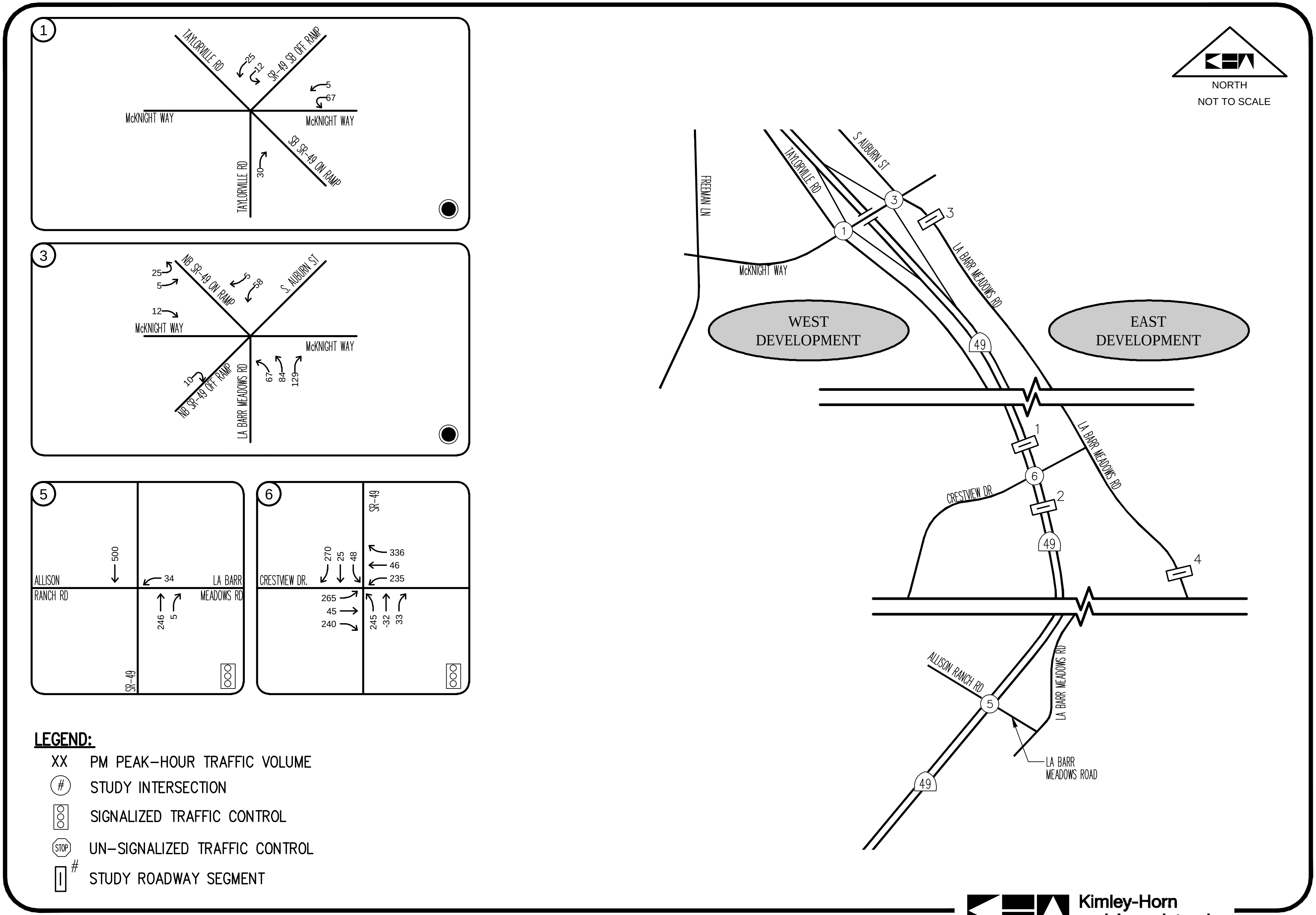


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FIGURE 9

EAST AND WEST DEVELOPMENT AREAS PROJECT TRIP ASSIGNMENT (2035 CONDITIONS)

SOUTHERN SOI EIR
GRASS VALLEY, CA

TRAFFIC IMPACT ANALYSIS METHODOLOGY

Intersections

Analysis of traffic operations at intersections is typically based on the concept of Level of Service (LOS). The LOS of an intersection is a qualitative measure used to describe operational conditions. LOS ranges from A (best), which represents minimal delay, to F (worst), which represents heavy delay and a facility that is operating at or near its functional capacity. Intersection LOS for this study was determined using methods defined in the *Highway Capacity Manual, 2000* (HCM) and appropriate traffic analysis software. The City of Grass Valley[1] has established an acceptable LOS D threshold (LOS E and F are unacceptable), and Caltrans[3] has established acceptable operations on their facilities as "the threshold between LOS C and LOS D."

The HCM includes procedures for analyzing two-way stop controlled (TWSC), all-way stop controlled (AWSC), and signalized intersections. These procedures define LOS as a function of average control delay. Table 2 presents intersection LOS definitions as defined in the HCM.

Table 2 – Intersection Level of Service Criteria

Level of Service (LOS)	Un-Signalized	Signalized
	Average Control Delay (sec/veh)	Control Delay per Vehicle (sec/veh)
A	≤ 10	≤ 10
B	> 10 – 15	> 10 – 20
C	> 15 – 25	> 20 – 35
D	> 25 – 35	> 35 – 55
E	> 35 – 50	> 55 – 80
F	> 50	> 80

Source: Highway Capacity Manual, 2000

Due to the close spacing of the four study intersections along McKnight Way, LOS for these intersections were determined using the SimTraffic® traffic analysis software. SimTraffic® Measures of Effectiveness (MOEs) were compared against the HCM intersection delay thresholds (**Table 2**) to equate the SimTraffic ® results to HCM LOS.

Roadway Segments

Roadway LOS in the City of Grass Valley is analyzed by comparing segment Average Daily Traffic (ADT) volumes to the thresholds presented in the City's *General Plan*[4]. **Table 3** presents LOS volume thresholds for the various roadway functional classifications.

A weekday, PM peak-hour Level of Service (LOS) analysis was conducted for the study facilities for the following scenarios:

A. Existing (2013) Conditions
B. Existing (2013) plus Proposed Project Conditions[+]
C. Cumulative (2035) Conditions
D. Cumulative (2035) plus Proposed Project Conditions[++]

[+] *Includes two scenarios: East Development Area only, and East and West Development Areas*
[++] *East and West Development Areas*

The following is a discussion of the analyses for these scenarios.

---

[3] *Guide for the Preparation of Traffic Impact Studies*, Caltrans, December 2002.
[4] *City of Grass Valley 2020 General Plan*, November 23, 1999.

Table 3 – Roadway Segment Daily Service Volume Criteria (Maximums) by Average Daily Traffic (ADT)

Functional Classification	# Lanes	LOS A	LOS B	LOS C	LOS D	LOS E
Interstate & Freeway	2	29,700	34,650	39,600	44,550	49,500
	4	59,400	69,300	79,200	89,100	99,000
	6	89,100	103,950	118,800	133,650	148,500
Arterial	2	9,300	10,850	12,400	13,950	15,500
	4	18,600	21,700	24,800	27,900	31,000
	6	27,900	32,550	37,200	41,850	46,500
Collector	2	6,600	7,700	8,800	9,900	11,000

Source: City of Grass Valley 2020 General Plan Table 4-2.
Note: Two lane freeway level of service volumes are estimated based on the values for 4 lane and 6 lane facilities.

EXISTING (2013) CONDITIONS

One new weekday PM peak-period (4:00 p.m. – 6:00 p.m.) intersection turning movement traffic count was conducted for the SR-49 intersection with La Barr Meadows Drive in July 2013. Traffic data for the four McKnight Way interchange intersections were obtained from Nevada County and were projected one year from 2012 to 2013 to establish existing conditions at these locations. Existing (2013) PM peak-hour turn movement and roadway segment volumes are presented in **Figure 10**. Traffic count data sheets are provided in **Appendix A**, and analysis worksheets for this scenario are provided in **Appendix B**.

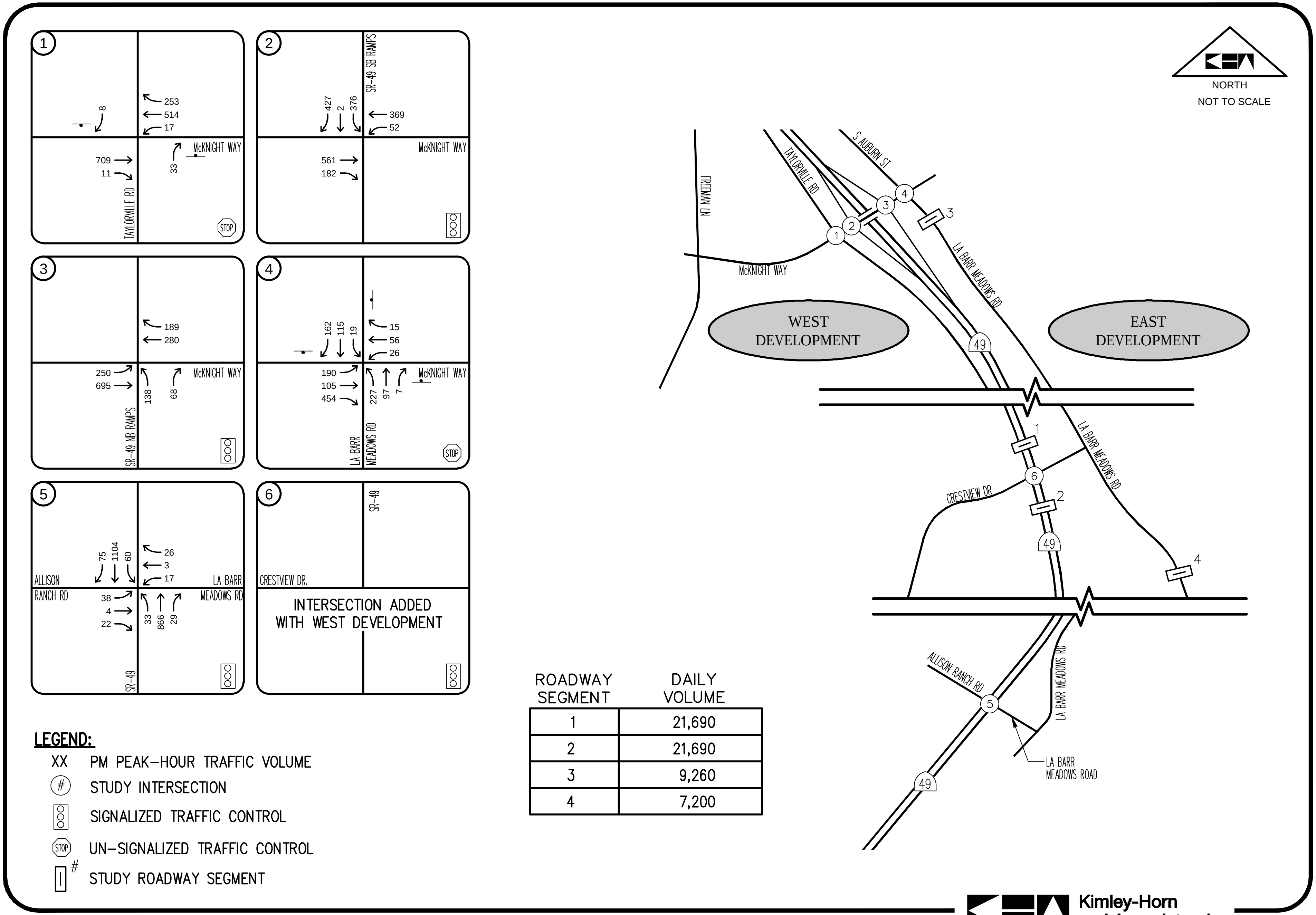
Intersections

Table 4 presents the peak-hour intersection operating conditions for this analysis scenario. As indicated in Table 4, the study intersections operate from LOS A to LOS F during the PM peak-hour. It is important to note that, due to the analysis methodology (SimTraffic), the existing operations at the McKnight Way intersection with the SR-49 SB Ramps (Intersection #2) reports worse conditions than observed. When evaluated more traditionally (Synchro), this intersection operates at LOS A. As discussed later in this report, the ultimate reconfiguration of the interchange renders this operational discrepancy moot.

Table 4 – Existing (2013) Intersection Levels of Service

#	Intersection	Traffic Control	PM Peak-Hour	
			Delay (seconds)	LOS
1	McKnight Way @ Taylorville Road	TWSC*	21.0 **(331.0)**	C **(F)**
2	McKnight Way @ SR-49 SB Ramps	Signal	**80.4**	**F**
3	McKnight Way @ SR-49 NB Ramps	Signal	15.5	B
4	McKnight Way @ S Auburn St/La Barr Meadows Rd	TWSC*	6.3 (12.7)	A (B)
5	SR-49 @ La Barr Meadows Rd	Signal	9.7	A
6	SR-49 @ Crestview Dr	*Not applicable for this scenario*		

* TWSC presented as Overall Intersection (Worst Minor Approach Movement)
Bold = Substandard per City



ROADWAY SEGMENT	DAILY VOLUME
1	21,690
2	21,690
3	9,260
4	7,200

LEGEND:

XX PM PEAK-HOUR TRAFFIC VOLUME

(#) STUDY INTERSECTION

SIGNALIZED TRAFFIC CONTROL

STOP UN-SIGNALIZED TRAFFIC CONTROL

\# STUDY ROADWAY SEGMENT

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FIGURE 10

EXISTING (2013) TRAFFIC VOLUMES

SOUTHERN SOI EIR
GRASS VALLEY, CA

Roadway Segments
Table 5 presents the peak-hour roadway segment operating conditions for this analysis scenario. As indicated in **Table 5**, the study roadway segments operate at LOS A during PM peak-hour.

Table 5 – Existing (2013) Roadway Segment Levels of Service

#	Location	Roadway Type	# Lanes	Daily Volume	LOS
1	SR-49 between McKnight Way and Crestview Dr	Highway*	2	21,690	A
2	SR-49 south of Crestview Dr	Highway*	2	21,690	A
3	La Barr Meadows Rd south of McKnight Way	Arterial	2	9,260	A
4	La Barr Meadows Rd south of project	Arterial	2	7,200	A

* Considered as "Interstate & Freeway" classification, **Bold = Substandard per City**

EXISTING (2013) PLUS PROPOSED PROJECT CONDITIONS

Peak-hour traffic associated with the proposed project was added to the existing traffic volumes and levels of service were determined at the study facilities. As previously discussed, two scenarios were considered as part of this scenario. The following is a summary of both scenarios:

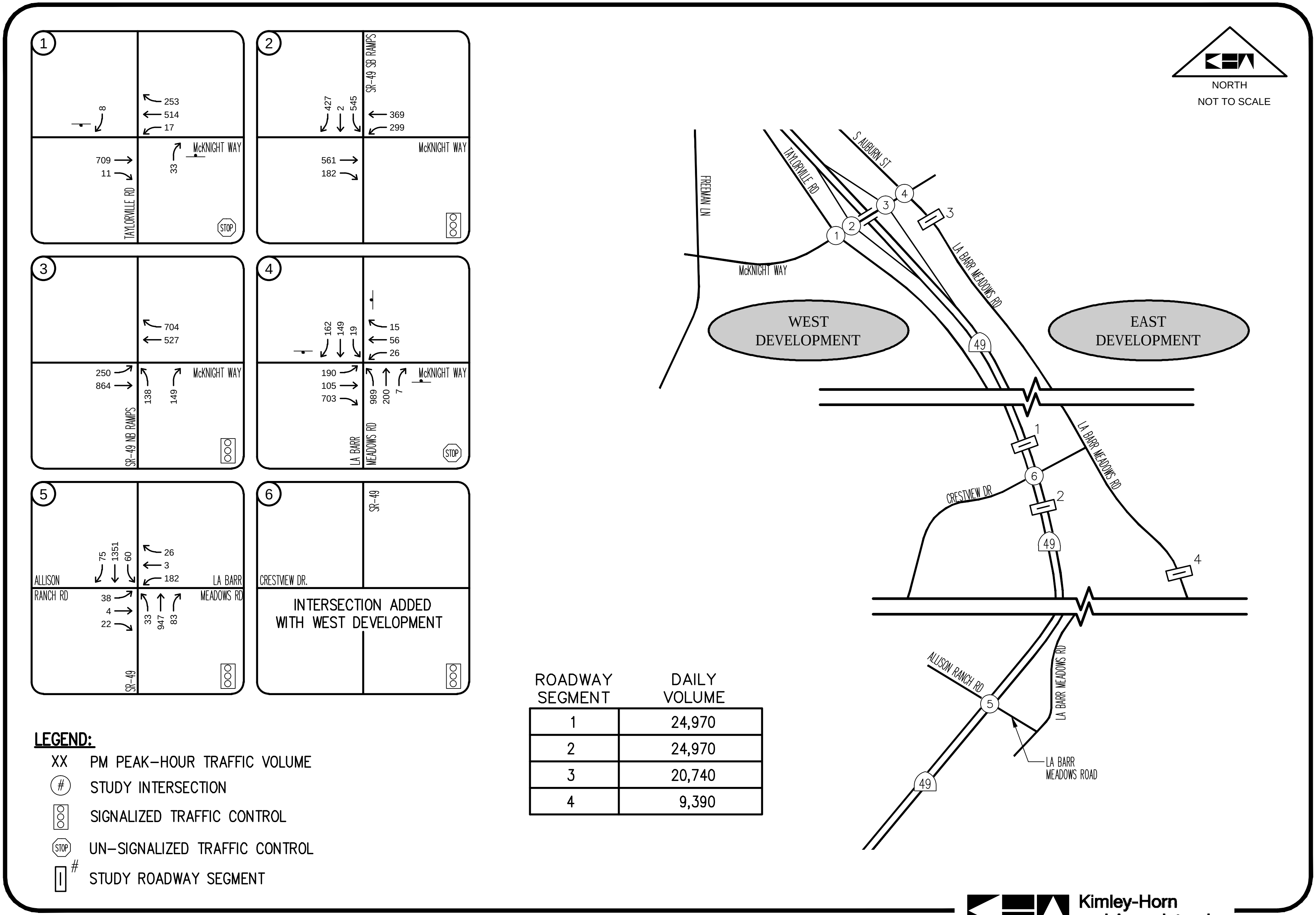
Scenario 1: East Development Area Only
Entire Project Assumed "on top of" Existing Uses

Scenario 2: East and West Development Areas
Entire Project Assumed "on top of" Existing Uses
New SR-49 @ Crestview Drive intersection

Weekday PM peak-hour turn movement and roadway segment volumes for this analysis scenario are shown in **Figure 11** and **Figure 12**. Analysis worksheets for this scenario are provided in **Appendix C**.

Intersections
Table 6 presents the peak-hour intersection operating conditions for the study intersections. As indicated in **Table 6**, the study intersections operate from LOS B to LOS F during the PM peak-hour.

Roadway Segments
Table 7 presents the peak-hour operating conditions for the study roadway segments. As indicated in **Table 7**, the study roadway segments operate from LOS A to LOS F during the PM peak-hour.



ROADWAY SEGMENT	DAILY VOLUME
1	24,970
2	24,970
3	20,740
4	9,390

LEGEND:

XX	PM PEAK-HOUR TRAFFIC VOLUME
(#)	STUDY INTERSECTION
▯	SIGNALIZED TRAFFIC CONTROL
STOP	UN-SIGNALIZED TRAFFIC CONTROL
▯#	STUDY ROADWAY SEGMENT

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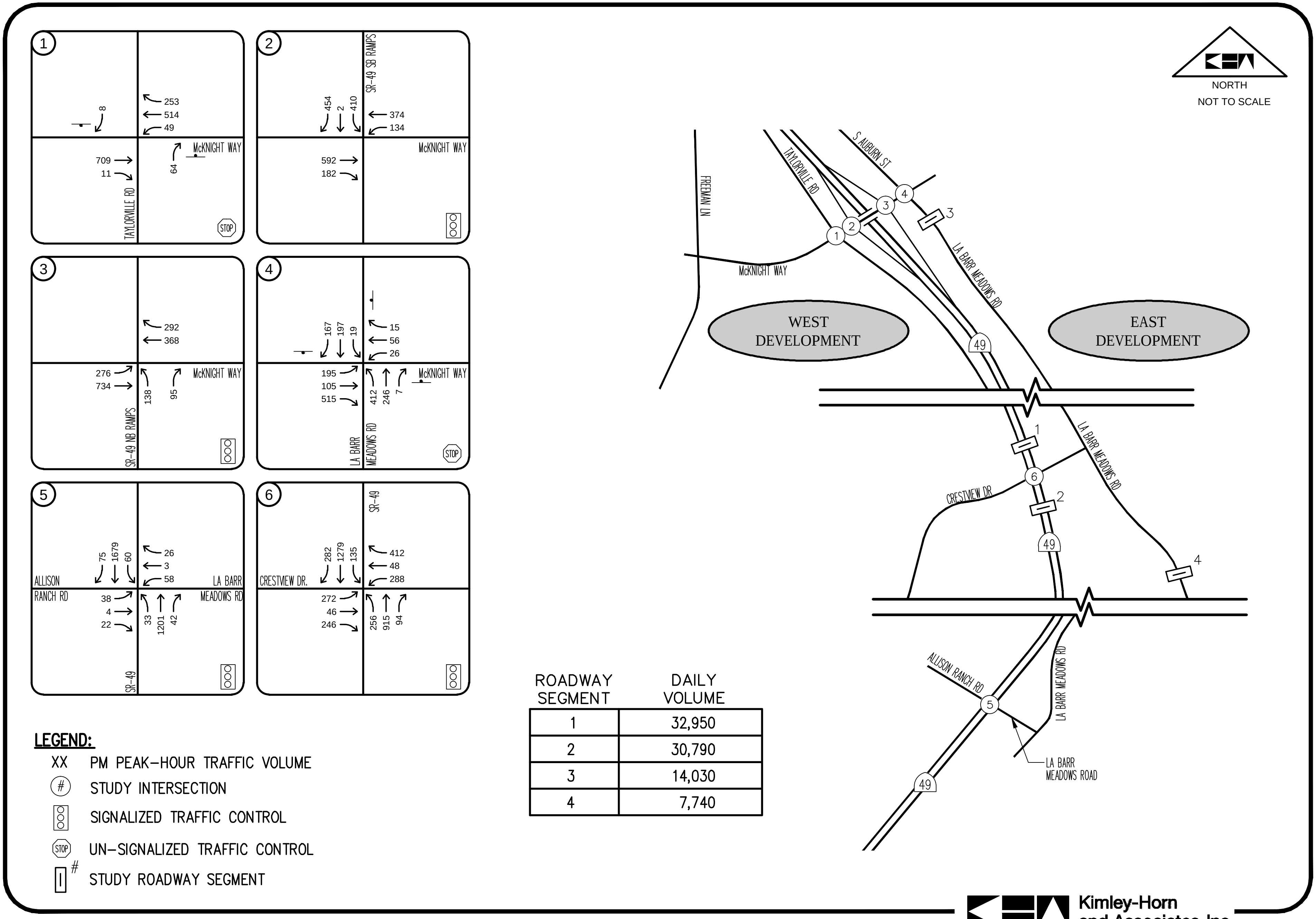
FIGURE 11

EXISTING (2013) PLUS EAST DEVELOPMENT AREA TRAFFIC VOLUMES

SOUTHERN SOI EIR
GRASS VALLEY, CA



ROADWAY SEGMENT	DAILY VOLUME
1	32,950
2	30,790
3	14,030
4	7,740

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FIGURE 12

EXISTING (2013) PLUS EAST & WEST DEVELOPMENT AREA TRAFFIC VOLUMES

SOUTHERN SOI EIR
GRASS VALLEY, CA

Table 6 – Existing (2013) and Existing (2013) plus Proposed Project Intersection Levels of Service

#	Intersection	Analysis Scenario[+]	Traffic Control	PM Peak-Hour	
				Delay (seconds)	LOS
1	McKnight Way @ Taylorville Road	Ex	TWSC[*]	21.0 **(331.0)**	C **(F)**
		Ex+PP (1)		**37.8 (620.7)**	**E (F)**
		Ex+PP (2)		26.6 **(316.6)**	D **(F)**
2	McKnight Way @ SR-49 SB Ramps	Ex	Signal	**80.4**	**F**
		Ex+PP (1)		**127.8**	**F**
		Ex+PP (2)		**96.6**	**F**
3	McKnight Way @ SR-49 NB Ramps	Ex	Signal	15.5	B
		Ex+PP (1)		17.8	B
		Ex+PP (2)		14.7	B
4	McKnight Way @ S Auburn St/La Barr Meadows Rd	Ex	TWSC[*]	6.3 (12.7)	A (B)
		Ex+PP (1)		**134.1 (415.1)**	**F (F)**
		Ex+PP (2)		**52.8 (182.3)**	**F (F)**
5	SR-49 @ La Barr Meadows Rd	Ex	Signal	9.7	A
		Ex+PP (1)		18.3	B
		Ex+PP (2)		15.5	B
6	SR-49 @ Crestview Dr	Ex	*Not applicable for this scenario*		
		Ex+PP (1)	*Not applicable for this scenario*		
		Ex+PP (2)	Signal	50.5	D

[+] Ex = Existing (2013), Ex+PP (1) = Existing (2013) plus Proposed Project (Scenario 1, east only), EX+PP (2) = Existing (2013) plus Proposed Project (Scenario 2, east and west)

[*] TWSC presented as Overall Intersection (Worst Minor Approach Movement) **Bold = Substandard per City**

Shaded Cells indicate Significant Impact as defined by City.

Table 7 – Existing (2013) Roadway Segment Levels of Service

#	Location	Analysis Scenario[+]	Roadway Type	# Lanes	Daily Volume	LOS
1	SR-49 between McKnight Way and Crestview Dr	Ex	Highway[*]	2	21,690	A
		Ex+PP (1)			24,970	A
		Ex+PP (2)			32,950	B
2	SR-49 south of Crestview Dr	Ex	Highway[*]	2	21,690	A
		Ex+PP (1)			24,970	A
		Ex+PP (2)			30,790	B
3	La Barr Meadows Rd south of McKnight Way	Ex	Arterial	2	9,260	A
		Ex+PP (1)			**20,740**	**F**
		Ex+PP (2)			**14,030**	**E**
4	La Barr Meadows Rd south of project	Ex	Arterial	2	7,200	A
		Ex+PP (1)			9,390	B
		Ex+PP (2)			7,740	A

[+] Ex = Existing (2013), Ex+PP (1) = Existing (2013) plus Proposed Project (Scenario 1, east only), EX+PP (2) = Existing (2013) plus Proposed Project (Scenario 2, east and west)

[*] Considered as "Interstate & Freeway" classification. **Bold = Substandard per City**

Shaded Cells indicate Significant Impact as defined by City.

CUMULATIVE (2035) CONDITIONS

The Cumulative analysis was performed for year 2035 conditions. Cumulative, year 2030, model segment data was obtained from the City's travel demand model. The model's 2005 to 2030 annual growth rates for roadway segments were used to project model volumes to year 2035. These growth rates, as calculated from the model, ranged from a negligible amount to as high as approximately 1.4 percent per year. Using the industry standard National Cooperative Highway Research Program (NCHRP) Furness Method, existing year turn movement percentages were applied to the model PM-Peak hour segment volumes to establish turning movement volumes at each study intersection for Cumulative (2035) Conditions.

In addition, traffic from development projects that were determined to not have been accounted for in the current City traffic model's development conditions was added to the roadway network. A list of these projects is provided in **Appendix D**.

Roadway network changes were assumed to be in place with this analysis scenario and are reflected in **Figure 13**. As depicted, the SR-49 interchange with McKnight Way is shown to be reconfigured to consolidate intersections and make use of two roundabout intersections, one on each side of SR-49. This configuration is consistent with improvements identified in the City's *Road Impact Fee Update*[5]. It is important to note that other interchange improvements may ultimately be explored and implemented. The effect of this relative uncertainty on this analysis is discussed in greater detail in the Impacts and Mitigations section.

Figure 14 provides the PM peak-hour traffic volumes for this analysis scenario. Volume growth computations and analysis worksheets for this scenario are provided in **Appendix D.**

Intersections

Table 8 presents the peak-hour intersection operating conditions for this analysis scenario. As indicated in **Table 8**, the study intersections operate at LOS B during the PM peak-hour.

Table 8 – Cumulative (2035) Intersection Levels of Service

#	Intersection	Traffic Control	PM Peak-Hour	
			Delay (seconds)	LOS
1	McKnight Wy @ Taylorville Rd/SR-49 SB Ramps	Roundabout	15.0	B
2	*Intersection consolidated with interchange reconfiguration*			
3	McKnight Wy @ SR-49 NB Ramps/S Auburn St/La Barr Meadows Rd	Roundabout	13.3	B
4	*Intersection consolidated with interchange reconfiguration*			
5	SR-49 @ La Barr Meadows Rd	Signal	11.5	B
6	SR-49 @ Crestview Dr	*Not applicable for this scenario*		
Bold = Substandard per City				

Roadway Segments

Table 9 presents the peak-hour roadway segment operating conditions for this analysis scenario. As indicated in **Table 9**, the study roadway segments operate from LOS A to LOS C during PM peak-hour.

---

[5] *Road Impact Fee Update*, City of Grass Valley, August 2008.

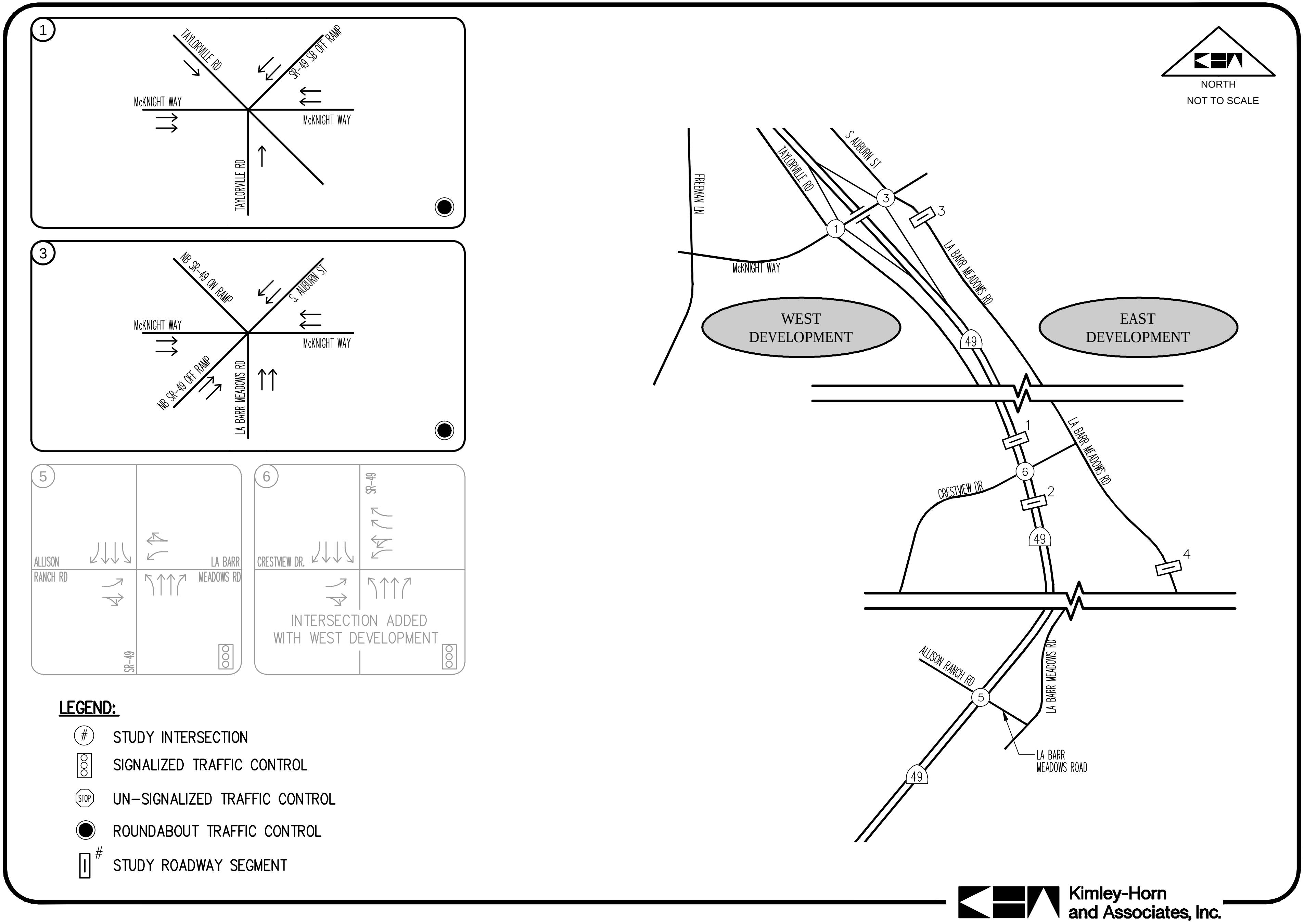
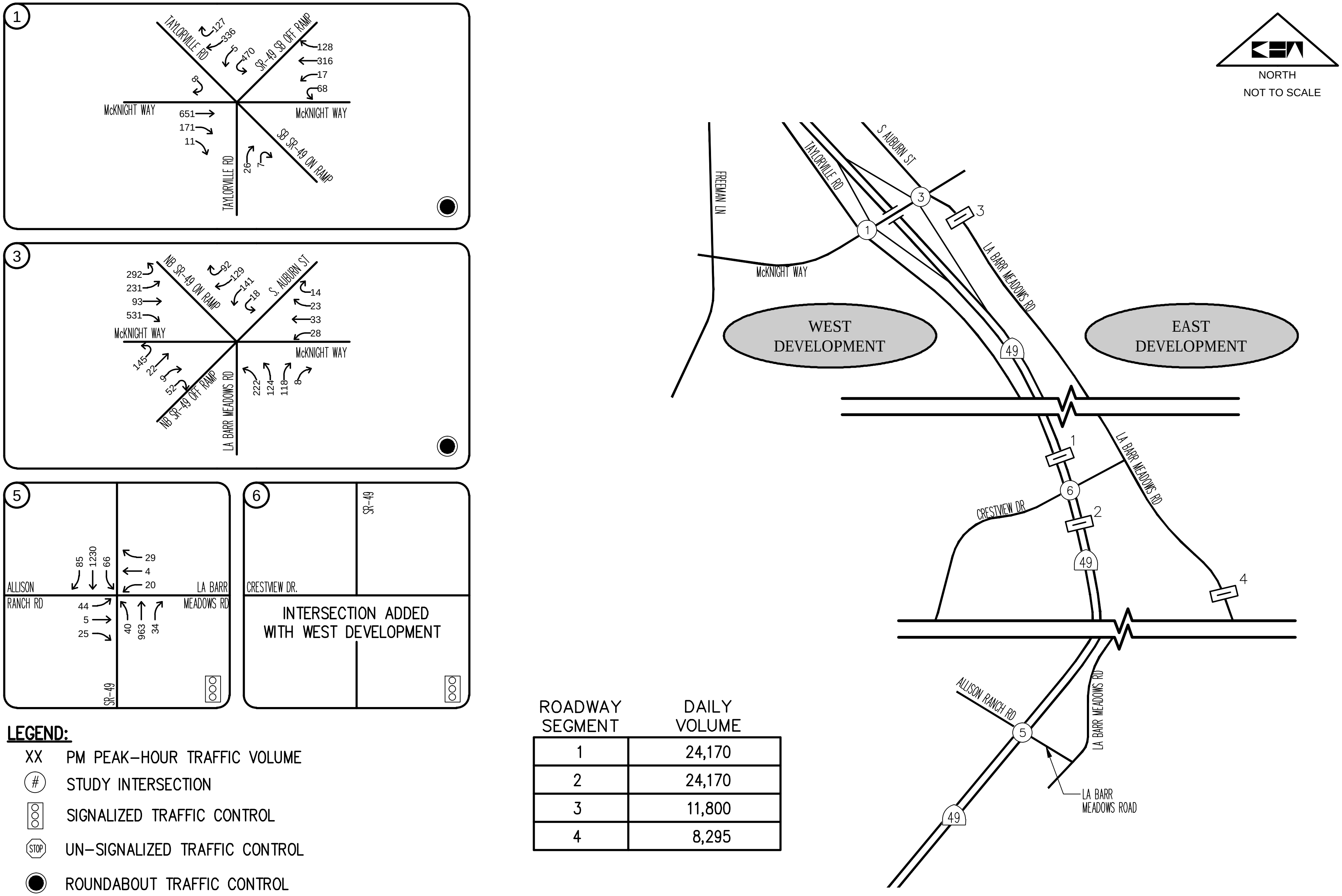


FIGURE 13

CUMULATIVE (2035) NETWORK MODIFICATIONS

SOUTHERN SOI EIR
GRASS VALLEY, CA



ROADWAY SEGMENT	DAILY VOLUME
1	24,170
2	24,170
3	11,800
4	8,295

LEGEND:

- XX PM PEAK-HOUR TRAFFIC VOLUME
- (#) STUDY INTERSECTION
- SIGNALIZED TRAFFIC CONTROL
- (STOP) UN-SIGNALIZED TRAFFIC CONTROL
- ● ROUNDABOUT TRAFFIC CONTROL
- ▯# STUDY ROADWAY SEGMENT

Kimley-Horn and Associates, Inc.

FIGURE 14

CUMULATIVE (2035) TRAFFIC VOLUMES

SOUTHERN SOI EIR
GRASS VALLEY, CA

Table 9 – Cumulative (2035) Roadway Segment Levels of Service

#	Location	Roadway Type	# Lanes	Daily Volume	LOS
1	SR-49 between McKnight Way and Crestview Dr	Highway*	2	24,170	A
2	SR-49 south of Crestview Dr	Highway*	2	24,170	A
3	La Barr Meadows Rd south of McKnight Way	Arterial	2	11,800	C
4	La Barr Meadows Rd south of project	Arterial	2	8,295	A

* Considered as "Interstate & Freeway" classification, **Bold = Substandard per City**

CUMULATIVE (2035) PLUS PROPOSED PROJECT CONDITIONS

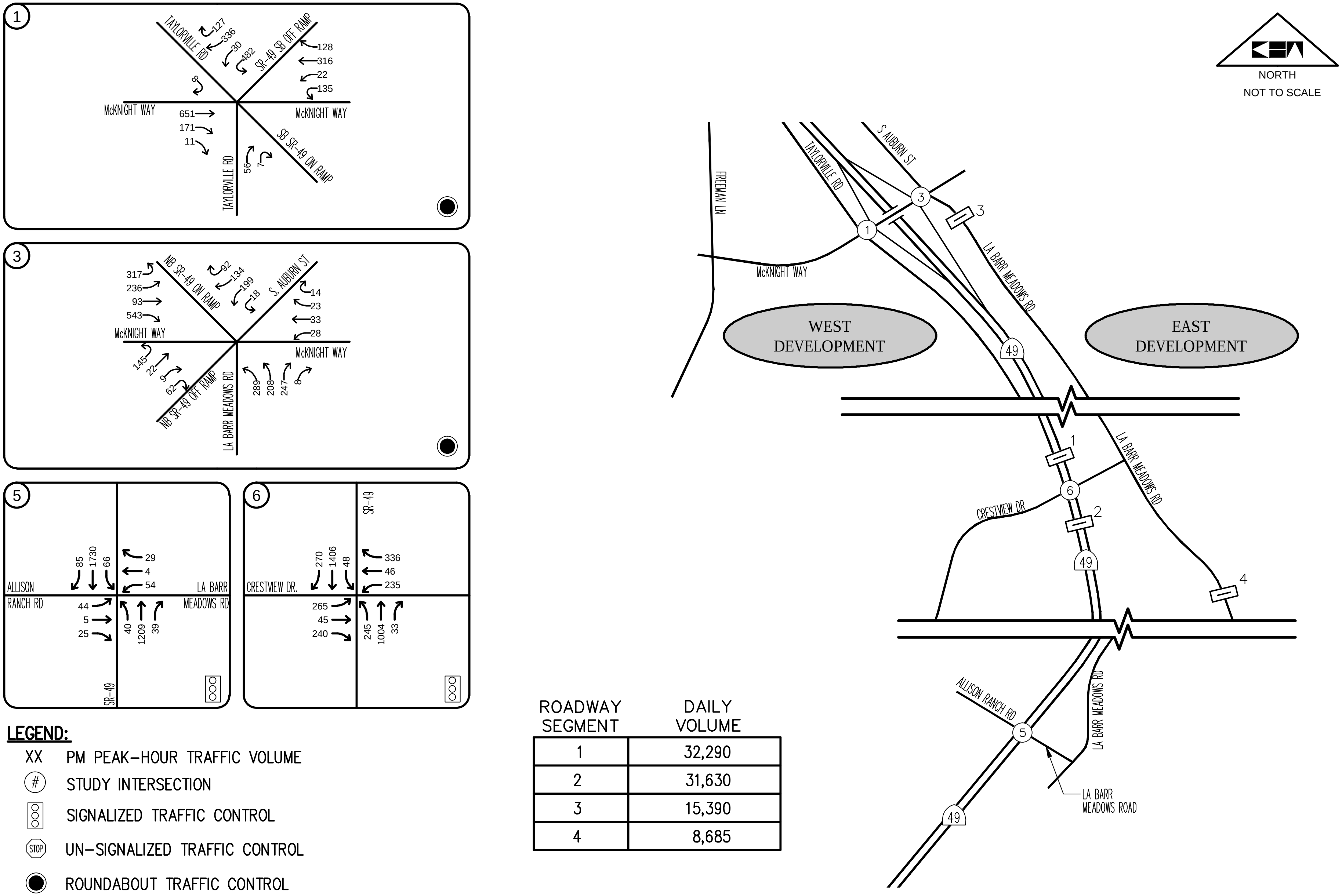
Because the City's travel demand model includes trips associated with assumed development within the eight TAZs included in the proposed project boundary, the assessment of the addition of the proposed project required an interim step to remove these already-assumed-trips from the network so that the project could be added without "double-counting" project area trips. As reflected in **Table 10**, to isolate the trips that were already assumed to be on the network, it was necessary to first approximate the proportion of each TAZ within the project boundary. In other words, how much of the model's traffic for these eight TAZs are within the project boundary and, therefore, should be removed and replaced with project volumes. It is important to note that only two of the eight TAZs are entirely contained within the project boundary, thereby introducing the need to "proportion" the remaining six TAZ trips. Accordingly, ranging from 100 percent to fifty percent, these proportions were then used to calculate the model trips that are included in the project boundary and are essentially replaced by the proposed project.

Table 10 – TAZ Trip Comparison

% of TAZ in Project	TAZ	Model Daily Trips (total)	Model Daily Trips (in Proj)	Rezone Daily Trips	Model PM Trips (total)	Model PM Trips (in Proj)	Rezone PM Trips
100%	350	612	612	1,196	68	68	149
50%	351	981	491	1,178	109	55	138
75%	352	90	68	1,195	10	8	132
50%	353	423	212	455	47	24	63
85%	366	618	525	3,606	56	47	439
100%	374	1221	1,221	50	82	82	23
85%	375	1729	1,469	2,200	147	125	423
50%	407	756	378	11,858	84	42	1,045
	Total:	**6,430**	**4,975**	**21,738**	**603**	**450**	**2,411**
	East:	*5,674*	*4,597*	*9,880*	*519*	*408*	*1,366*
	West:	*756*	*378*	*11,858*	*84*	*42*	*1,045*

As an example, for TAZ 353, 50 percent of the TAZ is within the project boundary. As such, one half of the model PM peak-hour trips were calculated (24) and this value was compared to the project's trips for this TAZ (63). This "delta" (39) was the peak-hour volume analyzed in this scenario for this TAZ. Repeating this calculation for each TAZ resulted in the addition of a total of 1,961 PM peak-hour trips (2,411-450). As depicted in **Table 10**, the addition of the proposed project results in a net increase of 959 PM peak-hour trips (1,366-408) within the East Development Area, and 1,003 (1,045-42) additional PM peak-hour trips within the West Development Area. These "net" trips were then added to the Cumulative (2035) volumes and levels of service were determined at the study facilities.

Weekday PM peak-hour turn movement and roadway segment volumes for this analysis scenario are shown in **Figure 15**. Analysis worksheets for this scenario are provided in **Appendix E**.



LEGEND:

XX PM PEAK-HOUR TRAFFIC VOLUME

(#) STUDY INTERSECTION

SIGNALIZED TRAFFIC CONTROL

STOP UN-SIGNALIZED TRAFFIC CONTROL

● ROUNDABOUT TRAFFIC CONTROL

▯# STUDY ROADWAY SEGMENT

ROADWAY SEGMENT	DAILY VOLUME
1	32,290
2	31,630
3	15,390
4	8,685

Kimley-Horn
and Associates, Inc.

FIGURE 15

CUMULATIVE (2035) PLUS EAST & WEST DEVELOPMENT AREA TRAFFIC VOLUMES

SOUTHERN SOI EIR
GRASS VALLEY, CA

Intersections

Table 11 presents the peak-hour intersection operating conditions for the study intersections. As indicated in **Table 11**, the study intersections operate from LOS B to LOS E during the PM peak-hour.

Table 11 – Cumulative (2035) and Cumulative (2035) plus Proposed Project Intersection Levels of Service

#	Intersection	Analysis Scenario[+]	Traffic Control	PM Peak-Hour	
				Delay (seconds)	LOS
1	McKnight Way @ Taylorville Road/SR-49 SB Ramps	Cum	Roundabout	15.0	B
		Cum+PP		18.4	C
2	*Intersection consolidated with interchange reconfiguration*				
3	McKnight Way @ SR-49 NB Ramps/S Auburn St/ La Barr Meadows Rd	Cum	Roundabout	13.3	B
		Cum+PP		21.9	C
4	*Intersection consolidated with interchange reconfiguration*				
5	SR-49 @ La Barr Meadows Rd	Cum	Signal	11.5	B
		Cum+PP		13.9	B
6	SR-49 @ Crestview Dr	Cum	*Not applicable for this scenario*		
		Cum+PP	Signal	49.6	D

[+] Cum = Cumulative (2035), Cum+PP = Cumulative (2035) plus Proposed Project
Bold = Substandard per City. Shaded Cells indicate Significant Impact as defined by City.

Roadway Segments

Table 12 presents the peak-hour operating conditions for the study roadway segments. As indicated in **Table 12**, the study roadway segments operate from LOS A to LOS E during the PM peak-hour.

Table 12 – Cumulative (2035) and Cumulative (2035) plus
Proposed Project Roadway Segment Levels of Service

#	Location	Analysis Scenario[+]	Roadway Type	# Lanes	Daily Volume	LOS
1	SR-49 between McKnight Way and Crestview Dr	Cum	Highway[*]	2	24,170	A
		Cum+PP			33,290	B
2	SR-49 south of Crestview Dr	Cum	Highway[*]	2	24,170	A
		Cum+PP			31,630	B
3	La Barr Meadows Rd south of McKnight Way	Cum	Arterial	2	11,800	C
		Cum+PP			**15,390**	**E**
4	La Barr Meadows Rd south of project	Cum	Arterial	2	8,295	A
		Cum+PP			8,685	A

[+] Cum = Cumulative (2035), Cum+PP = Cumulative (2035) plus Proposed Project
[*] Considered as "Interstate & Freeway" classification. **Bold = Substandard per City**
Shaded Cells indicate Significant Impact as defined by City.

IMPACTS AND MITIGATION

Standards of Significance

Project impacts were determined by comparing conditions with the proposed project to those without the project. Impacts are created when traffic from the proposed project forces the LOS to fall below a specific threshold.

City standards[1] specify that "If the project traffic causes an intersection or roadway segment to worsen from an acceptable LOS to LOS E or worse, or is distributed to an intersection or roadway segment currently operating at an unacceptable LOS, the project is determined to cause a significant impact which must be mitigated."

Impacts and Mitigation

Existing (2013) plus Proposed Project Conditions

Impacts:

I1. *Intersection #1, McKnight Way @ Taylorville Road*
As shown in **Table 6**, this intersection operates at acceptable LOS C during the PM peak-hour without the project, and the project results in LOS E. ***This is a significant impact.***

I2. *Intersection #2, McKnight Way @ SR-49 SB Ramps*
As shown in **Table 6**, this intersection operates at substandard LOS F during the PM peak-hour without the project, and the project contributes traffic. ***This is a significant impact.***

I3. *Intersection #4, McKnight Way @ S Auburn Street/La Barr Meadows Road*
As shown in **Table 6**, this intersection operates at acceptable LOS A during the PM peak-hour without the project, and the project results in LOS F. ***This is a significant impact.***

I4. *Roadway Segment #3, La Barr Meadows Road south of McKnight Way*
As shown in **Table 7**, this segment operates at acceptable LOS A without the project, and the project results in LOS E or LOS F. ***This is a significant impact.***

Mitigations:

M1. Intersection #1, McKnight Way @ Taylorville Road
The significant impact at this intersection during the PM peak-hour can be mitigated with the implementation of the SR-49/McKnight Way interchange reconfiguration. As documented in **Table 11**, when the full project is added to the Cumulative (2035) conditions, the interchange intersections operate at acceptable levels. Because the Existing (2013) plus project volumes are less than Cumulative (2035) plus project volumes, it is reasonable to assume that the interchange reconfiguration adequately mitigates the impact at this intersection.

However, this impact for the Existing (2013) plus Proposed Project conditions requires an ***overriding consideration*** since the impact experienced prior to Cumulative (2035) conditions may be unavoidable due to the following factors: 1) the intersection will exceed LOS standards at some unknown time before the Cumulative (2025) conditions which is when the intersection improvements are presumably in place; 2) the proposed intersection improvements require further analysis as well as the analysis of other alternatives; and 3) the collection of mitigation fees to fund the improvements are not guaranteed to be assigned to the needed intersection improvements. Further traffic analysis will be required to evaluate the effects of each individual development within the project that satisfy the requirements for traffic analysis as detailed in the City Improvement Standards. When improvements are determined to be feasible, each of these individual development projects will be conditioned to mitigate their impacts accordingly.

M2. Intersection #2, McKnight Way @ SR-49 SB Ramps

The significant impact at this intersection during the PM peak-hour can be mitigated with the implementation of the SR-49/McKnight Way interchange reconfiguration. As documented in **Table 11**, when the full project is added to the Cumulative (2035) conditions, the interchange intersections operate at acceptable levels. Because the Existing (2013) plus project volumes are less than Cumulative (2035) plus project volumes, it is reasonable to assume that the interchange reconfiguration adequately mitigates the impact at this intersection.

However, this impact for the Existing (2013) plus Proposed Project conditions requires an ***overriding consideration*** since the impact experienced prior to Cumulative (2035) conditions may be unavoidable due to the following factors: 1) the intersection will exceed LOS standards at some unknown time before the Cumulative (2025) conditions which is when the intersection improvements are presumably in place; 2) the proposed intersection improvements require further analysis as well as the analysis of other alternatives; and 3) the collection of mitigation fees to fund the improvements are not guaranteed to be assigned to the needed intersection improvements. Further traffic analysis will be required to evaluate the effects of each individual development within the project that satisfy the requirements for traffic analysis as detailed in the City Improvement Standards. When improvements are determined to be feasible, each of these individual development projects will be conditioned to mitigate their impacts accordingly.

M3. Intersection #4, McKnight Way @ S Auburn Street/La Barr Meadows Road

The significant impact at this intersection during the PM peak-hour can be mitigated with the implementation of the SR-49/McKnight Way interchange reconfiguration. As documented in **Table 11**, when the full project is added to the Cumulative (2035) conditions, the interchange intersections operate at acceptable levels. Because the Existing (2013) plus project volumes are less than Cumulative (2035) plus project volumes, it is reasonable to assume that the interchange reconfiguration adequately mitigates the impact at this intersection.

However, this impact for the Existing (2013) plus Proposed Project conditions requires an ***overriding consideration*** since the impact experienced prior to Cumulative (2035) conditions may be unavoidable due to the following factors: 1) the intersection will exceed LOS standards at some unknown time before the Cumulative (2025) conditions which is when the intersection improvements are presumably in place; 2) the proposed intersection improvements require further analysis as well as the analysis of other alternatives; and 3) the collection of mitigation fees to fund the improvements are not guaranteed to be assigned to the needed intersection improvements. Further traffic analysis will be required to evaluate the effects of each individual development within the project that satisfy the requirements for traffic analysis as detailed in the City Improvement Standards. When improvements are determined to be feasible, each of these individual development projects will be conditioned to mitigate their impacts accordingly.

M4. Roadway Segment #3, La Barr Meadows Road south of McKnight Way

The significant impact on this roadway segment cannot be mitigated by widening the segment from 2 to 4 lanes (which if possible for the entire roadway length would result in LOS A or LOS B) due to the road's proximity to existing buildings and SR-49. The impact for the Existing (2013) plus Proposed Project conditions requires an ***overriding consideration*** since the impact cannot be mitigated by widening to 4 lanes.

Cumulative (2035) plus Proposed Project Conditions

Impacts:

I5. Roadway Segment #3, La Barr Meadows Road south of McKnight Way

As shown in **Table 12**, this segment operates at acceptable LOS C without the project, and the project results in LOS E. ***This is a significant impact.***

Mitigations:

M5. Roadway Segment #3, La Barr Meadows Road south of McKnight Way

The significant impact on this roadway segment cannot be mitigated by widening the segment from 2 to 4 lanes (which if possible for the entire roadway length would result in LOS A or LOS B) due to the road's proximity to existing buildings and SR-49. The impact for the Cumulative (2035) plus Proposed Project conditions requires an ***overriding consideration*** since the impact cannot be mitigated by widening to 4 lanes.

CONCLUSIONS

Significant findings of this study include:

- The proposed project is anticipated to generate a total of 21,738 new daily trips and 2,411 new PM peak-hour trips. When compared to the City's originally projected trips for the project area, the proposed project results in a net increase of 1,962 PM peak-hour trips.
- The addition of the proposed project results in four significant impacts under Existing (2013) plus Proposed Project conditions. All four of these impacts are considered to be unavoidable and therefore will require ***overriding consideration*** from the City.
- The addition of the proposed project results in one significant impact under Cumulative (2035) conditions. This impact is considered to be unavoidable and therefore will require ***overriding consideration*** from the City.

Appendix A:

Traffic Count Data Sheets

ALL TRAFFIC DATA

Nevada County
All Vehicles on Unshifted
Nothing on Bank 1
Nothing on Bank 2

(916) 771-8700
orders@atdtraffic.com

File Name : 13-7399-001 SR 49-La Bar Meadows.ppd
Date : 7/16/2013

Unshifted Count = All Vehicles

	SR-49 Southbound					La Bar Meadows Road Westbound					SR-49 Northbound					Allison Ranch Road Eastbound						
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total	Ped Total
16:00	12	243	17	0	272	3	1	7	0	11	7	172	9	0	188	6	3	1	0	10	481	0
16:15	6	229	13	0	248	9	1	11	0	21	7	205	7	0	219	9	0	3	0	12	500	0
16:30	7	260	19	0	286	6	0	5	0	11	5	179	9	0	193	10	1	5	0	16	506	0
16:45	12	258	16	0	286	3	0	7	0	10	7	191	6	0	204	11	1	4	0	16	516	0
Total	37	990	65	0	1092	21	2	30	0	53	26	747	31	0	804	36	5	13	0	54	2003	0
17:00	15	256	37	0	308	4	1	2	0	7	7	219	10	0	236	5	2	7	0	14	565	0
17:15	13	320	11	0	344	4	1	11	0	16	10	225	7	0	242	14	1	5	0	20	622	0
17:30	20	270	11	0	301	6	1	6	0	13	9	231	6	0	246	8	0	6	0	14	574	0
17:45	14	228	10	0	252	5	4	3	0	12	12	199	15	0	226	7	0	5	0	12	502	0
Total	62	1074	69	0	1205	19	7	22	0	48	38	874	38	0	950	34	3	23	0	60	2263	0
Grand Total	99	2064	134	0	2297	40	9	52	0	101	64	1621	69	0	1754	70	8	36	0	114	4266	0
Apprch %	4.3%	89.9%	5.8%			39.6%	8.9%	51.5%			3.6%	92.4%	3.9%			61.4%	7.0%	31.6%				
Total %	2.3%	48.4%	3.1%		53.8%	0.9%	0.2%	1.2%		2.4%	1.5%	38.0%	1.6%		41.1%	1.6%	0.2%	0.8%		2.7%	100.0%	

PM PEAK HOUR	SR-49 Southbound					La Bar Meadows Road Westbound					SR-49 Northbound					Allison Ranch Road Eastbound					
START TIME	LEFT	THRU	RIGHT		APP.TOTAL	LEFT	THRU	RIGHT		APP.TOTAL	LEFT	THRU	RIGHT		APP.TOTAL	LEFT	THRU	RIGHT		APP.TOTAL	Total
Peak Hour Analysis From 16:45 to 17:45																					
Peak Hour For Entire Intersection Begins at 16:45																					
16:45	12	258	16		286	3	0	7		10	7	191	6		204	11	1	4		16	516
17:00	15	256	37		308	4	1	2		7	7	219	10		236	5	2	7		14	565
17:15	13	320	11		344	4	1	11		16	10	225	7		242	14	1	5		20	622
17:30	20	270	11		301	6	1	6		13	9	231	6		246	8	0	6		14	574
Total Volume	60	1104	75		1239	17	3	26		46	33	866	29		928	38	4	22		64	2277
% App Total	4.8%	89.1%	6.1%			37.0%	6.5%	56.5%			3.6%	93.3%	3.1%			59.4%	6.3%	34.4%			
PHF	.750	.863	.507		.900	.708	.750	.591		.719	.825	.937	.725		.943	.679	.500	.786		.800	.915

Appendix B:

Analysis Worksheets for Existing (2013) Conditions

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	4:55	4:55	4:55	4:55	4:55	4:55
End Time	6:00	6:00	6:00	6:00	6:00	6:00
Total Time (min)	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	3	3	3	3	3	3
# of Recorded mScheduledIntervals	2	2	2	2	2	2
Vehs Entered	1892	1800	2497	1807	2549	2109
Vehs Exited	1877	1780	2448	1781	2498	2077
Starting Vehs	72	60	73	62	52	62
Ending Vehs	87	80	122	88	103	96
Travel Distance (mi)	798	754	1012	757	1044	873
Travel Time (hr)	404.2	451.1	127.6	422.1	101.6	301.3
Total Delay (hr)	374.6	423.1	89.4	394.0	62.2	268.7
Total Stops	2601	2272	4113	2245	4588	3163
Fuel Used (gal)	113.4	123.5	56.7	116.5	51.6	92.3

Interval #0 Information Seeding

Start Time	4:55
End Time	5:00
Total Time (min)	5

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Peak

Start Time	5:00
End Time	5:15
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	548	550	632	534	660	586
Vehs Exited	528	520	593	511	625	555
Starting Vehs	72	60	73	62	52	62
Ending Vehs	92	90	112	85	87	92
Travel Distance (mi)	225	223	245	212	264	234
Travel Time (hr)	29.5	38.5	27.1	32.2	18.5	29.2
Total Delay (hr)	21.1	30.3	17.8	24.2	8.6	20.4
Total Stops	854	714	1086	655	1112	881
Fuel Used (gal)	12.8	14.8	12.9	13.1	11.2	13.0

Interval #2 Information Off Peak

Start Time	5:15
End Time	6:00
Total Time (min)	45

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	2	3	4	5	Avg
Vehs Entered	1344	1250	1865	1273	1889	1524
Vehs Exited	1349	1260	1855	1270	1873	1522
Starting Vehs	92	90	112	85	87	92
Ending Vehs	87	80	122	88	103	96
Travel Distance (mi)	573	531	767	544	780	639
Travel Time (hr)	374.7	412.6	100.6	389.9	83.0	272.2
Total Delay (hr)	353.5	392.9	71.6	369.8	53.6	248.3
Total Stops	1747	1558	3027	1590	3476	2276
Fuel Used (gal)	100.6	108.7	43.8	103.5	40.4	79.4

1: Taylorville Rd. & McKnight Way Performance by movement

Movement	EBT	EBR	WBL	WBT	WBR	NBR	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Delay (hr)	4.2	0.0	0.0	0.2	0.0	3.2	0.0	7.6
Total Del/Veh (s)	22.1	4.4	3.8	1.5	0.5	331.0	4.1	21.0

2: SR 49 SB Ramps & McKnight Way Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	95.9	0.4	106.8	203.1
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	903.5	1309.9	892.2	373.9
Total Delay (hr)	1.5	0.1	0.4	0.8	25.7	0.6	5.1	34.2
Total Del/Veh (s)	10.1	2.0	25.2	7.4	508.9	2154.6	89.6	80.4

3: SR 49 NB Ramps & McKnight Way Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Denied Del/Veh (s)	0.1	0.3	0.0	0.0	0.2	0.1	0.1
Total Delay (hr)	1.2	3.6	0.7	0.1	0.3	0.1	6.0
Total Del/Veh (s)	23.3	24.9	8.5	2.6	8.0	5.0	15.5

4: La Barr Meadows Rd./S. Auburn St. & McKnight Way Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.2	0.1	0.1	0.2	0.1	0.1	0.3	0.2	0.2
Total Delay (hr)	0.0	0.0	0.2	0.1	0.2	0.0	0.8	0.3	0.0	0.0	0.4	0.3
Total Del/Veh (s)	0.9	1.6	2.4	9.9	11.1	6.9	12.7	8.9	4.1	9.6	11.3	5.8

4: La Barr Meadows Rd./S. Auburn St. & McKnight Way Performance by movement

Movement	All
Denied Delay (hr)	0.0
Denied Del/Veh (s)	0.1
Total Delay (hr)	2.3
Total Del/Veh (s)	6.3

Total Network Performance

Denied Delay (hr)	205.6
Denied Del/Veh (s)	289.8
Total Delay (hr)	63.1
Total Del/Veh (s)	104.5

HCM Signalized Intersection Capacity Analysis
5: Hwy-49 & La Barr Meadows Rd

Existing (2013)
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	38	4	22	17	3	26	33	866	29	60	1104	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.87		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1623		1770	1610		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1623		1770	1610		1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	4	24	18	3	28	36	941	32	65	1200	82
RTOR Reduction (vph)	0	23	0	0	27	0	0	0	12	0	0	33
Lane Group Flow (vph)	41	5	0	18	4	0	36	941	20	65	1200	49
Turn Type	Prot	NA		Prot	NA		Prot	NA	pm+ov	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases									2			6
Actuated Green, G (s)	3.9	2.5		3.5	2.1		2.5	35.1	38.6	4.5	37.1	37.1
Effective Green, g (s)	3.9	2.5		3.5	2.1		2.5	35.1	38.6	4.5	37.1	37.1
Actuated g/C Ratio	0.06	0.04		0.06	0.03		0.04	0.57	0.63	0.07	0.60	0.60
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	112	65		100	54		71	2016	1094	129	2131	953
v/s Ratio Prot	c0.02	c0.00		0.01	0.00		0.02	0.27	0.00	c0.04	c0.34	
v/s Ratio Perm									0.01			0.03
v/c Ratio	0.37	0.08		0.18	0.07		0.51	0.47	0.02	0.50	0.56	0.05
Uniform Delay, d1	27.7	28.4		27.7	28.8		28.9	7.8	4.3	27.5	7.4	5.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.0	0.5		0.9	0.6		5.6	0.2	0.0	3.1	0.3	0.0
Delay (s)	29.7	28.9		28.5	29.4		34.5	7.9	4.4	30.6	7.7	5.1
Level of Service	C	C		C	C		C	A	A	C	A	A
Approach Delay (s)		29.4			29.1			8.8			8.7	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	61.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Appendix C:

Analysis Worksheets for
Existing (2013) plus Proposed Project Conditions

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	4:55	4:55	4:55	4:55	4:55	4:55
End Time	6:00	6:00	6:00	6:00	6:00	6:00
Total Time (min)	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	3	3	3	3	3	3
# of Recorded mScheduledIntervals	2	2	2	2	2	2
Vehs Entered	2198	2503	2522	2587	2104	2383
Vehs Exited	2163	2445	2405	2494	2070	2315
Starting Vehs	129	129	130	130	126	128
Ending Vehs	164	187	247	223	160	194
Travel Distance (mi)	899	1014	1004	1028	869	963
Travel Time (hr)	953.8	761.2	711.6	678.1	981.9	817.3
Total Delay (hr)	919.9	723.0	673.5	639.1	949.1	780.9
Total Stops	3218	4516	4587	4677	3046	4007
Fuel Used (gal)	242.4	202.0	190.8	183.4	248.3	213.4

Interval #0 Information Seeding

Start Time	4:55
End Time	5:00
Total Time (min)	5

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Peak

Start Time	5:00
End Time	5:15
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	621	784	751	739	598	697
Vehs Exited	576	693	655	639	546	621
Starting Vehs	129	129	130	130	126	128
Ending Vehs	174	220	226	230	178	204
Travel Distance (mi)	238	284	274	271	230	260
Travel Time (hr)	84.2	67.9	68.0	64.6	87.3	74.4
Total Delay (hr)	75.1	57.1	57.7	54.4	78.6	64.6
Total Stops	926	1267	1266	1236	839	1103
Fuel Used (gal)	25.7	23.4	23.1	22.2	26.2	24.1

Interval #2 Information Off Peak

Start Time	5:15
End Time	6:00
Total Time (min)	45

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	2	3	4	5	Avg
Vehs Entered	1577	1719	1771	1848	1506	1684
Vehs Exited	1587	1752	1750	1855	1524	1694
Starting Vehs	174	220	226	230	178	204
Ending Vehs	164	187	247	223	160	194
Travel Distance (mi)	661	730	730	757	639	703
Travel Time (hr)	869.6	693.3	643.5	613.5	894.6	742.9
Total Delay (hr)	844.8	666.0	615.8	584.7	870.5	716.3
Total Stops	2292	3249	3321	3441	2207	2902
Fuel Used (gal)	216.7	178.6	167.6	161.2	222.1	189.3

1: Taylorville Rd. & McKnight Way Performance by movement

Movement	EBT	EBR	WBL	WBT	WBR	NBR	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Delay (hr)	5.6	0.0	0.0	0.1	0.0	6.0	0.0	11.7
Total Del/Veh (s)	29.5	2.9	3.4	1.3	0.4	620.7	3.2	37.8

2: SR 49 SB Ramps & McKnight Way Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.1	0.0	153.3	0.6	120.2	274.2
Denied Del/Veh (s)	0.1	0.0	1.1	0.2	1039.5	1135.0	1042.3	472.1
Total Delay (hr)	1.7	0.1	5.1	0.5	39.1	0.7	5.3	52.4
Total Del/Veh (s)	11.5	2.3	97.8	6.9	748.0	2388.9	139.3	127.8

3: SR 49 NB Ramps & McKnight Way Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBR	All
Denied Delay (hr)	0.0	0.1	0.0	0.0	0.0	0.0	0.1
Denied Del/Veh (s)	0.0	0.7	0.1	0.1	0.2	0.2	0.3
Total Delay (hr)	1.4	4.6	1.3	0.3	0.4	0.3	8.3
Total Del/Veh (s)	31.9	31.1	15.2	3.0	10.3	6.9	17.8

4: La Barr Meadows Rd./S. Auburn St. & McKnight Way Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	271.2	56.0	1.8	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.2	0.1	960.1	983.6	939.7	0.3	0.2	0.2
Total Delay (hr)	0.0	0.0	0.4	0.1	0.3	0.0	58.2	3.8	0.1	0.1	0.8	0.5
Total Del/Veh (s)	1.1	1.7	2.7	12.2	16.6	7.6	415.1	133.6	163.4	15.7	20.3	10.7

4: La Barr Meadows Rd./S. Auburn St. & McKnight Way Performance by movement

Movement	All
Denied Delay (hr)	329.1
Denied Del/Veh (s)	505.0
Total Delay (hr)	64.4
Total Del/Veh (s)	134.1

Total Network Performance

Denied Delay (hr)	625.2
Denied Del/Veh (s)	605.0
Total Delay (hr)	155.7
Total Del/Veh (s)	223.5

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	38	4	22	182	3	26	33	947	83	60	1351	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.87		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1623		1770	1610		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1623		1770	1610		1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	4	24	198	3	28	36	1029	90	65	1468	82
RTOR Reduction (vph)	0	23	0	0	24	0	0	0	29	0	0	41
Lane Group Flow (vph)	41	5	0	198	7	0	36	1029	61	65	1468	41
Turn Type	Prot	NA		Prot	NA		Prot	NA	pm+ov	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases									2			6
Actuated Green, G (s)	5.8	2.3		13.4	9.9		4.3	34.3	47.7	6.7	36.7	36.7
Effective Green, g (s)	5.8	2.3		13.4	9.9		4.3	34.3	47.7	6.7	36.7	36.7
Actuated g/C Ratio	0.08	0.03		0.18	0.14		0.06	0.47	0.66	0.09	0.50	0.50
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	141	51		326	219		104	1669	1125	163	1786	799
v/s Ratio Prot	0.02	c0.00		c0.11	0.00		0.02	0.29	0.01	c0.04	c0.41	
v/s Ratio Perm									0.03			0.03
v/c Ratio	0.29	0.09		0.61	0.03		0.35	0.62	0.05	0.40	0.82	0.05
Uniform Delay, d1	31.5	34.2		27.2	27.2		32.8	14.3	4.5	31.1	15.2	9.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	0.8		3.2	0.1		2.0	0.7	0.0	1.6	3.2	0.0
Delay (s)	32.7	35.0		30.4	27.3		34.9	15.0	4.5	32.7	18.4	9.2
Level of Service	C	C		C	C		C	B	A	C	B	A
Approach Delay (s)		33.6			30.0			14.8			18.5	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	72.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	4:55	4:55	4:55	4:55	4:55	4:55
End Time	6:00	6:00	6:00	6:00	6:00	6:00
Total Time (min)	65	65	65	65	65	65
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	3	3	3	3	3	3
# of Recorded mScheduledIntervals	2	2	2	2	2	2
Vehs Entered	2272	2234	2665	2962	2299	2483
Vehs Exited	2256	2222	2625	2845	2280	2446
Starting Vehs	83	85	101	74	85	85
Ending Vehs	99	97	141	191	104	127
Travel Distance (mi)	941	939	1094	1181	951	1021
Travel Time (hr)	456.2	527.4	289.0	223.2	482.1	395.6
Total Delay (hr)	421.4	492.7	248.3	178.9	446.7	357.6
Total Stops	3085	2970	4273	5413	3190	3788
Fuel Used (gal)	129.8	145.5	96.0	83.5	135.7	118.1

Interval #0 Information Seeding

Start Time	4:55
End Time	5:00
Total Time (min)	5

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Peak

Start Time	5:00
End Time	5:15
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	648	650	844	815	636	719
Vehs Exited	641	621	776	716	613	674
Starting Vehs	83	85	101	74	85	85
Ending Vehs	90	114	169	173	108	131
Travel Distance (mi)	261	263	325	309	252	282
Travel Time (hr)	40.8	48.6	37.7	31.7	35.0	38.8
Total Delay (hr)	31.1	38.9	25.6	20.2	25.6	28.3
Total Stops	903	844	1374	1455	874	1091
Fuel Used (gal)	16.4	18.2	17.4	15.6	14.7	16.5

Interval #2 Information Off Peak

Start Time	5:15
End Time	6:00
Total Time (min)	45

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	2	3	4	5	Avg
Vehs Entered	1624	1584	1821	2147	1663	1768
Vehs Exited	1615	1601	1849	2129	1667	1774
Starting Vehs	90	114	169	173	108	131
Ending Vehs	99	97	141	191	104	127
Travel Distance (mi)	680	675	769	872	699	739
Travel Time (hr)	415.4	478.8	251.3	191.5	447.0	356.8
Total Delay (hr)	390.3	453.8	222.7	158.7	421.2	329.3
Total Stops	2182	2126	2899	3958	2316	2696
Fuel Used (gal)	113.3	127.3	78.6	67.9	121.0	101.6

1: Taylorville Rd. & McKnight Way Performance by movement

Movement	EBT	EBR	WBL	WBT	WBR	NBR	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0
Total Delay (hr)	3.3	0.0	0.0	0.1	0.0	6.0	0.0	9.5
Total Del/Veh (s)	17.7	1.1	5.4	1.5	0.5	316.6	5.0	26.6

2: SR 49 SB Ramps & McKnight Way Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	121.3	0.6	136.9	258.9
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	1045.1	2276.8	1069.1	438.6
Total Delay (hr)	1.6	0.1	1.5	0.7	33.9	0.7	3.4	41.9
Total Del/Veh (s)	9.7	1.9	40.6	7.3	767.8	2574.9	80.5	96.6

3: SR 49 NB Ramps & McKnight Way Performance by movement

Movement	EBL	EBT	WBT	WBR	NBL	NBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Denied Del/Veh (s)	0.9	0.3	0.0	0.0	0.2	0.1	0.3
Total Delay (hr)	1.8	3.1	0.9	0.2	0.3	0.1	6.4
Total Del/Veh (s)	32.9	21.9	9.1	2.8	8.3	5.5	14.7

4: La Barr Meadows Rd./S. Auburn St. & McKnight Way Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.3	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.1	0.1	3.4	3.8	4.4	0.2	0.2	0.2
Total Delay (hr)	0.0	0.0	0.2	0.1	0.3	0.0	21.0	1.6	0.0	0.1	1.8	0.5
Total Del/Veh (s)	1.0	1.7	2.2	13.6	17.0	8.6	182.3	24.0	17.0	24.1	31.0	9.4

4: La Barr Meadows Rd./S. Auburn St. & McKnight Way Performance by movement

Movement	All
Denied Delay (hr)	0.7
Denied Del/Veh (s)	1.4
Total Delay (hr)	25.7
Total Del/Veh (s)	52.8

Total Network Performance

Denied Delay (hr)	264.9
Denied Del/Veh (s)	308.0
Total Delay (hr)	92.7
Total Del/Veh (s)	129.7

HCM Signalized Intersection Capacity Analysis

Existing (2013) + East + West Development

5: Hwy-49 & La Barr Meadows Rd

PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑	↗	↰	↑↑	↗
Volume (vph)	38	4	22	58	3	26	33	1201	42	60	1679	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.87		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1623		1770	1610		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1623		1770	1610		1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	4	24	63	3	28	36	1305	46	65	1825	82
RTOR Reduction (vph)	0	23	0	0	26	0	0	0	16	0	0	34
Lane Group Flow (vph)	41	5	0	63	5	0	36	1305	30	65	1825	48
Turn Type	Prot	NA		Prot	NA		Prot	NA	pm+ov	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases									2			6
Actuated Green, G (s)	4.2	2.2		6.3	4.3		2.6	35.4	41.7	4.6	37.4	37.4
Effective Green, g (s)	4.2	2.2		6.3	4.3		2.6	35.4	41.7	4.6	37.4	37.4
Actuated g/C Ratio	0.07	0.03		0.10	0.07		0.04	0.55	0.65	0.07	0.58	0.58
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	115	55		172	107		71	1942	1121	126	2052	917
v/s Ratio Prot	0.02	0.00		c0.04	c0.00		0.02	0.37	0.00	c0.04	c0.52	
v/s Ratio Perm									0.02			0.03
v/c Ratio	0.36	0.09		0.37	0.05		0.51	0.67	0.03	0.52	0.89	0.05
Uniform Delay, d1	28.9	30.2		27.2	28.2		30.3	10.4	4.1	28.9	11.8	5.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	0.7		1.3	0.2		5.6	0.9	0.0	3.5	5.2	0.0
Delay (s)	30.8	30.9		28.6	28.4		35.9	11.3	4.1	32.4	16.9	5.9
Level of Service	C	C		C	C		D	B	A	C	B	A
Approach Delay (s)		30.8			28.5			11.7			17.0	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	15.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	64.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Existing (2013) + East + West Development

6: SR-49 & Crestview Dr. — PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↰	↱↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	272	46	246	288	48	412	256	915	94	135	1279	282
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		0.95	0.95	0.88	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.87		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1627		1681	1708	2787	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1627		1681	1708	2787	1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	296	50	267	313	52	448	278	995	102	147	1390	307
RTOR Reduction (vph)	0	192	0	0	0	62	0	0	46	0	0	141
Lane Group Flow (vph)	296	125	0	182	183	386	278	995	56	147	1390	166
Turn Type	Split	NA		Split	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	4	4		8	8	1	5	2	8	1	6	4
Permitted Phases						8			2			6
Actuated Green, G (s)	16.0	16.0		14.2	14.2	26.7	15.0	39.5	53.7	12.5	37.0	53.0
Effective Green, g (s)	16.0	16.0		14.2	14.2	26.7	15.0	39.5	53.7	12.5	37.0	53.0
Actuated g/C Ratio	0.16	0.16		0.14	0.14	0.27	0.15	0.40	0.55	0.13	0.38	0.54
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	288	265		243	246	871	270	1423	865	225	1333	918
v/s Ratio Prot	c0.17	0.08		c0.11	0.11	0.06	c0.16	0.28	0.01	0.08	c0.39	0.03
v/s Ratio Perm						0.08			0.03			0.08
v/c Ratio	1.03	0.47		0.75	0.74	0.44	1.03	0.70	0.06	0.65	1.04	0.18
Uniform Delay, d1	41.1	37.3		40.3	40.3	29.6	41.6	24.4	10.5	40.8	30.6	11.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	60.4	1.3		11.9	11.5	0.4	62.6	1.5	0.0	6.7	36.6	0.1
Delay (s)	101.5	38.6		52.2	51.8	30.0	104.2	25.9	10.5	47.4	67.2	11.6
Level of Service	F	D		D	D	C	F	C	B	D	E	B
Approach Delay (s)		69.0			39.8			40.6			56.3	
Approach LOS		E			D			D			E	

Intersection Summary			
HCM 2000 Control Delay	50.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	98.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	89.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Appendix D:

Analysis Worksheets for
Cumulative (2035) Conditions

Approved Project Volumes - *PM Peak*

Intersection	NB			SB			EB			WB		
	L	T	R	L	T	R	L	T	R	L	T	R
Wolf Creek Village												
1. McKnight Way @ Taylorville Road								10			15	
2. McKnight Way @ SR-49 SB Ramps						8		8	2		7	
3. McKnight Way @ SR-49 NB Ramps	3						5	3			4	
4. McKnight Way @ South Auburn Street/La Barr Meadows Road	1					3	2		1			
5. SR-49 @ La Bar Meadows Road												
Berriman Ranch												
1. McKnight Way @ Taylorville Road								9			14	
2. McKnight Way @ SR-49 SB Ramps						8		7	2		6	
3. McKnight Way @ SR-49 NB Ramps	2						4	3			4	
4. McKnight Way @ South Auburn Street/La Barr Meadows Road	1					3	2		1			
5. SR-49 @ La Bar Meadows Road												
Village at South Auburn												
1. McKnight Way @ Taylorville Road								12			15	
2. McKnight Way @ SR-49 SB Ramps								15			15	
3. McKnight Way @ SR-49 NB Ramps								12			15	
4. McKnight Way @ South Auburn Street/La Barr Meadows Road						15	12					
5. SR-49 @ La Bar Meadows Road												
Victoria Grove												
1. McKnight Way @ Taylorville Road								16			9	
2. McKnight Way @ SR-49 SB Ramps								16		3	9	
3. McKnight Way @ SR-49 NB Ramps			6					16			12	
4. McKnight Way @ South Auburn Street/La Barr Meadows Road						12	22					
5. SR-49 @ La Bar Meadows Road												
TOTAL AM APPROVED PROJECT TRIPS												
1. McKnight Way @ Taylorville Road	0	0	0	0	0	0	0	47	0	0	53	0
2. McKnight Way @ SR-49 SB Ramps	0	0	0	0	0	16	0	46	4	3	37	0
3. McKnight Way @ SR-49 NB Ramps	5	0	6	0	0	0	9	34	0	0	35	0
4. McKnight Way @ South Auburn Street/La Barr Meadows Road	2	0	0	0	0	33	38	0	2	0	0	0
5. SR-49 @ La Bar Meadows Road	0	0	0	0	0	0	0	0	0	0	0	0

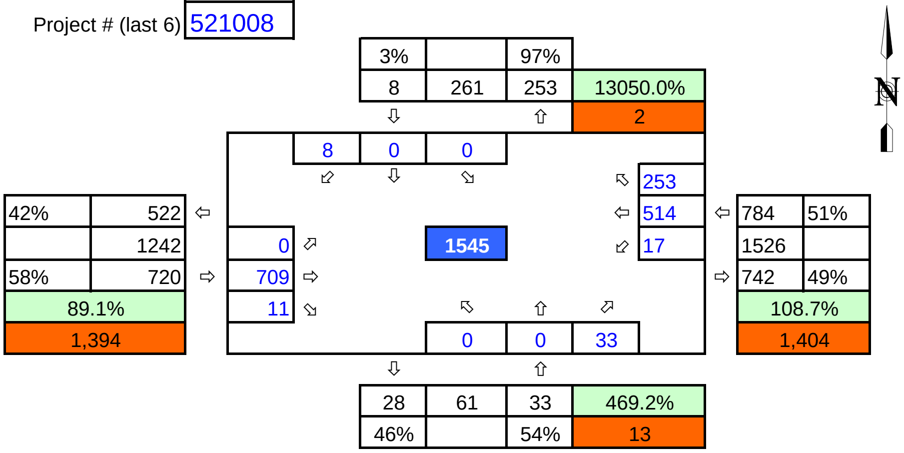
Growth Rate Computation

PM	2005				2030				Annual Growth Rate				2013				2035			
	N-LEG	S-LEG	W-LEG	E-LEG	N-LEG	S-LEG	W-LEG	E-LEG	N-LEG	S-LEG	W-LEG	E-LEG	N-LEG	S-LEG	W-LEG	E-LEG	N-LEG	S-LEG	W-LEG	E-LEG
1. McKnight Way @ Taylorville Road	2	13	1352	1362	2	13	1484	1494	0.00%	0.00%	0.39%	0.39%	2	13	1394	1404	2	13	1510	1520
2. McKnight Way @ SR-49 SB Ramps	679	166	1362	1272	798	172	1494	1523	0.70%	0.14%	0.39%	0.79%	717	168	1404	1352	822	173	1520	1573
3. McKnight Way @ SR-49 NB Ramps	690	236	1272	1385	866	246	1523	1750	1.02%	0.17%	0.79%	1.05%	746	239	1352	1502	901	248	1573	1823
4. McKnight Way @ South Auburn Street/La Barr Meadows Road	892	977	1385	40	1073	1309	1750	40	0.81%	1.36%	1.05%	0.00%	950	1083	1502	40	1109	1375	1823	40
5. SR-49 @ La Bar Meadows Road	2572	2572	36	751	2925	2925	43	870	0.55%	0.55%	0.78%	0.63%	2685	2685	38	789	2996	2996	44	894

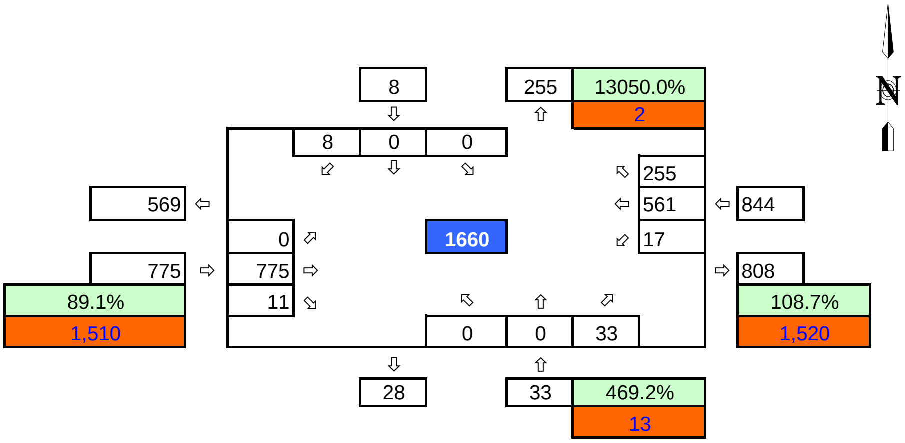
Input
Calculated

Int 1 PM Peak Volumes

Scenario: **2013 No Project Conditions**
N/S Street: **Taylorville Road**
E/W Street: **McNight Way**
Intersection #: 1
Project # (last 6) 521008



Scenario: **2035 No Project Conditions**
N/S Street: **Taylorville Road**
E/W Street: **McNight Way**

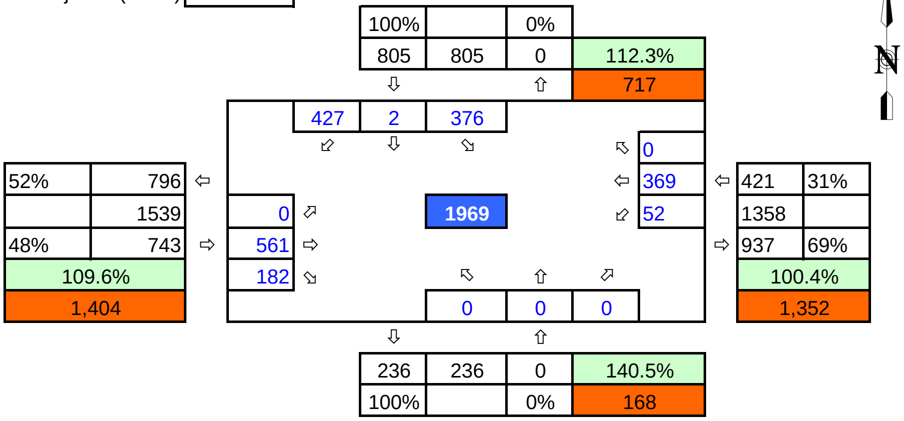


LEGEND

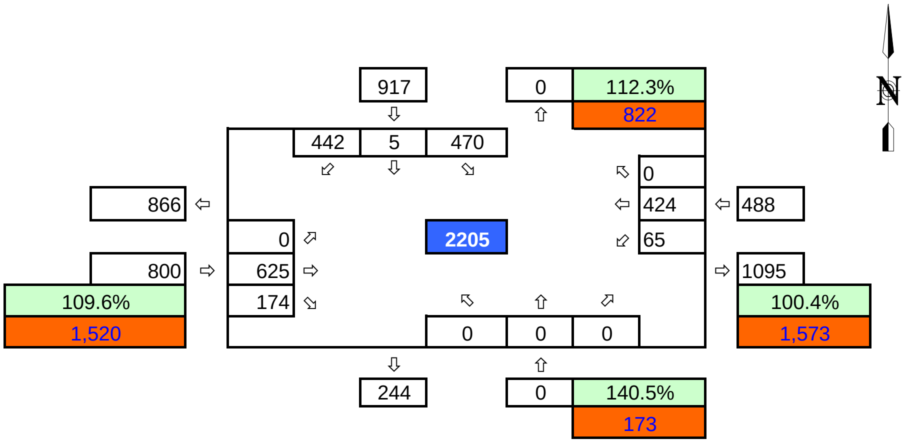
Diff. btw Model and TM	xx%
PM Model Volume	xx

Int 2 PM Peak Volumes

Scenario: **2013 No Project Conditions**
N/S Street: **SR-49 SB Ramps**
E/W Street: **McNight Way**
Intersection #: 2
Project # (last 6) 521008



Scenario: **2035 No Project Conditions**
N/S Street: **SR-49 SB Ramps**
E/W Street: **McNight Way**



LEGEND

Diff. btw Model and TM	xx%
PM Model Volume	xx

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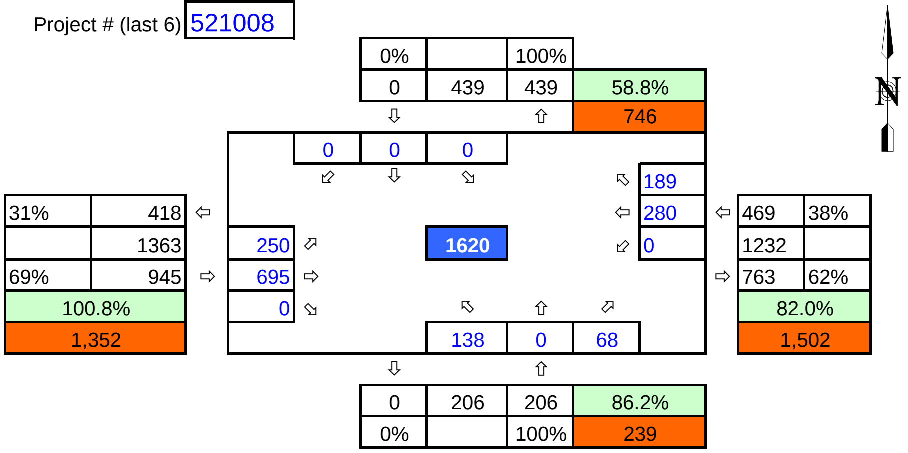
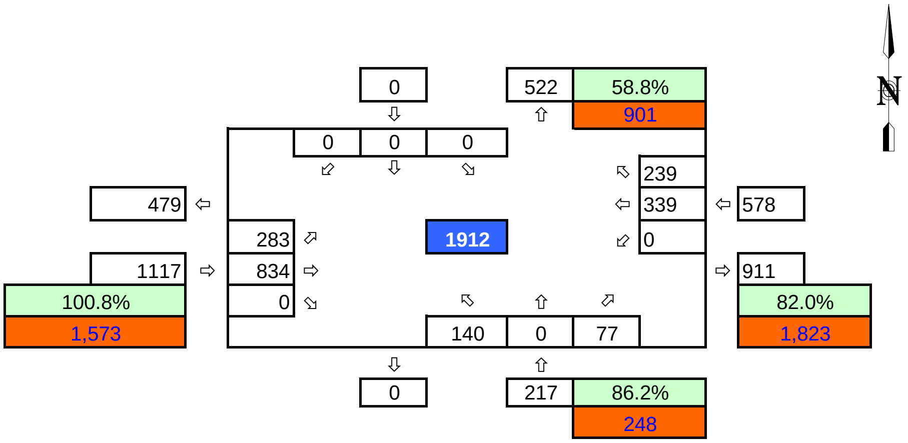
Int 3 PM Peak Volumes

Scenario: **2013 No Project Conditions**
N/S Street: **SR-49 NB Ramps**
E/W Street: **McNight Way**
Intersection #: 3
Project # (last 6) 521008



Scenario: **2035 No Project Conditions**
N/S Street: **SR-49 NB Ramps**
E/W Street: **McNight Way**



LEGEND

Diff. btw Model and TM	xx%
PM Model Volume	xx

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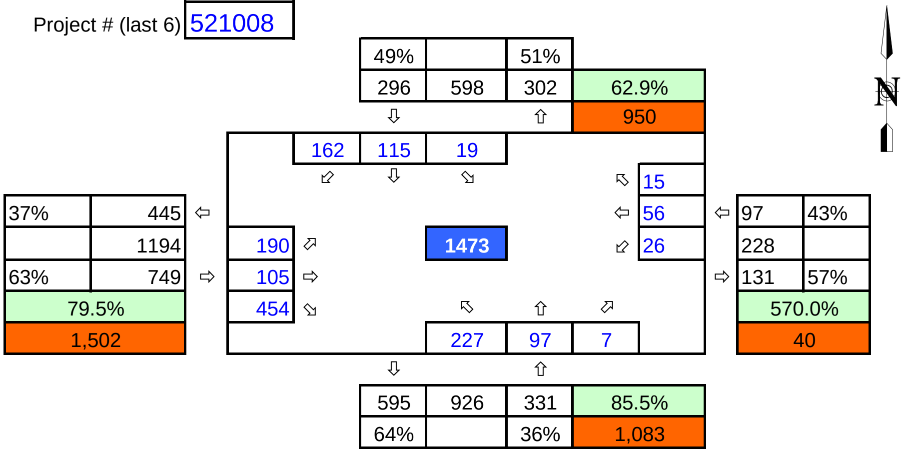
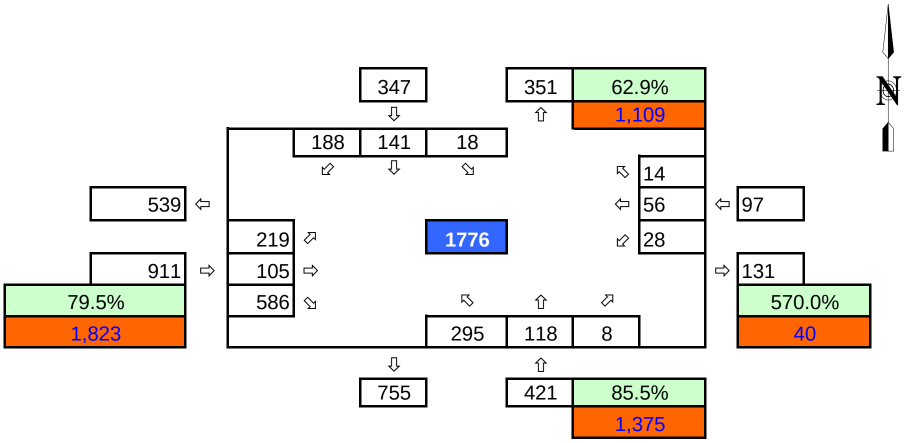
Int 4 PM Peak Volumes

Scenario: **2013 No Project Conditions**
N/S Street: **La Barr Meadows Road**
E/W Street: **McNight Way**
Intersection #: 4
Project # (last 6) 521008



Scenario: **2035 No Project Conditions**
N/S Street: **La Barr Meadows Road**
E/W Street: **McNight Way**



LEGEND

Diff. btw Model and TM	xx%
PM Model Volume	xx

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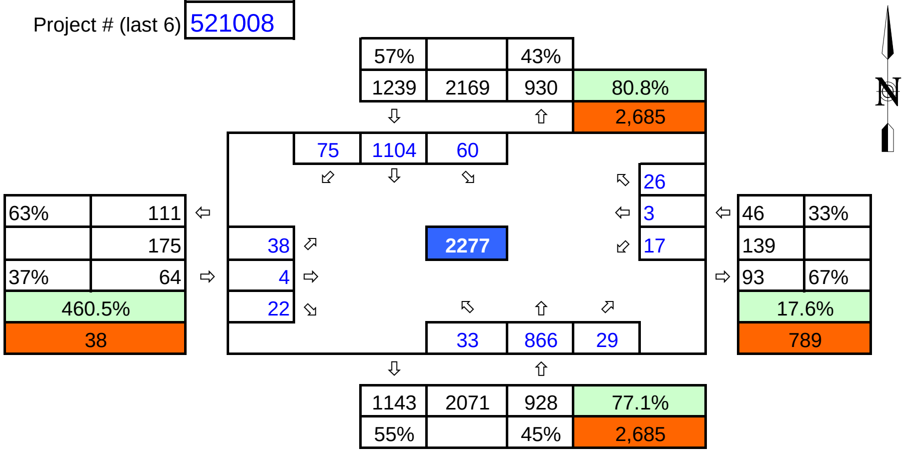
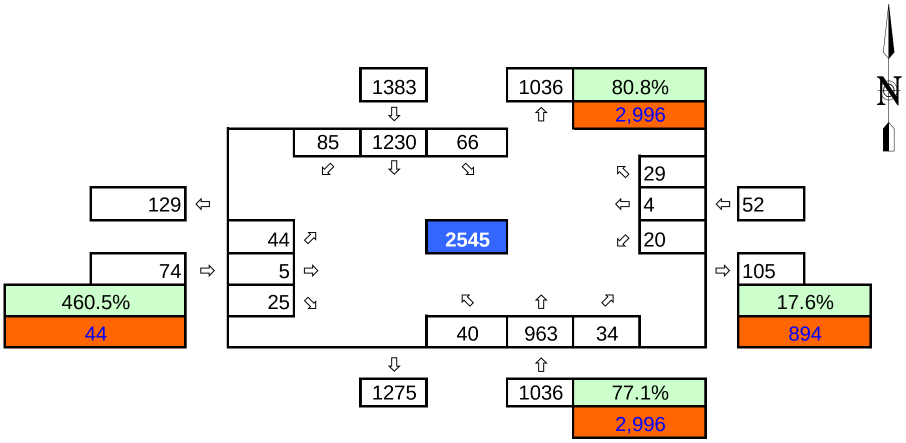
Int 5 PM Peak Volumes

Scenario: **2013 No Project Conditions**
N/S Street: **SR-49**
E/W Street: **La Barr Road**
Intersection #: 5
Project # (last 6) 521008

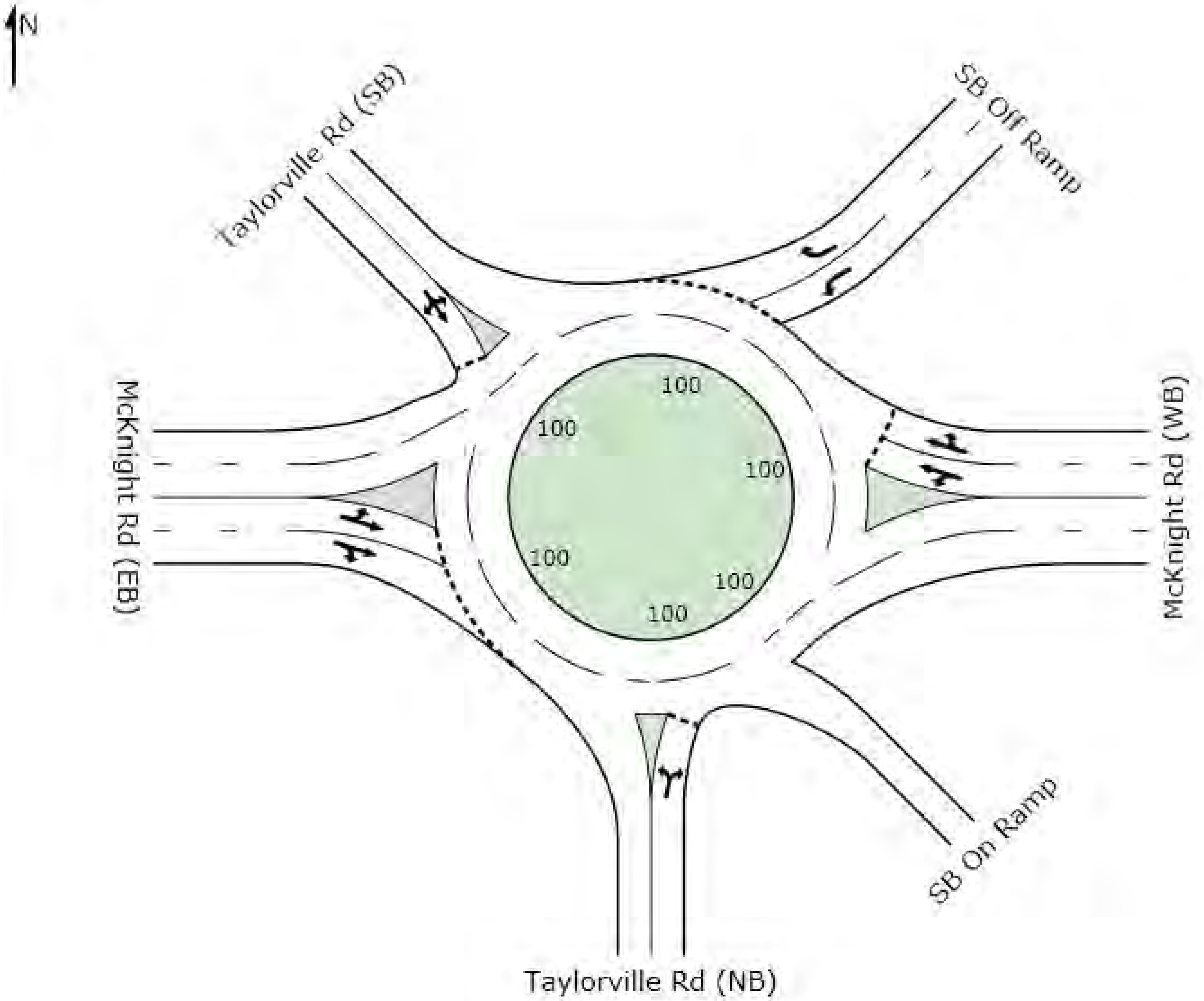


Scenario: **2035 No Project Conditions**
N/S Street: **SR-49**
E/W Street: **La Barr Road**



LEGEND

Diff. btw Model and TM	xx%
PM Model Volume	xx


N
Taylorville Rd (SB)
SB Off Ramp
McKnight Rd (EB)
McKnight Rd (WB)
100
100
100
100
100
100
SB On Ramp
Taylorville Rd (NB)

LANE SUMMARY

Site: 2035 PM

Southern Soi EIR- 2035 Background Conditions (PM Peak)
McKnight Way/Taylorville Road - McKnight Way/SR 49 SB Ramps
Roundabout

Lane Use and Performance

	Demand Flows L veh/h	Demand Flows T veh/h	Demand Flows R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Lane Length ft	SL Type	Cap. Adj. %	Prob. Block. %
South: Taylorville Rd (NB)																
Lane 1	2	0	36	38	1.9	385	0.099	100	10.9	LOS B	0.2	6.2	1600	–	0.0	0.0
Approach	2	0	36	38	1.9		0.099		10.9	LOS B	0.2	6.2				
East: McKnight Rd (WB)																
Lane 1	92	195	0	288	2.0	1508	0.191	100	3.9	LOS A	0.6	14.8	1600	–	0.0	0.0
Lane 2	0	148	139	287	2.0	1508	0.191	100	3.9	LOS A	0.5	13.8	1600	–	0.0	0.0
Approach	92	343	139	575	2.0		0.191		3.9	LOS A	0.6	14.8				
North East: SB Off Ramp																
Lane 1	517	0	0	517	2.0	733	0.706	100	19.3	LOS C	4.1	103.5	1600	–	0.0	0.0
Lane 2	0	0	503	503	2.0	712	0.707	100	19.8	LOS C	4.3	108.3	1600	–	0.0	0.0
Approach	517	0	503	1021	2.0		0.707		19.6	LOS C	4.3	108.3				
North West: Taylorville Rd (SB)																
Lane 1	1	1	10	12	2.0	433	0.028	100	8.7	LOS A	0.1	1.7	1600	–	0.0	0.0
Approach	1	1	10	12	2.0		0.028		8.7	LOS A	0.1	1.7				
West: McKnight Rd (EB)																
Lane 1	1	445	0	446	2.0	693	0.644	100	17.3	LOS C	3.4	85.9	1600	–	0.0	0.0
Lane 2	0	263	198	460	2.0	715	0.644	100	16.9	LOS C	3.2	82.5	1600	–	0.0	0.0
Approach	1	708	198	907	2.0		0.644		17.1	LOS C	3.4	85.9				
Intersection				2552	2.0		0.707		15.0	LOS B	4.3	108.3				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used.

Processed: Wednesday, August 14, 2013 10:27:16 PM
SIDRA INTERSECTION 5.1.5.2006

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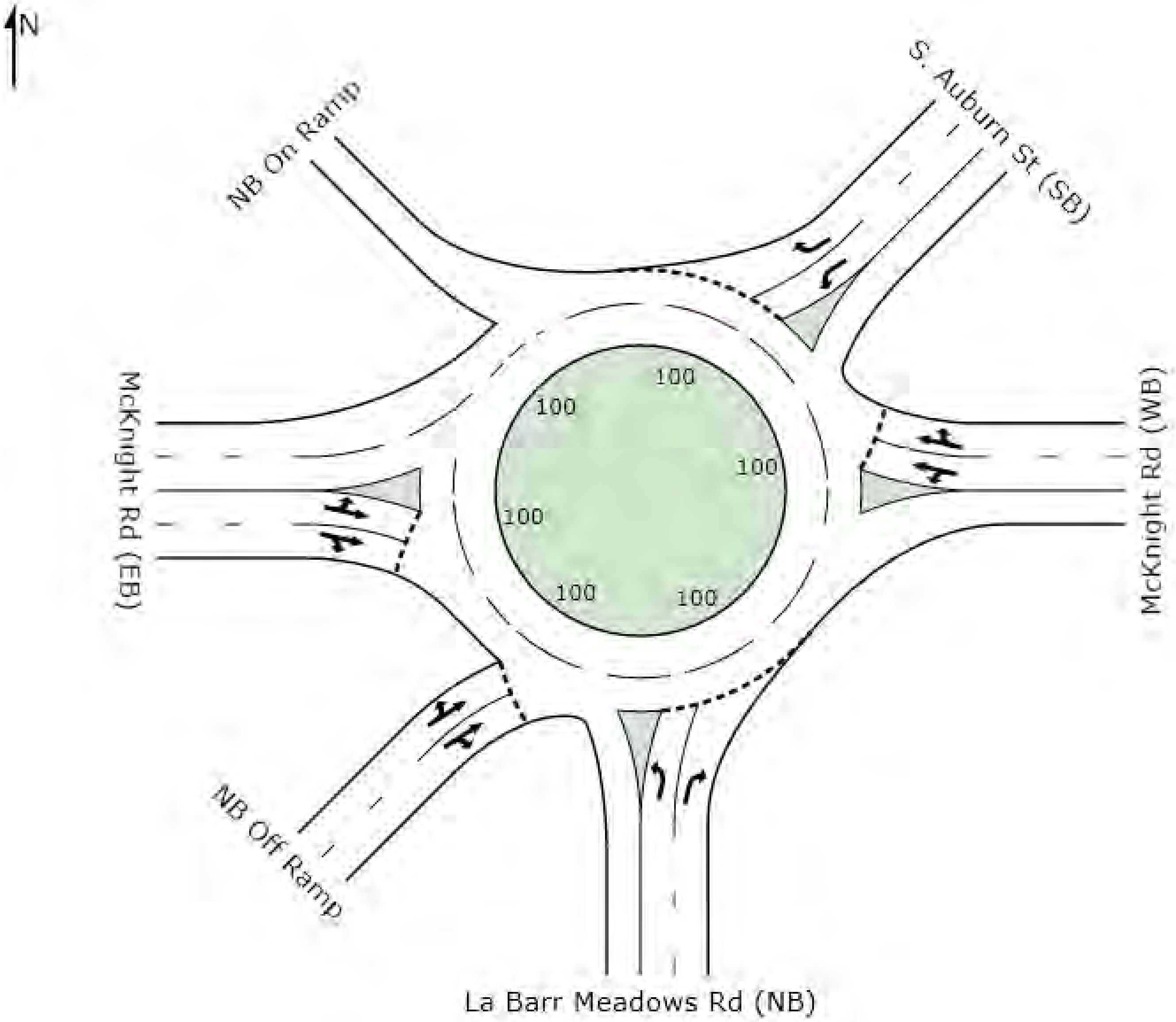
8000965, KIMLEY-HORN & ASSOCIATES INC, ENTERPRISE


N
NB On Ramp
S. Auburn St (SB)
McKnight Rd (EB)
McKnight Rd (WB)
NB Off Ramp
La Barr Meadows Rd (NB)
100
100
100
100
100
100

LANE SUMMARY

Site: 2035 PM

Southern Soi EIR- 2035 Background Conditions (PM Peak)
McKnight Way/La Barr Meadows Road - McKnight Way/SR 49 NB Ramps
Roundabout

Lane Use and Performance

	Demand Flows L veh/h	Demand Flows T veh/h	Demand Flows R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Lane Length ft	SL Type	Cap. Adj. %	Prob. Block. %
South: La Barr Meadows Rd (NB)																
Lane 1	376	0	0	376	2.0	590	0.637	100	19.4	LOS C	2.9	72.9	1600	–	0.0	0.0
Lane 2	0	0	137	137	2.0	564	0.243	100	9.6	LOS A	0.7	17.7	1600	–	0.0	0.0
Approach	376	0	137	513	2.0		0.637		16.8	LOS C	2.9	72.9				
East: McKnight Rd (WB)																
Lane 1	30	21	0	52	2.0	424	0.122	100	10.3	LOS B	0.3	8.1	1600	–	0.0	0.0
Lane 2	0	15	40	55	2.0	452	0.122	100	9.7	LOS A	0.3	7.8	1600	–	0.0	0.0
Approach	30	36	40	107	2.0		0.122		10.0	LOS A	0.3	8.1				
North East: S. Auburn St (SB)																
Lane 1	173	0	0	173	2.0	538	0.321	100	11.4	LOS B	1.0	25.4	1600	–	0.0	0.0
Lane 2	0	0	240	240	2.0	565	0.425	100	13.1	LOS B	1.4	36.5	1600	–	0.0	0.0
Approach	173	0	240	413	2.0		0.425		12.4	LOS B	1.4	36.5				
West: McKnight Rd (EB)																
Lane 1	568	101	0	670	2.0	1047	0.639	100	12.5	LOS B	3.6	91.7	1600	–	0.0	0.0
Lane 2	0	0	577	577	2.0	1024	0.564	88[5]	10.8	LOS B	2.8	70.0	1600	–	0.0	0.0
Approach	568	101	577	1247	2.0		0.639		11.7	LOS B	3.6	91.7				
South West: NB Off Ramp																
Lane 1	159	24	0	183	2.0	393	0.464	100	19.2	LOS C	1.5	37.8	1600	–	0.0	0.0
Lane 2	0	0	66	66	2.0	365	0.181	39[5]	12.9	LOS B	0.5	12.1	1600	–	0.0	0.0
Approach	159	24	66	249	2.0		0.464		17.5	LOS C	1.5	37.8				
Intersection				2528	2.0		0.639		13.3	LOS B	3.6	91.7				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used.

[5] Lane underutilisation determined by program

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SIDRA INTERSECTION 5.1.5.2006
Project: K:\SAC_TPTO\Grass Valley Bear River Mill EIR - 097521008\03 Analysis Files\Sidra\PM_McKnight-La Barr Meadows.sip
8000965, KIMLEY-HORN & ASSOCIATES INC, ENTERPRISE

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	44	5	25	20	4	29	40	963	34	66	1230	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.87		1.00	0.87		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1627		1770	1614		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1627		1770	1614		1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	48	5	27	22	4	32	43	1047	37	72	1337	92
RTOR Reduction (vph)	0	26	0	0	30	0	0	0	15	0	0	37
Lane Group Flow (vph)	48	6	0	22	6	0	43	1047	22	72	1337	55
Turn Type	Prot	NA		Prot	NA		Prot	NA	pm+ov	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases									2			6
Actuated Green, G (s)	3.8	3.2		4.2	3.6		3.4	35.9	40.1	6.9	39.4	39.4
Effective Green, g (s)	3.8	3.2		4.2	3.6		3.4	35.9	40.1	6.9	39.4	39.4
Actuated g/C Ratio	0.06	0.05		0.06	0.05		0.05	0.54	0.61	0.10	0.60	0.60
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	101	78		112	87		90	1919	1054	184	2106	942
v/s Ratio Prot	c0.03	c0.00		0.01	0.00		0.02	0.30	0.00	c0.04	c0.38	
v/s Ratio Perm									0.01			0.03
v/c Ratio	0.48	0.08		0.20	0.07		0.48	0.55	0.02	0.39	0.63	0.06
Uniform Delay, d1	30.2	30.1		29.4	29.7		30.5	9.8	5.2	27.7	8.7	5.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.5	0.4		0.9	0.3		4.0	0.3	0.0	1.4	0.6	0.0
Delay (s)	33.7	30.5		30.3	30.0		34.5	10.2	5.2	29.1	9.4	5.6
Level of Service	C	C		C	C		C	B	A	C	A	A
Approach Delay (s)		32.5			30.1			10.9			10.1	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	66.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	56.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Appendix E:

Analysis Worksheets for
Cumulative (2035) plus Proposed Project Conditions

LANE SUMMARY

Site: 2035+PP PM

Southern Soi EIR- 2035 Background Conditions (PM Peak) + Project
McKnight Way/Taylorville Road - McKnight Way/SR 49 SB Ramps
Roundabout

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Lane Length ft	SL Type	Cap. Adj. %	Prob. Block. %
South: Taylorville Rd (NB)																
Lane 1	2	0	68	71	1.9	362	0.195	100	13.3	LOS B	0.5	12.6	1600	–	0.0	0.0
Approach	2	0	68	71	1.9		0.195		13.3	LOS B	0.5	12.6				
East: McKnight Rd (WB)																
Lane 1	171	156	0	327	2.0	1515	0.216	100	4.1	LOS A	0.7	17.2	1600	–	0.0	0.0
Lane 2	0	188	139	327	2.0	1515	0.216	100	4.1	LOS A	0.6	16.1	1600	–	0.0	0.0
Approach	171	343	139	653	2.0		0.216		4.1	LOS A	0.7	17.2				
North East: SB Off Ramp																
Lane 1	558	0	0	558	2.0	693	0.804	100	27.0	LOS D	5.6	142.2	1600	–	0.0	0.0
Lane 2	0	0	503	503	2.0	670	0.751	100	23.5	LOS C	4.8	120.8	1600	–	0.0	0.0
Approach	558	0	503	1061	2.0		0.804		25.3	LOS D	5.6	142.2				
North West: Taylorville Rd (SB)																
Lane 1	1	1	10	12	2.0	398	0.030	100	9.5	LOS A	0.1	1.8	1600	–	0.0	0.0
Approach	1	1	10	12	2.0		0.030		9.5	LOS A	0.1	1.8				
West: McKnight Rd (EB)																
Lane 1	1	444	0	445	2.0	633	0.703	100	21.5	LOS C	3.9	98.7	1600	–	0.0	0.0
Lane 2	0	264	198	462	2.0	657	0.703	100	20.9	LOS C	3.8	95.3	1600	–	0.0	0.0
Approach	1	708	198	907	2.0		0.703		21.2	LOS C	3.9	98.7				
Intersection				2703	2.0		0.804		18.4	LOS C	5.6	142.2				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used.

LANE SUMMARY

Site: 2035+PP PM

Southern Soi EIR- 2035 Background Conditions (PM Peak) + Project
McKnight Way/La Barr Meadows Road - McKnight Way/SR 49 NB Ramps
Roundabout

Lane Use and Performance

	Demand Flows L veh/h	Demand Flows T veh/h	Demand Flows R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Lane Length ft	SL Type	Cap. Adj. %	Prob. Block. %
South: La Barr Meadows Rd (NB)																
Lane 1	540	0	0	540	2.0	577	0.937	100	49.9	LOS E	9.1	231.3	1600	–	0.0	0.0
Lane 2	0	0	277	277	2.0	551	0.503	100	15.5	LOS C	1.9	49.4	1600	–	0.0	0.0
Approach	540	0	277	817	2.0		0.937		38.2	LOS E	9.1	231.3				
East: McKnight Rd (WB)																
Lane 1	30	21	0	51	2.0	328	0.156	100	13.8	LOS B	0.4	10.2	1600	–	0.0	0.0
Lane 2	0	15	40	55	2.0	355	0.156	100	12.8	LOS B	0.4	9.9	1600	–	0.0	0.0
Approach	30	36	40	107	2.0		0.156		13.3	LOS B	0.4	10.2				
North East: S. Auburn St (SB)																
Lane 1	236	0	0	236	2.0	465	0.507	100	18.0	LOS C	1.9	47.3	1600	–	0.0	0.0
Lane 2	0	0	246	246	2.0	493	0.499	100	16.8	LOS C	1.8	44.6	1600	–	0.0	0.0
Approach	236	0	246	482	2.0		0.507		17.4	LOS C	1.9	47.3				
West: McKnight Rd (EB)																
Lane 1	601	101	0	702	2.0	985	0.713	100	15.7	LOS C	4.9	125.4	1600	–	0.0	0.0
Lane 2	0	0	590	590	2.0	957	0.617	87[5]	12.7	LOS B	3.5	89.2	1600	–	0.0	0.0
Approach	601	101	590	1292	2.0		0.713		14.3	LOS B	4.9	125.4				
South West: NB Off Ramp																
Lane 1	159	24	0	183	2.0	364	0.502	100	21.9	LOS C	1.6	41.3	1600	–	0.0	0.0
Lane 2	0	0	77	77	2.0	336	0.230	46[5]	15.0	LOS C	0.6	15.7	1600	–	0.0	0.0
Approach	159	24	77	260	2.0		0.502		19.9	LOS C	1.6	41.3				
Intersection				2958	2.0		0.937		21.9	LOS C	9.1	231.3				

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used.

[5] Lane underutilisation determined by program

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5: Hwy-49 & La Barr Meadows Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	44	5	25	54	4	29	40	1209	39	66	1730	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.87		1.00	0.87		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1627		1770	1614		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1627		1770	1614		1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	48	5	27	59	4	32	43	1314	42	72	1880	92
RTOR Reduction (vph)	0	25	0	0	31	0	0	0	13	0	0	30
Lane Group Flow (vph)	48	7	0	59	5	0	43	1314	29	72	1880	62
Turn Type	Prot	NA		Prot	NA		Prot	NA	pm+ov	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases									2			6
Actuated Green, G (s)	6.2	5.3		4.2	3.3		3.7	57.1	61.3	7.3	60.7	60.7
Effective Green, g (s)	6.2	5.3		4.2	3.3		3.7	57.1	61.3	7.3	60.7	60.7
Actuated g/C Ratio	0.07	0.06		0.05	0.04		0.04	0.64	0.68	0.08	0.68	0.68
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	122	95		82	59		72	2247	1149	143	2389	1068
v/s Ratio Prot	0.03	c0.00		c0.03	0.00		0.02	0.37	0.00	c0.04	c0.53	
v/s Ratio Perm									0.02			0.04
v/c Ratio	0.39	0.07		0.72	0.09		0.60	0.58	0.02	0.50	0.79	0.06
Uniform Delay, d1	40.1	40.0		42.3	41.8		42.4	9.5	4.6	39.6	10.1	4.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.1	0.3		25.9	0.6		12.6	0.4	0.0	2.8	1.8	0.0
Delay (s)	42.1	40.3		68.2	42.5		55.0	9.9	4.6	42.3	11.9	5.0
Level of Service	D	D		E	D		D	A	A	D	B	A
Approach Delay (s)		41.4			58.4			11.1			12.7	
Approach LOS		D			E			B			B	

Intersection Summary			
HCM 2000 Control Delay	13.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	89.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↰	↱↱	↰	↑↑	↱	↰	↑↑	↱
Volume (vph)	265	45	240	235	46	336	245	1004	33	48	1406	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		0.95	0.95	0.88	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.87		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1627		1681	1712	2787	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1627		1681	1712	2787	1770	3539	1583	1770	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	288	49	261	255	50	365	266	1091	36	52	1528	293
RTOR Reduction (vph)	0	162	0	0	0	89	0	0	13	0	0	122
Lane Group Flow (vph)	288	148	0	150	155	276	266	1091	23	52	1528	171
Turn Type	Split	NA		Split	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	4	4		8	8	1	5	2	8	1	6	4
Permitted Phases						8			2			6
Actuated Green, G (s)	17.0	17.0		13.7	13.7	21.0	15.0	53.7	67.4	7.3	46.0	63.0
Effective Green, g (s)	17.0	17.0		13.7	13.7	21.0	15.0	53.7	67.4	7.3	46.0	63.0
Actuated g/C Ratio	0.16	0.16		0.13	0.13	0.19	0.14	0.50	0.63	0.07	0.43	0.58
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	279	256		213	217	646	246	1764	990	119	1511	984
v/s Ratio Prot	c0.16	0.09		0.09	c0.09	0.03	c0.15	0.31	0.00	0.03	c0.43	0.03
v/s Ratio Perm						0.07			0.01			0.08
v/c Ratio	1.03	0.58		0.70	0.71	0.43	1.08	0.62	0.02	0.44	1.01	0.17
Uniform Delay, d1	45.4	42.0		45.1	45.1	38.1	46.4	19.6	7.6	48.2	30.9	10.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	62.5	3.2		10.1	10.6	0.5	80.7	0.7	0.0	2.6	26.0	0.1
Delay (s)	107.8	45.2		55.2	55.7	38.5	127.1	20.2	7.7	50.8	56.8	10.4
Level of Service	F	D		E	E	D	F	C	A	D	E	B
Approach Delay (s)		75.4			46.2			40.3			49.4	
Approach LOS		E			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	49.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	107.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	90.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			